Industry Canada Industrie Canada

NORTH AMERICAN LINKAGES

Opportunities And Challenges For Canada

June 20–22, 2001
Delta Bow Valley Hotel
Calgary, Alberta

Working Documents

LES LIENS EN AMÉRIQUE DU NORD

Occasions et défis pour le Canada

Du 20 au 22 juin 2001
Hôtel Delta Bow Valley
Calgary (Alberta)

Documents de travail

Canada

NORTH AMERICAN LINKAGES

Opportunities And Challenges For Canada

June 20-22, 2001
Delta Bow Valley Hotel
Calgary, Alberta

Working Documents

LES LIENS EN AMÉRIQUE DU NORD

Occasions et défis pour le Canada

Du 20 au 22 juin 2001
Hôtel Delta Bow Valley
Calgary (Alberta)

Documents de travail

INDUSTRY CANADA/INDUSTRIE CANADA
presents/présente
a conference on/une conférence sur

« North American Linkages: Opportunities and Challenges for Canada »
« Les Liens en Amérique du Nord: Occasions et Défis pour le Canada»

June 20-22, 2001/ Du 20 au 22 juin 2001
Delta Bow Valley Hotel/ Hôtel Delta Bow Valley
Calgary, Alberta/ Calgary (Alberta)

PROGRAM

DAY 1	Wednesday evening, June 20, 2001 / **JOUR 1** Mercredi soir, le 20 juin 2001
5:00-6:30	**Registration** (Foyer-Ballroom)/**Inscription** (Foyer-Salle de Bal)
5:30-6:30	**Reception (Cash Bar)** (Foyer-Ballroom)/**Réception (Bar payant)**(Foyer-Salle de Bal)
6:30-8:00	**Dinner** (Ballroom)/**Dîner** (Salle de Bal)
8:00	PANEL/DISCUSSION:**North American Linkages: Perspectives and Issues** **Les liens en Amérique du Nord : perspectives et enjeux** CHAIR/PRÉSIDENT: ***V. Peter Harder**, Deputy Minister/ Sous ministère, Industry Canada/Industrie Canada.* PANELISTS/PANÉLISTES: ***Robert Baldwin,** University of Wisconsin* ***Wendy Dobson**, University of Toronto* ***Andrew Jackson**, Canadian Council of Social Development* ***Kenneth Norrie**, University of Alberta.*
DAY 2	Thursday, June 21, 2001 (Ballroom) / **JOUR 2** - Jeudi, le 21 juin 2001 (Salle de bal)
7:45-8:40	Registration, coffee and muffins/Inscription, café et muffins
8:40	**Opening Remarks/Mots de Bienvenue** ***V. Peter Harder**, Deputy Minister/ Sous ministère, Industry Canada/Industrie Canada* ***Richard Harris**, Simon Fraser University.*
9:00-11:00	**Session 1/Séance n° 1** **North American Economic Linkages: Empirical Evidence** **Les liens économiques en Amérique du Nord : donneés empiriques** CHAIR/PRÉSIDENT: ***John Curtis**, Department of Foreign Affairs and International Trade/Ministère des affaires étrangères et du commerce international.* PAPERS/DOCUMENTS: 1. Canada's Trade and Foreign Direct Investment Patterns with the United States, ***Ram Acharya, Prakash Sharma** and **Someshwar Rao**, Micro-Economic Policy Analysis Branch, Industry Canada/Direction générale de l'analyse de la politique micro-économique, Industrie Canada.*

2. Comparative Advantage and Trade in North America: A Sectoral Analysis, ***Lawrence Schembri** and **Mykyta Vesselovsky**, Carleton University.*
3. Cities, Regions and North American Integration, ***Pierre-Paul Proulx**, Université de Montréal.*

DISCUSSANTS/PARTICIPANTS:

***Daniel Schwanen**, Institute for Research on Public Policy*

***Keith Head**, University of British Columbia.*

11:00-11:15 Coffee Break /Pause

11:15-12:45 **Session 2/Séance N° 2**

Role of Trade and Labour Mobility for Canada's Economic Performance
Le rôle du commerce et de la mobilité de la main-d'oeuvre dans la performance économique du Canada

CHAIR/PRÉSIDENT: ***Renée St-Jacques**, Micro-Economic Policy Analysis Branch, Industry Canada / Renée St-Jacques, Direction générale de l'analyse de la politique micro-économique, Industrie Canada.*

PAPERS/DOCUMENTS:

1. Free Trade and Canadian Economic Performance: Which Theories Does the Evidence Support?, ***Keith Head** and **John Ries**, University of British Columbia.*
2. The Consequences of Increased Labour Mobility within an Integrating North America, ***Richard G. Harris** and **Nicolas Schmitt**, Simon Fraser University.*

DISCUSSANT/PARTICIPANT:

***Eugene Beaulieu**,* University of Calgary.

12:45-2:30 Luncheon (Ballroom) / Déjeuner (Salle de bal)

Canadians' Views on Growing Linkages Among the NAFTA Partners

L'opinion des Canadiens sur l'accroissement des liens entre les partenaires de l'ALENA

SPEAKER/CONFÉRENCIER INVITÉ: ***Frank Graves**, EKOS Research Associates Inc.*

2:45-4:15 **Session 3/Séance n° 3**

Human Capital Mobility/Mobilité du capital humain

CHAIR/PRÉSIDENT: ***Richard Roy**, Human Resources and Development Canada /Développement des ressources humaines Canada.*

PAPERS/DOCUMENTS:

1. Canada-U.S. Integration and Labour Market Outcomes: A Perspective within the General Context of Globalization, ***Paul Beaudry** and **David Green**, University of British Columbia.*
2. Tax Treatment of Human Capital in Canada and the United States: An Overview and Examination of the Case of University Graduates, ***James B. Davies**, University of Toronto; and **Kirk Collins**, University of Ottawa.*

ETRs

DISCUSSANT/PARTICIPANTE:

***Alice Nakamura**, University of Alberta.*

4:15-4:30 Coffee Break / Pause

4:30-6:00 **Session 4/Séance n° 4**

Foreign Direct Investment and Corporate Taxation/L'Investissement direct étrangères et la fiscalité des entreprises

CHAIR/PRÉSIDENT: ***Serge Nadeau**, Finance Canada/Finances Canada*

Papers/Documents:

1. Assessing Recent Patterns of Foreign Direct Investment in Canada and the United States, ***Steven Globerman**, Western Washington University; and **Daniel Shapiro**, Simon Fraser University.*
2. Economic Integration: Implications for Business Taxation, ***Bev Dahlby**, University of Alberta*

DISCUSSANT/PARTICIPANT:

***Kenneth J. McKenzie**, University of Calgary.*

6:00-7:00 Cash Bar/18 h - 19 h Bar payant

7:00 **Dinner** (Garden Patio)/19 h **Dîner** (Terrasse du jardin)

Policy Challenges of North American Linkages

KEYNOTE SPEAKER/CONFÉRENCIER D'HONNEUR AU DÎNER:
***David Zussman**, Public Policy Forum.*

DAY 3 Friday, June 22, 2001 (Ballroom) / **JOUR 3** Vendredi, le 22 juin 2001 (Salle de bal)

8:00-8:45 Coffee and muffins/Café et muffins

8:45-10:15 **Session 5/Séance n° 5**

Deepening the Linkages/L'accroissement des liens

CHAIR/PRÉSIDENT: ~~***Laura Chapman**, Policy Research Secretariat / Secrétariat de la recherche sur les politique*~~

PAPERS/DOCUMENTS:

1. Canada, the United States, and Deepening Economic Integration: Next Steps, ~~***Michael Hart**, Carleton University.*~~
2. Impacts on NAFTA Members of Multilateral and Regional Trading Arrangements and Initiatives and Harmonization of NAFTA's External Tariffs, ***Drusilla K. Brown, Allen V. Deardorff** and **Robert M. Stern**, University of Michigan.*

DISCUSSANT/PARTICIPANT:

***Randy Wigle**, Wilfrid Laurier University.*

10:15-10:30 Coffee Break / Pause

10:30-12:00 **Session 6 / Séance n° 6**

Socio-Environmental Issues/Questions socio-environnementales

CHAIR/PRÉSIDENT: ***Valerie Clements**, Human Resources Development Canada /Développement des ressources humaines Canada.*

PAPERS/DOCUMENTS:

1. Converging and Diverging Paradoxes: National and Sub-National Variation in Income Maintenance Programs in Canada and the United States, ***Keith G. Banting**, Queen's University, and **Gerard W. Boychuk**, University of Waterloo.*
2. North American Integration and the Environment, ***Nancy Olewiler**, Simon Fraser University.*

DISCUSSANT/PARTICIPANT:

***James Gaisford**, University of Calgary.*

12:00-1:45 **Luncheon** (Ballroom)/**Déjeuner** (Salle de bal)

U.S. Perspectives on North American Linkages.

SPEAKER/CONFÉRENCIER: ***Christopher Sands**, Center for Strategic and International Studies.*

1:45-3:15 **Session 7/Séance n° 7**

Macro-Economic Linkages / Les liens macro-économiques

CHAIR/PRÉSIDENT: ***Bruce Montador**, Finance Canada / Finances Canada.*

PAPERS/DOCUMENTS:

1. The Pros and Cons of North American Monetary Integration, ***Sven Arndt**, Claremont College, California.*
2. Mexico's and Canada's Changing Trade Specializations with the United States, ***Aaron Sydor**, and **Gary Sawchuk**, Industry Canada/Industrie Canada.*

DISCUSSANTS/PARTICIPANTS:

***John Murray**, Bank of Canada / Banque du Canada*

***Eduardo Martinez Curriel**, Embassy of Mexico.*

3:15-3:30 Coffee 3:15-3:30 Break/Pause

3:30-5:00 **Session 8/Séance n° 8**

Framework Policies / Politiques cadres

CHAIR/PRÉSIDENT: ***Val Traversy**, Industry Canada/Industrie Canada*

PAPERS/DOCUMENTS:

1. Competition Policy and Intellectual Property: Issues of North American Integration, ***Roger Ware**, Queen's University.*
2. Can NAFTA Forgo A Global Approach to Internet and Governance?, ***Catherine Mann**, Institute of International Economics.*

DISCUSSANT/PARTICIPANT: ***Steven Globerman**, Western Washington University.*

5:00-5:30 **Rapporteur's Report/Compte rendu du rapporteur**

***Andrew Sharpe**, Center for the Study of Living Standards.*

5:30-5:45 **Closing Remarks/Mot de la fin**

***Richard Harris**, Simon Fraser University*

***Renée St-Jacques**, Micro-Economic Policy Analysis Branch, Industry Canada/ Direction générale de l'analyse de la politique micro-économique, Industrie Canada.*

Industry Canada Industrie Canada

Deputy Minister Sous-ministre

Ottawa, Canada
K1A 0H5

June 20, 2001

Dear Participants:

I am delighted to welcome you to our conference on "North American Linkages: Opportunities and Challenges for Canada" here in Calgary.

Globalization continues to link the economies of all three North American partners into the world economy and also creates new opportunities and some unique challenges world wide. Certainly the issues are many, impacting on all areas and levels of government.

This conference is part of Industry Canada's ongoing work on North American linkages. The seventeen papers commissioned for this conference will allow us to better understand the opportunities, pressures and challenges of deepening North American linkages and provide sound foundations for policy development work.

We feel we have put together a stimulating program, with many of North America's renowned economists and researchers presenting papers and speaking at the conference. We wish you an exciting and fruitful conference.

Sincerely yours,

V. Peter Harder

Canada

Industry Canada Industrie Canada
Deputy Minister Sous-ministre

Ottawa, Canada
K1A 0H5

Le 20 juin 2001

Madame (Monsieur),

Je suis très heureux de vous accueillir à la conférence intitulée « Les liens en Amérique du Nord : occasions et défis pour le Canada » ici même à Calgary.

La mondialisation, qui poursuit son intégration économique des trois partenaires nord-américains à l'économie mondiale, offre des occasions nouvelles et des défis extraordinaires, et ce, à l'échelle planétaire. De toute évidence, les enjeux sont nombreux, et ils ont une incidence sur les activités des administrations publiques de tous ordres.

Cette conférence fait partie intégrante du travail d'Industrie Canada sur les liens en Amérique du Nord. Les 17 documents qui ont été commandés en vue de cette conférence nous permettront de mieux comprendre les occasions, les pressions et les défis que représentent l'accroissement des liens en Amérique du Nord, et ils constitueront une mine de précieux renseignements pour l'élaboration des politiques.

Nous sommes persuadés que le programme de la conférence saura vous intéresser, car nous avons invité de nombreux économistes et chercheurs réputés de l'Amérique du Nord à venir présenter un document ou faire un exposé. Nous espérons que cette conférence sera pour vous une expérience stimulante et enrichissante.

Veuillez agréer, Madame (Monsieur), l'expression de mes sentiments distingués.

Le sous-ministre,

V. Peter Harder

Canada

Industry Canada Conference on North American Linkages: Opportunities and Challenges for Canada

Les Liens en Amérique du Nord: Occasions et Défis pour le Canada

WORKING DOCUMENTS/DOCUMENTS DE TRAVAIL

Table of Contents

TAB

Notes

INDUSTRY CANADA/INDUSTRIE CANADA
presents/présente
a conference on/une conférence sur

« North American Linkages: Opportunities and Challenges for Canada »
« Les Liens en Amérique du Nord: Occasions et Défis pour le Canada»

June 20-22, 2001/ Du 20 au 22 juin 2001
Delta Bow Valley Hotel/ Hôtel Delta Bow Valley
Calgary, Alberta/ Calgary (Alberta)

PROGRAM

DAY 1 Wednesday evening, June 20, 2001 / **JOUR 1** Mercredi soir, le 20 juin 2001

5:00-6:30 **Registration** (Foyer-Ballroom)/**Inscription** (Foyer-Salle de Bal)

5:30-6:30 **Reception (Cash Bar)** (Foyer-Ballroom)/**Réception (Bar payant)**(Foyer-Salle de Bal)

6:30-8:00 **Dinner** (Ballroom)/**Dîner** (Salle de Bal)

8:00 PANEL/DISCUSSION:**North American Linkages: Perspectives and Issues**
Les liens en Amérique du Nord : perspectives et enjeux

CHAIR/PRÉSIDENT: ***V. Peter Harder,*** *Deputy Minister/ Sous ministère, Industry Canada/Industrie Canada.*

PANELISTS/PANÉLISTES:

Robert Baldwin, *University of Wisconsin*
Wendy Dobson, *University of Toronto*
Andrew Jackson, *Canadian Council of Social Development*
Kenneth Norrie, *University of Alberta.*

DAY 2 Thursday, June 21, 2001 (Ballroom) / **JOUR 2** - Jeudi, le 21 juin 2001 (Salle de bal)

7:45-8:40 Registration, coffee and muffins/Inscription, café et muffins

8:40 **Opening Remarks/Mots de Bienvenue**

V. Peter Harder, *Deputy Minister/ Sous ministère, Industry Canada/Industrie Canada*

Richard Harris, *Simon Fraser University.*

9:00-11:00 **Session 1/Séance n° 1**

North American Economic Linkages: Empirical Evidence
Les liens économiques en Amérique du Nord : donneés empiriques

CHAIR/PRÉSIDENT: ***John Curtis,*** *Department of Foreign Affairs and International Trade/Ministère des affaires étrangères et du commerce international.*

PAPERS/DOCUMENTS:

1. Canada's Trade and Foreign Direct Investment Patterns with the United States, ***Ram Acharya, Prakash Sharma*** *and* ***Someshwar Rao,*** *Micro-Economic Policy Analysis Branch, Industry Canada/Direction générale de l'analyse de la politique micro-économique, Industrie Canada.*

2. Comparative Advantage and Trade in North America: A Sectoral Analysis, ***Lawrence Schembri*** *and* ***Mykyta Vesselovsky****, Carleton University.*
3. Cities, Regions and North American Integration, ***Pierre-Paul Proulx****, Université de Montréal.*

DISCUSSANTS/PARTICIPANTS:

Daniel Schwanen*, Institute for Research on Public Policy*

Keith Head*, University of British Columbia.*

11:00-11:15 Coffee Break /Pause

11:15-12:45 **Session 2/Séance N° 2**

Role of Trade and Labour Mobility for Canada's Economic Performance
Le rôle du commerce et de la mobilité de la main-d'oeuvre dans la performance économique du Canada

CHAIR/PRÉSIDENT: ***Renée St-Jacques,*** *Micro-Economic Policy Analysis Branch, Industry Canada / Renée St-Jacques, Direction générale de l'analyse de la politique micro-économique, Industrie Canada.*

PAPERS/DOCUMENTS:

1. Free Trade and Canadian Economic Performance: Which Theories Does the Evidence Support?, ***Keith Head*** *and* ***John Ries****, University of British Columbia.*
2. The Consequences of Increased Labour Mobility within an Integrating North America, ***Richard G. Harris*** *and* ***Nicolas Schmitt****, Simon Fraser University.*

DISCUSSANT/PARTICIPANT:

Eugene Beaulieu*,* University of Calgary.

12:45-2:30 Luncheon (Ballroom) / Déjeuner (Salle de bal)

Canadians' Views on Growing Linkages Among the NAFTA Partners

L'opinion des Canadiens sur l'accroissement des liens entre les partenaires de l'ALENA

SPEAKER/CONFÉRENCIER INVITÉ: ***Frank Graves****, EKOS Research Associates Inc.*

2:45-4:15 **Session 3/Séance n° 3**

Human Capital Mobility/Mobilité du capital humain

CHAIR/PRÉSIDENT: ***Richard Roy****, Human Resources and Development Canada /Développement des ressources humaines Canada.*

PAPERS/DOCUMENTS:

1. Canada-U.S. Integration and Labour Market Outcomes: A Perspective within the General Context of Globalization, ***Paul Beaudry*** *and* ***David Green****, University of British Columbia.*
2. Tax Treatment of Human Capital in Canada and the United States: An Overview and Examination of the Case of University Graduates, ***James B. Davies****, University of Toronto; and* ***Kirk Collins****, University of Ottawa.*

DISCUSSANT/PARTICIPANTE:

Alice Nakamura*, University of Alberta.*

4:15-4:30 Coffee Break / Pause

4:30-6:00 **Session 4/Séance n° 4**

Foreign Direct Investment and Corporate Taxation/L'Investissement direct étrangères et la fiscalité des entreprises

CHAIR/PRÉSIDENT: ***Serge Nadeau**, Finance Canada/Finances Canada*

Papers/Documents:

1. Assessing Recent Patterns of Foreign Direct Investment in Canada and the United States, ***Steven Globerman**, Western Washington University; and **Daniel Shapiro**, Simon Fraser University.*
2. Economic Integration: Implications for Business Taxation, ***Bev Dahlby**, University of Alberta*

DISCUSSANT/PARTICIPANT:

***Kenneth J. McKenzie**, University of Calgary.*

6:00-7:00 Cash Bar/18 h - 19 h Bar payant

7:00 **Dinner** (Garden Patio)/19 h **Dîner** (Terrasse du jardin)

Policy Challenges of North American Linkages

KEYNOTE SPEAKER/CONFÉRENCIER D'HONNEUR AU DÎNER:

***David Zussman**, Public Policy Forum.*

DAY 3 Friday, June 22, 2001 (Ballroom) / **JOUR 3** Vendredi, le 22 juin 2001 (Salle de bal)

8:00-8:45 Coffee and muffins/Café et muffins

8:45-10:15` **Session 5/Séance n° 5**

Deepening the Linkages/L'accroissement des liens

CHAIR/PRÉSIDENT: ***Laura Chapman**, Policy Research Secretariat / Secrétariat de la recherche sur les politique*

PAPERS/DOCUMENTS:

1. Canada, the United States, and Deepening Economic Integration: Next Steps, ***Michael Hart**, Carleton University.*
2. Impacts on NAFTA Members of Multilateral and Regional Trading Arrangements and Initiatives and Harmonization of NAFTA's External Tariffs, ***Drusilla K. Brown, Allen V. Deardorff** and **Robert M. Stern**, University of Michigan.*

DISCUSSANT/PARTICIPANT:

***Randy Wigle**, Wilfrid Laurier University.*

10:15-10:30 Coffee Break / Pause

10:30-12:00 **Session 6 / Séance n° 6**

Socio-Environmental Issues/Questions socio-environnementales

CHAIR/PRÉSIDENT: ***Valerie Clements**, Human Resources Development Canada /Développement des ressources humaines Canada.*

PAPERS/DOCUMENTS:

1. Converging and Diverging Paradoxes: National and Sub-National Variation in Income Maintenance Programs in Canada and the United States, ***Keith G. Banting**, Queen's University, and **Gerard W. Boychuk**, University of Waterloo.*
2. North American Integration and the Environment, ***Nancy Olewiler**, Simon Fraser University.*

DISCUSSANT/PARTICIPANT:

***James Gaisford**, University of Calgary.*

12:00-1:45 **Luncheon** (Ballroom)/**Déjeuner** (Salle de bal)

U.S. Perspectives on North American Linkages.

SPEAKER/CONFÉRENCIER: ***Christopher Sands**, Center for Strategic and International Studies.*

1:45-3:15 **Session 7/Séance n° 7**

Macro-Economic Linkages / Les liens macro-économiques

CHAIR/PRÉSIDENT: ***Bruce Montador**, Finance Canada / Finances Canada.*

PAPERS/DOCUMENTS:

1. The Pros and Cons of North American Monetary Integration, ***Sven Arndt**, Claremont College, California.*
2. Mexico's and Canada's Changing Trade Specializations with the United States, ***Aaron Sydor**, and **Gary Sawchuk**, Industry Canada/Industrie Canada.*

DISCUSSANTS/PARTICIPANTS:

***John Murray**, Bank of Canada / Banque du Canada*

***Eduardo Martinez Curriel**, Embassy of Mexico.*

3:15-3:30 Coffee 3:15-3:30 Break/Pause

3:30-5:00 **Session 8/Séance n° 8**

Framework Policies / Politiques cadres

CHAIR/PRÉSIDENT: ***Val Traversy**, Industry Canada/Industrie Canada*

PAPERS/DOCUMENTS:

1. Competition Policy and Intellectual Property: Issues of North American Integration, ***Roger Ware**, Queen's University.*
2. Can NAFTA Forgo A Global Approach to Internet and Governance?, ***Catherine Mann**, Institute of International Economics.*

DISCUSSANT/PARTICIPANT: ***Steven Globerman**, Western Washington University.*

5:00-5:30 **Rapporteur's Report/Compte rendu du rapporteur**

***Andrew Sharpe**, Center for the Study of Living Standards.*

5:30-5:45 **Closing Remarks/Mot de la fin**

***Richard Harris**, Simon Fraser University*

***Renée St-Jacques**, Micro-Economic Policy Analysis Branch, Industry Canada/ Direction générale de l'analyse de la politique micro-économique, Industrie Canada.*

Notes

Participants in Industry Canada Conference June 20-22, 2001Delta Bow Valley Hotel-Calgary, Alberta
North American Linkages: Opportunities and Challenges for Canada

	First Name	Last Name	Position	Organization
1	Ram	Acharya***	Economist, Micro-Economic Policy Analysis Branch	Industry Canada
2	David C.	Adams	Vice-President, Policy	Canadian Vehicle Manufacturers' Association
3	Gwill	Allen	Assistant Deputy Commissioner of Competition, Competition Bureau	Industry Canada
4	Doug	Anderson	Special Advisor, International Trade Policy Division	Finance Canada
5	John	Appleby	Economist	Industry Canada
6	Sven	Arndt****	Director of the Lowe Institute of Political Economy	Claremont College, California
7	Philipe	Aubé	Senior Economist	Industry Canada
8	Shaun	Augustin	Economist	Saskatchewan Finance
9	Robert	Baldwin**	Hilldale Professor of Economics	University of Wisconsin
10	Louis	Balthazar	Professeur émérite, Science Politique	Université Laval
11	Rishi	Basak	Environmental Economist, Regulatory & Economic Analysis Branch	Environment Canada
12	Eugene	Beaulieu***	Assistant Professor, Department of Economics	University of Calgary
13	Eric	Bélair		Policy Research Initiative
14	Sam	Boutziouvis	Vice President, International Trade & Global Economics	Business Council on National Issues
15	Gerald W.	Boychuk***	Assistant Professor, Department of Political Science	University of Waterloo
16	Jason	Brisbois	Chief Economist	Western Economic Diversification
17	Denise	Brown	Director, Latin American Studies Program	University of Calgary
18	Joel	Bruneau	Department of Economics	University of Saskachewan
19	Norman	Cameron	Professor, Department of Economics	University of Manitoba
20	Mingtao	Chen	Policy Research Analyst	Foreign Affairs and International Trade
21	Valerie	Clements*	Director General, Strategy and Coordination	Human Resources and Development Canada
22	Kirk	Collins***	Ph.D Candidate, Department of Economics	University of Ottawa
23	David	Crane	Economics Editor	Toronto Star
24	Douglas	Crighton	Business Analyst	City of Medicine Hat

Chair* Panelist/Speaker Paper Giver*** Discussant****

25	Eduardo	Curiel****	Minister, Deputy Head of Mission	Embassy of Mexico

26	John	Curtis*	Senior Policy Advisor	Foreign Affairs and International Trade
27	Bev	Dahlby***	Professor of Economics	University of Alberta
28	Luciano	Dalla-Longa	General Manager, Business Development & Marketing	City of Medicine Hat
29	James B.	Davies***	Chair, Dept. of Economics	University of Western Ontario
30	Barry	Davis	Trade and Economic Analysis, US Bureau	Foreign Affairs and International Trade Canada
31	Lloyd	Deane	Policy Analyst, Economic Framework Policies	Industry Canada
32	Wendy	Dobson**	Director, Institute for International Business, Rotman School of Management	University of Toronto
33	Edwin	Dreessen	Manager, Research, Small Business Policy Branch	Industry Canada
34	Andrea	Duncan	Senior Analyst	Industry Canada, Prairie & Northern Region
35	Dwight	Duthie	Assistant Director of Innovation	Natural Resources Canada
36	John	Fisher	Policy Analyst, Regulatory Affairs and Standards Policy	Industry Canada
37	Nicolas	Forsans	Lecturer in International Business & Strategic Management, Centre for International Business	University of Leeds
38	Fraser	Fowler	Policy Analyst	Investment Partnerships Canada
39	Gilbert	Gagné	Professeur, Science Politique	Université d'Ottawa
40	James	Gaisford****	Department of Economics	University of Calgary
41	Yvan	Gervais	Co-ordinator, Research and Analysis Projects	Statistics Canada
42	Malcolm	Gibb	Research Consultant	Canadian Heritage
43	Steven	Globerman***	Ross Distinguished Professor of Canada-United States Business and Economics Relations	Western Washington University
44	Frank	Graves**	President	EKOS Research Associates, Inc.
45	David	Green***	Associate Professor of Economics	University of British Columbia
46	Charles	Hall	Sector Development Officer	Industry Canada
47	V. Peter	Harder**	Deputy Minister	Industry Canada
48	Richard	Harris**	B.C. Telephone Professor of Economics	Simon Fraser University
49	Michael	Hart***	Professor of International Affairs	Carleton University
50	Keith	Head*****	Associate Professor in Asian Commerce Strategy	University of British Columbia

Chair* Panelist/Speaker Paper Giver*** Discussant****

51	Annette	Hester	Director, Latin American Research Centre.	University of Calgary
52	Margaret	Hill		Policy Research Initiative

53	Todd	Hirsch	Economist	Bank of Canada
54	Doug	Hostland	Chief, Economic Studies and Policy Analysis Division	Finance Canada
55	Philip	Howell	Assistant Deputy Minister, Office of Economic Policy	Ontario Ministry of Finance
56	Dave	Jackson	Policy Analyst	Saskatchewan Highways & Transportation
57	Andrew	Jackson**	Director of Research	Canadian Council on Social Development
58	Miodrag	Jovanovic	Senior Policy Analyst, Micro-Economic Policy Analysis Branch	Industry Canada
59	Phaedra	Kaptein-Russell	Economist, Micro-Economic Policy Analysis Branch	Industry Canada
60	Mark J.	Kasoff	Director, Canadian Studies Centre	Bowling Green State University
61	Thomas	Klier	Senior Economist, Research Department	Federal Reserve Bank of Chicago
62	Peter	Larson	Executive Vice-President	Public Policy Forum
63	Alfred	Leblanc*	Editor ISUMA, Acting Director of Dissemination	Policy Research Initiative
64	Raynald	Létourneau	Senior Economist, Micro-Economic Policy Analysis Branch	Industry Canada
65	Brenda	Lipsett	Senior Policy Advisor, Strategy and Coordination	Human Resources Development Canada
66	David C.	MacDonald	Director General, Strategic Policy	Human Resources Development Canada
67	Catherine	Mann****	Senior Fellow	Institute of International Economics
68	Derek	McCall	Policy Analyst, Policy Division	Health Canada
69	Heather	McGregor	Policy Analyst, Strategic Policy	Industry Canada
70	Simon	McInnes	Director, International Cooperation	Industry Canada Int'l – 05-C
71	Kenneth J.	McKenzie****	Associate Professor of Economics	University of Calgary
72	Emily	McLaughlin	Political Officer (Mexico Division)	Foreign Affairs and International Trade
73	Des	McManus	Regional Economist	Bank of Canada
74	David G.	Moloney	Assistant Secretary, Liaison Secretariat for Microeconomic Policy	Privy Council Office
75	Bruce	Montador*	General Director, International Trade and Finance Branch	Finance Canada
76	John	Morin	Director, Planning, Analysis & Communications	Industry Canada, Prairie & Northern Region

Chair* **Panelist/Speaker**** **Paper Giver***** **Discussant******

77	John	Murray****	Adviser to the Governor	Bank of Canada
78	Serge	Nadeau*	Director, Personel Income Tax Division	Finance Canada
79	Alice	Nakamura****	Winspear Professor of Business	University of Alberta
80	Gil	Nault	Manager, Economics & Forecasting	ATCO Electric

81	Kenneth	Norrie**	Dean of Arts	University of Alberta
82	Nancy	Olewiler***	Professor of Economics	Simon Fraser University
83	Tim	Olsen	Alberta Regional Manager	Canadian Commercial Coorporation
84	Paul	Osborne	Assistant Deputy Minister, Trade and International Relations	Government of Saskatchewan
85	Garnett	Picot	Director General, Business & Labour Market Analysis Division	Statistics Canada
86	Anne	Pigeon	Senior Policy Analyst	Industry Canada
87	Stephen S.	Poloz	V.P. and Chief Economist	Export Development Corporation
88	Brant	Popp	Director	Western Economic Diversification
89	Douglas J.	Porter	Senior Economist and Vice-President	BMO Nesbitt Burns
90	Pierre-Paul	Proulx***	Professeur Honoraire	Université de Montréal
91	Someshwar	Rao***	Director, Strategic Investment Analysis Division, Micro-Economic Policy Analysis Branch	Industry Canada
92	Art	Ridgeway	Director Balance of Payments Division	Statistics Canada
93	John	Ries***	Associate Professor, Faculty of Commerce and Business Administration	University of British Columbia
94	Richard	Roy*	Special Advisor, Applied Research Branch	Human Resources and Development Canada
95	Jane	Sadler	Senior Contribution Consultant	Millennium Bureau of Canada
96	Iain	Sandford	Second Secretary	New Zealand High Commission
97	Christopher	Sands**	Director, Canada Project	Centre for Strategic and International Studies
98	Eric	Sanscartier	Economiste, Affaires intergouvernementales, Politiques stratégiques et research	Bureau du Conseil privé
99	Gary	Sawchuk***	Senior Economist, Micro-Economic Policy Analysis Branch	Industry Canada
100	Lawrence	Schembri***	Department of Economics	Carleton University
101	Al	Schulz	Regional Director, Alberta	Canadian Chemical Producers Association

Chair* **Panelist/Speaker**** **Paper Giver***** **Discussant******

102	Daniel	Schwanen****	Senior Economist	Institute for Research on Public Policy
103	Daniel	Shapiro***	Associate Dean, Faculty of Business Administration	Simon Fraser University
104	Prakash	Sharma***	Senior Research Coordinator, Micro-Economic Policy Analysis Branch	Industry Canada
105	Andrew	Sharpe**	Executive Director	Centre for the Study of Living Standards

106	Kendra	Shaw	Policy Analyst, Strategic Policy	Human Resources Development Canada
107	Doug	Simmons	Senior Policy Advisor	Industry Canada
108	Robert M.	Stern***	Professor of Economics and Public Policy	University of Michigan
109	Renée	St-Jacques*	Director General, Micro-Economic Policy Analysis Branch	Industry Canada
110	Nick	Strizzi	Research Analyst	Canadian Tourism Commission
111	Greg	Sweet	Coordinator	Policy Research Secretariat
112	Pawel	Swisterski	Analyst, Office of Budget and Management	Alberta Finance
113	Aaron	Sydor***	Economist, Micro-Economic Policy Analysis Branch	Industry Canada
114	Antonella	Tarantino	Policy Advisor	Foreign Affairs and International Trade
115	Margaret R.	Thibault	Team Leader, Contribution Management	Millennium Bureau of Canada
116	Henry	Thomassen	Economic Advisor, Office of the Governor	State of Georgia
117	Harold	Thomson	Planning Coordinator, Trades and Mines	Manitoba Industry
118	Valerie	Traversy*	Director General, Industrial Analysis and Strategies	Industry Canada
119	Roger	Ware***	Professor of Economics	Queen's University
120	Randy	Wigle****	Professor of Economics	Wilfred Laurier University
121	Shane	Williamson	Director, Micro-Economic Policy Analysis Branch	Industry Canada
122	George	Woods	Senior Policy Advisor	Investment Partnerships Canada
123	David	Zussman**	President	Public Policy Forum

Chair* Panelist/Speaker Paper Giver*** Discussant****

Notes

Biographical Sketches of Participants in the Industry Canada Conference on North American Linkages, Calgary, Alberta, June 20-22, 2001

Ram Acharya is a senior economist in the Micro-Economic Policy Analysis branch of Industry Canada, where he has conducted research on pre- and post-merger performance of Canadian firms and on Canada-U.S. economic integration regarding trade and investment. He was a policy analyst at the Department of Foreign Affairs and International Trade, where he conducted research on Canada-U.S. regional market integration, and analysis of international trade and investment performance in Canada. He received his Ph.D. in economics from the University of Ottawa in 1999.

Sven D. Arndt is the C.M. Stone Professor of Money, Credit and Trade and Director of the Lowe Institute of Political Economy at Claremont College, California. His research interests include trade theory and policy, globalization and production fragmentation, and regional economic integration. He is managing editor of *The North American Journal of Economics and Finance* and co-editor of *The World Economy*, an annual document on trade policy. He has served as Director of the Office of International Monetary Research at the U.S. Treasury and President of the North American Economics and Finance Association. He received his Ph.D. from University of California at Berkeley in 1964.

Robert E. Baldwin is Hilldale Professor of Economics, Emeritus, at the University of Wisconsin-Madison. He received his Ph.D. in Economics from Harvard in 1950 and taught at Harvard and the University of California at Los Angeles before moving to Wisconsin in 1964. He has published over a hundred theoretical, empirical, and policy-oriented articles in various professional journals and conference volumes in the fields of international trade and economic development. Books he has written include: *The Political Economy of U.S. Import Policy* (1985), *Trade Policy in a Changing World Economy* (1988), and *The Political Economy of U.S.-Taiwan Trade Relations, (1995) and Congressional Trade Votes: From NAFTA Approval to Fast-Track Defeat* (with C. Magee). He was Chief Economist in the Office of the U.S. Trade Representative (USTR) in Washington in 1963-64 and has served as a consultant on trade matters in the U.S. Department of Labor, the United Nations Conference on Trade and Development, the World Bank, and the OECD. He has also been a consultant to the Committee for Economic Development, the U.S. Chamber of Commerce, and the Atlantic Council. He is a Research Associate at the National Bureau of Economic Research. In addition, he is a member of the Council on Foreign Relations and is on the Advisory Committee of the Institute for International Economics. He is also a Fellow of the American Academy of Arts and Sciences.

Keith G. Banting is Director of the School of Policy Studies at Queen's University in Kingston. His research interests lie in the area of comparative public policy, and particularly in the welfare state in western nations. He has a B.A. (Hons.) from Queen's University and a Ph.D. from Oxford. He was editor of *The Nonprofit Sector in Canada: Roles and Relationships* (1999) and co-editor of *Degrees of Freedom: Canada and the United States in a Changing World* (1997), as well as author of chapters in many economic texts in Canada and England.

Paul Beaudry is Associate Professor of Economics at the University of British Columbia, and is currently on leave. He is also a Research Associate at Centre de recherche en développement

économique at the Université de Montréal; a scholar at the Canadian Institute for Advanced Research; and a Faculty Research Associate at the National Bureau of Economic Research. His main research fields include macroeconomics, contract theory and labour economics.

Eugene Beaulieu is an Assistant Professor in the Department of Economics at the University of Calgary. He joined the department after completing his Ph.D. at Columbia University in 1997. Before pursuing his doctorate he worked as economist for the government of Kenya and the Bank of Canada. Dr. Beaulieu's research examines the political economy and distributional consequences of international trade policy in Canada and the United States. He was awarded the 1998 Petro-Canada Young Innovators Award to study the impact of CUSTA and NAFTA on manufacturing plant closures in the United States and Canada.

Gerard W. Boychuk is an Assistant Professor in the Department of Political Science at the University of Waterloo specializing in public policy. He is the author of *Patchworks of Purpose: The Development of Provincial Social Assistance Regimes in Canada* (1998). He is co-investigator with Debora Van Nijnatten in a multi-year project comparing the public policies of American states and Canadian provinces in the fields of environmental protection and social policy. He has acted as a consultant to Human Resources Development Canada on public policy comparisons between Canada and the United States.

Drusilla K. Brown is Associate Professor at Tufts University. She received her Ph.D. from the University of Michigan in 1984. She was appointed Assistant Professor at Tufts University in 1985 and promoted to Associate Professor in 1992. Her primary area of research is in the application of large scale applied general equilibrium models to the study of international economic integration in the Western Hemisphere. Recent publications have appeared in the *Economic Journal*, *Journal of International Economics*, and the *Journal of Development Economics*. She is also a member of the advisory board of the North American Economics and Finance Association.

Valerie Clements is Director General, Strategy and Coordination, Strategic Policy, Human Resources Development Canada. Her 20-year career within the Public Service has included positions in Industry Canada and the Department of Finance. She has also worked on Parliament Hill. Valerie holds a Master of Arts in Economics from Queen's University and a Bachelor of Science in Economics and Psychology from Trent University.

Kirk A. Collins earned his Honours B.A. from the University of Western Ontario in 1998, and his M.A. from Queen's University the following year. Currently he is completing his Ph.D. at the University of Ottawa, where he is doing research on taxation and policy issues. He has just co-authored a study on the tax treatment of human capital in Canada with Jim Davies for the IRPP. Other recent papers include, "Winning at Hide and Seek: The Tax Mix and the Informal Economy" (with Dan Brou) and "Endogenous Leisure, Human Capital and Taxes."

Eduardo Martínez Curiel is Minister, Deputy Head of Mission at the Embassy of Mexico in Canada, a position he assumed in January 2000. He entered the Mexican Foreign Service as a career diplomat in 1973 and was appointed to the position of Minister in 1991. During his career he has fulfilled duties in several capacities in the Mexican Department of Foreign Affairs, and at Embassies and Consulates abroad, specifically in Asia, Europe and North America. Recently he acted as Technical Secretary of the Foreign Affairs Commission, for North America, of the

Senate of the Republic (1998), Director General for the Pacific and Asia of the Mexican Department of Foreign Affairs (1997-98), Visiting Fellow to the Pacific Council on International Policy (1996-97), and Head Officer at the Consulate General of Mexico in Sacramento, California (1993-96). He has also been posted as Minister and Deputy Head of Mission at the embassies of Mexico in the United Kingdom (1991-93), and Belgium (1989-91), and as a Secretary in Japan (1981-85) and the People's Republic of China (1978-81). He has a Degree in International Relations from the National Autonomous University of Mexico (UNAM), a Diploma in International Relations and Development from the Institute for Social Studies, The Hague, Netherlands, a Masters studies in Political Science and International Relations from Sophia University, Japan, and a Masters in Political Science and International Relations from Université Libre de Brussels.

John Curtis is Senior Policy Advisor and Coordinator, Trade and Economic Policy, and Director of Trade and Economic Analysis, Foreign Affairs and International Trade Canada. As the department's chief economist, he is responsible for providing overall trade and economic policy advice and for overseeing and managing trade and economic policy analysis and research within the department. He chairs the World Trade Issues Working Group within the Global Challenges and Opportunities Network of the Policy Research Initiative. Over the past several years, he has played a major role in the Uruguay Round of GATT negotiations; and the Asia Pacific Economic Cooperation (APEC) forum over the past decade, serving as the founding Chair of the Economic Committee for its first four years (1994-1998). At the same time, he was involved in the OECD Trade Committee and in the Government of Canada's private sector consultative process on trade policy. He participated in the Canada-U.S. Free Trade negotiations, was the federal government's first coordinator of regulatory reform at the Treasury Board, and has held various policy advisory and management positions in the federal government and with the International Monetary Fund. He completed his B.A. degree at the University of British Columbia and his Doctorate in Economics at Harvard, and he maintains formal teaching and research links with both Carleton University and the University of Ottawa.

Bev Dahlby is Professor of Economics at the University of Alberta and Fellow of the Institute for Public Economics. He is co-author of a book entitled *Public Finance in Canada* (1999). He received his M.A. from Queen's University in 1974 and Ph.D. from the London School of Economics in 1979. He is currently researching the theory and measurement of the marginal cost of public funds, and has work in progress on topics ranging from the Alberta pension plan to public pensions, provincial business taxes and the taxation of the mining sector in Canada.

Jim Davies is a Professor in, and Chair of, the Department of Economics in the Faculty of Social Science at the University of Western Ontario, where he has been a faculty member since 1977. He received his undergraduate training at the University of Manitoba, and his Ph.D. at the London School of Economics. He is the author of many articles on a wide range of topics published in scholarly journals and books. He is also the author of two books, including *Reforming Capital Income Taxation in Canada: Efficiency and Distributional Effects of Alternative Options* (1987, with France St-Hilaire). He has served as a special advisor in the federal Department of Finance, and has consulted widely. He is a Research Fellow of the C.D. Howe Institute and of the CESifo Network, University of Munich. In 1999 he joined the editorial boards of the *Canadian Tax Journal* and the *Review of Income and Wealth.*

Allen V. Deardorff is the John W. Sweetland Professor of Economics and Professor of Public Policy at the University of Michigan. His research focuses on international trade and finance.

With Bob Stern, he has developed the Michigan Model of World Production and Trade, which is used to estimate the effects of trade agreements. He has served as a consultant to the U.S. Departments of Commerce, Labor, State, and Treasury and to international organizations including the Overseas Economic Development Council and the World Bank. Dr. Deardorff received his Ph.D. from Cornell University.

Wendy Dobson is Professor and Director, Institute for International Business at Rotman School of Management at the University of Toronto. She received her Ph.D. in Economics from Princeton University in 1979. Between 1981 and 1987 she was President of the C.D. Howe Institute. From 1987-1989, she served as Associate Deputy Minister of Finance in the Canadian government with responsibility for international monetary affairs. Professor Dobson is non-executive director of a number of public companies in financial services, advanced manufacturing and transportation. She is a member of several international networks including the Trilateral Commission and the Pacific Trade and Development network (PAFTAD), and serves as an advisor to governments and international organizations on international trade and finance issues. Her most recent publications include *Financial Services Liberalization and the WTO* (1998), co-authored with Pierre Jacquet; *Fiscal frameworks and financial systems in East Asia: How much do they matter?* (1998); and *Multinationals and East Asian Integration* (1997) edited with Chia Siow Yue, which won the 1998 Ohira Prize. In 1991, the Institute for International Economics published her study *Economic Policy Coordination: Requiem or Prologue?*

James Gaisford joined the Department of Economics at the University of Calgary in 1988 after spending two years as a Lecturer and Assistant Professor at Wilfrid Laurier University. Professor Gaisford earned his Doctorate from Queen's University in 1987 and holds Master of Arts degrees in Economics (Queen's University, 1982) and Social and Political Thought (York University, 1979). He has published scholarly articles in the areas of international trade, agricultural economics and liberalization in former command economies. His teaching interests are diverse and include all levels of international trade, microeconomic theory and policy, and "contextual" fields such as the history of economic thought. He is currently an Associate Director of the Centre for International Financial and Economic Research (CIFER) at Loughborough University in the UK. He won the Distinguished Teacher award in 2001.

Steven Globerman is the Ross Distinguished Professor of Canada-United States Business and Economics Relations at Western Washington University. Previously he was Professor of Economics at Simon Fraser University. He held a tenured appointment at York University and was a visiting professor at the University of California, University of British Columbia and the Helsinki School of Economics. He has published widely on topics related to international trade and investment. Dr. Globerman has consulted for many public and private sector organizations on economic policy issues including the Asian Development Bank, the Canadian Radio-television and Telecommunications Commission, the Economic Council of Canada, Investment Canada, The World Bank, Bell Canada, B.C. Telephone and Imperial Oil. He has also provided management seminars and lectures to government policy makers throughout North America and in several Asian countries.

Frank Graves is President of Ekos Research Associates Inc., an applied social and economic research firm he founded in 1980. In recent years, Mr. Graves has advised some of Canada's most senior decision-makers. One of Ekos' projects, *Rethinking Government*, a longitudinal research study on the evolving relationship between Canadians and their governments, has

yielded fresh insight into the way Canadians view their governments and one another. Mr. Graves lectures and has published widely on program evaluation, research design and related methodological topics. More recently, he has been writing and publishing in the area of public policy, specifically on the impact of Canadians' changing views towards their governments and their country.

David Green is Associate Professor of Economics at the University of British Columbia. His areas of interest include wage inequality, wage and income distribution, and the labour market impacts of social policy. His work includes *Cohort Patterns in Canadian Earnings and the Skill-Biased Technical Change Hypothesis* (with Paul Beaudry) and *The Effects of the Minimum Wage on the Distribution of Teenage Work* (with Harry Paarsch).

V. Peter Harder was appointed Deputy Minister, Industry Canada, in March 2000. He was first appointed Deputy Minister in 1991. He has served in a number of departments including Treasury Board and Citizenship and Immigration. His early career included various private and public sector positions. Mr. Harder is also a member of the Board for the Business Development Bank of Canada, the National Research Council, the Communications Research Centre and the Canadian Tourism Commission. He is also a member of the Canadian Space Agency Advisory Council and a member of the Board of the Canadian Comprehensive Auditing Foundation and the Public Policy Forum. Peter Harder is a member of the Advisory Board on public executive programs at Queen's University. In addition, he is the federal public service champion for German and West Coast American investment in Canada. Mr. Harder was awarded the Prime Minister's Outstanding Achievement Award for public service leadership in May of 2000. In 1998, he was the Royal Bank's visiting Chair on Women and Work. Mr. Harder was born in Winnipeg, Manitoba in 1952 and was raised in Vineland, Ontario. He has a Bachelor of Arts (Honours) in Political Science from the University of Waterloo and a Master of Arts from Queen's University.

Michael Hart is professor of international affairs in the Norman Paterson School of International Affairs at Carleton University. He is a former official in Canada's Department of Foreign Affairs and International Trade, where he specialized in trade policy and trade negotiations. He was involved in the Canada-US Free Trade Negotiations, the North American Free Trade Negotiations, and various GATT, textile, and commodity negotiations. He was founding director of the Centre for Trade Policy and Law and stepped down in September 1996 after a second term as director. He holds an M.A. and ABD from the University of Toronto and is the author, editor, or co-editor of more than a dozen books and numerous articles and chapters in books on international trade issues. He is currently at work on a history of Canadian trade policy as well as a study of the policy implications and negotiating challenges of deep integration and globalization.

Richard G. Harris is the B.C. Telephone Professor of Economics at Simon Fraser University and an Associate of the Canadian Institute for Advanced Research. He received his PhD from the University of British Columbia in 1975. He has taught at Queen's University, was Director of the John Deutsch Institute for the Study of Economic Policy, and has held visiting professorships at MIT, Berkeley, and the University of Sydney. His area of specialization is international economics, especially the economics of integration. A former President of the Canadian Economics Association, he is currently involved in research on the North American Free Trade Area, North American Currency Union, and the globalization of labour markets.

Keith Head is an Associate Professor in Asian commerce strategy in the Faculty of Commerce, University of British Columbia, where he teaches courses on international business management and public policy analysis. He has a Ph.D. from the Massachusetts Institute of Technology and a B.A. (Economics) from Swarthmore College. Dr. Head's research interests include foreign direct investment, international trade policy, multinational enterprises, industrial organization and economic geography. His current research focuses on the immigrants' impact on trade and the effects of trade liberalization on North American manufacturing. He won the Killam Teaching Prize in 2000, and is the author of "Elements of Multinational Strategy," and numerous chapters and articles in economic books and journals.

Andrew Jackson is Director of Research at the Canadian Council on Social Development, a position he assumed in June 2000, after 11 years as senior economist with the Canadian Labour Congress. At the CLC he was responsible for research on employment, fiscal, monetary, taxation and international economic issues. He has worked with government task forces on training, taxation, working-time and workplace issues, and was active in the research work of the Trade Union Advisory Committee to the OECD. He is the co-author of three books, including the recently published *Falling Behind: The State of Working Canada 2000*, an analysis of key employment, income, and social policy trends in the 1990s. He was educated at the London School of Economics and Political Science (B.Sc. (Econ.) and M.Sc. (Econ.)) and at the University of British Columbia (Doctoral studies in Canadian Political Economy.)

Alfred LeBlanc is Editor of *ISUMA: Canadian Journal of Policy Research*, and Acting Director of Dissemination, Policy Research Initiative (PRI). Prior to joining the PRI, he was Editor of *Policy Options* for the Institute for Research on Public Policy (IRPP). He has served as Deputy Editorial Page Editor of The Financial Post, and worked as a policy and communications consultant in Toronto. A Rhodes Scholar from Atlantic Canada, he has university degrees in political science and economics from St. Francis Xavier University, Oxford and Queen's University.

Catherine L. Mann has been a Senior Fellow at the Institute for International Economics since 1997. Previously, she served in policymaking institutions in Washington, including as Assistant Director in the International Finance Division and Officer at the Federal Reserve Board of Governors; as senior staff member of the President's Council of Economic Advisors at the White House; and as a principal staff member for the Chief Economist of the World Bank. In addition to her work at the Institute, Dr Mann is Adjunct Professor of Management at the Owen School of Management at Vanderbilt University, and is currently teaching at the Johns Hopkins School for Advanced International Studies. The Institute recently published her book *Global Electronic Commerce: A Policy Primer*. She is currently doing a major research project on the New Economy for APEC.

Kenneth J. McKenzie is Associate Professor of Economics at the University of Calgary. He received his Ph.D. in Economics from Queen's University. His areas of specialization include taxation, investment under certainty, resource economics, financial economics and micro-economic theory. He began his career as an economist with the Saskatchewan Economic Development Corporation and subsequently joined the Tax Policy Branch of the Dept. of Finance. He is the author/co-author of numerous studies and articles for scholarly journals examining the impact of changes in tax policy on various sectors of the economy and on the cost of capital. Current research involves an empirical investigation of the Alberta deficit elimination program.

Bruce Montador was appointed General Director of the International Trade and Finance Branch, Department of Finance on January 20, 1997. Prior to this he was Chief, Financial Markets Department at the Bank of Canada (1994-97), structural (microeconomic) counsellor at the OECD (1993-94), Deputy Chief of the Securities Department at the Bank of Canada (1991-1993) and Deputy Chief of the Monetary and Financial Analysis Department (1988-1991). Prior to this he was principal administrator in the monetary and fiscal policy division at OECD, and held various positions at the Bank of Canada, Treasury Board Secretariat and the Universities of Victoria and Sherbrooke. Dr. Montador received his B.Sc. in Mathematics and Economics from University of British Columbia (1967), M.Sc. in Mathematics (1969) and Ph.D. in Mathematics (1973) from Université de Montréal and graduate work in economics at Queen University (1974-76).

John Murray was appointed Adviser to the Governor in January 2000. His responsibilities include research and analysis of international issues. Born in Toronto, he received a Bachelor of Commerce degree from Queen's University in 1971, as well as an M.A. in Economics and a Ph.D. in Economics from Princeton University in 1974 and 1977 respectively. After completing his Ph.D., he taught at the University of British Columbia as an assistant professor and at the University of North Carolina as a visiting assistant professor. From 1985 to 1986 he also lectured at Princeton University. He joined the Bank of Canada in 1980 as a Senior Economist with the Department of Monetary and Financial Analysis. In 1981 he was promoted to Research Officer and in 1982 he became Assistant Chief of the department. He served as Research Adviser in the Monetary and Financial Analysis and International Departments from 1984 to 1987. In 1987 he was appointed Deputy Chief of the International Department, and in 1990, Chief.

Serge Nadeau is Director of the Personal Income Tax Division at Finance Canada. He previously served as Director General of the Micro-Economic Policy Analysis Branch and Chief Economist of Industry Canada. He received a Ph.D. in Public Policy from Carnegie-Mellon University, Pittsburgh and an MBA from l'Université Laval, Québec City. Prior to joining Industry Canada, he was Chief, Economic Development, Business Income Tax Division, at the Department of Finance and Assistant Professor of Economics at the University of Victoria. He has published several papers in the areas of taxation theory and policy, and in applied economics.

Alice Nakamura is the Winspear Professor of Business at the University of Alberta. She holds a Ph.D. in Economics from Johns Hopkins University and a B.Sc. from the University of Wisconsin at Madison. Her publications are in the area of labour economics, firm behaviour, microanalytic simulation, econometric methodology, price and productivity measurement, and social policy. In 1994-95, she served as President of the Canadian Economics Association. She is a Member of the Board of Directors of the Centre for the Study of Living Standards and Academic Co-chair of the Canadian Employment Research Forum.

Kenneth Norrie is Dean of Arts at the University of Alberta, a position he assumed in 1999. He earned an Honours degree in economics from the University of Saskatchewan in 1967, and a PhD from Yale University in 1971. He joined the University of Alberta in 1971, and was promoted to Full Professor in 1980. He was Associate Dean of Arts (Social Sciences) in 1989-90, Acting Chair of the Economics department in 1993-94, Chair in 1997-99. He was seconded to the Royal Commission on the Economic Union and Development Prospects for Canada (the Macdonald Commission) in 1983-84 and 1984-85. In 1990-91, he was Clifford Clark Visiting Economist at the Department of Finance, Government of Canada. He was the editor of *Canadian Public*

Policy/Analyse de Politique between 1986 and 1990. His teaching and research interests lie in the areas of Canadian economic history, regional economics, and economic policy. He is the author or co-author of five monographs, including *A History of the Canadian Economy, 2nd edition* (1996) with Douglas Owram.

Nancy Olewiler is a Professor of Economics at Simon Fraser University and was Chair of the Department of Economics from 1995 to 2000. She received her B.A. from Columbia University (1970), her M.A. from Simon Fraser University (1973), and her Ph.D. from the University of British Columbia (1975). Prior to coming to Simon Fraser University in 1990, she was at Queen's University for 14 years. Her research has focused in recent years on environmental policy and the impact of environmental regulation on the economy. She has written two widely used textbooks: *Environmental Economics*; and *The Economics of Natural Resource Use* with John Hartwick. Recent work is on pollution taxes and environmental fiscal reform and the pollution intensity of Canadian industry. From 1996 to 1998 she served as a member of the Technical Committee on Business Taxation, established by federal Finance Minister Paul Martin to create a blueprint for reform of business taxation in Canada. From 1990 to 1995 she was Managing Editor of *Canadian Public Policy*.

Pierre-Paul Proulx is Professeur Honoraire of the Université de Montréal and an economics consultant. He is a graduate of the University of Ottawa, University of Toronto and Princeton University. His more recent projects have dealt with the following subjects: competitiveness of large cities in North America; trade and foreign direct investment flows between European countries and North American countries and between the latter; growth by country and region in Europe, and by state in the United States; and globalization and productivity.

Someshwar Rao is the Director of the Strategic Investment Analysis Division, Micro-Economic Policy Analysis Branch, the Policy Sector at Industry Canada. He is responsible for managing research and analysis associated on issues related to trade, investment, productivity, the New Economy, sustainable development/climate change and policy modelling. He is also in charge of the Industry Canada Research Publications Program. Prior to joining Industry Canada in 1992, Dr. Rao worked as a Senior Economist at the Economic Council of Canada for over 15 years. He was actively involved with the preparation of the Council's Annual Reviews and two major reports on the Canada-U.S. Free Trade Agreement and Canada's competitive position. He was the Acting Director of the CANDIDE Model Group, a disaggregated model of the Canadian economy. He has published extensively on both micro and macro economic issues. He obtained a Ph.D. in economics from Queen's University in 1977.

John Ries is an Associate Professor at the Faculty of Commerce and Business Administration of the University of British Columbia where he holds the HSBC Professorship in Asian Business. He teaches courses on international business, international trade policy, government and business, and the Asian business environment. He has a B.A. from U.C. Berkeley and received a Ph.D. in Economics from the University of Michigan in 1990. Professor Ries' primary research interests are international trade and business and the Japanese economy. He speaks Japanese and spent one year at Japan's Ministry of International Trade and Industry in 1989.

Richard Roy is currently Special Advisor in the Applied Research Branch of Human Resources Development Canada. He occupied various director positions in the Branch after joining the group soon after its creation. Before joining HRDC in 1994, he worked with the International Monetary Fund in Washington, the Economic Council of Canada and the Bank of Canada. His

current research interests revolve around the issue of how human capital and social arrangements, including social capital, may affect economic growth and well-being. He holds a M.Sc. from the Université de Montréal and an ABD in Economics from the University of British Columbia.

Christopher M. Sands is Director of the Canada Project at the Center for Strategic and International Studies in Washington, D.C., conducting ongoing research on Canadian affairs. He produces regular columns, *Canada Focus* and *North American Integration Monitor*, featuring analysis and opinion on Canada and Canada-U.S. relations, on subjects ranging from Canadian politics, NAFTA, Quebec separatism, Canadian culture and trade, and the role of the U.S. Congress in North America. His most recent publications include *The North American Auto Industry under NAFTA* (1998), edited with Sidney Weintraub, and "How Canada Policy is made in the United States," a chapter in *Canada Among Nations 2000* (2000). Prior to joining CSIS, he was the Canadian affairs specialist for the Michigan World Trade Center, led a state of Michigan office charged with the promotion of trade and investment with Canada, and in 1990 served on Michigan governor James J. Blanchard's Task Force on International Trade. In 1999, he was a Fulbright Scholar and visiting fellow at the Norman Paterson School of International Affairs at Carleton University in Ottawa. He holds a B.A. in political science from Macalester College in St. Paul, Minnesota, and an M.A. in Canadian studies and international economics from the Paul H. Nitze School of Advanced International Studies at the Johns Hopkins University, where he is currently pursuing a Doctorate in International Relations and Economics.

Gary Sawchuck is a Senior Economist with the Micro-Economic Policy Analyis Branch at Industry Canada. He holds a Ph.D. from the University of Manitoba and an MPA from Harvard University. He is presently working in the area of Canada-U.S. economic relations.

Lawrence Schembri teaches in the Department of Economics at Carleton University. He has been Research Adviser in the International Department at the Bank of Canada. He received a Bachelor of Commerce degree from the University of Toronto in 1979, an M.Sc. in Economics from the London School of Economics and Political Science in 1980, and a Ph.D. in Economics from the Massachusetts Institute of Technology in 1984. He has been a professor of economics at Carleton University in Ottawa since 1984. He was on leave at the International Department at the Bank of Canada in 1990 to 1991 and currently since 1997. His research interests are international macroeconomics and international trade.

Daniel Schwanen is a Senior Economist at the Institute for Research on Public Policy (IRPP), specializing in trade and economic growth issues. He holds degrees in economics from the Université de Montréal and Queen's University in Kingston. Prior to joining IRPP, he was Senior Economist at the C.D. Howe Institute, and International Economist at the Canadian Imperial Bank of Commerce. He is the author of a number of articles and commentaries on the impact of Canada's policies concerning international trade, culture, the Canadian social and economic union, and greenhouse gas emission reduction. He is also a frequent commentator on economic affairs in the media.

Daniel M. Shapiro is Professor and Associate Dean in the Faculty of Business Administration at Simon Fraser University. He received his Ph.D. from Cornell University. He was a Director of the Executive MBA program at Simon Fraser University, a Wing Lung Bank Fellow at the School of Business in the Hong Kong Baptist University, a Principal at the School of Community and Public Affairs at Concordia University and he has over 20 years experience as a business

educator and researcher. He has served as consultant for the Anti-Inflation Board, Investment Canada, Bureau of Competition Policy, the OECD, The World Bank and the City of Vancouver, in the areas of foreign investment, mergers, competition policy, strategy and industrial policy. He was awarded the Canada Trust Teaching Award at Simon Fraser in 1995. He has published four books and monographs, such as *Foreign and Domestic Firms in Canada* (1980) and over 30 articles in scholarly journals. Dr. Shapiro's current research is on foreign investment policies in Canada, earnings and ethnicity in Canada, ownership effects and firm performance in Japan and Asia, and quality management practices in British Columbia. He also has designed and delivered executive management programs in Canada and abroad (Russia, Guyana, Indonesia and China) and has international experience working in El Salvador, Belarus, Germany and Hong Kong.

Prakash Sharma is a Senior Research Coordinator in the Micro-Economic Policy Analysis Branch at Industry Canada. Before this he was with the Department of Foreign Affairs and International Trade (DFAIT), where he was a Senior Research Coordinator and Deputy Director in the Trade and Economic Analysis Division. He has also taught at University of Ottawa. Before obtaining a Ph.D. in Economics from Carleton University in Ottawa, he studied Economics at the University of Heidelberg in Germany. His policy analysis and research work relates to international trade and investment. A number of his papers are available on the DFAIT web site under policy analysis documents.

Andrew Sharpe is Executive Director of the Centre for the Study of Living Standards (CSLS), a research organization he founded in 1995. He has held a variety of earlier positions, including Head of Research and Editor, *Quarterly Labour Market and Productivity Review* at the Canadian Labour Market and Productivity Centre and Chief, Business Sector Analysis at the Department of Finance. He is past President of the Canadian Association for Business Economics and served as a founding editor of *Canadian Business Economics* from 1992 to 1998. He currently edits the *International Productivity Monitor*. He received a Ph.D. in Economics from McGill University in 1982.

Renée St-Jacques is Director General of the Micro-Economic Policy Analysis Branch of Industry Canada. As the Chief Economist of Industry Canada, she is responsible for providing research and analytical support to the Senior Management on micro-economic issues and policies and programs. Prior to joining Industry Canada, she worked in various senior capacities at the Department of Finance, Treasury Board Secretariat, Privy Council Office. Ms. St-Jacques obtained an undergraduate degree in economics from Université Laval and pursued graduate studies (ABD) at the University of Chicago.

Robert M. Stern is Professor of Economics and Public Policy (Emeritus) at the University of Michigan. He received his Ph.D. in economics from Columbia University in 1958 and joined the faculty at the University of Michigan in 1961. He has been an active contributor to international economic research and policy for more than four decades. He has published numerous papers and books on a wide variety of topics. He has been a consultant to and done research under the auspices of the Office of the U.S. Trade Representative, the Departments of Labor, State, and Treasury, the Senate Committee on Finance, U.S. Agency for International Development, U.S. National Commission on Employment Policy, the United Nations Conference on Trade and Development, the Economic Council of Canada, the Economic Commission for Latin America and the Caribbean, the National Council for Applied Economic Research (New Delhi), Tunisian Ministry of International Cooperation and Foreign Investment, the European Union, and The Mark Twain Institute. He has collaborated with Alan Deardorff (University of Michigan) since

the early 1970s in developing the Michigan Model of World Production and Trade. He is currently working on the computational modelling and analysis of regional trading blocs, issues in U.S.-Japan international economic relations, issues of child labour exploitation and international labour standards, and forecasting U.S. trade in services.

Aaron Sydor is an economist with the Micro-Economic Policy Analysis Branch at Industry Canada. His research interests include international trade and investment and issues relating to foreign ownership. He received his M.A. in Economics from Carleton University and his B.A. in Economics from Brock University.

Val Traversy is currently Director General of Industrial Analysis and Strategies in the Industry Sector of Industry Canada, having served previously in a number of economic development policy positions in Industry Canada, the Department of Finance and other federal ministries. Before joining the Industry Sector, Val was Director General, Economics and International Affairs with the Competition Bureau. He was a member of the Canadian team negotiating NAFTA investment and competition provisions, and was the initial Canadian co-chair of the NAFTA Working Group on Trade and Competition. He has an academic background in political science, economics and public administration, and he has held senior administrative positions at Dalhousie University.

Roger Ware is Professor of Economics at Queen's University. He previously taught at the University of Toronto and has held a visiting position at the University of California, Berkeley. In 1993-94, he held the T.D. McDonald Chair in Industrial Organization at the Competition Bureau. His research interests are focused on antitrust economics, intellectual property and the economics of the banking sector. He has recently published a major textbook (with Jeffery Church) on Industrial Organization and Antitrust Economics. He teaches graduate and undergraduate courses in Industrial Organization and Regulation and has lectured widely on antitrust topics.

Randall Wigle is Professor of Economics at Wilfrid Laurier University in Waterloo Ontario, Canada. He has published widely on topics in the areas of international trade policy and environmental economics. The overwhelming majority of this work relates to computable general equilibrium modelling. This modelling simulates the world economy's response to trade and environmental policies. An important theme in this work is the international effects of individual nations' actions and the role of international agreements. In recent years his research has concentrated on modelling the effects of the Uruguay Round, as well as evaluating the consequences of various environmental taxes. An ongoing branch of his work involves the evaluation of alternative instruments to reduce emissions of greenhouse gases.

David Zussman is President of the Public Policy Forum, an organization committed to bridging the gap between government, business, labour and the voluntary sector, and Professor of Public Policy and Management at the University of Ottawa. He graduated with his B.Sc. in Mathematics from McGill University in 1968, and obtained his M.Sc. in Educational Psychology from Florida State University in 1970. He completed his Ph.D. in Social Psychology, at McGill in 1975. During the early years of his career, he worked for the federal government, at the Treasury Board Secretariat, Energy, Mines and Resources, and the Department of the Secretary of State for External Affairs. In 1993, he was asked by the newly elected Prime Minister, Jean Chrétien, to lead the transition for the federal Liberal government, a role he undertook again in 1997. He has taught at the University of Ottawa, the University of Victoria and Carleton

University. He held the position of Dean of the Faculty of Administration at the University of Ottawa from 1988-1992, and was subsequently Associate Dean, Graduate Programs, from 1995-1998. He is the author and co-author of a number of publications, including *Alternative Service Delivery: Sharing Governance in Canada* and *The Vertical Solitude: Managing in the Public Sector*.

Notes

Draft

June 2001

Canada's Trade and Foreign Direct Investment Patterns with the United States

By

Ram C. Acharya, Prakash Sharma and Someshwar Rao*

Micro-Economic Policy Analysis

Industry Canada

A Paper Prepared for Industry Canada's Conference in Calgary, June 20-22,

on

North American Linkages: Opportunities and Challenges For Canada

---

*The views expressed here are not necessarily those of Industry Canada or the Government of Canada.

1. Introduction

Rapid advances in information and communication technologies, the sharp drop in transportation and communication costs and fierce international competition for markets, capital and skilled professionals have accelerated the pace of globalization of business in Canada and all other countries. Canada has actively participated in this process. International trade (goods and services) as a share of GDP increased dramatically in the 1990s. It now represents over 90 percent of Canada's GDP. Similarly, Canadian firms are investing heavily abroad. Since 1996 Canadian foreign direct investment abroad has exceeded foreign direct investment in Canada.

However, much of the increased trade and investment orientation came in the form of increased commercial linkages with the US and Mexico, perhaps a result of FTA and NAFTA, the strong US economy and the depreciation of Canadian dollar. Despite the growing economic linkages, Canada's productivity and real income performance lagged far behind the US in the 1990s and the Canada-US productivity and real income level gaps, widened significantly, exactly opposite of the expectations.

The objective of this paper is to do an in-depth analysis of Canada's trade and investment patterns with the US, our dominant and most important trading partner. Our analysis hopes to shed some new light on the puzzling trend of widening of the economic performance gap between Canada and the US despite the growing commercial linkages. The paper hopes to address the following key research and policy questions:

- What are the merchandise trade patterns between Canada and the US by industry and by region?
- Is the recent large increase in trade and between two countries a structural or cyclical phenomenon?
- What role intra-firm trade plays in Canada-US trade relation?
- What has been the patterns of services trade and foreign investment between Canada and the US?
- What has happened to the factor content of Canada's exports over the years?
- How did comparative advantage position of Canadian manufacturing industries change over time?
- How intra industry trade has changed over time in Canada-US trade relation?
- Did trade expansion with the US lead to increased product specialization and higher productivity growth?

- Who are the main competitors for Canada in the US goods market and how well Canada is doing?

Our findings indicate that Canada-US trade and investment links deepened in the 1990s across all provinces and industries. The buyout US economy, the depreciation of Canadian dollar were mainly responsible for the dramatic increase in Canadian exports the US. Nevertheless, FTA/NAFTA increased Canadian exports to the US by about 9 percent. But, contrary to expectations, the share of intra-firm trade in total trade of US affiliates in Canada and Canadian affiliates in the US declined significantly, suggesting that the reduction of tariff and non-tariff barriers might have increased outsourcing by the US and Canadian multinationals in search of cost reductions. Our results also show that the two free trade agreements increased somewhat intra-industry trade, an indicator of increased specialization, and improved Canada's productivity. The skill content of Canadian exports of goods and services increased steadily in the past 20 years. Canada gained market share in the US mainly in resource-based and labor intensive products. On the other hand, Canada lost market share in paper and allied products, non-electrical machinery, leather products and non-metallic minerals. In these products, both Mexico and China increased significantly their market shares.

The paper is organized in the following manner. Section 2 analyses Canada's merchandise trade patterns with the US, disaggregated by province/state and industry. It also looks at the role of intra-firm trade in Canada's growing trade linkages between the two countries. Canada's services trade and foreign direct investment linkages with the US, disaggregated by industry, are discussed in Section 3. The factor content of Canada's exports and Canada's revealed comparative advantage positions are discussed in Section 4. The trends in intra- and inter-industry trade between Canada and the US, and the contribution of FTA/NAFTA on Canada's product specialization and productivity improvements are discussed in Section 5. Section 6 analyses the trends in Canada's market shares in the U.S, diaggregated by industry and competitor. The final section, Section 7, summarizes the key findings of the paper and discusses their implications.

2. Merchandise Trade Patterns

Canada's trade flows increased dramatically since 1980. In year 2000, Canada's exports of goods and services reached $473.9 billion, from just $87.7 billion in 1980, a 5.4 fold increase. Similarly, imports of goods and services reached $425.9 billion in 2000, a 5.2 fold increase during the same period (see Figure 1). As a result of this phenomenal growth, the share of merchandise trade in Canada's GDP has risen from 25 percent in 1980 to 42 percent in 2000. Likewise, the share of

merchandise imports in GDP rose to 35 percent in 2000, compared to 22 percent in 1980 (see Figure 2). As per services trade, the share of exports to GDP increased to 5.4 percent in 2000 from 2.8 percent in 1980. The share of services imports was 6 percent in 2000, up from 4 percent in 1980 (Figure 3).

Few bilateral economic relationships in the world today approach the Canada-US commercial linkages. In 2000, the two-way trade of goods and services between Canada and the US amounted to 700 billions; 627.2 billions of goods and remaining $72.8 billions of services trade. The US share of Canadian merchandise exports in 2000 reached 86 percent and its share of imports reached 73.7 percent (Figure 4). Two decades earlier less than 70 percent of Canadian merchandise exports were destined to the US. The US accounts for a much smaller share of Canada's services trade. In 2000, US accounted for 59 percent of exports and 63 percent of services imports, not significantly different from the 1980 shares.

2.1. Merchandise trade links among Canadian regions and the US

Canada's strong economic performance over the 1980-2000 period was powered by a 9.5 percent annual growth of goods exports to the US. Among five Canadian regional markets, Ontario is the main supplier to the US market.[1] Ontario currently supplies more than half of total Canada's goods exports to the US. However, Ontario's share has declined in the second half of the 1990s. On the other hand, the share of Prairies in Canada's exports to the US increased significantly. Consequently, Prairies replaced Quebec as the number two Canadian supplier to the US market (see Table 1). On the

Table 1. Canadian regional shares in merchandise trade with the US (percent)

	Exports			Imports		
	1980-89	1990-94	1995-00	1980-89	1990-94	1995-00
Atlantic	4.1	3.9	3.8	1.4	1.7	1.3
Quebec	16.8	17.6	17.8	11.5	11.6	9.8
Ontario	56.1	56.7	56.5	72.4	70.9	73.3
Prairies	15.5	15.0	15.5	9.0	8.7	9.4
BC & Terri.	7.5	6.8	6.4	5.7	7.1	6.2
Total	**100**	**100**	**100**	**100**	**100**	**100**

Source: Statistics Canada

[1] Atlantic includes Newfoundland and Labrador, Prince Edward Island, Nova Scotia and New Brunswick; Prairies consist of Manitoba, Saskatchewan, and Alberta; and B.C. & Territories include British Columbia, Yukon, Nunavut, and North-West Territories.

import side, Ontario absorbs almost three- quarters of Canadian merchandise imports from the US. Quebec and Prairies each accounts for 10 percent of Canadian merchandise imports from the US. The US share in all Canadian regional exports rose during the 1995-2000 compared to 1980-89 1980s, except for Atlantic Canada. On the other hand, the US share of regional imports from US fell in all Canadian regions between 1990-94 and 1995-2000 except for British Columbia and Territories (see Table 2).

Table 2. The US share of Canadian regional goods trade (percent), 1980-2000

	Exports to the US			Imports from the US		
	1980-89	**1990-94**	**1995-00**	**1980-89**	**1990-94**	**1995-00**
Atlantic	60.1	66.5	61.9	20.3	26.9	23.8
Quebec	65.8	76.8	82.8	43.0	44.0	43.0
Ontario	86.5	88.1	91.4	79.9	76.1	75.7
Prairies	73.4	69.4	76.4	86.1	83.1	82.1
BC & Territories	40.0	48.3	58.6	40.4	45.9	48.4
Canada	**73.0**	**77.5**	**82.9**	**67.1**	**65.8**	**66.9**

Source: Statistics Canada

Here, we evaluate the performance of Canadian merchandise exports, disaggregated by regions to the US states. For analytical purposes, we group the US states into four regions: Northeast, Midwest, South and Northwest.[2] Canadian exports to South increased at 12.3 percent per year during the 1980-2000 period. Compared to 9.5 percent overall export growth to the US, all Canadian regions registered double digit export growth except BC and Territories (see Table 3). Both Ontario and Quebec expanded their exports to the US by about 10 percent per annum, powered by strong export growth to the South and Northwest. Atlantic Canada also increased significantly its trade linkage with South, Midwest and Northwest. Prairies' exports to the South and Northeast increased by 15 percent per year. The exports of BC and Territories to the US increased at a significantly slower pace than other Canadian regions.

[2] Northeast region includes Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont, Delaware, District of Columbia, Maryland, New Jersey, New York, and Pennsylvania; Midwest region consists of Illinois, Indiana, Michigan, Ohio, Wisconsin, Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota; South region includes Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, West Virginia, Arizona, New Mexico, Oklahoma and Texas; and Northwest region includes Colorado, Idaho, Montana, Utah, Wyoming, Alaska, California, Hawaii, Nevada, Oregon and Washington.

Table 3. Average annual growth of goods exports from Canadian regions to US regions (percent), 1980-2000

From/To	*Northeast*	*Midwest*	*South*	*Northwest*	*All US*	*World*
Canada	8.3	9.3	12.3	9.7	9.5	9.3
Atlantic	7.2	13.1	14.0	11.9	9.2	7.9
Quebec	8.8	8.5	13.1	13.8	9.9	7.4
Ontario	7.6	9.9	11.8	15.3	10.0	9.4
Prairies	15.1	7.6	15.0	5.9	8.6	9.1
BC & Territories	6.2	9.2	7.9	8.3	8.2	4.9

Source: Statistics Canada

Note: The compound growth rate was obtained by (i) fitting the trend using the equation, $\ln x_t = \ln x_0 + \ln(1+g)t + u_t$, where x_t denotes goods exports from Canada, and g represents the instantaneous (at a point in time) growth rate; and then (ii) computing the compound growth rate = (Anti-log of $g - 1$) * 100. The trend factor is highly significant for all trend equations estimated for merchandise exports from all Canadian markets to all US markets for a period of 21 years.

Since Canada's exports to Northeast and Midwest grew slowly compared to the other US regions, consequently their shares in total Canadian exports declined steadily (see Table 4). The shares of South and Northwest, on the other hand, increased steadily. These two regions accounted for 30 percent of total Canada's merchandise exports during 1995-2000 period, up from about 23 percent during 1980-89 period. However, almost half of Canada's exports are still destined to Midwest. Northeast and Midwest regions represent over two-thirds of exports of all Canadian regions, except Prairies, BC and Territories. They account for 60 percent of total exports of Prairies and less than 30 percent of total exports of BC and Territories to the US. Northwest is the major destination of BC's and Territories' exports to the US - 52 percent. Similar shifts in shares, albeit small, are observed for Canadian imports from the US regions; the shares of South and Northwest increased, while the importance of Northeast declined (see Table 4).

Table 4. Regional distribution of Canadian regions' trade in the US (percent), 1980-2000

		Exports				Imports			
		NE	MW	South	NW	NE	MW	South	NW
Canada									
	1980-89	30.2	46.0	11.7	11.8	22.0	43.4	15.1	10.3
	1990-94	26.0	47.4	12.6	12.5	20.9	44.6	19.7	11.4
	1995-00	24.9	44.0	16.4	13.6	19.5	44.5	23.7	11.4
Atlantic									
	1980-89	76.4	5.7	15.6	1.8	35.3	20.6	32.9	10.4
	1990-94	66.4	8.6	18.5	3.1	30.1	23.6	32.0	10.2
	1995-00	59.5	10.2	25.3	3.0	36.8	18.3	36.9	7.6
Quebec									
	1980-89	51.3	27.9	16.4	3.8	43.9	21.9	20.5	10.8
	1990-94	47.5	25.3	17.2	8.1	47.9	15.7	22.3	9.0
	1995-00	45.4	23.6	23.8	5.9	47.7	14.5	24.8	10.6
Ontario									
	1980-89	28.7	56.2	10.3	4.6	21.0	48.6	13.5	6.1
	1990-94	21.9	59.3	9.9	7.4	18.7	51.9	18.7	7.4
	1995-00	21.0	54.8	13.4	9.7	17.5	51.2	23.2	7.4
Prairies									
	1980-89	8.3	53.7	7.8	30.0	8.9	48.1	20.4	15.5
	1990-94	13.2	50.4	13.9	21.2	10.2	46.6	26.2	13.8
	1995-00	13.1	46.5	16.1	23.3	10.9	43.9	30.2	14.4
BC & Territories	1980-89	14.0	16.7	17.7	51.0	8.4	19.3	11.7	54.8
	1990-94	10.5	20.5	15.7	51.7	8.8	21.1	14.2	53.0
	1995-00	10.3	19.1	16.8	52.2	8.5	18.7	16.0	56.2

Source: Statistics Canada
Note: NE is Northeast, MW is Midwest and NW is Northwest.

2.2. Merchandise trade links with the US: Industry dimensions

In this section, we present the Canada's goods trade in the US market for SIC 2-digit industries.[3] The US shares of Canadian exports of 21 industries at SIC 2- digit level are presented in Annex A, Table A1. It is interesting to note that the US share has risen in all industries in the second half of the 1990s, except tobacco, compared to the first half. In seven industries, the US share of Canadian exports was more than 90 percent during the 1995-2000 period. They are: furniture, refined petroleum, transportation, rubber and plastic, clothing, non-metallic minerals and print. On import side, the US

[3] There are altogether 31 industries at SIC 2- digit level on goods producing sector. However, in order to make industry classification comparable with other sections of the paper, particularly with US classification, we put all five industries under agriculture, fishing and logging Divisions under one heading named "Agriculture, fishing and logging". Furthermore, we put all four 2-digit industries in mining Division under one industry called "Mining". We add Food and Beverage industries into one. We also add Rubber products and Plastic products and call it Rubber and Plastic. Finally, Primary textile and Textile product industries are grouped under "Textile product industry" heading. Hence, we have only 21 industries and one overall merchandise sector.

share rose in some industries and fell in others. There is not a single industry in which US supplies ninety percent of Canada's imports.

For the regional dimension of industries, we calculated the share of each of 21 industries in total regional exports. Then this share was divided by corresponding regional share in the US. This would tell us which industry has more than average orientation in the US region. All results are based on average annual data for the period 1995-2000. The results are presented in Table 5. The industries in a region with a value higher than one is denoted by a check mark indicating that this industry has above

Table 5. Regional distribution of industries with higher than average market share in the US, 1995-2000

	Canadian Region/Province				
Industries	Atlantic	Quebec	Ontario	Prairies	BC and Territories
1. Agri., fishing, & forestry	√			√	√
2. Mining	√			√	
3. Food and beverages	√			√	
4. Tobacco products		√			
5. Rubber and plastics	√	√			
6. Leather and allied products		√			
7. Primary textile		√			
8. Clothing industries		√			√
9. Wood industries	√	√			√
10. Furniture and fixture		√	√		
11. Paper and allied products	√	√			√
12. Print, publishing and allied		√			√
13. Primary metal industries		√			
14. Fabricated metal products			√		
15. Machinery (except electrical)			√		√
16. Transport equipment			√		
17. Electrical and electronic		√			
18. Non-Metallic mineral					√
19. Refined petroleum and coal	√			√	
20. Chemical products				√	
21. Other manufacturing		√	√		

Source: Statistics Canada

average share in the US market, a rough indicator of comparative advantage. A few interesting patterns emerge. Atlantic Canada specializes in resource based industries such as agriculture, fishing and forestry, mining, paper and allied products. Quebec has a revealed comparative advantage in labor intensive industries such as textiles, clothing, electrical products and paper and allied products. Ontario

on the other hand, concentrates in autos, non-electrical machinery and fabricated metals. Prairies exports are dominated by agricultural products, mining, refined petroleum and chemicals. Agriculture, fishing and forestry, paper and allied products, non-electrical machinery and non-metallic minerals dominate exports of BC and Territories.

2. 3. Role of intra-firm trade in Canada-US merchandise trade

Is the dramatic increase in trade flows between Canada and the US due to the rise in intra-firm or inter-corporate trade? Cross-border trade between parents and affiliates is referred to as the intra-firm trade or intra-corporate trade. Since there are no good time series data on intra-firm trade of goods from Canadian side, we use data from the US Bureau of Economic Analysis to examine the trends in intra-firm trade between Canada and the US.[4] This data shows that the share of US intra-firm goods trade (both exports and imports) in total US goods trade (exports and imports) has changed little during 1983 to 1998 period: it has fluctuated with no sustained trend. However, the share of intra-firm goods trade in total US goods trade with Canada has declined substantially.[5] The share of US intra-firm exports in total US exports to Canada declined from 51 percent in 1983 to 36 percent in 1998 (Figure 5). Similarly, the share of intra-firm imports in total US imports from Canada declined to 40 percent in 1998, from 47 percent in 1983 (Figure 6). But, the rate of decline in intra-firm exports share was faster than that in intra-firm imports share.

Much of the intra-firm trade between Canada and the US is carried by the US multinational companies (MNCs) and this has changed little in the 1990s. As shown in Table 6, the share of US MNCs in US intra-firm exports to Canada is about 95 percent and the share of US MNCs in US intra-firm imports from Canada is over 80 percent. The rest of intra-firm trade is the contribution of Canadian MNCs. As expected, the US MNCs dominate in all industries, especially in transportation equipment and chemical and allied products.

---

[4] In 1998, intra-firm trade accounted for 35 percent of US exports and 39 percent of US imports. Intra-firm exports consisted largely of transactions by US MNCs to its affiliates, whereas intra-firm imports consisted of transactions by foreign MNCs to their affiliates in the US. In 1998, out of 35 percent of exports accounted by intra-firm trade, the exports shipped by US parent companies to their affiliates was 27 percent and the exports shipped by foreign affiliates to their foreign parent groups was about 8 percent. On the import side, out of 40 percent share of US intra-firm imports in total US imports, 17 percent was imports by US parents from their affiliates and 22 percent was imports by foreign affiliates from their parent groups. However, the intra-firm trade share of US parent companies in their trade has increased indicating a fall in share of their transactions with non-affiliated companies over the years. In exports, the share has increased to 46 percent in 1998 from 35 percent in 1983. Similarly, the import share has increased to 49 percent from 39 percent during the same period.

[5] Since there are no data on all affiliates, the following analysis on intra-firm trade of US MNCs is restricted to intra-firm trade between US parent companies and their majority owned foreign affiliates (MOFs). In the aggregate, intra-firm exports with MOFAs accounted for about 97 percent in the last 16 years, approaching about 100 percent in recent years. Similarly, the intra-firm imports accounted for 95 percent in the last 16 years, with 98 percent in the recent years.

Hence, contrary to expectations, the dramatic increase in the two-way trade between Canada and the US in the 1990s was not due to the increased importance of intra-firm trade. These results suggest that the fall in tariff and non-tariff barriers might have increased out sourcing by the US MNCs in search of cost reductions.

Table 6. Share of US MNCs and their affiliates in US intra-firm trade with Canada (percent)

	Exports shipped by US parent companies to affiliates in Canada		Imports shipped to US affiliates in Canada by US parent companies	
	1992-95	1995-98	1992-95	1995-98
All industries	95.7	94.7	84.1	81.6
Petroleum	95.3	na	79.1	na
Total manufacturing	96.3	95.4	90.0	89.3
Food and kindred Products	na	92.5	na	na
Chemical and allied products	na	98.5	na	88.8
Primary and fabricated metals	53.1	na	na	40.7
Machinery except electrical	99.4	na	na	97.8
Electric and electronic equipment	75.2	55.4	na	na
Transportation equipment	99.7	na	na	98.7
Wholesale trade	94.2	92.7	34.7	29.2
Services	na	78.9	86.6	50.5
Other industries	na	91.4	66.0	27.8

Source: US Bureau of Economic Analysis

Note: In this table, three are industries which belongs to services sector even though the trade is on merchandise. It is because some of the services industries perform transactions in goods even though their share might be very small. Furthermore, since there were data undisclosed due to confidentiality, some of the entries are reported as na.

2.4. Impact of FTA on Canada-US trade flows

In this sub-section, we will analyze the role of the economic growth in the US and Canada, depreciation of Canadian dollars and the FTA/NAFTA in the expansion of trade flows between Canada and the US in the 1990s. For this purpose, we estimate equations for Canadian exports and imports disaggregated by industry. Given that our objective is to quantify the contribution of various factors to the growth of exports, we estimated growth equations for Canadian exports to the US, disaggregated by industry. We specify the empirical model as follows:

$$\frac{dx_i}{x_i} = \beta_1 \frac{dy^*}{y^*} + \beta_2 \ln r_i + \beta_3 c_i + \beta_4 FTA + u_i, \qquad i = 1, \ ,22$$

where x_i is the export of industry i, y^* is the US real GDP, r_i is the industry specific real exchange rate, c_i is capacity utilization in Canada of industry i and FTA is a dummy that is assigned a value of zero

from 1980 to 1988 and of one from 1989 to 2000. The real exchange rate is defined as p_i/ep_i^*, where p_i denotes industry i's output price index in Canada, p_i^* is the US output price index, and e refers to the nominal exchange rate, defined as the number of Canadian dollar per US dollar. Therefore, r_i = *US goods/Canadian goods*. In general, we expect a negative relationship between the growth of real exports and the real exchange rates.[6] In the estimation, the growth of real exports and US real GDP are expressed in percentage forms. The equation is estimated with data from 1980 to 1999 (for details on the estimation of export and import functions, see Goldstein and Khan, 1985 and Magee, 1975).

The overall empirical model does a good job, and the details of all the estimated equations are presented in Table A2. All four explanatory variables are statistically significant in the regression equation for total merchandise exports. The regression results imply that a one percent increase

Dependent variable	Independent variables					
Canada's real exports growth to the US market	US real GDP growth	Log of real exchange rate	Capacity	FTA	R^2	D-W
Total merchandise exports	2.314 (3.54)[a]	-0.432 (-2.74)[b]	-0.002 (-2.96)[a]	0.086 (3.24)[a]	0.61	1.76

Note: The number in parenthesis below each coefficient is a t-ratio

[a]Significantly different from zero at the 1% level, using a two-tailed test.

[b]Significantly different from zero at the 5% level, using a two-tailed test.

in US real GDP leads to a 2.3 percent rise in Canadian goods exports to the US. The depreciation of Canadian dollar, as expected, stimulates exports. The coefficient on the capacity utilization variable is negative, implying that Canadian business relies more on exports to the US in periods of weak domestic demand and vice versa. The coefficient on the FTA dummy is positive and statistically significant. However, the impact of FTA after controlling for other variables on Canadian exports to the US was modest—they increased by about 9 percent. These results strongly suggest that the strong economic expansion and the real exchange rate were mainly responsible for the large expansion of Canadian exports to the US in the 1990s.

In industry level, the export growth of different industries responded to different combinations of the four explanatory variables. Only for the export growth of fabricated metal products, all the four determinants were statistically significant.[7] US real GDP growth was significant for wood, furniture

[6] The ratio of price indices in Canada and in the US measures the relative price of Canada's exports in the US market. An increase in $r_i = p_i/ep_i^*$, means that a basket of Canadian could purchase more US. goods, amounting an appreciation of the Canadian dollar. A decrease in r_i would mean a depreciation in the purchasing power of Canadian goods abroad.

[7] The criterion for statistical significant is taken at 10% or lower level.

and fixture, fabricated metals, machinery (except electrical), non-metallic minerals, and refined petroleum. The real exchange rate was significant for rubber and plastics, clothing, paper, printing, fabricated metals, transport and refined petroleum. Capacity utilization variable was positively significant for real export growth of food and beverage, rubber, printing, fabricated metals and non-metallic minerals. The dummy variable FTA was positively significant for food and beverage, rubber and plastics, fabricated metals, non-metallic minerals, chemical and other manufacturing.

We now turn to the estimation of Canada's imports from the US, disaggregated by industry. The real growth of Canadian imports from the US is regressed on growth of Canadian real GDP, log of real exchange rate and the FTA dummy. Complete estimation results are presented in Table A3, Annex A. Different combinations of the three explanatory variables propelled the import growth across industries in Canada.

For total manufacturing imports, the following is the estimated regression equation:

Canada's real import growth from the US	Canadian real GDP growth	Log of real exchange rate	FTA	R^2	D-W
Total merchandise imports	3.119 (5.16)[a]	0.123 (1.11)[b]	0.018 (0.82)	0.65	1.08

Note: The number in parenthesis below each coefficient is a t-ratio

[a]Significantly different from zero at the 1% level, using a two-tailed test.

[b]Significantly different from zero at the 5% level, using a two-tailed test.

As expected, the coefficient on real GDP is positive and highly statistically significant. A one percent increase in Canadian real GDP raises merchandise imports from the US by 3.2 percent. The coefficient on real exchange rate has the expected positive sign but not statistically significant. Similarly, the coefficient on the FTA dummy is positive, but small and statistically insignificant, suggesting that on average FTA did not contribute to the growth in imports from the US.

In 17 out of 22 industries, the coefficient on real GDP was statistically significant, exceptions being (a) agriculture, fishing, logging and forestry, (b) mining, and (c) print, publishing and allied industries. The real exchange rate variable was significant in food and beverage, primary textile, clothing, electrical and electronic products industries. The FTA dummy was positive and significant in food and beverage, primary textile, clothing, electrical and electronics and other manufacturing industries.

3. Services Trade and Foreign Direct Investment Patterns

The discussion till now was based on how merchandise trade links between Canada and US has evolved over the last 20 years. However, the deep economic integration between Canada and the US is also reflected in services trade and foreign direct investment linkages between two countries.

3.1. Canada-US services trade patterns

On the global scale it is expected, and to some extent already reflected in the data, that services are playing increasingly a greater role in international trade, especially in the new knowledge and skills intensive commercial services. In order to understand this dynamics of services trade, we analyze the pattern of Canada-US services trade with special focus on commercial services.[8] It should be noted that ahead of the WTO-based initiatives, both the Canada-US FTA and the NAFTA had included a number of provisions to facilitate the growth of services trade in North America.

Table 7. The US share of Canada's services trade (percent), 1980-2000

	Exports to the US			*Imports from the US*		
Type of services	**1980-89**	**1990-94**	**1995-00**	**1980-89**	**1990-94**	**1995-00**
Travel	68.0	56.9	58.9	66.3	70.6	63.8
Transport	40.1	47.3	54.4	36.6	41.1	43.8
Commercial	63.0	63.9	60.6	74.8	71.0	71.9
Government	29.9	21.0	23.1	34.4	25.7	24.5
Total	**57.3**	**56.7**	**58.1**	**60.9**	**63.3**	**62.8**

Source: Canada's International Transactions in Services, Catalogue 67-203-XPB), Statistics Canada

Over the last 20 years, the share of the US market in Canada's total services exports has remained steady at about 58 percent. However, the share of imports from the US in Canada's total services imports increased marginally to 63 percent in the 1990s from 61 percent in the 1980s (see Table 7). This Table also shows that US share of Canada's exports and US share in Canada's imports in commercial services trade declined in the 1990s. However, commercial services are still the single largest Canadian exports to, and imports from, the US. Exports of commercial services amounted to 52 percent of Canada's total services exports in the 1990s. Canada's share of imports of commercial services in total services imports from the US was about 54 percent (see Table 8).

[8] In the absence of detailed regional and industrial data, our discussion here is based on national data.

Table 8. The composition of services trade with the US, 1980-2000

	Exports			*Imports*		
	1980-89	1990-94	1995-00	1980-89	1990-94	1995-00
Travel	40.3	31.2	29.2	34.5	40.1	30.1
Transport	17.8	17.4	17.8	14.8	14.2	15.2
Commercial	39.5	50.1	52.2	48.3	44.7	54.2
Government	2.5	1.3	0.8	2.5	0.9	0.5

Source: Canada's International Transactions in Services, Catalogue 67-203-XPB), Statistics Canada

Commercial services consist of different categories. Among them the main categories for Canada's exports are insurance, architectural engineering, management, communication, R&D and computer and information. They all combined had the share of 67 percent in 1990-94 which fell to 63 percent in 1995-99, as given in Table 9. However, they were still the main items in Canada's exports to the world. On import side, the same categories except R&D were the main items. Besides, royalties and license fees were also important import categories.

Table 9. Average share of commercial services trade to the world, by category (percent)

	Exports		Imports	
	1990-94	1995-98	1990-94	1995-98
Communication	11.6	8.9	8.5	8.1
Insurance	21.8	16.0	18.9	18.0
Other financial	5.9	5.2	6.9	7.2
Computer and information	7.1	6.3	3.4	3.7
Royalties and license fees	2.4	6.1	14.0	12.8
Management	9.0	9.2	11.2	13.6
R&D	7.8	9.5	3.8	3.7
Architect, engineering & other	9.4	13.4	4.4	4.9
Miscellaneous	13.1	13.2	15.6	14.4
Audio-Visual	4.1	5.5	5.1	6.1
Total	**92.1**	**93.3**	**91.7**	**92.5**

Source: Canada's International Transactions in Services, Catalogue 67-203-XPB), Statistics Canada

Note: In order to concentrate on bid export items, we have excluded five categories from the study, as their share in total trade was very small. Those excluded categories are construction, non-financial commissions, equipment rental, advertising and personal, cultural and recreational All these five categories combined contributed about 7 percent of Canada's total exports to the world and 6 percent of Canada's exports to the US.

The composition of services trade with the US was more or less similar to the rest of the world except for few categories. In total the share of services exports to the US has fallen from 64 percent in 1990-94 to 61 percent in 1995-99. Similarly, the share of imports from the US remained at 71 percent throughout these two periods. Comparing the US share of each category to the total US share in commercial services given in Table 10, we find that both exports to the US and imports from the US

are concentrated on computer, R&D and audio-visual. The imports are also concentrated on royalties and license fees.

Table 10. The US share of Canadian exports of commercial services, by category

	Exports		*Imports*	
	1990-94	1995-99	1990-94	1995-99
Communication	67.4	54.0	51.3	51.9
Insurance	57.0	56.1	50.8	49.1
Other financial	47.5	48.1	48.3	52.3
Computer and information	74.3	75.0	94.3	85.4
Royalties and license fees	51.0	61.5	83.4	76.9
Management	64.4	64.5	84.9	86.7
R&D	76.2	73.7	73.5	81.5
Architect, engineering and other	34.8	28.3	51.3	62.4
Miscellaneous	79.1	71.1	88.1	90.5
Audio-Visual	86.2	87.5	83.6	86.7
Total	**63.9**	**60.6**	**71.0**	**71.7**

Source: Canada's International Transactions in Services, Catalogue 67-203-XPB), Statistics Canada

Trade in services can be among related parties or foreign third parties (arms length client).[9] The share of trade carried out by related parties in Canada's total services trade with the US is given in Table 11. In Canada's total exports of services to the US, about 43 percent was carried out through

Table 11. Share of trade carried out by related parties to the US, by affiliation (percent)

	Exports		Imports	
	1990-94	1995-98	1990-94	1995-98
Computer & inform.	49.0	47.7	39.0	40.3
Royalties & license fees	72.0	56.0	86.5	86.7
Management	79.8	74.8	88.8	86.9
R&D	93.6	90.0	94.1	87.6
Miscellaneous	68.9	68.3	87.5	89.0
Total	42.1	43.0	58.0	57.5

Source: Canada's International Transactions in Services, Catalogue 67-203-XPB), Statistics Canada
Note: In this table, we have included only those categories of commercial services whose shares of related trade was higher than the related share of total commercial services for at least one time period.

related parties. That is, out of Canada's total exports of commercial services to the US, 43 percent transaction was made by US subsidiaries in Canada and the remaining 58 percent was made by either Canadian or MNCs of foreign countries' other than the US. On the import side, the share of related transactions with the US was 58 percent. These shares are almost stable during the 1990 to 1998

[9] When transactions take place between Canadian parents and Canadian subsidiaries, and between foreign subsidiaries and foreign parents, then such transactions are called related. However, if transactions take place between Canadian companies and third parties, then they are called other or not related.

period. Hence the share of related trade in Canada's commercial services exports to the US is lower than the share of related trade in its imports from the US.

In Canada's exports to the US, the share of related exports was very high on R&D, management and royalties and license fees. The share of related imports was also high on these categories. Over time, the share of related exports on computer information, management, royalties and license fees, and R&D fell. However, on import side only the share of R&D fell in 1995-98 period compared to 1990-94.

The largest volume of commercial services trade in Canada is carried out by resident companies which are Canadian controlled followed by US controlled. Both of them combined covered about 90 percent of Canada's exports and imports of commercial services, as is evident from Table 12.[10] From this table it is also clear that the share of Canadian controlled firms in Canada's exports of commercial services was much higher than their share in Canada's imports of commercial services. For the US controlled firms, it was just the opposite; their share of Canada's services exports was lower than their

Table 12. Share of commercial services by category (percent), by country of control

	Exports				Imports			
	1990-94		1995-98		1990-94		1995-98	
	Canada	US	Canada	US	Canada	US	Canada	US
Communication	97.5	1.7	93.8	2.1	97.4	0.7	93.5	1.0
Insurance	57.9	24.0	56.3	22.6	50.1	31.6	47.9	32.1
Other financial	98.1	1.9	94.9	4.4	97.7	2.1	93.8	3.6
Computer & information	56.3	38.6	62.8	27.7	59.3	33.0	59.2	30.4
Royalties and license fees	57.5	31.6	70.8	19.3	5.8	75.9	10.5	66.3
Management	75.8	14.5	78.9	12.6	22.1	63.0	31.0	56.3
R&D	69.4	16.4	68.0	17.5	30.3	48.8	28.0	56.1
Architect, engin. & other	75.2	11.7	79.1	12.1	62.9	18.4	68.0	17.5
Miscellaneous	35.6	57.4	41.2	52.5	17.5	81.4	14.9	83.5
Audio-Visual	85.2	14.8	82.7	17.3	80.6	17.9	78.1	19.5
Total	**67.6**	**22.3**	**69.1**	**21.0**	**46.1**	**43.3**	**47.4**	**41.1**

Source: Canada's International Transactions in Services, Catalogue 67-203-XPB), Statistics Canada

share of Canada's imports of commercial services. On an average, the share of exports by companies controlled by Canadians rose from 67.6 percent in 1990-94 to 69 percent in 1995-99, whereas the share of exports by US controlled firms fell from 22.3 percent to 21 percent. On the import side, the share of Canadian controlled firms rose to 47.4 percent in the second period from 46 percent in the

[10] The sum of the entries under Canada and the US for a given category of commercial services and for a given time period may be less than 100. If that is the case, the remaining share of trade is carried out by companies which are neither Canadian controlled nor US controlled.

first period. The share of imports from the US controlled firms fell from 43 percent to 41 percent during the same time period. The remaining share of trade was through companies controlled by foreign countries other than the US.

On the export side, the share of Canadian controlled firms rose on computer information, royalties and license fees, equipment rentals, management and advertising in the second period compared to the first period (compare the percentage given in column 1 with that given in column 3 in Table 12). The share of Canadian controlled firms fell for communication, insurance, R&D and audio-visual. In most of the cases, but not always, the rise in share of Canadian controlled firms was taken by the fall in share of US controlled firms and vice versa.

Canadian controlled companies dealt mostly with unaffiliated clients, as their exports share to unaffiliated parties was 76.7 percent in 1990-94 and 74.8 percent in 1995-98 (Table 13). However,

Table 13. Canada's services trade by country of control and affiliations

	Exports				Imports			
	1990-94		1995-98		1990-94		1995-98	
	Affiliated	Un-affiliated	Affiliated	Un-affiliated	Affiliated	Un-affiliated	Affiliated	Un-Affiliated
Canadian Control	23.3	76.7	25.2	74.8	14.7	85.3	17.6	82.4
US control	67.6	32.4	62.5	37.5	84.2	15.8	84.2	15.8
Other Countries control	65.1	35.0	58.6	41.4	73.7	26.3	74.7	25.3
Total	37.4	62.6	36.3	63.7	51.0	49.0	51.5	48.5

Source: Canada's International Transactions in Services, Catalogue 67-203-XPB), Statistics Canada

most of the export transactions of the US controlled companies were between parents and subsidiaries (67.6 percent in the first period and 62.5 percent in the second period). On the import side, the share of intra-firm trade between Canadian parents and Canadian subsidiaries was even smaller. It was 14.7 percent in 1990-94 and 17.6 percent in 1995-98. And the imports by US controlled firms in Canada was mostly (about 84 percent) from their US parents. Overall, the share of intra-firm trade in Canada's services exports was 37.6 percent in 1990-94 and that fell to 36.3 percent in 1995-98. On the import side, the share of intra-firm trade is about 51 percent in both periods.

3.2. Canada-US foreign direct investment patterns

Foreign direct investment (FDI) stock reached $291.5 billions in 2000, a 4.5 fold increase from $64.7 billion in 1980. Similarly, the stock of Canadian direct investment abroad (CDIA) rose from

$28.4 billion in 1980 to $301.4 billion in 2000, a 10.6 fold increase. Both the stock of FDI and CDIA as a share of GDP exhibit, as illustrated in Figure 7, a growing trend over the 1980 to 2000 period. The FDI stock was higher than CDIA from 1980 to 1996. Since 1997, CDIA has outpaced the FDI in Canada. The investment linkages with the US, shown in Figure 8, point up the some interesting and opposite patterns. They are (i) the share of the US in Canada's total stock of direct investment abroad has been on a declining trend since reaching to its highest mark of 69.4 percent in 1985, (ii) the share of total stock of FDI in Canada coming from the US began its decline in 1985, remained stagnant between 1990 and 1994, and began its partial recovery but ended on a negative path in 2000, (iii) in relation to the US, neither the CDIA nor FDI appeared to have responded to real GDP growth in the US and Canada in the 1990s.

To get some industry perspective on US direct investment (USDI) in Canada, first we sorted the industries with largest USDI stock in Canada based on 1999 value. The ten largest industries based on that sorting are given in Table 14. Out of these ten industries, nine of them were also the largest

Table 14. Industry distribution of Canada's inward FDI stock from the US, largest 10 industries (percent), 1988-99

	Industry share of US FDI		Annual growth of US FDI	Share of US in total FDI
	1988	**1999**	**1988-1999**	**1999**
Petroleum & Natural Gas	22.6	11.1	0.4	95
Electronic Equipment & Computer Services	5.4	9.1	12.3	99
Consumer and Business financing Intermedi.	3.0	8.5	17.9	98
Insurers	7.8	8.2	7.5	65
Chemicals & Other Chemical Prods.	8.2	7.8	6.7	63
Motor Vehicles & Parts & Access.	11.3	7.1	2.7	79
Wood, Wood Prods. & Paper, Integ. Ops	0.9	4.3	23.4	-
Investment Intermediaries	1.7	3.7	15.3	50
Wood & Paper Prods.	2.0	3.7	13.1	100
Food (except Retailing)	3.6	3.7	7.3	100

Source: Statistics Canada

Note: The shares are calculated using the industry sum of available FDI data for the US. In 1999, this sum was 82.4% of the total FDI from the US.

industries for total FDI stock in Canada except wood and paper. It means that the largest FDI recipient industries are those which receive largest amount of USDI. Then in columns 2 and 3 in Table 14, we report the industry share of USDI in Canada in 1988 and 1999. About 67 percent of USDI is allocated into these ten industries. The distribution of industry share among them changed in 1999 compared to 1988, but the total share of these ten industries has not changed, indicating a stable flow of USDI in these industries. The third column shows the compound annual growth of USDI in

Canada in 1999 based on 1988. The stock of USDI in all industries except in petroleum and natural gas and motor vehicle increased by an impressive amount. The last column provides the US share of FDI in Canada. Five industries received at least 95 percent of FDI from the US and the remaining five received at least half of their FDI from the US. From the above analysis, three conclusions follow. They are: (i) the largest recipient industries of FDI in Canada are the largest recipient of USDI, (ii) in all ten largest industries, US share of FDI is very high (iii) the growth rate of USDI in most of these ten industries is impressive.

In Table 15, we repeat the same process based on stock CDI in the US in 1999. The list of ten largest industries according to the second sorting is given in Table 15. Out of these ten industries, eight (except railway transport and iron and steel) were also globally largest industries for CDIA stock in 1999. The share of these ten industries in CDI in the US increased from 74 percent in 1988 (sum of column 1) to 88 percent in 1999 (sum of column 2). The increase in their share could also be understood looking at very high annual growth rate of CDI in the US in column 3.

Table 15. Industry distribution of CDIA stock in the US, largest 10 industries (percent), 1988-99

	Industry share of CDI in the US		Annual growth of CDI in the US	Share of CDI in the US in CDIA
	1988	1999		1999
Deposit Accepting Intermediaries	7.3	17.7	18.0	37
Printing and Publishing	10.8	16.3	13.0	86
Non-Ferrous Metals & Primary Metal Prods.	12.8	12.3	8.4	47
Insurers	12.1	11.2	8.1	73
Petroleum & Natural Gas	10.7	8.5	6.6	47
Railway Transport	4.1	6.6	13.8	-
Investment Intermediaries	5.9	4.5	6.2	26
Chemicals & Other Chemical Prods.	2.7	3.7	12.2	58
Iron, Steel & Related Prods.	3.4	3.6	9.3	-
Wood, Wood Prods. & Paper, Integ. Ops	4.3	3.5	7.0	100

Note: The figures are calculated using the industry sum of available CDIA data for the US. In 1999, this sum was 60.4% of the total CDIA in the US.

The last column shows that contrary to DI from the US, for the largest ten industries, the US is not necessarily the predominant destination for CDIA.

In the 1990s, Canada's exports and imports of goods and services have expanded rapidly, thereby deepening the linkages between Canada and the US. This conclusion, however, does not necessarily extend to Canada's international direct investment performance. Overall, Canada's linkages with the

US have remained unchanged or declined as measured by the US share of total stock of FDI in Canada and by the US share of total stock of Canadian direct investment abroad.

4. Factor Content and Revealed Comparative Advantage

4.1. Factor content of Canadian exports

The pattern of Canada's exports is largely a result of changes in specialization in productive activities of firms. Businesses and entrepreneurs respond to the availability of inputs and access to markets. Export flows embody inputs that reflect total input availability in an economy. In practical terms, a country exports the services of its abundant inputs and imports services of its scarce inputs, when input abundance is measured relative to a world input-endowment standard. Empirically, changes in the input abundance in Canada would be reflected in its export flows.

Using Statistics Canada's input-output table of the Canadian economy, we compute factor content of Canada's exports for years 1985, 1990 and 1997. Since the input output tables are for the whole Canadian economy, the factor content we compute is for Canada's total exports to the world, not to the US. However, as we saw in Annex A, Table A1, since the US share of Canada's exports is very high and almost symmetric across industries, we can generalize the results for the US. For this analysis, we use more disaggregated industry level data than in previous sections. Our sample consists of 119 industries in the business sector (93 goods producing industries and 26 service industries).[11] There are altogether 110 industries in SIC 3-digit level in goods producing sector. Therefore, with 93 industries in the study, we are much closer to SIC 3-digit level of industry analysis in goods producing sector. The methodology given in Annex B allows us to compute the direct and indirect factor content in Canada's exports. Note that the proportion of total factor content may differ substantially from the direct factor content for an industry if the production technology of this industry is different from the technologies of its input producing industries. The computation results on factor content are presented in Table 16.[12] Not surprisingly with the increase in exports, the amount of capital embodied into them has risen. However, The physical capital content in one million dollar of exports of the

---

[11] In the input output table, at the link level of aggregation, there are 167 industries. Out of them, the business sector has 154 industries and the remaining 13 industries are in government sectors. Since the objective of this study is to measure the capital, labor and imported input contents of Canadian exports, which are associated with business sector , we will concentrate on industries in business sector only. In business sector also, seven industries are excluded from the study. These industries do not have capital stock and labor requirement data and do not exports or imports except transportation margin industry which has small amount of exports. Therefore, we have taken 147 industries in business sector into our study. Out of those 147 industries, since the data on capital stock is only available for 119 industries, we have converted the 147 industries into 119 industries and computed factor and imported input contents. The list of 119 industries is very close to the list of industry at SIC 3-digit level for goods producing sector. At 3-digt level, the goods producing sector has 110 industries.

[12] In this section, the results presented refer to Canada's exports to the world, given that the input-out table is not user-friendly to compute patterns for the US alone.

overall business sector in Canada had fallen by 1997 some 42 percent from its input-content level in 1985. Given that the labor content in one million dollar of exports over the same period also fell by 40 percent, the capital to labor ratio decreased marginally from 83, 582 dollars per employee to 80,705 dollars per employee (the sixth column in Table 16).

The magnitude of the decline in capital-labor differs in goods and services sectors. In goods sector, the physical capital content in one million dollar of exports of all goods industries in Canada had fallen by 1997 some 44percent from its input-content level in 1985. Given that the labor content in one million dollar of exports over the same period also fell by 42.3percent, the capital to labor ratio decreased marginally.

Table 16. Factor content of the Canadian exports

	1985	1990	1997
Total Business Sector			
Exports (millions of $)	125,086	159,554	312,747
Capital embodied in exports (millions of $)	125,229	139,595	181,645
Labor embodied in exports (thousands of employee)	1,498	1,693	2,251
Capital embodied in 1 million $ of exports	1,001,141	874,906	580,804
Labor embodied in 1 million $ of exports	12.0	10.6	7.2
Total Capital-labor ratio embodied in exports	83,582	82,468	80,705
Goods Producing Industries			
Exports (millions of $)	107,974	134,171	261,037
Capital embodied in exports (millions of $)	95,053	104,478	130,090
Labor embodied in exports (thousands of employee)	1,123	1,233	1,568
Capital embodied in 1 million $ of exports	880,336	778,690	498,359
Labor embodied in 1 million $ of exports	10.4	9.2	6.0
Total Capital-labor ratio embodied in exports	84,651	84,760	82,954
Services Producing Industries			
Exports (millions of $)	17,112	25,383	51,709
Capital embodied in exports (millions of $)	30,176	35,117	51,554
Labor embodied in exports (thousands of employee)	375	460	682
Capital embodied in 1 million $ of exports	1,763,391	1,383,493	996,998
Labor embodied in 1 million $ of exports	21.9	18.1	13.2
Total Capital-labor ratio embodied in exports	80,385	76,327	75,537

In 1997, services industries used two times the amount of physical capital and used, almost two and a quarter times the amount of labor than was used by the goods industries in one million dollar of exports. The physical capital content in one million dollar of exports of all services industries in

Canada had fallen by 1997 some 43.5percent from its input-content level in 1985. Given that the labor content in one million dollar of exports over the same period fell by a smaller proportion of 39.7 percent, the capital to labor ratio decreased much more markedly than in the goods industries.

Services export industries use at least twice as much physical capital and labor in absolute amounts than the goods exporting industries. The input-content analysis suggests that both the physical capital and labor content in a one million dollar export bundle of goods as well as of services exhibits a declining pattern. However, the goods exporting industries adopted productivity enhancing technologies that facilitated a greater reduction in the use of physical capital and labor services than was the case for the services exporting industries.

Total amount of labor embodied in exports reveals the structure of aggregate labor force, but it cannot shed light on the relative composition of different types of labor in the production process.. Labor force can be distinguished by the amount of investment workers have made in education, training and acquisition of various other skills. In the early 1970s, Canadian exports were most strongly intensive in natural resources, physical capital, and labor with at most an elementary-school education (Postner, 1975). Whether there has been any change in Canada's skill content of labor is an important policy issue. We address this issue using the data on labor quality based on labor force survey by Statistics Canada. We grouped the data on labor skill into four categories for each industry. They are (i) 0 to 8 years of schooling (ii) high school (iii) post secondary certificate or diploma (iv) university graduate.[13]

Our results in Table 17 show that labor skills content of Canada's exports has changed, as measured by the level of education. In the overall business sector consisting of 119 industries, by 1997, the share of workers with high school or less education had dropped and that of workers with post-secondary and university education had advanced smartly.

The goods exporting industries reduced input content of workers with less than high school education and increased the use of university and high school graduates by a wider margin than the services exporting industries in Canada. The intensity of post-secondary graduates improved much more rapidly in the services exporting industries, however.

---

[13] The data set is available at SIC 3-digit level from 1983 to 1998 for the whole economy. We use data only for business sector. The data from 1985 to 1989 and form 1990 to 1998 are based on two different surveys. They are not fully compatible. There are six type of labor skills in the first period and seven type in the second period. We have aggregated these skills into four categories for each period to make the skill content more comparable across time.

To sum up, Canada's exports of goods and services have become much more intensive in labor skills than was the case in the 1970s and 1980s.

Table 17. Share of labor-skill embodied in Canadian exports (percent)

	Year	*Up to 8 years of schooling*	*High school*	*Post Secondary*	*University*
Total Business Sector	1985	13.0	52.0	21.7	10.1
	1990	8.6	45.3	33.8	10.0
	1997	4.6	37.6	40.5	13.2
Goods Industries	1985	13.4	52.5	22.6	8.4%
	1990	8.5	44.8	33.5	7.6
	1997	5.3	37.3	40.9	10.6
Services Industries	1985	21.6	52.1	16.1	3.8
	1990	16.1	50.1	17.5	3.8
	1997	10.8	42.1	35.0	4.5

Note: The share does not add up to 100, as some data were suppressed due to confidentiality.

4.2. Imported input content of Canadian exports

The production and export of goods requires not only physical capital and skilled workers but also other goods and intermediate inputs produced elsewhere in the world. One aspect of globalization based on innovations and trade liberalization is the deepening of specialization and niche production of not only final goods but also intermediate inputs and processes across countries. Again, we use Statistics Canada's input-output table of the Canadian economy to compute the imported input-content of Canadá's exports which is presented in Table 18. Our calculations capture both direct and indirect inputs required to produce a dollar worth of exports from Canada.

Although the 26 services industries in our sample did not increase the use of imported inputs in their exports until the 1990s, the goods exporting industries in Canada had increased by 1997 the share of imported inputs to more than 37 percent from under 24 percent in 1980. The overall trend appears

to be that Canadian exporters of goods and services are making a compelling move in the increased use of imported inputs in achieving export sales abroad.

Table 18. Share of imported input-content in total exports (in percent)				
	1980	*1985*	*1990*	*1997*
Total Business Sector	22.2	25.8	25.6	32.5
Goods Industries	23.7	28.9	29.1	37.2
Services Industries	7.0	6.4	6.8	8.4

The above table provides the summary for the sectors, however, one important aspect will be to look at how the number of industries and their share of exports are changing for different ranges of imported input content share in exports. To decipher this pattern across industries, we compute the share of imported input content in its exports (μ_{xi}) for each ith industry. Then we group industries in total business sector, goods producing sector and services producing sector into six categories: those with share of imported input content in exports less than 10 percent, between 10-20 percent, 20-30 percent, 30-40 percent and more than 40 percent for year 1980, 1990 and 1997.[14] Then for each of these six categories, we provide information on number of industries and the share of Canada's total exports by these industries for each year in Table 19.

Table 19 should be read as follows. Let us take the first row. In 1980, there were 26 industries in business sector whose share of imported input content in their exports was less than 10 percent and they were supplying 28.7 percent of total Canada's exports to the world. That number has dropped to 17 in 1997 and the exports share by these 17 industries was 20.6 percent. However, note that we cannot say whether the 17 industries in 1997 with less than 10 percent of imported input content are the subset of 26 industries in 1980. Any of the three possibilities could happen: all of them might be different, or some of them might be same, or all of them might be same.

Table 19 shows that the overall pattern of the imported input-content in Canada's export industries is upward trended. For the overall business sector, the number of industries and the share of exports are falling for 10 percent, 10-20 percent and 20-30 percent share ranges and rising for 30 percent or higher categories. However, the increased imported input use is unevenly distributed in goods and services-producing industries. The pattern in business sector more or less is determined by the pattern in goods sector. In 1980, there were only 18 industries whose share of imported input

[14] In services producing sector there are only three categories, as there were no industries with share of imported inputs in exports higher than 30 percent.

content in their exports was less than 30 percent in goods producing sector. That number has gone up to 41 in 1997. Similarly, the share of exports from these categories of industries rose from 22 percent

Table 19. Distribution of industries by shares of imported input content, 1980-97

	1980		*1990*		*1997*	
	No. of Industries	Share of exports	No. of Industries	Share of exports	No. of Industries	Share of exports
Total Business Sector						
$\mu_{xi} \leq 10\%$	26	28.7%	26	27.4%	17	20.6%
$10 < \mu_{xi} \leq 20\%$	41	24.0	41	21.0	29	15.0
$20 < \mu_{xi} \leq 30\%$	31	26.7	31	18.9	30	15.4
$30 < \mu_{xi} \leq 40\%$	11	6.2	13	12.5	26	16.4
$\mu_{xi} > 40\%$	10	14.4	8	20.2	17	32.6
Goods Industries						
$\mu_{xi} \leq 10\%$	8	23.2%	8	16.5%	3	11.5%
$10 < \mu_{xi} \leq 20\%$	38	25.6	36	23.1	21	12.3
$20 < \mu_{xi} \leq 30\%$	29	28.5	30	21.5	28	17.5
$30 < \mu_{xi} \leq 40\%$	11	6.9	13	14.8	26	19.6
$\mu_{xi} > 40\%$	7	15.8	6	24.1	15	39.1
Services Industries						
$\mu_{xi} \leq 10\%$	18	83.5%	18	84.9%	14	66.1%
$10 < \mu_{xi} \leq 20\%$	3	8.4	5	9.8	8	29%
$20 < \mu_{xi} \leq 30\%$	5	8.1	3	5.3	4	4.9

in 1980 to 59 percent in 1997. Therefore, in the goods industries, in 1997, most industries had increased the use of imported inputs into 30 percent or higher categories. Given that more than 75 percent of Canada's goods are imported from the US, this is a clear indication that in the 1990s, Canada's exporters have become more linked to the US suppliers for intermediate inputs to achieve export sales abroad.

In the services industries, in 1997, the use of imported inputs has moved from below the 10 percent share range and into to 10-20 percent share range. In contrast, industries that were using more than 20 percent imported inputs have also moved down into the 10-20 percent usage range.

An empirical observation of deeper economic links across trading economies has been the increased trade in intermediate inputs. Now, the obvious question is in what type of industries was the import content rising? Is the growth in import content strongest where the export growth has been strongest? To answer this question, we compute the growth rate of imported intermediate input and

export growth for each industry in both sectors over the three periods: growth from 1980 to 1985, from 1985 to 1990 and from 1990 to 1997. In the following panel, we present correlation coefficients of growth of imported intermediate inputs and the growth of exports in each of the three periods.

	Growth of Exports		
Growth of imported intermediate input	1980-1985	1985-1990	1990-1997
Goods Industries (93 industries)	0.99	0.93	0.99
Services Industries (26 industries)	0.95	0.89	0.83

Note: All the coefficients are statistically significant at the 1% level.

For the goods industries in Canada, there was strong evidence of almost perfect correlation between the growth in the use of imported inputs and the growth of Canada's exports in all the three periods. For the services industries this linear association between the growths of imported inputs and of exports, despite remaining strong, had eased to 83 percent in the 1990s from a high of 95 percent in the early 1980s. It means that not only the imported input-content has not grown for the services industries at the same pace as it did for the goods industries, but also that exports of goods grew faster than the imports of imported inputs. Our analysis shows that throughout the 1980s and 1990s, there was a sustained pattern of strong growth of imported input use in Canada, which went hand in hand with strong exports from Canada.

4.3. Trade intensities of Canadian industries

Now another related question is how had export intensity and import penetration changed over time. Here, we will concentrate only to 84 Canadian manufacturing industries, which contribute about 80 percent of Canada's exports. Let ξ denotes gross export intensity which is given by percentage share of exports of an industry's in its total shipments. And let ρ denotes the import penetration defined as the percentage share of imports in total domestic consumption. Therefore, the export intensity shows the share of gross output used in the foreign market either for consumption or for intermediate input, whereas the import penetration represents the share of Canadian consumption fulfilled by foreign goods. We have presented both these share in Table 20.

The last row of Table 20 shows that on an average, the gross export intensity of manufacturing industries reached 53.2 percent in 1997, an increase of 52 percent, from its level of 35 percent in 1985. Similarly, the import penetration increased from 37 percent in 1985 to 55 percent in 1997, a 49 percent increase. In gross export intensity range of more than 30 percent, the number of industries increased

to 50 in 1997 from 23 in 1985. In the same range of import penetration, the number of industry increased to 54 in 1997 from 30 in 1985. Therefore, Canadian productions are increasingly shipped to

Table 20. Industry distribution based on gross export intensity and import penetration (percent)

	Gross export intensity			Import penetration		
ξ and ρ	**1985**	**1990**	**1997**	**1985**	**1990**	**1997**
≤10%	32	29	9	24	21	9
10-20%	20	16	9	17	11	16
20-30%	69	13	16	13	14	5
30-40%	6	4	8	8	5	7
40-50%	6	9	6	5	13	9
> 50%	11	13	36	17	20	38
Average	**34.9**	**39.0**	**53.2**	**36.7**	**40.4**	**54.8**

Note: The interval is upper bounded. For Example, if the export intensity of an industry in 1985 was 20 percent, then it will be counted into 10-20 percent range, not into 20-30 percent range.

foreign market, and demands at home are increasingly fulfilled by imported goods. It could probably be an indication of intra-industry trade, which we will analyze in detail in different sub-section.

Since import content of intermediate input is rising and gross export intensity is also rising, it is worthwhile to evaluate net export intensity, defined as difference between gross export intensity and share of imported intermediate input content. Let μ_{si} denote the share of imported-input content in *shipments*. Hence, for industry *i*, the net export intensity is given by $\xi_i - \mu_{si}$. The results are presented in Table 21.

The number of industries as well as the share of exports rises in 1997 compared to 1985, as we move down to the higher range of net export intensity categories given in the first column. For example, in 1985, there were only 18 industries which had net export intensity of more than 30 percent, and these industries supplied 37 percent of Canada's manufacturing export shares. In 1997, the number of industries with higher than 30 percent of net export intensity rose to 36 and the share of exports from them increased to 42 percent. This suggests that not only the imported input was rising over time in manufacturing sector, the gross export intensity was rising faster. As a result, Canadian manufacturing industries have become more international market oriented, even if we net out the increasing use of imported input content used by these industries. In a study with more aggregated level of data for 1974 and 1993 for 18 manufacturing industries in Canada, Campa and

Goldberg (1997) have shown that the tendency for Canadian industry has been toward increased net external orientation.

Table 21. Distribution of net export intensity of 84 manufacturing industries (percent)						
$\xi_i - \mu_{si}$	1985		1990		1997	
	No. of Industries	*Share of Shipments*	*No. of Industries*	*Share of Shipments*	*No. of Industries*	*Share of Shipments*
$\xi_i - \mu_{si} \leq 10\%$	42	39.6%	38	32.7%	15	12.0%
$10 < \xi_i - \mu_{si} \leq 20\%$	14	18.7	11	17.1	22	17.0
$20 < \xi_i - \mu_{si} \leq 30\%$	10	4.3	11	7.5	11	29.5
$30 < \xi_i - \mu_{si} \leq 40\%$	7	17.0	10	20.1	14	14.2
$40 < \xi_i - \mu_{si} \leq 50\%$	6	6.0	5	6.9	10	8.8
$\xi_i - \mu_{si} > 50\%$	5	14.4	9	15.8	12	18.5

Using Spearman rank correlation coefficients among the four indicators of trade orientation we found that the industries with relatively higher share in 1985 and 1990 remained so in 1997.[15] For all

Spearman rank correlation of 84 manufacturing industries			
Rank of	*1985 and 1990*	*1990 and 1997*	*1985 and 1997*
Gross export intensity	0.88	0.85	0.73
Import penetration	0.95	0.93	0.87
Import-content intensity	0.98	0.81	0.82
net export intensity	0.83	0.78	0.70

the four indicators the rank correlation coefficients are high, indicating that the rank of the industries did not change significantly over the sample period. Hence, despite the phenomenal increase in all intensities, the relative pattern of gross intensity, import penetration, imported input content and net intensity remained stable over time.

4.4. Revealed comparative advantage

In this section, we calculate revealed comparative advantage (RCA) for Canada vis-à-vis the US for 84 manufacturing industries at 3-digit Canadian SIC.16 The quantification of RCA is not usually a

[15] To calculate Spearman's rank correlation (r) coefficient for export intensity for 84 industries between 1985 and 1990, we first ranked the industries in 1985 according their export intensity (from low to high or high to low). Then we ranked the export intensity for 1990 in the same way. After that we found the sum of squares of the differences, d, between the ranks of export intensity in 1985 and those in 1990 and substituted in the formula $r = 1 - \left(6\left(\sum d\right)^2 / \left(n^3 - n\right)\right)$, where n is a number of industries (84 in our case) for two time periods. We repeated the same process for other pairs of year of export intensity and also for other intensities as well.

trivial task and three is not a clear-cut methodology on how one should proceed with mutli-country, multi-commodity case. One problem is that the theoretical concept of comparative advantage is usually specified with respect to pre-trade relative prices whereas in real world we have data on post-trade equilibria. Even though Balassa (1977) export share index of RCA is not flawless, we use it in our methodology as a first approximation. The use of this index implies that the level of trade barrier between two countries in the study is the same and each country has trade on each industry (Bowen, 1983). It could be argued that the first assumption is not far off while compared between Canada and the US. The second assumption is satisfied, as out of 84 industries only three industries had no trade data for either Canada or for the US. The export-share measure of RCA is

$$RCA_i^j = \frac{x_i^j}{X^j} / \frac{w_i}{W}, \qquad i = 1, 2, \ ,84 \text{ and } j = \text{Canada and US}$$

where the subscript i denotes an industry and the superscript j a country; x_i^j is country j's export of commodity i, X^j is the total export of country j to the world, w_i is the export of good i from the world and W is the total export from the world. By using the ratio of the above index for Canada and the US, we obtain the following index for each of 84 industries:

$$R_i = \frac{x_i^{Canada}}{X^{Canada}} / \frac{x_i^{US}}{X^{US}} \qquad (1)$$

Now the next question is if Canada has, the index calculated using equation (1), higher (lower) than one, can it be interpreted as Canada having revealed comparative advantage vis-à-vis the US in the given industry? If there are only two goods, then there is exact relation between comparative advantage as indicated by pre-trade relative prices and the observed trade pattern, and it is given by direction of trade. However, with multiple goods and countries the methodology is, again, not clear-cut. Hillman (1980) has developed an index that has to be fulfilled for obtaining the correspondence between RCA and pre-trade relative prices in country comparison with respect to a specific commodity: the transformation performed to the index or RCA has to be monotonic. In a study, Simone and Marchese (1989) has shown that this condition is fulfilled for the great majority of commodities traded in 1985 by 118 developing countries. We do not test this condition in this paper,

[16] The data for the US were converted to 1980 Canadian SIC using the document "Concordance between the standard Industrial Classifications of Canada and the United States: 1980 Canadian SIC-1987 United Cda, Catalogue no. 12-574E.

but make a first guess that the data between Canada and the US will satisfy Hillman criteria so that $R_i > 1$ (< 1) could be taken as industry with revealed comparative advantage (disadvantage) for Canada compared to the US.

By converting data on total exports to the world for Canada and the US at the same industry category, we computed the RCA using equation (1). The industries with value higher than one (that is, the industries with RCA for Canada vis-à-vis the US) are given in Annex C, Table C1. There were 31 (out of 84) industries in which Canada had RCA in 1985. By 1997, Canada had lost its RCA position in seven of them and gained in new thirteen industries. Therefore, in 1997, Canada had RCA in 37 industries, which are listed in Table C1.[17]

Since comparative advantage might be either due to factor endowment or due to technological differences, we relate the ranking of industries according to R_i with their ranking according to total (direct and indirect) capital labor ratio embodied to them, which we computed in sub-section 4.1.

Based on total capital labor ratio embodied in exports, we decompose 84 manufacturing industries into two categories: those which have higher capital labor ratio than the national average on manufacturing, hence called capital intensive industries, and those which have lower capital labor ratio than the average, hence called labor intensive industries. In notational form, an industry i is considered capital intensive if $k_i/l_i > \bar{k}/\bar{l}$, where k_i l_i are the total capital and labor embodied in industry i respectively; and $\bar{k}$ and $\bar{l}$ are the average of total capital and labor embodied for the whole manufacturing sector. If the relation reverses for an industry, then it is called a labor intensive industry.

Note that for industry i the comparative advantage position might change reversing R_i from greater than one to less than one and vice versa. Similarly, an industry can be capital intensive in one year and labor intensive in another year depending on its ratio of capital and labor to the national average capital labor ratio in manufacturing.

---

[17] In order to compute RCA, we have to get Canada's total exports and US total exports to the world at the same industry categories. Since the classification of industries is different between two countries, we have to run a concordance. For that purpose, first we got US trade data from 1980 to 2000 from NBER database and United States International Trade Commission home page at US 4-digit level. Then we converted them into Canadian 3-digit SIC. Since many US industries, even at 4-digit level, do not fall uniquely into single Canadian 3-digit industry, the Statistics Canada catalogue 12-574 was not sufficient. In that situation, we use the augmented concordance table kindly provided to us by Daniel Trefler (for detail, see Trefler, 1999).

In 1985, 31 Canadian industries have comparative advantage over US industries. These industries were producing 70 percent of total Canada's export to the world. Out of that share, two-third of exports was produced by industries which were labor intensive, and one-third was produced by capital intensive industries (see Table 22). The share of exports by those industries where Canada has comparative advantage has fallen slightly over time to 66.6 percent in 1990 and 65.1 percent in 1997, even though the number of industries with comparative advantage has increased from 30 in 1985 to 37 in 1997. There is an interesting change in 1997 compared to previous two years. Even though the share of exports by industries with comparative advantage has not changed much compared to previous years, however, substantial share of these exports has been shifted from labor intensive industries to capital intensive industries. Note that the share of capital intensive industries with comparative advantage has increased from 24.4 percent in 1990 to 41.9 percent in 1997. On the other hand the share of labor intensive industries has fallen from 42.2 percent in 1990 to 23.2 percent in 1997. There is not such a drastic shift in the industries that US had comparative advantage.

Table 22. Trends in Canada's revealed comparative advantage vis-à-vis the US

		RCA > 1			RCA < 1		
		$\frac{k_i}{l_i} > \frac{\bar{k}}{\bar{l}}$	$\frac{k_i}{l_i} < \frac{\bar{k}}{\bar{l}}$	Total	$\frac{k_i}{l_i} > \frac{\bar{k}}{\bar{l}}$	$\frac{k_i}{l_i} < \frac{\bar{k}}{\bar{l}}$	Total
1985	Share of exports	22.9	46.8	69.7	10.1	19.9	30.0
	No. of industries	11	19	31	13	37	50
1990	Share of exports	24.4	42.2	66.6	4.7	27.9	32.6
	No. of industries	10	21	31	8	42	50
1997	Share of exports	41.9	23.2	65.1	6.2	27.8	34.0
	No. of industries	14	23	37	9	35	44

Note: We have only 81 number of industries instead of 84 manufacturing industries because RCA for three industries could not be computed as exports either for Canada or for US were zeroes.

5. Intra-industry Trade and Productivity

Increasing trade allows countries to specialize in the production. Specialization may occur among industries, among firms within industries and also within firms. In this section, we are interested to examine what type of specialization has taken place due to our increasing trade linkage with the US. We adopt the definitions of (Fuentes-Godoy at al, 1996) and compute different specialization index using trade flows with the US for 84 manufacturing industries at SIC 3-digit level for 15 years of data from 1983 to 1997. Since we are interested with Canada's trade with the US, we use Canada's exports to the US and Canada's import from the US to compute intra industry trade.

Let x_{it}, m_{it} and q_{it} be exports, imports and shipments of production in industry i in year t. Let g_{it}, n_{it} and z_{it} be gross international trade specialization, inter-industry specialization and intra-industry specialization. Hence we have

$$g_{it} = \frac{x_{it} + m_{it}}{c_{it}},\ n_{it} = \frac{|x_{it} - m_{it}|}{c_{it}} \text{ and } z_{it} = g_{it} - n_{it} \equiv \frac{2\min(x_{it}, m_{it})}{c_{it}},$$

where $c_{it} = q_{it} + m_{it} - x_{it}$, is consumption.[18] Thus the formula estimate to what extent the gross trade, net trade and intra trade are related (or deviated) with (from) consumption. It is clear from the above definition that if an industry only exports or imports, all gross specialization reflects inter-industry specialization and an industry's exports is equal to its imports, all specialization will be intra-industry specialization. We can aggregate these definitions across industries and arrive into aggregate concepts of gross, inter-industry and intra-industry specialization. Note that the level of specialization indices depend on the level of aggregation; the higher the level of aggregation, the value of inter-industry rises and the value for intra-industry falls and vice versa. There is not clear what level of aggregation one should adopt for computing these specialization. However, the rationale is that the level of aggregation should be compatible with the production technology. An industry should be defined at that level where the factor intensity is similar across establishments in that industry. Therefore, the higher the level of disaggregation, the more precise the definitions will be.

---

[18]When $x_{it} > m_{it}$, intra industry trade is represented by $x_{it} - m_{it}$ and it will be twice the minority flow $2m_{it}$. Similarly if $x_{it} < m_{it}$, intra industry trade will be represented by twice the minority flow, $2x_{it}$. Note that in the first case if $2x_{it} > c_{it}$ and in the second case if $2m_{it} > c_{it}$, then intra-industry trade will be more than 100 percent. Note that the concept of intra industry trade defined here is similar of Grubel-Lloyd index (except the denominator) given by $\left(x_{it} + m_{it} - |x_{it} - m_{it}|\right) / \left(x_{it} + m_{it}\right)$. Actually, the denominator in the above definition could be output of industry i as well.

It is clear from Figure 9 that both inter and intra industry has grown up significantly during 1983 to 1997. However, the growth in intra industry is much larger indicating that the main focus of trade was between the same industries rather then different industries defined in line with comparative advantage as shown in Figure 13. And that trend is strengthening in recent years, as the gap between the percentage of intra and inter industry specialization is widening. The fitted time trend equations for gross, inter and intra trade specialization are given in the following panel. It shows that the intra industry trade rose almost 2 times faster than inter industry per annum.

Time period: 1983 to 1997	*Coefficient of Time Trend*	*t- value*	*Growth*
Gross orientation	0.039	(7.99)	4.02
Inter industry trade	0.029	(5.04)	2.94
Intra industry trade	0.046	(8.95)	4.69
Share of intra to inter industry trade	0.017	(3.73)	1.70
Note: The t-values are significant at 1% level.			

We were interested to examine what has determined the intra industry trade specialization. Intra industry trade may occur in industries that are differentiated on the demand side or on the supply side or both. The determinants of intra industry trade that are considered in the literature are economies of scale, demand for variety, product differentiation and difference in technology. Economies of scale is an important factor for intra industry trade, however, there are no data available to measuring this concept. As a proxy, we use number of employees per establishment. Similarly, there are no data to capture product differentiation from the demand side. Therefore, we use a variable that could capture the notion of differentiated product from the supply side. To that effect, we use the share of high school graduate in total labor force in an industry. The difference in technology is captured using capital labor ratio. We use free trade (FTA) as dummy. We have allowed for industry fixed effects and time variant effect is taken by time. We estimated pooled regression for this variable using the following equation.

	Share of high school graduates	Capital labor ratio	Employment per establishment	FTA	Time
Intra industry trade	108.78 (2.01)[b]	3.75 (8.91)[a]	-0.37 (-2.12)[b]	34.04 (1.23)	-7.16 (-1.76)[b]
	$R^2 = 0.21$				
	n = 1134				

Note: The share of high school graduates is the percentage of high school graduate in total labor force. Capital labor ratio is the net capital stock per employee. Employment per establishment is the total number employee divided by number of establishments in an industry.

[a]Significantly different from zero at the 1% level, using a two-tailed test.

[b]Significantly different from zero at the 5% level, using a two-tailed test.

Except FTA, all other explanatory are significant, indicating that the increase share of high skill labor force and increase in capital labor ratio leads to higher level of intra industry specialization. As the size of the firm in terms of number of employee rises, intra industry trade falls. This may be due to the fact that intra industry trade is mainly carried out by relatively smaller firms that takes the benefit of niche product market in the US.

From the above analysis, it is evident that the increased trade has led to intra industry specialization. However, the importance of trade arises only if it increases productivity. The interaction between trade and productivity between two countries is not well understood. However, there are evidences suggesting that increase in international trade has led to increased productivity for many countries. Edwards (1998) provide a good overview of the existing literature. There has been some studies on Canada especially relating FTA with productivity. Trefler (1999) finds that FTA increased labor productivity in Canada's manufacturing sector and he finds the highest increase in those industries where the tariff cuts were highest. Harris and Kherfi (2000) find that the increases in intra industry specialization seem to have contributed significantly to productivity growth in Canadian manufacturing since the FTA. We estimated the impact of intra industry; inter industry, size (as defined above) capital labor ratio and FTA on level of productivity for manufacturing industry at 3-digit level with 15 years of data (from 1984 to 1997).

	Intra industry specialization	Capital labor ratio	Employment per establishment	FTA	Time
Labor productivity	108.78 (2.01)[b]	0.001 (31.69)[a]	0.001 (2.25)[b]	0.011 (5.68)[a]	-0.000 (-0.73)
$R^2 = 0.86$ n = 1134					

Note: Capital labor ratio is given as net capital stock per employee. Employment per worker is the total number employ in establishments in an industry.

[a]Significantly different from zero at the 1% level, using a two-tailed test.

[b]Significantly different from zero at the 5% level, using a two-tailed test.

Our results suggest that increase in intra industry trade raised labor productivity. Employment per establishment is positively significant, indicating that the higher the size of the firm, the higher will be labor productivity. Here, FTA is significant suggesting its positive impact on labor productivity in Canada.

6. Canada's Competitive Position in the US Market

Throughout this paper, we tried to assess and analyze the importance of the US market for Canada's trade and investment without taking account of other countries. However, Canada's relative position depends on how other market competitors are performing in the US. One sure way to eyeball how economic landscape is being reconfigured in the US is to browse through the ebb and flow of market share of major competitors in the US markets. The main suppliers of the US imports are Canada, EU-15, Japan, Mexico, China, and other East Asia.[19] In order to identify the performance of each of these six competitors, we estimate a time trend equation for each of 21 US manufacturing industries and one overall manufacturing sector. The estimated equation is:

$$x_{jit} / m_t^* = C_{ji} + \beta_{ji} t + u_{it}, \qquad i = 1, \ , 22,$$

where x_{ji} denotes country j's exports of i^{th} industry to the US, m^* stands for total US imports from the world, C represents the constant term, and t denotes the time period from 1980 to 2000. The dependent variable is expressed in percentage form. The complete estimations is given in Annex D, Table D1. The fitted trend equation for overall merchandise sector indicates that Canada, EU and Japan lost the market share whereas Mexico, China and East Asia gained. The lost was most pronounced for Japan whereas the gain was most for Mexico. Canada lost its market share in the US by 0.15 percent per year, whereas Mexico gained by 0.45 percent and China gained by 0.43 percent. The fitted time trend for total merchandise is given in the following panel.

Share of imports of different competitors in total US merchandise imports						
	Canada	**EU-15**	**Japan**	**Mexico**	**China**	**Other E-Asia**
Constant	20.84	23.78	24.40	1.202	0.548	15.39
Time	-0.148	-0.283	-0.523	0.450	0.430	0.038
	(-4.29)[a]	(-6.79)[a]	(-6.22)[a]	(22.1)[a]	(18.1)[a]	(0.73)

Note: The dependent variable is measured in percentage. The constant term for each country could be read as the share of that country in the US import in 1980. The second row of number is the coefficient on time for each country, which measures the country's change in annual share in the US. The number in parenthesis is t-ratio for coefficient of time trend.

[a]Significantly different from zero at the 1% level, using a two-tailed test.

[19] We include Hong Kong, Indonesia, Malaysia, the Philippines, Singapore, South Korea, Thailand, and Taiwan in other East Asia.

Canada has gained market share in nine industries.[20] In Table 23, we show the industries where Canada gained its market share. The first column in Table 23 shows the industry share of total US manufacturing imports and the second column shows the annual growth of industry imports from 1980 to 2000.[21] The third column is the coefficient of time variable, which shows by what percentage Canada's market share is rising in the US. In other remaining columns, we show the market share position of other competitors. The country which gained market share on a given industry is assigned a '+' sign; the country which lost market share is assigned a '-' and a country which had neither lost nor gained the market share is left blank.

The industries where Canada was able to gain its position over the year constituted about 26 percent of US goods imports. Among those, the imports of some industries were growing faster than the average growth of 11.1 percent of US goods imports in 1995-2000 and those of others were growing by less than 11.1 percent (could be read from column 2). Among the industries that Canada gained its market share, the industries whose imports were growing faster than the average constituted 8.4 percent of the US goods imports and those whose imports were growing slower than the average constituted 17.7 percent of US imports.

Table 23. Industries where Canada gained market share in the US

	Share	growth	Canada	EU-15	Japan	Mexico	China	Other E-Asia
2. Mining	6.0	2.4	1.671			+	-	-
3. Food and beverages	2.6	5.1	0.748		-	+	+	
4. Tobacco products	0.5	27.9	1.095		+	-	+	+
5. Rubber and plastics	2.1	11.5	0.160	-	-	+	+	-
7. Primary textile	0.9	5.2	0.751		-	+		-
8. Clothing industries	5.8	12.6	0.102	-	+	+	+	-
9. Wood industries	1.5	8.0	0.393	-			+	-
13. Primary metal	4.4	4.4	0.318	-	+	+	+	-
14. Fabricated metal	2.3	10.0	0.109	-	+	+	+	

Note: This table is taken from Table A6 in Annex A. The industries listed here are those where the estimated time trend for Canada was negatively significant for the last 20 years.

[20] The change in market share position is defined based on t-value of time coefficient. The negatively significant t-value indicates decline in market share; the positively significant t-value indicates rise in market share. Market share is stable if the t-value is not significant, irrespective of its sign.

21 The share is based on annual average between 1995 to 2000. And the growth is annual average growth in 1995-2000 based on annual average in 1990-1994.

In the industries where Canada gained its market share, EU, other East Asia and in some cases Japan lost their market shares. However, Mexico and China were able to raise their market shares in most of the industries.

Canada lost its market share in the US in four industries as shown in Table 24. These industries constituted 17 percent of the total US goods imports. Among them, 14.4 percent of the total imports was taken by industries whose imports grew faster than the average of 11.1 percent and 3 percent was taken by those whose imports growth were slower than the average. The market gainers were China (in all four industries), Mexico (in three of them), other East Asia (in two of them) and EU and Japan (in one of them). Even though, the imports of machinery (except electrical) was rising faster than the national average, Canada lost its market share, which is a big export item for Canada.

Table 24. Industries where Canada lost market share in the US

	Share	growth	Canada	EU-15	Japan	Mexico	China	Other E-Asia
6. Leather and allied	1.7	7.5	-0.029	-	-	+	+	-
11. Paper and allied	1.8	6.6	-0.975	+	+		+	+
15. Machinery (except electrical)	14.4	12.7	-0.366	-	-	+	+	+
18. Non-Metallic mineral	1.2	9.0	-0.155	-	-	+	+	-

Note: This table is taken from Table A5 in Annex A. The industries listed here are those where the estimated time trend for Canada was positively significant for the last 20 years.

Canada has maintained its market share in number of industries which constituted 56 percent of total US goods imports. Among them there were big import industries such as (a) furniture and fixtures (b) electronic and electrical products and (c) chemical and chemical products. These industries constituted about 20 percent of US imports and their imports were growing faster than the average. Therefore, it is obvious that some other US trading partners were the one who advanced their market share in the US in these industries. They were Mexico and China for furniture and electrical industries, and all other suppliers lost their market shares in these two industries. In case of chemical industry, only EU and China advanced their market shares.

The other industries that Canada maintained its market share were (a) agriculture, (b) printing, (c) transport, (d) refined petroleum and (e) other manufacturing. The imports of these industries grew slower than the average import growth and they constituted 33 percent of US goods imports. In all of these industries except in agriculture, the share of Mexico rose and that of China rose as well except

for refined petroleum, where China lost its market share. None of the other competitors were advancing their shares in these industries except Japan in case of agriculture.

We summarise the above discussion in the following panel. We split US import share into two categories based on whether the imports of a particular industry grew faster than the average US import growth. Moreover, we also break the information of import share according to market loss, market gain, and no trend for Canada.

	US share of goods imports by industries where Canada had			
Growth of industry imports	Market gain	Market loss	No trend	Total
faster than average US import growth	8.4	14.4	19.8	42.6
Slower than average US import growth	17.7	2.9	36.6	57.2
Total	**26.1**	**17.3**	**56.4**	**99.8**

Note: The average US import growth was 11.1 percent from 1980 to 2000.

The overall story of the changes in the market share of major suppliers in the US market is fascinating. As the US economy kept on piling up riches in the 1990s, the market share of Japan and the EU kept on declining. Japan lost market share in 15 industries, while gaining in two (tobacco and paper and allied products) industries out of the 21 US goods import industries. The EU-15 economies lost market share in 11 US import industries, while gaining in two (chemicals, and paper products) industries. Other East Asian economies lost market share in 10 industries while scoring gains in six of the US import industries.

Mexico made the biggest inroads in the US import market by gaining market share in 16 industries, while giving up in just one (tobacco products) industry to Canada, East Asian economies, China and Japan. China grabbed bigger market shares in 12 industries, while yielding in just two (mining to Canada and Mexico, and refined petroleum & coal products) industries to Mexico.

At the aggregate level, the above conclusions suggest that the marketplace in the US is highly dynamic and competitive. Market share champions of the past cannot take the US market for granted. It appears more to be the case that the prosperous and large US economy is linking deeper in a large number of industries located in Mexico, China. In contrast, Canada's exporters were not able to increase market share in a number of large *and* above average growth import industries in the US, such

as (a) machinery equipment, (b) electronics and electrical products, and (c) chemicals and chemical products. Even in the transportation equipment industries, the largest import market in the US that averaged a growth of 9 percent annually, despite the preferred access under the now expired Auto Pact, Canada's exports could not replicate the market share gains achieved by Mexico, non-China East Asia and China. It may also indicate that Canada's exports turned up below average performance in increasing market share of industries often included in the "new economy" characteristics, such as a high degree of product innovation, high new technology and skill intensity, and above average growth prospects. New players such as Mexico, China, and East Asia have been successful in challenging Canada's "special" economic relationship with the US. They have increased economic links with the US in a number of important industries, including those parts of the "new economy" activities.

7. Conclusions

The main objective of this paper has been to provide an in-depth analysis of Canada's trade and foreign direct investment patters with the US, Canada's largest and most important trading partner. Our research findings highlight several interesting trends. The following are some of the important conclusions:

- Canada's trade and investment links with the US deepened considerably in the 1990s. This trend is pervasive across all Canadian industries and provinces;
- The importance of South and Northwest US regions increased steadily to all Canadian provinces/regions, except British Columbia and Territories. However, Over two-thirds of all Canadian exports are still destined to North East and Midwest regions;
- Not surprisingly, Atlantic Canada exports to the US mainly resource-based and labor intensive products; Quebec concentrates primarily in resource-based and labor intensive manufacturing products and electrical machinery; Ontario's exports to the US are dominated by transportation equipment and non-electrical machinery; agriculture, mining, refined petroleum and chemical products account for much of Prairies exports to the US; and the British Columbia and Territories exports largely wood products, paper and allied products, non-electrical machinery and non-metallic mineral products;
- Contrary to expectations, the share of intra-firm trade in Canada-US trade flows declined significantly in the post-FTA period, suggesting that the reduction of tariff and non-tariff barriers might have increased outsourcing by the US and Canadian multinationals in search of cost reductions;
- The buyout US economy and the depreciation of Canadian dollar were mainly responsible for the dramatic increase in Canadian exports to the U.S in the 1990s. As expected, the FTA contributed positively to Canada's exports — on average, they increased by about 9 percent. Similarly, the growth in Canadian real GDP was the main driver of the rapid growth of imports from the US during the post FTA period. On average, real exchange rate depreciation and the FTA were not significant factors in the import expansion;
- Unlike goods, the US share of total Canadian exports of services remained more or less constant at about 58 percent for the past 20 years, suggesting that service exports do not respond much to business cycles and real exchange rate movements. Americans account for slightly less than two-thirds of our total service imports;

- The importance of commercial services in total service trade with the US increased steadily during the past 20 years. They currently represent slightly over 50 percent of Canadian service exports and imports. The US share of Canadian commercial service exports also declined in the 1990s. Canadian and US multinationals account for over 90 percent of Canada's trade in commercial services with the US.;
- Canadian exports of commercial services is mostly carried out by Canadian controlled firms, whereas imports are equally split between Canadian controlled US controlled firms. The Canadian controlled multinationals are engaged more in arms length trade, whereas the US controlled firms are engaged in intra-corporate trade. The share of intra-firm exports is higher than the share of imports for Canadian controlled companies, whereas the opposite is true for US controlled firms.
- Unlike merchandise trade, the US share of Canada's foreign direct investment stock declined steadily during the past 20 years. The US now accounts for only slightly over 50 percent of the total Canadian outward direct investment stock. Similarly, the US share of total Canadian inward foreign direct investment stock fell until 1990 and remained more or less constant until 1994, but thereafter increased slightly.
- Since much of services trade, especially commercial services, are carried out by multinationals, it is not surprising that the importance of US market for service exports either remained stagnant or declined. The foreign direct investment trends do not bode very well for future growth of Canadian service exports to the US;
- The labor and capital requirements for producing 1 million dollar Canadian exports declined steadily both in goods and service producing industries. Service exports use much more labor and capital than goods exports;.
- More importantly, the skill content of exports of goods and services increased steadily during the past 15 years. For instance, the share of employees with post-secondary and university education in total goods exports increased from 31 percent in 1985 to almost 51 percent in 1997. In the case of service exports, the share of skilled workers more than doubled during the same period, reaching about 36 percent.
- The share of imported inputs in goods exports increased steadily from about 24 percent in 1980 to over 37 percent in 1997. The import content of service exports is considerably smaller than goods exports—in 1997 imported inputs represented only 8 percent of service exports, up from 6.8 percent in 1990;

- The industrial structure of import content, export intensity, import penetration and net- export intensity remained fairly stable during the 1985-97 period, suggesting a deepening of the comparative advantage position of Canadian industries;
- Between 1985 and 1997, the number of industries with a revealed comparative advantage increased by 6. But, the export share of industries with a revealed comparative advantage declined from about 70 percent in 1985 to around 65 percent in 1997. In addition, the capital intensity of 23 of 37 industries with a revealed comparative advantage in 1997 was below the average capital intensity.
- Both intra- and inter-industry trade increased significantly in the 1990s. But, intra-industry trade increased at a faster pace than inter-industry trade, suggesting faster increase in product specialization than the rise in specialization based on the advantage in factors of production. Our pooled industry and time Series regression results suggest that share of skilled workers and capital labor ratio contribute positively to intra-industry trade. The coefficient on the FTA dummy is positive but not statistically significant, implying that the FTA at best had only a small positive impact on intra-industry trade;
- Our analysis of inter-industry variation in labor productivity over time suggest that the FTA contributed significantly to Canada's labor productivity both directly and indirectly, perhaps by stimulating competition and innovation, rationalizing production processes, increasing capital intensity and intra-industry specialization and raising the average size of business establishments;
- Despite a fierce competition, Canada maintained its market share in a majority of industries. These industries account for over 55 percent of US imports. Surprisingly Canada gained market share in a number resource-based and labor-intensive industries, perhaps because of the FTA and dollar depreciation. In these industries, EU, Japan and the East Asian countries lost substantial ground. On the other hand, Mexico and China made huge gains. Canada lost ground in paper and allied products, non-metallic minerals and non-electrical machinery. Mexico and China here too made huge in roads at the expense of Canada, the EU and Japan.

Our findings suggest that the dramatic increase in trade and investment linkages between Canada and the US in the 1990s was mainly the result of strong economic expansion in the United States and the real exchange rate depreciation. These results imply that future growth in Canadian exports to the US will critically depend on the health of the US economy and the competitive position of Canadian industries.

We can not continue to rely on a weak Canadian dollar for maintaining our cost competitiveness in the US market. Instead, we should deepen and broaden our comparative advantage position in technology and skill intensive products and improve our relative productivity performance across all industries. This is the only winning way for facing the growing competitive challenge from Mexico and China in the US market and closing the large Canada-US real income gap.

REFERECES

Balassa, Bela A. "The Changing Pattern of Comparative Advantage in Manufactured Goods", *The Review of Economics and Statistics*, Vol. 61, 1979, pp. 259-266.

Bowen, Harry P. "On the Theoretical Interpretation of Indices of Trade Intensity and Revealed Comparative Advantage", *Weltwirtschaftliches Archiv*, Vol. 119, 1983, pp. 464-472.

Campa Jose and Goldberg, Linda S. "The Evolving External Orientation of Manufacturing Industries: Evidence form Four Countries", NBER working paper 5919, February 1997.

Edwards, S. "Openness, Productivity and Growth: What Do We Really Know." *Economic Journal*, 1998.

Fuentes-Godoy, Cesar, Hanson Paul and Lundberg. "International Specialization and Structural Change in the Swedish Manufacturing Industry, 1969-1992." *Weltwirtschaftliches Archiv*, 1996, 132(3), pp. 522-543.

Goldstein, Morris and Khan, Mohsin. "Income and Price Effects in Foreign Trade," in Ronald W Jones and Peter B. Kenen eds., *Handbook of International Economics, Vol 2*, Elsveir: North Holland, 1985, pp. 1041-1105.

Harris, Richard G. and Kherfi, Samer. "Productivity Growth, Convergence, and Trade Specialization in Canadian Manufacturing." Paper presented on the Canada-US Manufacturing Productivity Gap conference, 2000.

Hillman, Arye L. "Observations on the Relation between "Revealed Comparative Advantage" and the Comparative Advantage as Indicated by Pre Trade Relative Prices", *Weltwirtschaftliches Archiv*, Vol. 116, 1980, pp.315-321.

Magee, S. P. "Prices, Income and Foreign Trade," in P. B. Kenen. Ed., *International Trade and Finance: Frontier for Research.* Cambridge: Cambridge University Press, 1975, pp. 115-252.

Postner, Harry H. *Factor Content of Canadian International Trade*, Ottawa: Economic Council of Canada, 1975.

Simone, Nadal De and Marchese, Serafino. "Monotinicity of Indices of "Revealed" Comparative Advantage: Empirical Evidence on Hillman's Condition", *Weltwirtschaftliches Archiv*, 1989.

Trefler, Daniel. "The Long and Short of the Canada-US Free Trade Agreement." Industry Canada Research Series on Perspective on North American Free Trade, 1999.

Annex A: Merchandise Trade

Table A1. The US share of Canada's goods trade, 1980-2000

	Exports			Imports		
	1980-89	1990-94	1995-00	1980-89	1990-94	1995-00
1. Agriculture, fishing, logging and forestry	17	34	41	66	67	66
2. Mining	64	71	74	31	23	23
3. Food and beverages	56	65	72	44	55	58
4. Tobacco products	36	74	38	69	40	35
5. Rubber and plastics	90	94	94	73	77	79
6. Leather and allied products	82	85	89	11	13	11
7. Primary textile	49	71	84	46	56	64
8. Clothing industries	74	88	94	6	13	18
9. Wood industries	72	69	80	82	85	82
10. Furniture and fixture	94	96	97	53	71	67
11. Paper and allied products	68	69	70	78	85	87
12. Print, publishing and allied industries	91	84	91	85	86	86
13. Primary metal industries	70	65	77	63	65	59
14. Fabricated metal products	77	80	87	68	71	74
15. Machinery industries (except electrical)	75	75	82	72	71	70
16. Transport equipment	94	94	94	84	78	80
17. Electrical and electronic products	73	80	84	67	58	56
18. Non-Metallic mineral	90	88	92	62	66	68
19. Refined petroleum and coal products	91	92	97	55	55	66
20. Chemical and chemical products	64	74	82	73	76	76
21. Other manufacturing	71	75	80	59	61	63
Total	**73**	**78**	**83**	**67**	**66**	**67**

Table A2. Estimation of equations for Canada's exports to the US (annual data, 1980-1999)

Dependent variable	Independent variables					
Canada's real exports growth to the US market	US real GDP growth	Log of real exchange rate	Capacity	FTA	R^2	D-W
Agriculture, fishing, logging and forestry	-1.309 (-1.07)	-0.405 (-1.95)[b]	0.000 (0.027)	0.050 (0.96)	0.22	2.57
Mining	0.656 (0.46)	-0.071 (-0.33)	-0.000 (-0.25)	0.091 (1.54)	0.19	1.47
Food and beverages	0.652 (0.89)	-0.342 (-2.86)	-0.002 (-2.55)[b]	0.113 (3.72)[a]	0.55	1.78
Tobacco products	-8.997 (-1.01)	0.596 (0.68)	-0.001 (-0.08)	0.183 (0.40)	0.14	2.00
Rubber and plastics	0.733 (0.76)	-0.700 (-3.42)[a]	-0.003 (-2.28)[b]	0.193 (2.72)[b]	0.41	1.89
Leather and allied products	0.423 (0.238)	-0.520 (-0.97)	-0.001 (-0.66)	0.000 (0.000)	0.08	2.11
Primary textile and textile products	1.851 (1.59)	-0.058 (-0.21)	0.001 (0.59)	0.024 (0.54)	0.18	1.63
Clothing industries	1.206 (0.63)	-0.840 (-2.12)[b]	-0.002 (-1.25)	0.121 (1.49)	0.26	1.15
Wood industries	2.304 (1.88)[c]	-0.480 (-1.65)	-0.001 (-1.15)	0.044 (0.96)	0.27	1.35
Furniture and fixture	3.236 (2.69)[b]	-0.201 (-1.00)	-0.000 (-0.28)	0.000 (0.012)	0.42	2.11
Paper and allied products	-0.008 (-0.01)	-0.312 (-2.81)[a]	0.000 (0.81)	0.014 (0.32)	0.36	1.08
Print, publishing and allied industries	1.108 (0.61)	-0.712 (-2.23)[b]	-0.002 (-1.79)[c]	0.020 (0.33)	0.33	1.12
Primary metal industries	3.569 (1.21)	0.174 (0.37)	-0.001 (-0.88)	0.069 (0.57)	0.11	2.79
Fabricated metal products industries	4.865 (2.93)[a]	-0.845 (-2.38)[b]	-0.004 (-3.28)[a]	0.153 (2.39)[b]	0.54	1.56
Machinery industries (except electrical)	4.116 (2.42)[b]	0.084 (0.57)	-0.000 (-0.23)	0.002 ((0.02)	0.42	1.14
Transport equipment industries	1.606 (1.38)	-0.36 (-1.94)[c]	-0.000 (-0.54)	-0.024 (-0.58)	0.31	1.33
Electrical and electronic products	-1.356 (-0.59)	-0.165 (-1.17)	0.001 (0.70)	0.086 (1.22)	0.20	2.48
Non-Metallic mineral products	4.951 (4.36)[a]	-0.262 (-1.47)	-0.003 (-2.88)[a]	0.102 (2.22)[b]	0.63	2.38
Refined petroleum and coal products	12.34 (1.97)[c]	-1.146 (-4.83)[a]	0.002 (0.68)	-0.734 (-2.46)	0.62	2.12
Chemical and chemical products	0.648 (0.53)	-0.108 (-0.70)	-0.000 (-0.36)	0.081 (1.83)[c]	0.24	2.29
Other manufacturing	-0.015 (-0.00)	-0.930 (-1.44)	-0.004 (-1.24)	0.302 (1.87)[c]	0.20	3.03

Note: The number in parenthesis below each coefficient is a t-ratio. The dependent variable is measured in percentage.

[a]Significantly different from zero at the 1% level, using a two-tailed test.

[b]Significantly different from zero at the 5% level, using a two-tailed test.

[c]Significantly different from zero at the 10% level, using a two-tailed test.

Table A3. Estimation of equations for Canada's imports from the US (annual data, 1980-1999)					
Dependent variable	Independent variables				
Canada's real import growth from the US market	Canadian real GDP growth	Log of real exchange rate	FTA	R^2	D-W
1. Agriculture, fishing, logging and forestry	1.094 (1.18)	-0.021 (-0.18)	0.003 (0.08)	0.06	1.43
2. Mining	2.707 (1.40)	0.314 (1.11)	0.020 (0.24)	0.15	2.27
3. Food and beverages	1.813 (2.48)[b]	0.119 (1.38)	0.063 (2.49)[c]	0.24	1.89
4. Tobacco products	-4.704 (-1.58)	-0.218 (-1.01)	0132 (1.08)	0.17	2.14
5. Rubber and plastics	4.062 (4.11)[a]	0.017 (0.20)	0.019 (0.57)	0.50	1.73
6. Leather and allied products	3.376 (2.48)[b]	0.27 (1.13)	0.005 (0.10)	0.29	1.36
7. Primary textile and textile products	2.812 (3.46)[a]	0.262 (2.35)[b]	0.093 (3.39)[a]	0.51	1.78
8. Clothing industries	3.939 (2.61)[b]	0.418 (2.25)[b]	0.157 (3.11)[a]	0.40	0.96
9. Wood industries	3.752 (3.19)[a]	0.400 (1.06)	-0.029 (-0.55)	0.35	2.49
10. Furniture and fixture	7.669 (2.58)[b]	0.666 (2.58)[a]	0.085 (1.16)	0.42	1.83
11. Paper and allied products	2.342 (2.28)[b]	0.024 (0.16)	0.034 (0.76)	0.15	2.31
12. Print, publishing and allied industries	0.885 (1.36)	0.132 (1.43)	0.025 (1.20)	0.10	1.74
13. Primary metal industries	3.282 (2.21)[b]	-0.314 (-0.80)	-0.032 (-0.42)	0.27	2.24
14. Fabricated metal products industries	4.191 (5.62)[a]	0.283 (2.47)[b]	0.042 (1.57)	0.66	2.20
15. Machinery industries (except electrical)	5.718 (8.42)[a]	0.144 (3.93)[a]	0.015 (0.57)	0.81	1.92
16. Transport equipment industries	3.478 (3.90[a]	0.152 (0.87)	-0.012 ((-0.34)	0.54	0.87
17. Electrical and electronic products	4.411 (6.59)[a]	-0.091 (-1.27)	0.053 (2.34)[b]	0.56	2.48
18. Non-Metallic mineral products	4.575 (6.34)[a]	0.300 (3.64)[a]	0.024 (1.02)	0.70	1.46
19. Refined petroleum and coal products	6.435 (2.14)[b]	-0.185 (-1.18)	-0.176 (-1.27)	0.14	1.29
20. Chemical and chemical products	1.597 (2.40)[b]	-0.023 (-0.19)	0.038 (1.24)	0.20	1.99
21. Other manufacturing	2.363 (4.24)[a]	0.039 (0.60)	0.032 (1.78)[c]	0.53	1.36

Note: The number in parenthesis below each coefficient is a t-ratio

[a]Significantly different from zero at the 1% level, using a two-tailed test.

[b]Significantly different from zero at the 5% level, using a two-tailed test.

[c]Significantly different from zero at the 10% level, using a two-tailed test..

Annex B: Input-Output Model

In the Input-Output analysis, the following accounting balance between total supply and total demand (disposition) must hold for each industry *i*:

(B1) $g + m + v_w = Bg + c + i + v_a + x_d + x_r$,

where, g = gross values of output produced by industry,
m = imports of goods and services (defined as positive),
v_w = inventories withdrawals,
B = intermediate input coefficient, technology matrix; Bg yields the total use of industry *i*'s output as intermediate input by all industries in the economy,
c = total consumption of goods and services, both personal and government,
i = total capital formation, business and government,
v_a = inventories additions,
x_d = value of domestic exports of goods and services,
x_r = value of re-exports of goods and services.
In equation (B1), the left-hand side is the total supply and the right-hand side is the total demand of goods and services. By solving equation (B1) for g, we could obtain expression that shows the linear transformation of final demand categories into industry outputs. It would show that industry output could be obtained if $(1 - B)^{-1}$ is post-multiplied by exogenously given final demand. This expression, however, would not account for any leakage from the domestic industries. To the extent that imports, and/or withdrawals from inventories share with the domestic industries in the supply of a commodity, the impact of an increase in final demand on domestic industries will be reduced. Therefore, to measure the impact of a change in final demand in domestic output, one should net out the import leakage and inventory depletion leakage.

Imports must be used to satisfy re-exports, final demand (excluding domestic exports), and intermediate input demand. Re-exports should be subtracted from total imports when computing import leakage parameter, as re-exports should not be allocated to any other demand categories. If net imports are denoted by m_n, equation (B1) can be written as

(B2) $g = Bg + c + i + x_d - m_n + v_a - v_w$,

where $m_n = m - x_r$. The net imports must be allocated to c, i and v (if it is positive). Then import leakage is specified as below:

(B3) $m_n = \hat{\mu}\left(Bg + c + i + v_a\right)$,

where, $\hat{\mu}$ is a diagonal matrix of coefficients whose elements are calculated as the ratios of imports to use, use defined by $Bg + c + i + v$. This import share assumption implies that domestic exports of a commodity are supplied from domestic industries that produce the commodity. Of course, domestic exports may have imports indirectly embodied in them to the extent that producing industries import their intermediate inputs.

Substituting equation (B3) into equation (B1) and simplifying it, we have

(B5) $g = \left[1 - \left(1 - \hat{\mu}\right)B\right]^{-1}\left[\left(1 - \hat{\mu}\right)\left(c + i + v_a - v_w\right) + x_d\right]$

Equation (B5) states that domestic gross output, g, can be obtained by adding intermediate and final demand expenditure net of leakage (imports). Using equation (B5), the direct and indirect effects of exogenous change in any of the component of demand in total production g can be calculated. It also tells us how much output will be required to satisfy the total demand in the economy, net of all leakage.
Now, the sum of direct and indirect output required to produce domestic exports, g_x, is given by the following equation:

(B6) $g_x = \left[1-\left(1-\hat{\mu}\right)B\right]^{-1} x_d$

In order to compute capital embodied in export, let net capital stock (k) and gross output (g) ratio be denoted by $\kappa = k/g$. Then we have $\kappa_x = k_x/g_x$.
Substituting this ratio into (B6) and diagonalizing the net export vectors, we have

(B7) $k_x = \kappa_x\left[1-\left(1-\hat{\mu}\right)B\right]^{-1}\hat{x}_d$
Equation (B7) estimates the direct and indirect capital embedded in domestic exports.

For skill content of exports, we have data on four types of labor quality. They are (i) 0 to 8 years of schooling (ii) high school (iii) post secondary certificate or diploma (iv) university graduate. We define the skill labor to output ratio as follows:
$\lambda_i = l_i/g$, where i = indicates four different types of labor quality. Therefore,
$\lambda_{xi} = l_{xi}/g_x$

Substituting this expression into (B6), we have

(B8) $l_{xi} = \lambda_{xi}\left[1-\left(1-\hat{\mu}\right)B\right]^{-1}\hat{x}_d$
Equation (B8) computes total (direct and indirect) labor embedded in domestic exports by four types of skills.

Using the similar approach, we could compute the level of intermediate input required to produce g_x as follows

(B9) $u_x = B\left[1-\left(1-\hat{\mu}\right)B\right]^{-1}\hat{x}_d$

Out of this total intermediate input, the level of imported intermediate input is given by

(B10) $m_x = \mu^T B\left[1-\left(1-\hat{\mu}\right)B\right]^{-1}\hat{x}_d$,

where $\hat{x}_d$ is a diagonal matrix of vector x_d, and μ^T is the transpose of vector μ which in turn is obtained from diagonal matrix $\hat{\mu}$ as defined in equation (B3).

The share of import content in total export, λ_x is given as follows:
$\lambda_x = m_x / x_d$, where $0 \le \lambda_x \le 1$.

Annex C: Revealed Comparative Advantage (RCA)

Table C1. List of industries that Canada had revealed comparative advantage vis-à-vis the US in 1985 and 1997

Industries with RCA in 1985

1 Fish products industry
2 Dairy products industries
3 Biscuit, Bread and other bakery products
4 Rubber products industries
5 Sawmill, planing mill and shingle mill prod.
6 Veneer and plywood industries
7 Sash, door and other millwork industries
8 Wooden box and coffin industries
9 Other wood industries
10 Household furniture industries
11 Office furniture industries
12 Other furniture and fixture industries
13 Pulp and paper industries
14 Asphalt roofing industry
15 Primary steel industries
16 Steel pipe and tube industry
17 Iron foundries
18 Non-ferrous metal smelting and refining
19 Copper and alloy roll., cast. and extr. ind.
20 Wire and wire products industries
21 Motor vehicle industry
22 Motor vehicle parts and accessories ind.
23 Shipbuilding and repair industry
24 Record player, radio and tv receiver ind.
25 Communic. and energy wire and cable
26 Hydraulic cement industry
27 Concrete products industries
28 Ready-mix concrete industry
29 Misc. non-metallic mineral prod. ind.
30 Refined petroleum and coal products ind.
31 Sign and display industry

Loss in RCA between 1985 and 1997

1 Asphalt roofing industry
2 Steel pipe and tube industry
3 Iron foundries
4 Copper and alloy roll., cast. and extr. ind.
5 Wire and wire products industries
6 Record player, radio and tv receiver
7 Ready-mix concrete industry

Gain of RCA between 1985 and 1997

1 Poultry, meat and meat prod. ind.
2 Soft drink industry
3 Brewery products industry
4 Plastic products industries
5 Broad knitted fabric industry
6 Other converted paper products industries
7 Platemaking, typesetting and bindery ind.
8 Oth. roll., cast & extr. non-ferr. met. prod.
9 Power boiler and structural metal
10 Hardware, tool and cutlery industries
11Truck and bus body and trailer industries
12 Railroad rolling stock industry
13 Misc. transportation equipment ind.

Annex D: Competitors in the US Market

Table D1. Trend in export shares of main suppliers in the US market, 1980-2000

Industry		Share of imports of different competitors by industry					
		Canada	**EU-15**	**Japan**	**Mexico**	**China**	**Other E-Asia**
1. Agri, fishing, & forestry	Constant	16.66	5.155	1.438	14.01	3.410	13.51
	Time	0.084	0.004	-0.031	0.029	-0.051	0.082
		(1.57)	(0.14)	(-3.64)[a]	(0.31)	(-1.29)	(0.64)
2. Mining	Constant	2.555	5.560	0.045	7.014	2.425	4.449
	Time	1.671	-0.143	-0.001	0.280	-0.104	-0.195
		(16.7)[a]	(-1.45)	(-0.99)	(3.49)[a]	(-8.75)[a]	(-4.50)[a]
3. Food and beverages	Constant	8.723	32.57	2.252	1.672	0.444	11.57
	Time	0.748	-0.010	-0.055	0.307	0.076	-0.057
		(21.4)[a]	(-0.12)	(-3.94)[a]	(20.6)[a]	(14.5)[a]	(-1.53)
4. Tobacco products	Constant	3.038	26.61	-0.005	7.258	0.000	10.43
	Time	1.095	-0.315	0.176	-0.140	0.261	0.601
		(7.76)[a]	(-1.37)	(4.62)[a]	(-3.32)[a]	(9.12)[a]	(1.89)[c]
5. Rubber and plastics	Constant	17.43	28.96	20.24	1.118	0.550	33.58
	Time	0.160	-0.857	-0.462	0.195	1.610	-0.740
		(1.84)[c]	(-11.8)[a]	(-8.51)[a]	(7.72)[a]	(13.0)[a]	(-6.53)[a]
6. Leather and allied products	Constant	1.379	26.11	1.360	1.411	0.440	61.96
	Time	-0.029	-0.533	-0.078	0.107	2.978	2.349
		(-3.61)[a]	(-6.41)[a]	(-9.54)[a]	(4.66)[a]	(15.7)[a]	(-8.49)[a]
7. Primary textile	Constant	0.490	23.41	15.77	-0.326	7.051	36.22
	Time	0.751	0.001	-0.496	0.349	-0.012	-0.851
		(16.1)[a]	(0.01)	(-10.4)[a]	(5.40)[a]	(-0.42)	(-7.04)[a]
8. Clothing industries	Constant	0.731	8.535	3.719	-0.931	6.027	72.83
	Time	0.102	-0.185	-0.203	0.657	0.560	-2.384
		(8.27)[a]	(-3.32)[a]	(-12.3)[a]	(9.29)[a]	(6.74)[a]	(-29.2)[a]
9. Wood industries	Constant	62.77	4.858	2.403	2.709	0.407	23.08
	Time	0.393	-0.001	-0.138	0.031	0.209	-0.734
		(3.63)a	(-0.03)	(-10.2)[a]	(1.22)	(12.3)[a]	(-7.94)[a]
10. Furniture and fixture	Constant	27.40	27.32	3.464	2.430	0.651	35.24
	Time	-0.132	-0.714	-0.096	0.786	1.035	-0.609
		(-1.23)	(-8.10)[a]	(-3.52)[a]	(18.0)[a]	(8.16)[a]	(-3.30)[a]
11. Paper and allied products	Constant	87.12	8.948	0.837	1.557	0.001	0.991
	Time	-0.975	0.305	0.099	0.018	0.236	0.121
		(-9.54)[a]	(3.32)[a]	(12.3)[a]	(0.85)	(11.6)[a]	(7.63)[a]
12. Print, publishing and allied	Constant	23.18	44.76	15.08	3.084	0.235	11.01
	Time	0.114	-0.821	-0.530	0.135	0.773	0.466
		(0.93)	(-12.3)[a]	(-8.65)[a]	(2.81)[b]	(12.1)[a]	(3.13)[a]
13. Primary metal industries	Constant	24.55	27.02	20.65	2.021	0.241	6.909
	Time	0.318	-0.463	-0.766	0.291	0.176	-0.103
		(2.91)[a]	(-7.14)[a]	(-12.6)[a]	(10.9)[a]	(10.3)[a]	(-3.09)[a]
14. Fabricated metal industries	Constant	16.34	27.46	29.90	0.440	0.292	22.13
	Time	0.109	-0.264	-1.029	0.541	0.625	-0.049
		(2.25)[b]	(-5.05)[a]	(-15.0)[a]	(15.7)[a]	(15.7)[a]	(-0.39)
15. Machinery (except electrical)	Constant	14.78	41.14	32.50	0.432	0.021	6.786
	Time	-0.366	-1.111	-0.355	0.273	0.362	1.315
		(-5.89)[a]	(-13.2)[a]	(-2.00)[c]	(7.50)[a]	(8.27)[a]	(19.9)[a]
16. Transport equipment industries	Constant	33.54	23.14	42.80	0..711	0.000	1.095
	Time	0.010	-0.146	-0.833	0.686	0.037	0.112
		(0.88)	(-2.12)[b]	(-9.13)[a]	(16.4)[a]	(8.80)[a]	(3.80)[a]

17. Electrical and electronic products	Constant	6.065	9.367	43.99	5.466	0.018	34.90
	Time	0.009	0.046	-1.253	0.687	0.682	-0.051
		(0.25)	(1.42)	(-8.24)[a]	(15.9)[a]	(17.4)[a]	(-0.66)
18. Non-Metallic mineral	Constant	16.64	41.84	22.26	5.118	0.610	13.05
	Time	-0.155	-0.413	-0.754	0.321	0.851	-0.204
		(-4.13)[a]	(-7.48)[a]	(-16.6)[a]	(16.7)[a]	(12.6)[a]	(-2.36)[b]
19. Refined petroleum and coal products	Constant	16.10	12.99	0.483	2.331	1.663	4.032
	Time	-0.091	0.228	-0.006	0.081	-0.072	-0.056
		(-0.84)	(1.54)	(-1.07)	(1.91)[c]	(-3.57)[a]	(-1.26)
20. Chemical and chemical products	Constant	16.84	39.89	9.524	3.053	1.107	1.870
	Time	0.030	0.339	0.062	0.004	0.058	0.135
		(0.47)	(3.31)[a]	(1.53)	(0.29)	(5.77)[a]	(5.58)[a]
21. Other manufacturing	Constant	3.900	26.48	30.11	2.939	0.532	28.91
	Time	0.006	-0.260	-0.545	0.152	1.306	-0.848
		(0.37)	(-6.72)[a]	(-7.77)[a]	(3.58)[a]	(19.1)[a]	(-15.9)[a]

Note: The dependent variable is measured in percentage. The constant term for each country and industry could be read as the share of that country in that industry in the US import in 1980. The second row of number for each industry is the coefficient on time, which measures a country's change in annual share in the US import for that industry. The number in parenthesis is t-ratio for coefficient of time trend.

[a]Significantly different from zero at the 1% level, using a two-tailed test.

[b]Significantly different from zero at the 5% level, using a two-tailed test.

[c]Significantly different from zero at the 10% level, using a two-tailed test.

Figure 1. Total value of exports and imports of goods and services

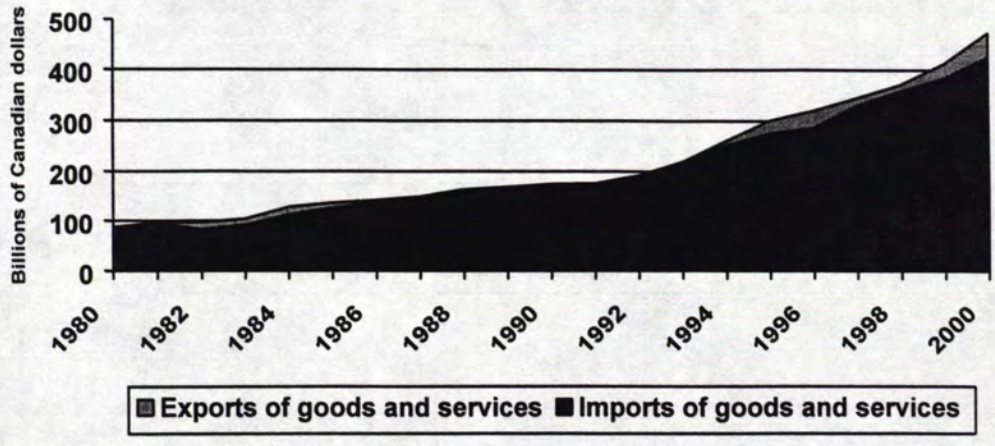


Figure 2. Share of goods trade in GDP, 1980-2000

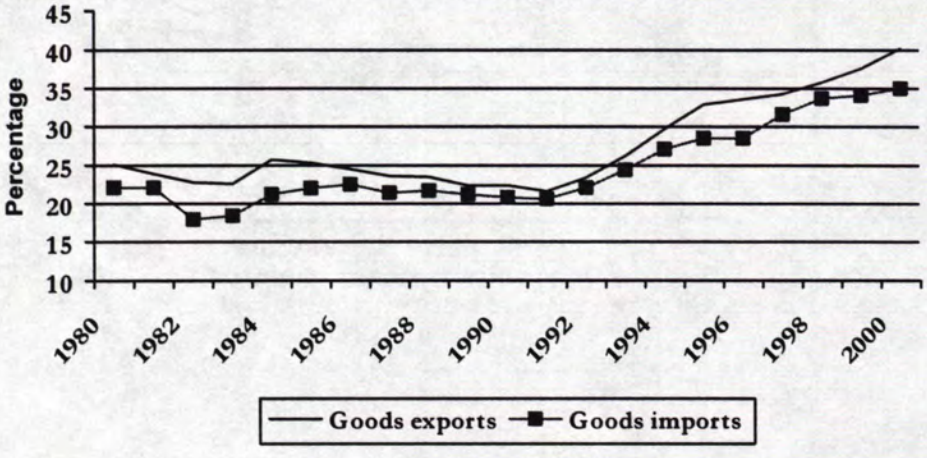


Figure 3. Share of services trade in GDP, 1980-2000

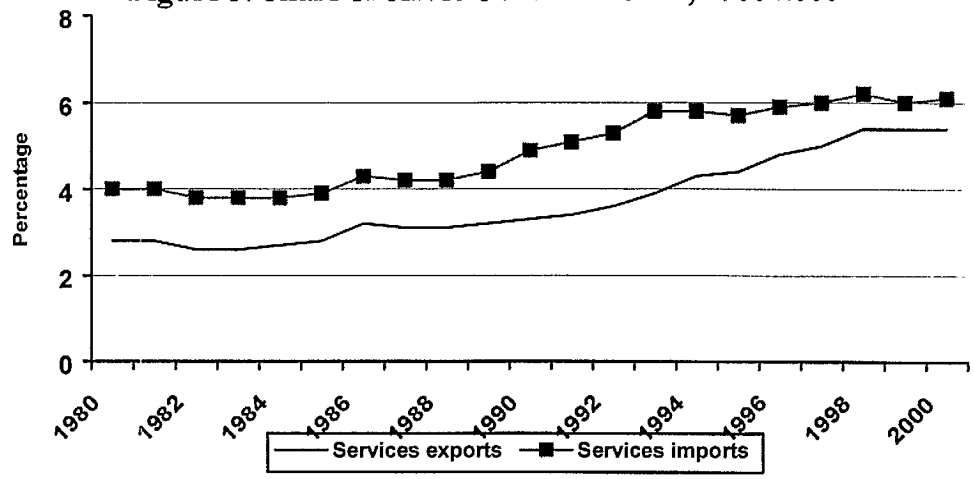


Figure 4. The US share of Canadian trade on goods, 1980-2000

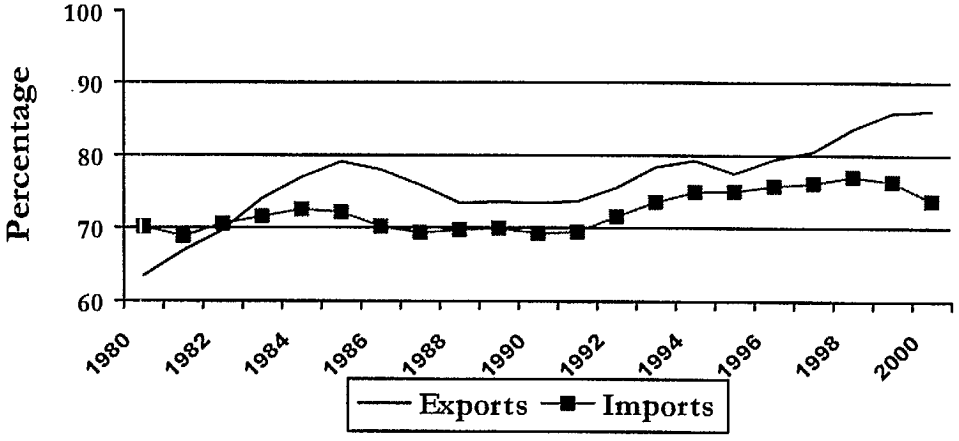


Figure 5. Share of US intrafirm exports of goods in total US goods exports

Figure 6. Share of US intrafirm imports of goods in total US goods imports

Figure 7. Stock of FDI and CDIA as a percentage of GDP

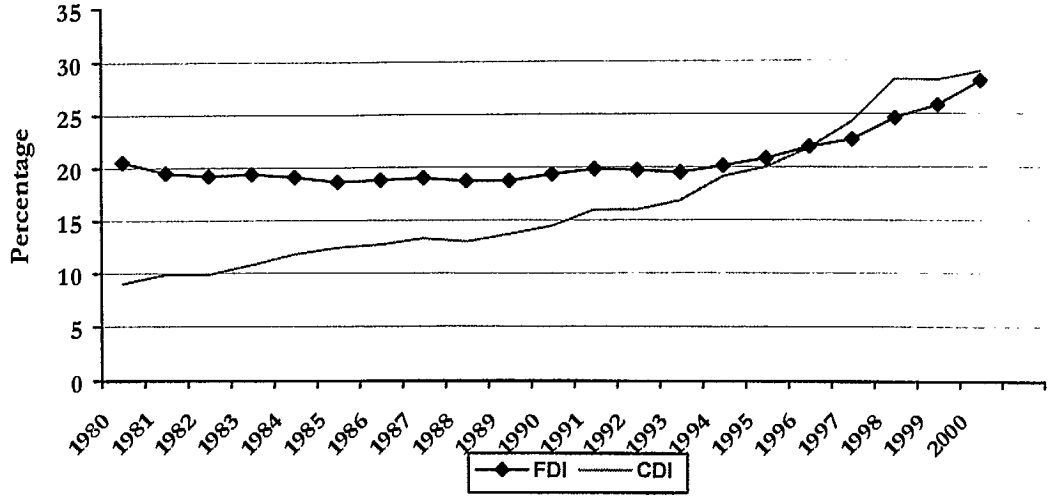


Figure 7. US Shares of Canadian FDI and CDIA stocks

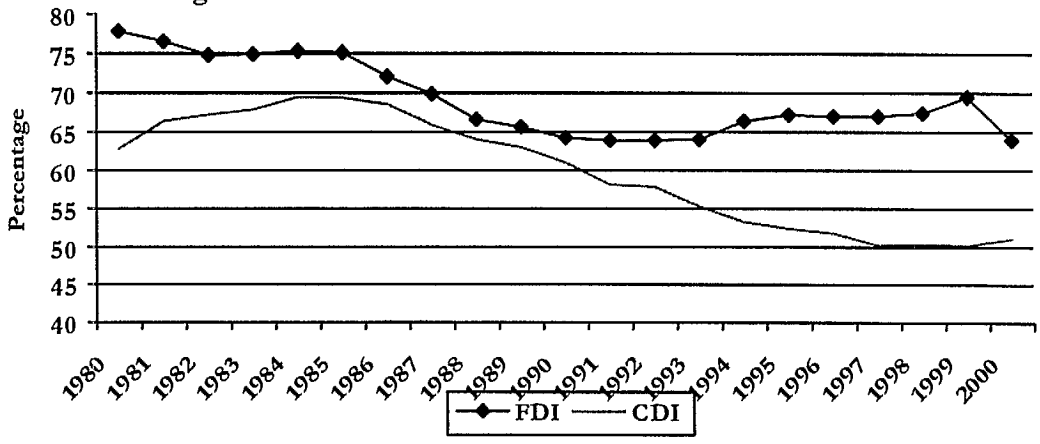
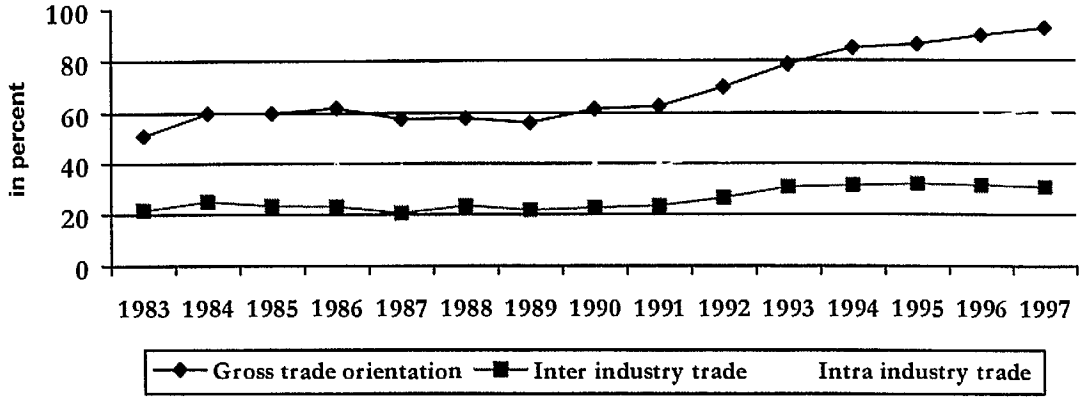


Figure 9. Trends in total, inter and intra industry trade, 1983-1997



Notes

COMPARATIVE ADVANTAGE AND TRADE IN NORTH AMERICA:

A SECTORAL ANALYSIS

Lawrence L. Schembri
Associate Professor

Mykyta Vesselovsky
Ph.D. Candidate

Department of Economics
Carleton University

June 2001

Abstract

This paper investigates international trade and comparative advantage in manufactured products in North America at the sectoral level. A theoretical monopolistically competitive model is developed that also allows for both the Ricardian and Heckscher-Ohlin sources of comparative advantage. A regression model is derived from the theoretical model that explains relative bilateral exports to the third-country market (i.e., Canadian relative to U.S. exports to Mexico). The model is estimated using industry and trade data for nine 2-digit manufacturing sectors in Canada, the United States and Mexico over the period 1980 to 1996. The model fits the data reasonably well given the quality of the data and the variables suggested by both traditional and new trade theories play a role in explaining relative exports.

Email address: larry_schembri@carleton.ca.

This paper was prepared for presentation at the Industry Canada Conference "North American Linkages: Opportunities and Challenges for Canada", June 20-22, 2001, Calgary, Alberta.

The authors would like to thank Someswhar Rao, Prakash Sharma, Aaron Sydor of Industry Canada and the Banco de Mexico for their kind assistance in assembling the data and Ehsan Choudhri for helpful advice.

I. Introduction

The upward trends in trade and investment flows among Canada, the United States and Mexico not only reflect the growing degree of economic integration in North America, but also serve to facilitate further integration as the pressure to reduce barriers to these flows increases. To develop policies to manage this growing integration, it is important, therefore, to understand the factors that underlie these flows.

The purpose of this paper is to explore theoretically and empirically trade in manufacturing products among these three countries at a disaggregated sectoral level. Although trade in manufactured products represents approximately 60% of total international trade in goods and services in North America, international competitiveness in these products is often seen as being vital to achieving higher standards of living. These products have relatively high levels of value-added, relatively high rates of productivity growth and often experience increasing relative prices.

Clearly, several exogenous forces have contributed to the dramatic recent increase in trade flows among these countries (See Figures 1-3), the most prominent being the Canada-U.S. Free Trade Agreement (CUSFTA) of 1989 and the North America Free Trade Agreement (NAFTA) of 1994, which extended the original Canada-U.S. agreement to Mexico. Yet trade flows began surging upwards well before these agreements came into effect and, moreover, they have continued to increase afterwards by much more than was originally expected (Helliwell 2001). Hence, there have been other factors at work that have caused trade to increase. The improvements in communication and transportation technologies have undoubtedly played a role, first by directly reducing the cost of international transactions, but also by making it much easier to manage and operate multinational firms with specialised

production. For Mexico, profound economic reforms have been implemented since the debt crisis of 1982[1]; these reforms coupled with Mexico's sizeable difference in relative factor prices have also had a positive impact.

Explaining international trade flows is an important theoretical and empirical issue because international trade can produce large welfare gains by specializing production in countries with a comparative advantage and expanding consumption opportunities. Consequently, it has spawned a large body of empirical research. Early work focused on testing explanations suggested by the Ricardian and Heckscher-Ohlin theories of comparative advantage, which are based on differences in technology and relative factor endowments, respectively, but these tests failed to provide unambiguous answers.[2]

Recently, however, a number of studies [e.g., Trefler (1995) and Davis and Weinstein (1998)] have been successful in improving the empirical performance of the Hechscher-Ohlin model by incorporating general differences in production techniques between countries. Although these differences in technology across countries are typically Hicks-neutral and thus not Ricardian, they do move in the direction of marrying the two models. Other papers, such as Hakura (1999, 2000) and Harrigan (1997) go one step further by introducing Ricardian type non-uniform (Hicks-neutral) technology differences across sectors and unequal factor prices.

---

[1] Lustig (2001) provides a useful survey of the recent economic reforms in Mexcio.

[2] For example, MacDougall (1951,1952) provides a test of the single-factor (labour) Ricardian model; he finds a positive cross-industry association between the ratio of US to UK labor productivity and the US-UK export ratio. Although this evidence is still widely cited, the theoretical basis for the empirical model is suspect. The multi-factor Heckscher-Ohlin model has run into a string of empirical rejections starting with Leontief's (1953) paradoxical findings that US export goods were less capital intensive than US import-competing products. Bowen, Leamer and Sveikauskas (1987) also reject the more general Heckscher-Ohlin-Vanek (HOV) version of the model that is supposed to explain trade in factor content, as opposed to the goods themselves.

They find that these differences are important in explaining cross-country variation in output shares of different sectors

The above evidence speaks in favour of a generalized Heckscher-Ohlin framework with international differences in technology and also unequal factor prices between countries. The ability of such a framework to explain international trade in goods rather than factor content, however, remains largely unexplored.[3] One key difficulty in addressing this question is that both the Heckscher-Ohlin and Ricardian models assume perfect competition and it is difficult to derive clear predictions about trade flows in individual sectors under this assumption. In contrast, new trade models allow for product differentiation and imperfect competition (often in the form of monopolistic competition) and these factors can be merged with traditional models to obtain testable implications for trade in goods.[4]

The theoretical model used in this paper borrows from recent work by Choudhri and Schembri (2000) and Choudhri and Hakura (2001). Choudhri and Schembri (2000) use the model to derive an empirical relation for relative market shares of imports and domestic production and apply it to Canada-US trade in domestic consumption. They find that relative productivity differences are a significant determinant of the two country's relative shares in each country's markets. The present paper adapts the Choudhri-Schembri approach to explore how well a model that combines both the Ricardian and Heckscher-Ohlin effects and incorporates monopolistic competition can explain North American trade in manufactured

---

[3] There are a number of studies that regress some measure of export performance (e.g., net exports) on industry characteristics such as capital and skill intensities [see Deardorff (1984) for a review of early literature]. The theoretical basis for these regressions, however, is not clear; Leamer and Bowen (1981), for example, make this argument.

[4] Helpman and Krugman (1985) is the standard reference for new trade models incorporating monopolistic competition. Interestingly, they show that their models do not affect the predictions of the basic HOV model for trade in factor content.

goods. The paper empirically implements a relation implied by the model, which (like the MacDougall relation) explains relative sectoral exports of two countries to a third country (or a group of countries). This relation includes variables that capture not only the Ricardian and Heckscher-Ohlin effects but also the influence of product differentiation and monopolistic competition.

One of the important contributions of this paper is the construction of a unique two-digit industry-level data set for North America. The data set combines and concords data from a number of different sources (including the OECD and the Banco de Mexico). This was a difficult and time-consuming exercise, but in the end proves fruitful because the data set is used successfully to estimate the export relation derived from the theoretical model. Given the quality of the data, the empirical model fits the data reasonably well and the key variables normally have the expected sign and are statistically significant in the important case Canadian and Mexican exports going to the U.S. market.

The basic theory underlying the export relation is discussed briefly in Section II. More technical details concerning the derivation of the theoretical model are in Appendix I. Section III discusses the methodology for empirical implementation of the export relation using various data sources including the OECD. More detail concerning the data is Appendix II. Section IV describes key features of the data for Canada, the United States and Mexico. The key regression results are discussed in section V. Section VI provides some concluding remarks.

II. Theory

This section briefly outlines a theoretical model that incorporates monopolistic competition into the Ricardo-Heckscher-Ohlin framework. (The technical details are left to Appendix I). The model is used to derive a relation explaining relative exports of two countries to a third country.

Each country is assumed to contain the same set of monopolistically-competitive industries. Each firm in these monopolistically competitive industries produces a single differentiated product. These firms are identical except that their product is slightly different from those of other domestic and foreign firms in the industry; hence, the firm faces a downward-sloping demand curve. In addition, each firm has a downward sloping marginal cost function because of a fixed cost of production (e.g., headquarter services) and constant variable costs. Profit maximization implies that firms will produce output at the point at which marginal revenue equals marginal cost. The number of firms in each industry is determined by the zero-profit condition. Since entry is free, firms will enter the industry until profits are driven to zero.

The demand curve facing each firm can be derived from the Dixit-Stiglitz (1977) love-of-variety utility function which assumes that consumers will spread their expenditure for a given industry over all firms in that industry. This utility function also treats all products symmetrically; hence the price of each product in the industry should be the same in the absence of any frictions because of the symmetry of demand and the similar cost structure across firms.

To introduce some simple notation, let P_i^j be the home price of each variety produced in country j's industry I; $B_i^{jm} > 1$ represents an index of industry trade barriers for country j's exports to country m (so that $P_i^j B_i^{jm}$ represents the price of country j's variety in

country m's market); n_i^j is the number of varieties in country j's industry; and X_{it}^{jm} is the value of exports of sector i from country j to country m.

Based on this cost and demand structure, the basic building block of the theoretical model can be derived which expresses the relative exports of a country pair (j, k) to country m's market as

$$X_i^{jm} / X_i^{km} = (n_i^j / n_i^k)(B_i^{jm} / B_i^{km})^{-\sigma} (P_i^j / P_i^k)^{1-\sigma}. \quad (1)$$

where σ is the elasticity of substitution in demand across varieties (assumed to be the same for all industries). Factors emphasized by Ricardian and Heckscher-Ohlin models can be introduced into (1) by linking the price ratio to relative productivity and relative factor prices.

The next step is to transform the relation given by (1) into a regression model that incorporates the variables of interest and that can be estimated empirically with the available data. First, the number of firms in each industry is difficult to measure empirically; no data are available. However, given the monopolistically competitive structure of the model in which each firm in the industry is identical, the number of firms in industry i in country j can be represented by the total employment of a composite factor in the industry, F_i^j, holding other factors constant. Note that this composite factor is an aggregate of the primary factors (capital, labour and intermediate goods) employed in the industry i in country j. Second, the price of a product is related to the cost of using one unit of the composite factor. This unit cost can be expressed as $C_i^j = \chi_i(\mathbf{W}^j)$, where $\mathbf{W}^j$ is the price vector for primary factors. Finally, differences in productivity can be incorporated into the production function by allowing for only Hicks-neutral technology differences between countries. In particular, let A_i^j denote the

industry total factor productivity (TFP) for country j. Note that $A_i^j = n_i^j Q_i^j / F_i^j$, where Q_i^j is the output of an individual firm in industry *i*.

Using these relationships between the number of firms, productivity and employment of the composite factor on the one hand and prices and costs on the other, equation (1) can restated as:

$$X_i^{jm} / X_i^{km} = (F_i^j / F_i^k)(B_i^{jm} / B_i^{km})^{-\sigma} (C_i^j / C_i^k)^{-(\sigma-1)} (A_i^j / A_i^k)^{\sigma-1}. \quad (2)$$

In this expression, Ricardian effects are represented by the ratio of total factor productivities in the two countries *j* and *k* in industry *i*. Note that TFP is assumed to be determined exogenously. The ratio of unit composite-factor costs captures the Heckscher-Ohlin effects because this ratio depends on relative factor prices and sectoral factor intensities (via the $\chi_i(.)$ function). This ratio of unit composite-factor costs is assumed to be exogenous because individual industries are assumed to be sufficiently small relative to the entire economy that they take factor prices as given.[5] The influence of the new trade theory is reflected in the composite-factor quantity ratio, which is a proxy for the ratio of the number of varieties/firms. Note this ratio is determined endogenously even at the industry level and should be positively related to the relative size of the two countries: for example, larger countries will have larger industries with more varieties and firms of a given size.[6]

Two interesting special cases of the general model can be identified. The first case assumes Hicks-neutral technical differences to be uniform across industries. In this case, the TFP ratio would not vary across countries and the Ricardian effects would be absent. The

[5] Note that relative factor endowments do not directly enter equation (2) but they would exert an indirect influence via relative factor prices.

[6] Such a relation would potentially represent the home market effect discussed by Krugman (1980)

second case assumes that the function defining the composite factor is the same for all industries [i.e., $\phi_i(.) = \phi(.)$] and thus there are no factor-intensity differences between industries. The cost ratio in this case would be identical in all industries and the Heckscher-Ohlin influences would be absent.[7]

III. Empirical Implementation

This section discusses the empirical implementation of the theoretical model given by equation (2) for explaining international trade in manufactured products in North America. The regression model for the ratio of exports in log-linear form is given by:

$$\ln(X_{it}^{jm} / X_{it}^{km}) = \beta_0 \ln(B_{it}^{jm} / B_{it}^{km}) + \beta_1 \ln(F_{it}^{j} / F_{it}^{k}) + \beta_2 \ln(A_{it}^{j} / A_{it}^{k}) + \beta_3 \ln(C_{it}^{j} / C_{it}^{k}) + e_{it}^{jkm}, \quad (3)$$

where $\beta_0 = -\sigma$, $\beta_1 = 1$, $\beta_2 = \sigma - 1$, $\beta_3 = -(\sigma - 1)$, and e_{it}^{jkm} is a mean-zero disturbance term that captures random departures from the theoretical model. Time subscripts also have been added. The regression model (3) explains relative exports of industry i of any country pair (j, k) to a particular market (m) in time period t. Apart from trade barriers, the explanatory variables in this model are industry-level variables for countries j and k only. OECD's STAN and ISDB databases provide industry-level/sectoral data for member countries, including Canada, the United States and Mexico, on a comparable basis. These data are available for a number of manufacturing sectors (generally at the 2-digit ISIC level), but cover only the value-added activity and two factors (capital and labor). [8]

---

[7] Note that in this case, $\mathbf{W}^j$ could still differ from $\mathbf{W}^k$ because of international differences in factor endowments, factor intensities and productivity. The cost ratio $[= \chi_i(\mathbf{W}^j) / \chi_i(\mathbf{W}^k)]$, however, would not vary across industries since $\chi_i(.)$ would be the same for all i.

[8] Some of the Mexican data had to be obtained from sources other than the OECD.

To define the composite factor, a Cobb-Douglas functional form is used. With additional assumptions, this specification allows for intermediate goods in the estimation based on OECD data (supplemented by some data from other sources).

An index of trade barriers (B_{it}^{jm}) that adequately captures all types of trade costs and border effects is difficult to construct. To get around this problem, relative trade barriers for an exporting pair of countries (in a specific market at a given time) are assumed to be the same across sectors. Relative barriers, however, are allowed to vary across markets, country pairs and time periods, and time trends and fixed-effect dummy variables are used to capture this variation.

To explain the measurement of other variables, first define the industry use of the composite factor in country j in the presence of M intermediate goods as

$$\ln F_{it}^{j} = \theta_i^K \ln K_{it}^{j} + \theta_i^L \ln L_{it}^{j} + \sum_{r \in M} \theta_i^{zr} \ln Z_{it}^{jr} , \tag{4}$$

where K_{it}^{j} and L_{it}^{j} represent amounts of capital and labor used in industry i; Z_{it}^{jr} is an index (quantity aggregator) for the amounts of industry r's intermediate goods used in industry i, and θ_i^K, θ_i^L and θ_i^{zr} are the shares of capital, labor and industry r's intermediate goods in the value of output (i.e., the sum of the shares equals one). Total factor productivity (TFP) is given by

$$\ln A_{it}^{j} = \ln Q_{it}^{j} - \ln F_{it}^{j} . \tag{5}$$

Because data on Z_{it}^{jr} are not available, F_{it}^{j} and A_{it}^{j} cannot be directly estimated from (4) and (5). The Cobb-Douglas functional form in (4), however, can be utilised to estimate these variables using the following value-added function:

$$\ln Y_{it}^{j} = \ln \widetilde{A}_{it}^{j} + \widetilde{\theta}_i^K \ln K_{it}^{j} + \widetilde{\theta}_i^L \ln L_{it}^{j} , \tag{6}$$

where Y_{it}^j is value-added output; $\widetilde{\theta}_i^K$ and $\widetilde{\theta}_i^L$ are shares of capital and labor in value added; and $\widetilde{A}_{it}^j$ is TFP in the value-added activity, which can be estimated from the data available. Letting θ_i^Y denote the share of value added in the value of output, (4)-(6) can be used to link the two measures of TFP as $\ln A_{it}^j = \theta_i^Y \ln \widetilde{A}_{it}^j$.[9] This expression can be used to estimate A_{it}^j and then an estimate for the composite factor, F_{it}^j, can be obtained from (5) using data on Q_{it}^j. Note also that the TFP ratio is given by $\ln(A_{it}^j / A_{it}^k) = \theta_i^Y \ln(\widetilde{A}_{it}^j / \widetilde{A}_{it}^k)$.

The cost of one unit of the composite factor can be derived from (5) as

$$\ln C_{it}^j = \theta_i^K \ln R_t^j + \theta_i^L \ln W_t^j + \sum_{r \in M} \theta_i^{zr} \ln P_{it}^{jr} \,, \tag{7}$$

where R_t^j and W_t^j represent the country's rental and wage rates (which are assumed to be the same across sectors because factors are assumed to mobile), and P_{it}^{jr} is the price index for Z_{it}^{jr}. In the estimation of the basic regression, given by (3), all intermediate goods are produced in monopolistically-competitive industries and are traded. Hence, inter-country differences in the intermediate-goods price index are assumed to be relatively small. This assumption simplifies the estimation of the composite-factor cost ratio by letting P_{it}^{jr} be the same for all j. Note that the cost of the composite factor in value added is given by

$$\ln \widetilde{C}_{it}^j = \widetilde{\theta}_i^K \ln R_t^j + \widetilde{\theta}_i^L \ln W_t^j \,. \tag{8}$$

Under the assumption that $P_{it}^{jr} = P_{it}^{kr}$, (7) and (8) imply that

---

[9] Given that $\theta_i^K = \theta_i^Y \widetilde{\theta}_i^K$ and $\theta_i^L = \theta_i^Y \widetilde{\theta}_i^L$, (4) and (6) can be used to express $\ln Q_{it}^j = \theta_i^Y \ln Y_{it}^j + \sum_r \theta_i^{zr} \ln Z_{it}^r = \theta_i^Y \ln \widetilde{A}_{it}^j + \ln F_{it}^j$. The link between the two measures of TFP can be derived using (5).

$$\ln(C_{it}^j / C_{it}^k) = \theta_i^Y \ln(\tilde{C}_{it}^j / \tilde{C}_{it}^k). \quad (9)$$

Thus, the cost ratio can be estimated using data on value-added.

IV. Data

This section briefly describes the data used in the estimation. Further details are provided in the Data Appendix.

Most of the export and industry data for Canada, the United States and Mexico were taken from OECD sources. Some data for Mexico, however, had to be found elsewhere because Mexico only became a member of the OECD in 1990 and so a sufficiently long time series was not available for several variables. Indeed, matching the various sources of data was problematic. Nonetheless, this is one of the first studies to analyse international trade flows at the sectoral level in North America and new ground had to be broken.

For these countries, W_t^j is measured by the annual wage in manufacturing expressed in US dollars and for R_t^j, an estimate of the user cost of a comparable unit of capital (i.e., worth one US dollar in 1990 prices) in US dollars is used.[10] With annual data (mostly from the OECD) for nine 2-digit manufacturing sectors, each sector's shares of capital and labor in value-added are averaged over the three countries and over the 1980-1996 sample period to obtain estimates of $\tilde{\theta}_i^K$ and $\tilde{\theta}_i^L$, which were in turn employed to calculate $\ln \tilde{A}_{it}^j$ and $\ln \tilde{C}_{it}^j$. The three-country 1980-96 averages of sectoral shares of value added in output are used to

[10]This cost is calculated simply by multiplying the price of a comparable unit of capital in US dollars by the sum of the real interest rate and a fixed depreciation rate. These rates are measured as in Caballero and Lyons (1990).

estimate θ_i^Y. This estimate is employed to measure $\ln(A_{it}^j / A_{it}^k)$, and $\ln(C_{it}^j / C_{it}^k)$ under the assumption that prices of intermediate goods are the same in all countries.

The OECD does not provide data on real (gross) output by sector (Q_{it}^j). Without such data, the composite factor in value added (i.e., $\ln \widetilde{F}_{it}^j \equiv \ln Y_{it}^j - \ln \widetilde{A}_{it}^j$) is used to measure F_{it}^j. This measure would be a good approximation for the relative quantity of the composite factor if the ratio of the intermediate-goods to the value-added composite factor does not vary much across countries.[11] Another limitation of the OECD data is that it converts real industry (value-added) outputs to internationally comparable units using GDP purchasing power parities. This procedure does not allow for international differences in relative prices across sectors, which could introduce errors in the measures of $\ln \widetilde{A}_{it}^j$ as well as $\ln \widetilde{F}_{it}^j$. This problem is addressed with the estimation method discussed in section V.

For each country, Table 1 provides the 1980-1996 averages of absolute and relative factor prices as well as aggregate measures of relative factor supplies and productivity performance for the total manufacturing sector in the three countries. The United States is the most productive country and also has the highest wage rate and the lowest rental rate (and thus a rent/wage ratio that is substantially lower than other countries). There is considerable variation in factor prices and TFP across the three countries especially between Canada and the United States on one hand and Mexico on the other. The data do suggest a negative relationship between the rent/wage ratios and the TFP.

Figures 4 and 5 display the inter-industry variation in comparative productivity and costs for the three countries. Figure 4 exhibits the long-run behavior of each country's

[11] See Choudhri and Hakura (2000) for more details.

comparative TFP in value added [i.e., the 1980-96 average of $\ln(\widetilde{A}_{it}^{j} / \widetilde{A}_{it}^{k})$ with k = US] across the nine sectors. If international differences in TFP were uniform across sectors, these measures of TFP would be flat and parallel to each other. As Figure 1 shows, however, each country's comparative productivity varies considerably from one sector to another. Mexico's TFP index is below that of the other two countries for all industries. Canada's TFP index is below that of the United States for all industries except Food, Beverages and Tobacco and Wood and Wood Products.

Figure 5 shows how each country's long-run comparative cost of the composite factor in value added [i.e., the 1980-96 average of $\ln(\widetilde{C}_{it}^{j} / \widetilde{C}_{it}^{k})$ with k = US] varies from one industry to another. The relative cost of the composite factor is much lower in Mexico whereas the Canadian cost of the composite factor is similar to that of the United States.

In the next section, the relative exports of a pair of North American countries to the third country are investigated using these data in a regression model.

V. Regression Results:

Basic Model:

Annual data from 1980-1996 are used to estimate the relative exports regression model given by (3) in the three markets. In the Canadian and Mexican markets, the United States is used as the reference country (i.e. it is in the denominator), and in the U.S. market, Mexico is the reference country.

Letting δ_t^m denote the coefficient of the time trend in market m and simplifying the notation, the regression model (3) is estimated in the following form:

$$x_{it}^{jm} = \delta^{jm} + \delta_t^m + \beta_1 f_{it}^{j} + \beta_2 a_{it}^{j} + \beta_3 c_{it}^{j} + e_{it}^{jm}, \qquad (10)$$

where $x_{it}^{jm} \equiv \ln(X_{it}^{jm} / X_{it}^{km})$, $f_{it}^{j} \equiv \ln(F_{it}^{j} / F_{it}^{k})$, $a_{it}^{j} \equiv \ln(A_{it}^{j} / A_{it}^{k})$, $c_{it}^{j} \equiv \ln(C_{it}^{j} / C_{it}^{k})$; for m = Canada, j = Mexico and k = United States; for m = United States, j = Canada and k = Mexico; for m = Mexico, j = Canada and k = United States; i = 1,...,9; t = 1980, ..,1996. For each market, the data are pooled across industries and time periods to estimate (10). A time trend is introduced into (10) to account for the influence of the omitted trade-barriers term, $\ln(B_{it}^{jm} / B_{it}^{jk})$, which is assumed to be the same for all industries. The use of a time trend imposes the constraint that trade barriers are monotonically changing over the entire sample at a constant rate.[12]

The first three rows in Table 2 ("Heckscher-Ohlin-Ricardian") present the results of estimating (10), the basic regression model, with ordinary least squares. The theoretical model implies that the coefficient of the size variable, $f_{it}^{j} \equiv \ln(F_{it}^{j} / F_{it}^{k})$, is positive and equal to one while coefficients of the productivity variable, $a_{it}^{j} \equiv \ln(A_{it}^{j} / A_{it}^{k})$, and the cost variable, $c_{it}^{j} \equiv \ln(C_{it}^{j} / C_{it}^{k})$, are positive and negative and equal $\sigma - 1$ and $-(\sigma - 1)$, respectively. The results in the first three rows are generally consistent with these predictions. Eight of the nine coefficients have the expected signs and two out of three coefficients in the important U.S. market are statistically significant. In particular, the results for the U.S. market indicate that relative productivity is an important determinant of competitiveness and export penetration by Canadian and Mexican firms into the U.S. market.

---

[12] We hope to explore more fully the possibility of using time and industry fixed effects when we pool the sample across the three markets in the next version of the paper. We recognise that the composite-factor size variable (f_{it}^{j}) and the productivity variable (a_{it}^{j}) are potentially endogenously determined. We intend to use an instrumental variables estimator (three stage least squares) to deal with this simultaneity problem in the next version of the paper as well.

The results for the other markets are not statistically significant, which is not surprising give that the level of bilateral trade between Canada and Mexico is an order of magnitude smaller than each country's bilateral trade with the United States (See Figures 1-3). Consistent with the theory, the effect of the size variable is positive and not significantly different from one.[13] In addition, the theory predicts that the absolute values of the coefficients of productivity and cost variables should be identical. In the Mexican market they are close, while in the other two markets they are further apart, but these differences are not statistically significant. Finally, the estimated coefficients for these two variables suggest an estimate of σ in the range 1.01 to 2.79, which is smaller than most recent estimates, which are in the range of 3 to 6.[14]

Variations:

Two variations of the basic regression number were estimated and the results are shown in Table 2 under the headings "Heckscher-Ohlin" and "Ricardian".

Recall that the first case eliminates the Ricardian effects due to differences in technology across industries by assuming a Heckscher-Ohlin model with *uniform* Hicks-neutral technical differences. In this version of the Heckscher-Ohlin model, a_{it}^{j} in (10) is replaced by its average value over all of the industries in country j.[15] The second case

---

[13] The 5% level is employed to determine the critical value for statisitcal significance throughout the paper.

[14] Obstfeld and Rogoff (2000) provide a survey of recent estimates of σ.

[15] Observed differences in this index are viewed as measurement errors (with a zero mean). Note that the average value of the index equals $\theta_t^Y \ln(\widetilde{A}_t^j / \widetilde{A}_t^k)$, where $\ln(\widetilde{A}_t^j / \widetilde{A}_t^k)$ is the average value of $\ln(\widetilde{A}_{it}^j / \widetilde{A}_{it}^k)$. Also, f_{it}^{j} in (10) is now measured as $\ln(Y_{it}^j / Y_{it}^k) - \ln(\widetilde{A}_t^j / \widetilde{A}_t^k)$.

suppresses the Heckscher-Ohlin effects due to differences in factor endowments by assuming a multifactor Ricardian model with the same composite-factor function for all sectors. Shares of capital and labor in this version of the model are set equal to their average value across industries in country j and these average shares are used to calculate c_{it}^{j} in (10).[16]

The results for the Heckscher-Ohlin and Ricardian models are shown in rows 3-6 and 7-9 in Table 2. There is not a lot of difference between the coefficient estimates from these two special cases and the basic regression model. Most of the estimated coefficients have the signs predicted by theoretical model, although many are not statistically significant. Only for the U.S. market is there is a sizable improvement in the fit; the results for the Heckscher-Ohlin case dominate those of the basic model and the Ricardian case. All three explanatory variables have the expected sign and are statistically significant. The coefficient on f_{it}^{j} is very close to one (1.01), but the estimates of σ are still relatively low. The good performance of H-O case for the U.S. market can potentially be explained by the fact that Canada and Mexico export different sets of products to the United States that are driven primarily by differences in factor endowments. Cross-industry differences in productivity are less relevant.

Time Effects:

Table 3 displays the estimates of the time trend in the three markets. Although only four of the nine coefficients are statistically significant, there are some interesting and intuitively appealing results. In particular, the estimated trend indicates that Mexico is gaining export market share in both the Canadian and U.S. markets (relative to its American and

---

[16] This index is the same for all sectors and equals $\theta^{Y}[\tilde{\theta}^{K}\ln(R_t^j/R_t^k)+\tilde{\theta}^{L}\ln(W_t^j/W_t^k)]$, where θ^{Y}, $\tilde{\theta}^{K}$ and $\tilde{\theta}^{L}$ are the average values of θ_i^{Y}, $\tilde{\theta}_i^{K}$ and $\tilde{\theta}_i^{L}$, respectively. Observed

Canadian competitors) over and above its relative gains through productivity gains and cost reduction. Given the scope and magnitude of economic reforms to Mexico, including the widespread liberalisation of trade that preceded and exceeded NAFTA, this result is not unexpected. In contrast to Mexico, the estimated time trends for Canada are negative, indicating that relative to its North American neighbours, barriers to trade are falling more gradually. Again this is not unexpected relative to Mexico because Mexican barriers were very high at the beginning of the sample period. However, relative to the United States in the Mexican market, it seems that integration between the United States and Mexico is proceeding at a faster rate than between Canada and Mexico. Again this is not surprising given the geographic proximity of the United States and Mexico, and also the closer cultural and linguistic ties developing between the two countries. There are almost 20 million Mexican-Americans in the United States andd the vast majority live close to the Mexican border.

VII. Concluding Remarks

Although the empirical results presented in this paper represent the first pass at a recently constructed North American trade and industry data base, they are generally supportive of the theoretical model developed in the paper. This model incorporates traditional Ricardian and Heckscher-Ohlin channels of comparative advantage through differences in technology and factor endowments, as well as new theories of trade based on product differentiation and monopolistic competition. Hence, the evidence seems to imply that

---

differences in shares are now considered measurement errors and estimates of a_{it}^{j} and f_{it}^{j} are based on the average values of the shares.

all of these factors play a role in explaining international trade in manufactured goods in North America. However, for Canadian and Mexican exports to the United States, differences in factor endowments appear more important. In addition, the results indicate that trade barriers facing the exports of Mexican goods seem to be falling faster than barriers confronting exports from the other two countries. This result is not surprising given that the barriers facing Mexican exports were relatively high at the beginning of the 1980-97 sample period and that the Mexican government has actively pursued a program of trade liberalization over the past 15 years that includes NAFTA and a host of other efforts.

This paper is work in progress. The lack of empirical explanatory power comes from the relatively short sample period. The theoretical relation between productivity and trade is a long-run one that requires more than 17 years of data to provide a powerful test. Work is ongoing to extend the sample back another 10 years. The potential endogeneity of the right-hand side variables in the regression model needs to be tested and instrumental variable methods applied, if needed.

These results imply that trade flows in North American are going to continue to increase as barriers to trade fall with improvements in technology and as Canada and Mexico close the productivity gap with the United States with increases in human and physical capital and the adoption of new technologies. Policy makers will have to deal with the increasing trade flows and greater economic integration and the resulting pressure they will place on governments to reduce official barriers to trade. Calls for the greater harmonization of product standards, more labour mobility, better North-South transportation links and even a common currency can only get louder.

Notes

Villes, régions et intégration économique en Amérique du nord.

Communication présentée dans le cadre de la conférence

Les liens en Amérique du nord, Occasions et défis pour le Canada,

Le 21 juin, 2001.06.07

Calgary, Alberta.

Pierre-Paul Proulx

Professeur honoraire, Université de Montréal,

1) *Introduction*

L'intégration économique s'accompagne d'une recomposition spatiale et sectorielle de l'activité économique ainsi que d'une augmentation du pourcentage de l'activité économique que l'on retrouve dans les agglomérations urbaines.

Les rôles de divers acteurs dont les gouvernements nationaux et métropolitains et les entreprises sont modifiés. Les déterminants de la croissance économique sont aussi influencés par le processus de mondialisation. Nous nous intéresserons particulièrement aux causes du processus d'agglomération et à ses effets de régionalisation et de métropolisation

Même en l'absence d'une union monétaire en Amérique du nord, le processus d'agglomération est à l'œuvre. Il donne lieu a des concentrations d'activités dans des régions et villes de plus en plus spécialisées aux Etats-Unis,.

Nous allons examiner quelques indicateurs de l'importance des villes dans la nouvelle économie, énumérer les principaux traits du processus de mondialisation en cours; discuter des causes de la *métropolisation,* terme qui décrit la concentration grandissante d'activités économiques dans les agglomérations urbaines; examiner quelques données sur la spécialisation des villes américaines et canadiennes et faire état de nos analyses empiriques des déterminants de la croissance des grandes villes nord-américaines. Ce faisant nous allons vérifier quelques thèses qui ont fait l'objet de divers débats concernant la croissance économique des villes, et vérifier entre autre une de nos thèses à l'effet qu'il se forme des régions (dont certaines sont trans-frontalières) en Amérique du nord.

2) *Quelques données sur l'importance des villes* [1]

En 1999, on trouvait dans les 219 régions métropolitaines américaines d'au moins 100,000 habitants 291 millions de personnes ce qui représente 80% de la population des Etats-Unis. On y trouvait 84% de l'emploi total (108 sur 129 millions), 85% du PIB, 90% des services financiers, 87% des activités de transport et de services publics, 93% des emplois de haute technologie, et 93% des services aux entreprises. En 1999, le PIB de New York place son économie au 16 ième rang d'une liste de pays et villes (juste derrière l'Australie et devant Los Angeles-Long Beach qui précède l'Argentine. Vient ensuite Chigago qui précède Taiwan...

[1] Nous citons des données présentées dans : U.S. Conference of Mayors and the National Association of Counties, *U.S. Metro Economies, The engines of America growth*, mai 2000. Les données ont été compilées par Standard & Poors DRI. La définition des région métropolitaine est celle du United States Office of Management and Budget, selon laquelle une région est classifié région métropolitaine lorsqu'on y trouve une ville d'au moins 50,000 habitants et une région ayant une population metropolitaine totale d'au moins 100,000 habitants (75,000 en Nouvelle-Angleterre). Voir http://www.whitehouse.gov/omb/inforeg/msa99.pdf pour la liste des régions métropolitaines américaines et de leurs contés en 1999.

Selon les données du dernier recensement américain les plus grandes villes américaines ont vu leur population augmenter deux fois plus vite dans les années 90 par rapport aux années 80 alors que 3 centres urbains sur 4 ont vu leur population augmenter. [2]

Les données canadiennes indiquent un phénomène analogue que nous avons appelé la métropolisation, phénomène qui évoque la concentration grandissante de la population, du PIB, de l'emploi... dans les agglomérations urbaines.

Nous en serions au point ou selon Linda McCarthy, dans son étude récente d'examen des écrits sur la croissance urbaine pour la U.S. Economic Development Administration :

...America's economy should now be seen as a common market of metropolitan-based local economic regions. These regions are indeed strongly interdependent, but they also compete with each other and with the rest of the world.... The new leadership coalitions and networks recognize that the geographic focus of their efforts has to be the metropolis as a whole, not just the central city or suburbs independently...The big city mayors concur: The American economy is, in reality, comprised of regional economies centered in America's cities, within which the fates of central cities, suburbs and rural are entwined... [3]

Notre analyse du processus d'intégration économique dans l'hémisphère ouest) nous incite à inclure les villes canadiennes, les villes américaines et les grandes villes d'Amérique Latine dans un réseau de grandes villes entre lesquelles les relations commerciales internationales augmentent.

Dans leur rapport pour la U.S. Conference of Mayors et la National Association of Counties, Standard & Poors et DRI écrivent :

..As the focal points of economic activity, cities and counties within metropolitan areas are essential to the nation's economic development. The geographic concentration of business and people in metro areas creates unique economic conditions that generate new industries, spped the diffusion of knowledge, spur technological innovation, and increase productivity. Metro areas have larger markets for goods and services, more specialized labor pools and more extensive and sophisticatd transportations and telecommunications networks than non-metro areas. These competitive advantages make metro areas engines of U.S. economic growth and global competitiveness. [4]

---

[2] New York Times, le 7 mai, 2001.

[3] Linda McCarthy, University of Toledo, *Competitive regionalism: beyond individual competition*, U.S. Economic Development Administration, Review of Economic Development literature and practice, no 2, October, 2000, pp,1 et 2. Mme McCarthy s'inspire entre autres sources des suivantes : Barnes W.R. et Ledebur, L »C. (1994), Local economies : The U.S. common market of local economic regions, Washington D. C., National League of Cities; Wallis A.D. 1994, The third wave: Current trends in regional governance, National Civic Review, 83(3), pp. 290-309; Cisneros, H. G. 1995, Urban entrepreneurialism and national economic growth, Washington, DC: United States Department of Housing and Urban Development; Berkman R. et al Editor, 1992, In the national interest: The 1990 urban summit, New York: The Twentieth Century Fund Press.

[4] U.S. Conference of Mayors, op cit., page 1

On sait qu'il s'agit d'un thème qui fait l'objet de beaucoup de travail aux Etats-Unis dont ceux que mène Michael Porter pour le U.S. Competitiveness Council sur une cinquantaine de grappes « clusters » régionaux américains. Cette réalité semble enfin avoir atteint Ottawa tel que le confirme une annonce le 11 mai dernier d'une subvention de 2,5 millions du Ministre d'Industrie Canada : « for a major national study that will investigate, in communities across Canada, how local networks of firms and institutions, businesses and people, interact to spark economic growth. »

3) *Traits saillants du contexte d'intégration économique dans lequel se doivent d'œuvrer nos villes et régions.*

La citation qui suit indique de façon intéressante les traits saillants et l'ampleur des changements à anticiper dans le nouveau contexte d'intégration économique auquel doivent s'adapter nos villes.

> « Des progrès rapides sont attendus dans les domaines des technologies de l'information, des matériaux, du génie génétique, de la protection de l'environnement et de l'énergie. A plus long terme, l'homme prendra l'habitude d'évoluer dans un environnement dont tous les éléments sont raccordés à des réseaux. L'interaction entre le progrès technologique et l'évolution économique et sociale aura transformé le « où », le « quand », et le « comment » de notre travail, de nos loisirs et de nos périodes de repos, de notre production et de notre consommation, de nos interactions avec les autres individus, les entreprises, les organismes sociaux et l'État »
> OCDE, « Les technologies du XXIième siècle : un avenir prometteur », L'Observateur, no 217-218, été 1999, pp. 56-58.

Cette citation de l'OCDE capte beaucoup des éléments du nouveau contexte dans lequel les citoyens, entreprises et institutions privées, les gouvernements nationaux métropolitains et municipaux devront évoluer et qu'il nous faut comprendre le plus clairement possible pour orienter notre développement. L'ouverture de l'économie; le rôle du changement technologique; l'interaction entre la technologie l'économie et le social; des changements dans les activités des acteurs des secteurs privé, public et de la « société civile », voilà des éléments du nouveau contexte économique.

Énumérons certains éléments marquants du contexte de ce début de millénaire. Notre défi est de bien identifier les causes et les effets de ces phénomènes (nous ne prétendons pas avoir distingué entre les causes et les effets, n'ayant pas estimé un modèle quantifiable du processus de mondialisation). Tentons néanmoins d'énumérer les causes afin de profiter le plus possible des effets positifs qui en découlent, d'éviter au maximum leurs effets négatifs et d'adopter les institutions, politiques programmes et comportements qui nous permettront de canaliser les effets de l'intégration économique afin qu'ils contribuent à la poursuite de nos objectifs socio-économiques et culturels.

La nouvelle économie de l'information, du savoir, de la haute technologie et des services de haut niveau se manifeste de multiples façons inter reliées, tout comme l'on fait les technologies de l'acier, de l'imprimerie, de l'électricité, lors de leur introduction.

En voici une liste (sélective et forcément partielle):

-pénétration grandissante des technologies de l'information, des microprocesseurs, des technologies numériques, autoroutes électroniques, intelligence artificielle, robotique, réseaux électroniques et interfaces en réalité virtuelle, commerce électronique -(B2B, B2C);

-applications de plus en plus nombreuses de la biotechnologie dans les activités de production, de distribution et de gestion, -

-convergence des TIC et de la biotechnologie (biochips et génôme humain)

-augmentation de l'importance de l'information, du savoir et de la formation,

-libéralisation, déréglementation, privatisation, internationalisation, multinationalisation, mondialisation,
- disparités de revenus accrues entre pays, villes, régions et personnes;

- des régions métropolitaines qui se détachent de leur « arrière pays »,

- des régions périphériques qui « décrochent »;

- déclin relatif des activités de production de biens et croissance de celles des services, un fort pourcentage de nos activités nous laissant dans un monde industrialo-tertiaire.

-recomposition de l'activité économique sur le plan spatial et déclin relatif du Nord-Est du continent nord-américain, Les travaux empiriques dont nous faisons état ci-bas nous ont incité à conclure que le long déclin du nord-est du continent documentée par nombre d'auteurs (dont Paul Krugman) se poursuit. Le déplacement progressif de l'activité économique vers l'ouest et le sud du continent explique des taux de croissance plus lents de la population, du revenu personnel, de l'emploi manufacturier et de la compétitivité dans une région transfrontalière du nord-est du continent.

- importance accrue des exportations, des importations et du commerce intra-firme et intra-industrie d'où spécialisation, économies d'échelle et agglomération des activités économiques;

- réorientation de nos flux de commerce extérieur dans un axe nord-sud d'où le défi d'accélérer notre pénétration des marchés de l'hémisphère Ouest afin de faire concurrence à la concurrence sud-nord qui s'intensifie;

- augmentation importante de l'investissement direct étranger, dont surtout les alliances et les partenariats pour pénétrer rapidement des marchés, accéder à des nouvelles technologies et partager le coût élevé de la R&D et des activités dans les nouveaux secteurs;

- importance accrue des firmes multinationales (d'où la nécessité d'assurer que nos PME s'y branchent comme fournisseurs spécialisés et figurent dans les plates-formes électroniques qui se multiplient) ;

- mobilité des capitaux, flux financier accrus et instabilité des marchés de capitaux;

- déplacement des assiettes fiscales vers des pays à fiscalité moins élevée, d'où contraintes évidentes sur les niveaux des impôts et taxes que nos gouvernements peuvent prélever, surtout sur les facteurs mobiles;

- concurrence accrue dans les marchés nationaux régionaux et locaux d'où l'importance de l'innovation et de la productivité;

- inflation amenuisée en bonne partie semble-t-il grâce aux effets de l'introduction de plus en plus répandue des technologies de l'information,

- interdépendance accrue entre pays régions et villes, le pourcentage des flux commerciaux qui « passe par les villes » étant en croissance;

- américanisation,

- rôle important des médias et de la publicité;

- importance grandissante des activités sportives et des loisirs comme biens de consommation et comme déterminants des décisions de localisation des individus et en conséquences des entreprises intensives en ressources humaines lesquelles se localisent en fonction de la disponibilité de la main-d'œuvre (la ville-consommation de Glaeser);

- formation de zones monétaires; [5]

- accords de libéralisation des échanges tels OMC, ALE, ALÉNA et éventuellement ZLEA;

- faiblesse du dollar canadien (en partie le reflet de notre faible niveau de productivité par rapport à nos voisins américains) d'où revenu par habitant très bas pour les villes canadiennes dont la CMM par rapport aux villes américaines, et incitation moindre d'améliorer notre productivité ce qui ne peut durer.....

- importance grandissante de l'action a distance d'où (quoique cela puisse apparaître contre-intuitif) l'importance des synergies locales et régionales, l'action à proximité et le niveau de fonctionnement des régions économiques étant un déterminant important de

[5] Selon J.A. Frankel et A. K Rose « An Estimate of the Effect of Common Currrencies on Trade and Income, April 12, *2001 le PIB per capita du Canada augmenterait de 37% advenant la formation d'une union monétaire nord-américaine.* Ils utilisent un modèle de gravité et une méthode d'estimation en deux étapes selon laquelle ils estiment d'abord les effets de l'union monétaire sur les flux de commerce, et ensuite les effets de ceux-ci sur le PIB per capita.

leur pouvoir de concurrencer dans le nouvel espace économique de plus en plus continental et mondial.

Soulignons (suivant en ce faisant Manuel Castells) que la mondialisation touche simultanément la finance, la production, la R&D, la technologie, la consommation, la culture (d'où les batailles pour influer sur les cultures, déterminant important des dépenses de consommation) alors que les étapes précédentes de la mondialisation ne touchaient que certaines de ces réalités.

Il découle de ce nouveau contexte la recherche d'un nouveau modèle de gouvernance et de gestion des entreprises États et sociétés d'État. L'interdépendance accrue qui découle de la mondialisation incite les gouvernements a mettre en commun des compétences afin de pouvoir traiter de problèmes sans frontière et d'autre part a déconcentrer et décentraliser d'autres fonctions, d'ou notre intérêt pour les déterminants de la croissance économique au niveau métropolitain.

4) Les causes de l'agglomération des activités économiques. de la métropolisation et de la croissance économique

« Scholars and policymakers have increasingly come to suspect that the specific spatial arrangement of economic actitivities into geographical agglomerations or clusters might also in itself somehow influence the creation of knowledge and consequentially, economicy growth. »[6]

Un thème commun que l'on retrouve dans les écrits d'un nombre grandissant d'économistes qui tentent d'expliquer la croissance économique est que les rendement croissants à l'échelle (internes aux entreprises, ou externes tels ceux provenant de la diffusion des connaissances-knowlege spillovers, de concert avec les coûts de transport, créent des externalités qui sont spécifiques a certains lieux. [7]

Un nombre grandissant d'états et de villes américaines abandonnent les politiques et programmes de développement économique visant des industries et secteurs particuliers pour adopter une approche visant des grappes et clusters industriels. On reconnaît de plus en plus que la compétitivité repose non seulement sur des politiques et investissements nationaux mais aussi sur le renforcement de grappes innovatrices dans diverses régions. Selon la définition de Michael Porter il s'agit d'une concentration géographique : a) d'entreprises qui collaborent (ie.dans la R&D pré-compétitive) et se font concurrence , b) de fournisseurs, c) d'entreprises de services aux entreprises, et d) d'organismes associés. Ces grappes sont de nature primaire en région et soit de nature locale ou ouvertes (exportatrices) dans les régions plus urbanisées. On retrouve dans les régions technologiques dynamiques (dont Silicon Valley par exemple) des réseaux denses et flexibles de relations serrées entre entrepreneurs, détenteurs de capital de risque, chercheurs universitaires, avocats et consultants, travailleurs hautement qualifiés et d'autres acteurs qui savent traduire les nouvelles idées en nouveaux produits, services processus et

---

[6] Peter Maskell : « Growth and the territorial configuration of economic activity »,Danish research unit for industrial dynamics, Summer Conference, June 12-15, 2001,page 4.

[7] Voir G. H. Hanson, « Scale Economies and the geographic concentration of industry, NBER Working Paper series, no 8013, november 2000, pour un examen de ces thèses.

méthodes de gestion assez rapidement pour demeurer à la fine pointe de la courbe des innovations.

Dans son rapport 2001, le *U.S. Competitiveness Council* propose au Gouvernement des Etats-Unis de concentrer ses efforts sur l'innovation (la R&D), l'éducation et la formation, et le renforcement des grappes technologiques régionales . Les grappes industrielles et la convergence des technologies de base et leur application donne lieu à la naissance et au développement d'activités économiques qui se situent dans des villes et régions américaines de plus en plus spécialisées.

Il nous importe de bien comprendre les causes de la naissance des grappes (clusters) car c'est ainsi que nous pourrons mieux cerner le pourquoi du rôle grandissant des villes et régions dans la processus d'intégration économie nord-américain. Passons donc a un bref examen de la littérature sur le sujet.

Nous allons regrouper dans cette section de notre rapport les phénomènes qui s'apparentent plus a des causes qu'à des effets du processus d'agglomération et de métropolisation.

Nous avons discuté des multiples causes qui ont donné lieu et qui expliquent encore le processus de mondialisation lequel s'accompagne d'une recomposition sectorielle et spatiale de l'activité économique dont une partie grandissante se poursuit dans les grandes agglomérations urbaines. Tel que suggéré, le changement technologique et les accords de libéralisation des échanges tels l'ALE , l'Aléna et éventuellement la ZLEA sont des facteurs importants de ce processus, parmi les autres.

L'innovation qui accompagne le changement technologique est une activité que l'on retrouve de plus en plus dans les agglomérations urbaines.

Selon Gertler [8], les équipements de production sophistiqués sont non seulement adoptés de façon plus réussie lorsqu'il y a proximité et interaction entre l'acheteur et le vendeur, ils sont aussi fabriqués de façon plus réussie dans ce contexte. Il souligne l'importance de pouvoir évaluer la crédibilité du vendeur et du producteur, et l'importance de pouvoir facilement transmettre au producteur les besoins technologiques de l'acheteur. Il note l'importance pour l'innovation de la distance organisationnelle par laquelle il entend la ressemblance dans la culture institutionnelle de l'entreprise, les pratiques de formation et les attitudes envers la technologie. Selon lui, la distance organisationnelle est moindre dans les métropoles.

L'importance des métropoles dans l'explication de l'innovation et du changement technologique est aussi soulignée par Feldman et Audretsch [9] dans leur étude des grappes d'industries aux États-Unis. Ils signalent que 3,819 des 3969 nouveaux produits manufacturiers qu'ils ont étudiés proviennent des régions métropolitaines. Selon leurs résultats, seulement 14 villes américaines sont plus innovatrices que la moyenne nationale. Selon eux, l'innovation est un phénomène de métropole.

Selon Michael Storper [10] les interdépendances non transigées sont aussi une cause importante du développement des métropoles. Ce concept évoque le rôle que joue la connaissance et la confiance mutuelle entre personnes comme assise de projets, d'échange d'information sur les marchés les technologies et le savoir tacite, d'où la mise en marche d'un processus d'apprentissage collectif et d'activités économiques qui ne naîtraient pas sans les interdépendances non transigées. Les chercheurs du Groupe Européen de Recherches sur les Milieux Innovateurs (GREMI) [11] accordent un rôle important aux synergies ainsi qu'à la proximité comme facteur explicatif de la croissance économique

De nombreux écrits sur les grappes régionales (les regional clusters de Michael Porter et du U.S. Council on Competitiveness) soulignent l'importance de ce facteur.

Selon les travaux que nous trouvons les plus convaincants, il y aurait une complémentarité entre les technologies de l'information et le face à face en milieu métropolitain.. Selon Gaspar et Glaeser, les villes cesseront d'être des lieux de production et deviendront des lieux d'interaction au sein desquels les contacts directs sont très importants

Peter Hall abonde dans le même sens lorsqu'il signale que beaucoup d'information est encore échangée « face to face » d'où la croissance dans le transport aérien et par train à grande vitesse,

---

[8] Gertler, Meric S., "Being There : Proximity, Organisation and Culture in the Development and Adoption of Advanced Manufacturing Technologies", *Economic Geography,* vol. 71, no 1, Janvier 1995, p.3.

[9] Feldman, M. P. et Audretsch, D. B., "Innnovation in cities : Science-based diversity, specialization and localized competition", *European Economic Review*, vol 43, 1999, pp. 421- 427.

[10] M. Storper, « .Regional economies as relational assets », *Revue d'économie régionale et urbaine,* no 4, 1996.

[11] Voir la *Revue d 'Économie Régionale et Urbaine* pour des écrits sur le sujet. Le no. 4, 1993 présente de nouvelles analyses sur la localisation ; les no 3 et 4, 1991 traitent des milieux innovateurs et des réseaux d' innovation.

la croissance de l'industrie de l'hôtellerie et la croissance du nombre de conventions. Il cite le chercheur britannique John Goddard qui conclut, tout comme Gaspar et Glaeser que: *telecommunications are used much of the time for premiminary routine encounters, leading to a positive need for the more complex kind of exchange for which face -to-face contact is deemed essential.* [12]

La métropolisation est influencée de plus à divers degrés par les décisions des villes concurrentes, celles des dirigeants d'entreprises domestiques et étrangères, les décisions des leaders régionaux, les politiques et programmes des gouvernements domestiques de divers niveaux et celles de pays étrangers. Les décisions d'organismes internationaux dont l'OMC et le FMI ont aussi des effets qui influencent de façon importante le fonctionnement de nombre d'entreprises et institutions.[13]

Notre analyse nous incite à souligner l'influence fondamentale des dirigeants d'entreprises et des firmes multinationales sur la compétitivité et le développement des métropoles.

La localisation des activités des entreprisese dont firmes multinationales et du « secteur privé » lequel a participé à divers degrés et de diverses façons dans la conception et la mise en application des stratégies de nombre des grandes villes sont des facteurs déterminants importants de la croissance des métropoles. Nos résultats économétriques de cette année et ceux de notre projet de l'an dernier indiquent que de telles collaborations (secteur public-secteur privé) ont des effets bénéfiques sur la compétitivité des grandes villes nord-américaines.

Les décisions de localisation des entreprises et en particulier celles des grandes entreprises (et celles concernant la localisation de leurs sièges sociaux) sont un autre déterminant important du rythme de métropolisation. Et ceux ci le sont de plus en plus avec la mise en place de plates-formes d'achat, le B2B, et l'internet

Selon le dernier estimé disponible, les firmes multinationales seraient responsables de 46% des exportations et 44% des importations entre le Canada et les États-Unis.[2] La localisation des sièges sociaux de ces entreprises est encore un déterminant de la localisation de leurs fournisseurs quoique la croissance rapide du commerce électronique modifie les stratégies que les PME doivent utiliser pour pénétrer ces réseaux..

Dans une étude relativement récente nous avons conclu que le marché disponible (il ne s'agit pas que du marché de la métropole ou l'on songe se localiser), la qualité de la main-d'oeuvre et la disponibilité et les coûts de transport étaient des facteurs importants de localisation des firmes multinationales. L'activité innovatrice, les synergies et l'activité de réseau intra-métropolitaine et

---

[12]Peter Hall, A Great Cities in the 21 st Century: Infrastructure Planning and Development, polycopié, conférence de Madrid, 1999, page 5.

[13] La localisation des sièges sociaux d'organisations internationales a aussi beaucoup d'influence sur le développement des métropoles.

[2]Richard A Cameron, Commerce intra société des entreprises transnationales étrangères au Canada, Document de Travail no 26, *Industrie Canada.*

avec l'extérieur, le niveau d'information sur les marchés extérieurs, les infrastructures multimodales et la qualité de vie telle qu'indiquée par les activités culturelles étaient aussi des facteurs importants de compétitivité des villes. [3] Nos travaux indiquent aussi que des facteurs locaux spécifiques tels la fiscalité des entreprises, et de plus en plus la fiscalité des personnes interviennent dans les décisions finales, mais que la fiscalité est une variable significative que dans le cas ou la charge fiscale s'éloigne de façon significative de la moyenne des localisations concurrentes. [14]

Que les synergies, les collaborations entre les secteurs privé et public, que les échanges d'information et de savoir entre scientifiques, chercheurs, universités et laboratoires privés bref qu'un milieu innovateur accompagne la métropolisation est une conclusion presque unanime des travaux de recherche sur le sujet..

Kherdjemil examine les points forts, les convergences et les singularités des différents modèles explicatifs du développement des territoires.[4] Il passe en revue la notion de district industriel, concept développé à la fin du 19ième siècle par Alfred Marshall dans lequel on souligne les rendements croissants dus aux économies d'échelle et d'agglomération, et l'importance de divers facteurs dont l'atmosphère industrielle qui permet de former facilement des contacts avec l'autre; les économies en coûts de transaction du fait que les échanges sont personnalisés et les externalités positives liées au processus de partage des compétences induites par la dynamique de fluidité du travail entre les différentes entreprises.

Pour Pecqueur, la capacité d'une métropole à assurer son développement renvoie à la capacité à produire un ensemble de règles.... pour pérenniser l'existence d'une solidarité socioculturelle entre les acteurs. Selon lui un territoire peut innover, s'adapter et se réguler, bref être ce qu'il appelle un système productif localisé qu'il définit comme une configuration d'entreprises regroupées dans un espace de proximité autour d'un métier voire même, de plusieurs métiers industriels. Les entreprises entretiennent des relations entre elles et avec le milieu socioculturel d'insertion. Ces relations ne sont pas seulement marchandes, elles sont aussi informelles et produisent des externalités positives pour l'ensemble des entreprises. [5]

---

[3]Pierre-Paul Proulx, Critères de localisation d'activités économiques à Montréal, vers un modèle opérationnel pour favoriser la rétention et l'attraction d'entreprises à Montréal, *Montréal International*, janvier, 1998. Le lecteur intéressé trouvera dans ce document une revue des écrits universitaires et un examen des méthodes des site locators, ainsi que les résultats d'une enquête sommaire auprès d'entreprises américaines récemment localisées à Montréal.

[14] Voir aussi P.K. Kresl et P.P.Proulx, « Montreal's Place in the North American Economy", The American Review of Canadian Studies, volume 30 number 3, Autumn 200, 00 283-314 pour un examen plus récent de des facteurs ayant influencé le développement économique de Montréal.

[4]Kherdjemil, op. cit. pp. 276-281.

[5] Pecqueur, B. *Le développement local*, Syros, Alternatives, Paris, 1992.

Nos collègues du GREMI (Groupe de Recherche Européen sur les milieux innovateurs) dont Denis Maillat, sont d'avis que le degré de puissance de production technologique d'un territoire passe par l'analyse de sa logique d'interaction et de sa dynamique d'apprentissage.[6] La mobilité et l'échange de scientifiques ingénieurs et techniciens entre les entreprises de la métropole est un des facteurs importants de ce processus d'apprentissage collectif.

Dans son bilan des approches territoriales au développement local, Kherdjemil note : « que l'on se réfère au district industriel, au système productif localisé ou au milieu innovateur, il semble que le processus de l'innovation... est un phénomène essentiellement immanent au territoire.... C'est le territoire, dans son aspect de proximité géographique entre les acteurs, qui va permettre une meilleure coordination entre ces derniers et une absorption plus efficace des apprentissages collectifs. « [7]

Ne minimisons cependant pas l'importance du recrutement de scientifiques de l'extérieur et les activités résiliaires au sein d'entreprises ou dans des réseaux industriels pour favoriser cet accès aux connaissances si essentiel pour la production de connaissances.

Selon Camagni, il faut que les divers agents soient impliqués dans des activités de réseau, créant un milieu synergétique favorable à des interactions mutuellement bénéfiques. [8]

Garnsey, van Geenhuizen et Nijkamp mettent aussi en lumière l'importance des synergies et des activités de réseau comme nous l'avons vu ci-haut.

Storper démontre que les districts technologiques qui génèrent un apprentissage technologique basé sur la production (production based technology learning) génère des quasi-rentes semblables à celles générées par les industries de l'acier et de l'automobile dans le passé. Dans ces districts industriels (les cités du multimédia, du commerce électronique et le quartier du vêtement de la rue Chabanel de Montréal en sont des exemples), on retrouve une combinaison de flexibilité et spécialisation très importante.

Peter Maskell distingue deux catégories d'économies d'agglomération soit les économies d'urbanisation qui proviennent de la proximité géographique des industries et des services, et les économies de localisation.[15] Celles-ci naissent de l'agglomération géographique d'activités économique reliées.

L'analyse conventionnelle des grappes (clusters) a souligné les effets d'agglomération qui découlant des avantages de coûts provenant de la réduction des coûts de transport entre

---

[6]Maillat, D.Milieux innovateurs et dynamique territoriale, dans Rallié A et Torres A, éditeurs, *Économie industrielle et économie spatiale*, Économisa, Paris, 1995.

[7]Kherdjemil, op. cit. p. 280.

[8]Roberto Camagni, The concept of Innnovative Milieu and its relevance for public policies in European Lagging Regions, *Papers in Regional Science,* vol 74, no 4, p.319

[15] Peter Maskell, juin 2001, op. cit.

entreprises, de la présence d'une infrastructure dédiée, de la disponibilité de main-d'œuvre spécialisée et hautement qualifiée, d'un système d'éducation adapté aux besoins des entreprises...C'est dans les grandes villes que l'on retrouve les ressources humaines hautement qualifiées, les infrastructures multimodales, l'information, le savoir et les synergies qui donnent lieu a ce que les économistes appellent les économies d'agglomération attribuables d'une part aux aux économies d'échelle et d'autre part aux économies d'urbanisation découlant de la présence de ressources humaines qualifiées, du capital de risque...

Certaines explications plus récentes ont souligné la diminution des coûts de transaction tels les coûts d'information et de recherche (search), les coûts de négociation et de décision, les coûts de suivi et de mise en application des contrats, comme causes de l'agglomération des activités économiques dans les métropoles (analyse à la R. Coase). La proximité rend coûteuse toute dérogation aux règles du milieu et on profite du climat de confiance mutuelle que l'on retrouve dans les grappes (clusters).

La grappe existerait dont car elle diminue les coûts pour les entreprises d'identifier, d'évaluer et d'échanger des produits, services ou des connaissances.

Maskell signale cependant que ce raisonnement pourrait mener à l'existence d'une seule entreprise par grappe et soumet un complément d'explication de l'existence des grappes.Il distingue (suivant en cela Richardson) *la dimension horizontale de la grappe* (des entreprises avec des compétences semblables qui sont impliqués dans des activités semblables et la *dimension verticale de la grappe* laquelle implique des entreprises différentes avec des compétences complémentaires impliquées dans dans activités complémentaires. Les entreprises impliquées dans la volet vertical des grappes sont souvent des partenaires et collaborateurs alors que les entreprises impliquées dans le volet horizontal des grappes sont surtout des rivaux et compétiteurs.

Maskell souligne l'importance de l'expérimentation qui se fait dans des entreprises indépendantes qui mènent des activités complémentaires dans les grappes. *C'est en s'analysant mutuellement, en discuttant des solutions différentes que se met en marche un processus continu d'apprentissage continu et d'amélioriation,* processus qui ne fonctionnerait pas si on est dans une grande entreprise ou hors de la grappe géographique. On peut donc imiter et profiter de l'expérience des autres entreprises dans la grappe, processus d'autant plus fécond que l'on partage une culture sociale commune, une langue commune... La co-localisation permet donc des externalités et des apprentissages entre entreprises semblables. Il s'agit de la dimension horizontale de la grappe.

La grappe attire aussi des fournisseurs spécialisé et des acheteurs discriminants, la dimension verticale du concept.(analyse à la M. Porter). La réduction des coûts de transaction et la diminution du problème de l'information asymétrique qui provient de l'agglomération en grappe permet la spécialisation qui permet la différentiation verticale qui renforce la grappe.

On attire ainsi de nouvelles entreprises de l'extérieur, et de plus, de nouvelles entreprises peuvent naître à partir des entreprises existantes- le processus d'esseimage- (spin offs).

4b) La spécialisation régionale et métropolitaine : un sine qua non dans l'Hémisphère ouest.

La métropolisation et l'agglomération géographique des activités économiques s'accompagne d'une spécialisation grandissante des villes et régions en Amérique du nord. Examinons brièvement cette question.

Le rapport intitulé *Cybercities* de l'Association américaine de l'Électronique publié récemment conjointement avec NASDAQ présente des données sur les industries de haute technologie de 60 régions métropolitaines américaines, chacune ayant au moins 15000 emplois en haute technologie.

Les auteurs mettent en lumière l'importance de la disponibilité de main-d'œuvre hautement qualifiée et la présence d'universités très impliquées dans la recherche comme facteurs reliés au succès de ses industries. Une masse critique, est un autre facteur qu'ils soulignent.

La disponibilité de capital de risque, une infrastructure de transport efficace, et une population qui utilise les nouvelles technologies (ordinateurs et internet) sont d'autres facteurs identifiés. Tout comme d'ailleurs la qualité de vie, facteur difficile a cerner qui signifie un bon climat pour certains, peu de problèmes de transport pour d'autres, des activités culturelles intéressantes pour d'autres.

La proximité i.e. entre San Jose, San Francisco et Oakland leur permet aussi de profiter d'un pool de main d'œuvre et de capital. (analyse à la A. Marshall). L'industrie de haute technologie de San Jose aurait été responsable de 40% de la création d'emploi dans Silicon Valley depuis 1993.

Boston aurait été la première ville en termes de création d'emplois de haute technologie jusqu'en 1996. Colorado Springs est la cybercité dont le taux de croissance a été le plus élevé entre 1993 et 1998. Dallas se serait situé au 2^{e} rang et Houston se serait située au 3^{e} rang. Washington DC est un leader dans l'emploi dans les logiciels (software). Minneapolis-St-Paul se situe parmi les 10 premières cybercité. San Jose est cependant un endroit très diversifié en haute technologie est le leader américain dans les domaines suivants :ordinateurs, composantes électroniques, semi-conducteurs et production électronique industrielle.

Selon les données du AEA-Nasdaq, l'emploi en haute technologie serait le suivant dans les villes examinées dans le rapport de Montréal Technovision : [16]

San Jose,	252, 900
Boston	234,822,
Chicago	180,425
Dallas	176, 600
Los Angeles,	160, 544
Atlanta	117, 279
Philadelphia	88,647
Seattle	75, 565
Détroit	59, 310

[16] Le rapport de la AEA-Nasdaq donne des renseignements et des fiches concernant un nombre plus considérable de villes tel qu'indiqué ci-haut.

Selon ces données, l'emploi en haute technologie aurait augmenté du nombre suivant selon les villes examinées dans l'étude de Montréal TechnoVision :

Houston	27,900
Seattle	25,900
Atlanta	38,500
Washington	46,400
New York	25,500
Chicago	38,200
Détroit	11,200
Philadelphie	11,600
Miami	2,800
Boston	21,800
Los Angeles	9,900.

Selon l'étude de Montréal TechnoVision il y aurait 160,000 personnes dans la nouvelle économie à Montréal. Quoique les définitions du secteur haute technologie ne soit pas directement comparables on peut conclure que Montréal est un joueur respectable dans ce domaine en Amérique du Nord.

Une étude récente publiée par le Brookings Institution nous éclaire beaucoup concernant le processus de spécialisation des villes technologiques américaines. [17]

Une des conclusions les plus pertinentes provenant de cette étude de 14 régions métropolitaines « high-tech » aux Etats-Unis est celle a l'effet *que les régions métropolitaines ont tendance est se spécialiser dans peu de produits et technologies.* Les auteurs ont examiné la concentration en emploi, l'activité de brevets, et les flux de capital de risque dans les villes high-tech étudiées.

Selon leurs résultats l'emploi est concentré dans peu de secteurs i.e. Washington, Denver et Atlanta en logiciel mais peu en hardware; d'autres telles Phoenix en hardware et peu en logiciel.

L'innovation serait aussi le fait d'un petit nombre d'entreprises spécialisées dans une technologie données. San Jose, Phoenix, Portland et Austin innovent en électronique et en logiciel mais peu en technologie biomédicale. Washington, Raleigh-Durham, San Diego,Boston et Seattle innoverait en biotechnologie mais peu en électronique et logiciel.

Les flux de capital de risque seraient aussi spécialisés : les logiciels et la biotechnologie à Boston; les communications et le stockage de données à Denver; les industries médicales à San Diego.

Les principales spécialisations seraient les suivantes :

Atlanta : bases de données et télécommunications,

---

[17] J. Cortright et H. Mayer, .."High Tech Specialization : A comparison of High Technology Centers, Institute of Portland Metropolitan Studies, Portland State University et Brookings Institution, Survey series, January 2001, étude diffusée par le Brookings Institute.

Austin : semi-conducteurs, ordinateurs, production d'équipement manufacturier,

Boston : ordinateurs, équipement médical logiciel et biotechnologie

Denver : Stockage de données, équipement de télécommunication et logiciel

Minneapolis-St.Paul : ordinateurs, périphériques, instruments médicaux

Phoenix : semi-conducteurs , aérospatial

Portland : semi-conducteurs, display technologie-écrans..., production d'équipement manufacturier, logiciel d'automatisation et de design électronique;

Raleigh-Durham ordinateurs, bases de données et pharmaceutique

Sacramento : ordinateurs, semi-conducteurs,

Salt Lake City : logiciel et équipements médicaux

San Diego : équipement de communication et biotechnologie

San Jose semi-conducteurs, ordinateurs, logiciel, équipement de communication, production d'équipement manufacturier, design électronique et logiciel d'automatisation, stockage de données

Seattle : logiciel aérospatial et biotechnologie

Washington : bases de données, service internet, télécommunications et biotechnologie.

Selon leurs données l'emploi total en haute technologie (ordinateurs et produits électroniques (SCIAN 334), logiciel (SCIAN 5112), services d'information et de traitement de données (SCIAN 514) et design de systèmes d'ordinateurs et services reliés (SCIAN 5415) était comme suit en 1997 : [18]

San Jose 212, 249, Washington 138, 662, Boston 133, 745, Minneapolis 66, 738, Atlanta 57, 837, Phoenix 56,051, Seattle 55, 897, Austin 49, 521, San Diego 47, 296, Portland 45,155, Raleigh-Durham 40, 153, Denver 33, 288, Sacramento 23, 993 et Salt Lake City 22, 404.

Ils ont aussi estimé les quotients de localisation, examiné l'activité de brevets, et examiné les placements de capital de risque entre 1995 et 1999.

Michael Porter fera rapport de sa vaste étude sur les grappes, dont bon nombre sont dans des agglomérations urbaines dans quelques mois. Les trois graphiques qui figurent en annexe permettent d'identifier les villes qu'il a identifiées.

[18] Les données sont disponibles par secteur de SCIAN dans le rapport.

Les travaux du *Milken Institute* qui ont estimé des coefficients de localisation par industrie des villes américaines et nos travaux en cours avec la banque de donnée Corptech nous permettent aussi de parfaire nos connaissances des spécialisations des villes et régions américaines (voir le tableau Corptech en annexe).

Nos travaux empiriques sur la compétitivité des villes en 1999 ont porté entre autres questions sur un débat qui a impliqué Jane Jacobs, M Porter, Marshall Romer et Arrow. [19] Jane Jacobs favorise une stratégie de diversification économique et la concurrence entre entreprises pour favoriser la croissance urbaine alors que M Porter et certains autres auteurs favorisent la concurrence et la spécialisation. D'autres encore favorisent les monopoles et la concentration (thèse de Shumpeter) pour accroître la croissance urbaine. E. Glaeser et ses collègues ont obtenus des résultats indiquant que la concentration de certaines industries urbaines dans de domaines tels les assurances, les autos, faisait diminuer la croissance urbaine.

Gordon Hanson conclu que la croissance sectorielle à long terme est plus élevée dans des villes plus diversifiées. Il identifie aussi des effets d'agglomération reliés à des externalités spécifiques a certaines industries et à des liens du côté de la demande. [20]

Nos résultats de 1999 nous ont porté à conclure que la création d'entreprises (et donc une concurrence accrue) est à encourager tout comme la spécialisation. Notre variable représentant la concurrence était positive (+) et significative dans nos équations de régression multiple. La spécialisation aurait un effet positif et de la concentration un effet négatif sur la compétitivité. Ces deux variables n'étaient cependant pas statistiquement significative dans nos travaux empiriques (voir ci-bas).

Un rapport de *Moody's Investors* identifie et mesure la concentration par secteur industriel et on calcule un indice de diversité métropolitaine pour les villes canadiennes.

Moody's cherche essentiellement a déterminer jusqu'à quel point la structure industrielle de chacune des 25 Census Metropolitan Areas ressemble à celle au niveau national canadien. L'étude vise à déterminer jusqu'à quel point une industrie donnée est sur ou sous représentée dans la ville étudiée par rapport à la même industrie au niveau national. On se sert de données sur l'emploi jusqu'en 1999 pour effectuer les calculs.

On a étudié 34 industries regroupées en 7 groupes industriels majeurs.

Un examen des quotients de localisation (la part d'un secteur dans l'emploi métropolitain divisée par la part de cette industrie au niveau national) indique ce qui suit :

---

[19] P.P.Proulx, P Kresl et P. Langlois, « La région métropolitaine de Montréal et les métropoles de l'Amérique du nord : compétitivité et politiques « , Rapport au Ministère ds Finances du Québec, juillet 1999.

[20] Gordon H. Hanson, Scale Economies and the geographic concentration of industry, Working paper 8013, NBER, novembre, 2000.

-Montréal n'a pas de concentration particulière dans le domaine bancaire ou financier. Dans cette dernière industrie son quotient de localisation est de 1.08, celui de Toronto de 2,14 et celui de Vancouver de 1,74.

-Dans le domaine des assurances, le quotient de localisation de Montréal est de 1.19, celui de Toronto de 1,25 et celui de Vancouver 1.14.
-Le secteur aérospatial ressort a Montréal son quotient de localisation étant de 4.35, celui de Toronto de 1,26.

-Montréal a le plus haut coefficient de localisation parmi les villes étudiées (Calgary, Ottawa, Toronto, Vancouver) dans le domaine de l'alimentation du tabac et des breuvages.

-Montréal a aussi un coefficient de 1.50 (celui de Toronto est de 1.48) dans le domaine des biens durables pour consommateurs,

-Son quotient de localisation de 1.40 dans les biens non durables pour consommateurs indique aussi une industrie à scruter dans le cadre de la stratégie de développement économie de la CMM.

Ottawa avec un quotient de 3.09 de démarque dans le domaine de l'électronique. Montréal a un coefficient de 1,82 et Toronto de 1.33.

La spécialisation de Montréal est évidente dans le domaine des textiles et vêtements son coefficient étant de 3.14.

Les coefficients de localisation indiquent aussi que Montréal est relativement spécialisée dans le « publishing and broadcasting » (1,53) ; et dans les télécommunications (1.78).

Il existe une certaine concentration de l'emploi canadien à Montréal dans certains secteurs : l'aérospatial ; les ordinateurs et logiciels ; les biens de consommation durables et non durables, l'électronique, la finance, les loisirs, les médias: l'imprimerie, le pétrole et le gaz, les télécommunications; les textiles le cuir et les vêtements; et l'industrie du transport personnel.

Il découle de ce bref aperçu que les villes-régions américaines et canadiennes sont caractérisées par des spécialisations qui sont appelées à devenir plus pointues à l'avenir, ce que permet la formation et le renforcement des grappes industrielles.

Le processus d'intégration économique en cours dans l'hémisphère ouest nous incite à effectuer de tels calculs et de tels travaux dans une optique canado-américaine au minimum et selon le secteur pour l'Hémisphère ouest.

5) *Notre analyse empirique de la compétitivité et de la croissance économique d'un échantillon de villes nord-américaines.* [21]

[21] Les résultats complets sont disponible dans : P.P.Proulx » La région métropolitaine de Montréal : son positionnement en Amérique du nord et des éléments de réflexion pou rune stratégie de développement économique », Rapport au Ministère des affaires municipales et de la métropole, mars 2001, 223 pages et annexes.

Nous avons effectué une analyse de régression multiple linéaire classique des déterminants de la croissance économique des métropoles.

5a) Notre échantillon

Notre échantillon est constitué de toutes les agglomérations urbaines comptant en 1999 plus de 850,000 habitants (+ la ville de Québec), soit 56 Metropolitan Statistical Areas (MSA) ou CMSA (Central MSA) américaines et 7 grandes régions métropolitaines (telles que définies par Statistique Canada soit : Vancouver, Edmonton, Calgary, Toronto, Montréal, Québec et Ottawa-Hull. L'annexe I présente la liste des villes étudiées.

5b) Nos variables dépendantes

Dans notre étude de 1999, la seule variable dépendante utilisée était un indice de compétitivité. Il s'agit d'une variable composée de trois indicateurs (pondérés selon leur part du total en fin de chaque période étudiée) à savoir : a) la valeur ajoutée manufacturière, b) les ventes au détail et c) le PIB dans les services aux entreprises.. L'augmentation dans les ventes au détail capte les changements dans la population et leurs revenus, et l'attrait de la métropole pour fins de loisirs, d'activités culturelles, de restaurants. Le changement dans la valeur ajoutée manufacturière capte les dépenses d'investissement en capital humain et en machinerie et équipement, en structures. Le changement dans le PIB pour les services indique le point auquel la métropole sert de lieu de services dans son espace économique et indique le degré de sa conversion vers les services. Des taux de changement élevés pour ces variables indique que la région métropolitaine en question est compétitive et est un bon endroit pour la production et l'achat de biens et services.

Selon les données de notre plus récent projet les ville étudiées se classeraient tel qu'indiqué au Tableau sur l'indice de compétitivité durant la période 1987-1997 (en annexe).[22]

Selon ce classement on retrouve : Vancouver, Toronto, Calggary, Montréal, Edmonton, Ottawa-Hull et Québec pour la période 1987-1997.

Durant la période 1987-1997 on observe les augmentations suivantes (en dollars canadiens courants) dans les indicateurs de notre indice de compétitivité :
a)ventes au détail : Montréal +24%, Vancouver 96%, Calgary 71%, Toronto 48%, Edmonton et Ottawa 45% et Québec 16%).
b) valeur ajoutée manufacturière : 92% pour Montréal. 128% pour Vancouver, 110% pour Toronto, 93% pour Edmonton, 79% pour Calgary, 26% pour Ottawa, et 22% pour Québec. Montréal est donc au 4^{e} rang parmi les 7 villes canadiennes.

c) PIB dans les services aux entreprises :

[22] Bon nombre de nos données (voir les annexes 2 et 3 proviennent de la maison Arthur Andersen. Les autres ont été puisées dans les banques de données de Statistique Canada et du Bureau of Economic Analyis et du Bureau of the Census américains.

Montréal 78%, Calgary 161%, Vancouver 160%, Edmonton 142%, Toronto 119%, Ottawa 108%, Québec 82%. Montréal est donc au dernier rang parmi les villes canadiennes.

Durant la période 1992-1997 on observe les augmentations suivantes dans les composantes de notre indice de compétitivité :

a) ventes au détail : Vancouver 35%, Calgary 32%, Toronto 30%, Ottawa 28%, Montréal 25%, Edmonton 21%, Québec –2%.

b) valeur ajoutée manufacturière : Vancouver 52%, Toronto 40%, Edmonton 29%, Calgary 26%, Montréal 19%, Ottawa 11%, Québec 10%.

c) PIB dans les services aux entreprises : Calgary 90%, Edmonton 76%, Toronto 59%, Vancouver 48%, Ottawa 41%, Montréal 28% et Québec 23%.

Nous disposons de renseignements analogues pour chacune des 56 américaines de notre échantillon pour les périodes 1977-1987 et 1987-1997.

Durant la période 1987- 1997 les ventes au détail ont augmenté de 265% a Austin, 125% a Salt Lake City, 85% à Seattle, 55% à Chicago, 47% à Philadelphia, 38% à Buffalo, 48% à New York, 31% à Albany, 28% à Boston, 24% à Hartford.

Durant la période 1987-1997 la valeur ajoutée manufacturière a augmenté de 422% à Austin, 176% à Portland, 174% à Sacramento, 172% à Phoenix, 160% a Dallas-Fort Worth, de 142% a Salt Lake City, de 103% à Houston, de 100% a Raleigh, de 95% à Indianapolis, , de 80% à Seattle, de 71% à San Diego, de 55% à Atlanta, de 43% à Chicago, de 33% à Washington-Baltimore, de 28% à Philadelphia, de 23% à Boston, de 15% à Rochester, de 9% à Albany, de 7% à Harford, de –1% à New York.

Durant cette même période le PIB dans les services aux entreprises a augmenté de 1051% à Greenville, de 543% à Washington-Baltimore, de 478% à Austin, de 421% à Houston, de 417% à West Palm Beach, de 393% à Denver, de 356% à Raleigh,...de 269% ; a Seattle, de 262% à Sacramento, de 255% ;à San Diego, de 242% à Atlanta, de 205% à Boston, de 203% à Dallas-Fort Worth, de 194% à New York, de 186% à Phoenix, de 168% à Providence.

Dans notre étude de 1999, l'équation définissant notre variable de compétitivité est la suivante :

*Compétitivité = 0,3683 *(change in manufacturing value added) + 0,5002 * (change in retail sales) + 0, 1314 *(change in revenues in selected services activites and in services to firms).*

We used the 1987 weights for the 1977-1992 index and the weights of the last year for sub periods i.e. 1982 for the 1977-1982 index, 1987 for the 1982-1987 index and 1992 for the 1987-1992 index.

Nous avons utilisé le poids de l'année 1997 dans la calcul de notre indice de compétitivité pour la période 1987-1997.

Les variables dépendantes utilisées dans notre dernière étude (mai 2001) sont énumérées dans l'Annexe II. Les variables dépendantes utilisées (selon le sous-ensemble de régressions) sont, : a) soit une coupe instantanée (i.e. l'année 1999) pour le PIB, ou b) la variation dans le PIB entre 1998 et 1999 , ou c) la variation dans l'emploi total (y inclus l'emploi dans le secteur public) entre 1997 et 1998 [23] ; ou d) un indice de compétitivité dont nous avons expliqué la construction couvrant la période 1987-1997.

Selon certaines estimations, il existe une relation statistique assez serrée entre la variation du PIB et celle de l'indice de compétitivité qui servent à tour de rôle de variables dépendantes dans notre analyse. La relation serait au niveau de 0,88% selon un coefficient de corrélation de rang Spearman..[24]

5c) *Nos variables dichotomiques : existe-t-il des régions en Amérique du nord?*

Nos variables dichotomiques captent trois phénomènes soit : a) la localisation de la métropole dans les différentes régions dont certaines sont transfrontalières; b) sa taille mesurée par sa population et c) sa présence près de la frontière canadienne ou vers le sud des Etats-Unis. [25] Les métropoles ont étés caractérisées selon qu'elles étaient localisées dans le nord-est du continent , dans la région centre-est (EC), dans la région Centre-ouest (WC),dans la région sud (SO), ou dans la région pacifique (PA). Nous avons voulu vérifier une hypothèse (confirmée dans notre travail de 1999 pour le Ministère des Finances) à l'effet que la région Nord-Est (dans laquelle sont situées située Montréal, Boston,...) se trouve dans une région en déclin relatif en Amérique du nord sur le plan de la compétitivité. Comme nous le verrons ci-bas, nos résultats sont compatibles dans les études de 1999 et 2001 et confirment notre résultat de l'étude de 1999 ainsi que l'existence de régions (dont certaines sont transfrontalières) en Amérique du nord.

Nous avons omis la variable Nord-Est dans les équations, ce qui fait que dans les équations ou l'on régresse les variables dépendantes à tour de rôle contre 4 variables dichotomiques pour capter la présence des métropoles dans les régions centre est (EC), centre-ouest (WC), sud (SO) et du pacifique (PA).

Nous avons situé Montréal, Québec et Ottawa-Hull dans la région Nord-Est; Toronto dans la région centre-est, Calgary et Edmonton dans la région Centre –ouest, et Vancouver dans la région Pacifique. L'annexe I donne les détails concernant les variables frontière et région pour l'ensemble des villes.

---

[23] Dans notre banque de donées 2001, les données canadiennes pour l'emploi total a temps plein et temps partiel pour tous les secteurs (y inclus le secteur public) proviennent de Statistique Canada. Les données américaines définies de la même façon proviennent du Bureau of Economic Analysis. En 1999, nous avons retranché l'emploi du secteur public des données d'emploi des villes canadiennes afin de faire correspondre nos données aux données américaines lesquelles, provenant de County Business Patterns, ne comprenait pas le secteur public.

[24] Selon les résultats obtenus par Pierre Langlois dans un rapport préparé en vue de l'obtention d'une maîtrise en sciences économiques à l'Université de Montréal en 1999.

[25] Voir l'Annexe 1 pour des détails concernant chaque ville.

Nous avons aussi voulu aborder la question des effets de la taille de la ville sur sa performance économique (les économies ou déséconomies d'échelle) en utilisant soit POPP (villes de moins de 1,5 millions d'habitants) et POPM (villes moyennes de 1,5 à 5 millions d'habitants)..[26]

Notre dernière variable dichotomique capte la présence de la ville soit près de la frontière du Canada (NOB) ou sud des Etats-Unis (SOB) afin de vérifier si la présence d'une grande ville près d'une frontière avait, toutes choses étant égales par ailleurs, un effet sur sa croissance Les travaux empiriques de Gordon Hanson sur cette question indiquait que l'effet avait été positif pour les villes méxicaines près de la frontière américaine.

Notre démarche de régression a commencé par des régressions voulant capter les effets de variables structurelles, i.e. localisation et taille. Nous avons ensuite ajouté des variables explicatives dont certaines peuvent être influencées par des politiques.

5 e-1) Nos résultats empiriques en 1999.

Our regression analysis is conventional and lacking in refinements to reflect non linearities obviously present in the relationships examined.

All equations were ajusted for heteroskedasticity (maximum likelihood).

Our dependant variable (the competitiveness index) is a linear function of a series of independent variables plus an error term. Since cross section and time series data were invoved we "pooled" the data to do our regression analysis.

The regressions were run for : a) the total sample of 63 metro areas, and b) american cities. The degrees of freedom precluded separate analysis for the canadian cities, although comparison of the results obtained in regressions a) and b) suggests comments on the canadian cities.

Regressions covered the following time periods: 1977-1982, 1982-1987, 1987-1992, and 1977-1992.

Data availability in the U.S. precluded analysis of the competitiveness index beyond 1992, hence regressions for the 1977- 1992 time period. Our most recent study covers the period through 1997

As indicated above we omitted the "north-east "region and metro areas with more than 5 million inhabitants in dealing with our proxy varibles representing regions and metro areas. As indicated above, coefficients of the regional and size variables are thus to be interpreted with reference to the north-east and large metro areas.

Our initial « structural »equation experiments with more structural and permanent variables i.e region, proximity to the northern or southern border and size as determined by population, leaving more policy relevant variables to be added in subsequent equations.

[26] Il existe vraisemblablement de non linéarités dont nous ne nous soucions pas dans notre analyse.

In our structural equation we regressed the competitiveness index IND against

a) a regional variable, EC =east central, WC= west central, SO=south, and PA= pacific

b) population size variables POPP, (less than 1,5 million POPM (1,5-5 million)

c) a border variable NOB and SOB

Let us examine regression 1,3 (total sample- 1977-1992 results presented in our Appendix. .

The coefficients of each of the regional variables are positive and except for EC they are statistically significant according to the T ratio. This confirms our previous conclusion that *Montréal and Boston are located in a " north-east" region which is in relative decline compared to other regions in north america.*

NOB has a positive and significant effect on competitiveness while SOB has a non significant negative effect.

POPP and POPM both have positive effects on competitiveness , the former being non statistically significant, the latter meeting the significance test. The positive signs indicate that small and medium size metro areas have experienced a more pronounced growth in competitivenss than have large metro areas (the omitted variable).

Discriminant analysis we shall examine later indicates that POPP and POPM are significant variables. The probability of finding small and medium metro areas among competitive cities grows from quartile to quartile for cities ranked according to competitiveness.

Variable DENS (population density) which is positive but not significant precludes us from concluding that larger metro areas suffer from a competitiveness disadvantage relative to small and medium metro areas.

In equation 2.0 we add to the regional, population size and border variables figuring in equations 1.0-1.3 a variable to capture initial average wage (INIWAGE) and another the capture initial productivity INIPROD. INIWAGE has a negative but not statistically significant effect on competitiveness,whereas INIPROD has a positive and highly significant effect, a result confimed by our discriminant analysis. High initial wages in a metro area are not a significant determinant of its subsequent competitiveness, but high initial productivity definitely gives a metro area a headstart in its relative competitiveness among metro areas.

Note that equation 2.0 is a "better" equation than 1.3; the coefficients of the log likelihood estimate being higher in absolute value (-102.54)for equation 2.0 versus (–102.56) for equation 1.3.

We shall not comment further on these results except to indicate that our "best equation" is equation 9.0 with an absolute value of the maximum likelihood of 95.34. As indicated below, equation 9.0 (an equation fitted to the U.S. metros only), involved regressing the competitiveness

index IND against the regional, population and border varibles to which we added the following: CSI, SERV, CONC, TECH and FISC. The next best equations are 8.0, 6.0 and 5.0 respectively).

OUR REGRESSION ANALYSIS

Equation 1,3:
IND = a + EC +WC +SO+ PA + POPP +POPM
+ns +s +s +s +ns +s
+NOB -SOB
+s -ns

(+ns indicates the variable is statistically non significant, its sign being positive; +s indicating the variable is significant and has a positive sign)

Equation 2.0
(Same as 1,3 but add the following: -INIWAGE +INIPROD
-ns +s
Equation 2.1
(Same as 2.0 except that +DIFFPROD, replaces INIPROD (DIFFPROD +change in PROD) +s

Equation 3,0
(Same as 2.0 except that INIPOP replaces INIPROD.
+ns
As a consequence we also exclude POPP and POPM from this equation.

No indication of strong agglomeration economies measured in this way.

Equation 4.0
(same as 1.,3, except that we add +SPEC(77) +CONC (90)
+ns -ns
– CONCE (77)

-ns

SPEC = Ei\Et by city divided by Ei\Et for the U.S. where i = industry.
CONC = number of firms per employee by city
CONCE= share of total employment in the top three industries by city

The results of this equation are relevant to the debate between Jane Jacobs and Marshall, Arrow, Romer and M. Porter mentionnd above..[27]

Although subject to further testing we conclude that favoring firm creation (and hence competition) is a good strategy; that specialisation is to be encouraged and that concentration and

[27] ("Growth in cities", *Working paper no 3787*, NBER, 1991)

monopolistic powers are not to be encouraged. The analysis of competition and concentration should however be cast in at least north american space and not national space given the growing importance of north-south integration.

Equation 5.0
IND = a +TECH + SERV + EXP
+s +s (na) +ns (na= north american sample of 63 metro areas)
+ns(us) +s (us =us cities only)

TECH= the share of total city employment in 21 high tech industries ;
SERV= the ratio of services employment to total employment in the city
EXP= total exports of the city.

The EXP coefficient is the highest in this equation but is only statistically significant for the u.s sample of metro areas.

The share of total metro employment which is in 21 high tech sectors TECH such as pharmaceuticals, computers, office equipment, industrial electrical equipment, medical and ophtalmic equipment, communications equipment, missiles, measuring devics, engineering and architectural services is a positive and significant determinant of competitiveness.

The share of total metro employment in services has a positive effect on competitiveness although it is not a significant variable in the regression equation for american cities alone.

Equation 6.0
Same as 1,3 except for the following added variables:

IND = a) +IT +HT +SOFT + COMMUNIC
+s +ns +s +ns

Competitiveness is positively related to the share of total metro employment in information technoloy jobs, high tech employment, software and computers, and communications.

Our analysis of variance indicates that IT is a signifcant explanatory factor, its coefficient increases from quartile to quartile when cities are ranked according to competitiveness.

Equation 7.0
Same as 1.3 plus the following variables:
IND = a +CSI –SS
+s -ns

The percentage of total metro employment in administrative and scientific jobs i.e. scientists and engineers is a very significant positive determinant of competitiveness.

Discriminant analysis indicates that CSI is a significant determinant of metro competitiveness.

The SS (head offices) variable is negative and non significant in this equation, presumably a result of multicollinearity problems for administrators scientists and engineers are very present in head offices.

Equation 7.1

Same as 7.0 except for the SS variable. The coefficients of CSI are positive and statistically significant and important in these equations, an indication of the importance of highly qualified human resources for metro competitiveness.

Equation 8.0
Same as equation 1,3 but with added variables:
IND = CSI + SERV+ CONC+ TECH
+s +s +s +s

Our second best equation (maximum likelihood –99,34) Equation 9.0 being estimated only for U.S. metro areas. This is our best equation for the north american sample.

The regression equations that follow add variables that are more subject to influence by government policies.

We have dropped the POPP and POMM variables from these equations , their coefficients not being significant in previous equations.

Equation 9.0
This equation keeps the border and regional variables that figured in Equation 1,3, but as indicated drops the POPP and POPM variables.

It is estimated for the sample of U.S. cities only given the unavailability of comparable internet usage data for all north america.

This is our best equation as indicated by our highest maximum log likelihood estimate of –95.34.

IND = a + CSI + SERV + CONC + TECH –FISC +
+s +s +s +s -ns
INTERNET/97 (work andhome)
+ns

CSI remains a significant determinant of competitiveness.

We also expiremented with a fiscal variable FISC (total public revenues per 1000$ of personal income) which was of the expected sign but was not statistically significant. Our previous

research indicates that taxes have a significant effect on location only if tax loads in the jurisdiction in question are significantly different from the average. [28]

We did not formulate conclusions concerning the FISC variable in our previous study for it would be necessary to take into consideration public expenditures along with revenues to more adequately address the effects of taxes and public expenditures on metro competitiveness. An estimate of simple correlation coefficients between competitiveness (IND) and FISC was – 0,78, and that of IND with public expenditures was +0,66.

It is of course necessary to take into consideration both personal and corporate income taxation as well as public expenditures to more adequately address the effects of taxation which may have significant influences on location decisions of highly qualified manpower in addition to those of firms, the latter being attracted to metro areas where highly qualified human resources are available.

The INTERNET (at work and at home in 1997 according to a Bureau of the Census survey) variable has a positive but non significant effect on competitiveness.

Equation 10,0
Same as 1,3 except for absence of POPP and POPM
IND = a + CSI + CULT/92 + UNI/per cap./ 99 + DEST/92
+s +ns +ns +s
Our CULT variable represent cultural assets per capita i.e. orchestras, opera, ballet companies, theatres, museums, art galleries and libraries per capita.

Universities are a necessary but not sufficient for metro competitiveness. We have however observed the great significance of CSI, the bulk of whom are university graduates.. As indicated in equation 10.1 where we substitute the percentage of the metro population with bachelors degrees in 1990, to the university per capita count we still remain with a positve but non significant variable. Our conclusion is that their his high geographic mobility of university graduates hence the importance of attracting, training and retaining them in metro development strategies.

DEST is the number of non-stop destinations from the metro area in 1992. It is a positive and significant determinant of competitiveness but does not reach our significance cutoff point (1,745) in our discriminant analysis.

Equation 10,1

This equation is identical to equation 10.0 except for the substitution of a BA /90 variable (positive but not signicant) for the UNI variable.

---

[28] (P.P.Proulx "Critères de localisation d'activités économiques à Montréal, vers un modèle opérationnel pour favoriser la retention et l'attraction d'entreprises à Montréal", Rapport à Montréal International, Janvier 1998.)

All results remained the same.

Equation 11,0 (U.S. only).
IND = a –FISC +INTERNET + DEST
-ns +s +s

Results are as obtained in previous equations.

iii) *our discriminant analysis.*

Our report to the Department of Finance describes the composition of the probit and logit formulations used to estimate the probabilites of metro areas being in different quartiles of the competitiveness index, as well as the method and hypotheses used to obtain the log-likelihood and the optimisation procedures.

Our discriminant analysis allowed us to identify and measure the characteristics of metro areas and to classify them from the less to the most competitive. We chose the variables in light of their significance in the regression analysis. The coefficients in the following table indicate the probability of being in each of the quartiles. The coefficient for the PA variable increases from 0,08 in the quartile of the least competitive metro areas to 0,14 in the highest quartile, indicating that it is more probable that a metro area from the Pacific area is more likely to be in the more competitive than the less competitive quartile of cities.

Each of the four quartiles of cities is regressed on the variables indicated in the first column of the following table.

ISABELLE –
(INTRODUCE TABLE OF DISCRIMINANT ANALYSIS RESULTS.) page 62 du texte RMR Montréal

The PA, WC, and SO regions are statistically significant according to the t ratio whereas the EC variable is not.

These results indicate that the two most significant variables in explaining competitiveness for the 1977-1992 time period are INIPROD and IT.

5d) Nos variables explicatives en 2001 : hypothèses et motifs d'utilisation

L'annexe III énumère les variables utilisées dans notre étude de 2001 dont les variables indépendantes.

Commentons brièvement les hypothèses et motifs qui nous ont incités à introduire nos différentes variables explicatives dans notre analyse de régression ainsi que l'interprétation que nous en faisons. La non disponibilité de données a contraint notre analyse empirique, notre revue de la

littérature ayant identifié nombre d'autres facteurs que nous aurions aimé examiner dans le cadre de nos travaux.

La variable captant la densité de la population DEN est à été introduite pour capter l'effet de la densité de la population sur nos variables dépendantes. La variable est reliée à nos variables de population POPM et POPP, mais il y des villes de taille semblable qui sont de densité inégale. Nous n'avons pas introduit les variables population et densité dans la même équation cependant.

La variable population initiale en 1997 POPI tente de mesurer elle aussi l'effet des économies d'échelle. Si elle est significative on peut conclure que les agglomérations urbaines de grande taille partent gagnantes de par le fait qu'elle ont atteint des masses critiques et des seuils qui leurs permettent d'être concurrentielles.

L'utilisation de la variable qui mesure la productivité (la valeur ajoutée manufacturière divisée par l'emploi manufacturier en 1997) PRO ne doit pas surprendre le lecteur étant donné la place centrale qu'occupe cette variable comme facteur pouvant expliquer le niveau de vie le PIB par habitant et la compétitivité des villes. [29]

Notre analyse de l'effet de la structure industrielle STR est sommaire. Nous avons voulu vérifier l'effet de la tertiarisation (du changement de l'économie métropolitaine vers le secteur des services) sur nos variables dépendantes. Nous savons que les vocations des villes peuvent différer, certaines (dont Montréal) se spécialisant dans la production de biens, d'autres plus dans les services quoique nous évoluons vers une économie industrialo-tertiaire, la production de biens et celle de services étant présentes dans la nouvelle économie.

La variable centres de recherche REC (en 1999) nous permet de vérifier les effets de la présence de centres de recherche sur nos variables dépendantes. Des travaux ultérieurs devraient tenter de tenir compte des champs de recherche car les métropoles se spécialisent de plus en plus dans des créneaux précis.

Nul besoin de motiver la présence d'une variable voulant capter les divers coûts des affaires CDB (en 1999) dans les différentes métropoles. Nous avons utilisé une variable qui regroupe divers coûts. Il est indiqué de désagréger cette variable dans des travaux ultérieurs. A priori, on s'attend à un effet négatif sur la croissance des villes le plus est élevé leurs coûts.

L'emploi de main-d'œuvre professionnelle et de gestionnaires en pourcentage de l'emploi total de la métropole en 1999 PM devrait avoir un effet positif sur la croissance urbaine. [30]

---

[29] Nous avons utilisé la variation dans PRO dans nos travaux de l'an dernier DIFFPROD, mais l'ampleur limitée de notre projet actuel nous a incité à ne pas entreprendre cette analyse entre autres dans l'étude 2001..

[30] Au niveau national américain ce pourcentage est de 25,2% pour : " current metro area population employed in executive, administrative, managerial and professional specialties ». Dans la banque de données d'Arthur Andersen on indique la différence entre le pourcentage de chaque ville et le pourcentage américain. Nous avons ajouté (ou soustrait) ce pourcentage de différence de la moyenne américaine pour fabriquer notre variable PM.

La présence de diplômés universitaires et de ceux de collèges devrait avoir un effet positif sur la croissance urbaine La variable EDU (en 1999) représente le rapport entre les inscriptions dans les collèges et les universités et la population totale. Cette donnée nous provient de la firme Arthur Andersen qui l'a compilée et utilisée lors du choix des villes d'affaires pour le magazine *Fortune.*

Le % de la population détenant un baccalauréat BACC (1999) devrait avoir un effet positif sur la croissance urbaine. Cette variable provient aussi des données d'Arthur Andersen, tout comme la variable COL (1999) qui indique le % de la population qui détient un diplôme collégial. Les résultats empiriques de notre étude de 1999 indiquait qu'il n'existait pas de relation statistiquement significative entre le nombre de diplômés universitaires et la compétitivité urbaine alors que l'emploi de diplômés universitaires était une variable significative. Nous avons « réconcilié » ces résultats en apparence contradictoire, en notant qu'il existe une grande mobilité de main-d'œuvre universitaire surtout entre les métropoles américaines d'où l'absence d'une relation. On étudie à Boston ou Los Angeles mais on n'y travaille pas nécessairement. Puisqu'une masse critique de diplômés universitaires était positivement reliée à la compétitivité urbaine nous avons conclu qu'il était indiqué de former des diplômés mais aussi de les attirer et de les retenir par divers moyens.

RS représente un indice des loisirs et divertissements disponibles dans les métropoles. Tirée des travaux du *Places Rated Almanach* cette donnée (pour 1999) nous provient de la banque de données d'Arthur Andersen.

Il en est de même pour la variable CS qui représente la disponibilité d'activités culturelles en 1999.

On prétend aussi que l'esprit d'entrepreneurship est un déterminant de la croissance économique et ce au point ou certaines firmes choisissent les villes dynamiques presque exclusivement à la lumière de cette variable. Nous avons tiré de la banque de données d'Arthur Andersen un indice de démarrage d'entreprises (business starteups) BS lequel peut capter cet esprit d'entrepreneurship. Convenons que la variable peut aussi refléter la présence de capital de risque, mais ne tentons pas d'aller plus loin dans l'examen de cette question, sauf en utilisant une variable qui capte l'activité de capital de risque dans les différentes métropoles VC . Cette variable provient elle aussi de la banque de données d'Arthur Andersen et comme pour BS, représente des données pour 1999.

La présence de sièges sociaux d'entreprises SS représente le pouvoir de décision que l'on trouve dans les grandes métropoles. Les travaux disponibles postulent une relation positive entre la présence de sièges sociaux et la compétitivité des villes. Se pourrait-il que des changements organisationnels (on déconcentre et découpe les entreprises multinationales en unités autonomes) et technologiques (la gestion à distance étant donné les intranet.....) viennent briser la relation positive entre la présence de sièges sociaux et certains indices de la croissance des villes? Cette donnée, compilée pour 1999, provient-elle aussi de la banque de données d'Arthur Andersen.

Nos résultats de 1999 avaient indiqué que le nombre de destinations nationales sans escales VOL allait de pair avec la compétitivité des grandes villes. Cette donnée, compilée elle aussi pour 1999, provient de la banque de données d'Arthur Andersen.

5f) Nos résultats empiriques dans l'étude de 2001

Les résultats de l'analyse économétrique sont disponibles au MAMM. Nous avons fait des estimations à l'aide de deux échantillons : le premier portant sur 63 métropoles et le deuxième sur 27 villes qui ont répondu à un questionnaire lequel nous permet de « mesurer » l'ampleur de la relation entre les autorités municipales et secteur privé, notre variable de gouvernance (GOU) dans certaines équations de régression.

Puisque les données compilées et rapidement disponibles pour la variation du PIB et la variation de l'emploi total ne couvrent que la variation d'une année à l'année suivante nous nous passons de commentaires détaillés sur les équations visant à expliquer ces deux variables dépendantes. Des travaux ultérieurs pourront examiner les déterminants de la variation du PIB et de l'emploi sur des plus longues périodes, ce qui est le cas pour notre indice de compétitivité (variable dépendante sur laquelle nous concentrons notre attention.

Nous avons utilisé le programme E-VIEWS pour effectuer les régressions. Nous avons examiné les statistiques t, R2, R2 ajusté pour les degrés de liberté et la variable F dans notre analyse des résultats économétriques.

Nous avons examiné équation par équation le signe des coefficients des variables explicatives (positive ou négative) et la signification de la variable explicative (selon la variable ''t'' ou nous avons indiqué que la variable en question était significative lorsque le ''t'' était de plus de 1.00, signifiant que la probabilité est de 66,6% que la valeur réelle du coefficient n'est pas zéro)

Nous en restons à des conclusions générales sur les hypothèses principales dans les commentaires qui suivent. Le lecteur intéressé pourra s'adonner à une analyse plus détaillée de nos résultats en consultant nos feuilles de travail déposées au MAMM.

5-f-1-Résultats de l'analyse de l'échantillon des 63 villes.

Notre intérêt dans le processus de recomposition territoriale de l'économie nord-américaine sous les effets du changement technologique, des politiques publiques telles l'OMC, l'ALE et l'ALÉNA et des stratégies de repositionnement des entreprises, ainsi que nos résultats de l'étude de 1999 selon laquelle la région transfrontalière du « Nord-Est » était en déclin relatif en ce qui concerne sa compétitivité nous ont incité à examiner la performance des régions nord-américaines en terme de niveau de PIB per capita, de croissance dans le PIB per capita, de croissance dans l'emploi et de changement dans la compétitivité.

En conséquence, nous avons débuté notre analyse de 2001 par l'estimation de notre équation de base (voir les résultats en annexe).

Examinons maintenant les principaux résultats de notre analyse empirique.

Question 1- La région Nord-Est dont fait partir la CMM est elle en déclin relatif en Amérique du nord?

Pour l'échantillon des 63 métropoles il y a des indications qu'en 1999, les métropoles de la région EC avaient un revenu per capita inférieur à celui des villes situées dans la région Nord-Est (dont la CMM). L'évolution de leur PIB et l'augmentation de leur emploi total entre 1997 et 1998 confirment cette conclusion.

Les résultats obtenus alors que nous utilisons l' indice de compétitivité indiquent au contraire que les villes de la région EC auraient amélioré leur compétitivité par rapport à celle des villes de la région Nord-Est,_ résultat en accord avec celui que nous avons obtenu en 1999. A première vue ce résultat est difficilement conciliable avec les résultats que nous avons obtenus pour les variables dépendantes du PIB per capita et du changement dans le PIB et l'emploi métropolitain. [31] La reprise économique du « rust belt » peut expliquer ce résultat en termes de compétitivité car l'indice capte la croissance dans la valeur ajoutée manufacturière, les ventes au détail et le PIB dans les services. De plus il est probable que les effets d'une compétitivité plus faible dans la région NE ne se font sentir qu'avec la passation du temps, d'où une relation différente pour des données pour une ou deux années à la fin des années 90.

Nos résultats (niveau du PIB, changement dans le PIB et changement dans l'emploi total) sont tels que nous ne pouvons rien conclure concernant les villes localisées dans la région WC comparativement à celles dans la région Nord-Est. Les coefficients de la variable WC sont cependant systématiquement positifs dans les équations ou la variable dépendante est notre indice de compétitivité indiquant que les villes de la région NE aurait vu leur compétitivité se détériorer par rapport à celle des villes de la région WC.

Les résultats de nos trois dernières régressions dans lesquelles le revenu per capita figure comme variable dépendant nous empêchent de conclure que les métropoles de la région SO ont un revenu per capita plus bas que celles du Nord-Est toutes choses étant égales par ailleurs. Le signe du coefficient SO est systématiquement négatif dans les équations ayant le changement dans le PIB comme variable dépendante indiquant une amélioration de la situation des villes du Nord-Est. On ne peut rien conclure en ce qui concerne le changement dans l'emploi, alors que les résultats pour l'indice de compétitivité indiquent que les villes dans la région SO ont vraisemblablement vu leur compétitivité s'améliorer relativement à celle de la région NE. (15 coefficients positifs et significatifs, un positif et non significatif et 3 négatifs mais non significatifs).

Les coefficients de la variable PA (villes de la région du Pacifique) dans les équations ayant le PIB per capita comme variable dépendantE sont tous négatifs, indiquant un effet négatif provenant d'une localisation dans cette région. Il en est de même en ce qui concerne le changement dans le PIB entre 1997 et 1998 ce qui indique qu'il s'est produit une détérioration dans la croissance du revenu de la région Pacifique par rapport à la région NE. Les coefficients de la variable PA dans les équations ayant le changement dans l'emploi comme variable dépendante sont tous positifs indiquant une détérioration dans la situation des villes du NE à ce titre.

[31] La seule exception est dans l'équation 1.4.15 alors que nous ajoutons la variable BS (business starteups)à l'équation de base. BS a un coefficient significatif et positif sur la compétitivité dans cette équation de régression alors que le coefficient pour EC est négatif quoique non significatif.

Les coefficients de PA sont tous positifs dans les équations ayant l'indice de compétitivité comme variable dépendante indiquant une détérioration dans la situation du NE.

Nos résultats concernant l'évolution de la compétitivité sont donc systématique et en accord avec ceux de notre étude de 1999 à l'effet qu'il se serait produit une détérioration de la compétitivité des métropoles de la région Nord-Est par rapport à celles des autres régions durant la période 1987-1997.

Cette détérioration n'est pas évidente en ce qui concerne les autres variables étudiées.

Le coefficient EC est systématiquement négatif dans les équations estimées, il n'est cependant significatif statistiquement que dans 8 équations sur 19.

Commençons notre examen de l'effet taille de la métropole (mesurée par la population) en examinant les équations ayant l'indice de compétitivité comme variable dépendante.

Les coefficients de POPP et POPM sont systématiquement négatifs indiquant que les grandes métropoles profitent d'économies d'échelle par rapport aux petites et moyennes villes. Ces résultats ne sont pas conciliables avec nos résultats de l'étude de 1999 ou les variables POPP et POPM avaient des coefficients positifs.

Nos résultats économétriques concernant l'effet frontière i.e. la localisation de la ville au Canada ou près de la frontière canadienne (NOB) ou près de la frontière sud des Etats-Unis (SOB) sont les suivants. Les coefficients pour SOB sont tous positifs dans les équations ayant le niveau du PIB, le changement dans le PIB et le changement dans l'emploi comme variable dépendante ce qui indiquerait qu'une ville située près de la frontière sud en profite. Rappelons que nos résultats de 1999 indiquait que SOB avait un effet négatif non significatif sur la compétitivité. De plus NOB avait un effet positif et significatif sur la compétitivité en 1999 alors qu'il est négatif et significatif en 2001 dans cette équation.

Les résultats de 2001 sont clairs et concordants en ce qui concerne les effets d'une localisation des villes américaines et de villes canadiennes à proximité de la frontière du Canada : l'effet est négatif sur le PIB, le changement dans le PIB, le changement dans l'emploi et la compétitivité. *Le déclin du Canada relativement aux Etats-Unis et celui de Montréal en Amérique du nord sont évidents de par ces résultats.*

Les effets de la densité de la population DEN dans les différentes métropoles ne sont clairs qu'en ce qui concerne le changement dans le PIB ou l'effet est positif et l'indice de compétitivité ou l'effet est négatif. Cet effet était positif et non significatif dans les résultats de 1999.

Le niveau de la population en 1997 POPI qui sert à identifier les économies d'échelle (les plus grandes métropoles ayant des économies d'échelle selon nos résultats avec POPP et POPM) n'a d'effets systématiques statistiquement que sur le changement dans l'emploi dans nos analyses et cet effet est positif. Convenons qu'il s'agit d'une mesure limitée des économies d'échelle et d'une mesure limitée du changement dans l'emploi. Il s'agit cependant de notre seul résultat systématique avec la variable POPI.

A priori nous anticipions que la productivité (la valeur ajoutée manufacturière sur l'emploi manufacturier) PRO aurait un effet positif sur nos variables dépendantes Les résultats empiriques indiquent l'existence d'un effet négatif sur le changement du PIB entre 1998 et 1999 ainsi que sur la compétitivité, résultats contre intuitifs que nous ne pouvons expliquer. La variable INIPROD avait un effet positif et significatif sur la compétitivité en 1999.

Le rapport de l'emploi dans le secteur manufacturier à l'emploi dans les services STR ajouté à l'équation de base i.e. équation donne des coefficients négatifs pour toutes les variables dépendantes. Les villes qui se spécialisent dans la production de biens n'en profitent pas.

La présence de centres de recherche REC (mesurée selon Places Rated Almanach) a un effet positif sur le niveau du PIB et l'indice de compétitivité comme on pouvait l'anticiper. L 'importance de la R&D pour le développement métropolitaine est confirmée.

La variable CDB devrait affecter négativement la compétitivité des métropoles. Le seul résultat systématique que nous obtenons indique que le PIB per capita est relié positivement à la variable CDB.[32] Nous n'avons pas fait d'analyse avec les données de KPMG sur les coûts afin de vérifier si les résultats obtenus seraient en accord avec nos anticipations d'un effet négatif.

Le pourcentage de l'emploi d'une métropole dans les postes professionnels et de gestion PM est relié positivement à la compétitivité tel qu'anticipés. Ce résultat confirme que le plus la métropole est forte dans ses fonctions de commande, le plus elle est compétitive. Les résultats statistiques dans les équations concernant les autres variables dépendantes le PIB per capita, le changement dans le PIB per capita et l'emploi total ne sont pas concluant. Nous les passons donc sous silence. Rappelons cependant que la variable CSI (équation 5.0 de l'étude de 1999) avait un effet positif et significatif sur la compétitivité, résultat qui concorde avec celui que nous obtenons cette année.

Les coefficients de la variable EDU (inscriptions dans les collèges et universités) sont positifs dans les équations concernant le changement dans le PIB per capita et l'indice de compétitivité tel que l'on pouvait l'anticiper. Ces coefficients sont cependant non significatifs sauf dans l'équation 1.2.12 concernant le changement dans le PIB.

Les résultats de notre analyse confirment l'importance de la main-d'œuvre avec diplôme universitaire dans une économie de l'information, du savoir et de la haute technologie. Toutes les variables dépendantes sont reliées positivement à la variable BAC . Sept des douze (7\12) coefficients sont significatifs et 5 non significatifs. Ce résultat est analogue à celui que nous avons obtenu l'an dernier.

Le pourcentage de la population détenant de une à trois années d'études collégiales COL affecterait le changement dans le PIB de façon positive et l'indice de compétitivité de façon

[32] Cette donnée sur le coût des affaires reflète le coût unitaire du travail, les coûts énergétiques, les impôts des états et les impôts locaux et les loyer s de bureau. Voir Markey et Burt, Dismal Sciences, op cit., pour les pondérations et définitions.

négative selon nos résultats. Les coefficients de cette variable sont cependant tous non significatifs d'où aucune conclusion possible concernant cette relation.

La disponibilité d'activités récréatives RS dans les métropoles est positivement reliée à leur niveau de PIB per capita et leur compétitivité. On peut considérer ces activités comme dépenses de consommation, mais l'importance des ressources humaines comme facteur de localisation des entreprises nous incite à interpréter la disponibilité d'activités récréatives comme un investissement qui a des effets positifs sur la croissance urbaine.

Contrairement à nos anticipations, la disponibilité d'activités culturelles CS est reliée négativement au changement dans l'emploi et à l'indice de la compétitivité des villes.

Tel qu'anticipé l'activité de démarrage d'entreprise BS reflète l'entrepreneurship et la disponibilité de capital de risque entre autres facteurs est reliée positivement et significativement à la compétitivité des métropoles. Des changements de signe selon les équations nous empêchent de conclure quoi que ce soit concernant les effets de cette variable sur le niveau du PIB per capital, le changement dans le PIB per capita et le changement dans l'emploi.

La disponibilité de capital de risque VC est reliée positivement à la compétitivité des villes tel qu'anticipé. Nos résultats indiquent cependant une influence négative sur le changement dans le PIB mais nous sommes enclins à ne pas tirer de conclusions de ce résultat étant donné qu'il s'agit du changement dans le PIB pour une seule année.

La présence de sièges sociaux SS a un effet positif sur le niveau du PIB per capita métropolitain (2 coefficients significatifs et 2 non significatifs) tel qu'anticipé. Le pouvoir de décision se révèle. Rappelons que SS avait un effet négatif non significatif sur la compétitivité dans notre étude de 1999 tout comme en 2001. Nous avons cependant conclu que la variable CSI (présence d'adminstrateurs et de scientifiques dans la population active de la ville) captait les effets de la présence de sièges sociaux à laquelle elle était correlée.

Le nombre de vols domestiques sans escale VOL est relié positivement au changement dans le PIB. Nos résultats économétriques nous empêchent de tirer des conclusions concernant les effets de cette variable sur nos autres variables dépendantes.

5-f-2) Les résultats concernant les effets de la gouvernance dans l'échantillon 2 de 27 villes.

Poursuivons notre analyse en examinant les résultats pour l'échantillon comprenant les 27 villes ayant répondu à notre questionnaire, nous permettant ainsi de leur attribuer une note pour le niveau de collaboration public-privé GOU que l'on y trouve.

L'échantillon des 27 villes ayant répondu à notre questionnaire n'étant pas un échantillon aléatoire, nous ne commentons pas les résultats obtenus dans notre analyse sauf en ce qui concerne les résultats pour la variable GOU.

Les signes des coefficients de la variable GOU sont systématiquement négatifs dans les équations ayant pour variable dépendante le changement dans l'emploi, résultat contre-intuitif.

Les coefficients de la variable GOU sont cependant tous positifs dans les équations ayant l'indice de compétitivité comme variable dépendante. Ils sont cependant non significatifs dans trois équations sur quatre. Il est donc impossible de tirer une conclusion statistique ferme à l'effet que la collaboration public-privé a des effets bénéfiques sur la compétitivité des villes mais nous avons eu des indications significatives à l'effet qu'il en est ainsi.

6) Commentaires de conclusion.

Nous avons longuement examiné les causes des effets d'agglomération qui se manifestent fortemment dans un contexte de mondialisation et d'intégration nord-sud-sud nord dans l'Hémisphère ouest. Les technologies de l'information, les synergies, la diminution des coûts de transaction, les économies d'échelle internes et externes, la possibilité pour les entreprises de se comparer entre elles, voilà des facteurs qui font diminuer les coûts d'identification, d'évaluation de production et d'échange en milieu urbain d'ou le processus de *métropolisation* que nous avons mis en lumière.

Nous avons conclu que les villes et régions américaines, de plus en plus en interaction se spécialisent.

Nos analyses empiriques de 1999 et de 2001 nous incitent aussi à conclure que le processus de recomposition sectoriel et spatial en cours n'a pas empêché que se poursuive un déclin tendantiel dans la région transfrontalière du nord-est de l'Amérique du nord. Certaines villes et régions qui s'y trouvent sont dynamiques, mais le processus de lent déclin relatif se poursuit.

Nos résultats ne nous ont cependant pas permis de conclure que les grandes métropoles profitent d'avantages ou de désavantages d'échelle par rapport aux métropoles de plus petites taille.

Nos résultats ne nous permettent pas non plus de conclure que les villes localisées près de la frontière canado-américaine ont une performance de compétitivité différente des autres villes du continent. Cette conclusion tient aussi pour les villes près de la frontière mexicaine.

Nos résultats ne sont pas concluant en ce qui concerne l'effet d'un niveau initial élevé de productivité (INIPROD) sur la compétitivité ultérieure des villes.

Nos résultats ne sont pas concluants non plus en ce qui concerne la présence d'activités culturelles et récréatives,

L'analyse discriminante effectuée dans le cadre de notre étude de 1999 permet d'identifier les principaux facteurs déterminants de la compétitivité pour une période se terminant en 1992.

Les variables spécialisation, concurrence, emploi de nature hautement technologique, emploi dans les services, activité exportatrice, emplois en TIC(hautement significatif), emplois en logiciel, et communications, présence d'un pool de main-d'ouvre hautement qualifiée (variable significative dans les deux études), présence d'universités et nombre de vols aériens dans escale voilà des variables qui contribuaient à expliquer la compétitivité des villes nord-américaines.

Un niveau élevé de concentration industrielle dans une ville semble cependant avoir eu un effet négatif sur le compétitivité des villes du moins jusqu'en 1992. Nos résultats de 1999 (pour la variable spécialisation) et notre analyse du nouveau contexte d'intégration économique nous ont incité à conclure que la spécialisation est un sine qua non de compétitivité.

Sommaire, notre analyse de la question de la fiscalité nous a permis de retrouver les effets attendus sur la compétitivité. Des charges fiscales qui s'éloignent de la moyenne nuisent à la compétitivité des métropoles..

Notre analyse empirique de 2001 confirme les effets positifs des variables suivantes sur la compétitivité des villes : existence d'un pool de main-d'œuvre hautement qualifiée, présence de sièges sociaux (effet négatif en 1999 et positif en 2001) , présence d'universités, nombre de vols aériens sans escale, activités plus prononcées dans les services plutôt que les biens, centres de recherche, démarrage d'entreprises.

Nos résultats ne sont pas concluants 2001 concernant la présence d'activités culturelles(l'effet était positif mais non significatif statistiquement dans l'étude de 1999) ; et la présence de capital de risque, résultat qui nous intrigue étant donné le fait que le démarrage d'entreprises et la concurrence (dans l'étude de 1999) avaient des effets positifs sur la compétitivité.

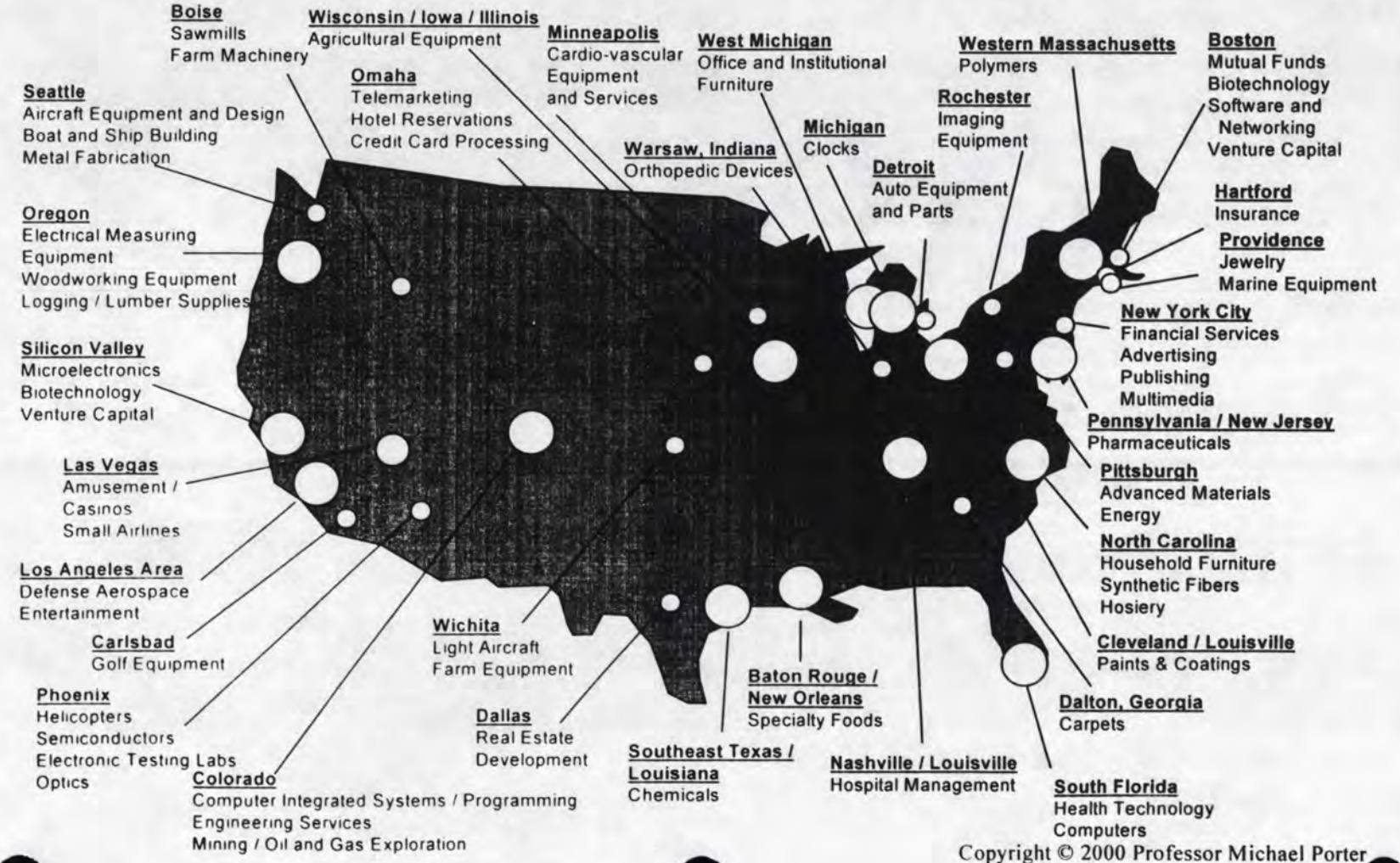
Quoique sommaire notre analyse indique que les liens entre les secteurs public et privés contribuent à la compétitivité des villes nord-américaines. Un résultat contraire nous aurait beaucoup surpris étant donné l'importance que nous avons données aux synergies entre acteurs dans notre analyse théorique des causes de l'agglomération et de la croissance économique.

Nous concluons donc que les villes et régions de plus en plus spécialisées jouerons un rôle important dans le processus d'intégration économique en cours en Amérique du nord. Il nous faudrait évidemment effectuer des travaux additionnels sur nombre de questions afin de rendre notre analyse plus pertinente pour fins de politique économique. La lecture des spécialisations de villes, celle de la dynamique économique au niveau métropolitain, une connaissance appronfondie de la concurrence accrue provenant du Mexique et d'autres pays d'Amérique latine, l'influence de la ville sur sa région économique, un découpage plus probant que le nôtre des régions économiques en Amérique du nord.... voilà des sujets que pourraient profiter de travaux additionnels.

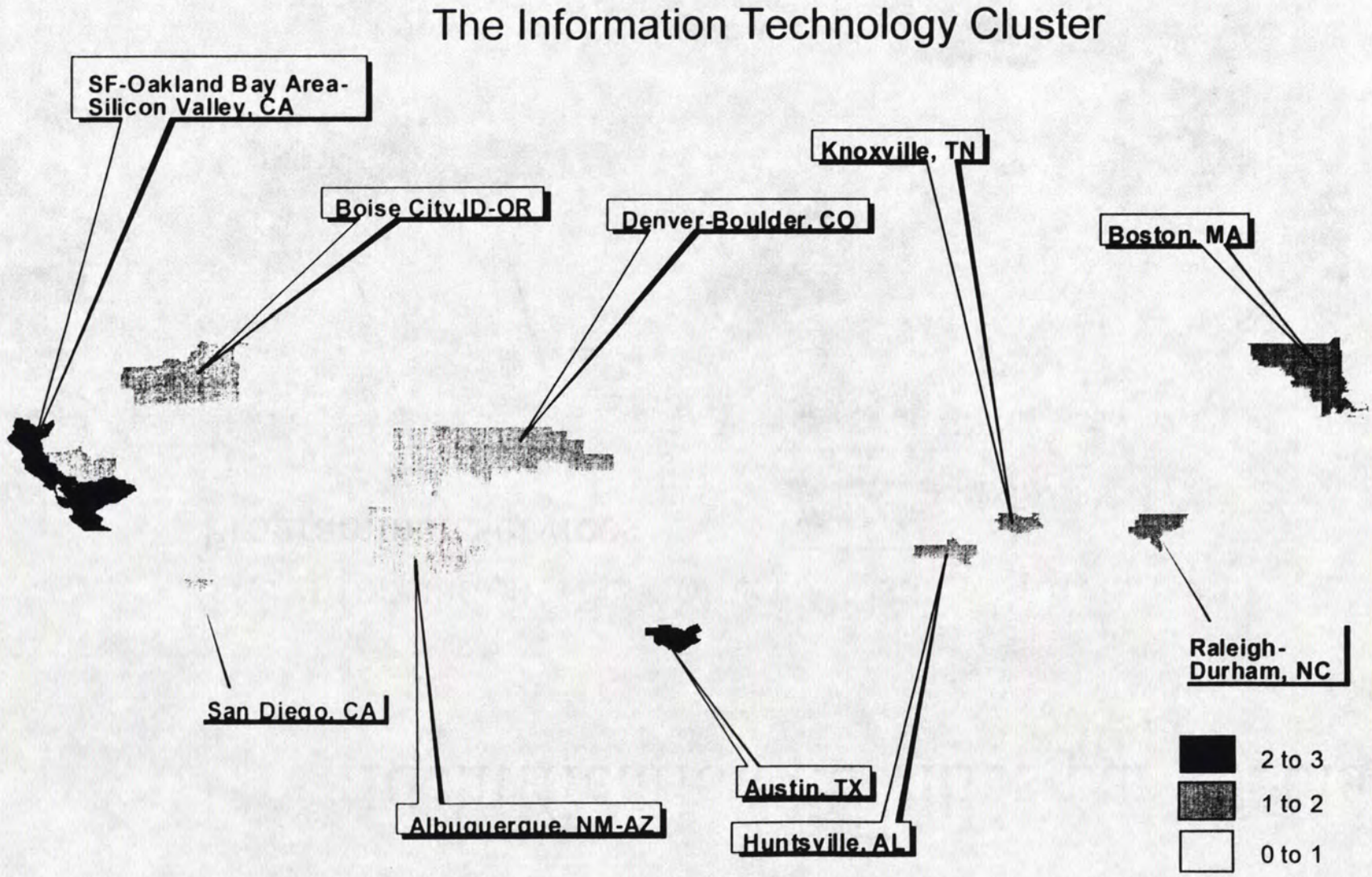
ANNEXE 1

Identification de villes par spécialité Porter

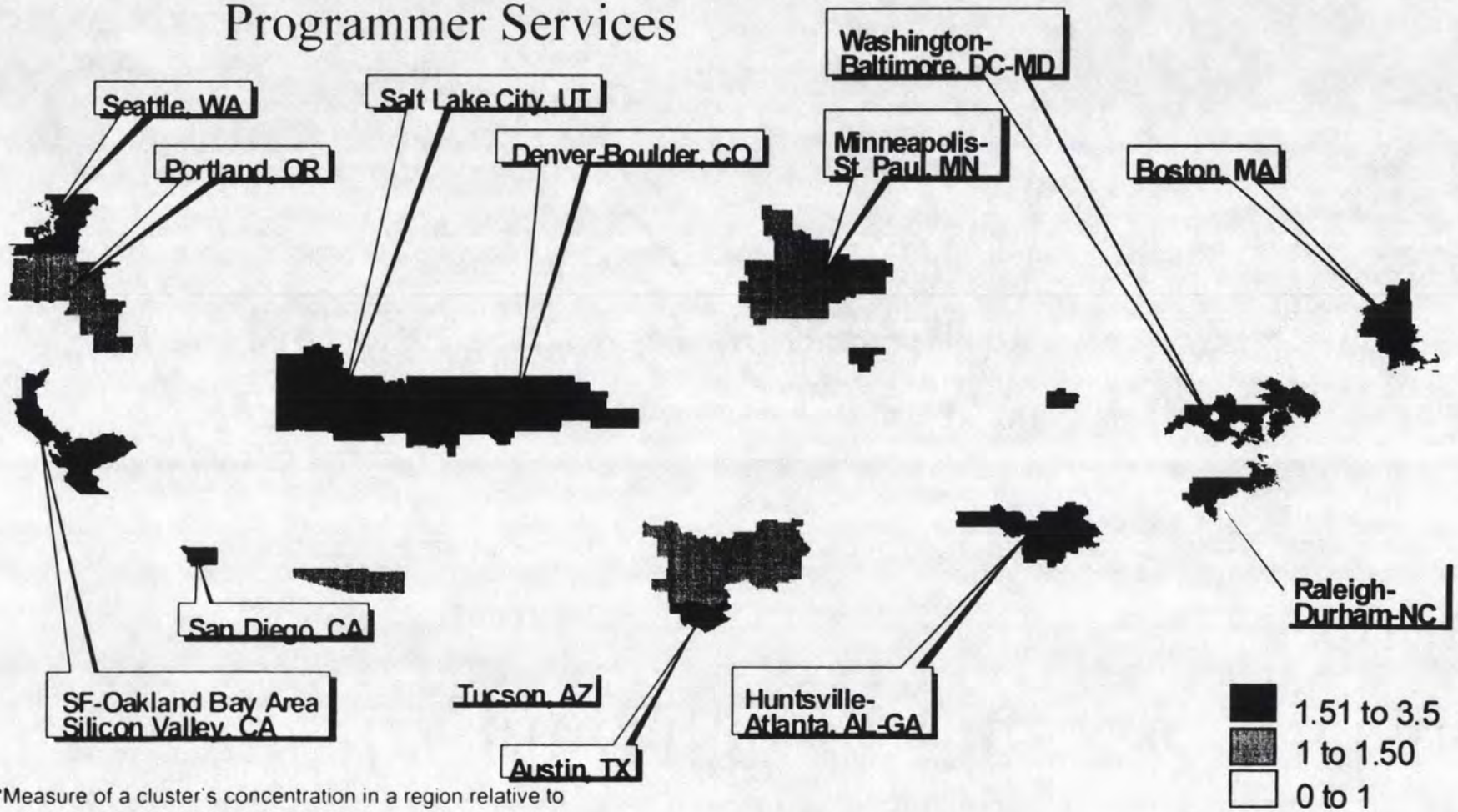
Selected Regional Clusters of Competitive U.S. Industries



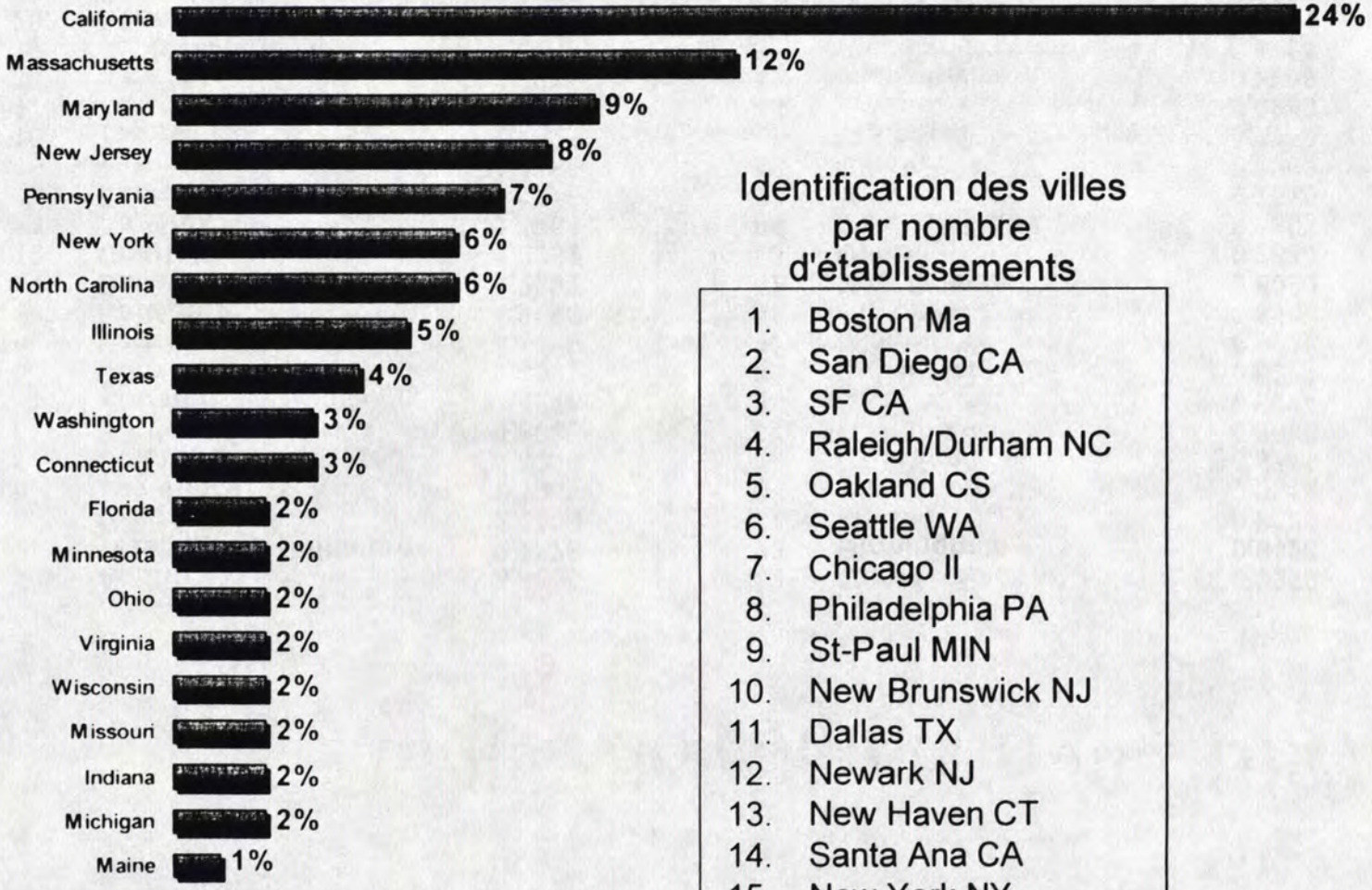
Identification de villes par spécialité
Porter



Identification de villes par spécialité Porter



Un exemple d'identification des états et villes via Corptech



Identification des villes par nombre d'établissements

1. Boston Ma
2. San Diego CA
3. SF CA
4. Raleigh/Durham NC
5. Oakland CS
6. Seattle WA
7. Chicago Il
8. Philadelphia PA
9. St-Paul MIN
10. New Brunswick NJ
11. Dallas TX
12. Newark NJ
13. New Haven CT
14. Santa Ana CA
15. New York NY

Indice de compétitivité 1987-1997

1.	Austin	3,4835
2.	Washington-Baltimore	2,2878
3.	Greenville	2,2729
4.	Las Vegas	2,1088
5.	Salt Lake City	1,5248
6.	Portland	1,5035
7.	Houston	1,4818
8.	Denver	1,4063
9.	Vancouver	1,3655
10.	Raleigh	1,3198
11.	Dallas - Fort-Worth	1,2392
12.	Charlotte	1,2352
13.	Phoenix	1,1761
14.	Sacramento	1,1476
15.	Toronto	1,1468
16.	Tampa	1,1425
17.	West Palm Beach	1,1263
18.	Seattle	1,007
19.	Louisville	1,0705
20.	Atlanta	1,0378
21.	Columbus	1,0253
22.	Kansas City	1,0209
23.	Calgary	1,0077
24.	San Francisco	0,9857
25.	Indianapolis	0,9749
26.	Richamond	0,9618
27.	Minneapolis	0,9547
28.	Orlando	0,9544
29.	Pittsburgh	0,9423
30.	Nashville	0,9329
31.	Norkfolk	0,9296

32.	Grand Rapids	0,9278
33.	Birmingham	0,9126
34.	Montréal	0,8995
35.	Edmonton	0,8814
36.	San Diego	0,8741
37.	Chicago	0,8686
38.	San Antonio	0,8284
39.	Philadelphia	0,8221
40.	Miami	0,8132
41.	Dayton	0,8107
42.	New Orleans	0,8020
43.	Detroit	0,7874
44.	Oklahoma City	0,7787
45.	Milwaykee	0,7515
46.	Cincinnati	0,7395
47.	St.Louis	0,7159
48.	Fresno	0,6963
49.	Jacksonville	0,6808
50.	Cleveland	0,6784
51.	Memphis	0,6491
52.	New York	0,6329
53.	Greensboro	0,5943
54.	Los Angeles	0,5878
55.	Providence	0,5864
56.	Boston	0,5831
57.	Honolulu	0,5249
58.	Albany	0,5084
59.	Buffalo	0,5026
60.	Ottawa	0,4782
61.	Rochester	0,3626
62.	Hartford	0,3490
63.	Québec	0,3436

Notre analyse empirique de l'an dernier

(Rapport au Ministère des Finances du Québec)

Équation de base 1987-1997

IND = indice de compétitivité (77-92), EC = région centre-est, WC = région centre-ouest, SO = région sud, PA = région pacifique, POPP = classification petite population (moins de 1,5 millions), POPM = classification population moyenne (de 1,5 à 5 millions), SOB = effet frontière sud, NOB = effet frontière nord

Résultats Amérique du Nord, après correction pour l'hétéroscédasticité (maximum de vraisemblance

Variable	Coefficient	T-Ratio	
EC	1,2654	1,345	non-significative positive
WC	1,385	2,944	significative positive
SO	0,9857	1,9854	significative positive
PA	1,5453	2,4879	significative positive
POPP	0,2459	1,5475	non-significative positive
POPM	0,7548	1,9854	significative positive
NOB	0,8956	2,345	significative positive
SOB	-0,2145	-1,057	non-significative negative
CONSTANT	0,5568	2,124	
LIKELYHOOD	-102.56		

Notre analyse empirique de l'an dernier

(Rapport au Ministère des Finances du Québec)

Analyse discriminante compétitive

Variable	(prob y =0)	(prob y=1)	(prob y=2)	(prob y=3)	T-Ratio
EC	0,05	0,08	0,10	0,11	1,874
WC	0,09	0,10	0,15	0,16	2,254
SO	0,06	0,08	0,12	0,12	2,157
INIPROD	0,005	0,007	0,289	0,454	4,125
POPP	0,06	0,154	0,298	0,319	2,754
POPM	0,08	0,1875	0,287	0,312	2,954
IT	0,004	0,021	0,186	0,253	4,594
SOFT	0,03	0,08	0,256	0,289	1,854
DEST	0,10	0,15	0,18	0,19	1,745
CSI	0,08	0,11	0,13	0,16	2,014
CONC	0,04	0,08	0,09	0,19	1,421
SERV	0,16	0,18	0,22	0,25	1,321

Pour le Canada, la régression ne respecte pas le cinqième point de Gauss-Markov énuméré ci-haut

Notre analyse empirique de 2001

(Rapport au Ministère des Affaires Municipales et de la Métropole.

Analyse 2000

Équation de base 1987-1997

IND = indice de compétitivité (77-92), EC = région centre-est, WC = région centre-ouest, SO = région sud, PA = région pacifique, POPP = classification petite population (moins de 1,5 millions), POPM = classification population moyenne (de 1,5 à 5 millions), SOB = effet frontière sud, NOB = effet frontière nord

Résultats Amérique du Nord, après correction pour l'hétéroscédasticité (maximum de vraisemblance

Variable	Coefficient	T-Ratio
EC	0,16342	non-significatif positif
WC	0,635268	significatif positif
SO	0,338326	significatif positif
PA	0,279448	significatif positif
POPP	- 0,2400	significatif négatif
POPM	- 0,2039	non-significatif négatif
NOB	-0,308281	significatif négatif
SOB	-0,354628	significatif négatif
CONSTANT	0,916716	
R^2	0,1289	

Annexe 2

Tableau 1

	Partenaire	Frontière Nord	Frontière Sud	Région	Réponse au questionnaire
New York				Nord-Est	X
Los Angeles			X	Pacifique	
Chicago				Centre-Est	X
Washington - Baltimore				Nord-Est	X
San Francisco - Oakland				Pacifique	
Philadelphia				Nord-Est	
Boston				Nord-Est	
Detroit	Windsor	X		Centre-Est	
Dallas – Fort Worth				Centre-Ouest	X
Houston				Centre-Ouest	
Atlanta				Sud	
Miami – Fort Lauderdale				Sud	
Seattle	Vancouver	X		Pacifique	X
Cleveland		X		Centre-Est	
Phoenix			X	Centre-Ouest	
Minneapolis - St. Paul				Centre-Est	X
San Diego			X	Pacifique	X
St. Louis				Centre-Ouest	
Pittsburgh				Nord-Est	
Denver				Centre-Ouest	
Tampa - St. Pete				Sud	
Portland - Salem				Pacifique	X
Cincinnati				Centre-Est	
Kansas City				Centre-Ouest	X
Sacramento				Pacifique	
Milwaukee				Centre-Est	
Norfolk				Sud	X
San Antonio			X	Centre-Ouest	X
Indianapolis				Centre-Est	X
Orlando				Sud	X
Columbus				Centre-Est	X
Charlotte				Sud	
New Orleans				Sud	X
Las Vegas				Centre-Ouest	X
Salt Lake City				Centre-Ouest	
Buffalo	Toronto	X		Nord-Est	
Greensboro				Sud	X
Nashville				Sud	
Hartford				Nord-Est	X
Rochester		X		Nord-Est	
Memphis				Sud	X
Austin				Centre-Ouest	X
Raleigh - Durham				Sud	
Jacksonville				Sud	
Oklahoma City				Centre-Ouest	
Grand Rapids				Centre-Est	
West Palm Beach				Sud	
Louisville				Sud	
Dayton				Centre-Est	
Richmond				Sud	
Providence				Nord-Est	
Greenville				Sud	
Birmingham				Sud	
Albany				Nord-Est	
Honolulu				Pacifique	
Fresno				Pacifique	
Calgary				Centre-Ouest	
Edmonton				Centre-Ouest	X
Vancouver	Seattle	X		Pacifique	X
Toronto	Buffalo	X		Centre-Est	
Ottawa		X		Nord-Est	X
Quebec		X		Nord-Est	X
Montreal		X		Nord-Est	X

Tableau 2

Variables	US	Canada
dépendantes		
ET	1976 à 1998	1987 à 1999
PIB	1997 à 1999	1987 à 1999
IND	1977-87, 1987-97, 1992-97	19987-97, 1992-97
indépendantes		
DEN	1977, 1987, 1992, 1997 à 1999	1987, 1992, 1997 à 1999
POPI	1977, 1987, 1992	1987, 1992
PRO	1977, 1982, 1987, 1992, 1997	1987 à 1997
STR	1977 à 1996	1987 à 1997
REC	1999	1999
CDB	1999	1999
PM	1999	1999
EDU	1999	1999
BAC	1999	1999
COL	1999	1999
RS CS	1999	1999
BS	1999	1999
VC	1999	1999
SS	1999	1999
VOL	1999	1999
GOU	1999	1999

Tableau 3

ANALYSE DE RÉGRESSION

1. ÉCHANTILLON : AMÉRIQUE 1997 (1997.wf1)
2. ÉCHANTILLON : GOUVERNANCE 1997 (gouv1997.wf1)

Variables dépendantes :

1. PIB = PIB per capita en niveau
2. Δ PIB = variation du PIB per capita
3. Δ ET = variation de l'emploi total
4. IND = Indice de compétitivité

Variables dichotomiques :

EC = région centre-est
WC = région centre-ouest
SO = région sud
PA = région pacifique

POPP = classification petite population (moins de 1.5 millions)
POPM = classification population moyenne (de 1.5 à 5 millions)

SOB = effet frontière sud
NOB = effet frontière nord

Variables indépendantes :

DEN = variable de densité
POPI = population initiale
PRO = productivité
STR = structure industrielle
REC = centres de recherche
CDB = cost of doing business
PM = Professional or managerial employment (AA)
EDU = $\frac{\text{inscription dans les collèges et les universités (AA)}}{\text{Population totale}}$
BAC = % de la population avec un diplôme universitaire (AA)
COL = % de la population avec un diplôme collégial (AA)
RS = recreation score (AA)
CS = culture score (AA)
BS = Business Startups (AA)
VC = Venture capital (AA)
SS = Sièges sociaux selon FORTUNE 500 (AA)
VOL = nombre de destination pour les vols aériens directs (AA)
GOU = effet de gouvernance

Tableau 4

Indice GOU: Relations entre les municipalités et le secteur privé

Atlanta	2.0
Austin	2.7
Calgary	2.3
Chicago	3.7
Columbus	1.0
Dallas	2.0
Edmonton	2.3
Greensboro	2.7
Houston	3.0
Indianapolis	3.0
Kansa City	2.7
Las Vegas	2.3
Louisville	3.0
Memphis	2.7
Milwaukee	2.3
Minneapolis	1.3
Montréal	1.3
Nasville	1.7
New Orleans	2.7
Orlando	2.7
Ottawa	1.3
Portland	3.0
San Antonio	1.3
Seattle	3.0
Toronto	3.0
Vancouver	2.0
Washington	2.3

Notes

"Free Trade and Canadian Economic Performance: Which Theories Does the Evidence Support?"

Keith Head and John Ries
Faculty of Commerce
University of British Columbia

June 2001

This paper is prepared for the conference "North American Linkages: Opportunities and Challenges for Canada," sponsored by Industry Canada and the Centre for the Study of Living Standards, Calgary, Alberta, June 20-22

Introduction

Over the past two decades, Canada has made major commitments to free trade. Free trade agreements (FTAs) were successfully negotiated with the United States (1988), Mexico (1993), Chile (1997), and most recently Costa Rica (April 2001). The year 2001 Summit of the Americas in Quebec City brought the Free Trade Area of the Americas proposal into public discussion again. Despite the protests that marked the last World Trade Organization meeting in Seattle, we can reasonably expect that a new Millennium Round of multilateral trade negotiations will eventually start to move forward. In addition, the 1994 Bogor Declaration of the Asia Pacific Economic Cooperation (APEC) forum has called for its industrialized members (such as Canada) to achieve "free and open trade and investment no later than the year 2010."

In light of this full plate of trade liberalizing initiatives, it is important to determine what lessons can be drawn from Canada's existing set of experiences with North American free trade agreements. The issue of free trade with the United States caused considerable controversy in the 1980s leading up to a 1988 election that many saw as a referendum on free trade. Economists in Canada offered theoretical arguments for and against further liberalization with their large neighbour. At the time, there was relatively little empirical grounding for these positions, as many of the ex-ante arguments drew upon recent innovations in international trade theory.

A reasonably large body of ex-post empirical analyses has since emerged. This paper synthesizes the new research with a view to determining which theories receive support from the evidence. In addition to guiding future Canadian trade policy, we hope that our meta-analysis will be useful for students of international trade theory. Canada's

experience provides a valuable "natural laboratory" for understanding how trade liberalization affects the economic performance of a small, high-income economy trading with a much larger country.

This paper will assess the impact of free trade on three aspects of Canadian manufacturing performance. First, we will examine the trade creation effects of the Canada's North American free trade agreements. Common across theories is the notion that the removal of barriers impeding trade will lead to an increase in trade. However, the magnitude of the increase is uncertain and we will provide estimates from the empirical literature. We will also discuss negative aspects of free trade agreements—trade diversion and increased dependence on a single trading partner.

The second area we will investigate is inter-sectoral resource allocations across manufacturing sectors. The Heckscher-Ohlin theorem predicts the expansion of industries producing goods intensive in a county's abundant factors. A key component of gains from trade according to this traditional theory is the shift of resources towards the production of goods that Canada is relatively efficient at producing. We will also discuss the "new" trade theory developed in Krugman (1980) predicting that the country with the larger market size will be the net exporter in increasing returns industries. Both the Heckscher-Ohlin theorem and the Krugman theory predict that trade liberalization will lead to greater specialization within an economy.

Finally, we will consider whether free trade has enhanced productivity. Theory suggests a number of mechanisms through which trade liberalization leads to greater efficiency. Better access to foreign markets can increase plant output. If there are plant-level economies of scale, higher output translates to lower average costs and greater

efficiency. A second mechanism is an increase in technological innovation. This may occur because trade facilitates the flow of knowledge or because open markets increase the incentives for innovation. The third way in which trade liberalization may increase efficiency is by increasing competition. "Market selection," a concept analogous to Darwinian "natural selection," implies that less efficient firms will be forced to exit the market, restructuring industry towards more efficient operations. We will assess the productivity performance of Canadian manufacturing in the context of the different theories.

We organize the paper into sections on trade creation, inter-sectoral resource allocation, and industry efficiency. In each section, we discuss theory and relevant empirical evidence for each of these three aspects of Canada's manufacturing performance. Our conclusion draws lessons from Canada's experience with freer trade and discusses the likely affects of additional liberalization.

Trade Creation and Diversion

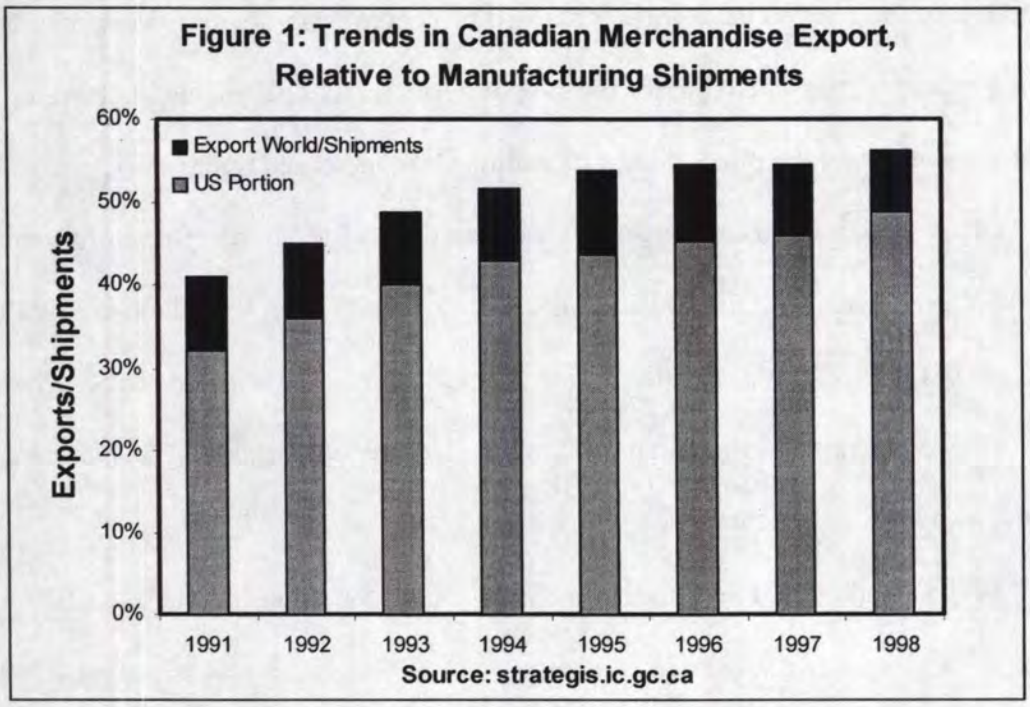
Trade creation

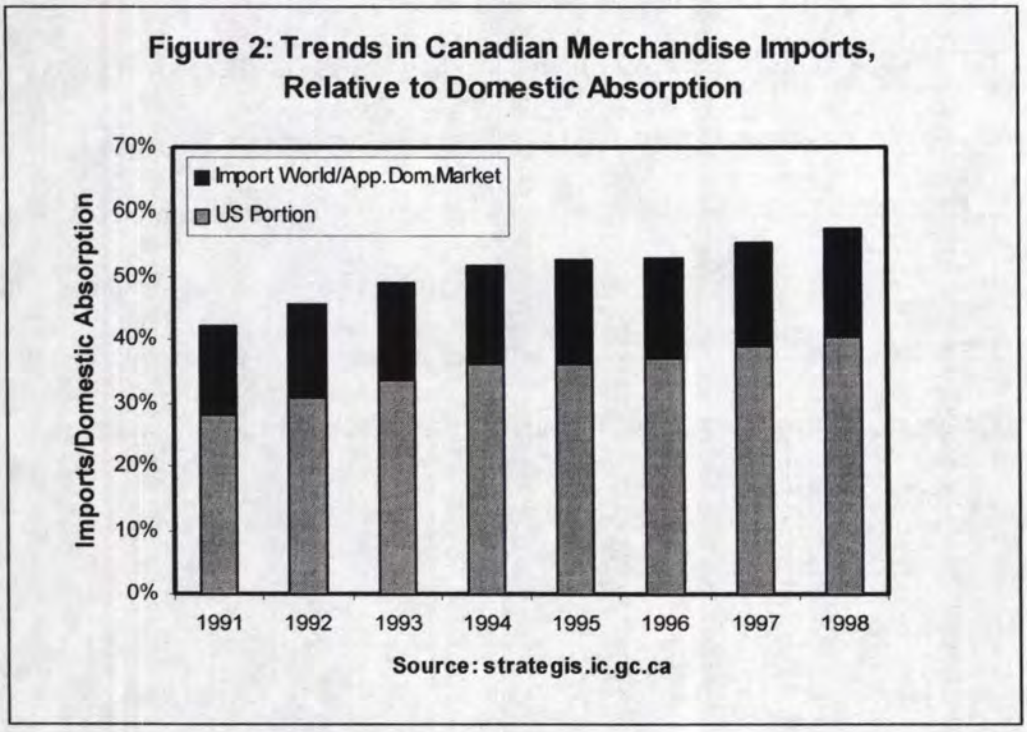
Free trade agreements should result in increased trade with partners to the agreement. Tariffs put foreign firms at a competitive disadvantage relative to domestic firms as they create a wedge between the price that foreign firms receive for their products and the price that domestic consumers pay for these products. The elimination of tariffs on goods from particular countries may allow firms in these countries to increase market share at the expense of other foreign firms as well as domestic firms. Thus, some of the increase in trade reflects a reorientation of purchases towards firms in FTA partner countries. In

addition, some of the increase in trade will be generated by lower prices and increased aggregate purchases. Except for the case of perfectly inelastic demand, the removal of tariffs will lower the price of imports and result in increased trade.

This section will examine the evidence on the trade creating effects of Canada's free trade agreements with the United States, Mexico, and Chile, with the focus on the Canada-U.S. FTA. We will also define the costs associated with free trade agreements that occur when domestic purchases are diverted towards firms in FTA partner countries and away from efficient third-country firms.

The Canada-U.S. Free Trade Agreement called for a phasing out of tariffs on manufactures between the two countries. Across 93 industry classifications in 1988, Canadian tariffs averaged 6.1 percent and U.S. tariffs 3.7 percent (Lester and Morehen (1987)). Some industries had very high Canadian tariffs--leather footwear 20.7 percent, clothing 19.7 percent, and household furniture 13.1 percent. On the other hand the tariff rates in other industries were lower; it was 1.8 percent for motor vehicles with the Canada-U.S, as Autopact eliminated tariffs on most auto trade. Mexican and Chilean tariffs were even higher when Canada entered into free trade agreement with those countries suggesting that these agreements have great potential to lower import prices and create trade.

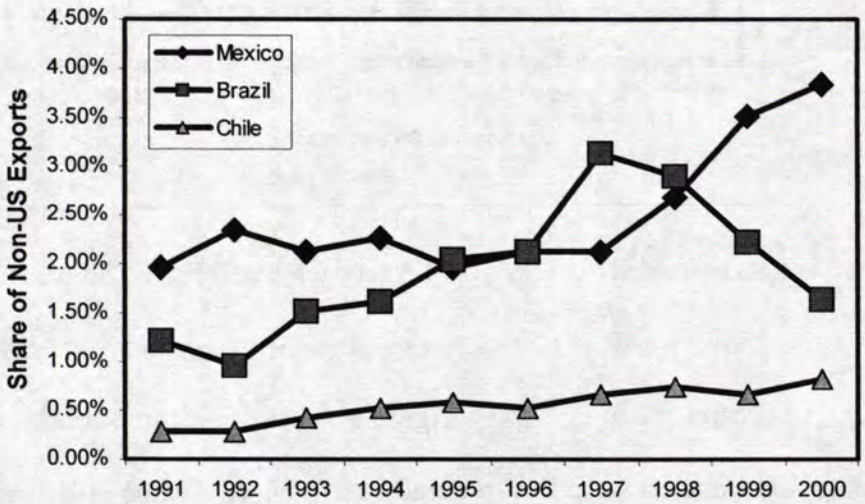




Figures 1 and 2 suggest that the Canada-U.S. Free Trade Agreement led to increased trade between the two countries. Figure 1 shows Canadian merchandise exports to the world and to the U.S. relative to manufacturing shipments. Apparent in the figure is a

steady increase in the share of Canadian manufacturing shipments exported to the U.S., ultimately reaching almost 50 percent in 1998.[1] Figure 1 reveals that most Canadian exports go to the United States (87 percent in 1998). Figure 2 compares Canadian imports to Canadian domestic absorption (shipments-exports+imports), showing that U.S. provides a large portion of the goods consumed by Canadians and this share has risen over the post-FTA period (40 percent in 1998).

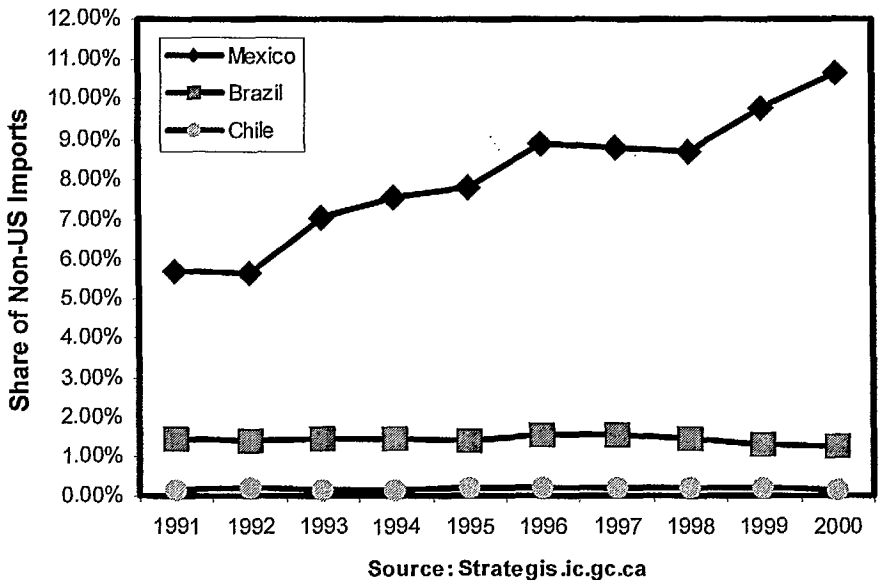
Figure 3: Canadian Exports to Brazil, Chile & Mexico



Source: strategies.ic.gc.ca

[1] We prefer comparing trade figures to shipments rather than to gross domestic product (GDP) because GDP is a value added measure whereas trade and shipments are based on sales values. However, shipments matched to exports are currently available only through 1998.

Figure 4: Canadian Imports from Brazil, Chile & Mexico



There is also evidence that the NAFTA has generated increased trade with Mexico. Figure 3 shows trends in Canada's exports to Mexico, Chile, and Brazil as a share of non-U.S. destined exports, while Figure 4 shows these three countries' shares of Canada's non-U.S. imports. Canada's free trade agreements became effective with Mexico in 1994 and Chile in 1997, with bilateral tariffs gradually being phased out. We add Brazil, a country that does not currently have a free trade agreement with Canada, for comparison purposes. Figure 3 reveals that Canadian exports to Mexico increased rapidly from 1997 to 2000 and now comprise about 4 percent of the total non-U.S. destined exports. Exports to Chile are small but have grown steadily both before and after the agreement came into effect in 1997. Interestingly, exports to Brazil have dropped over the same time period that exports to Mexico have grown, suggesting that Canadian exporters have shifted their attention towards the Mexican market. Figure 4 portrays that Canada's imports from Mexico have risen, reaching 11 percent of the total non-U.S.

imports in 2000. There has been little change in the share of Canadian imports from Chile and Brazil.

Of course, one has to be careful about interpreting rising trade with free trade partners such as the United States and Mexico in the periods corresponding to the phasing out of bilateral tariffs as a causal relationship. Three empirical studies, however, suggest a causal relationship.

Trefler (1999) investigates the effect of the Canada-U.S. Free Trade Agreement on various performance measures of 213 4-digit SIC manufacturing industries in Canada. He examines the change in the growth rate of Canadian imports from the United States across two time periods corresponding to before and after the implementation of the FTA. He finds that Canadian tariff reductions explain roughly half of the observed increase in Canadian imports from the United States.

Clausing (2001) conducts a similar exercise but focuses on U.S. imports at the 10-digit harmonized system level. Using a gravity specification, she finds that U.S. tariff reductions mandated by the Canada-U.S. FTA significantly increased Canadian imports. She finds extremely large effects, concluding that the FTA was responsible for over one-half of the $42 billion increase in U.S. imports from Canada over the 1989-1994 period.

Schwanen (1997) compares the growth in trade of liberalized and non-liberalized sectors as well as the increase in trade with the United States compared to other countries. The idea is that growth in trade should be most pronounced in liberalized sectors and for trade between the U.S. and Canada. He finds that over the 1988-1995 period, Canadian exports to the United States grew 139 percent in liberalized sectors and 64 percent in non-liberalized sectors. Exports to non-U.S. destinations in liberalized sectors grew only

34.7 percent whereas exports to non-U.S. destinations in non-liberalized sectors increased 53.6 percent. Imports show a similar pattern, with growth highest for Canadian imports from the United States in liberalized sectors. It is worth noting, however, that Schwanen excludes motor vehicles from the analysis, an industry that realized significant changes in trade and had enjoyed free trade prior to the FTA. The results would be different if motor vehicles were included as a non-liberalized sector.

The results of Trefler, Clausing, and Schwanen indicate that the rise in trade with the United States that occurred after the Canada-U.S. FTA was not simply coincidental. They show increases to be systematically related to tariff reductions. What is surprising is the magnitude of the measured effects. The two studies indicate that roughly half of the trade increase exhibited in the years after the Agreement was attributable to the tariff reductions.

Trade Diversion

As we discussed in the introduction, Canada has been busily signing free trade agreements since 1988. Indeed, the Costa Rican agreement was completed just two months before this conference and the Canadian Department of Foreign Affairs website indicates that an agreement with Singapore is under consideration. Some economists, most notably Jagdish Bhagwati, have strongly criticized regional agreements of the kind Canada has been actively pursuing. The critics refer to the bilateral agreements as "preferential" agreements rather than "free trade" agreements. There is a potential welfare-reducing aspect of preferential agreements—they may divert trade away from efficient trading partners.

Figure 5: Welfare Effects of Free Trade Agreements

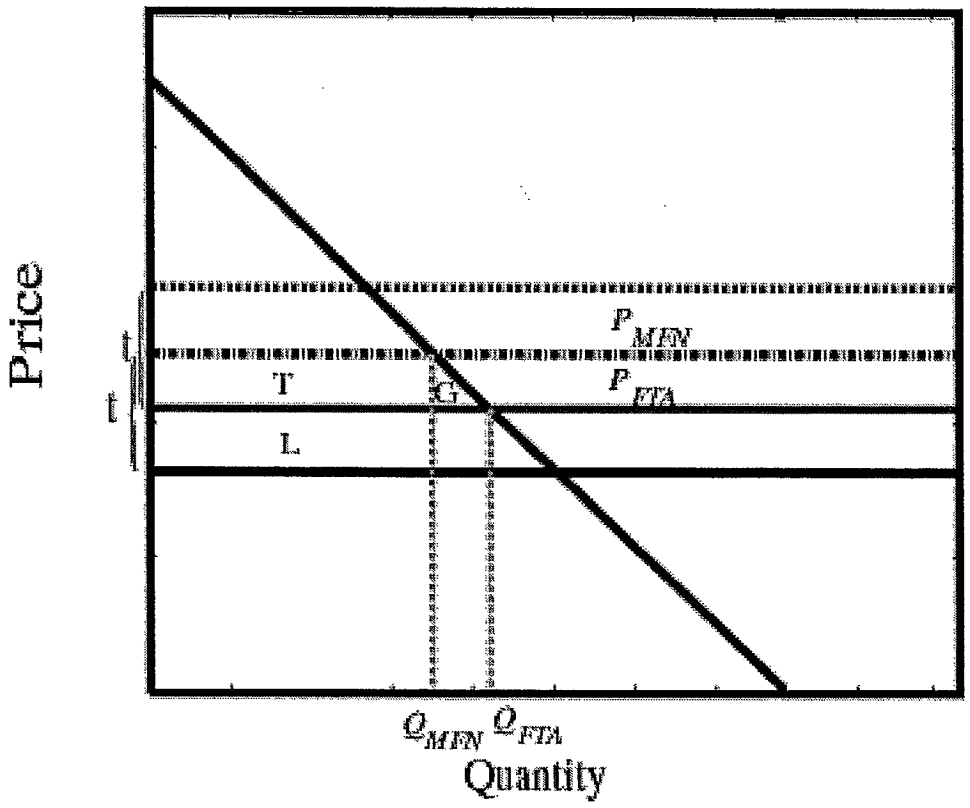


Figure 5 portrays welfare effects of preferential tariff reductions. Consider two trading partners offering Canadians a product at two different prices. The dashed lines represent the tariff-inclusive price offered to Canada by the two trading partners. The solid lines indicate prices before the tariff is levied. Canada will import the lower priced goods offered by the more efficient producer and consume quantity Q_{MFN}. Now suppose Canada eliminates tariffs on goods produced in the less efficient country but not on goods from the other country. The less efficient country now offers goods at a price corresponding to the upper solid line. Canadians switch to importing from this country and quantity rises to Q_{FTA}. The fall in price generates a gain in consumer surplus represented by the sum of the areas labelled *G* and *T*. However, the Canadian government

loses tariff revenues represented by T and L. The overall welfare effect for Canada can be positive or negative depending on the difference between area G and L.

We are not aware of any studies that have attempted to measure areas G and L in the context of Canada's free trade agreements. To calculate G, one needs to know the price elasticity of demand for each good. L corresponds to tariff revenues induced by tariff reductions that are not recouped by consumers as additional surplus. The trade data we presented earlier showed rising trade with the United States and Mexico during the period tariffs with these countries were being phased out. Trade with other countries remained roughly flat in this period rather than fell as the diagram indicates would happen with trade diversion. However, would imports from non-agreement countries have been higher had preferential tariffs not been in place? The counterfactual exercise determining the level of trade with third countries, had preferential tariffs not been instituted, is necessary to measure the welfare effects portrayed in Figure 5.

"Hold-up" effects

McLaren (1997) formalized what he calls the "Judge Bowker" argument against free trade. The idea is that countries have the option of making irreversible investments that lower the costs of trading with each other. Anticipating tariff liberalization with the U.S., Canadian firms make investments that will facilitate exports to that market. This is all fine as long as there are complete, enforceable contracts between the two countries. However, in practice, the U.S. may be able to renegotiate or circumvent the signed agreement. The more Canadian exporters commit themselves to trade with the U.S., the less bargaining power the Canadian government has with respect to its trading partner.

So far there does not seem to be any empirical work confirming the importance of hold-up effects. However, as reflected in Figure 1, Canada now sells almost 90 percent of its exports to the United States and the U.S. is the destination for 50 percent of manufacturing shipments. Schwanen's and Clausing's analysis suggest the increased dependency is a consequence of the FTA. An increase in bilateral trade dependence is a key component of McLaren's argument. Thus, while we are not aware of any opportunistic behaviour by the United States towards Canada subsequent to the FTA, a precondition for such behaviour—trade dependency—has been a consequence of the agreement.

The lesson to draw from this section is that Canada's free trade agreements created substantial new trade with the United States and possibly Mexico. To the extent that some of the new trade with these two countries represents trade diverted from third countries, there is an associated loss. Moreover, Canada is now quite dependent on the United States as a destination for exports.

Inter-industry Resource Reallocation

Trade liberalization makes it less costly for economies to specialize in the activities they do best. This simple idea forms the basis for two centuries of research on the gains from trade. To gain real insights, one needs to be very careful in defining what an economy "does best." Trade theorists have devoted the most attention to the opportunity costs of producing goods in different industries. Countries that have low opportunity costs in one industry have a comparative advantage in that industry and will respond to trade liberalization by reallocating scarce resources out of industries in which

they have a comparative disadvantage. A second source of advantage flows from the demand side. Recent work has suggested that there are plausible circumstances in which having relatively large demand in an industry confers what might be called a comparative home market advantage. As with traditional comparative advantages, the existence of "home-market effects" will lead to resource reallocations across industries following trade liberalization.

Traditional trade theory, as embodied in the Heckscher-Ohlin theorem, predicts the expansion of industries producing goods intensive in a county's abundant factors. The specification developed by Vanek predicts that a country's pattern of net exports of factor services will be given by its share of the world supply of a given factor minus its share of world demand, which, assuming homothetic preferences, is given by its share of world GNP. In the case of Canada, we would expect greater exports of resource-intensive goods.

The Canadian economy is composed of the agriculture, logging, mining, manufacturing, services, and government sectors. The first three sectors are resource intensive and we might expect that trade liberalization promoted those sectors at the expense of manufacturing. Within manufacturing, however, there are resource intensive sectors such as pulp and paper, food and metals. Thus, the Heckscher-Ohlin theorem would predict the expansion of these sectors and contraction of other sectors within manufacturing.

The traditional trade models focused on the production side to show how country differences might influence the pattern of trade. Another natural possibility is to consider how differences in demand structures might matter. The role of demand is stressed in Linder (1961). Linder's hypothesis primarily revolved around who would trade with

whom. Linder argued that internal demand would stimulate new product development and that the pioneering country, after developing a new product, would then begin to export it to countries with similar levels of per-capita income. Two decades later, the work of Krugman (1980) showed how relatively high domestic demand in a country could lead to net exports in increasing returns sectors. Krugman referred to this possibility as the home market effect. The basic idea is that there is a trade-off between serving small markets with local production and thereby avoiding tariffs, and serving them from a single plant in the large country, thereby achieving scale economies. A reduction in tariffs reduces the benefit of local presence. Krugman shows that trade liberalization will cause industries with increasing returns (manufacturing) to concentrate in large markets and thereby increase large-country net exports in these industries.

Krugman's model is highly specialized. His assumptions of ad-valorem tariffs, Dixit-Stiglitz preferences, and atomistic firms imply that FOB prices are independent of the number and location of firms as well as transportation costs. The later work of Feenstra, Markusen and Rose (2001), Head and Ries (2001), and Head, Mayer, and Ries (forthcoming) show that home market effects occur in other models characterized by economies of scale and product variety linked to mobile firms. However, all three papers develop cases where small country manufacturing grows in response to trade liberalization. These "reverse" home market effects occur when varieties are tied to nation of production and trade liberalization gives small-country producers better access to large-country consumers.

The home market effect predicts that trade liberalization will shift manufacturing towards the larger country. As U.S. manufacturing industries are on average ten times larger

than those in Canada, this raises the concern that the Canada-U.S. Free Trade Agreement will have served to reduce the size of Canadian manufacturing. A further elaboration of the theory predicts differential impacts across manufacturing. Weder (1995) assumes balanced trade in manufacturing. (In the Krugman model, a perfectly competitive, constant returns to scale sector absorbs any trade imbalances arising in the manufacturing sector). According to Weder, exchange rate adjustment implies that industries with a relatively large share of demand will expand and firms with a relatively small share of demand will contract. Head and Ries (2001) provide a model generating the opposite result: when varieties are linked to country of production, relatively small demand industries in the small country benefit from trade liberalization.

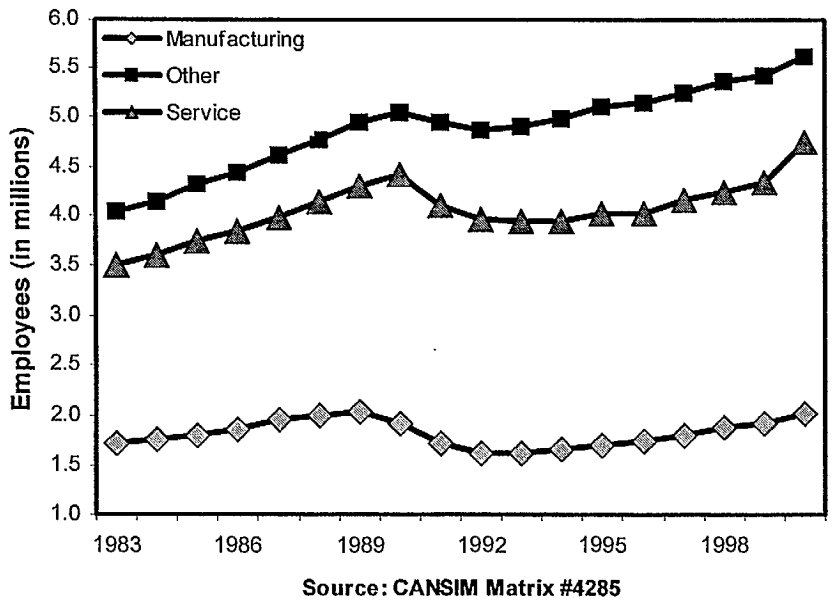
Empirical evidence

Clearly, theory does not restrict the type of inter-industry restructuring that may occur as a result of trade liberalization. Observing what has occurred in Canadian manufacturing will shed light on the practical importance of the alternative theories.

Figure 6 shows employment in manufacturing, services, and other industries from 1983-2000. The 1991-1992 Canadian recession and the subsequent recovery are apparent in the figure. Manufacturing employment fell from a peak of 2.03 million in 1989 to 1.62 million in 1993. This led many critics of the FTA to claim that the massive job losses resulted from the agreement. However, in 2000, manufacturing employment had recovered to 2.01 million. The figure indicates that the manufacturing share of Canadian employment has fallen post-FTA. This could be the case because Canadian tariffs were higher in 1988 than U.S. tariffs. Alternatively, it could reflect Krugman's home market effect where small country's output declines in the manufacturing sector and results in a comparative

disadvantage for Canada. However, since the share of manufacturing employment was also falling in Canada before the Canada-U.S. FTA, one cannot be confident that the observed fall after 1988 was due to the FTA.

Figure 6: Employment in Canada



Source: CANSIM Matrix #4285

Head and Ries (2001) test whether home market effects or reverse home market effects characterize North American manufacturing by examining differential impacts of tariff reductions across 3-digit manufacturing industries. We examine whether the effect tariffs reductions had on changes in a Canadian industry's share of North American (Canada and United States) output depended on its initial (1988) output share. We find that Canadian industries with small shares benefited relative to Canadian industries with large shares. This supports models predicting reverse home market effects where trade liberalization benefits the smaller industries by giving them better market access.

As we mention at the outset of this section, trade liberalization should allow countries to specialize production in activities that they do best. This is true whether "best" results from supply or demand factors. Thus, we should look to see if specialization in Canadian manufacturing increased subsequent to the FTA. We would consider manufacturing to be specialized if a few sectors constitute a majority of total manufacturing employment or output. It would be considered non-specialized if all sectors had similar output. A natural way to measure manufacturing specialization is to construct a herfindahl index. We use 2-digit manufacturing data for the years 1983 to 2000 to calculate real GDP and employment herfindahl indexes for Canadian manufacturing. These are calculated as the sum of each industry's squared share of the variable in question:

$$H = \sum_i (shr_i)^2$$

where shr_i is industry i's share of manufacturing real GDP or employment.

Figure 7: Is Canadian Manufacturing Becoming More Specialized?

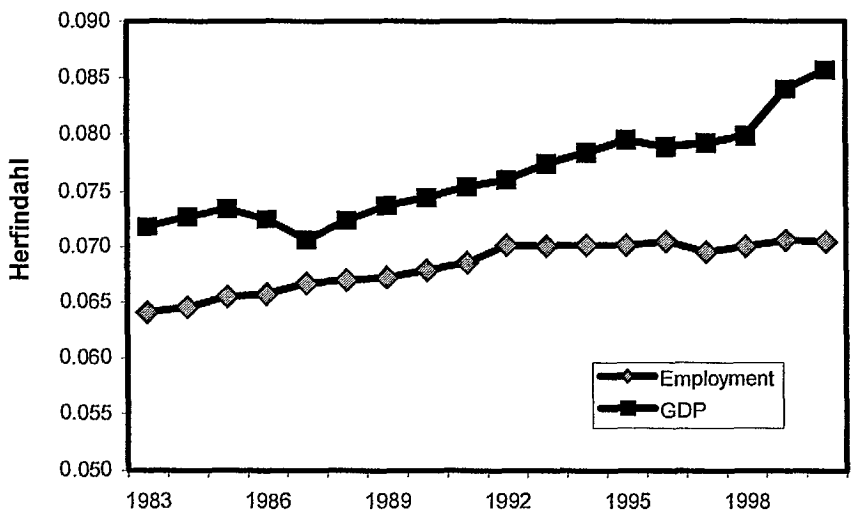


Figure 7 displays the two herfindahl indexes. They behave very differently in the post-FTA period. The employment herfindahl is remarkably flat whereas as the real GDP herfindahl increases, especially in 1999 and 2000. Thus, while the distribution of employment in manufacturing has hardly changed at all, the distribution of GDP has become more concentrated. GDP in an industry rises when capital, labour, or factor productivity increases. Since the employment herfindahl indicates that employment did not become more concentration, it must be either capital or productivity that caused the increased concentration of Canadian industry in terms of GDP.

Overall, the figure provides absolutely no evidence that the FTA increased specialization in Canadian manufacturing through an inter-sectoral reallocation of labour. There does appear to be greater concentration of capital and/or productivity in large industries, although no studies have linked this reallocation *across* industries to trade liberalization. However, there are studies that link tariff reductions to increased productivity *within* industries. To this topic we now turn.

Efficiency Gains Within Industries

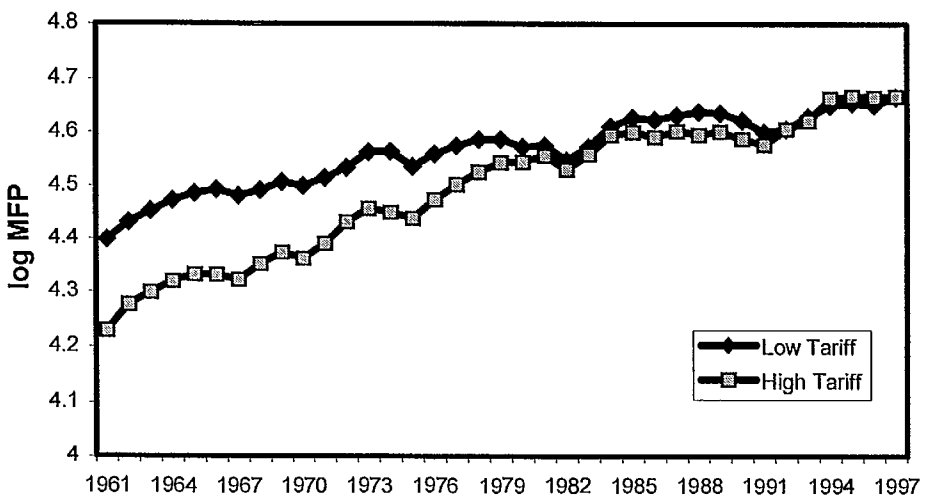
While traditional trade theory emphasizes efficiency gains that arise from inter-industry reallocations of resources, the "newer" trade theory developed in the early 1980s shows how gains from trade could arise from rationalization within industries. Later research added dynamic effects and modeled the effects of trade on endogenous technological progress. More recent research explores the implications of the enormous amount of heterogeneity in business performance between firms in the same industry.

There are two pieces of information suggesting that trade liberalization has increased productivity within Canadian manufacturing. Trefler (1999) relates changes in

4-digit SIC value-added per worker to Canadian tariff reductions under the Canada-U.S. FTA. He identifies substantial effects. In his preferred specification, his finds that Canadian tariff reductions increased value-added per worker by 0.6 percent per year from 1988 to 1996. For highly impacted industries, the ones with tariff reductions exceeding eight percentage points, the annual effect was 3.2 percent!

Greater value-added per worker could reflect capital deepening rather than an increase in multifactor productivity (MFP). To examine whether large tariff reductions are related to higher MFP, we divide the 22 2-digit manufacturing industries in Canada into two equal sized groups (of 11 industries) based on 1988 tariff levels. We calculate the average of tariff reductions and log MFP for each group. The results for 1961-1997 are displayed in Figure 8. High tariff industries lagged in productivity until the early 1980s and then fell behind again until 1988. Subsequent to the implementation of the Canada-U.S. FTA in 1989, high tariff rapidly caught up to low tariff industries in terms of MFP and even surpassed them for a few years. The figure suggests that MFP growth is accelerated by tariff reductions. We should introduce a note of caution regarding this interpretation, however. We were unable to generate a robust statistically significant difference between the MFP of the two groups when we conducted regression analysis. Nevertheless, coupled with the Trefler results, there is evidence that the FTA promoted industry efficiency. We consider the theoretical underpinnings for this result in the ensuing three subsections.

Figure 8: MFP in Low and High Tariff Industries



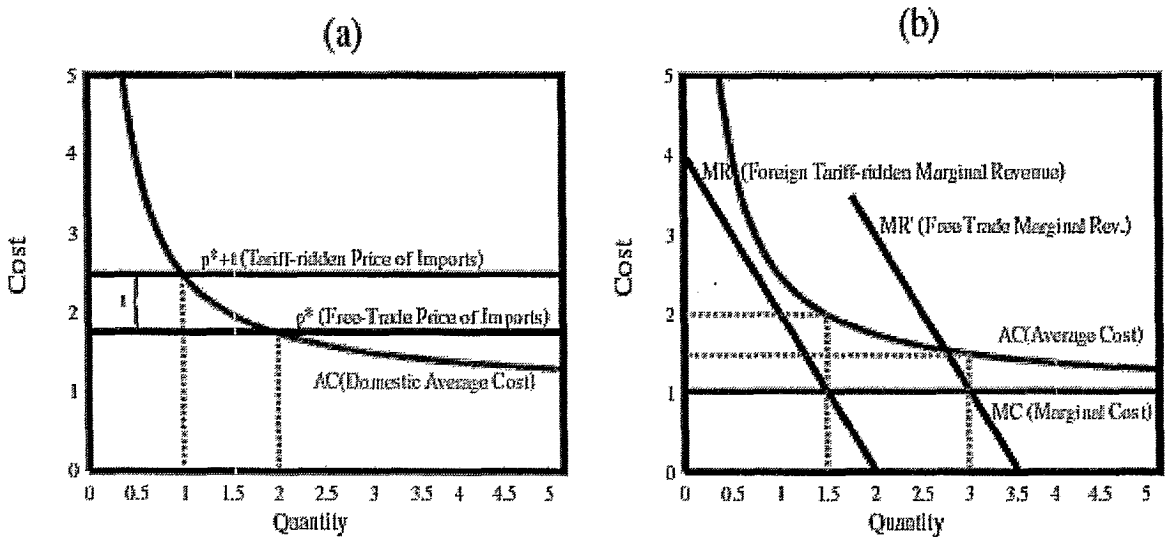
Scale effects

Canadian trade economists have long given particular attention to the issue of whether trade liberalization might move manufacturing firms down their average costs curves. The process of achieving greater economies of scale through concentrating production at a smaller number of factories is sometimes referred to as "rationalization." The early work on this subject gave rise to the Eastman-Stykolt (1967) hypothesis that states that high tariffs cause excess entry and inefficient scale in Canadian manufacturing.

There are two distinct reasons for why trade liberalization might boost scale. The first involves a domestic industry that competes with imports but does not export. It is "sheltered" by an import tariff of t dollars per unit. Assume that imports are supplied elastically from the world (or U.S.) at a pre-duty price of p^*. In that case, it is reasoned that domestic prices can be no higher than p^*+t. If entry of domestic firms continues until there are no economic profits, the domestic average costs will be set equal to the

tariff-inclusive import price. Thus it will be the case that $AC(q) = p^* + t$, where $AC(q)$ is a domestic firm's average cost of producing a given amount of output and is assumed to be deceasing. Given all these assumptions, the lowering of domestic tariffs will force down price, reduce down average costs, and raise output per firm.

Figure 9



This mechanism is illustrated in frame (a) of Figure 9. We illustrate with the average cost firm given by $AC(q) = F/q + c$, where F is a fixed cost. Solving for output per firm we find $q = F/(p^* + t - c)$. Hence, scale is inversely proportionate to *ad valorem* tariffs. Removal of a 10% domestic tariff should cause domestic firms to expand by 10%! Cox and Harris (1985) built effects along these lines into their computable general equilibrium analysis of the effects of Canadian trade liberalization and predicted substantial gains in scale and correspondingly much larger gains in economic welfare than conventional constant returns analyses had predicted. The Cox and Harris results may have been influential in causing the Mulroney government to pursue the Canada-

U.S. Free Trade Agreement even though it would involve much larger tariff reductions for Canada than its trade partner.[2]

A second story behind scale effects applies to reductions in *foreign* tariffs. Better access to the foreign market gives domestic firms more customers and therefore allows them to spread their fixed costs over more units, leading to lower average costs per unit. This second story is illustrated in frame (b) of Figure 9. In that figure, lower foreign tariffs shift out the representative exporter's marginal revenue curve. Its new profit maximizing quantity increases (from 1.5 to 3.0 in the figure) and therefore it moves down the average cost curve, achieving economies of scale.

This second story suggests that tariff reductions by trading partners benefit Canadian firms by allowing them to expand output. One might also expect, however, that Canadian tariff reductions would have the opposite effect. Eastman-Stykolt hypothesis showing scale increase resulting from Canadian tariff reductions is predicated on the notion that Canadian manufacturers are pricing to eliminate imports (tariff-limit pricing). There are theoretical and practical reasons to be suspicious of this proposition. On theoretical grounds, it is unclear how Canadian firms maintain pricing at $p^* + t$. What prevents one firm from lowering price, stealing market share, and realizing cost reductions due to economies of scale? Also, from a practical standpoint, Canada imports in every manufacturing industry and thus tariff-limited pricing does not appear to be empirically relevant. Head and Ries (1999) present an imperfect competition model with Cournot competition to assess bilateral tariff reductions. We show that home tariff reductions reduce scale, the opposite prediction to Eastman-Stykolt. Thus, once again,

[2] See Muller and Rawana (1990) and Ross (1988) for a more complete theoretical analysis of the Eastman-Stykolt hypothesis.

different models generate opposing predictions, and the practical relevance of the models is an empirical question.

Figure 10: Scale of Canadian Manufacturing

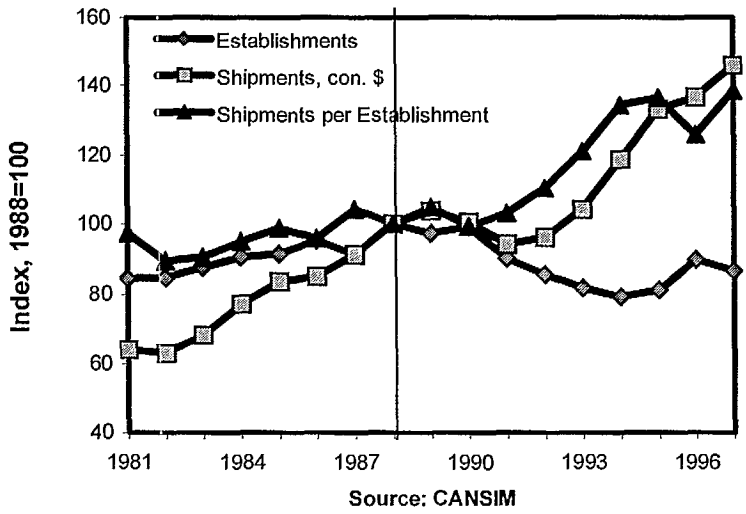


Figure 10 is a slightly updated version of a figure appearing in Head and Ries (1999) showing shipments, establishments, and average scale (shipments divided by establishments) in Canadian manufacturing. The dramatic increase in scale occurring after 1988 is *prima facie* evidence of positive scale effect of trade liberalization. However, we note in this paper that part of the increase is attributable to changes in the way Statistics Canada measures establishments resulting in the omission of small establishments. In the paper, we relate average shipments in Canadian industry to both Canadian and U.S. tariff levels. We find that U.S. tariff reductions caused a 9.8 percent increase in scale but this was largely offset by an 8.5 percent decline due to Canadian tariff reductions. Undercounting, industry composition changes, and the depreciation of the Canadian dollar explains the increase of shipments per establishments depicted in the figure.

Trefler (1999) and Gu, Sawchuk, Whewell (2001) also finds that Canadian tariff reductions lowered output per firm in Canadian manufacturing. Thus, there is very strong evidence against the Eastman-Stykolt hypothesis that Canadian tariff reductions raise scale. However, coupled with gains in scale associated with U.S. tariff reductions, we observe that tariff reductions under the Canada-U.S. Free Trade Agreement had no net effect on scale.

Dynamic gains from trade

The so-called "trade and growth" literature focuses on how productivity growth is influence by trade. Dynamic gains from trade occur when liberalization increases the returns associated with innovation, thereby inducing greater investment in knowledge creation. There also is a large empirical literature estimating the relationship between trade and growth.

Grossman and Helpman (1995) describe two mechanisms through which trade increases productivity and enhances economic growth. One mechanism is knowledge spillovers that are by-products of trade. Through the process of importing and exporting, firms learn of new technologies that they can apply to increase output. A second mechanism involves the provision of intermediate inputs. Trade increases access to intermediate inputs and the incentives for firms to create these inputs. Productivity is enhanced when firms have access to larger range of intermediate inputs or state-of-the-art intermediates. These different models indicate that trade liberalization can increase welfare by increasing productivity.

The most common way to estimate multifactor productivity is to employ growth accounting to relate the growth in output to the growth in factor inputs (labour, capital,

etc.). There is a large body of literature that adds trade or measures of openness to trade as covariates in cross-country growth accounting regressions. The idea is to explain growth not accounted for by increased factor usage. While early literature finds both positive and negative relationships, more recent papers obtain positive ones. Levine and Runelt (1992) estimate growth equations using a large panel of countries and find a robust positive relationship between the country income and the ratio of trade to GDP. Frankel and Romer (1999) consider an important econometric issue inherent in relating trade to income. Specifically, unobservable factors that cause a country to have a high income are likely to also result in high values of trade. Using distance between trading partners to instrument for trade, they also find that find that the trade to GDP ratio has a strong effect on income. Finally, Frankel and Rose (2000) show that currency unions stimulate trade and trade stimulates output. This literature indicates that by promoting trade, Canada's free trade agreements could underlie the recent increases in MFP in Canadian manufacturing.

Selection Effects

Trade advocates have long argued that trade liberalization benefits countries by increasing competition that induces greater efficiency within the domestic economy. However, only recently has there been theory demonstrating the mechanisms through which a reduction in trade barriers results in higher productivity. Melitz (1999) develops a trade model of firms with heterogeneous levels of productivity. Increased competition caused by the lowering of trade barriers generates a selection effect: high productivity firms increase output by exporting more whereas low productivity firms are forced to exit the market.

His model allows firms to enter if they pay a non-recoverable (sunk) cost. Before entering, a firm does not know its productivity as reflected by its marginal cost of production. In equilibrium, both high and low cost firms exist in the market. Trade liberalization increases imports and forces out marginal producers. While no individual firm is more productive in the new equilibrium, the industry as a whole is more productive as the composition of industry output has shifted towards the more productive firms.

Melitz's theory may explain productivity increases in Canada. The closest test of this theory is contained in Gu, Sawchuk, and Whewell (2001) who relate Canadian tariff cuts under the FTA to industry turnover rates. They find that tariff reductions promoted both entry and exit in Canadian manufacturing. Their result that the increase in exit rates due to tariff reductions is more pronounced in large firms than small firms is somewhat at odds with Melitz's theory. Large firms would be those with low marginal costs and would not be the ones in jeopardy when trade barriers fall.

Overall there is ample theoretical support for the proposition that trade liberalization promotes industry efficiency and efficiency did appear to increase in liberalizing manufacturing sectors in Canada. The empirical literature shows that increased scale was not an outcome of the Canada-U.S. Free Trade Agreement. Moreover, while Gu, Sawchuk, and Whewell's (2001) analysis shows that tariff reductions had selection effects on Canadian industry (by inducing turnover), the selection was not consistent with what Melitz's theory predicts. This leaves dynamic growth through trade as the means through which efficiency increased in Canada after the FTA.

Conclusion

In light of the free trade agreements that Canada has signed and the prospect that more will be signed in the future, this paper has attempted to synthesize the theoretical and empirical literature on trade liberalization as it relates to Canada. We find that the literature indicates a substantial increase in trade but we caution that this is not altogether welfare enhancing due to the potential costs of trade diversion and increased trade dependence. We find only limited evidence that the Canada-U.S. Free Trade Agreement increased specialization within Canadian manufacturing. Finally, we consider the manufacturing productivity growth that occurred in Canada in the 1990s. We conclude that this increase in industry efficiency was not the result of greater economies of scale in Canadian manufacturing. Nor does it appear tariff reductions "naturally" selected away from small, inefficient firms and towards larger, more productive firms. Thus, the trade and growth literature identifying spillovers and greater incentives to invest in knowledge capital remains as the theoretical explanation for the increased efficiency, although as yet empirical research has not explicitly tested this proposition.

The Canada-U.S. Free Trade Agreement stimulated a large amount of trade. Increased trade is the prerequisite for the various gains from trade espoused by economists. Consumers clearly have benefited through the ability to choose goods supplied by foreign producers. Moreover, if trade liberalization did promote multifactor productivity in Canada then this is strong evidence in favour of free trade agreements as productivity advance directly translates into higher income and improved standards of living. Since the critics of free trade have not yet presented any serious evidence of a link between more trade and lower welfare in Canada—even manufacturing employment has rebounded to its pre-FTA

levels—we see no reason that Canada's should deviate from its commitment to open market policies.

References

Clausing, Kimberly A., 2001, "Trade Creation and Trade Diversion in the Canada-United States Free Trade Agreement" *Canadian Journal of Economics*, forthcoming

Cox, and Richard Harris, "Trade Liberalization and Industrial Organization: Some Estimates for Canada, *Journal of Political Economy* 93, 115-145.

Eastman, H. and S. Stykolt, 1967, *The Tariff and Competition in Canada*, (MacMillan, Toronto).

Feenstra, Robert C., James R. Markusen, and Andrew K.Rose, 2001, "Using the Gravity Equation to Differentiate Among Alternative Theories of Trade, *Canadian Journal of Economics* 32(2), 430-447.

Frankel, Jeffrey A. and David Romer, 1999, "Does Trade Cause Growth," *American Economic Review* 89:3, 379-399.

Frankel, Jeffrey A and Andrew K. Rose, 2000, "Estimating the Effect of currency Unions on Trade and Output." NBER Working Paper 7857.

Grossman, Gene M, and Elhanan Helpman, 1995, "Technology and Trade," in Grossman, Gene M. and Kenneth Rogoff, eds., *Handbook of International Economics*, Volume 3, Amsterdam: Elsevier Science.

Gu, Wulong, Gary Sawchuk, and Lori Whewell, 2001,"The Effects of the FTA on Firm Size and Firm Turnover in Canadian Manufacturing." Industry Canada manuscript.

Head, Keith, Thierry Mayer, and John Ries, 2001, "On the Pervasiveness of Home Market Effects," *Economica*, forthcoming

Head, Keith and John Ries, 2001, "Increasing Returns versus National Product Differentiation as an Explanation for the Pattern of U.S.-Canada Trade," *American Economic Review*, forthcoming.

Head, Keith and John Ries, 1999, "Rationalization Effects of Tariff Reductions," *Journal of International Economics* 47, 295-320.

Krugman, Paul R., 1980, "Scale Economies, Product Differentiation, and the Pattern of Trade," *American Economic Review* 70, 950-959.

Lester, John and Thomas Morehen, 1987, "New Estimates of Canadian Tariff Rates by Industry and Commodity," Canadian Department of Fiance Working Paper no. 88-2.

Levine, R. and D. Renelt, "A Sensitivity Analysis of Cross-Country Growth Regressions," *American Economic Review* 82, 942-963.

Linder, Staffan B., 1961, *An Essay on Trade and Transformation*, Uppsala: Almqvst and Wiksells.

McLaren, John, 1997, "Size, Sunk Costs, and Judge Bowker's Objection to Free Trade," *American Economic Review* 87(3): 400-420.

Melitz, Marc J., 1999, "The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity," Economics Department, Harvard University manuscript.

Schwanen, Daniel, 1997, "Trading Up," *C.D. Howe Institute Commentary* 89, C.D Howe Institute

Trefler, Daniel, 1999, "The Long and the Short of the Canada-U.S. Free Trade Agreement," Perspectives on North American Free Trade, Industry Canada Research Publications Program, Paper Number 6.

Weder, Rolf, 1995, "Linking Absolute and Comparative Advantage to Intra-Industry Trade Theory," *Review of International Economics* 3(3), 342-354.

Notes Eugene Stanley - discussant

- déjà-vu

nb: dissem - of data to secure site & users

micro-labour data

lab: no business data

(US Census some, no bus. data)

NAMobility-paper.doc

The Consequences of Increased Labour Mobility within an Integrating North America

by

Richard Harris

Simon Fraser University and the Canadian Institute for Advanced Research

and

Nicolas Schmitt

Simon Fraser University

June 2001

Preliminary Conference Version

*Please do not quote without the authors' permission. To be presented June 21-22, Calgary Alberta, Industry Canada Conference on North American Integration. The authors are grateful to Martin Andressen for research assistance. Comments are welcome. Email addresses rharris@sfu.ca and schmitt@sfu.ca

1. Introduction

One hallmark of a true common market is labor mobility. NAFTA has some provisions on labor mobility--in particular the temporary migration of business persons and professionals under the TN visa program which has been extremely successful. However migration within NAFTA is far from free and traditional immigration controls are viewed as instruments of national social and economic policy within all three partners. To the extent there has been much discussion within NAFTA on migration it has been largely focused on the movement of Mexican's northward across the U.S.-Mexico border. Here in Canada the discussion has revolved around the movement of highly skilled individuals to the United States. There has been almost no discussion of a movement towards a common continental labour market, with full mobility rights of all NAFTA workers. In contrast the single market program and the entire integration program of the EU has as one its central features mobility of labour. This has led to a new and growing literature on the impact of labour mobility on growth, trade, investment and social ad economic policy. Since labour mobility is not currently high on the policy agenda in NAFTA countries, why a paper on the subject now? Our position is that the question may prove to be more than academic for a number of reasons.

Why is Labor Mobility likely to become a bigger issue in the Future?

There are a number of specific reasons why labor mobility within NAFTA is likely to become one of the more important items as deeper North American integration evolves with or without the help of governments.

1. The growth in service trade is expanding rapidly between the countries, particularly in business services. Given the potential size of this market it is reasonable to assume the after-market and complementary aspects of most service activity are often both firm and place specific. Customers want to be serviced in their home location. The existing TN program goes part way in this regard, but reducing border frictions completely to these type of labor flows would facilitate better integration of the service markets, and facilitate growth of Canadian service exports to the United States.

2. MNE's routinely move staff across borders and the ease with which this is accomplished can affect FDI decisions. Reducing the barriers for MNE to easily move staff between Canada and the U.S. may help to remove the bias against Canada locations for North American based FDI. This would help Canada attract it share of North American destined FDI and at the same time discourage Canadian firms from moving South of border.

3. Telemobility is likely to increase in importance. Virtual labour mobility is a substitute for physical labor mobility in many areas already. Call centers in various Canadian cities serving the entire NAFTA market provide in essence a form of mobile labour service. The Internet has dramatically enhanced the ability of firms and individuals to deliver labor services via digital based telecommunications giving rise to the vision of a continental E-Labour Market. Doctors located in one city performing surgery in another and university professors delivering courses via Distance Learning Technology are two common examples--but there are many others.

4. The Brain Drain Debate. Within Canada there has, over the last two years, been serious concern about the loss of highly skilled workers to the United States, particularly in the high technology areas. The mobility of high tech workers is a reality as long as supply shortages in these areas persist in the U.S. economy. Initiatives to further ease the extent to which workers can move between Canada and the U.S. may encounter public resistance in Canada given the concerns about a Brain Drain to the U.S. To be fair the Brain Drain is as much about other policies such as taxation and currency depreciation as it is about labor markets. The current degree of mobility however is function of current circumstances and not a permanent institutional characteristic of the NA labor market.

5.Border controls are becoming increasingly difficult to enforce without impeding other forms of commerce. At both the Canada-Mexico and Canada-US border there have been substantial demands to expedite the flow of cross-border business visits and of course the movement of goods and services. The appeal of reducing border costs carries with it a cost--the inability to control immigration to the same

extent. The call for formal mechanisms of reducing border impediments is equivalent in most cases to a de facto increase in labour mobility.

6.The increase in the average age of the population has not only well-known implications for the funding of the old age pensions but it also implies that the flows of workers entering into retirement is superior to that of individuals entering the workforce. Although extra-NAFTA immigration helps to fill the gap, pressure to improve labor mobility within NAFTA will grow especially if adjustment costs both for firms and for individuals are lower for NAFTA migration than for extra-NAFTA migration.

Welfare and Trade

A preoccupation of the traditional economic analysis of a move towards a common market is the trade and welfare consequences of the assumed increase in factor mobility. Full labor mobility is not absolutely essential for a common market but generally the consensus view is that the greater the mobility the larger the efficiency gains. Different theories give rise to quite different predictions as to the welfare gains. In some instances countries can lose by increasing factor mobility. In almost all cases there are distributional consequences that are negative for some groups and postive for others. What happens to trade as labour mobility increases--the classic Mundell question. One defense of strong restrictions on labour mobility is the prediction of one well-known theory most of the efficiency gains can be realized through free trade in goods and services. NAFTA has certainly moved us a long ways towards free trade. Does that imply the efficiency gains from increased labour mobility are negligible? This paper seeks to address this and other related questions.

An important caveat regarding this paper is that we do not explore the social and fiscal policy implications of formal labour market integration. Within a true common market there is labor mobility but not necessarily citizenship mobility. That is an individual's rights to social and transfer programs can be defined by citizenship and not available unless one resides in one's home country. Practically however in both Canada and the United States most citizenship rights currently go more or less in hand with residency. Increasing labor mobility therefore may or may not imply increasing access to

local social programs and public goods for non-citizen workers. This is the case for example for workers moving between Cantons within the Swiss federation. This is a topic which is sufficiently complex topic that we do not explore it here. The paper also has a distinctive Canada-US focus. There are some references to Mexico-US migration issues but this is not our intention here. Deeper Canada-US integration could of course involve a variety of formal and informal mechanisms which would enhance Canada-US labour mobility without the creation of a fully integrated continental labour market.

The paper proceeds as follows. Section 2 discusses some recent trends in international labour flows and some historical data. Section 3 covers the standard theories of international factor movements, and amendments to deal with a number of medium term considerations such as uncertainty, labour market rigidities, and short run factor specificity. Section 3 also draws out the implications of these theories should a Canada-US labour market integration proceed. Section 4 deals with the regional and industrial structure implications of labor mobility. In particular will increased labour mobility lead to a core-periphery pattern of economic development biased against given the existence of continental free trade? Section 5 is a discussion of some dynamic factors including those surrounding the recent Brain Drain Debate. Section 6 discusses new forms of labour mobility including temporary workers and virtual labour mobility. Section 7 discusses the macroeconomic adjustment implications of labour mobility and the lessons that can be drawn from the European and US experience. The last section deals with possible policy implications of these developments for Canada-US integration and NAFTA.

2. Historical and Recent Trends in Migration

Historical census data shows that rates of permanent out-migration are currently near an all time low, and also that Canada has enjoyed a net inflow of permanent migrants for a very long time. Rates of immigration have for many years been between 0.5 and 1 percent of the population, while rates of emigration have been in the 0.2 to 0.3 percent of population range. Historically there have been large flows out of Canada and into the United States. The classic Dales model of post-confederation Canadian

economic development was predicted on the assumption of highly mobile flows of labour into and out of Canada. From 1870 to 1901 there were in fact very large rates of emigration from Canada, most of it to the United States (Table 2.1). However with the exception of the Great Depression immigration has usually exceeded emigration in Canada. In the early post-war period there were large flows from Canada into the United States, but relatively little reverse migration. (Tables 2.2 and 2.3). The most recent Brain Drain debate on Canadian migration to the U.S. attracted a great deal of media attention, and a number of efforts have been made to estimate these flows more accurately. Finnie(2000) is the most recent effort using tax filer data, census data, and US Current Population Survey data. Finnie suggests the tax filer data indicate that the number of tax filers leaving Canada to all destinations has increased steadily in recent years, from about 15,360 in 1991 to 28,870 in 1997, with an average of about 21,700 per year over this period.

> "They suggest that 178,000 people left Canada to go to the U.S. between 1991 and 1996, and past experiences indicate that 126,000 of these would be expected to remain permanently in the United States and 52,000 to return to Canada (Graph 3.5). Emigration to the U.S. was, furthermore, 30 percent higher in this period than from 1986 to 1991, permanent migration increasing by 15 percent and temporary migration doubling."
>
> *Finnie(2000) page 3.*

One of the interesting trends of the last decade has been the shift toward temporary forms of migration. The extent of this shift is indicated in Table 2.4. Of particular interest is the dramatic increase in the number of person us the NAFTA TN visa. For a number of reasons the TN data are thought to be unreliable as indicators of permanent migration flows. Nevertheless the dramatic increase in their use is undoubtedly indicative of greater labour market interactions by Canadians in the US market of some form. Likewise are the figures on MNE employee transfers which have been rising at a rapid rate. These represent both the increased importance of FDI in the economy, and the shift towards shorter-term assignments of MNE employees.

3. Trade and Migration: Traditional Theories and Implications

As noted in the introduction liberalization over the last two decades has been for the most part in the area of trade and investment. If anything, mobility of people has probably decreased over the same period. Economists have naturally been concerned with both the positive and normative implications of this development. For example a large part of the literature presumes that most economic benefits of integration can be obtained with goods market integration and without labor mobility. The basic question we seek to address in this section is the impact on Canada of increased labor mobility within NAFTA. For the purposes of this paper we assume that NAFTA approximates a classic free-trade area, including free movement of capital even if it also contains few provisions facilitating the international mobility of some categories of workers. Should we then expect migration pressures to increase or to decrease with such an agreement? Asking this question is equivalent to asking whether labor migration and international trade are substitutes or complements. Below we answer this question by first reviewing the basic theories linking trade and migration and discussing how NAFTA may have changed migration pressures between Mexico and the United States or Canada and between Canada and the United States. In the last part of this Section, we ask what lower barriers to labor mobility will do on trade and wages.

3.1 Neoclassical Trade Theory

The Heckscher-Ohlin approach provides a very clear picture of the link between trade and migration: the pressure of international labor migration decreases with freer trade and it disappears completely with free trade. In other words, trade and international labor migration are substitutes (see Mundell, 1957). This result is the intellectual basis for one of the main motivations behind the US desire to negotiate the NAFTA agreement with Mexico, given that the systemic illegal migration from Mexico was viewed as politically unsustainable. Free trade should under this theory eliminate the pressures on migration.

The reason why this result holds with the Heckscher-Ohlin approach is simple. Suppose that the US and Mexico have different factor endowments: the US is relatively abundant in capital while Mexico is relatively abundant in labor. Both countries produce two products and they share the same technology of production. In free trade, each country will then export (import) the good using more intensively the factor that is relatively more (less) abundant in that country. Hence, Mexico exports the labor-intensive product to the US and imports the capital-intensive product. As long as changing trade barriers do not affect the pattern of trade, freer trade increases the price of the relatively abundant factor relative to the price of the other factor and of both products (Stolper-Samuelson Theorem). This means that, viewed from a Mexican worker perspective, the real price of labor in Mexico rises with freer trade while it decreases in the US so that the pressure to migrate to the US decreases. With free trade, factor prices get equalized and the pressure to migrate disappears completely. One way of interpreting the Heckscher-Ohlin approach is thus that international trade (or international migration) contributes to make economies alike. Viewed in this fashion, it can only be a long-term outcome.

Another workhorse model of international economics is the specific factor model. Factors of production such as capital are often specific to the sector in which they are employed. Consider then trade liberalization in a simple environment where the price of the Mexican importable falls but the price of the exportable good remains unchanged. By lowering the price of the importable good, trade liberalization depresses the demand for labor in the Mexican import sector. If labor is mobile (or not specific) in this economy, the nominal wage must fall. The effects of trade liberalization on real wages however are ambiguous since the real wage expressed in terms of the exportable good falls but the real wage expressed in terms of the importable good increases. Hence, with migration pressure responding to real wages, a fundamental ambiguity exists about the direction of the migration as a response to freer trade since, depending on individual preferences, real wages in Mexico can fall or increase.[1]

---

1 See Venables (2000) for other cases using the same model.

The requirements of the neo-classical approach are quite severe and, in recent years, many arguments have been put forward showing that, when the assumptions of the standard approach are relaxed, pressures to migrate may easily increase with freer trade. Most U.S. proponents of the NAFTA probably did not believe that the North American economies satisfy the assumptions of the neoclassical approach, but more realistically that those differences and the possible increase in migration pressures coming with freer trade are mainly short-run or medium-run phenomena. Hence a short-run increase in immigration was a worthwhile price to pay for policies which would lead to reduced immigration and free trade in the long run.

What could cause an increase in migration pressure with freer trade? There are a number of potential explanations[2] We review a few of these below. They correspond to relaxing at least one of the key assumptions of the standard neo-classical approach, namely, identical production technologies, the use of the same factors of production, constant returns to scale technologies, instantaneous adjustments to policy changes, prefect competition, homogeneous product, full employment and complete markets.

3.2 Departures from the Neoclassical Trade Model

To see how the elements mentioned above might increase migration pressure with freer trade consider each of them separately.

Technological Differences and Increasing Returns

Consider first the case where the technology of production is not the same across countries for example due to specialization effects, or extreme factor endowment differences that induce factor price differences across countries. Suppose for instance that Mexico produces a good with a labor-intensive technology while the US uses a capital-intensive technology to produce the same good. If opening up borders with Mexico gives the US a comparative advantage in producing this good, then this forces Mexico to substitute away from this labor-intensive product. This drives the Mexican wage down increasing migration pressure to the US, at least as long as Mexico does not expand the

2 See Martin and Taylor (1996) and Venables (1999) for surveys about some of these links between trade and migration.

production of other goods that use labor intensively or as long as it does not adopt the same technology as in the US.

Technological differences between countries may also imply that one country has absolute productivity advantage in some sector. Such differences may exist because of differences in complementary public inputs (whether through public services, infrastructure, transportation, communication or education) making wage differences alone insufficient to create comparative advantage in a country. In other words, there could be so little public infrastructure in Mexico as compared to the US that despite lower wage there, the US might have a comparative advantage in the production of this labor-intensive product. Hence, opening up trade could also lead to more migration pressures, at least as long as investments in these public inputs do not close the labor productivity gap.

Introducing increasing returns at the level of the sector may also change the standard result. Suppose for instance that the technology used in the labor-intensive sector exhibits increasing returns to scale. The expansion of production in the US through trade liberalization could encourage immigration to staff a growing and a more efficient industry. In general, when trade is due to scale economies, migration and trade are complements as shown by Markusen (1983) and Markusen and Melvin (1981).[3]

Adjustment Lags, Migration Costs, Risk and Migration Networks

All the above elements implicitly assume that adjustments are instantaneous or, if they are not, that they do not affect comparative static results. Of course, adjustments can take time. In particular, while investments and the creation of new jobs usually take some time to respond to trade reforms, increased migration pressure might be an obvious short-term response to these adjustment lags.

Migration costs can also lead to increased migration pressure in response to trade liberalization through the following channel. Suppose the cost of migration is high relative to income limiting thereby the number of potential migrants. If trade liberalization does increase income then it may increase migration pressure as this

3 Economies of scale at the firm level are important ingredients in the more recent approach of geography and trade. This approach has something important to say about the links between trade and migration. We choose to develop this approach in a separate Section 4.

constraint is being relaxed. Similarly if migration involves some risk and there is no insurance against this risk then higher income through trade liberalization may help bearing this risk increasing thereby migration pressure. Finally, when trade liberalization favors income inequality, those who are deprived might react by wanting to migrate to maintain family income (see Stark and Taylor, 1991). Of course these forces tend to disappear with more jobs opportunities at home.

Migration pressures following freer trade may be compounded by the existence of migration networks. Most of the time, migration networks exist when there are significant differences between countries. Their main characteristic is that, once established, migration networks can keep migration flows going. So if trade liberalization tends to increase pressure on migration, the existence of migration networks may magnify this effect since networks lower the cost of migrating by providing information, jobs, insurance, etc. Limits to this effect exist if there are diminishing returns to migration networks and, of course, with increasing job opportunities in the country of migration.

Foreign Direct Investment

Finally, consider the case of foreign direct investments (FDI). It is well known that market dealings often involve transactions costs. The more complex a product or a service is, the higher the transactions costs usually are because such products or services need before- and/or after-sale services, specialized management, quality control or other specialized services. With international trade, an exporting firm might find local specialized individuals to carry out these services through licensing or other market arrangements. Alternatively, it might prefer investing abroad (FDIs) and send own individuals to supply such services. In this case, the firm chooses to internalize within the firm the provision of such services. By doing so, transactions costs are often saved because opportunistic behavior often associated with market transactions is being avoided. Trade liberalization may induce such internationalization and new FDI because organizing a firm in such a way involves a fixed cost and thus a relatively large market.[4]

---

4 Notice that FDI in this case are mainly designed for the provision of these services, not for production in another country. Hence, FDI and trade are here complements, an outcome often found in the empirical literature.

If it is the case, trade liberalization may induce more migration of specialized workers in so far as FDI require these specialized workers (see Globerman, 1999).

Short run Specificity

Most of the above elements suggest that trade liberalization between two similar economies like Canada and the US should not produce much migration pressure between the two countries. The strength of such pressure is certainly lower than between Mexico and the United States and its nature is largely different. Among the possible sources reviewed above, two seem to be particularly relevant: factor specificity, including labor specificity, and specialized migration associated with FDI.

It is fair to say that an important characteristic of modern economies like Canada and the United States is to have largely sector specific factors of production. In fact one aspect of globalization is probably an overall increase in factor specificity through specialization. When a particular type of labour is specific to an import competing sector, trade liberalization lowers its real return contributing to pressure on out-migration. In short, whether labor is a specific factor or not (but used jointly with other specific factors), freer trade can easily contribute to increased migration pressure in an otherwise very standard environment.[5] When, in addition, there is the the firm's internalization motive for migration, we must conclude that countries like Canada and the United States are not immune to migration pressures following freer trade even if it is not always easy to predict the sectors in which such pressure might occur. The most likely outcome is that migration pressure will occur for some sectors in one direction and for other sectors in the other direction unless other forces (like tax reason) make such a pressure more systematically asymmetric between the two countries.

It is important to note that specific labor is often highly skilled so that the description above can also be broadly applied to the case of brain drain/gain. Of course the specific factor model assumes that factors are homogeneous so that each factor has just one price. Brain drain/gain, on the other hand, is usually understood as affecting a subset of individuals (the 'stars') within a sector. In so far as, within a sector, specific

---

5 Hence, along with factor specificity, only difference in factor endowments can explain trade and increased migration pressure associated with trade liberalization.

labor is differentiated according to talent and that more talented individuals earn more (in real terms) than less talented ones,[6] trade liberalization may affect differently these talented individuals. In particular, trade liberalization may increase inequality of rewards among these stars in such a way that the best talents see their income rises with respect to less talented individuals.[7] In so far as fundamental differences between countries otherwise exist (like their size), it is quite possible that trade liberalization may then induce migration pressure in some categories of talents and not in others.

Unemployment

There is a substantial labor market and macroeconomic literature identifying unemployment as both a push and pull factor in the migration decision. A wide range of theories of unemployment can be used to explain migration. These include rigid wage theories, efficiency wage models, or rural-urban migration models as in the Harris-Todaro model. These theories are usually not focused on the issue of economic integration but can be adopted for that purpose.[8] The unemployment issue figures prominently in virtually all discussion of North-South migration and the migration of illegal Mexican workers into the U.S. for example. In the Canada-U.S. context low rates of unemployment in the U.S. and higher rates in Canada ought to lead to out-migration from Canada. Improving factor mobility ought to lead to an increase in the rate at which regional cross-border differences in unemployment are reduced by cross-border migration. This is all fairly standard.

There is remarkably little literature on the implications for trade or economic integration of these theories with the notable exception of the Brecher-Srinivasan model of trade with rigid wages. In this model there are two factors, skilled and unskilled labor. If there is rigid wage in the unskilled labor sector, equilibrium is resolved by having the quantity of unskilled employment adjust so all firms are on their demand curves. The

---

6 This may be because specific labor, like entrepreneurs, brings more efficiency to their firm with more talents, or that, like with entertainment, they face a greater demand (Rosen, 1981).

7 See Manasse and Turrini, (2001) for such a model. In their model, the main reason why it is the case is because more talented individuals can engage in trade whereas less talented ones cannot.

8 They also have played a prominent role in optimal currency area theory. See section 7 on macroeconomics of mobility.

flexible wage for skilled labor adjusts to clear the market for skilled labor at all times. In general shocks to technology or prices will impact on both the quantity of unskilled unemployment and the skilled wage. An interesting implication of this type of analysis occurs if we start with free trade and consider an out-migration of skilled labor--this will have two impacts. One, it will have the usual neoclassical effect of raising the real wage of skilled labor which remains, and two it will raise the rate of unemployment of unskilled labor whose demand falls given that there are fewer skilled workers available. Certainly this type of argument is one concern driving the debate on the Brain Drain.[9] Losing skilled workers in Canada could contribute to job losses and rising unemployment amongst the lesser skilled.

3.3 Implications for Labor Mobility within NAFTA

The Starting Point

The main message of the last section is that regional trade liberalization under NAFTA may actually increase migration pressures in Mexico and in Canada. In Mexico, it mainly comes from low-skilled workers because technological or other differences do not guarantee that sectors using intensively low-skilled workers will expand, at least in the short- and medium run. In Canada, this migration pressure is globally much smaller but may exist in some sectors and for some categories of individuals. It is mainly associated with FDI activity and especially with factor specificity. To get more explicit implications from the theory requires stronger assumptions on the relevant starting point. Any attempt to address the potential implication of either introducing reduced barriers to labor mobility, or opening up a common market in labor within North American, will require some quantitative assessment of the current state of trade and wages across the Canada-US regions. In order to generate more specific predictions one needs to identify the potential relevance of alternative theories. The 'facts' on Canada-US comparisons has been the subject of a large amount of research within Canada and is the subject of a number of other papers in this conference. Generally speaking, the literature falls into

---

9 Unemployment or underemployment is a large concern in the literature on North-South migration and East-West migration in Europe. Since this is not that relevant to Canada-US it will not be covered here. See Zimmerman (1999) for an overview of this debate.

three areas: a) explanations for the observed increase in wage inequality across skill groups in both Canada and the United States, b) explanations of the Canada-U.S. productivity gap, and c) explanations for the large growth in trade and investment subsequent to the FTA in 1988 and NAFTA in 1993. One can take from this literature three important stylized facts that any analysis of increased Canada-US labour mobility must accommodate.

1. Wage level differences between Canada and the United States remain significant. While there are many serious measurement problems the average gap in real incomes is in the 20 to 30 percent range. More relevant perhaps to the issue of skilled labour mobility are starting salaries for recent university graduates. A Statistics Canada report says

> "After taking inflation and purchasing power parity into account, the median annual earnings of bachelor's graduates working in applied and natural sciences jobs upon arrival in the U.S. was $47,400, considerably higher than the $38,400 earned by their counterparts in Canada. The gap in salaries between bachelor's graduates in health occupations upon arrival in the U.S. and those who remained in Canada was similar."
> *page x, An Analysis of Results from the Survey of 1995 Graduates Who Moved to the United States HRDC and Statistics Canada, Ottawa, Statistics Canada Catalogue Number: 81-587-XIE,, 1999.*

2. The wage gap between skilled and unskilled workers, usually measured by educational attainment has risen in both Canada and the United States. In additional overall earnings inequality also increased sharply. In 1971, a worker at the 90th percentile of the wage distribution earned 266 percent more than a worker at the 10th percentile. By 1995 this number had risen to 366 percent. 10 A substantial part of this growth in inequality is not explained by education but by some unexplained factor. When one controls for education-experience and other variables there has been a remarkable increase in measured *within-group or residual wage inequality*. Many studies point to as much as 60 percent of increase in wage inequality has been within groups who have apparently same education and age.

---

10 From Acemoglu(2000).

3. The Canada-U.S. productivity gap both in the total economy and in manufacturing remains substantial and appears to have widened in the latter part of the 1990's. Most explanations of the latter have focused on the superior performance of the U.S. economy in the New Economy sectors.
4. Trade and FDI have grown dramatically within NAFTA since 1988. Canada's export to GDP ratio has gone from around 26 percent of GDP in the mid 1980's to 46 percent using the most recent data. Most of the growth in exports was in Old Economy sectors. The U.S. now accounts for almost 90 percent (2000 data) of Canada's merchandise exports. Two-way flows of FDI into and out Canada have grown dramatically. In 2000 the U.S. accounted for 63.9 percent of inward FDI stocks in Canada.
5. The relative price of tradable capital to labour has diverged substantially between Canada and the United States over the 1990's and the Machinery and equipment investment intensity of Canadian industry fell in the same period. A rough order of magnitude is that that the relative price of machinery and equipment to labour in Canada rose by 30 percent as compared to the same relative prices in the U.S.[11]

The decade of the 1990's were of course characterized by a number of other events that one may want to factor into a broader explanation of these trends and in the choice among competing trade theories. This would include macro policy developments, the Asia Crisis in 1997-98, and the emergence of the New Economy in the United States. However most of these trends are inconsistent with the basic Heckscher-Ohlin model of trade since it predicts absolute factor price convergence. They are also inconsistent with most other neoclassical models that usually predict relative factor price convergence. Models relying solely on static scale economies are not likely to do much better. At a minimum one needs to append to the basic international trade framework, a dynamic theory incorporating some explanation of the growing skilled wage gap between Canada and the United States. The most promising of recent theorizing are those models focused

11 See Harris(2001) and Schembri and Lafrance(2000).

around Skill-Biased Technological Change or General Purpose Technology.[12] In either of these cases a basic assumption is an economy-wide acceleration of technological change rooted in the IT sectors has taken place, which gave rise to an increase in the wages of skilled labor in the United States and to the strong increase of within-group inequality. Work by Industry Canada and others has identified that the same forces are evident in Canada but with a lag relative to the U.S. Canada's weak productivity performance, together with the fact that most IT capital is imported, jointly explain the real wage gap particularly for skilled workers in the two countries. The fact that Canadian relative supplies of highly educated labor grew much faster than in the U.S. also helps to explain why the increase in the skill premium was less dramatic in Canada than in the U.S.

One can therefore take as a starting point for improved skilled labor mobility a model in which the average level of labor productivity in Canada is lower than that in the U.S. but perhaps converging toward U.S. levels. The demands for skills are highly selective however with some skills in high demand and others falling. The U.S. continue to find certain types of skilled labor in short supply and therefore the wages of those skill groups remains high in the U.S. Since Canada is both close to the U.S. and relatively abundant in skilled labor medium run migration pressures on skilled labour remain high.

The Case of Mexico

What do then relaxing migration restrictions within NAFTA imply? The case between Mexico and the United States/Canada is clear. Whatever model one uses the large differences in income levels and relative supplies of unskilled to skilled labour between Mexico and the other members of NAFTA are sufficiently important to expect, along with the different causes of migration pressure reviewed in the previous Section, significant emigration out of Mexico in response to relaxing migration restrictions. This will be the case for at least the next 10-15 years as it will be only after significant income and development convergence with respect to the other NAFTA members that such migration pressure can be expected to subside. How would trade and wages be affected?

---

12 There is an extensive literature on this issue. See in particular the Beaudry-Green paper presented at this conference and a recent survey by Acemogle(2000).

Since most of the migrating Mexicans are probably not working in the Mexican manufacturing industry but rather in the subsistence sector of the economy, Mexican trade would not be affected. US trade however would be as an important inflow of low-skilled (and legal) migrants would lower low-skilled wage and favor sectors using intensively low-skilled labor (importables).[13]

The Case of Canada

What about the case of Canadian unskilled labor? The issue of skilled labour is treated in detail below. If one considers the Canadian unskilled workers as mid-skilled relative to Mexicans, Canadian and Mexican 'unskilled' workers do not really compete with each other simply because Canadian tradable sectors using low-skilled workers no longer exist. In addition, the wage ap between US- and Canadian mid-skilled labor is much lower than for the skilled workers, thanks in part to NAFTA. Hence, the introduction of a continental free-labor mobility would probably not have much effect on the Canadian patterns of comparative advantages (including outsourcing), nor would it bring much pressure from low-skilled Mexican or from mid-skilled US migrants simply because NAFTA has already induced most adjustments in sectors using intensively low- or mid-skilled labor. The only remaining issue is whether, with free mobility, Canada would absorb some very low skill Mexican workers and start building some of the labor intensive industries observed in the southern US states. Except possibly for agriculture, the answer is probably negative as these industries are also absent from the northern US states.

---

13 An additional trade effect of lowering barriers to international mobility could come from trade networks. They exist when differences in culture and language between the country of emigration and that of immigration confer an advantage to migrants to trade with their country of origin. Through these networks, improved international mobility of labor expands trade because, not only the countries of origin often have products that the migrants wish to consume in their country of immigration (hence affecting mainly imports) but there might also be implicit costs to trade with these countries (hence affecting both imports and exports). Positive and significant relationships have been found between trade and immigration by Gould (1994) concerning the US, Head and Ries (1998), and Head, Ries and Wagner (1998) concerning Canada. Head and Ries evaluate that a 10% increase in immigrants leads to an increase of 1% in exports and 3% in imports, while Head, Ries and Wagner find that immigration creating trade networks might explain 10% of Canadian trade over the first half of the 1990s.

A forward looking issue surrounds the aging of the Canadian population and to what extent immigration may be viewed as part of a 'solution' to growing depenency ratios. Certainly opening the Canadian NAFTA border to unskilled labour from the U.S. and in particular Mexico might be part of this overall strategy. Even with complete continental free mobility of labour there is no guarantee the resulting inflows would be sufficient to make a great deal of difference to the larger macro problem posed by an aging population.

Productivity Effects

Would increased migration of skilled workers from Canada to the US tend to reduce or increase the labor productivity gap between the two countries? The static theories outlined in 3.1 above have little to say about this question other than through indirect effects on factor accumulation. In general we expect out-migration of skilled labor to reduce the average labor productivity of unskilled labor for the standard neoclassical reasons. A potentially more damaging channel would be via the reduced adoption and use of IT technology which is complementary to particular types of skilled labor. If increased NA labour mobility implied a loss of skilled labor supply in Canada, this could potentially slow the rate at which productivity grew in Canada and lead to an increase in the Canada-US productivity gap. In addition this would tend to shift the composition of production and exports in Canada toward Old Economy goods.

Unemployment

Lowering barriers to migration may alter structural conditions in regional labour markets and thus impact on rate of unemployment. Canada has had a significantly higher permanent unemployment rate for sometime than the US that differences in measurement cannot entirely capture. Lowering barriers to international mobility should produce some migration of relatively low skilled workers from Canada to the US (assuming that there is a large proportion of the low skilled in unemployment). Will the unemployment rates be equalized between the two countries as a result? Most probably not since preferences, even language, make the international mobility lowers than the inter-provincial labor mobility. Even under the most liberal labor mobilty regime unemployment rates across regions will not be equalized given that inter-provincial like the inter-state labor mobility

has not equalized unemployment rates within Canada or the US. Still, the introduction of the option to move to another country necessarily implies that there will be some convergence, if not in level, at least in the unemployment rate and in the wage response to asymmetric macroeconomic shocks in the two countries. The numbers involved however are too small to change trade significantly between the two countries.

Complements or Substitutes? The European Lesson

The case of the EU is probably the most interesting recent case to investigate the effects of relaxing migration rules once free trade has been reached. Indeed, the 1992-Unique market experiment, which has introduced free-labor mobility within the EU, has followed a long process of trade liberalization. By all accounts, the 1992-experiment has produced very little movements of people within the EU suggesting that, for the EU, trade and migration are substitutes. Table 3.1 illustrates this point for six EU countries for which data on intra-EU migration exists. For the period 1988-97, it indicates the share of all the migrants coming from other EU countries and, for the period 1988-95, the last row indicates the share of migrants coming from other EU countries with respect to the total population of these six countries. Although migration may take time to adjust to the elimination of restrictions, migration within the EU has been very stable in proportion to all migrants since 1992 as compared to the pre-1992 period and its share with respect to total population has been very low.[14] Straubhaar (1988), using econometric techniques, found that trade and migration are substitutes within the EC.[15] Of course, an important reason is the importance of culture and `distance' restricting the scope for migration within Europe. Krueger (2000) does not expect this picture to change much in the future. The best proof of this is the low level of migration *within* EU countries estimated to be half the rate found within the US. Indeed Krueger (2000) reports that if 2.8% of Americans have moved between state boundaries in 1987, only 1.1% of Germans, 1.1% of Britons and .5% of Italians have moved across regions within their respective countries. This means that, within Europe, the only way to take advantage of the gains

14 At the individual country level, the proportion of EU citizens migrating to other EU countries tends to be larger in smaller countries but it remains very stable.

15 As Table 1 indicates, the same conclusion does not hold with respect to non-EU migrants, at least during the period 1990-94.

from integration is through international trade, not free mobility of labor and this goal has been largely reached.

4. Agglomeration, Convergence and Regional Development

A central question when addressing both the positive and normative effects of increases labor mobility is the potential impact on the pattern of regional economic activity within a more integrated North American market. Traditional trade theory has little to say on this subject, but it has become the central question in the new theories of trade and geography initiated by Krugman (1991) which suggests in general agglomeration and divergence in regional income levels. There is also a considerable body of theory and some evidence that suggests increased integration leads to convergence of income levels.

Agglomeration and Divergence

These models are characterized by the joint presence of economies of scale and costs to trade. The latter can include transport costs, border costs, and other transaction cost associated with interregional goods trade, or more formal barriers to trade such as tariffs and quotas. With or without factor mobility these models are subject to cumulative causation effects. In particular factor mobility reinforces the gains to regions which tend to attract industries characterized by economies of scale due to their size advantage. This advantage translates into higher productivity, higher real incomes and thus attract additional factors by migration. Manufacturing production (assumed to exhibit economies of scale) tends to concentrate where there is a large market and a market is large where manufacturing production is concentrated (backward linkages). This is reinforced by the fact that the cost of living is lower in the region with the larger manufacturing sector because consumers there rely less on imports that are subject to transport costs (forward linkage). Both forces tend to favor agglomeration in the core leaving other regions (or countries) a rural hinterland. Large regions become larger and a core-periphery pattern of economic development emerges.

The actual outcome is sensitive to the specification of trade costs. With free trade and no trade costs this asymmetric pattern of development cannot occur. But otherwise it

gives rise to the fear that by opening up labor mobility some regions of a free-trade area, in particular the smaller regions, may be hollowed-out resulting in the loss of industry and skilled people. In the absence of factor mobility the cumulative effect is lost. The models still predict the possible emergence of permanent income and productivity differences but given the absence of a migration channel the de-industrialization effects are much less pronounced. For small regions within existing common markets, the policy issue is clear. Factor mobility may have in fact led to lower incomes. In the case of existing free trade areas that are contemplating reducing the barriers to labor mobility, the possibility of a becoming a peripheral region in a large integrated economic area is obviously worrisome. The applicability of this question to the European Single Market is obvious and has generated a great deal of research on regional development patterns. At this point the evidence is not clear. The early evidence comparing US states to EU countries suggested that actual outcomes were different than predicted by the model. In the US where labor mobility is high, it appears that incomes were leveled but that industrial development was relatively uneven. These models can explain this outcome provided trade costs are sufficiently low. In Europe on the other hand where labor mobility has been historically low, income levels across countries exhibited a great deal of variability but industrialization patterns were more balanced.

The early models generally either worked with the polar cases of perfect mobility or complete immobility. Moving to the more realistic case of imperfect mobility leads to some important differences as shown by Ludema and Wooton (1999). They show that, with imperfect labor mobility and by appropriate choice of the sequence of trade versus labor market integration, it is possible to avoid the potentially negative effects of agglomeration on some regions.

Consider a typical geography and trade model in the Krugman's (1991) tradition with two sectors: agriculture and manufacturing. The first sector produces a homogeneous product under constant returns to scale with sector-specific immobile labor while the second sector produces differentiated products with increasing returns technology and internationally mobile workers. Only the differentiated products face barriers to trade. As a result there is a tendency for the production of differentiated products to be concentrated in the country where the demand for this variety is larger so

as to minimize trade costs. As a result, real wages may be higher in the larger country, providing an incentive for workers to move to the industrialized core reinforcing the decisions of the firms to locate at the core. This produces a labor demand schedule showing the proportion of the manufacturing labor force that will be employed in one country as a function of the relative real wage and given the level of international barriers to trade.

Suppose now that internationally mobile workers have preferences biased toward the home country in which they would rather live and work. Hence they need a higher real wage than at `home' to induce them to move and this premium of course depends on the intensity of their preferences. This produces a labor supply showing the willingness of workers to take employment in one country as a function of the real wage and for specific preferences about `home'. The intersection of the labor demand and of the labor supply produces an equilibrium which can be stable or not and which can produce complete agglomeration or not. It is not difficult to imagine that if workers have strong preferences towards home it is more difficult to get complete agglomeration as an equilibrium since there exist workers for which only very high compensation will induce them to move to the other country. Ludema and Wooton show that very strong preferences for home are not needed to produce such a result. In other words, with imperfect international mobility of labor, it is difficult to produce complete agglomeration in which one region has all the manufacturing activity. They then look at two policies: one of trade integration (lower trade costs), and then a factor market integration which allows for reduced costs to migration. Given home locational preferences, there is never complete migration from one region to another. Not surprisingly, trade liberalization never leads to complete agglomeration if home preferences are strong enough. But of particular interest is the result that *for a given level of trade costs, an increase in factor mobility tends to level the agglomeration effect.* One could imagine that the NAFTA area, now characterized by relatively free, but not costless trade, may have been subject to agglomeration forces. At the regional level, this is even more obvious given the uneven growth rates across US states. Between Canada and the US, the smaller region Canada may have been partially pushed toward specialization in those sectors not subject to agglomeration effects under free trade. The Ludema-Wooton model would then predict that increased mobility

holding the trade regime constant tends to lead to more even patterns of industrial development.

If NAFTA were to move towards a common market in labour how would the pattern of regional development within Canada be affected by lowering barriers to labor mobility across the Canada-U.S. border? It would not be unreasonable to assume for example that the variability observed within US states in terms of incomes (before tax and transfers) and industrial specialization would also be observed within Canada. Theory provides no precise answer to this question. Clearly however the impact of opening up the US labor market to Canadian labor will have a much greater impact on regional development within Canada than would the converse. It is also useful to note that the local demand linkages for a number of the smaller Canadian regions are not likely to be important even with some trade costs. Exports of manufactured goods will tend to be relatively more important for these regions than would production for local use. Assuming that skilled labor is the main target of mobility enhancing policies, those regions in Canada for which the geographically proximate border wage gap was largest and which have the smallest markets would be impacted the most visibly in the short run. Over the longer run, reduction in trade costs and the benefits of specialization may lead to a longer-run leveling in income levels. It is interesting to note that border state-province comparisons indicate there is already a tendency for proximate border regions to look somewhat similar. Lowering the costs of labor mobility may therefore not have a large effect on the smaller Canadian regions as a simple interpretation of these models would suggest.

Convergence

There is an alternative empirical approach to regional development based on the convergence hypothesis. Its basic hypothesis is that increased integration leads to faster rates of convergence in income and productivity levels. The evidence for this hypothesis has been mixed. Generally most of the evidence presented has been for trade integration, and studies such as Ben-David(1991) find strong effects of trade integration on

convergence.[16] Some studies claim to find similar effects on US state and Canadian provincial data [Barro, Coulombe]. Generally however there appears to be no strong case that greater labor mobility leads to faster rates of convergence in productivity. Hulten and Schwab (1993) in fact find the opposite for US states using as their indicator TFP levels. If economic growth is being driven by spillovers of knowledge and human capital, which are common rationales for expecting convergence, then it stands to reason that increased labor mobility ought to have some positive effects on these forces. A number of Brain-Drain models tend to have this effect. A Brain Drain actually leads to improved knowledge spillovers which tend to close the income gap.

5. The Brain Drain and Knowledge Transfers

The Canadian policy debate on North American labour migration has been almost exclusively focused on the Brain Drain from Canada to the United States of medical professionals, high tech professionals, business managers, and scientists and engineers. As is well known the numbers were initially small but have been growing. The extent to which the rapid increase in TN visas issued represent more permanent flows remains unresolved. The major concern is that the current flows represent the best and brightest of Canadians and there is some evidence this appears to be the case. There are three issues the Brain Drain debate raises with respect to common market like arrangements for labour. First, to what extent one country in a regional economic grouping is likely to be the location of most human capital intensive activities. Second, whether a common labor market would incrementally significantly contribute to additional skilled labor mobility. And third, what the broader growth consequences of these movements might be.

Human Capital Specialization and North American Integration

At the root of the brain drain debate lies the fear that Canada could conceivably lose most human capital intensive employment given a high level of mobility of highly skilled labour or human capital. In effect Canada could become specialized in sectors where human capital requirements are low. This may not lead to lower incomes but it might lead to substantially reduced employment opportunities for highly educated

16 These theories and evidence are reviewed in Harris(1995)/

Canadians. The situation in North America is one in which the U.S. continues to draw in large numbers of high ability individuals to study and pursue careers in Science and Engineering. Many of these choose to stay in the U.S. A National Science Foundation study notes that

> "Between 1988 and 1996, foreign students from major Asian and European countries, Canada, and Mexico earned over 55,000 U.S. S&E doctoral degrees (table 2). During this period, about 63percent of these doctoral recipients planned to remain in the United States after completion of their studies, and about 39 percent had firm plans to do so."
>
> Johnson and Regets (1998)

The same study reported the number of Canadians who intended to stay in the U.S. was 43%.

The earlier discussion on agglomeration and core-periphery development is relevant to these arguments. As noted there are a number of theoretical arguments which counter the hypothesis that one region (Canada) could become peripheral with respect to that activity in which agglomeration economies exist. Nevertheless the commonly cites agglomeration benefits associated with labour networking and the success of regional agglomerations such as Silicon valley are justifiable worries. In those models it is worth recalling there are at least three forces at work. One, the strength of the agglomeration effect (in those models it comes through increasing returns to scale effects), two the rapidity at which human capital moves relative to firms or capital relocation, and three the attachment of labour to its home location. With respect to the first, we have evidence that a number of Canadian high technology centers such as Kanata are succeeding. In addition Canadian cities are of sufficient economic diversity that there seem little prospect they are going to be de-industrialized. New forms of knowledge transfers via digital networks is increasingly replacing face-to-face contact. To that extent the stickiness of the locational preference of the people may be more relevant than higher wages abroad. On the second issue the worry is whether firms lead or follow human capital. If the firms move first, this creates a postive dynamic which tends to provide additional pull and push to human capital seeking to migrate. To the extent that Canada continues to provide a well trained pool of highly skilled labor this effect will be

mitigated but other factors such as taxes or currency issues are more likely to factor in firm location decisions between Canada and US. Attachment of people to their home locations depends on a host of factors, economic, social and cultural. Canada is certainly not disadvantaged in this respect anymore than any average U.S. state seeking to attract or keep people.

How Mobile is Highly Skilled Labour in North America ?

There is a general view that skilled labor is already very mobile across the Canada-US border and thus any further changes in labor mobility provisions are likely to have little effect. Perhaps the analogy most frequently made is between Brains and FDI. Both are regarded as highly desirable and in short supply. Competition for both these factors has meant they are in a sellers market and can choose their location. Moreover since both factors are viewed as engines of economic growth and employment there is considerable international tax competition to keep and attract these highly internationally mobile factors. The analogy is instructive and contains a lot of truth. Recent surveys report a very dramatic willingness of students in science , engineering and business to move to the United States for employment purposes.

> " The majority of respondents (78%) indicate that they are willing to relocate to the United States, and 88% are willing to relocate within Canada. Overall, only 12% of respondents indicate that they would NOT consider relocation."
> *Personnel Systems, Ottawa "Today's Technology Graduate: Mobile, In Demand & Demanding!, page 3.*

With respect to the Canadian situation it useful to remember that this vision has emerged out of a decade long economic boom in the United States coupled with some critical skilled labor shortages in the U.S. The expansion of the TN and H1-B visa program has to a considerable extent been an endogenous response to this boom. Tax competition between jurisdictions which lowers effective marginal rates on income earned by human capital can be viewed as an efficiency enhancing outcome of this process--but is it permanent?

A more cynical view of the situation is one 'Scientists and Engineers as Guest Workers'. Should a prolonged slump or oversupply of labor in these areas emerge cross border mobility may quickly dissipate. It is interesting for example that historically in

some engineering areas there was been little cross-border mobility between Canada and the U.S. in the 70's and 80's. Using immigration regulations as a sort of labor market tap is of course one of the conventional rationales behind immigration policy. A firm commitment to permanently increase mobility within a common market for labour is essentially another example of giving up some national sovereignty in favor of a more liberal regime. Exactly the same argument as was used in the case of removing the power to tax trade under the FTA. Canada has similar reasons to favor a more permanent labor mobility regime for human capital. Given the increasingly highly specialized nature of human capital it would substantially decrease the risk involved in for any Canadian resident undertaking the lengthy training in one of these areas by expanding their relevant job market. This would benefit not only Canadian suppliers of labour, but also the sectors providing that training and the economy at large. Second, there is always the risk that immigration controls, like tariffs, will be used as political devices for rent sharing and in highly unpredictable ways which may be detrimental to the smaller country.

Growth and Knowledge Transfers

The traditional argument about brain drain is that it leads to a transfer of scarce resources from one country to another and that, as a consequence, this transfer leads to a higher growth rate in the country benefiting from this inflow of talents relative to the growth rate in the other country. Part of the Canadian concern with allowing increased mobility of skilled labor is that the growth rate would fall in response to an out-migration of Brains. This argument which is commonplace has not gone unchallenged. There are in fact arguments whereby a brain drain could lead to faster growth in the country losing talented individuals that could attenuate or even reverse the other negative 'brain drain' effect on growth? Two arguments have been proposed in the literature and both are relevant to the current discussion. First, a brain drain may foster investments in human capital (see for instance Stark, Helmenstein and Prskawetz, 1998) and, second, brain drain could lead to higher growth rates through the transfer or the spillover of the knowledge generated by brain drain.

Consider the first argument. Assume that agents in a country are differentiated by skills. For any individual contemplating whether or not to migrate, income abroad is uncertain. Skilled individuals, whatever their skill level, can be highly successful abroad or not. They can also expect that their expected income abroad is increasing with their skill level; for instance that a higher skill level improves their chance of success abroad. Suppose now that skill level is a positive function of training and investments in human capital. An individual, taking into account the possibility of migrating and deciding (in an uncertain environment) which level of human capital to acquire, will want to invest more in human capital than someone not contemplating migrating. Simply, such an investment improves his/her possibility of success abroad. Of course, this additional investment in human capital also increases the probability that an individual actually migrates. However, not everybody will be migrating and, even among those who do, not everybody will be successful abroad and the unsuccessful ones may return to their country of origin. As a result, the average human capital may increase in the country even in the presence of brain drain. In addition, if these effects are strong enough, the growth rate may increase, not decrease (case of 'beneficial brain drain'). In a recent empirical paper using cross-section data for 37 developing countries, Beine, Docquier and Rapoport (2001) find that the possibility of a 'beneficial brain drain' growth effect may be more than a theoretical curiosity.

This effect applies to developed countries as well, at least in so far as investments in human capital are seen as a form of insurance (more than an income effect as in less developed countries). Simply, individuals, investing in human capital, keep their option open to be able to move abroad in case this possibility arises.[17]

Consider now the second argument and ignore the possible dependence between individual skills and investments in human capital. Skilled individuals may simply not be able to take advantage of their skills in one country but may have to migrate to another country to do so. In particular, skilled individuals may need other inputs not readily available in their country of origin, like capital, to innovate whether it is with respect to

---

17 The case of non-english speaking immigrants to Canada choosing to locate in English Canada rather than in Quebec in a very simple form of the same phenomenon: learning English gives more options, more potential mobility, than learning French.

new products, new processes of production or with respect to new knowledge. It is thus only by migrating that these individuals can create these new products, services or knowledge. In other words, it is efficient for the world if those skilled individuals migrate to the country where they can find the inputs that are complements to their skills. Provided imitation or spillover is feasible, the country subjected to brain drain may benefit from a higher growth rate with respect to the rate it would have if brain drain did not occur. In fact, it means that both countries (the country of emigration and of immigration) benefit from higher growth rates as compared to the rates without brain drain. The country of emigration may even benefit from a higher growth rate relative to other countries if we add network effects. Indeed, those skilled individuals having migrated know their country of origin better than outsiders. They are thus more able than others to channel the necessary foreign direct investments and other resources to take advantage of untapped human resources there. Recently it has been proposed on the basis of this argument that Brain Drain be replaced with the phrase Brain Circulation in reference to scientists in particular. The general idea that the creation of knowledge is increasingly a global industry with relatively rapid international spillovers is contrary to the conventional proprietary view of knowledge. Evidence such as the Coe-Helpman(1996) work on R&D spillovers confirms to a considerable extent this view of knowledge for a highly open economy such as Canada. They find that most TFP growth in Canada is in fact accounted for by world R&D spillovers, not domestically generated R&D.

6. New Forms of Labour Mobility

The TN visa program was a case of policy ahead of theory. The original motivation for the program was to allow business to provide customer and related technical support that is essential in the modern economy. Highly firm specific tacit knowledge can often only be transferred in close physical proximity to the customer. In addition activities such as sales, advertising and management of MNE subsidiaries often require repeated visits to the foreign market. The TN program was explicitly designed to facilitate these types of activities across NAFTA borders. The program evolved into much more than that, a form of temporary mobility for certain types of professionals, but

it stands as an important example of a successful policy designed to facilitate modern international business. The traditional economic approach to labour mobility has been to treat it in a comparative statics framework in which there is a migration decision by the individual involved reflecting a relatively permanent re-location of that person's place of residence and thus the location from which it delivers labour services. One can imagine other forms of delivery of labour services across borders other than those which reflect a migration decision. In this section we outline four types of 'delivery mechanisms' which involve a type of labour mobility which does not involve a permanent migration. In each case these are mechanisms which have been facilitated by new forms of technology both in transport and communications. They also reflect the judgement that close proximity of most Canadians to the Canada-U.S. border makes these type of delivery issues perhaps more relevant to this particular case than would be true in many other regional trade grouping.

Temporary Visits Associated with related Business Service Trade

As noted this type of program already exists in the form of the TN visa program. The motivation is to facilitate trade, and in particular those types of trade where close interaction with either the customer at the point of delivery, follow-up service related to previous sales, or preliminary interactions with customers prior to sale are an important aspect of the job. For many types of modern goods and services these activities are an essential part of business. In general NAFTA already provides a fairly high degree of mobility with respect to a lot of these activities. However improvements are possible particularly with respect to border procedures. One area where these impediments are most binding currently are in border communities. In these cases their is a potential for cross-border trade in a lot of services that would not be he case between communities at distances beyond a normal commuting distance. Some imagination is required as to how 'integration at the border' could be enhanced in areas such as Vancouver-Seattle and Windsor-Detroit.

At the moment the actual barriers often lie in labour market regulations and entry barriers that are not covered by trade agreements. Certain occupations, often unionized, are subject to entry restrictions which prohibit full temporary mobility. For example in

the film industry, which is important in most Canadian cities, certain types of jobs are subject to union membership restrictions. Similar restrictions also apply to Canadian wishing to work in California or New York. 'Deeper integration' which would facilitate temporary labour movements in these areas will require fairly major changes in the way in which some occupations are both organized and regulated. Other examples include pilots, certain types of health professionals, engineers, technicians, and construction trades.

There has been relatively little economic theory or measurement with respect to these type of labour movements. A major issue is the quantification of the welfare effects of facilitating this type of mobility. The general argument usually made is that these type of visits are complementary to trade and FDI. However there are other possibilities. In many cases the good delivered is a form of non-traded sold by a foreign based subsidiary of a Multinational. In these cases one could imagine that by facilitating this type of mobility the decision to produce and sell in the foreign market rather than export is made easier. At the margin therefore it is possible that in this sense trade and labour mobility of this form are substitutes in some sectors.

Virtual Mobility and E-Labour Markets

Innovations in communications technology such as the Internet and similar private data networks have given firms and individuals the ability to transmit large volumes of data instantly, and at close to zero marginal cost to other related parties any where in the world. This is an innovation which has already impacted on many forms of business and may soon begin to have similar effects in labor markets. There are indications this is already happening in areas such as the delivery of software coding and in call services centres. Its economic effects are many but one of relevance here is the ability to remove the barriers to delivery of particular types of services. In the international trade literature a common distinction is drawn between services and goods. For commodities with a sufficient degree of durability and transportability production can be divorced from consumption. Trade is realized by the transport of goods from the location of production to the location of consumption. Service transactions on the other hand are often characterized by the requirement that there be a coincidence in both time

and space of meeting buyers and sellers. Delivery of labour services have also traditionally been characterized by this requirement. As in the case of some business services, there are labour services which could in principle be subject to electronic delivery. This raises the prospect of a continental E-labour market for some types of labour services. Examples would include software engineering, data entry, translation services, and distance teaching.

As in the definition of any market the key issue is the degree of substitutability between alternative sources supply-in this case the virtual and the physical factor supply. Firms may seek to source labour via the Internet when it is technically possible and cost effective.

There is not yet a large economic literature on this subject but it is certain to grow in parallel to the emerging field of Internet economics. One issue related to the earlier discussion of agglomeration and regional development, is how E-labour markets within NAFTA would affect various regions. This problem has been treated theoretically in Harris(1998). The general fear that agglomeration might be biased against the smaller country is shown not to occur in this case. On the contrary in that paper it is shown that the emergence of an Internet for business labour services results in greater specialization by skilled labour in the integrating region as a whole, but a dramatic increase in market size for the specialized labour services provided by the smaller regions. Smaller regions sell more specialized labor services but to a much larger market with virtual labor market integration. The net welfare effect is postive and proportionately larger for the smaller region.

In a fully integrated, virtual labour market the country of location of the point of origin of the labor services should in principle not be a barrier to sourcing. Reducing the regulatory and trade barriers to firms and individuals in these type of virtual employment arrangements is necessary for a North American E-labour market to evolve. Most worker-firm relationships are heavily conditioned by local labor laws and various tax policies. It would be advantageous to create new forms of cross border worker-firm contractual relationships which would facilitate the Telemobility of labor services across the border. This would expand the NA market for virtual labor services, and potentially

increase employment of skilled labor in those regions where job growth has been but labor supply has been ample.

At the moment there are few restrictions beyond general labor market regulation on the development of E-labour market. However that situation could change. If Telemobility of labor services grows we can expect labor that is adversely affected to want restrictions on their competition. A NA integration program should at a minimum seek to preserve the rights of NA originating labor to deliver services digitally in any NA location from any other NA location when this is technically possible and economically desirable.

Cross-Border Labour Demand Variations

Regional labour markets and particular industries in particular regions are subject to shocks in demand and supply which are not correlated across regions or industries. The existence of these types of idiosyncratic risk has two implications . First, there is potential demand for insurance arrangements via which the income risk which results can be reduced. Second, there are efficiency gains to be had if labor can be moved from those locations where its' productivity is temporarily low to locations where it is high. Improvments in both objectives can be made if a least some labor is made locationally mobile. Greater specialization of labour has compounded the potential severity of this problem. Highly specialized talents are often in very inelastic supply in the short run. Allowing increased mobility for these type of people is particularly beneficial and in some cases critical. In the short run when regions lose people with these highly specialized skills to a foreign based demand there are obvious short run costs. However in the longer run the larger labour market available to specialized labor tends to reduce income variability and risks of employment in these occupations and thus increase the long run supply of individuals with these talents, ceteris paribus.

As discussed in section 7 regional mobility of labour even within existing common markets is quite low. The actual extent to which regional specific variations in labour demand could be facilitated by moving workers is an unresolved empirical question. Historically however Canada has had some large interprovincial labour flows in response to regional specific booms and busts. In principle there is no reason this

could not occur across borders. Canadian labor flows have historically been East-West, but the existence of a North-South option might change this pattern considerably. The closer proximity of northern U.S. states than distant Canadian provinces might lead to Canadians responding to local employment shocks by moving North-South. Likewise province specific booms might give rise to inflows of more closely available U.S. labour.

To the extent that workers choice set would expand this type of mobility would be an unambiguous welfare improvement and moreover would tend to raise expected output of the integrated industry as a whole relative to the situation without labour mobility. In modern terms the existence of labour mobility gives workers essentially a put option on local employment conditions. The option is only exercised should local employment conditions become sufficiently bad relative to conditions elsewhere. Competition amongst workers would raise the pattern of wages such that at the margin those who are mobile versus immobile would have the same levels of expected real income net of all expected costs of moving over a working life. Note that the welfare benefits of this type of mobility are particularly important for non-traded goods (for example construction or health care), where imports cannot provide an alternative source of supply. The welfare benefits of greater labour mobility include a more secure source of supply with more stable prices than would otherwise be the case, and these benefits accrue to local consumers.

Historically the type of workers who exhibit this type of temporary mobility within countries are younger workers, both skilled and unskilled. The costs to them of a temporary move, but which does involve the cost of re-location are much lower than for older workers and those with spouses who have jobs or dependents who are not mobile. The aging population in Canada implies that the potential supply of these type of workers available for interprovincial and intercity migrations is falling. While increased immigration targeted at young workers is one obvious response, another is to increase temporary cross border mobility of both skilled and unskilled workers from the U.S. A significant extension of the TN visa program to a wider range of occupations would be one possible response to this growing problem.

Seasonal Labour Demand and Supply

One of the most important differences between Canada and the United States is its weather. The Canadian winter is a reality most of us would like to forget in January and February. The Canadian winter affects both the supply of labour and demand in a large number of sectors. Currently beyond a few isolated professions, such as golf instructors and hockey players, there is little in the way of seasonally oriented North-South labor flows. There are however large number of climate motivated permanent moves. It is claimed there are over 2 million Canadians by birth, currently living in California. There is a very significant fraction of retired Canadians who winter in the southern US but they do not work and from a macroeconomic perspective contribute significantly to a et tourism deficit in the current account. The full extent of the snowbird migration seems to be unknown but one estimate put the number at about 1.5 million in 1997 and growing rapidly.[18] A full common market in labour services between Canada and the U.S. could change both of these situations, although the magnitudes remain unclear to us. Canadian winters would certainly induce a larger number of people who possess skills which are transportable to southern U.S. locations to make this seasonal move. Most of us in the education business for example already know of people who do this. Other occupationss such as the building trades, tourism, consultants of all types, health workers, and agricultural workers must all contain large numbers of people who could potentially benefit from opening up this type of mobility. In the case of retired Canadians while the issue is now almost never discussed, with the potential impact of an aging population on North American labour markets it may soon become one. If one policy response to aging is part time or temporary work by the aged then making this option available to retired Canadians spending the winter in the U.S. would be a highly significant and valuable option both to them and to Canada. Specific arrangements for these type of employment arrangements could be made in both countries so that unemployment or pension benefits for example were not portable across borders for workers past a certain age. This would serve to both increase the attractiveness of these people to potential employers, and to

---

18 See Canadian snowbirds face taxing plight. Financial Post. v.10(45) N 8/10'97 pg F7.

increase the likelihood of a postive decision to enter the labour force. For both countries the fiscal and real output benefits would be favorable.

MNE personnel

The last form of unconventional mobility is with respect to the personnel, particularly, management of multinational enterprises. In this area mobility is already very high and the number of transfers signifcant as discussed in section 2. In many respects this market is global in scope, and the mobility of management is on par with the mobility of the investment itself. One distinguishing characteristic of the personnel of these firms is the relatively short tenure of their foreign postings, and the frequency with which they are required to re-locate. One study (Solomon, 1998) found there had been a substantial increase in short term overseas assignments amongst MNE's largely to save costs, because of reluctance of people to move for longer periods, and to accommodate project specific tasks. Specialization of tasks within large organizations is a common theme in the human resources literature. A common market in North American labour would have little incremental impact with respect to this type of specialization, as mobility for the employees of these firms is already very high class of employment. The TN program together with continental free trade undoubtedly contributed towards greater task specialization within large MNE's. However with the organizational form of business shifts toward greater contracting out more formal arrangements to facilitate the temporary movement of personnel who are not at arms-length with the previous MNE will be increasingly useful and important.

7. Mobility and Adjustment

An alternative perspective on mobility is provided by the macroeconomic literature on regional adjustment mechanisms, and the related literature on the costs and benefits of optimal currency areas.[19] Within an integrated economic area within which factor mobility is high, factor flows are an important adjustment mechanism to asymmetric shocks across regions. Both macroeconomists and labor market economists

---

19 Most of the empirical literature on OCA and asymmetric shocks takes the state of labour mobility as fixed. The question in this section is how those adjustment costs would change if formal restrictions on cross-border flows were reduced. This may or may not result in increased labour mobility.

are often concerned with how wages, labour force participation, unemployment rates, and migration flows adjust to these shocks. In a cost-benefit analysis of more formal mechanism for labour mobility a principle benefit would be greater adjustment capacity of labour markets to regional macroeconomic shocks.

In principle adjustment is presumed to be more efficient and flexible the greater the response of wages and migration to a shock, as opposed to changes in unemployment or participation rates. This question is a central question in the empirical literature on adjustment mechanisms in Europe. With substantial wage and other forms of labour regulation in Europe the loss of exchange rate movements as an adjustment mechanism puts all the weight on the alternatives noted above. The general worry is that Europe's labour markets are relatively poor at adjusting and in particular labour mobility is quite low within Europe. The usual benchmark for comparison is the interregional migration of labour within the United States. Below we review some of the basic findings of this literature. It is important to note that this question is of interest independently of whether NAFTA countries were on flexible or some form of fixed exchange rate regime. Even under flexible rates increased cross border labour mobility would be a valuable adjustment mechanism.

As a benchmark we review what is known about interprovincial Canadian migration. Rosenbluth(1986) finds that interprovincial migration within Canada accounts for approximately 1% of the Canadian population each year. This is large relative to the annual change in population. In general, whenever there has been increases in provincial demand for labour, there has been an increase in in-migration and a decrease in out-migration. Morley Gunderson(1994) claims regional migration to be of greater significance to Canada than immigration from abroad: at the country level 2/3 of all migration is regional, ranging from 40% (Quebec) to 94% (NW and Yukon Territories) at the provincial level. The author cites two sources of barriers to labour mobility in Canada: natural/economic barriers (distance, and culture/language) and artificial barriers (professional/trade licensing, education/language requirements). Due to forces of global competition, free trade, technical change, and industrial restructuring, there is an increased importance to reduce these barriers in order to achieve efficient allocations of labour in order for Canada to be strong and competitive. Data for 1981 to

1986 are presented in Table 7.1 below (to be updated). Mobility tends to occur from low-wage, high unemployment regions to higher-wage low unemployment regions and is negatively affected by distance. Mobility tends to be higher among younger people, due to a longer benefit period from the move, less family disruption, and typically, lower forgone wages. The Atlantic and Prairie provinces are the main sources of out-migration, while Ontario and B.C. are the main destinations. Quebec mobility (in and out) is lower than most province, probably due to language/cultural differences.

Finnie(1999) updates some of this. He does an empirical analysis of interprovincial migration from 1982-1995. Consistent with the previous studies, the author finds that the largest number of people (measured as the percentage of their provincial population) move from the Atlantic and Prairie provinces to the larger, and nearby, provinces of Ontario, Quebec, and British Columbia. Overall, the annual out-migration rates for provinces as a whole held constant at 1.5% of the population from 1982-1983 through until 1988-1989, but this level had subsequently dropped to 1.2% in 1994-1995—all provinces fell except Newfoundland. Though this drop appears to be small, Finnie claims that this represents interprovincial migration rates shifting down structurally. Over the period of 1982-1995, 7.4% of the Canadian population were involved in interprovincial migration; these movers were classified in to three groups: single movers (4.5%), multiple movers (1%), and returnees (1.9%). Within each of these three categories, the Atlantic and Prairie provinces had the highest provincial rates in each. For 20-24 year old men, there is no pattern with respect to earnings. However, for older groups of men, multiple movers tended to have the highest initial incomes, followed by single movers and returnees. Unfortunately, there are no data available on education, occupation, etc. For women, movers are no typically concentrated among the high income earners. In fact, women typically lose out with respect to income.

Europe and US evidence

In considering how an integrated labour market in North American might adjust to macroeconomic shocks we might usefully examine look at the cases of the EU and the United States. Both have formal common labour markets with permanent labour

mobility rights for all workers. If Canada were to have an integrated labour market with the U.S. for example an obvious question is whether on a North-South basis the degree of labour mobility would converge towards U.S. levels or towards European levels. The difference is significant. The general view of European labour mobility is that in contrast to the US it is exceptionally low. The majority of studies find that migration within Europe is largely within European states. Migratory responses to labour market shocks are low, and are mainly accommodated by changes in the labour force participation rate. The lagged response of migration to changes in employment are exceptionally long. Decressin and Fatas(1995) for example find that there is a zero percent response after the first year. Two, three and four years after the employment shock the equivalent numbers are 27, 45, and 80 percent. These authors find in contrast using US state data that 52 percent of a shock in labour demand is accommodated by migration. Barro and Sali-Martin(1995) find similarly qualitative results for the US. Interesting they also find evidence that in Europe income differences seem to play a relatively minor role in explaining migration but more so in the U.S. A recent paper by Puhani(1999) looks specifically at France, Germany and Italy. In the case of Germany he finds that for a given decrease in unemployment, 29.6 percent of that decrease would be accommodated by an increase in migration over 1.66 years. The numbers for France and Italy are much lower--8.4 and 3.7 percent. He concludes labour mobility in an inconsequential adjustment mechanisms within Europe.

The contrast between the US and European experience carries mixed messages for the Canada-US case. Most labour market specialists view Canada as lying somewhere between the US and Europe in terms of our labour market adjustment mechanisms, and in our unemployment experience for example. This perspective would suggest that full Canada-U.S. labour mobility might serve to increase the macroeconomic adjustment capacity within Canada by more than has been observed in Europe under the EU, but less than has been the case in the U.S. An alternative perspective however is that these type of changes are very slow to evolve, involving fundamental changes in life experience and perspective of workers. It is worth recalling that historically there have been very large flows across the Canada-U.S. border. Under a more liberal migration regime, in particular with an elimination of uncertainty as to access rights, it is quite

possible the U.S. benchmark could prove more relevant, and macroeconomic adjustment would improved.

8. Conclusion: Policy Implications

This paper has examined the interactions between deeper North American economic integration and increased labour mobility between Canada and the United States. The paper has identified a number of potential channels through which increased labour mobility would affect the U.S. economy and some of the postive and normative implications. While NAFTA is still a long ways from a common market with permanently enshrined mobility rights for workers we have identified a number of factors which are pushing in that direction. There are implications for both future research and for policy.

Research Priorities

Labour mobility studies in both Canada and the United States remain largely national in scope. It is clear that we need additional quantitative work which would seek to identify the probable flows and their frequency in response to various shocks under a common labour market. In addition we need further work on issues such as firm location, patterns of comparative advantage, and productivity effects of a substantial liberalization of cross border labour flows. The NAFTA studies which focused on trade and investment liberalization did not identify the static nor dynamic efficiency gains to internal NA labor mobility--this remains a largely uncompleted task for general equilibrium modelers. Given the human capital intensity of New Economy this a potentially an important research issue and some of the recent work in Europe could be a useful starting point. In addition there is a need for research on the distributive consequences of greater labor mobility in Canada. Disaggregation by skill and/or occupation will be a necessary feature of this research program. A potential consequence of increased cross border movements are the knowledge spillovers that might result. While there is now an extensive literature on spillovers to R&D and aggregate human capital stocks. But we know relatively little as to how international labor flows contribute to knowledge spillovers and thus productivity gains. The quantification of this particular spillover channel is important in order to assess both costs and benefits of

greater labour market integration. On the human capital supply side there are concerns about opening the markets for Higher Education in Canada under NAFTA.[20] Many of these worries seem overdone, but a research piece on human capital supply mechansims, and some estimates of on how greater mobility might impact on private and social rates of return to human capital acquisition in Canada would be very useful.

Policy

There is admittedly little formal discussion of taking NAFTA towards a common labour market. However the 'bottom up' integration which is ongoing is giving rise to greater cross border labour flows and for demands to facilitate these flows.[21] Policy can either be in front or behind on this process. If Canada were to enter a formal agreement to open it's borders in some permanent way to free movement of NAFTA labour this would undoubtedly be seen as sacrificing national sovereignty. However as in other policy areas, before this option is rejected a more realistic assessment of its long term consequences should undertaken. It is possible that as in the case of freer trade in goods, the forces of integration and globalization will benefit those most who successfully adopt to the implied levels of greater mobility. For small countries in particular failure to do so, may imply a loss of both the investment and human capital to those jurisdictions who adapt more effectively.

Short of a common labour market the issues raised in the paper suggest a number of medium term policy options for Canada and the U.S. which would serve to enhance labour mobility in the northern part of the continent. In each case we would recommend a more serious examination of these options.

(1) The NAFTA TN visa program led to increased mobility for professionals, and basically anyone with a technical university degree. A useful approach would be to increase the scope of that program to other classes of labor by creating a negotiated schedule of dates for liberalizing the movements of various occupations. Generally one

---

20 There has been a number of concerns expressed about the impact of NAFTA on Canadian sovereignty in the areas of culture, water, health, environment, education and immigration.

21 For a discussion of the bottom up versus top down integration see Harris(2000a)

could imagine moving from the highest to the lowest skill categories. Certainly it would be relatively easy to extend the program to technical and trade workers for example.

(2) How can Canada-U.S. border procedures be amended such as to lower transactions costs to individuals seeking work in the other country? Would it be useful for Canada and the U.S. to coordinate border management with respect to non-NAFTA nationals.

(3) E-Labour Markets. Reducing barriers to firms in these type of virtual employment decisions should be a major objective. Most worker-firm relationships are heavily conditioned by local labor laws and various tax policies. It would be advantageous to create new forms of cross border worker-firm contractual relationships which would facilitate the Telemobility of labor services across the border. This would expand the NA market for virtual labor services, and potentially increase employment of skilled labor in those regions where job growth has been but labor supply has been ample.

At the moment there are few restrictions beyond general labor market regulation on this type of activity. However that situation could change. If Telemobility of labor services grows we can expect labor that is adversely affected to want restrictions on their competition. A NA integration program should at a minimum seek to preserve the rights of NA originating labor to deliver services digitally in any NA location from any other NA location when this is technically possible and economically desirable.

(4) Work on harmonization of professional and occupational standards, and the elimination of entry barriers such as residency prerequisites for licensing for occupation currently subject to these restrictions, should be initiated by a joint Canada-U.S. task force. This will require in many instances state-province cooperation. In some instances the standards issue could be dealt with by resort to a principle of Mutual Recognition, while in other instances a common Canada-US standard may be appropriate or necessary. These should be examined on a case by case basis.

References (incomplete)

Beine,Michel; Docquier, Frederic and Hillel Rapoport (2001), Brain Drain and Economic Growth: Theory and Evidence, *Journal-of-Development-Economics*, 64(1), 275-89.

Devoretz, Don (1998), Canadian Human Capital Transfers: The United States and Beyond, C.D. Howe Institute.

Faini, Ricardo, Jean-Marie Grether and Jaime de Melo (1999), Globalisation and Migration Pressures from Developing Countries: A Simulation Analysis, in Ricardo Faini, Jaime de Melo and Klaus Zimmermann (eds.), *Migration: The Controversies and the Evidence*, Cambridge University Press and CEPR.

Finnie, Ross (2001), The Brain Drain: Myth and Reality-What It is and What Should be done, Working Paper 13, School of Policy Studies, Queen's University.

Globerman, Steven (1999), Trade Liberalization and the Migration of Skilled Workers, Industry Canada.

Gould, David (1994), Immigration Links to the Home Country: Empirical Implications for US Bilateral Trade Flows, *Review of Economics and Statistics*, 76(2), 302-16.

Harris, R.G. (1996) "Evidence and Debate on Economic Integration and Economic Growth" pp. 119-155 in P. Howitt (ed.) *The Implications of Knowledge-Based Growth for Micro-Economic Policies* (Calgary University Press, Calgary), 1996.

Harris, R.G. (1999) "The Internet as a GPT: Factor Market Implications" chapter 6 in E. Helpman (ed.) *General Purpose Technologies* (M.I.T. Press, 1999)

Harris, R.G. (2000a)" North American Economic Integration: Issues and a Research Agenda", Industry Canada Discussion Paper No. , available at www. strategis.ca.

Harris, R.G.(2000b) "Is there a case for exchange rate induced productivity changes" Forthcoming volume edited by L. Schembri, Bank of Canada, Ottawa.

Head, Keith and John Ries (1998), Immigration and Trade Creation: Econometric Evidence from Canada, *Canadian Journal of Economics*, 47-62.

Head, Keith; John Ries and Don Wagner (1998), Immigrants and the Trade of Province, RIIM Working Paper 98-21, December, Vancouver.

Helliwell, John (2000), Checking the Brain Drain: Evidence and Implications, mimeo, UBC.

Jean M. Johnson and Mark C. Regets (1998) "International Mobility Of Scientists And Engineers To The United States: Brain Drain Or Brain Circulation?", ISSUE BRIEF NATIONAL SCIENCE FOUNDATION Directorate for Social,

Behavioral, and Economic Sciences Division of Science Resources Studies, Washington. D.C.

Krueger, Alan (2000), From Bismarck to Maastricht: The March to European Union and the Labor Compact, NBER Working Paper 7456, January.

Krugman, Paul (1991), Increasing Returns and Economic Geography, *Journal of Political Economy*, 99, 483-99.

LaFrance, R. and L. Schembri (2000) "The Exchange Rate, Productivity and the Standard of Living", *Bank of Canada Review*, Winter 1999-2000, pp. 17-28.

Ludema, Rodney and Ian Wooton (1999), Regional Integration, Trade and Migration: Are Demand Linkages Relevant for Europe? in Ricardo Faini, Jaime de Melo and Klaus Zimmermann (eds.), *Migration: The Controversies and the Evidence*, Cambridge University Press and CEPR.

Manasse, Paolo and Alessandro Turrini (2001), Trade, Wages and `Superstars', *Journal of International Economics*, 54, 97-117.

Markusen, James (1983), Factor Movements and Commodity Trade as Complements, *Journal of International Economics*, 14, 341-56.

Markusen, James and Jim Melvin (1981), Trade, Factor Prices and Gains from Trade with Increasing Returns to Scale, *Canadian Journal of Economics*, 14, 450-69.

Martin, Philip and J. Edward Taylor (1996), The Anatomy of a Migration Hump, in J.E. Taylor (Ed.), *Development Strategy, Employment and Migration,* OECD.

OECD (1998), *Trends in International Migration*, Annual Report, Paris.

Rosen, Sherwin (1981), The Economics of Superstars, *American Economic Review*, 71, 845-58.

Schwanen, Daniel (2000), Putting the Brain Drain in Context: Canada and the Global Competition for Scientists and Engineers, C.D. Howe Institute, Commentary.

Stark, Oded and John E. Taylor (1991), Migration Incentives, Migration Types: The Role of Relative Deprivation, *The Economic Journal*, 101, 1163-78.

Stark, Oded; Helmenstein, Christian; Alexia Prskawetz (1998), Human Capital Depletion, Human Capital Formation, and Migration: A Blessing or a "Curse"?, *Economics Letters*, 60(3), 363-67.

Straubhaar, T. (1988), International Labour Migration within a Common Market: Some Aspects of EC Experience, *Journal of Common Market Studies*, 27, 45-61.

Venables, Anthony (1999), Trade Liberalization and Factor Mobility: An Overview, in Ricardo Faini, Jaime de Melo and Klaus Zimmermann (eds.), *Migration: The Controversies and the Evidence*, Cambridge University Press and CEPR.

Table 2.1

Canadian Population and Growth Components

Period	Net Natural Increase	Immigration	Emigration[3]	Emigration / Immigration	Census Population at end of Period
1851-1861	611	352	170	0.48	3230
1861-1871	610	260	411	1.58	3689
1871-1881	690	350	404	1.15	4325
1881-1891	654	680	826	1.21	4833
1891-1901	668	250	380	1.52	5371
1901-1911	1025	1550	739	0.48	7207
1911-1921	1270	1400	1089	0.78	8788
1921-1931	1360	1200	971	0.81	10377
1931-1941	1222	149	241	1.62	11507
1941-1951[4]	1972	548	379	0.69	13648
1951-1956	1473	783	184	0.24	16081
1956-1961	1675	760	278	0.37	18238
1961-1966	1518	539	280	0.52	20015
1966-1971[5]	1090	890	427	0.48	21568
1971-1976[6]	931	1053	492	0.47	23518
1976-1981	977	771	366	0.47	24900
1981-1986	987	677	360	0.53	26204
1986-1991	987	1199	279	0.23	28111
1991-1996	908	1170	230	0.20	29959
Source: Helliwell(1999), Table 2.					

Table 2.2a:

Canadian born immigrants to the United States, 1951-1998

Years	Average Annual Flows ('000s)
1951-1960	N/a
1961-1970	41.3
1971-1980	17.0
1981-1990	15.7
1991-1996	16.2
1991-1998	14.06

Table 2.2b:

U.S. Immigration to Canada, 1961-2000

Years	Average Annual Flows ('000s)
1951-1960	10.1
1961-1970	16.7
1971-1980	17.9
1981-1990	7.9
1991-1994	7.1
1991-2000	6.05

Table 2:3

Flow of non-immigrant professional workers and their families to the United States

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
	Canada-U.S. Free Trade Agreement									
Professional Workers under FTA (TC)	2677	5293	8123	12531	16610					
Spouses and children of FTA workers	140	594	777	1271	2386	North American Free Trade Agreement				
Professional Workers under NAFTA (TN)						19806	23904	26987	N/a	59061
Spouses and children of FTA workers (TD						5535	7202	7694	N/a	17816

Table 2.4
Flow of Temporary Workers under the Canada-U.S. Free Trade Agreement and the North American Free Trade Agreement

Categories*	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Traders	24	18	11	3	5	6 (0)	7 (0)	5 (0)	6 (1)	5 (1)	11 (4)
Investors	27	27	28	29	16	12 (0)	22 (0)	11 (3)	18 (2)	22 (0)	14 (2)
Intracompany Tranferees	867	1,297	1,139	1,101	1,090	1,474 (7)	1,333 (15)	1,299 (15)	1,633 (25)	1,922 (42)	1,734 (44)
Professionals	1,741	2,756	3,466	3,673	4,348	5,109 (19)	5,082 (66)	6,240 (88)	7,572 (69)	8,502 (96)	7,331 (77)
Total	**2,659**	**4,098**	**4,644**	**4,806**	**5,459**	**6,601**	**6,444**	**7,555**	**9,229**	**10,451**	**9,090**

**Temporary workers who qualify in these categories are business persons who require an employment authorization but are exempt from labour market assessment (employment validation). Business Visitors are not included since an employment authorization is not required.*

Note: The numbers are based on persons not on employment authorization documents.The numbers in parentheses indicate those workers coming to Canada from Mexico.

Source: Unpublished data provided by Citizenship and Immigration Canada.

Table 3.1: Inflows of Foreign Population in Selected EU Countries

(in thousands)

Years	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Belgium										
Total	38.2	43.5	50.5	54.1	55.1	53	56	53.1	51.9	49.2
EU (%)	52	52	49	46	49	50	48	50	55	56
Denmark										
Total	n.a.	n.a.	15.1	17.5	16.9	15.4	15.6	33	24.7	n.a.
EU (%)[1]			15	15	16	20	24	13	16	
France										
Total[2]	44	53.2	102.4	109.9	116.6	99.2	69.3	56.7	55.6	80.9
EU (%)	n.a.	n.a.	11	11	22	15	16	14	13	8
Germany										
Total	648.6	770.8	842.4	920.5	1207.6	986.9	774	788.3	708	615.3
EU-15 %	22	18	17	16	12	14	20	23	24	25
Luxemb.										
Total	8.2	8.4	9.3	10	9.8	9.2	9.2	9.6	9.2	9.7
EU-15 %	85	82	82	78	72	77	77	73	n.a.	n.a.
Netherl.										
Total	58.3	65.4	81.3	84.3	83	87.6	68.4	67	77	76.7
EU-15 %	27	24	23	25	27	23	23	22	25	27
EU-6										
Total in % of pop.	.65	.8	.6	.59	.75	.62	.45	.45	n.a.	n.a.
EU migr. in % pop	.2	.21	.13	.12	.13	.11	.12	.13	n.a.	n.a.

1.Include Finland and Sweden from 1995; 2. From 1990, spouse of French nationals, parents of French children, refugees, self-employed and others eligible for a residence permit are also included.

Source: OECD (1998) and Krueger (2000).

Table 7.1

Domestic and International Migration, Canada 1981-1986

Province/Territory	Total Immigration	Numbers by Source		% by Source	
		Other Provinces	Other Countries	Other Provinces	Other Countries
Canada	1,388,395	924,495	463,900	66.6	33.4
NFLD.	18,765	17,090	1,675	91.1	8.9
P.E.I.	10,370	9480	890	91.4	8.6
N.S.	62,880	54,985	7,895	87.4	12.6
QUE.	139,350	66,915	72,435	48.0	52.0
ONT.	506,850	285,525	221,325	56.3	43.7
MAN.	75,995	56,680	19,315	74.6	25.4
SASK.	63,575	54,695	8,880	86.0	14.0
ALTA.	233,280	177,290	55,990	76.0	24.0
B.C.	221,290	151,680	69,610	68.5	31.5
Y.T.	4,900	4,620	280	94.3	5.7
N.W.T.	9,570	9,010	560	94.2	5.9

Source: Gunderson(1994), Table x.

Luncheon

Notes French Groves

Public did not demand globalization, but is now accepting as fact — to be as the norm

Based largely on Rethinking Work. — recently added QC's to Americans

from 'future shock' to "Luxophilia"

Canada-US Integration and Labour Market Outcomes: A Perspective within the General Context of Globalization

Paul Beaudry [1] and David A. Green [2 3]

Preliminary: June 2001

[1]University of British Columbia and C.I.A.R.
[2]University of British Columbia.
[3]

Abstract

This paper is based on the following three points. First, that one of the most important aspects of economic integration and globalization is to facilitate physical capital movements across borders. Second, that inflows of physical capital are, from both a theoretical and empirical perspective, likely to be particularly desirable in terms of labour market outcomes in the current technological environment. Third, that both Canada and the US are likely to continue being net demanders of capital on the international market and hence Canada cannot reasonably expect to generate substantial net inflows of capital from the US alone. Therefore, further economic integration with the US is likely to be beneficial for the Canadian labour market only if Canada manages to use it to leverage investment from third-party countries.

Paul Beaudry, Department of Economics, University of British Columbia, 997-1873 East Mall, Vancouver, B.C., Canada, V6T 1Z1 and NBER, beaudry@econ.ubc.ca.

David Green, Department of Economics, University of British Columbia, 997-1873 East Mall, Vancouver, B.C., Canada, V6T 1Z1 and NBER

1 Introduction

When thinking about further economic integration with the US, it is desirable to first step back and discuss the implications of integration quite broadly. In particular, we need to re-phrase a standard set of questions. For example, what are the margins most likely affected by economic integration when the countries involved are advanced industrialized countries? Is it a process which mainly favours the equalization of the price of goods and thereby country specialization? Or instead, is it mainly a process that favours the reallocation of factors across borders or , alternatively, the transmission of knowledge? Although the answers to these questions are highly controversial, we believe that it is necessary to take a stance on these issues.

In our view, which comes from studying labour market outcomes, the most relevant aspect of the current process of integration is the entire process by which the allocation of physical investment (and thereby allocation of production) across borders is facilitated. Accordingly, in this paper, we will address the link between Canada-US integration and labour market outcomes by emphasizing how facilitating investment flows (i.e. flows of physical capital) between Canada and the US is likely to affect labour market outcomes. In particular, we will address this issue in three steps. First, we will review theory and evidence regarding how movements in physical capital likely affect labour market outcomes in the current technological environment. Second, we will discuss the forces that affect the direction of physical capital movements across countries. Finally, we discuss whether or not further economic integration with the US is likely to favour Canada in terms of investment flows.

Before proceeding, let us briefly indicate why we believe that flows in physical capital are so important for a proper understanding of the current process of economic integration. First, at least among advanced industrialized countries, relative prices among traded goods are rather similar and, hence, it is unlikely that further economic integration can have large effects along this margin. Second, much of the

international finance literature, as for example reviewed in Obsfeld and Rogoff 2000, suggests that capital mobility across countries is still far from perfect. In particular, domestic savings and investment rates still appear tightly linked even among industrialized countries. Hence, this is a margin on which further integration can potentially have large effects. Third, in our own work (Beaudry & Green 1998,2000,2001), which examines labour market outcomes in the US, Canada, the UK and Germany in substantial detail, we found that differences in physical capital accumulation across these countries greatly affected labour market outcomes over the last twenty years. Hence, we think that capital flows are conceptually and empirically the most likely venue by which further economic integration among industrialized countries is likely to affect labour market outcomes.

The remaining sections of the paper are structured as follows. In section 2, we present a simple theoretical model to illustrate how capital flows can affect labour market outcomes. We take special care to discuss the effects of capital flows both in terms of the overall effect on wage levels as well as its distributional effect between more and less educated workers. Furthermore, we highlight how recent technological change may impact on this relationship. In section 3, we present international evidence regarding the effects of increases in physical capital on the wage structure. In section 4, we review the main determinants of international capital flows and we relate this discussion to the particular case of Canada-US integration. Note that this last section is more speculative as it reflects mainly conjectures and extrapolation from our research.

2 Capital Flows and Labour Market Outcomes: A simple theoretical framework

The object of this section is to illustrate how flows of physical capital likely affect labour market outcomes in a world with workers of different skill levels and where

technological choice is endogenous. To this end, consider a situation where there is only one produced good denoted by Y. [1] Furthermore, let there be three inputs: high skilled labour, denoted by H, low skilled labour, denoted by L, and physical capital, denoted by K. Since, for now, we are interested only in understanding the effects of exogenous change in K, we can adopt a simple static framework.

The labour supply decisions of workers are assumed to be given by the upward sloping functions $\psi^H(w^H)$ and $\psi^L(w^L)$, where w^H and w^L represent the wages paid to high and low skilled workers respectively. Without loss of generality, we can interpret these labour supply curves as wage bargaining curves and thereby alternatively interpret movements along these curves as generating either changes in participation or changes in involuntary unemployment. Without imposing any additional structure on the functioning of such an economy, a capital inflow can have one of four effects; (1) it can increase the wage and employment of high skilled workers, while reducing it for low skilled workers, (2) it can increase the wage and employment of lowed skill workers, while reducing it for high skilled workers, (3) it can increase the wage and employment of both type of workers, with the effect on wages being greatest for the high skill workers or (4) it can increase the wage and employment of both type of workers, with the effect on wages being greatest for the low skill workers. In order clarify which of these cases is most likely in the current technological environment, it is useful to consider an environment where there are two competing means of producing Y.[2] Using this framework, we will be able to highlight an important link between the nature of technological change and the effects of capital inflows on labour market outcomes. In particular, we will argue that the condition under which capital inflows are especially good in terms of labour market outcomes conform surprisingly well to many casual observation regarding the nature of recent technological change.

[1] The presence of only one produced good should be interpreted as the reduced form of a more general production structure where there is already perfect integration in the goods market.

[2] There is a growing literature which uses models of endogenous technological choice as a means of understanding recent technological change. For example, see Basu and Weil (1998), Caselli (1999), Zeira (1998).

Let us begin with the extreme case where firms can produce Y using either a traditional technology which requires only low skilled labour and capital, or a modern technology which requires high skilled labour and capital. These two production functions will be denoted by $F^T(L, K^T)$ and $F^M(H, K^M)$, where K^T and K^M are the amount of physical capital used respectively in the traditional and modern modes of production. Both these production functions are assumed to be convex and satisfy constant returns to scale. If we further assume that firms are price takers, then the general equilibrium determination of wages and employment for this economy is given by the solution to the following set of six equations, where we assume that capital is mobile in the sense of being efficiently allocated between the two different modes of production. [3]

$$w^L = \frac{\partial F^T(L, K^T)}{\partial L} \qquad (1)$$

$$w^H = \frac{\partial F^M(H, K^M)}{\partial H} \qquad (2)$$

$$\frac{\partial F^T(H, K^T)}{\partial K} = \frac{\partial F^M(H, K^M)}{\partial K}, \qquad (3)$$

$$K^T + K^M = K \qquad (4)$$

$$H = \psi^H(w^H), \quad (5) \qquad L = \psi^L(w^L) \quad (6)$$

Equations (1) and (2) represent the marginal product conditions that implicitly

[3] It is simple to extend our analysis to the case where the two modes of production use the different types of physical capital. For example, if one dollar of capital inflow can buy either one unit of traditional capital or θ units of the new capital, then our analysis carries through by replacing equation (4) with $K^T + \frac{K^M}{\theta} = K$.

define demand for high and low skilled workers. Equation (3) represents the marginal product condition which determines the allocation of capital between the modes of production. Finally, Equation (4), (5) and (6) guaranty that the total demand of factors is equal to the total supply.

Based on this simple set up, we can ask how an inflow of physical capital would affects wages and employment. In other words, we can perform the compartive static exercise associated with increasing K. Note that an increase in K is meant to capture the idea of a reduction in a barrier to the free international movement of capital. As can be easily verified using Equations (1)-(6), an increase in total capital will unambiguously cause an increase in both wages and both employment levels, regardless of the precise forms of $F^T(\cdot)$ and $F^M(\cdot)$. In particular, this implies that an increase in physical capital does not in this case cause either types of labour to be displaced by physical capital. Hence, in this set-up, an increase in physical capital would be highly desirable.

An obvious question that emerges from this simple exercise relates to the generality of the result than an increase in physical capital is likely to improve labour market outcomes of both high and low skilled workers. The analyses in Beaudry and Green (1998,2000) provide insight into this issue. In particular, these papers illustrate simple conditions for which an increase in physical capital will cause such beneficial effects. The first condition is that the economy is in a technological transition, which means that the economy is in the process of adopting a new method of production but has not yet entirely abandoned the more traditional mode of production. Secondly, the new method of production must be skill biased relative to the more traditional mode of production, that is, the main characteristic of the new method of production must be that is uses skilled labour more intensively than the traditional mode of production. Under these two conditions, an inflow of physical capital will necessarily cause wages and employment of both types of labour to increase. Obviously, the above example satisfies this latter condition since it corresponds to an extreme case of skill biasedness

where the modern form of production does not use any low skill labour.

The reason we consider this theoretical discussion useful is that it links the discussion of technological change with the discussion of the effects of capital flows on labour market outcomes. In particular, the two conditions which assure that an increase in physical capital has very desirable labour market outcomes conform surprising well to the type of technological transition that many believe has been taking place in industrialized economies. For example, there is a huge literature which suggests that over the last 20-25 years, the economy has been moving away from the more traditional forms of work organisation based on a hierarchical and centralized system, towards a more decentralized and autonomous system of work organisation. Moreover, one of the main properties of this new form of work organisation has been its emphasis on and need for highly educated worker. Hence, at least on a priori grounds, it appears reasonable to think that an inflow of physical capital is likely, in our current technological environment, to generate very desirable labour market outcomes.

There is one additional element that is important to discuss within this framework and this regards the effects of an increase in physical capital on wage inequality, i.e., the effect of an inflow of physical capital on the ratio of low to high skilled wages. In particular, the previous discussion argues that in the current technological environment, an inflow of physical capital is likely to increase both w^H and w^L; however, this does not tell us how it affects the ratio of the two. To derive conditions associated with this question, it is helpful to maintain the view that the economy is in a technological transition. This allows the derivation of simple conditions regarding whether an inflow of physical capital likely generates a decrease or an increase in wage inequality. As it turns out (see Beaudry & Green (1998,2000) for details), the relevant condition relates to whether the new mode of production uses physical capital more or less efficiently than the more traditional mode of production. In particular, if the new mode of production uses less physical capital per unit of output than the more traditional mode of production, then an inflow of physical capital will causes a

decrease in the ratio of high to low skilled wages.

In order to understand this possibility more clearly, it is useful to consider a specific example. For this case, let us maintain the assumption that the modern mode of production only uses highly skilled labour and capital, while the traditional mode uses only less skilled labour and capital. Furthermore, to assure that wages can be expressed as an explicit function of aggregate capital, let us choose particular functional forms for these production functions and let us assume that labour supply is inelastic. In particular, the production function for the traditional mode of production can be set as a Lieontief, $F^T(L, K^T) = Min[L, K^t]$, while the modern form of production is set to be a Cobb-Douglas with $F^M(L, K^M) = (HK^M)^{.5}$. Finally, we will assume that the capital labour ratio in the economy $(\frac{K}{H+L})$ is greater than one to assure that factor prices are always positive. Under these assumptions, the wages of high skilled and low skilled labour can be solved explicitly as given by Equation (7) and (8).

$$w^H = 1 - (\frac{H}{K-L})^{.5} \qquad (7)$$

$$w^L = (\frac{K-L}{H})^{.5} \qquad (8)$$

As can be seen from Equations (7) and (8), both w^L and w^H are increasing functions of capital. Moreover, it can be easily verified that an increase in K can simultaneously lead to a decrease in the ratio of high to low skilled wages (as long as the stock of capital is not too great $(K < 4S + U)$). Our interest in this example is that it illustrates a clear case where, during a technological transition, an increase in physical capital is desirable for both the wage growth and inequality. Hence, in this example, an inflow of capital could be viewed a silver bullet in terms of labour market outcomes. Obviously, we do not think that the real economy is as simple as this example. Nevertheless, the example illustrates why capital inflows may be par-

ticularly desirable when an economy is witnessing a technological transition toward a skill-biased and capital efficient production process, and therefore if such a pattern is observed it should not come at too much of a surprise. In fact, if observed, such a pattern may reasonably interpreted as suggesting that the economy has been witnessing a technological transition towards a skill-biased and capital efficient technology.

3 International Evidence of the Effect of Physical Capital Accumulation on the Wage Structure

3.1 Empirical Framework

The model described in the section 2 sets out the theoretical result that in an economy transiting between two competing technologies, an increased supply of physical capital leads to higher wages and employment for both low skilled and high skilled workers. Further, under the condition of relative capital efficiency of the new technology, an increased supply of physical capital will generate a reduction in the differential between high and low skilled wages. Our goal in this section of the paper is to examine evidence for whether this model provides a relevant depiction of the recent evolution of wage and employment in industrialized economies. To the extent that it does, the model can be used as a basis for discussing labour market implication of North American integration. We will first summarize our previous investigations of the implications of this theoretical model carried out using Canadian, American and German data. We will then provide new evidence on long term movements in capital use, wages and employment incorporating combined data from these three countries and the UK. It is worth emphasizing that both in our earlier papers and in the work presented here, we focus on international comparisons to examine the theory. This stems from our belief that cross-country variation is essential in investigating macro level issues such as the impacts of technical change and aggregate capital movements

on wage and employment levels.

3.2 Framework with Inelastic Labour Supply

We begin by deriving an empirical specification that allows for an exploration of the theoretical results of the previous section. As a first step, we will assume that both high and low skilled labour is inelastically supplied. This both makes the intuition clearer and provides a direct link to our earlier studies where results were derived in this context. In the next subsection, we extend the framework to allow for labour supply responses to wage changes.

In order to understand the empirical implications of the theoretical framework from the previous section, it is useful to define the economy's aggregate production function, denoted by $F(L, H, K)$, as:

$$F(L, H, K) = \max_{L^T, L^M, H^T, H^M, K^T, K^M} F^T(L^T, H^T, K^T) + F^M(L^M, H^M, K^M)$$

subject to

$$L^T + L^M = L, \quad H^T + H^M = H, \quad K^T + K^M = K$$

where L, H and K are the total amounts of unskilled labour, skilled labour and physical capital in use in the economy. In the last section, we considered a special case in which,

$$F^T(L^T, H^T, K^T) = F^T(L, K^T)$$

and

$$F^T(L^M, H^M, K^M) = F^M(H, K^M)$$

that is, where the traditional technology uses only unskilled labour and capital while the modern technology uses only skilled labour and capital. This specification is useful for gaining intuition but we do not need to be as restricted as this to obtain our results.

Using this aggregate production function, we can derive expressions for the wages in a competitive equilibrium, assuming for the moment that the supplies of L and H are inelastic. These are simply the marginal product conditions associated with L and H. Using a log-linear approximation, these can be expressed as:

$$\log(w_t^H) \approx \alpha_0 + \alpha_1 \log(\frac{H_t}{K_t}) + \alpha_2 \log(\frac{L_t}{K_t}), \quad (9)$$

$$\log(w_t^L) \approx \beta_0 + \beta_1 \log(\frac{L_t}{K_t}) + \beta_2 \log(\frac{H_t}{K_t}), \quad (10)$$

where, we exploit the property of homogeneity of degree zero implied by the assumption that the underlying production functions, and hence the aggregate production function, exhibit constant returns to scale. We can easily extend this framework to allow for the ongoing, exogenous technical change. To do this, they rewrite the aggregate production function as:

$$Y_t = F(\theta_t^L L_t, \theta_t^H H_t, K_t)$$

where θ^L and θ^H are unskilled and skilled factor augmenting terms, respectively.

In this framework, exogenous technological change appears as movements in θ^L and θ^H. Earlier work on movements in skill differentials in earnings assume that growth in θ^H has been greater than growth in θ^L, resulting in an increase in demand for skilled relative to unskilled workers (Katz and Murphy(1992), Murphy, Riddell and Romer(1998)).[4] Therefore, we would like to allow for the possibility of factor augmenting technical change as an additional force affecting labour market outcomes. Recall that in the context of our model, labour market outcomes are explained by firms endogenously choosing between the modern and traditional technologies. However, within this framework, there can also be ongoing, factor augmenting technical change within each of the two dominant technologies. In empirical investigations of our model, we therefore want to control for any such incremental change in order to better isolate the effects of capital accumulation on labour maket ouitcomes.

On means of controlling for ongoing technical change is by relating θ^L and θ^H to movements in Total Factor Productivity(TFP). As shown in eaudry & Green (1998), this leads to the following equations for skilled and unskilled wages.

$$\log(w_t^H) = \alpha_0 + \alpha_1 \log(\frac{H_t}{K_t}) + \alpha_2 \log(\frac{L_t}{K_t}) + \alpha_3 TFP_t + \epsilon_t^H, \quad (11)$$

$$\log(w_t^L) = \beta_0 + \beta_1 \log(\frac{L_t}{K_t}) + \beta_2 \log(\frac{H_t}{K_t}) + beta_3)\ TFP_t + \epsilon_t^L, \quad (12)$$

where ϵ_t^L and ϵ_t^H are approximation errors that are assumed to be uncorrelated with other variables and TFP_t is the log of total factor productivity. [5]

[4] In Beaudry and Green(2000a), we have argued that this explanation does not fit the Canadian data very well.

[5] In Beaudry and Green(1998)'s derivation, α_3 is a function of α_1, α_2, a parameter capturing the degree of skill biasedness of technical change, and factor income shares. The coefficient β_3 is defined in a similar manner. The equation is estimated by nonlinear least squares. Here we consider the less efficient, though still consistent approach, in which we do not impose the restrictions on α_3 and β_3 derived in our earlier paper.

In the previous section, we argued that it may be appropriate to consider the current economic situtation as one where we are gradually, and endogenously adopting a skill biased and potantially capital efficinet technology. However, whether this is an accurate depiction of the actual economy must ultimately be determined by comparing predictions from the model to data. We are particularly interested in this discussion in the prediction that, given this structure for the economy, an increase in K will lead to increases in both w^H and w^L. In terms of the estimating equations derived above, we can state this in the form of an hypothesis about the values of the parameters:

Hypothesis 1: If the economy is transiting towards a predominantly skill biaseed technology, then an increase in K will lead to increases in both w^H and w^L, which implies that $\alpha_1 + \alpha_2 < 0$ and $\beta_1 + \beta_2 < 0$.

Under this set of assumptions, the model also implies that an increase in the price of one of the two factors leads to a decrease in the price of the other, which is to say that L and H are q-substitutes. This, too, can be stated in terms of an explicit hypothesis about values of wage equation parameters.

Hypothesis 2: If the economy is transiting towards a predominantly skill biased technology, then L and H are q-substitutes, implying that $\alpha_2 < 0$ and $\beta_2 < 0$.

If we go further and add the assumption discussed in the previous section that the modern technology is more capital efficient, then we get the further implication that an increase in K leads to a decrease in the difference between skilled and unskilled wages.

Hypothesis 3: If the economy is transiting towards a skill biased and capital efficient technology, then an increase in capital leads to an decrease in the skill-wage differential, implying $\alpha_1 + \alpha_2 - \beta_1 - \beta_2 > 0$

Note that by framing the discussion in terms of the aggregate production function,

both the wage equation estimation and the hypotheses are written in terms of the aggregate factor usage in the economy, not in terms of the amounts of each factor used explicitly with each technology. This is important because we view the competing technologies as general purpose technologies which can be applied in a wide variety of production processes. This is turn means that the different technologies are being applied within the same industries and thus identifying factor allocation across technologies in standard datasets is difficult.

3.3 Previous Empirical Work with this Framework

In this subsection, we consider evidence from our previous studies using this framework. In focussing on our own papers, we are not claiming that there have not been other insightful papers on the issues we are considering. However, we are most familiar with our own papers and we know of few other recent papers which consider the impact of K on the wage structure.

Beaudry and Green(1998) use data from the Canadian Surveys of Consumer Finances (SCF) and the American Current Population Surveys (CPS) for available years between 1971 and 1995 in combination with capital and TFP series to test Hypotheses 1-3 along with other implications of the endogenous technological choice model. In their preferred specification, with the degree of skill biasedness of any exogenous technical change being estimated from the data, they obtain estimates of α_1, α_2, β_1, and β_2, all of which are negative and all of which except β_1 are statistically significantly different from zero at conventional significance levels. This implies that both Hypothesis 1 and Hypothesis 2 cannot be rejected using US and Canadian data over an extended time period. In testing Hypothesis 3, the authors find that the sum of coefficients set out in the hypothesis is positive, as posited, but is not well defined relative to its standard error. These results stand up to a barrage of robustness checks, including instrumental variables estimation and using Canadian data on its own. The

instrumental variables estimation is particularly important in our context since in the previous section we explicitly assume that supplies of L and H are functions of wages in the economy, making them endogenous variables. Beaudry and Green(1998) use demographic variables as instruments, taking advantage of the fact that much of the increase in H observed in the data occurs because of the large and relatively well educated baby boom generation moving into the labour force, not because successive generations entering the labour force in their sample period increased their education levels.

The results from the Beaudry and Green(1998) analysis have several important implications for our discussion. First, the results that K increases both high and low skilled wages and that H and L are q-substitutes are ratifications of important implications of our two technology, endogenous choice model. The fact that they cannot be rejected in North American data supports our claim that this model provides a useful lens for examining issues related to capital movements, technical change and the labour market. Second, their estimates point to quite substantial impacts from increased capital flows on wages. A 1generate a 1.2sizes of these impacts is then the source of the result that increases in K lead to a reduction in the skill differential. Thus, increases in K generate both high wage levels and lower skill differentials, as claimed in our theoretical derivation in the previous section.

One interesting implication from the Beaudry and Green(1998) results is that increases in H and increases in K have offsetting impacts on the wage structure. Thus, because H and L are q- substitutes, an increase in H will lead to a decrease in the wages of low skilled workers. It will also lead to a decrease in high skilled wages because of a standard own-price effect. Given the assumptions stated to this point (that both technologies are in use, that there are three factors of production, that the modern technology is defined by being relatively skill biased, and that the modern technology is more capital efficient) plus the assumption that the modern technology

exhibits capital skill complementarity relative to the traditional technology [6], Beaudry and Green(1998) also show that educational policies that increase H while decreasing L lead to an increase in the wage-skill differential. Therefore, the impacts of increases in H (i.e., falling wages and increasing skill differentials) are the opposite of those from increasing K (i.e., rising wages and decreasing skill differentials). This raises the possibility of the existence of a balanced path for accumulation of K and H: a path for jointly accumulating H and K along which both wage levels and skill differentials would not change. Beaudry and Green(2000b), using a somewhat different though strongly related model to the one presented here, show that in a model with two competing technologies and three factors of production, such a balanced path must exist. Further, they show that the existence of a balanced path implies very tight restrictions on parameters in wage regressions (the counterparts of the α's and β's above). They test these restrictions using data from the US and Germany and cannot reject them in any specification of their estimating equations. This provides strong support for the appropriateness of the model we use as the basis of our discussion in this paper.

Beaudry and Green(2000b) also use this model as the basis for explaining the radically different evolutions of US and European wages over the last two decades. The US wage distribution has been characterized by large declines in real wages for the least skilled, virtually unchanged real wages for the most skilled, and sharply rising wage differentials. In contrast, the German wage distribution over the last two decades has been characterized by rising real wages for workers at all skill levels and no increase in skill differentials. Beaudry and Green(2000b) explain this difference as arising from the different accumulation paths for K/L and H/L in the two countries. In particular, they argue that Germany has operated near the balanced path, accumulating K/L and H/L in balance, while the US has accumulated H/L at the same rate as Germany

[6] Capital skill complementarity in this context refers to relative factor intensities in the competing technologies. In particular, it means that the modern technology is more intensive in both its use of K and of H than the traditional technology.

but has greatly under-accumulated K/L. In the model developed here, the under-accumulation of K/L in the US means that there is not enough capital per worker to both service the expansion of the modern sector generated by the increased human capital and provide capital to maintain the marginal product (and hence, wages) of the low skilled workers in the traditional sector. Thus, the accumulation of H/L without a large enough accumulation of K/L to match has implied an increase in capital scarcity in the US that has meant both falling real wages for most workers and increases in the skill differentials. Beaudry and Green(2000b) show that this explanation has strong support in the US and German data. This characterization of the US as an essentially capital starved economy and the consequences in terms of falling real wages and increased inequality will be important for our discussion of the implications of North American integration in the next section.

3.4 Framework with Elastic Labour Supply

We now turn to our more general framework, allowing labour supply responses to wage movements. The results in the previous subsection allowed us to consider the impact of increased capital flows on wages but not on employment, which was assumed to be fixed. For the purposes of our empirical work, we will consider revised versions of equations (5) and (6) which include population as well as the wage as determinants of the labour supplies. This will allow us to normalize for country size in the ensuing regressions. With elastic labour supply and these adjustments, the only exogenous variables in our system are K and population (P). Thus, we can derive reduced form equations expressing high and low skilled wages and employment as functions of K and P. To do this, let us first create log linear approximations to the labour supply equations, (5) and (6),

$$\log(H_t) \approx \phi_0^H + \phi_1^H \log(w_t^H) + \log(P_t), \quad (13)$$

$$\log(L_t) \approx \phi_0^L + \phi_1^L \log(w_t^L) + \log(P_t), \quad (14)$$

We can then substitute expressions (13) and (14) into the marginal product conditions, (9) and (10). Rationalizing terms leads to reduced form equations for w_t^H and w_t^L :

$$\log(w_t^H) = \gamma_0^H + \gamma_1^H \log(\frac{K_t}{P_t}) + u_t^H, \quad (15)$$

$$\log(w_t^L) = \gamma_0^L + \gamma_1^L \log(\frac{K_t}{P_t}) + u_t^L, \quad (16)$$

where u_t^H and u_t^L are approximation errors that are assumed to independent of K_t. The parameters, $\gamma_0^H, \gamma_1^H, \gamma_0^L, \gamma_1^L$, are functions of the parameters in equations (9), (10), (13) and (14). Examining these functions, one finds that γ_1^H and γ_1^L are both positive if: 1) ϕ_1^H and ϕ_1^L are both positive and 2) the economy is transiting towards a predominantly skilled-biased technology (implying that $\alpha_1, \alpha_2, \beta_1$ and β_2 are all negative). Thus, as long as the assumptions of the last section hold and that the economy is not operating on backward bending portions of the aggregate labour supply curves, an increase in K_t causes an increase in the equilibrium wages for both low and high skilled workers. Whether these assumptions match reality must be determined by examining the data. In particular, we are unsure whether it is reasonable to assume that the economies we study are not on a backward bending portion of the relevant aggregate labour supply curves. The claim that our earlier assumptions hold is supported in the results in Beaudry and Green(1998, 2000b). The results in those papers obtained using instrumental variables methods are particularly interesting in this regard because they are consistent even under the assumption of elastic labour supply made in this section. In particular, viewed in light of the more general model discussed in this subsection, the estimating equations in those papers

are structural equations with endogenous variables on the right hand side.

To obtain reduced form expressions for employment, we can substitute equations (15) and (16) into equations (13) and (14). This yields,

$$\log(\frac{H_t}{P_t}) = \delta_0^H + \delta_1^H \log(\frac{K_t}{P_t}) + v_t^H, \quad (17)$$

$$\log(\frac{L_t}{P_t}) = \delta_0^L + \delta_1^L \log(\frac{K_t}{P_t}) + v_t^L, \quad (18)$$

Given the assumptions that ϕ^H and phi^L are positive, the assumptions implying that increases in K_t lead to increases in wages will also imply that increases in K_t lead to increases in employment levels for both types of workers.

In the next subsection, we will estimate versions of equations (15) - (18) using data from Canada, the US, the UK and Germany. We will thereby examine whether the outcomes in these four countries confirm to the above hypotheses. More specifically, we will assume that all for countries share similar parameter valuse in order to allow us to pool the data and use cross-country variation to identify the effects of factor supplies. However, we will allow for the wage and employment levels to differ across countries, i.e., allow $\gamma_0^H, \gamma_0^L, \delta_0^H, and \delta_0^L$ to differ by country (i.e., we allow for country fixed effects). This allows for the possibility not only of persistent differences in wage and employment levels across countries but also for persistent differences in the returns to skills.

Since the the types of forces we interested in (the impacts of capital movements and technological change on the labour market) are long term phenomena, it is necessary to estimate these effects using low frequency or long term variation. Therefore, we will estimate the equations in difference form, using data from the start and end of available data periods for each country. Differencing in this way will eliminate

the country specific intercept terms. We will effectively identify the parameters of interest (the coefficients on $\frac{K_t}{P_t}$) in each equation by comparing differences in (per capita) capital growth rates to differences in growth rates in wages and employment across countries. We again do not want to confuse estimated capital effects with effects of incremental technical change. Hence, we can again extend the above equations as to incorporate terms representing exogenous technical change. We then can allow for the impacts of such technical change in our estimation in two ways. First, we can assume that it takes the form of an arbitrary time effect. This time effect will be captured by the intercept coefficient in our differenced estimation framework. Note that without such a time effect, there would not be an intercept term. Second, we include differenced, country specific TFP the differenced regressions, using observed TFP as an additional control for how much incremental technical change any given country has experienced.

3.5 Data

We examine the implications of our theory using data on Canada, the US, the UK and Germany. These countries have exhibited widely different patterns in wage and employment outcomes as well as growth in the capital stock. In this sense, they provide useful variation for identifying the key parameters in the equations above. In all four countries, we choose a time span from approximately the late 1970s to the latest data to which we have access. For Canada, this means data running from 1979 to 1995. For the US, it means data from 1979 to 1996. For the UK, our data runs from 1979 to 1996, and for Germany from 1983 to 1996.

We obtain relevant data (hourly wages, education levels, gender, etc) for the US from the Panel Study on Income Dynamics (PSID) and for Germany from the German Socio-Economic Panel (GSOEP). Both are panel datasets in which a set of families and their off-shoots are followed across time. We make use of an Equivalence File

constructed by GSOEP researchers which provides comparable data constructs from the PSID and the GSOEP. [7] The PSID data in the equivalence file is available from 1979 to 1996, while the GSOEP data is available from 1983 to 1996. In all our samples we make use of weights presented in the publicly available data in order to overcome the fact that the sampling schemes are not completely representative. When we refer to Germany, we actually mean the former West Germany. The panel data we use follows a sample of families from that area. We use capital stocks and TFP figures that are relevant only for the former West Germany.

The UK data we use comes from General Household Survey (GHS) for the years 1979 to 1996. [8] The GHS is a representative survey of individuals in England, Scotland and Wales. It is based on a survey of between ten and twelve thousand households per year and is conducted continuously throughout the year. Information is collected on personal demographic and labour market data for a respondent with some added information on the head of household and spouse. However, education data, which is central to our analysis, is collected only for the main respondent and so we focus on their data. For Canada, we use data from Surveys of Consumer. Like the GHS, this is a large, cross-sectional survey with no panel component.

For all four countries, we use data for all individuals between the ages of 16 and 65. Our wage measure for the US, the UK and Germany is the hourly wage. This is constructed by dividing total annual labour earnings by annual hours of work as reported in the Equivalence File for the US and Germany. For the UK it is constructed using annual earnings, weeks worked and usual hours per week variables [9] The Canadian data does not include information on hours worked per week that can be matched consistently with the weeks worked in the survey year so we are

[7] These files are constructed and maintained by the German Institute for Economic Research, The Department of Policy Analysis and Management at Cornell University, and the University of Michigan.

[8] We thank David Card for helping us get access to the GHS data.

[9] In the GHS before 1982, usual hours are divided into regular and overtime hours. Plots of the data suggest to us that the best match to the post-1982 GHS data is created by using only regular time hours before 1982.

forced to use weekly wages. We assume that the over time patterns in real weekly wage growth will mirror those in real hourly wages for Canada. The fact that we use weekly wages in Canada but hourly wages in the other countries means that average wages will by definition be of larger size in Canada. This difference will be absorbed in the country specific intercepts in the wage equations, which in turn are eliminated in the differencing. All the constructed wages are deflated using country specific GDP deflators. We also use data from the US Current Population Survey (CPS) which matches the Canadian SCF relatively closely. Like the SCF, the CPS is a representative cross-sectional survey. Using the CPS, we construct a weekly wage measure and employment measures in weeks to match the SCF. We estimate separate regressions using the CPS and PSID data for the US in order to see whether bringing in weeks based data for Canada is likely to create problems.

A potential concern in discussing wage-education profiles for these four countries is the comparability of years of education measures across datasets. For the US, the years of education measure is based on an answer to a question about the highest number of years of schooling completed. For West Germany, years of education is a constructed variable based on norms for various reported completed levels of education. The years of schooling variable in the Equivalent File contains an attempt to generate a measure that is comparable to the US measure and includes attempts to account for educational contributions from apprenticeship programmes. For the UK we use Schmidt(1995)'s generated variable which essentially equals the age the individual left full-time education minus 5. For Canada, education is reported in categories for highest level of education attained (e.g., public school, some high school, completed high school, etc.). We assume that the some or completed high school category that is available in most years for the SCF is equivalent to 12 years of education in the other data sets and that completing a BA is equivalent to 16 years of education. While these are attempts to generate comparable education measures, the results are undoubtedly not perfectly comparable. However, we analyse within country patterns separately, effectively allowing for different wage levels and educa-

tion differentials across countries. Our key assumption is that we can meaningfully compare time patterns in wage levels and wage-education differentials across countries even if we do not regard comparisons of the levels in a given year as necessarily informative.

We divide the labour force into low and high skilled in a manner taken originally from Katz and Murphy(1992) but now quite common in the large literature examining movements in wage structures. Thus, low skilled workers are taken to be those with 12 or fewer years of education (or with a completed high school or less education in data where education is not reported in years) while high skilled workers are taken to be those with 16 or more years of education (or with a completed BA or more in data where education is not reported in years). Hours or weeks of work for those with an intermediate number of years of education are partitioned between the low and high skilled categories according to the division rule from Katz and Murphy(1992) (i.e., 0.69 are assigned to low skilled and 0.29 are assigned to high skilled). In Beaudry and Green(1998) we experimented with various other divisions of this middle category for the US and Canada but found that within a limited, reasonable range, these variations have limited effects on conclusions. While we use all workers to compute total hours or weeks of employment in each skill group, we use only average wages for males with less than five years of experience to construct our wage series. More specifically, we use the average wage for males with 12 or fewer years of education in a year to construct the low skilled wage and the average wage for males with 16 or more years of education to construct the high skilled wage. All wages are deflated using country specific GDP price deflators. We focus on younger workers because we believe that movements related to technological impacts are hidden by institutional impacts for older workers. In a paper examining the Canadian wage-age relationship, we argue that wages for older workers follow patterns that suggest that an implicit contract type framework is relevant (Beaudry, Green and Townsend(2001)). We focus on males in order to avoid difficulties relating to compositional changes associated with changes in female labour force participation. We view the resulting wage series as wage indices

for the economy.

Finally, our TFP and capital series are all taken from Jorgensen and Yip (1998) and cover the period 1975-95. The attractive feature of the Jorgensen and Yip data is that it has been constructed to provide internationally comparable capital stocks for the G7 countries, with special attention to quality improvements in physical capital and labour.

3.6 Estimation Results

As a first step, in Table 1 we present the long differences for important variables from our data. The table reveals some striking differences and similarities across countries. For example, the first row shows the annualized growth rate of the capital stock by country. The capital stocks grow at remarkably similar rates across the four countries in our time period. However, population grows quite differently across the countries, with the result that K/P grows substantially faster in the UK and Germany than in the US and Canada. According to our model, this means there is more capital per worker available in the UK and Germany to support the expansion of the modern sector without the need to substantially reduce investment in the traditional, lower skill, sector. The wage series show patterns familiar to students of international movements in wage structure. Both Canada and the US experienced substantial declines in the real wages of low skilled workers in this period while high skilled workers in those countries faced rather flat real wage trends. In contrast, both high skilled and low skilled wages rose in the UK and Germany and at nearly equal rates in each case. It is these stark differences which make comparisons across the four countries interesting. We wish to argue that technological forces as large as those being proposed here ought to operate in essentially the same manner across developed countries. Confronting the model with data from countries with such different experiences puts this claim, and the model, to a tough test. Finally, all four

countries are characterized by very high rates of growth of high skilled employment with essentially unchanged low skilled employment.

We begin our analysis of the data in Table 2 by estimating equations (9) and (10) using the data described in the earlier section. We report results using both the PSID and the CPS based US data. These results are given in columns 1 and 2 of Table 2. We should emphasize that we have purposefully chosen to only focus on long differences in this paper. We follow this route because we believe that the issues we are attempting to study are essentially long term phenomena. Estimating using annual data (or, more to the point, using first differenced annual data as is commonly done in the wage structure literature) would emphasize high frequency variation which is of less interest to the issue at hand. What this means for the results we are presenting is that we have a just identified specification or have very few degrees of freedom. Obviously, this affects the way we interpret the entries in the following tables. We view the entries of our Tables as essential summarizing a case study of four countries. As is common with case studies, there is not a sufficient number of degree of freedom for statistical inference since the issue is just identifies or near just-identification. Hence, we do not report standard errors since they, given our approach, they do not always exist.

10

The first column of Table 2 reports the effects of long term movements in $\frac{H}{K}$ and $\frac{L}{K}$ on the long term movements in the average skilled and unskilled wages. The results

[10] In particular, in these tables we attempt to portray the long term relationships among the variables of interest in as simple a way as possible. If the measure we wished to examine was just a ratio of differences in variables then we would just plot that ratio. However, we are interested in partial derivative effects, which require some extra calculation. If we had only two countries in our sample then we would simply calculate the partial derivative effects of interest from equations (9) and (10). This would yield a unique set of effects. With three countries, we could bring in TFP measures and calculate the partial derivatives from equations (11) and (12) - again obtaining a unique set of partial derivatives. With four countries, there are multiple ways to make these same calculations and we view the OLS approach we take as one way of constructing single calculated derivatives. We highlight this interpretation by not presenting standard errors associated with the derivatives.

mirror those from Beaudry and Green(1998), with all four partial derivatives being negative. As discussed earlier, this implies that Hypothesis 1 (that increases in K lead to increases in both w^H and w^L) cannot be rejected. The fact that the effects of $\frac{H}{K}$ on w^L and of $\frac{L}{K}$ on w^H are both negative mean that L and H are q-substitutes (Hypothesis 2): a key implication of the assumed form of our theoretical model that we have been discussing. In addition, the condition that K effects are larger for w^L than w^H, spelled out in Hypothesis 3, is met, implying that increasing K decreases skill differentials. Overall, the results indicate that long term patterns in four quite different developed countries fit with the implications of the theoretical model set out earlier. In particular, these results imply that increasing K both increases wage levels for workers of different skill types and decreases skill differentials. Further, as Beaudry and Green(2000) argue, it suggests that accumulation of H without balancing accumulations of K will lead to falling real wages for all skill types and increasing skill differentials.

In columns 2 and 3 of Table 2 we perform two robustness checks on the column 1 results. In column 2, we re-estimate equations (9) and (10) but substitute the US CPS based data for the US PSID based data. As described earlier, the CPS based data is similar in form to the Canadian SCF data while the US PSID data is similar to the German GSOEP data. However, Table 1 suggests that the basic data patterns in the CPS and PSID data are very similar. Thus, it is no surprise that using CPS data instead of PSID data does not change the conclusions from column 1: the calculated derivatives are again all negative and of a similar order of magnitude to those in column 1. In column 3, we return to using the dataset including the PSID based US data. In Column (3) we allow for arbitary time trend in both wage equations. Finally in Column (4) we further add country specific changes in TFP as a proxy for ongoing technical change. In both cases, the coefficients on $\frac{H}{K}$ and $\frac{L}{K}$ maintain the same sign pattern as in column 1, and in effect become even more negative suggesting an even greater positive effect of capital on wages. Thus, our main conclusions are not altered by introducing time trends or TFP growth as additional controls.

In Table 3, we present estimates of Equations (15)-(16). In all remaning cases, we use the PSID based data for the US, but the nature of the results do not change if we use the CPS data. In Column (1), we do not control for the possibility of factor augmenting technological change, while in Columns (3) and (4) we control for such effects by introducing a time trend and allowing for differences in measured TFP. As can be seen, the estimates are senstive to whether or not we include a control for factor augmenting technological change. In particular, in the absence of such a control (Column (1)), we find suport for the view that capital accumulation increases the wages of more skilled labour, but we do not observe such effects for the wages of the low skill. However, once we control for the possibility that factor augmenting technological change, we again find the pattern observed in Table 2. In particular, capital is observed to positively effect on both high and low skilled wages, with the effect on low skilled wages being the greatest.

Overall, the combination of the different types of wage regressions performed here and the results of our earlier work generally support the theoretical structure set out in the first sections of the paper. It is somewhat remarkable that such a simple story nicely summarizes the long run patterns data drawn from countries with such different experiences. The key implication of the results for our purposes here is that increases in K, holding either the workforce or the population constant, have positive impacts on both unskilled and skilled wages. Further, the impact on unskilled wages is larger, with the resulting implication that increases in K also reduce skill differentials and thus help to reduce inequality.

Table 4 contains the reduced form estimation results relating to employment, that is, estimates of Equations (17) and (18) in long difference form.. The implications from the employment regressions are somewhat less clear cut than those from the wage regressions. In column 1 of Table 3, we adopt the specification in which the dependent variables is either high or low wage employment growth relative to population growth. We regress this on the difference between capital growth and population growth.

Putting everything in per capita terms in this way allows us to focus on capital effects on the employment rate. The results indicate that increases in capital per capita increase employment rates of high skilled workers but reduce employment rates for the low skilled. The specification in column 2 is the same as that in column 1 but includes a time trend to pick up factor augmenting technological change effects. Once this time trend is added, capital per capita has nearly identical, positive impacts on H and L. Note that the time trend in the quantity equations should pick up the general trends towards a more educated work force. In column 3, we add TFP growth to the regressions since TFP growth can effect labour supply indirectly through its effect on wages. Here, the results indicate, as in Column (2), that increases in capital increase the per-capita employment of both H and L.[11] Although we are much let confident in the results presented in Table 4, we nevertheless beleive they nicely complement an overall picture suggesting that capital accumulation appears to favor extremly desirable labour market outcomes.

4 Discussion of the Role of US-Canada Integration in Increasing Capital Flows to Canada

Our discussions in Section 2 and 3 suggest that in the current environment, for both theorectical and empirical reasons, positive capital inflows into a country are likely to induce desirable labour market outcomes. Hence, given the focus of this conference, the key question remaining is whether further economic integration between Canada and the US is likely to generate increased capital flows to Canada. In order to address this issue, it is useful to begin by reviewing the main determinants of capital flows

[11]Notice that we derived these implications in a model in which H and L supply depended only upon their own wages plus population. That is, we assumed there was a set pool of each type of worker and that any labour supply effects related to the extent to which that pool participated in the labour market. Alternatively, we could consider a model in which the supplies of H and L also respond to the ratio of high to low skilled wages as some individuals alter their education plans in response to long term movements in the wage differential. Plots of graduation rates by cohort in Beaudry and Green(1998) suggest this type of adjustment plays only a minor role for Canada and the US over this period.

between countries and then discuss them within the context of US-Canada integration.

4.1 The Determinants of International Capital Flows

Open economy macroeconomic theory identifies many factors that influence international capital flows. For example, if we adopt the standard neo-classical growth model as our point of reference, there are at least three elements that potentially affect international capital flows. These elements are: differences in national savings rates, differences in population growth rates and differences in initial levels of income per capital. The reason these elements affect capital flows is that they each affect the returns to capital in the absence of economic integration. Hence, if a country has a low propensity to save, a high population growth or a low initial capital stock, it should attract capital from other countries since the return to capital is likely to be high in the domestic country. Obviously, such movements in capital respond to financial returns net of tax and therefore differences in the taxation of business income will also influence international capital flows.

One element not emphasized in the traditional international finance literature is the role of skill, or education, in affecting capital flows. Since we have been emphasizing the importance of taking into account the different skill levels in the population, we need to clarify how skill, or education, may affect capital flows. In general, it is difficult to say whether a more educated population is likely to attract a greater inflow of capital (given a fixed national savings rate). The reason being that education could in principle be either a complement or a substitute to physical capital. However, much evidence suggests that education is likely to be complementary to physical capital (see for example Goldin & Katz (1998)) and therefore it probably more reasonable to think that, ceteris paribus, an increase in education likely favours capital inflows.[12]

[12]As shown in Beaudry & Green (1998,2000), the empirical observations of the type presented in Section

In brief, there are many elements specific to a country that would lead it to want a high degree of international integration in order to attract international capital. In particular, if the country has a relatively low savings rate, a highly educated population or a high rate of population growth, then it has an tincentive to facilitate international capital flows as a means of improving labour market outcomes within its domestic economy.

4.2 Canada-US and the Global context

If we look at Canada and the US is isolation, it is difficult to predict how further US-Canada Integration is likely to affect capital flows. The reasons being that both countries have rather high and similar rates of population growth, low levels of savings and have now almost converged in terms of patterns of education among new cohorts. In this sense, both are countries that are likely net demanders of capital on the world market; but which is the strongest demander between the two is unclear. In effect, the slightly higher rates of population growth in Canada may at first pass suggest that Canada may be in more need of increased capital inflows that the US, but difference in savings rates could easily offset this difference.

Notwithstanding these macroeconomic aspects, there are nevertheless margins where integration may help capital to flow more freely from the US toward Canada. A standard claim in the popular press is that Canada has an underdeveloped venture capital market relative to the US. In general, Canada's relative difficulty is argued to arise because of economy of scale conditions in the venture capital market. In the US, with a much larger flow of new investment each year, venture capital firms can afford to specialize in one niche in the market. This includes keeping their own stable of experts who can evaluate new applications. In Canada, in contrast, firms need to

3 supports the view that an increase in skill increases the return to capital, and hence would favour a capital inflow in an open economy context.

diversify their effort and, it is argued, have difficulty in identifying new opportunities. In this context, better access to American venture capital markets may bring more capital funds for start up firms into Canada. For this argument to hold true, of course, one needs to provide an explanation for why US venture capital firms do not currently take advantage of the plums arguably being left unpicked in Canada. Knowing what barriers exist is then a necessary first step to determining whether any particular integration scheme will yield benefits. Even if such potential benefits do exist, however, it is not clear that they are sufficiently large to have a very big impact on total capital formation in Canada. This is particularly true if one acknowledges that integration may improve access to US venture capital funds but is unlikely by itself to generate perfect access.

Instead of looking at Canada and the US in isolation, we need to consider how Canada-US integration is likely to affect capital flows from the rest of the world (i.e. Japan and Europe). Note that relative to Europe and Japan, North America is likely to continue to be a net demander of international capital since it has a higher rate of population growth and a lower rate of savings. As discussed earlier, our work on Germany and the US supports a claim that the main source of the difference in the evolution of the wage structures between the two countries is differences in accumulation of capital per worker. The two countries accumulated human capital at similar rates over the last 20 years but the US lagged well behind Germany in terms of accumulation of capital per unit of labour. Then, in our model, as both economies move toward larger shares of production in the modern sector, Germany is able to achieve the technological transition while taking less capital out of the hands of low skilled workers. Thus, the German wage structure is characterized by rising real wages while the US wage structure is characterized by falling real wages, particularly for the least skilled. The key question about integration then becomes whether focussing on ties with an economy which appears to need more capital itself will help Canada in its attempt to avoid the falling real wage, rising inequality outcomes of the US. Is it reasonable to expect that by reducing investment barriers between Canada and

the US, Canada will end up with a larger share of the total investment pie in North America? Alternatively, is there a reason to believe that such integration will lead to greater investment in Canada from economies other than the US? Could further integration of the goods market generate a desire on the part of foreign investors to build plants in Canada in order to access the US market? If so, why would these same foreign investors not just invest directly in the US? We have no evidence to bring to bear to answer these questions but they do point towards where to look for an answer about the benefits of greater integration with the US. Such integration may be useful if Canada can figure out a way to use it to increase investment in Canada from non-US investors. Whether there is a way to design integration measures to accomplish this is beyond the scope of this paper.

5 Conclusion

In this paper, we attempt to examine the ramifications of further North American integration by focussing on the implications of increased capital flows for labour market outcomes in Canada. We argue that it is in the area of capital flows that integration may be able to make the greatest difference. In order to consider this question, we first describe and attempt to establish the credibility of a model of labour market outcomes in an era of technological change. We argue that in such an era, capital growth is particularly important. In our model, technological change occurs endogenously through firms choosing between two existing technologies, a traditional and a modern technology. We argue that the data fits with the claim that the last 20 years can be characterized as a transition period away from a traditional, hierarchical type of production technology toward a modern, more flexible technology. In that context, greater capital flows make it possible to move capital into the expanding modern sector without taking as much out of the hands of less skilled workers in the traditional sector. As a result, increased capital flows lead to high real wages

and smaller increases in the wage-skill differential. We argue, further, that the US and Canada have both under-accumulated capital per worker relative to European economies and have paid the price in terms of falling real wages and increased inequality. Thus, North American integration would be a process of further tying one economy with high net capital demands (and the troublesome labour market outcomes that follow from that) to another. It is unclear why one would expect further integrating Canadian and American capital markets would lead to an increase in the amount of capital flowing from the US to Canada. The flow could just as easily go the other way. Put another way, can we hope to avoid problems of falling real wages and increased inequality by integrating with an economy that itself is having those problems? The answer may be yes if further North American integration can lead to increased investment flows into Canada from non-US sources. The challenge is to decide whether integration will have that effect.

Table 1: Annualized Growth Rates in Key Variables

	UK 1979-96	US - PSID 1979-96	US - CPS 1979-95	Germany 1983-96	Canada 1979-95
K	.028	.025	.025	.029	.026
$\frac{K}{P}$	.026	.015	.015	.023	.014
w^H	.0068	.0047	.0067	.010	-.0027
w^L	.0046	-.014	-.0090	.013	-.018
H	.047	.034	.041	.035	.054
L	-.00086	.0084	.0090	.0016	-.0022

Table 2: Long Difference Estimates of Wage Equations

	1	2	3	4
High Skill				
$\frac{H}{K}$	-.59	-.37	-.58	-1.00
$\frac{L}{K}$	-.54	-.44	-.46	-.65
Trend	-	-	.002	.009
TFP	-	-		-1.54
Low Skill				
$\frac{H}{K}$	-1.31	-1.36	-1.46	-2.31
$\frac{L}{K}$	-.72	-.86	-2.35	-2.73
Trend	-	-	-.040	-.026
TFP	-	-	-	-3.04

Columns (1), (2) and (3) report estimates of Equations (9) and (10) based on data from four countries (UK, USA, Canada, Germany) in long-differenece form. Column (4) reports estimates of Equation (11) and (12). In Columns (1), (3) and (4), the US wage and hours data is drawn from the PSID, while Column (2) is based on CPS data. Specification (3) is the same as (1) and (2) but includes an intercept to control for the possibility of an unspecified common time trend. Specification (4) is the same as (3) but includes growth in measured total factor productivity as an additional control for arbitary factor augmenting technological change. Note that in Column (4), the model is just identified. All specifications allow for country fixed effects.

Table 3: Long Difference Estimates of Wage Equations (15) and (16)

	1	2	3
High Skill			
$\frac{K}{P}$	.27	.69	.60
Trend	-	-.009	-.011
TFP	-		1.12
Low Skill			
$\frac{K}{P}$	-.03	2.26	2.08
Trend	-	-.05	-.05
TFP	-	-	2.24

Table 3 reports estimates of Equations (15) and (16) based on data from four countries (UK, USA, Canada, Germany) in long-differenece form. In Columns (1), (3) and (4), the US wage and hours data is drawn from the PSID, while Column (2) is based on CPS data. Specification (3) is the same as (1) and (2) but includes an intercept to control for the possibility of an unspecified common time trend. Specification (4) is the same as (3) but includes growth in measured total factor productivity as an additional control for arbitary factor augmenting technological change. All specifications allow for country fixed effects.

Table 4: Lomg Difference Estimates of Employment Equations

	1	2	3
High Skill			
$\frac{K}{P}$	1.71	.52	.76
Trend	-	.025	.031
TFP	-		-3.09
Low Skill			
$\frac{K}{P}$	-.25	.49	.43
Trend	-	-.015	-.017
TFP	-	-	.68

Table 3 reports estimates of Employment Equations based on data from four countries (UK, USA, Canada, Germany) in long-differenece form. In all specifications, population growth rates are subtracted from employment growth rates to form the dependent variable and from capital growth rates to form the independent variable. In Columns (1), (3) and (4), the US wage and hours data is drawn from the PSID, while Column (2) is based on CPS data. Specification (3) is the same as (1) and (2) but includes an intercept to control for the possibility of an unspecified common time trend. Specification (4) is the same as (3) but includes growth in measured total factor productivity as an additional control for arbitary factor augmenting technological change. In all specifications, population growth rates are subtracted from employment growth rates to form the dependent variable and from capital growth rates to form the independent variable. All specifications allow for country fixed effects.

References

1. Basu, Susanto and David Weil *Appropriate Technology and Growth*, Quarterly Journal of Economics, 113(4), November 1998: 1025-54.

2. Paul Beaudry and David Green, *What is Driving US and Canadian Wages: Endogenous Technical Change or Endogenous Choice of Technique?*, N.B.E.R. working Paper 6853, December 1998.

3. Paul Beaudry and David A. Green, *The Changing Structure of Wages in the US and Germany: What Explains the Difference?*, N.B.E.R. working Paper 7697, May 2000.

4. Paul Beaudry and David A. Green, *Cohort Patterns in Canadian Earnings: Assessing the Role of Skill Premia in Inequality Trends*, Canadian Journal of Economics, November 2000.

5. Francesco Caselli, *Technological Revolutions*, American Economic Review, March 1999, 78-102.

6. Goldin, Claudia and Laurence Katz, *The Origins of Technology-Skill Complementarity*, Quarterly Journal of Economics 113, 1998, 693-732.

7. Daniel Hammermesh, *Labour Demand*, Princeton, New Jersey: Princeton University Press, 1993.

8. Dale W. Jorgenson and Eric Yip *Whatever Happened to Productivity Growth*, mimeo Harvard University, June 1999.

9. Obstfeld, Maurice and Kenneth Rogoff, *The Six Major Puzzles in International Macroeconomics: Is Ther a Common Cause*, NBER Macroeconomics Annual 2000, Ben Bernanke and Kenneth Rogoff (eds).

   bibitemmurph:c98 Kevin M. Murphy, W. Craig Riddell, and Paul M. Romer, *Wages, Skills and Technology in the United States and Canada*, NBER working paper no. 6638 (1998).

10. Zeira, Joseph, *Workers, Machines and Economic Growth*, Quarterly Journal of Economics, 113(4), 1998, 1091-1118.

Notes

Table 1a

Illustrative Calculations of Effective Tax Rates (%), University Graduates, Canada, 2000

Sex and Age	Quantile	E*s	ms	mw	Case I ETR	Case II ETR	Case III ETR	Case IV ETR
Males, 23	25	$26,000	0.249	0.249	0.0	7.4	-2.4	-7.1
	50	34,476	0.254	0.331	10.3	15.8	8.7	6.1
	75	43,000	0.275	0.331	7.8	13.2	6.8	4.3
	90	58,000	0.302	0.331	4.2	9.1	3.8	1.7
Females, 23	25	22,000	0.249	0.249	0.0	8.3	-2.7	-8.3
	50	28,000	0.265	0.249	0.0	7.0	-2.2	-6.7
	75	36,608	0.261	0.331	9.5	15.0	8.1	5.5
	90	42,185	0.276	0.331	7.6	13.1	6.5	4.2
Males, 33	25	34,338	0.254	0.331	10.4	15.9	8.8	6.2
	50	43,004	0.276	0.331	7.6	13.1	6.5	4.2
	75	55,000	0.298	0.331	4.7	9.7	4.3	2.1
	90	70,475	0.315	0.4174	15.0	18.9	14.9	13.6

Notes: E*s = Full-time full-year earnings.
ms = Tax rate on forgone earnings.
mw = Tax rate on earnings increment due to o
Case I: No direct costs, no tax credit, no loans.
Case II: Direct costs = $5,500; no tax credit, no loans.
Case III: Direct costs = $5,500; Tuition and Education Amount Credit; no loans.
Case IV: Directs costs = $5,500; Tuition and Education Amount Credits; Student loan = $2,500.

Source: Authors' calculations. See text for details.

Table 10
Davis/Mallis

Table 1b

Illustrative Calculations of Effective Tax Rates (%), University Graduates, U.S., 2000

Sex and Age	Quantile	E*s	ms	mw	Case I ETR	Case II ETR	Case III ETR	Case IV ETR
Males, 23	25	$20,000	0.132	0.137	0.6	5.8	-2.3	-7.0
	50	28,985	0.137	0.137	0.0	4.3	-2.1	-5.5
	75	38,000	0.137	0.137	0.0	3.5	-1.7	-4.3
	90	48,000	0.160	0.263	12.3	15.3	11.5	10.5
Females, 23	25	18,000	0.124	0.137	1.6	6.6	-1.8	-6.8
	50	25,000	0.137	0.137	0.0	4.7	-2.3	-6.2
	75	32,155	0.137	0.137	0.0	4.0	-1.9	-5.0
	90	41,289	0.137	0.232	11	13.9	9.6	8.5
Males, 33	25	31,000	0.137	0.137	0.0	4.1	-2.0	-5.1
	50	42,000	0.137	0.254	13.5	16.3	12.2	11.3
	75	60,000	0.193	0.263	8.7	12	8.5	7.4
	90	79,130	0.225	0.263	4.9	8.2	5.3	4.0

Notes:
E*s = Full-time full-year earnings.
ms = Tax rate on forgone earnings.
mw = Tax rate on earnings increment due to
Case I: No direct costs, no tax credit, no loans.
Case II: Direct costs = $7,500; no tax credit, no loans.
Case III: Direct costs = $7,500; Tuition Credit; no loans.
Case IV: Directs costs = $7,500; Tuition Credit; Student loan = $4,000.

Source: Authors' calculations. See text for details.

Table 2a

Illustrative Calculations of Effective Tax Rates (%), CPP and Sales Tax Effects, University Graduates, Canada, 2000

Sex and Age	Quantile	E*s	Case I ETR with CPP	Case IV ETR with CPP	Case I ETR with CPP and Sales Taxes	Case IV ETR with CPP and Sales Taxes
Males, 23	25	$26,000	0.0	-6.2	0.0	-1.8
	50	34,476	10.4	6.9	12.8	12.7
	75	43,000	3.4	0.0	4.2	3.7
	90	58,000	1.6	-0.9	1.9	1.6
Females, 23	25	22,000	0.0	-7.1	0.0	-2.0
	50	28,000	0.0	-5.8	0.0	1.8
	75	36,608	5.9	2.3	7.4	6.9
	90	42,185	3.3	0.0	4.1	3.6
Males, 33	25	34,338	10.7	7.2	13.2	13.1
	50	43,004	3.3	0.0	4.1	3.6
	75	55,000	1.8	-0.8	2.3	1.6
	90	70,475	13.5	12.2	16.9	17.3

Notes: E*s = Full-time full-year earnings.
ms = Tax rate on forgone earnings.
mw = Tax rate on earnings increment due to on
Case I: No direct costs, no tax credit, no loans.
Case IV: Directs costs = $5,500; Tuition and Education Amount Credits; Student loan = $2,500.
CPP: Rate = 3.9% on earnings between $3,500 and $37,600.
Sales Tax: Rate = 13.4%

Source: Authors' calculations. See text for details.

Table 2b

Illustrative Calculations of Effective Tax Rates (%), CPP and Sales Tax Effects, University Graduates, United States, 2000

Sex and Age	Quantile	E*s	Case I ETR with Social Security	Case IV ETR with Social Security	Case I ETR with Soc. Sec. and Sales Taxes	Case IV ETR with Soc. Sec. and Sales Taxes
Males, 23	25	$20,000	0.7	-4.2	0.7	-1.1
	50	28,985	0.0	-3.6	0.0	-1.6
	75	38,000	0.0	-2.9	0.0	-1.3
	90	48,000	13.2	12.7	14.3	15.0
Females, 23	25	18,000	1.7	-3.6	1.8	-0.2
	50	25,000	0.0	-4.0	0.0	-1.7
	75	32,155	0.0	-3.3	0.0	-1.5
	90	41,289	11.9	10.6	12.8	13.0
Males, 33	25	31,000	0.0	-3.4	0.0	-1.5
	50	42,000	14.6	13.7	15.7	16.2
	75	60,000	9.4	9.1	10.2	11.0
	90	79,130	-2.9	-3.5	-3.2	-2.8

Notes: E*s = Full-time full-year earnings.
ms = Tax rate on forgone earnings.
mw = Tax rate on earnings increment due to one y
Case I: No direct costs, no tax credit, no loans.
Case IV: Directs costs = $7,500; Tuition Credits; Student loan = $2,500.
Social Security: Contribution Rate = 6.2% on earnings up to $76,200.
Sales Tax: Rate = 5.9%

Source: Authors' calculations. See text for details.

Table 3

Earnings and Income Tax Rates, Full-Time Full-Year Workers, Canada 1997, by Quantile, Smoothed Data

	High School Grads Quantile:			University Grads Quantile:		
Age	**25**	**50**	**75**	**25**	**50**	**75**
Males: Earnings						
23	16,119	23,000	34,008	26,000	34,476	43,000
33	25,169	35,175	46,020	34,338	43,004	55,000
43	30,000	39,453	52,942	43,834	53,621	69,992
53	30,000	41,962	56,004	45,000	56,992	70,000
63	26,000	34,000	44,822	40,000	47,003	67,592
Males: Average Tax Rates (%)						
23	11.9	17.3	20.8	16.2	21.9	22.0
33	16.0	19.6	23.7	21.4	25.4	29.8
43	19.5	23.4	25.8	22.1	26.5	33.6
53	15.0	21.3	25.9	22.5	29.7	30.7
63	15.8	19.6	22.3	23.3	24.1	28.4
Females: Earnings						
23	12,605	18,200	26,000	22,000	28,000	36,608
33	17,323	24,250	31,874	27,976	38,000	45,681
43	20,020	27,000	34,647	35,295	45,000	54,964
53	21,600	28,341	35,000	38,445	49,455	56,063
63	16,536	22,307	31,243	30,000	35,317	54,461
Females: Average Tax Rates (%)						
23	9.5	14.0	16.0	17.4	18.1	19.4
33	11.8	17.2	18.5	17.6	21.5	24.9
43	12.1	16.5	20.0	19.4	26.3	28.6
53	16.4	18.2	19.4	21.9	21.5	28.4
63	13.5	15.4	18.6	21.2	20.2	24.9

Source: Authors' calculations using the 1998 Survey of Consumer Finance. See text for details.

Table 4

Earnings and Income Tax Rates, Full-Time Full-Year Workers, U.S. 1997, by Quantile, Smoothed Data

	High School Grads Quantile:			University Grads Quantile:		
Age	25	50	75	25	50	75
Males: Earnings						
23	14,000	20,000	25,986	20,000	28,985	38,000
33	20,185	28,000	38,000	31,000	42,000	60,000
43	23,000	33,000	45,000	35,000	50,000	70,000
53	25,000	35,000	47,000	36,000	52,000	70,000
63	24,000	32,097	43,000	35,000	55,000	80,000
Males: Average Tax Rates (%)						
23	8.3	10.3	12.0	11.7	13.3	15.0
33	11.3	11.8	14.0	13.3	16.3	19.0
43	11.5	12.2	15.5	14.3	17.7	18.8
53	12.4	13.4	16.5	13.9	18.0	18.8
63	12.0	13.2	15.5	14.3	18.6	23.1
Females: Earnings						
23	12,000	16,000	20,280	18,000	25,000	32,155
33	15,000	20,000	27,000	25,000	33,000	45,000
43	16,000	22,000	30,000	25,000	34,000	48,000
53	16,000	22,000	30,000	25,000	35,000	48,129
63	15,648	22,300	30,000	19,000	30,000	43,000
Females: Average Tax Rates (%)						
23	6.8	8.1	10.1	11.6	12.4	14.5
33	7.4	10.6	11.5	12.4	15.0	18.6
43	8.1	10.7	12.0	12.4	14.7	18.7
53	8.1	10.7	12.0	12.4	14.6	18.4
63	9.1	11.8	12.0	10.3	13.5	17.4

Source: Authors' calculations using 1998 Current Population Survey. See text for details.

ETR effective tax rate

Tax Treatment of Human Capital in Canada and the United States: An Overview and Examination of the Case of University Graduates

James B. Davies
Department of Economics
University of Western Ontario

Kirk A. Collins
Department of Economics
University of Ottawa

June, 2001

Correspondence:

Prof. J. Davies
Department of Economics
University of Western Ontario
London, Ontario N6A 5C2
Tel. (519) 661-3500
Fax (519) 661-3666
Email: jdavies@uwo.ca

This paper has been prepared for the Industry Canada Conference on North American Linkages: Opportunities and Challenges for Canada, to be held June 20-22, 2001 in Calgary.

I. Introduction[1]

This paper overviews the current tax treatment of human capital in Canada and the United States, focusing primarily on personal income tax but touching also on social security contributions, sales taxes and other forms of taxation. It shows how the net effect of the tax system can be assessed using effective tax rates on different kinds of human capital. The result is a picture of the incentive effects of tax systems on the two sides of the border on human capital formation. We find that tax systems in both countries create small to moderate disincentives for human capital accumulation. Overall, effective tax rates on human capital appear to be higher in Canada. Of special note, for high earners staying in Canada it takes careful tax planning to avoid a high effective tax rate on human capital. On the other hand, one of the lowest effective tax rates in North America is that on highly able Canadians who move to the U.S. to reap their rewards after graduation. This opportunity may mitigate disincentive effects on investment in education for some of the most able.

One should be careful in the interpretation of our results. It is not necessarily the case that the reason Canada has lagged the U.S. in the development of its high tech sector, and in the rate of growth of productivity in manufacturing over the last decade, lies in tax disincentives to invest in human capital. For a complete explanation one should also ask whether the Canadian education system has provided the right kinds of education and training, or whether high tax rates after graduation make Canada a bad location for the highest-performing high tech "stars". The latter issue is distinct from the question of whether taxes act as a disincentive for human capital formation. Investment and location decisions are related but must be carefully distinguished.

The effective tax rate on human capital is simply the percent gap between before- and after-tax rates of return. While there have been many attempts to estimate rates of return on human capital in both Canada and the U.S. over the last 40 years, oddly, attention has not been focused on the effective tax rate. This is in contrast to the situation

with regard to physical capital, where it has been recognized since the early 1980s that the effective tax rate is the key tool for summing up the incentive effects of the tax system on investment.

As in the case of physical capital, the effective tax rate can be used both conceptually and quantitatively to explore the impact of various tax provisions. In the case of physical capital, differences across industries, types of capital, size of firm, and financial structure have been studied, and a considerable lack of uniformity is found.[2] In the case of human capital one can examine differences according to earnings level, gender, how education is funded, and other variables. This of course allows rich possibilities for comparative study in an international context. Those possibilities are so rich, in fact, that the present study should be regarded as preliminary and exploratory. Much more study is needed in the two countries both separately, and in a comparative context.

Our methods are illustrated by two sets of calculations. First, we illustrate our analytical framework through calculations using the basic features of the Canadian and U.S. tax systems and stylized assumptions about earnings and the earnings gains for education. Second, we attempt to provide estimates with a stronger empirical basis through the use of the 1998 Survey of Consumer Finance for Canada and the March 1998 Current Population Survey for the United States. These are the standard income surveys for the two countries, and cover both earnings and income tax payments using similar methods.

The paper is organized as follows. Section II provides the conceptual framework. Discussion of the tax treatment of human capital in Canada and the United States follows in Section III, with the results illustrated by means of our stylized examples. Effective tax rates based on the SCF and CPS surveys are provided in Section IV. Section V discusses the implications for North American Economic Integration and for policy.

---

[1] We would like to thank John Burbidge for his generous assistance in smoothing the age-earnigs quantile profiles used in Section IV of this paper.

[2] See e.g. Boadway et al., 1984, and McKenzie et al., 1998.

II. Conceptual Framework

There is now a significant body of work that has discussed the effects of taxation on human capital investment. Some of this work is purely qualitative, but other contributions provide estimates of the size of the effects involved. Although there is a small amount of relevant work on Canada, most of this work is for the United States.

While the qualitative analysis of how taxation affects human capital investment in past literature is well developed, there is a surprising gap in this literature on the quantitative side. In the literature on physical capital much use has been made of the concept of marginal effective tax rates (METRs). These have been estimated for different kinds of capital, industry, and method of finance. In general, it is found that there are large differences in METR's, implying distortions in the allocation of physical capital. Surprisingly, while a parallel concept can be readily developed for human capital, this has not occurred in the existing literature.

We have investigated and developed the conceptual basis for the calculation of effective tax rates (ETRs) on human capital investment. Since human capital investment tends to be lumpy, these ETRs are best defined for a particular level of education - - for example, high school, community college, or university first degree. Seeing how these ETR's vary across the population, for example by income level and gender, allows us to tell which types of individuals get the most encouragment for human capital investment.

The ETR for human capital formed, for example, in obtaining a bachelor's degree equals the wedge between the before- and after-tax rates of return on a university first degree. In the absence of tuition fees or other direct costs of schooling, proportional labour income taxes, or proportional sales taxes on a comprehensive base (exempting human capital inputs), would produce a zero ETR. These taxes reduce both after-tax foregone earnings during education and after-tax earnings after graduation by the same

proportion. In contrast, progressive taxes increase ETR's since the tax on the extra earnings due to education is at a higher rate than the tax that would have been paid on foregone earnings. And regressive taxes, such as the payroll taxes observed in Canada and the U.S., will have the opposite effect for some workers.

The theoretical possibility of having a tax regime that produces a zero ETR illustrates an important point. We can tax the returns to human capital without distorting the incentive to invest in human capital. This is because implicitly subsidizing forgone earnings, and explicitly subsidizing tuition and other direct costs (e.g. by making them tax deductible), requires less revenue than is collected by taxes levied at the same rate on earnings. Thus, what constitutes a "low" ETR differs from what one might expect. Normally one think of a significant positive tax rate as evil but necessary. In the case of ETRs on capital, rates above zero are not necessary.

In order to set out how different tax features affect effective tax rates on human capital we provide some notation and simple analytical results. First, the *ETR* is defined as the gap between gross- and net-of-tax rates of return to a whole program of study, r_g and r_n :

(1) $$ETR = (r_g - r_n) / r_g$$

Now, suppose that an individual aged t is planning to engage in a program of education or training that will take n years of study. We will assume that after this program is completed the individual will stay in the labor force until age T. Students may continue to earn while going to school. Their wage rates can vary over time, perhaps increasing while they are still in school, and likely rising in real terms over much of the lifetime after graduation. Actual earnings before-tax are given by E_t, which is the product of the wage rate and hours worked. Earnings before-tax in the absence of the educational program would have been E^*_t, where we assume that $E^*_t < E_t$ in the T - n years after graduation. Forgone earnings costs of education, FE_t, are thus $E^*_t - E_t$ in the first n years. In addition to these costs, there are direct costs C_t, which in the absence of loans

occur only in the first n years.[3] After-tax variables will be denoted E^a_t, $E^a{}^*_t$, FE^a_t, and C^a_t.

Rates of return on the investment described can be calculated as internal rates of return via the usual approach. The gross private rate of return, r_g, is thus the discount rate which makes the present value of the net income streams the same whether the individual opts to invest or not:

$$(2) \qquad \sum_{t=1}^{T} \frac{E_t - C_t}{(1+r_g)^{t-1}} = \sum_{t=1}^{T} \frac{E_t^*}{(1+r_g)^{t-1}}$$

For the sake of illustration, suppose that the length of the schooling program, n, is just one year. Also, rearrange (2) so all the $t = 1$ terms are on one side and the remaining terms on the other:

$$(3) \qquad E_1^* - E_1 + C_1 = \sum_{t=2}^{T} \frac{E_t - E_t^* - C_t}{(1+r_g)^{t-1}}$$

Costs of Education Before-Tax | Benefits of Education Before-Tax

The left-hand side of (3) represents the costs of the education program, made up of foregone earnings, $E_1^* - E_1$, and direct costs, C_1. The right-hand side is the present value of future earning increments, $E_t - E_t^*$, due to education, net of any deferred direct costs (such as loan repayments).

Again for the sake of illustration, suppose that the yearly benefits of education, $E_t - E_t^* - C_t$ are constant. Then because T is typically large we have

[3] When education is debt financed amounts borrowed during schooling can be modelled as reductions in C_t and repayment (both principal and interest) will be caught in positive C_t after graduation.

$$E_s^* - E_s + C_s \approx \frac{E_w - E_w^* - C_w}{r_g}$$

where we now use subscripts s and w to denote the schooling and working periods. We now have a simple expression for the before-tax rate of returning r_g and a parallel expression for the after-tax rate of return, r_n:

(i) $$r_g \approx \frac{E_w - E_w^* - C_w}{E_s^* - E_s + C_s} = \frac{Annual\ Return\ Before - Tax}{Cost\ of\ Education\ Before - Tax}$$

(4)

(ii) $$r_n \approx \frac{E_w^a - E_w^{a*} - C_w^a}{E_s^{a*} - E_s^a + C_s^a} = \frac{Annual\ Return\ After - Tax}{Cost\ of\ Education\ After - Tax}$$

Now, let m_w be the fraction of the annual earning increments *EI*, in the working period that is paid in tax. We have:

(5i) $$E_w^a - E_w^{a*} = (1 - m_w)(E_w - E_w^*) = (1 - m_w)EI$$

Similarly, we can define the fraction, m_s of foregone earnings, *FE*, during education that would have been paid in tax and write

(5ii) $$E_s^{a*} - E_s^a = (1 - m_s)(E_s^* - E_s) = (1 - m_s)FE$$

Ignoring direct costs for the time being, with the help of this new notation, (2) and (4) give:

(6) $$ETR|_{C=0} = \frac{r_g - r_n}{r_g} = \frac{m_w - m_s}{1 - m_s}$$

This expression is simple and powerful. It indicates that, in the absence of direct costs, the tax system is non-neutral for human capital if and only if the increase in earnings

resulting from education is taxed at a different rate than would have applied to forgone earnings. The most obvious possibility is that the graduated rates under personal income tax will make $m_w > m_s$, resulting in a positive ETR. However, social security and unemployment insurance contributions are sizeable, and since the contributions are capped at maximum insurable earnings, the schedules are regressive. If contributions are in large part equivalent to taxes (i.e. benefits are paid out in a fashion that departs substantially from actuarial fairness) then these schemes work towards $m_w < m_s$ for workers whose *EI*'s fall entirely or partly above maximum insurable earnings. It should also be borne in mind that sales taxes reduce real earnings. Proportional sales taxes on a comprehensive consumption base would give $m_w = m_s$, that is neutrality. However, some necessities are widely exempt from sales tax in North America (food, children's clothing etc.) or taxed at a lower rate. This again suggests that $m_w > m_s$, reinforcing the tendency of the PIT to produce a positive ETR.

Expression (6) also makes possible a number of other insights. We note that:

1. If both m_w and m_s increase by the same amount, $m_w - m_s$ stays constant, but the ETR increases. Intuitively, the excess taxation of the returns to education rises relative to the cost of investment, which is reduced via the effective subsidy on forgone earnings, m_s .

2. An equi-proportional rise in m_w and m_s causes an increase in the ETR.

These insights have a direct application to human capital ETRs in North America. Think of the initial m_w and m_s as federal tax rates. If, as is the case in Canada and in some U.S. states, provincial or state income tax rates are either exactly or approximately a proportional blowup of federal rates, then they cause an equiproportional rise in m_w and m_s. On the other hand, some U.S. states (e.g. Illinois, Pennsylvania, Michigan) levy proportional income taxes, thereby adding an equal amount to m_w and m_s.

One may ask whether equi-proportional additions to m_w and m_s, or equal absolute additions, would raise the ETR more. In order to answer this question an equal yield

comparison is needed. In general, the size of the % increase in m_w and m_s needed to produce the same revenue as an equal absolute increase in all tax rates will depend on the distribution of taxpayers and taxable incomes across income brackets. However, in the simple case where there are just two tax brackets it is possible to show that the increase in the ETR will always be greater under the equi-proportional adjustment. There should at least be a tendency in this direction even when there are more brackets.[4]

Moving to the more general case, we need to take into account tuition and other direct costs; the student loan amount, L; student loan repayments, iL, where i is of course the interest rate; the rate of tax relief on student loan payments, d; and credits for tuition and other expenses, A. Making the appropriate adjustments to the costs and returns, and using the relationship ETR = 1 - rn/rg, we have:

$$(7) \qquad ETR = 1 - \left[\frac{(1-m_w)EI - i(1-d)L}{(1-m_s)FE + (C_s' - L - A)}\right]\left(\frac{EI - iL}{FE + C_s' - L}\right)^{-1}$$

where C'_s is direct cost before both tuition credits and student loans.

Using (7) we note the following:

1. Increases in tuition credits, A, or in interest deductibility, d, unambiguously reduce the ETR.
2. The ETR is affected by several factors that may be under the government's control to some extent, e.g. tuition fees, student loan amounts, and interest rates on student loans, but which are *outside* the tax system.
3. A rise in tuition and other direct costs, C'_s, raises the ETR. The intuition is that both the net and gross rates of return fall, but r_n is affected more than r_g since C'_s is larger

[4] To illustrate, suppose there are just two brackets, with $m_s = 0.15$ and $m_w = 0.30$. Then in order to produce the same revenue as an increase of, say, 0.05 in both marginal rates, an equi-proportional increase of 11.1% in both tax rates would be needed. The equal absolute increase of 0.05 points would raise the ETR from 0.1765 to 0.1875. The equi-proportional increase would raise the ETR from 0.1765 to 0.2245. The minimum new ETR one can get occurs when all taxable income is taxed at the higher rate. In that case the ETR rises to 0.212.

relative to both returns and costs when the latter are measured after- rather than before-tax.

4. If the interest rate on student loans is less than the gross and net rates of return on human capital, which is plausible, increasing loan amounts will raise both r_n and r_g. The extent of leverage is being increased. The impact on r_g will be greater, however, since the gap between r_g and i is greater than that between r_n and i. This means that the ETR will fall.

III. Tax Features in Canada vs. the U.S.

Most of the major components of the Canadian and U.S. tax systems have implications for human capital. Here we focus on the effects of the personal income tax (PIT), payroll taxes, sales taxes, and the corporate income tax (CIT). The main features of the current student loan plans are also described.

Personal Income Tax

Traditionally, the Canadian PIT provided relief for the direct costs of education and training, but did not allow a deduction or credit for interest paid on student loans. While the 1998 federal budget made 17% of the interest on qualified student loans creditable, Davies and Collins (2000) found that that had little effect on the ETR on university level human capital. [5]

In contrast to the Canadian system, the traditional approach in the U.S. was not to allow a deduction or credit for most direct costs of education and training, but to provide interest deductibility on student loans. Thus, it could be said that Canadian PIT attempted a "consumption tax" approach to human capital, while the U.S. system followed more of an "income tax" approach. This contrast has been eroded, however,

[5] The value of the credit is enhanced when provincial income taxes are also taken into account. There is no limit on the amount of interest that may be claimed. Unused credits may be carried forward for up to five years, but are not transferable to other taxpayers.

since not only has student loan interest become partially creditable in Canada, but substantial credits for tuition and other fees were introduced in the U.S. in 1997.

Note that the tax relief on tuition and other direct expenses provided by the Canadian PIT comes not from a deduction (as in the strict cash-flow approach) but via a credit for 17% of tuition (and additional mandatory fees starting in 1997) paid to approved post-secondary institutions, plus 17% of an "education amount". The education amount was $80 per month prior to 1996, but was raised in steps to $200 per month between 1996 and 1998. Unused credits can be carried forward to future tax years (since 1997) or they can be transferred to a spouse, parent or grandparent (up to a limit of $5,000 minus the part of the credit used by the student to reduce his/her tax liability to zero). The latter measures ensure that the implicit federal subsidy on direct costs of education is close to a uniform 17% rate. Adding in provincial tax, the average rate of relief is about 26%. While these arrangements work against the negative effect of progressivity on returns, one must recall that most of the costs of human capital are in the form of forgone earnings and are so unaffected. It is also important to point out that while the "education amount" credits are intended to offset non-tuition direct costs of education and training, they are paid as a lump sum. They are thus similar to a system of student grants.

Currently in the U.S. student loan interest is deductible up to a limit of $2,500, and this deduction is phased out beyond middle income levels. There are two, mutually exclusive, tuition credits. The Hope Scholarship Tax Credit provides a 100% credit on the first $1,000 of tuition and fees, and 50% on the next $1,000, for the first two years of postsecondary education.[6] For tax years after 2001 the $1,500 maximum will be indexed for inflation. The Lifetime Learning Credit is provided at a 20% rate on the first $5,000 of tuition and fees (scheduled to rise to $10,000 after Dec. 31, 2002). Both credits are phased out for single taxpayers with modified AGI from $40,000 - $50,000, and for

[6] These limits are in US $'s. Throughout the paper dollar magnitudes for the U.S. are reported in US $'s, and dollar magnitudes for Canada are reported in CDN $'s. According to current markets, the CDN $ is worth about $0.67 US. According to purchasing power, however, the Canadian dollar is worth about $0.75 - $0.80 US.

couples filing jointly with modified AGI between $80,000 and $100,000. It should also be noted that neither credit maybe claimed if a taxpayer is making tax-free withdrawals from an education IRA in the same year. Finally, these credits may be claimed either by a parent or by the student.

In order to do a rough comparison of the generosity of Canadian vs. U.S. tuition credits, note that typical fees at the bachelor's level in Canada are now about $4,500, while in the U.S. average fees are about $6,100. Assuming that the student and his/her family can make full use of the credits, in Canada they would get a (federal plus provincial) benefit of $1,709. In the U.S. there would be a federal benefit of $1,500 and a range of state level benefits. It would appear that tax credits relative to tuition fees may be somewhat more generous, on average, in Canada. In addition, it should be noted that for those U.S. students who attend private institutions, or public schools out-of-state, fees are far above the average, and tax credits correspondingly relatively less important.

PIT systems on both sides of the border also provide tax-sheltered saving for education. First, in both cases taxpayers may now withdraw funds from their RRSPs or IRAs (as of Dec. 31, 1997) to fund education expenses.[7] This means e.g. that parents can "overssave" in their RRSP's or IRA's and withdraw funds to pay for kids' university education. In Canada, use of RRSP saving for the taxpayer's own education, or that of a spouse, has been encouraged further since 1998 by the fact that withdrawals (up to $10,000 annually and $20,000 in total) are now tax-free as long as the amount withdrawn is restored to the RRSP within 10 years. These provisions may be especially attractive to high income taxpayers. In contrast, among those with employer-based pension plans the use of (deductible) IRA's in the U.S. is limited to lower income groups, since the $2,000 annual contributon limit is phased out on single incomes (AGI) between $31,000 and $41,000, and on married couples filing jointly between $51,000 and $61,000 (year 2000

[7] Canadians have long been allowed to make tax-free RRSP withdrawals two years after the contributions are made. In the U.S. there is a general 10% penalty on early withdrawals. As of Dec. 31, 1997 exceptions were introduced for qualified higher education expenses and for up to $10,000 of first-time home purchase.

limits). Further, annual contribution limits to RRSP's, at $13,500 or 18% of earnings in 2000, are generally higher than those to IRA's.[8]

In terms of sheltered saving dedicated to education, the two countries both have non-deductible sheltered savings programs - - Registered Education Saving Plans (RESPs) in Canada and Education IRAs in the U.S. Contributions are non-deductible, but income within the plans accrues tax-free. On withdrawal for education purposes there is no tax liability in the U.S., while in Canada withdrawals are taxed in the hands of the student - - i.e. generally at very low rates. Contribution limits are higher in Canada - - $4,000 CDN per year per benficiary vs. $2,000 US in the U.S. - - and are encouraged by means of Canada Education Saving Grants (CESG's), introduced in 1998, of up to $400 per student per year. In view of these features, the Canadian scheme likely has a significantly larger negative impact on ETR's than the U.S. program. As found by Collins and Davies (2000), CESG's can reduce ETR's substantially.

In summary, the sheltered savings provisions under Canadian federal PIT are now likely significantly more encouraging to human capital formation than the corresponding provisions in the U.S. Greater use can be made of both deductible retirement savings plans and non-deductible education savings plans in Canada to fund higher education. This is because of the higher contribution limits and the use of grants tied to RESP contributions. A further important point is that phaseouts in the U.S. eliminate these forms of assistance for high income taxpayers.

Our discussion in the last section indicated that an underlying impact of a PIT system on human capital ETRs is that arising from "progressivity" - - that is, from the graduated structure of marginal tax rates. It is widely felt that the Canadian PIT is more progressive than the U.S., and on that basis it might be expected that ETRs in Canada have an underlying tendency to exceed those in the U.S. (which could perhaps be

[8] Limits for those with the lowest incomes are greater in the U.S. since they are the maximum of $2,000 per person, or 100% of earnings. For a Canadian taxpayer, the RRSP contribution limit is less than for a single U.S. taxpayer up to an income of about $17,000 (CDN).

reversed by differences in deductions and credits). We will now investigate whether that intuition is reliable.

Let us first inspect the Canadian and U.S. federal tax schedules that applied in the year 2000[9]:

Federal Marginal Tax Rates by Taxable Income, 2000

Canada		U.S. Singles		U.S. Couples Filing Jointly	
Income	Rate	Income	Rate	Income	Rate
0	17%	0	15%	0	15%
30,004	25	26,250	28	43,850	28
60,009	29	63,550	31	105,950	31
		132,600	36	161,450	36
		288,350	39.6	288,350	39.6

It is not readily apparent from this table why the Canadian PIT is generally said to be more progressive than the U.S. counterpart. The tax rate in the lowest bracket is higher in Canada, and the top marginal rate is less than in the U.S. The view that the Canadian system is "more progressive" is probably based on the fact that we move into the top brackets more quickly than in the U.S. This is especially true since Americans get personal exemptions of $2,800; standard deductions of $4,400 and $7,350 for single taxpayers and couples filing jointly, respectively; and more liberal itemized deductions (including e.g. for mortgage interest). Hence a Canadian could enter the third (and top) tax bracket in 2000 with total income of just $60,009, whereas a single American must have had at least $70,750 (US!) to enter the third tax bracket, and a couple filing jointly needs at least $113,150. Recognizing the greater generosity of U.S. itemized deductions would make the contrast even more dramatic.

[9] The middle marginal tax rate in Canada was reduced from 26% to 24% on July 1, 2000. Thus the 25% rate reported in the table is an average figure for the year as a whole. Effective Jan. 1, 2001, the 17% rate was reduced to 16%, the middle rate fell to 22%, and a new bracket extending from about $61,000 to $100,000 was created with a rate of 26%.

A further important consideration has to do with state and provincial PITs. In Canada in 1999 provincial PIT revenue was 64.9% of Canadian. In the U.S. in the same year state PIT revenue was 22.4% of federal. Until 2000 nine of the Canadian provinces levied provincial PIT as a proportion of basic federal tax - - the so-called "tax on tax" approach. And the tax scheule of Quebec's independent PIT did not depart markedly from this standard. The provinces are now free to use whatever tax schedule they like, but four still used the tax-on-tax approach in 2000 (Newfoundland, Prince Edward Island, Saskatchewan, and Alberta). In the other cases it is fair to say that the schedules are still approximately proportional to the federal schedule. The result is that one can think of the overall Canadian PIT structure as a roughly proportional blowup of the federal structure. For the purposes of the present paper we assume proportionality.

State income taxes in the U.S. present a richer tapestry. Seven states (Alaska, Florida, Nevada, South Dakota, Texas, Washington and Wyoming), with 16.3% of U.S. population in 1999, levy no income tax. At the opposite extreme, California, with 12.2% of the population, levied a highly graduated tax with six brackets and marginal tax rates ranging from 1 to 9.3% in 2000. New York State had five brackets with marginal rates vayring from 4% to 6.85%. Many other states (e.g. Illinois, Michigan, Pennsylvania), on the other hand, levy flat income taxes.

The great variety of state income taxes makes them difficult to model simply in the kind of exercise we are carrying out in this section. This is one reason why, in addition to the illustrative calculations of this section, we later provide results based on survey evidence, in which individuals report all income taxes paid.

We have reviewed the income taxes levied by the 10 most populous states that levy the tax. Together they include 46.6% of the U.S. population. In this group, seven states, including the two largest, levy a graduated tax. Especially since state taxes are relatively much less important than provincial taxes, we therefore feel that for the illustrative calculations in this section we will not do too much violence to the facts if we assume that state income taxes are proportional to federal taxes in the U.S.

Eyeballing Canadian and American income tax schedules, and trying to guess which is "more progressive" is not a very adequate way of proceeding in the present context. We need to have a much more careful comparison. One way to do this might be to convert all U.S. $ figures to Canadian $'s and see how some measure of local progressivity varies in each schedule as we ascend the real income scale. There are two problems with this: (i) Canadians and Americans who are deciding whether to invest in human capital do not have the same real earnings, and, in terms of our notation, do not face the same *EI* and *FE* in terms of our notation. Thus, comparing progressivity at a given level of real income is not the relevant experiment. Canadians are generally located at lower real income levels and this fact must be taken into account. (ii) The appropriate measure of progressivity for our purposes is (mw - ms)/(1 - ms), that is the ETR level that would prevail if the costs of human capital investment were purely forgone earnings. This is not a standard measure of progressivity.[10] So, a custom approach is required.

We will proceed by comparing the situation of different well-defined types of human capital investors in the two countries. We will focus on individuals investing in full-time postsecondary schooling. We assume that their forgone earnings are 2/3 of the amount they would earn if they worked full-time, and that the *EI* produced as a result of one year of schooling equals 10% of possible full-time earnings in the year of investment.[11] Assumptions on earnings, tuition fees, loan amounts, and tuition credits will be based on the experience in the two countries as of the year 2000. Calculations of tax liabilities will take into account the full range of deductions.[12] All individuals will be

[10] It is interesting to ask how it is related to a standard measure of local progressivity, the ratio of the marginal to the average tax rate. The two measures become closely related if students specialize completely in studying (i.e. have zero earnings), and if the incremental earnings due to study are all taxed at a single marginal tax rate. In that case m_s equals the average tax rate, m_w is the marginal tax rate, and our measure is a straightforward transformation of the standard measure of local progressivity.

[11] There is a large literature that estimates human capital earnings equations. These equations provide estimates of the % gain in earnings due to an additional year of schooling. Conventional estimates put the average return at about 7 - 8%. Careful work on ability bias and measurement error suggests the true gains may exceed 10%. (See, e.g., Ashenfelter and Krueger, 1994, and Card, 1995.) Our assumed rate of return lies between these two sets of estimates.

[12] By referring to the published tax statistics of the two countries we ascertained the total income levels that, on average, generate the taxable incomes at the threshold of each tax bracket. Since deductions rise

assumed to be single and childless. While the latter assumption is realistic for the schooling period, it is not a realistic assumption for a lifetime of earnings. This is of special concern in the U.S. case where married couples are typically taxed jointly, and are always taxed on a separate schedule from single individuals. We are especially likely to overestimate taxes on females in the U.S.[13]

Table 1a sets out our illustrative calculations for Canada. It shows the situations of earners at the 25th, 50th, 75th, and 90th percentiles of the earnings distributions for three different demographic groups: male and female university graduates aged 23, and male university graduates aged 33. We focus mainly on university graduates at the start of their working careers in order to get an idea of the ETRs they face on their last year of university education. The alternative would be to look at high school graduates of university age, but that raises the issue of the students who decided not to attend a postsecondary institution not being representative of those who do. The 33 year olds were studied partly to get an idea of tax effects for mature students, but also to bring in more cases where the earnings increments from schooling are taxed in the top bracket.[14]

The first three columns of this table show our E, m_s, and m_w figures, and the fourth column shows $(m_s - m_w)/(1 - m_s)$, that is the "bare bones" ETR in the absence of forgone earnings or any distortions other than progressivity. For all but three of the 12 individual types we get $m_w > m_s$ and positive ETRs. The latter range from 4.2% to 15.0%.

---

with income, this also involves adjusting the marginal tax rates within brackets so as not to exaggerate the calculated tax liabilities.

[13] The lower incomes in the first few brackets of the tax schedule for singles are about 60% of the corresponding bracket limits for couples filing jointly. Since this is roughly the same ratio as that of average husbands' to wives' earnings, using the single's schedule for all men provides a reasonable guide to typical tax rates, whether men are single or married. The same is clearly not true for women.

[14] It can be argued that a limitation of the assumptions embedded in our equation (7) is that workers in fact have a hump-shaped age profile of earnings. One could argue that the earnings increment earned from education should be regarded as adding onto the humped age profile of earnings one would have in the absence of the additional schooling. Hence, the *EI* will be taxed at higher rates as the individual moves towards the peak of the age-earnings profile.

Interestingly, the ETRs shown in the fourth column of Table 1a do not show a monotonic trend with income. If the ETR's are charted as a full function of income they actually show a saw-tooth pattern - - taking upward jumps when *EI* crosses into a higher tax bracket, and falling between those jumps. What is happening is roughly as follows. The tax rate m_w is close to the marginal tax rate (mtr), whereas m_s is closer to the average tax rate (atr). The mtr (and therefore m_w) takes a small number of large discrete jumps while the atr (and therefore m_s) rises steadily with income. The highest mtrs are found where the mtr takes the biggest absolute jumps - - not at high income levels, but at total income of $7,231 and taxable income of $30,004, where the federal plus provincial effective mtrs jumps from 0 to 24.9% and from 24.9% to 33.1% respectively.

The next column of Table 1a shows the effect of the direct costs of education, neglecting tuition and education credits and student loans. All the ETRs rise substantially - - on average by 5.8 % points across the individual types shown. The ETR range is now from 7.4% to 18.9%. This powerful effect of a variable outside the tax system on the ETR is important to note. In recent years in Canada there has been a large increase in tuition fees for postsecondary students. In the absence of countervailing action in the form of increased tax credits or loans the result would have been a substantial increase in human capital ETRs.

The second-last column of Table 1a introduces tuition and education amount credits. These reduce the ETRs by an average of 7.1 % points, that is by more than direct costs added in the previous column. Also note that the reductions in the ETR are greater at lower income levels. Hence, once education credits are taken into account there is more of a tendency for the ETRs to rise with income than was evident initially.

It should be noted that our results on the education credits assume the student gets the full value of the credits, even if they are not required to reduce his/her tax burden to zero. In other words, amounts deferred to later tax years, or transferred to other family members are treated as of equal value to the student as cash-in-hand. This exaggerates the value of these excess credits somewhat.

Finally, in the last column of Table 1a we add a typical student loan amount - - $2,500 in borrowing (on an annual basis). Like education credits, student loans reduce the ETR, as we discussed in the previous section. On average the ETR declines by 2.9 % points - - a sizeable effect, although one smaller than that of education credits. Once again the largest effect is for the lowest earners, strengthening the upward trend of the ETR with income.

These calculations are, of course, subject to qualifications, a number of which have already been noted. The simplified framework of equation (7) prevents us from taking the hump-shaped age profile of earnings into account. If this profile were modelled, the EIs in several cases would ascend into the top tax bracket and the ETR would rise. On the other hand, we are not able here to take any account of tax-sheltered education saving, and the Canada Education Savings Grants (CESGs) that provide substantial assistance for members of higher income groups, who are the ones most likely to exploit these opportunities. Further, as has been emphasized in much recent literature, effective marginal tax rates on middle earners in Canada are substantially increased by the phaseout of sales tax credits and the Canada Child Tax Benefit over a wide middle income range. Thus, a more complete analysis could raise relative ETRs for middle earners, and it may be a mistake to make too much of the tendency for the ETRs computed to rise with income that we are seeing in the final columns of Table 1a.

Table 1b provides U.S. results corresponding to those of Table 1a. Here we assume that direct costs of education are $7,500 per year (vs. $5,500 in Canada). In the columns with education credits it is assumed that all students receive the maximum value of the Hope credit ($1,500).[15] While this exaggerates the current value of credits for those who have been in postsecondary education for more than two years ($1,000), we

[15] Parents or the students may claim the credit. As in the Canadian case we are not discounting the value of the credit to the student at all if it is taken by the parent.

note that the Lifetime Learning Credit is slated to double in maximum value to $2,000 in 2003. A student loan amount of $4,000 is assumed.[16]

As we have remarked earlier, a widespread expectation would likely be that U.S. ETRs should be less than Canadian. In fact we find that the comparison is about evenly split. Focusing only on progressivity (Case I), Canadian ETRs exceed the U.S. figures for only 5 of the 12 individual types. And, in the final two columns, with direct costs and credits modelled, ETRs are lower in Canada than in the U.S. for 13 of the 24 individual types.

A final comment from the tables is that the way to get a really low ETR would be to take one's education in Canada, but reap the rewards in the U.S. One's ms would be as shown in Table 1, that is quite high, while one's mw would be similar to, or perhaps smaller than, the U.S. mws shown in Table 2. Since the Canadian ms's are larger than the U.S. mw's, this means that one's "basic" ETR (i.e. before direct costs, education credits, and loans enter the picture) would be negative. For example, if a 90th percentile Canadian university graduate moved to the U.S. on graduation, his ETR on this basis would be -5.3%, compared with the 12.75% of someone who remained in Canada or the 11.66% of someone in the U.S.

It should be noted that recent federal budgets in both countries have reduced taxes, and that tax decreases are scheduled for coming years. What impact will these changes have on the ETR's? In the Canadian case the centre-piece is a reduction in tax rates on middle and upper-middle earners. The former middle federal tax rate is being reduced to 22%, from 25% in 2000 and 26% in 1999. In addition, a new tax bracket, to run from taxable income of about $61,000 to $100,000, is being carved out of the old top tax bracket. Instead of the former 29% federal rate, this new group will face only a 26% marginal tax rate. A reduction in the bottom tax rate from 17% to 16% is also occurring. As shown in Table 3, extending our earlier Case III calculations (no student loans) gives an average ETR reduction for our 12 individual types of 1.8 % points. (Compare with

[16] The direct costs are composed of $6,100 in tuition fees and $1,400 in other expenses. The student loan

Table 1a.) The dominant effect on the results comes from the rate changes in the middle tax brackets. This shows up in the fact that the 25th quartile male and female 23 year olds see a small *increase* in their ETRs, while the median and 75th quantile earners get the largest reduction. ETR's also decline for all of the 33 year old male university graduates.

In the U.S. case, the Bush tax cuts, recently signed into law, will reduce marginal tax rates at all levels. The current marginal rates of 15, 28, 31, 36, and 39.6% are being replaced by rates of 10, 15, 25, and 33 %. As in the Canadian case, the largest proportional cuts in mtrs are in the middle brackets. However, there is also a substantial cut in the bottom bracket. Again using the no student loan Case III, as shown in Table 3 we find that the Bush tax cuts will reduce human capital ETRs at all levels. Particularly noteworthy is that the cases where ETRs were significantly above zero now all display quite low ETRs.

Our discussion has ignored the fact that low and middle-income earners are eligible for a variety of tax credits, some of which are refundable. It also ignores the fact that many recent studies have found effective marginal tax rates of low and middle-income taxpayers present special features compared with those of taxpayers at higher income levels. For the lowest earners in the U.S., for example, the Earned Income Tax Credit generates a large *negative* mtr. But when taxpayers are in the phaseout range for such credits their mtr's can be greater than those of taxpayers with higher incomes. Could this mean that our above observations about the effect of tax schedules on ETR's in the two countries are misleading?

While tax credits and other tax features do undeniably affect mtr's for some post-secondary students, we believe that overall the impacts on the cost side of ETR calculations are likely small. This is because most of the tax features in question are targetted at families with children. Only a small fraction of post-secondary students fall in this category. In addition, the income maintenance problems of post-secondary students are not generally addressed by governments through the same tax/transfer means

---

amount is about the same fraction of these direct costs as the $2,500 amount was in the Canadian case.

as those of non-students. Rather than receiving refundable tax credits students are given bursaries and loans. Such programs can of course offset the incentive effects coming from ETR's, but they clearly lie on the expenditure rather than tax side, and so fall outside the scope of our study.

Turning to the return side of the ETR calculation, we would expect that the main effect of taking all credits into account would be to increase m_w for lower quartile and median earners. These are the individuals who will likely experience higher mtr's over the working lifetime as a result of credit phaseouts. While the impact could be significant, we do not believe it would be so large as to overturn our conclusion that ETRs on human capital in Canada are small to moderate, and that there should be special concern about ETR's on high earners.

Payroll Taxes

Both Canada and the U.S. operate pay-as-you-go social security plans that are largely unfunded, as well as unemployment insurance schemes. If these plans were run on an actuarially fair basis, in the absence of liquidity constraints they should have no effect on human capital accumulation. In practice the plans are so far from being actuarially fair that we are closer to the truth if we treat contributions simply as taxes.

Unlike PIT, payroll taxes are set up with a regressive structure. The typical pattern is to have a flat rate for contributions on earnings (in some cases minus a small exempt amount) up to some threshold income - - "maximum insurable earnings" - - beyond which marginal contributions fall to zero. This structure means that payroll taxes add to m_s and may, or may not add to m_w. In cases where incremental earnings due to education fall entirely above maximum insurable earnings, there is no addition to m_w; where this increment straddles the earnings cap the addition to m_w will be less than the payroll tax contribution rate. In either of these latter two cases, payroll taxes will raise m_s more than m_w , and the ETR is likely to decline.

The greater reliance on the social security scheme to generate pensions in the U.S. has led to maximum insurable earnings being much larger than in Canada - - $76,200 US in the U.S. in 2000 for example, vs. $37,600 in Canada. Thus, for most Americans, social security adds as much to m_w as to m_s - - which will raise the ETR. In the Canadian case, in contrast, higher earners may experience no increase in m_w due to CPP contributions. For these individuals, CPP acts like an increase in m_s, which will reduce the ETR.

Table 2 shows the result of adding social security and CPP contributions to the Case I and Case IV runs for male and female university graduates aged 23, and for male graduates aged 33.[17] In the U.S. case there is a small increase in the ETR in most cases, but there is a sizeable decrease for the 90th quantile 33 year-old male graduates, whose earnings gains from education lie above the social security contribution cap. In Canada the tendency for ETRs to rise is confined to fewer people in the U.S. Both the 75th and 90th quantiles see reductions. Hence, the difference in social security schemes across the two countries tends to reduce ETRs on high earners in Canada relative to the U.S.

On the employer's side, there may be incentive effects in so far as the employer finances specific human capital accumulation. The costs of this investment include wages that are paid to workers for time they effectively spend learning rather than producing. (An employer will be willing to share in the cost of investment if skills are specific to the firm, as explained in Becker, 1964.) These costs are inflated by the employer's portion of payroll taxes, implying a positive effective tax on the portion of human capital investment which is paid for by employers. The higher rate of social security contributions in the U.S. implies that this effect should be stronger there than in Canada.

[17] We have not done a comparison modelling UI contributions in the two countries. In the U.S. UI schemes differ across the states, making it more difficult to model the system simply than for social security.

Sales Taxes

One of the major differences in tax structure between Canada and the U.S. is that Canada relies much more heavily on sales tax revenue. The Canadian federal government levies a lucrative VAT-type Goods and Services Tax, while the U.S. federal government collects no general sales tax. Adding together all sales and excise taxes for 1999 (and referring to the total as "sales tax" for short), we find that U.S. consumers paid sales tax equal to 5.9% of aggregate consumer expenditure. The corresponding figure for Canada is 13.4%.

As discussed earlier, if a proportional sales tax were levied on a comprehensive tax base, in the absence of other taxes it would be neutral with respect to human capital formation. However, in the presence of a PIT with graduated rates, or other distortions, this is no longer the case. It is interesting to see how much of an effect the U.S. and Canadian sales tax regimes could have on estimated ETRs under the simplifying assumption of proportionality. While actual sales taxes exempt or zero-rate some necessities, the high excise taxes we levy on alcohol, tobacco, and gasoline tend to be regressive. The result is that the assumption of proportionality is a reasonable approximation for present purposes.

Estimates of ETRs for the two countries, taking into account sales taxes under the proportionality assumption, are provided in Table 2. ETRs rise in both countries when we take sales taxes into account - - by a fairly small amount in the U.S., but by up to 5 or 6 % points for some of the individual types in Canada. This is an interesting illustration of the principle that when you have a high existing level of taxation adding further even seemingly reasonable taxes can have surprisingly distortionary effects.

Corporate Income Tax

While we do not provide estimates of the effects of Corporate Income Tax (CIT) on human capital ETR's, it is nonetheless interesting to note some qualitative effects. Our comments apply to both Canada and the U.S.

Corporate income tax (CIT) affects incentives for both specific and general human capital accumulation occurring via on the job training (OJT). In the case of specific training, both the wages paid to trainees and much of the direct costs are deductible from CIT. This corresponds to immediate expensing of the investment. Structures and equipment used in training are, however, treated in the same way as other capital expenditures of the firm. That is, their costs are deducted in the form of interest and capital consumption allowance over the lives of the assets. This implies a small departure from neutrality in the treatment of specific human capital, but the approximation to neutrality is quite close.

CIT may also have implications for general OJT. Theory predicts that employees should pay for the costs of this training in the form of lower wages. However, the direct costs of providing this training are reduced due to their deductibility from CIT. Hence CIT provides a substantial implicit subsidy to general training conducted on the job. It is not clear whether the effective rate of subsidy is more or less than that provided to post-secondary institutions. However, this subsidy is worth keeping in mind when one hears claims that subsidies to post-secondary institutions distort the pattern of human capital investment away from OJT toward formal education and training, with supposed damage in terms of the quality of training. It may be that the effective rate of subsidy to private sector training is not less than to education at colleges and universities.[18]

[18] Heckman and Klenow (1997) argue that in the U.S. the balance is in favour of private sector training.

Student Loan Plans

As discussed earlier, student loan plans interact with human capital ETRs. They provide benefits that loom larger relative to after-tax costs and returns, and therefore increase after-tax rates of return more than before-tax rates. The result is a decline in the human capital ETR. In the illustrative calculations above we captured this effect to an extent in our Case IV.[19]

In Canada, the federal and provincial governments cooperate in providing an integrated system of student loans under the umbrella of the Canada Student Loan Plan (CSLP). These are subsidized student loans. The principle form of subsidy is that as long as students meet certain criteria (mainly, maintaining full-time status) no interest accumulates or is paid prior to graduation. Eligibility for loans is needs-tested, and individual students have different limits on the amount they can borrow. In recent years, in part due to rising tuition fees, the student participation rate in CSLP has been rising, and amounts borrowed have increased. In 1998 the Department of Finance estimated that those students taking loans would have average debt of about $14,000 on graduation.

Federal student loan plans in the United States are the Ford Direct Student Loan Program (FDSLP) and the Federal Family Education Loan Program (FFELP). For the FDSLP the education institution acts as an intermediary for the dispensing of funds, which come directly from the federal government, while for the FFELP students have the option of having a private lending institution supply the funds, but the government still guarantees the loan. Like the CSLP these are both subsidized programs and are dispensed on the basis of need.

Unsubsidized programs in the United States, which were introduced for the 1992-3 academic year and are not based on need, provide students with an alternative means of borrowing. Interest on these loans accumulates while the student is in school and gets

[19] The illustrative calculations understate the impact, however, since the fact that interest on loans may be completely subsidized during schooling cannot be captured in the discrete time, one schooling period framework used.

added to the total cost of borrowing. Studies show that this type of borrowing is on the rise (see, e.g., *Trends in Student Aid* (2000)) and it now makes up roughly 48 percent of the federal education loan volume.[20] Since the leveraging benefit of unsubsidzed loans is less than that of other student loans, it would be expected that their impact on human capital ETRs would be relatively small.

III. Estimating Effective Tax Rates on First Degree University Studies Using Survey Data

The previous section provided illustrative calculations taking into account a wide range of tax features. The simple framework of equation (7) however has certain limitations. It is assumed that earnings after graduation are constant for the remainder of the lifetime, which may lead to underestimation of the tax burden on the incremental earnings due to education. Also, results must be based on hypothetical tax scenarios that can only approximate the tax experience of real individuals.

In order to provide more empirically-based estimates of human capital ETRs we have made further calculations using the cross-section data provided by the 1998 Survey of Consumer Finance in Canada and the Current Population Survey in the U.S. In both cases we have drawn samples of full-time full-year workers (in order to ensure that we capture the full returns to human capital investment). We create hypothetical lifetime earnings and tax scenarios by assuming that graduates with a particular level of education earn at the same earnings quantile throughout life. We assume that the observed cross-section earnings and taxes for particular ages will continue to apply for the same ages in the future. (No adjustment is made for wage growth or future changes in the tax system.) The life-cycle path of earnings is projected using quantile age-profiles of earnings that have been smoothed using the methods devised by Burbidge et al. (1988) and Magee et al. (1991).[21]

---

[20] Based on the 1999-2000 school year.

[21] Our application of these methods uses a parabolic kernel function and cross-validated bandwidths. For an intuitive explanation see Burbidge and Davies, 1994.

Data

The SCF and CPS are large annual surveys that provide the standard data for the study of income distribution and related characteristics in their respective countries. Respondents are sampled in the spring of each year, after they have completed their income tax returns. Earnings and tax information are reported for the year preceding the survey (1997). . Sample sizes are 68,633 and 253,044 for the SCF and CPS, respectively.

Our sample includes only individuals aged 19 to 65 who were full-time, full-year workers. The definition of a full-year worker is someone who was employed for 52 weeks during the year of the survey. The self-employed are excluded. We also confine our attention to workers who had either graduated form high school and taken no further schooling, or who had received a bachelor's degree but had received no higher qualification. The definition of earnings includes only wage and salary income.

Since Canadian PIT is levied on an individual basis it is straightforward to obtain a measure of the total income tax paid by an individual in the SCF. Since some of this tax is due on non-labour income, however, the portion of the tax that is deemed to have been paid on labour earnings must be imputed. We have assumed that the taxes paid fell at the same rate on all an individuals' different sources of income.[22] We thus compute the ratio of taxes paid to total income, that is the average tax rate (ATR). We then multiply wage and salary income by the ATR to compute the tax paid on earnings.

In the U.S. case we apply the same procedure as in the Canadian case for individuals who are taxed as single taxpayers. However, in the case of married couples the procedure differs since couples are taxed on separate schedules from single individuals in the U.S. The great majority of married couples elect to be taxed jointly (it is extremely rare that there is a tax advantage, and there is generally a disadvantage, from being taxed separately). For individuals in such couples we compute the couple's joint

[22] An alternative would have been to assume that labour earnings are more "basic" than other income sources, and to have treated the latter as the marginal source of income. Since we view human and physical capital investments as being made simultaneously this approach does not appeal to us.

ATR and then apply this to husband's and wife's separate labour incomes to compute their respective taxes paid on earnings.[23]

Tables 3 and 4 show selected data from our age profiles for the 25th, 50th and 75th quantiles in Canada and the U.S. respectively. There is quite a pronounced hump-shape to the age profiles of earnings in Canada. In the U.S., on the other hand, female high school graduates, and male university graduates do not experience a decline of earnings at the end of the working life-cycle at the 50th and 75th quantiles. Also note that the greater inequality in the U.S. earnings structure shows up in the form of larger % differences between the 25th and 75th earnings quantiles than in Canada.

Average tax rates shown in Table 3 for Canada range between 9.5%, for the youngest 25th percentile female high school graduates, to 33.6% for 75th percentile male university graduates at age 43. In contrast, the range in the U.S. is from 6.8%, for the same young female group as in Canada, to 23.1% for the oldest male university graduates at the 75th percentile.

Assumptions Regarding Costs and Benefits of Education

We assume that individuals who attend university first register when they are 19, stay at university for four years, and enter the labour force at age 23. During this time they acquire a four-year bachelor degree. While in school, students forgo the income they would have earned in the labor market. In our base case, this lost income is based on the median earnings of high school graduates.[24] Given that students are only in school for eight months, based on full-time study, it is assumed they are able to work for the

[23] Once again, some might suggest that the "secondary earner's" income should be treated as marginal. In our view the days are past when one can reliably identify whose earnings are marginal in a married couple.
[24] Throughout the text we use median earnings of high school graduates as the counterfactual for *all* university graduates. Sensitivity to this assumption was tested by assuming, alternatively, that a university graduate at percentile X would have earned the amount observed to have been earned by a high school graduate of the same age at percentile X among high school graduates. Results are shown in the Appendix. The alternative counterfactual changes numerical results, but would leave our qualitative results mostly unchanged.

remaining four. Due to the search costs and uncertainty involved in finding a job, we calculate "summer earnings" as being one third of forgone earnings less 20%.[25]

Students also bear the costs of tuition and additional expenses of going to school. For Canadian students we use data from Statistics Canada to compute the average tuition and fee burden faced, based on Arts programs across Canada for the 1997-98 academic year. A figure of $3,253 was obtained for tuition, and we assume that additional direct costs add up to $1,000. For the U.S. we use data from *Trends in College Pricing* (1998), published by the College Board in the United States, to calculate corresponding values. The data used in this study are based on the College Board's *Annual Survey of Colleges*, which covers over 3,200 postsecondary institutions across the United States. Average tuition of $5,739 is obtained, and additional costs of $1,000 are assumed.[26]

Results

Table 5 shows our main results. It compares the median experience of men and women in Canada and the U.S. Note, first, that the estimated gross and net rates of return exceed 10% in all cases, except for Canadian males, whose net rate of return is 8.8%. The estimated rates of return are consistent with those from the recent labour economics literature. (See e.g. Ashenfelter and Krueger, 1994, and Card, 1995.) Note also that the gross and net rates of return to university education are higher for women than for men in both countries. This reflects the fact that the male-female wage differential is greater for high school than for university graduates.

Table 5 indicates that the ETRs for median earners are higher in Canada than in the U.S. - - 15.9% vs. 8.5% averaging across the sexes. This is a robust result that comes through consistently when we look across quantiles and use alternative assumptions. While the illustrative calculations of the last section suggested that U.S. ETRs were

[25] This approach is similar to that of Stager (1994)

[26] It should be noted that tuition fees are much more dispersed in the U.S. than in Canada. One consequence is that the $5,739 fee reflects the experience of a relatively small group. Students attending

likely, on average, lower than Canadian, the picture was much less clearcut. We believe the reason is that the earlier stylized calculations did not take account of the rise of earnings over the life-cycle, and therefore underestimated the extent to which Canadian earners move into the higher tax brackets, and are more heavily taxed over the lifetime.

It is also worth noting from Table 5 that men are indicated as facing higher ETRs than women in both Canada and the U.S. This is a reflection of the graduated marginal tax rates characterizing PIT systems in both countries. Since men, on average, earn more than women, they enter higher tax brackets on average and experience a greater reduction in their net returns to education. When combined with higher gross returns, the lower ETRs for women would seem to provide a plausible explanation for the trend in both countries for female postsecondary enrolments to rise relative to those of men.

Tables 6 and 7 break down our results by quantiles for men and women in the two countries. We see that estimated rates of return rise strongly with income, but that there is largely an absence of trend with income. ETRs are highest for low earners, but over a broad range they are trendless. We do see a rise for the 90^{th} percentile of male earners in Canada, but this is somewhat isolated. We find the comparative lack of trend with income difficult to interpret, and plan to investigate it more closely.

V. Implications for North American Economic Integration and Policy

There are two kinds of issues with regard to North American economic integration where the tax treatment of human capital is important. One has to do with the incentives to accumulate human capital within each country. The other has to do with incentives for the flow of human capital across the border. This latter issue has been much in the news recently in Canada, in the form of the brain drain controversy. We will comment on these two issues in turn.

---

public schools in-state had significantly lower fees, and students attending private or out-of-state public universities generally had much higher fees.

The analysis of human capital ETRs is an important building block in assessing tax effects on the domestic accumulation of different forms of capital, but it is not the whole story. We have seen that there is reason to believe human capital ETRs in Canada may on average be higher than in the U.S. Does this mean that Canadians will invest less in human capital than Americans? And does it mean that industry will be more intensive in physical capital in Canada than in the U.S.? The answer to both these questions is "not necessarily".

Whether Canadians will invest relatively less in human capital than Americans depends on the tax treatment of personal saving and investment, as well as on the human capital ETR. It has been calculated that in Canada about 70% of personal investment income is effectively tax-free. Middle and upper middle income Canadians can, for the most part, be viewed as on a consumption tax regime. A similar statement could be made for the corresponding group in the U.S. Given that many in this group will face significant positive ETRs on human capital there is an incentive effect acting in the direction of physical as opposed to human capital accumulation. This effect would seem to be stronger in Canada. On the other hand, turning to higher income levels, as taxpayers encounter positive taxation of personal investment income they can expect to do so at higher rates in Canada than in the U.S., given the higher mtr's under joint federal and provincial income taxes. The relative slant towards physical capital investment might therefore be less for the highest earners in Canada.

It is important to note that the relative incentive for personal investment in human vs. physical capital in the two countries, assuming that people "stay put" on their respective sides of the border, does not dictate which country's economy will be most human capital intensive. This is because (i) some people will migrate, and (ii) some physical capital will migrate. Taking the latter factor first, it is quite possible for there to be a bias towards physical capital investment at the personal level, but a bias against physical capital for the overall economy. It is well-known that Canada has suffered from a relatively low level of business investment over the last decade. This factor has been

blamed for much of our lagging productivity growth. It may well be that the economy as a whole is suffering from too low a physical to human capital ratio, while at the same time many individuals' personal investments are distorted away from human capital.

Although there has been increasing concern about emigration from Canada to the U.S., particularly of highly skilled workers, flows at the moment are still a small fraction of the labour force. Thus, the outflow of human capital from Canada to the U.S., overall, has probably had only a small impact on the existing stock of human capital. Nevertheless, in particular fields, for example computer programming and medical services, effects have already been sizeable. And, if current trends continue, flows will become increasingly significant.

It is important to note that even if ETRs were no different in Canada from those in the U.S. that would not make us "brain drain proof". This is because the emigration decision is affected by the tax treatment of the returns to education, but not by the treatment of costs. In other words, only half of what shows up in an ETR is at play in the emigration decision. If costs were more highly subsidized *and* returns more heavily taxed in Canada, Canadian ETRs would not differ greatly from U.S. ETRs. However, there would be a strong tax incentive to emigrate. Thus, *policy initiatives aimed at getting our human capital ETRs down will only have a payoff on the emigration front as well if they are directed at taxing returns less, rather than at subsidizing costs more.*

Summing up, personal incentives to invest in non-human capital also need to be considered, and international movements of both physical and human capital are important. It would therefore be naïve to evaluate tax policy towards human capital strictly in terms of the size of the tax wedge affecting personal investment in human capital. It does appear that Canadian face more of a tax disincentive for education than do Americans. However, if the policy goal is to promote gorwth and development in Canada, even via a strategy of building up a knowledge-based economy. it is not obvious that the chief priority must be reducing human capital ETRs. Reducing tax disincentives for firms to invest in Canada and for high earners to locate here may be more effective.

Further, considering the importance of these policy priorities indicates that the *way* that human capital ETRs are reduced is of crucial importance. Providing larger implicit or explicit subsidies for human capital investment will stimulate more education and training, but will not reduce the incentive for the highly educated and most able workers to relocate to the U.S. On the other hand, reducing marginal tax rates on upper-middle and high earners would both reduce the disincentive to invest in human capital and induce more high end workers to remain in Canada.

References

Appleby, John and Manon Rouleau, "Distribution by Rate of Return by Field of Study and Level of Education in Canada", Human Resources Development Canada, Ottawa, 2000.

Ashenfelter, O., and A. Krueger, "Estimates of the Economic Return to Schooling From a New Sample of Twins", *American Economics Review*, 84, December 1994: 1157-73.

Bar-Or, Yuval, John Burbidge, Lonnie Magee, and A. Leslie Robb, "The Wage Premium to a University Education in Canada, 1971-1991." *Journal of Labor Economics*;13(4), October 1995, pages 762-94.

Barro, Robert J. and Xavier Sala-I-Martin. "Economic Growth." New York; McGraw-Hill Inc. 1995.

Becker, Gary. "Human Capital." (1st ed.) *National Bureau of Economic Research.* New York: Columbia University Press, 1964.

Boadway, Robin, Neil Bruce and Jack Mintz, "Taxation, Inflation and the Effective Marginal Tax Rate on Capital in Canada", *Canadian Journal of Economics* 17 (1984), pp. 62-79.

Burbidge, John, and James Davies, "Household Data on Saving Behavior in Canada" in *International Comparisons of Household Saving*, ed. James Poterba, Chicago: University of Chicago Press for the NBER.

Burbidge, John, Lonnie Magee, and Leslie Robb, "Alternative Transformations to Handle Extreme Values of the Dependent Variable", *Journal of the American Statistical Association*, 83, 1988: 123-27.

Canadian Tax Foundation, *Finances of the Nation 2000*, Toronto, 2000.

Card, D., "Using Geographic Variation in College Proximity to Estimate the Return to Schooling", in *Aspects of Labour Market Behaviour: Essays in Honour of John Vanderkamp*, eds. L. Christofides, E.K. Grant, and R. Swidinsky. Toronto: University of Toronto Press, 1995.

Davies, James B. and France St-Hilaire. *Reforming Capital Income Taxation in Canada: Efficiency and Distributional Effects of Alternative Options*, Economic Council of Canada, 1987.

_____ and John Whalley. "Taxes and Capital Formation: How Important is Human Capital?" *in National Saving and Economic Performance*

edited by D.Bernheim and J.Shoven, Chicago, University of Chicago Press, 1991, pp.169-197.

Department of Finance, *Report of the Technical Committee on Business Taxation*, Ottawa, December 1997.

_____, *The Canadian Opportunities Strategy*, Ottawa, February 1998 budget paper.

Finnie, Ross, and Saul Schwartz, *Student Loans in Canada*, C.D. Howe Institute, Toronto, 1996.

Heckman James J. and Peter J. Klenow, "Human Capital Policy", University of Chicago, 1997, forthcoming in M. Boskin (ed.), *Understanding Economic Growth*, Hoover Institution Press, Stanford.

King, M.A., and D. Fullerton. *The Taxation of Income From Capital: A Comparative Study of the United States, United Kingdom, Sweden and West Germany*, Chicago: University of Chicago Press, 1984.

Laroche, Mireille, and Marcel Merette, "On the Concept and Dimensions of Human Capital in a Knowledge-Based Economy Context", *Canadian Public Policy* XXV (1), 1999, pp. 87-100.

Lucas, Robert E., "On the Mechanics of Economic Development", *Journal of Monetary Economics* 22(1), 1988, pp. 3-42.

Magee, Lonnie, John Burbidge, and Leslie Robb, "Computing Kernel-smoothed Quantiles From Many Observations", *Journal of the American Statistical Association*, 86, 1991: 673-77.

McKenzie, Kenneth J., Mario Mansour, and Ariane Brule, "The Calculation of Marginal Effective Tax Rates", Working Paper 97-15, Technical Committee on Business Taxation, Department of Finance, Ottawa, 1998.

Merette, Marcel, "Income Taxes, Life-Cycles and Growth", Working Paper No. 97-06, Department of Finance, Ottawa, 1997.

Morisette, Rene, "The Declining Labour Market Status of Young Men", in Statistics Canada, *Labour Markets, Social Institutions, and the Future of Canada's Children*, Publication No. 89-553-XPB, Ottawa, 1998, Chapter 3, pp. 31-50.

Murphy, Kevin, W. Craig Riddell, and Paul Romer, "Wages, Skills and Technologies in the United States and Canada" in Elhanan Helpman (ed.),

General Purpose Technologies and Economic Growth, Cambridge, Mass.: MIT Press, 1998, pp. 283-309.

Romer, Paul M. "Increasing Returns and Long Run Growth", *Journal of Political Economy* 94 (5), 1986, pp. 1002-1037.

Schultz, Theodore W., "Reflections on Investment in Man", *Journal of Political Economy* LXX (No. 5, Part 2), Supplement: October (1962), pp. 1-8.

Stager, A.A. David. "Returns to Investment in Ontario University Education, 1960-1990, and Implication for Tuition Fee Policy." *Council of Ontario Universities*, December 1994.

Vaillancourt, Francois. "The Private and Total Returns to Education in Canada, 1985." *Canadian Journal of Economics*;28(3), August 1995, pages 532-54.

_____. "The Private and Total Returns to Education in Canada, 1990: A Note", Centre de recherche et developpement en economique, Universite de Montreal, September 1997 (mimeo).

Table 1a

Illustrative Calculations of Effective Tax Rates (%), University Graduates, Canada, 2000

Sex and Age	Quantile	E*s	ms	mw	Case I ETR	Case II ETR	Case III ETR	Case IV ETR
Males, 23	25	$26,000	0.249	0.249	0.0	7.4	-2.4	-7.1
	50	34,476	0.254	0.331	10.3	15.8	8.7	6.1
	75	43,000	0.275	0.331	7.8	13.2	6.8	4.3
	90	58,000	0.302	0.331	4.2	9.1	3.8	1.7
Females, 23	25	22,000	0.249	0.249	0.0	8.3	-2.7	-8.3
	50	28,000	0.265	0.249	0.0	7.0	-2.2	-6.7
	75	36,608	0.261	0.331	9.5	15.0	8.1	5.5
	90	42,185	0.276	0.331	7.6	13.1	6.5	4.2
Males, 33	25	34,338	0.254	0.331	10.4	15.9	8.8	6.2
	50	43,004	0.276	0.331	7.6	13.1	6.5	4.2
	75	55,000	0.302	0.331	4.2	9.1	3.8	1.7
	90	70,475	0.315	0.4174	15.0	18.9	14.9	13.6

Notes: E*s = Full-time full-year earnings.
ms = Tax rate on forgone earnings.
mw = Tax rate on earnings increment due to o
Case I: No direct costs, no tax credit, no loans.
Case II: Direct costs = $5,500; no tax credit, no loans.
Case III: Direct costs = $5,500; Tuition and Education Amount Credit; no loans.
Case IV: Directs costs = $5,500; Tuition and Education Amount Credits; Student loan = $2,500.

Source: Authors' calculations. See text for details.

Table 1b

Illustrative Calculations of Effective Tax Rates (%), University Graduates, U.S., 2000

Sex and Age	Quantile	E*s	ms	mw	Case I ETR	Case II ETR	Case III ETR	Case IV ETR
Males, 23	25	$20,000	0.132	0.137	0.6	5.8	-2.3	-7.0
	50	28,985	0.137	0.137	0.0	4.3	-2.1	-5.5
	75	38,000	0.137	0.137	0.0	3.5	-1.7	-4.3
	90	48,000	0.160	0.263	12.3	15.3	11.5	10.5
Females, 23	25	18,000	0.124	0.137	1.6	6.6	-1.8	-6.8
	50	25,000	0.137	0.137	0.0	4.7	-2.3	-6.2
	75	32,155	0.137	0.137	0.0	4.0	-1.9	-5.0
	90	41,289	0.137	0.232	11	13.9	9.6	8.5
Males, 33	25	31,000	0.137	0.137	0.0	4.1	-2.0	-5.1
	50	42,000	0.137	0.254	13.5	16.3	12.2	11.3
	75	60,000	0.193	0.263	8.7	12	8.5	7.4
	90	79,130	0.225	0.263	4.9	8.2	5.3	4.0

Notes: E*s = Full-time full-year earnings.
ms = Tax rate on forgone earnings.
mw = Tax rate on earnings increment due to
Case I: No direct costs, no tax credit, no loans.
Case II: Direct costs = $7,500; no tax credit, no loans.
Case III: Direct costs = $7,500; Tuition Credit; no loans.
Case IV: Directs costs = $7,500; Tuition Credit; Student loan = $4,000.

Source: Authors' calculations. See text for details.

Table 2a

Illustrative Calculations of Effective Tax Rates (%), CPP and Sales Tax Effects, University Graduates, Canada, 2000

Sex and Age	Quantile	E*s	Case I ETR with CPP	Case IV ETR with CPP	Case I ETR with CPP and Sales Taxes	Case IV ETR with CPP and Sales Taxes
Males, 23	25	$26,000	0.0	-6.2	0.0	-1.8
	50	34,476	10.4	6.9	12.8	12.7
	75	43,000	3.4	0.0	4.2	3.7
	90	58,000	1.6	-0.9	1.9	1.6
Females, 23	25	22,000	0.0	-7.1	0.0	-2.0
	50	28,000	0.0	-5.8	0.0	1.8
	75	36,608	5.9	2.3	7.4	6.9
	90	42,185	3.3	0.0	4.1	3.6
Males, 33	25	34,338	10.7	7.2	13.2	13.1
	50	43,004	3.3	0.0	4.1	3.6
	75	55,000	1.6	-0.9	1.9	1.6
	90	70,475	13.5	12.2	16.9	17.3

Notes:
E*s = Full-time full-year earnings.
ms = Tax rate on forgone earnings.
mw = Tax rate on earnings increment due to on
Case I: No direct costs, no tax credit, no loans.
Case IV: Directs costs = $5,500; Tuition and Education Amount Credits; Student loan = $2,500.
CPP: Rate = 3.9% on earnings between $3,500 and $37,600.
Sales Tax: Rate = 13.4%

Source: Authors' calculations. See text for details.

Table 2b

Illustrative Calculations of Effective Tax Rates (%), CPP and Sales Tax Effects, University Graduates, United States, 2000

Sex and Age	Quantile	E*s	Case I ETR with Social Security	Case IV ETR with Social Security	Case I ETR with Soc. Sec. and Sales Taxes	Case IV ETR with Soc. Sec. and Sales Taxes
Males, 23	25	$20,000	-4.2	0.7	-1.1	-4.2
	50	28,985	-3.6	0	-1.6	-3.5
	75	38,000	-2.9	0.0	-1.3	-2.8
	90	48,000	12.7	14.3	15	2.4
Females, 23	25	18,000	-3.6	1.8	-0.2	-4.1
	50	25,000	-4.0	0.0	-1.7	-3.8
	75	32,155	-3.3	0.0	-1.5	-3.2
	90	41,289	10.6	12.8	13	1.6
Males, 33	25	31,000	-3.4	0	-1.5	-3.3
	50	42,000	13.7	15.7	16.2	2.6
	75	60,000	9.1	10.2	11	1.6
	90	79,130	-3.5	-3.2	-2.8	0.7

Notes: E*s = Full-time full-year earnings.
ms = Tax rate on forgone earnings.
mw = Tax rate on earnings increment due to one y
Case I: No direct costs, no tax credit, no loans.
Case IV: Directs costs = $7,500; Tuition Credits; Student loan = $2,500.
Social Security: Contribution Rate = 6.2% on earnings up to $76,200.
Sales Tax: Rate = 5.9%

Source: Authors' calculations. See text for details.

Table 3

Earnings and Income Tax Rates, Full-Time Full-Year Workers, Canada 1997, by Quantile, Smoothed Data

	High School Grads Quantile:			University Grads Quantile:		
Age	**25**	**50**	**75**	**25**	**50**	**75**
Males: Earnings						
23	16,119	23,000	34,008	26,000	34,476	43,000
33	25,169	35,175	46,020	34,338	43,004	55,000
43	30,000	39,453	52,942	43,834	53,621	69,992
53	30,000	41,962	56,004	45,000	56,992	70,000
63	26,000	34,000	44,822	40,000	47,003	67,592
Males: Average Tax Rates (%)						
23	11.9	17.3	20.8	16.2	21.9	22.0
33	16.0	19.6	23.7	21.4	25.4	29.8
43	19.5	23.4	25.8	22.1	26.5	33.6
53	15.0	21.3	25.9	22.5	29.7	30.7
63	15.8	19.6	22.3	23.3	24.1	28.4
Females: Earnings						
23	12,605	18,200	26,000	22,000	28,000	36,608
33	17,323	24,250	31,874	27,976	38,000	45,681
43	20,020	27,000	34,647	35,295	45,000	54,964
53	21,600	28,341	35,000	38,445	49,455	56,063
63	16,536	22,307	31,243	30,000	35,317	54,461
Females: Average Tax Rates (%)						
23	9.5	14.0	16.0	17.4	18.1	19.4
33	11.8	17.2	18.5	17.6	21.5	24.9
43	12.1	16.5	20.0	19.4	26.3	28.6
53	16.4	18.2	19.4	21.9	21.5	28.4
63	13.5	15.4	18.6	21.2	20.2	24.9

Source: Authors' calculations using the 1998 Survey of Consumer Finance. See text for details.

Table 4

Earnings and Income Tax Rates, Full-Time Full-Year Workers, U.S. 1997, by Quantile, Smoothed Data

	High School Grads Quantile:			University Grads Quantile:		
Age	25	50	75	25	50	75
Males: Earnings						
23	14,000	20,000	25,986	20,000	28,985	38,000
33	20,185	28,000	38,000	31,000	42,000	60,000
43	23,000	33,000	45,000	35,000	50,000	70,000
53	25,000	35,000	47,000	36,000	52,000	70,000
63	24,000	32,097	43,000	35,000	55,000	80,000
Males: Average Tax Rates (%)						
23	8.3	10.3	12.0	11.7	13.3	15.0
33	11.3	11.8	14.0	13.3	16.3	19.0
43	11.5	12.2	15.5	14.3	17.7	18.8
53	12.4	13.4	16.5	13.9	18.0	18.8
63	12.0	13.2	15.5	14.3	18.6	23.1
Females: Earnings						
23	12,000	16,000	20,280	18,000	25,000	32,155
33	15,000	20,000	27,000	25,000	33,000	45,000
43	16,000	22,000	30,000	25,000	34,000	48,000
53	16,000	22,000	30,000	25,000	35,000	48,129
63	15,648	22,300	30,000	19,000	30,000	43,000
Females: Average Tax Rates (%)						
23	6.8	8.1	10.1	11.6	12.4	14.5
33	7.4	10.6	11.5	12.4	15.0	18.6
43	8.1	10.7	12.0	12.4	14.7	18.7
53	8.1	10.7	12.0	12.4	14.6	18.4
63	9.1	11.8	12.0	10.3	13.5	17.4

Source: Authors' calculations using 1998 Current Population Survey. See text for details.

Table 5

Rates of Return and Effective Tax Rate for First Degree University Study, Canada and U.S. 1997

	Gross IRR	Net IRR	ETR
Male			
Canada	0.109	0.088	0.196
U.S.	0.128	0.116	0.094
Female			
Canada	0.140	0.123	0.121
U.S.	0.132	0.122	0.076

Note: Median earnings of university graduates are compared with the median earnings of high school graduates to measure the returns to education. Forgone earnings during education are based on median high school graduates' earnings.

Source: Authors' calculations using the 1998 Survey of Consumer Finance for Canada and the 1998 Current Population Survey for the U.S

Table 6

Canada/U.S. Quantile Comparison, Rates of Return and Effective Tax Rates for First Degree University Study, 1997, Males

	Country	Quantile													
		20	25	30	40	50	60	62.5	65	70	75	80	85	87.5	90
Gross IRR	Canada	-0.060	0.008	0.037	0.074	0.109	0.140	0.148	0.156	0.172	0.190	0.210	0.241	0.256	0.290
	U.S.	N/A	-0.009	0.046	0.092	0.128	0.162	0.171	0.179	0.196	0.215	0.236	0.264	0.278	0.299
Net IRR	Canada	-0.115	-0.003	0.027	0.062	0.088	0.112	0.122	0.133	0.146	0.163	0.176	0.212	0.222	0.231
	U.S.	N/A	-0.032	0.035	0.082	0.116	0.149	0.156	0.164	0.180	0.198	0.217	0.242	0.255	0.273
ETR	Canada	-0.917	1.375	0.270	0.162	0.193	0.200	0.176	0.147	0.151	0.142	0.162	0.120	0.133	0.203
	U.S.	N/A	-2.538	0.237	0.114	0.097	0.082	0.086	0.082	0.081	0.080	0.082	0.084	0.084	0.085

N/A = Not Available

Note: Returns on education are measured by the difference between earnings of full-time full-year university graduates in 1997 at the respective quantiles vs. median earnings of high school graduates over the life-cycle. Forgone earnings during education are based on median earnings of high school gradutes.

Source: See Table 5.

Table 7

Canada/U.S. Quantile Comparison, Rates of Return and Effective Tax Rates for First Degree University Study, 1997, Females

	Country	Quantile													
		20	25	30	40	50	60	62.5	65	70	75	80	85	87.5	90
Gross IRR	Canada	0.045	0.068	0.087	0.114	0.140	0.166	0.173	0.180	0.194	0.210	0.223	0.238	0.247	0.258
	U.S.	N/A	0.037	0.068	0.104	0.132	0.162	0.169	0.175	0.189	0.207	0.227	0.253	0.266	0.282
Net IRR	Canada	0.035	0.056	0.078	0.103	0.123	0.149	0.156	0.160	0.172	0.187	0.197	0.209	0.218	0.229
	U.S.	N/A	0.025	0.060	0.094	0.122	0.150	0.156	0.157	0.174	0.191	0.207	0.231	0.243	0.252
ETR	Canada	0.222	0.176	0.103	0.096	0.121	0.102	0.098	0.111	0.113	0.110	0.117	0.122	0.117	0.112
	U.S.	N/A	0.319	0.113	0.098	0.074	0.075	0.077	0.103	0.079	0.077	0.086	0.085	0.086	0.108

N/A = Not Available

Note: See note to Table 6.

Source: See Table 5.

Table A1

"Clone" VS. Median Case, Lifetime Calculations using SCF data, Canadian Males, 1997

	Case	Quantile													
		20	25	30	40	50	60	62.5	65	70	75	80	85	87.5	90
Gross IRR	Clone	0.116	0.117	0.119	0.116	0.109	0.097	0.094	0.092	0.088	0.085	0.082	0.085	0.085	0.090
	Median	-0.060	0.008	0.037	0.074	0.109	0.140	0.148	0.156	0.172	0.190	0.210	0.241	0.256	0.290
Net IRR	Clone	0.099	0.101	0.103	0.099	0.088	0.074	0.078	0.078	0.070	0.067	0.065	0.072	0.072	0.062
	Median	-0.115	-0.003	0.027	0.062	0.088	0.112	0.122	0.133	0.146	0.163	0.176	0.212	0.222	0.231
ETR	Clone	0.147	0.137	0.134	0.147	0.193	0.237	0.170	0.152	0.205	0.212	0.207	0.153	0.153	0.311
	Median	-0.917	1.375	0.270	0.162	0.193	0.200	0.176	0.147	0.151	0.142	0.162	0.120	0.133	0.203

Note: The Median Case is the same as that used in Tables 5 - 7. The "Clone" case assumes that a university graduate would have earned the same amount as a high school graduate at the same quantile (among high school graduates) if the university graduate had not gone to university. Forgone earnings are also based on the earnings of high school graduates at the corresponding quantile.

Source: See Table 5.

Table A2

"Clone" VS. Median Case, Lifetime Calculations Using CPS Data, U.S. Males, 1997

	Case	Quantile													
		20	25	30	40	50	60	62.5	65	70	75	80	85	87.5	90
Gross IRR	Clone	0.117	0.120	0.122	0.125	0.128	0.134	0.136	0.137	0.140	0.142	0.145	0.151	0.155	0.160
	Median	N/A	-0.009	0.046	0.092	0.128	0.162	0.171	0.179	0.196	0.215	0.236	0.264	0.278	0.299
Net IRR	Clone	0.110	0.113	0.114	0.116	0.116	0.121	0.122	0.125	0.126	0.127	0.129	0.134	0.135	0.141
	Median	N/A	-0.032	0.035	0.082	0.116	0.149	0.156	0.164	0.180	0.198	0.217	0.242	0.255	0.273
ETR	Clone	0.058	0.056	0.069	0.075	0.097	0.094	0.103	0.088	0.101	0.106	0.110	0.114	0.130	0.120
	Median	N/A	-2.538	0.237	0.114	0.097	0.082	0.086	0.082	0.081	0.080	0.082	0.084	0.084	0.085

N/A = Not Available

Note: See note to Table A1.

Source: See Table 5.

Table A3

Clone VS. Median Case, Lifetime Calculations Using SCF Data, Canadian Females, 1997

	Case	Quantile													
		20	25	30	40	50	60	62.5	65	70	75	80	85	87.5	90
Gross IRR	Clone	0.157	0.158	0.158	0.148	0.140	0.136	0.135	0.133	0.129	0.120	0.116	0.108	0.104	0.097
	Median	0.045	0.068	0.087	0.114	0.140	0.166	0.173	0.180	0.194	0.210	0.223	0.238	0.247	0.258
Net IRR	Clone	0.142	0.141	0.144	0.136	0.123	0.121	0.121	0.116	0.110	0.102	0.097	0.088	0.091	0.083
	Median	0.035	0.056	0.078	0.103	0.123	0.149	0.156	0.160	0.172	0.187	0.197	0.209	0.218	0.229
ETR	Clone	0.096	0.108	0.089	0.081	0.121	0.110	0.104	0.128	0.147	0.150	0.164	0.185	0.125	0.144
	Median	0.222	0.176	0.103	0.096	0.121	0.102	0.098	0.111	0.113	0.110	0.117	0.122	0.117	0.112

Note: See note to Table A1.

Source: See Table 5.

Table A4

Clone VS. Median Case, Lifetime Calculations Using CPS Data, U.S. Females, 1997

	Case	Quantile													
		20	25	30	40	50	60	62.5	65	70	75	80	85	87.5	90
Gross IRR	Clone	0.117	0.121	0.127	0.129	0.132	0.135	0.136	0.136	0.137	0.141	0.145	0.154	0.156	0.156
	Median	N/A	0.037	0.068	0.104	0.132	0.162	0.169	0.175	0.189	0.207	0.227	0.253	0.266	0.282
Net IRR	Clone	0.106	0.111	0.119	0.119	0.122	0.123	0.124	0.118	0.123	0.126	0.128	0.137	0.139	0.135
	Median	N/A	0.025	0.060	0.094	0.122	0.150	0.156	0.157	0.174	0.191	0.207	0.231	0.243	0.252
ETR	Clone	0.091	0.083	0.064	0.077	0.074	0.086	0.086	0.131	0.102	0.108	0.114	0.110	0.109	0.133
	Median	N/A	0.319	0.113	0.098	0.074	0.075	0.077	0.103	0.079	0.077	0.086	0.085	0.086	0.108

N/A = Not Available

Note: See note to Table A1.

Source: See Table 5.

Notes Alice Nakamura

Brandy Green paper does not deliver. Empirical work ok
Lacks simulations

Non Ord K stock growth is very small in all 4 countries
don't include unE rate or other CT controls (restrictions)

A.N.: Cause & Effect ≠ fully understood

K allocations are influenced by available HC
(more than yrs of schooling)

ASSESSING RECENT PATTERNS OF FOREIGN DIRECT INVESTMENT IN CANADA AND THE UNITED STATES

Steven Globerman
Western Washington University
College of Business and Economics
Bellingham, WA 98225-9170
Tel 360.650.7708 – Steven.Globerman@wwu.edu

Daniel Shapiro
Simon Fraser University
Faculty of Business Administration

May, 2001

Prepared for Industry Canada Conference on "North American Linkages: Opportunities and Challenges", June 20-22, 2001, Calgary, Alberta.

INTRODUCTION

On different occasions, policymakers have expressed concerns about the ability of the Canadian economy to compete effectively against the United States economy for foreign direct investment (FDI). Notable instances took place when Canada was negotiating the Canada-U.S. Free Trade Agreement (CUSTA), and the North American Free Trade Agreement (NAFTA). In both cases, opponents of the Agreements argued that the associated trade and investment liberalization would lead to the closure of U.S. affiliates in Canada with the subsequent repatriation of direct investment capital. It was also argued that Canadian multinationals would relocate investment capacity to the U.S. market and serve the Canadian market primarily through exports.[1]

The primary basis for the concerns expressed about reductions in FDI in Canada is the perception that the United States enjoys a strong location advantage related to its large domestic market. The latter gives rise to agglomeration economies that, in turn, make it cheaper for multinational companies (MNCs) to locate activities in the United States. The components of agglomeration economies are positively related to the size and scope of economic activities in a region. In this regard, large concentrations of production capacity in urban U.S. regions are alleged to contribute to external efficiencies benefits that are captured by manufacturing and service companies located in those regions.[2] Transportation cost savings are also associated with being located in proximity to large concentrations of consumers in urban U.S. areas.

More recently, Canada's impaired ability to attract inward FDI has been linked to relatively high personal and corporate tax rates, "excessive" government regulation and barriers to inter-provincial trade. In particular, Canada's relatively high personal tax rates are seen by many as contributing to an out-migration of highly skilled Canadian workers and, hence, to an overall scarcity of scientific and technical talent in Canada relative to the United States. As a consequence, firms in "knowledge-intensive" industries are unlikely to view Canada as enjoying a location advantage in the relevant activities (McCallum, 1999).[3] By balkanizing an already small domestic market, government regulations and policies restricting competition within and across provincial boundaries

dissipate potential agglomeration economies in Canada. This further discourages inward FDI, since the latter, as noted above, is strongly and positively related to larger relevant geographic markets.[4]

Another factor allegedly discouraging FDI in Canada is the relatively small share of Canadian industrial activity that is concentrated in high-technology industries.[5] Given the growth of FDI in "New Economy" industries such as telecommunications, software and financial services, a dearth of technological centres of excellence in Canada would presumably discourage MNCs from establishing affiliates in Canada in order to benefit from technology spillovers and related benefits. Conversely, Canadian companies would presumably be encouraged to expand their presence abroad, especially in technologically dynamic U.S. locations.

On the other hand, advantages to operating in Canada have also been identified. For example, Canada enjoys relatively low costs of "doing business" compared to many other developed countries, including the United States. Moreover, free trade between Canada and the United States has been trade-creating (Head and Ries, 1999). Since FDI and trade tend to be complementary, increased bilateral trade presumably enhances the benefits of bilateral FDI. That Canada has not suffered any significant overall deterioration of its relative cost position compared to the United States is suggested by the fact that, as a percentage of bilateral trade, Canada's trade surplus is higher than it was in 1970 and about the same as immediately preceding the CUSTA (Head and Ries, 1999). To be sure, the dramatic depreciation of the Canadian dollar relative to the U.S. dollar over the past three decades has been an important factor in maintaining relative costs and does attest to a decline in Canadian productivity relative to U.S. productivity in trade-related sectors.[6]

While it is a matter of argument whether a depreciating currency mitigates or exacerbates domestic productivity problems in the long-run, the inference to be drawn from the trade data is that the depreciation of the Canadian dollar has countervailed Canada's relatively poor productivity performance compared to the United States. The

dramatic decrease in the value of the Canadian dollar, along with decreasing relative real wage rates in Canada, have also presumably mitigated any productivity-related deterioration in Canada's relative attractiveness as a location for FDI.[7] The broad purpose of this paper is to assess whether there has been any recent systemic deterioration in Canada's location advantage for FDI relative to the United States. A specific objective is to identify the reasons for any substantial differences in recent patterns of FDI in Canada and the United States.

The paper proceeds as follows. The following section sets out and discusses data on aggregate FDI flows for Canada and the United States for the post-1960 period. Particular attention is paid to FDI patterns during the 1980s and 1990s. Next, we present and evaluate FDI data disaggregated by country of origin, as well as by industrial sector, in order to identify the contributions that geographical and sectoral differences in FDI flows make to observed differences in overall Canada-U.S. FDI patterns. We then consider various hypotheses regarding Canada's alleged location disadvantage relative to the United States against the background of historical FDI patterns. We conclude with an assessment of Canada's future FDI prospects, as well as a brief discussion of policy options.

AGGREGATE FDI FLOWS

In this section, we present and consider various time series describing inward and outward FDI flows for Canada and the United States. A relevant conceptual issue is whether it is preferable to use stock or flow measures of FDI for the comparison. Obviously, to the extent that a country is characterized by a relatively long history of inward and outward FDI flows, even relatively large recent changes in inward or outward FDI behaviour might be obscured by the use of stock measures. That is, changes in stocks on a year-to-year basis will be small when they take place against an absolutely large accumulated base value. On the other hand, accumulated stock values of FDI might influence the magnitude of FDI flows, either because of diminishing, or increasing, returns to FDI investments. Hence, a focus on flows might fail to portray accurately long-run incentives for inward and outward FDI for a region. Nevertheless, since much of the

concern about Canada's diminishing location advantage is of relatively recent origin, it seems appropriate to focus on FDI flows, especially those over the past decade or two.

If one were to rely on Canadian data alone, it would be hard to argue that Canada's position has deteriorated. Figure 1 provides time-series data on Canadian FDI inflows and outflows for the period 1927-2000. It is readily seen that both series increase rapidly in the period following the free trade agreements, and particularly after 1993. The increase in FDI inflows was particularly marked in the last two years so that a negative net position for most of the 1990s became positive in the last two years. The rapid increase in outflows can be seen as an indication of relative weakness, but as we discuss below, it can also be seen as an indication of the competitive advantage of Canadian companies. Of course, the issue is whether Canada's relative position has deteriorated, and that requires comparison with the United States.

The International Monetary Fund (IMF) reports net direct FDI flows (in nominal U.S. dollars) from 1961-1999. Separate estimates for direct investment inflows and outflows are also available which provides perspective on the observed pattern of net FDI. Globerman and Shapiro (2001) discuss and empirically document the fact that countries that attract relatively large inflows of FDI are also likely to be characterized by relatively large FDI outflows. This is because the factors that make a country attractive to foreign-owned MNCs will also encourage and support the emergence and growth of domestically owned MNCs. The latter, in turn, will engage in outward FDI. As a consequence, relatively small negative values of net FDI should not necessarily be interpreted as evidence of a location disadvantage with respect to MNC activities. However, a trend of large negative net FDI flows might signal a growing location disadvantage that, in turn, is encouraging less inward FDI by foreign firms and more outward FDI by domestic firms.

Net FDI Flows

Table 1 summarizes average net FDI flows for Canada and the United States over five year periods from 1961-1999. The data in the table highlight differences in the

behaviour of the two time series. In particular, from 1961-1975, Canada experienced net inflows of FDI, whereas the United States experienced net outflows. However, that pattern is reversed in 1976, as Canada is characterized by net FDI outflows from 1976-1999, whereas the United States is generally characterized by net inflows. Note, however, that the IMF data do not extend to 2000 when Canada experienced net FDI inflows (Figure 1). Moreover, as a percentage of GDP, Canada's net position actually improved in the 1990s. Nevertheless, there are broad differences in the two time series as illustrated by the simple correlation coefficient between Canadian and U.S. net FDI flows. The latter equals -.468 for annual values of net FDI over the period 1976-1999.[8]

While the Canadian and U.S. net FDI patterns differ in their signs over most of the sub-periods shown in Table 1, the differences are largely tempered by the fact that the net FDI flows are relatively small in most sub-periods. For example, the net outflows for Canada over the 1990s are generally less than 10 percent of the value of gross FDI inflows over that period. Thus, it seems fair to say that inward and outward FDI flows for Canada were relatively balanced over that period, as were flows for both countries in the 1960s and 1970s. In this context, 1986-1990 and 1996-1999 appear to be sub-periods in which relatively large FDI inflows to the United States contrast sharply with relatively balanced FDI flows for Canada.

Gross FDI Flows

Data reported in Table 2 document recent gross FDI inflows and outflows for the two countries. It is obvious from the data in Table 2 that both countries experienced relatively large and consistent increases in both FDI inflows and outflows over the period of the 1990s. However, the increase in inflows was relatively larger in the United States. For example, the value of gross FDI inflows in 1999 is around 6 times the value of FDI inflows in 1990 for the United States, whereas gross FDI inflows to Canada in 1999 are only around 3 times the 1990 value. On the other hand, gross outflows increased at much more comparable rates. Thus, gross outflows in 1999 are approximately 5 times the value of gross outflows in 1990 for the United States. For Canada, gross outflows in 1999 are slightly less than 4 times the value of gross outflows in 1990.

It is also obvious from Table 2 that the absolutely and relatively faster growth of inward FDI in the United States during the 1990s is heavily conditioned by the 1999 data. For example, gross inflows of FDI to the United States in 1998 are around 4 times higher than the 1990 value. Gross inflows to Canada in 1998 are slightly less than 3 times higher than the 1990 value. Inward FDI experiences are even more similar if the periods being compared are 1990-1997. Over this period, gross FDI inflows approximately doubled in the United States, whereas they increased around 1.5 times in Canada.

Examining the ratio of U.S./Canada inflows makes much the same point. The ratio increased over the period 1994-1999, reaching its peak in 1999. However, while the ratio rose over that period, it is not higher than its average value for the years 1988-1993. Clearly, care must be exercised when asserting that Canada has suffered from a declining share of inward FDI to North America in recent years, since differences in the inward FDI experiences of Canada and the United States are sensitive to the inclusion or exclusion of specific years that may, in fact, represent anomalies.

Table 2 also reports gross FDI flows as a percentage of gross fixed capital formation for the two countries. It shows that gross FDI flows as a percentage of fixed capital formation increased over the 1990s in both countries. Moreover, for both countries, there is an accelerated increase in the relevant percentages for both inflows and outflows in the latter half of the 1990s. Especially marked increases are apparent in 1998, and even larger increases would presumably be reported for 1999 were data on fixed capital formation available for that year at the time of writing.

What is especially interesting to note in Table 2 is that gross FDI inflows as a percentage of fixed capital formation are higher in Canada than in the United States over the latter part of the 1990s. It is perhaps relevant that gross FDI outflows as a share of fixed capital formation are higher in Canada than in the United States over the 1990s, with the difference being more marked than in the case of FDI inflows. Nevertheless, with both FDI inflows and outflows as a percentage of fixed capital formation being

higher in Canada than in the United States, it is difficult to infer that the behaviour of gross FDI flows signals that Canada is becoming a relatively less attractive place for multinational investment.

Additional evidence highlighting differences between the United States and Canada in recent FDI experiences is provided in Table 3, which provides data on shares of OECD inflows and outflows accounted for by Canada and the United States. The data in Table 3 support broad inferences drawn from the preceding tables. The relative increase in FDI inflows to the United States towards the end of the 1990s is distinctly different from the Canadian experience. Specifically, while Canada's share of total OECD inflows of FDI is relatively constant over the period 1996-1999, it did fall somewhat in 1998/99, and this decline coincided with an increase in the U.S. share. Thus, the ratio of the U.S./Canada share rose to a peak in 1998/99. Again, the important influence of very recent FDI inflow experiences in the United States is highlighted. With regard to FDI outflows, the U.S. share has tended to decrease over the sample period, whereas Canada's share is relatively stable. Thus, it appears to be the case that a large increase in OECD investment in the U.S. in 1998-99, combined with a relative reduction in outflows of FDI from the United States, resulted in relatively larger net inflows to the United States.

Summary

Swimmer (2000) and others have pointed to Canada's declining share of inward FDI to North America as evidence of Canada's decreasing attractiveness to MNC investors. The data presented in this section serve as a caution against drawing this conclusion based primarily upon gross and net FDI flows. In particular, the surge in inward FDI to the United States in 1998 and 1999 heavily influences any bilateral comparisons covering the past decade or two. In addition, there is evidence that inflows into Canada increased significantly in 2000, a year for which we do not have comparative data.

To the extent that the recent surge in inward FDI to the United States is only weakly related to "traditional" determinants of FDI, it may be misleading to draw any

strong policy inferences from that experience. Moreover, conclusions about Canada's decreasing attractiveness to foreign investors are arguably best viewed within the context of capital investment more generally. That is, capital investment, in general, proceeded more rapidly in the United States than in Canada in the latter part of the 1990s, arguably the result of stronger economic growth in the United States. Indeed, FDI, specifically, accounted for a relatively larger share of capital formation in Canada than in the United States suggesting that MNCs may have found Canada a more attractive place to invest than the United States "holding constant" cyclical economic conditions in the two countries.

FDI FLOWS BY COUNTRY OF ORIGIN AND INDUSTRIAL SECTOR

The data presented in the preceding section documented that FDI inflows to the United States increased at a more rapid rate in the latter half of the 1990s than did FDI inflows to Canada. In this section, we consider whether and to what extent this difference is specific to individual investing countries or to particular industries. To the extent that MNCs from a specific country have historically favoured investing in the United States rather than Canada, an increase in the propensity of that country to invest abroad would presumably contribute to an increase in FDI flows to the United States relative to Canada, all other things constant. This is more likely the stronger are agglomeration economies for national groups of investors. Duffield and Munday (2000), among others, document the role that agglomeration economies play in encouraging a geographical concentration of FDI by investors located in specific countries. To the extent that increased FDI inflows to the United States primarily reflect the behaviour of investors from one or a few countries, one might hesitate to draw the inference that there has been any deterioration in Canada's location advantages relative to the United States. Rather, it might reflect episodic changes in country sources of FDI that are characterized by location preferences tied to accumulated past investments.

To the extent that FDI is becoming increasingly concentrated in specific industries, in particular New Economy industries, differences in U.S. and Canadian patterns of FDI might be seen to be a function of differences in the mix of industries in

the two countries. Specifically, to the extent that FDI is increasingly attracted to New Economy businesses, the concentration of such businesses in the United States would place Canada at an increasing location disadvantage compared to the United States. Any such finding would focus policy attention on the issue of how to encourage a faster transformation of Canada's industrial structure towards a greater representation of faster growing, technology-intensive industries.

Locational Patterns

Some perspective on the first issue can be gained by identifying those countries whose FDI outflows increased relatively rapidly over the period of the 1990s. In this regard, Table 4 reports the percentage increases in FDI outflows over the period 1996-1999 for leading OECD countries, as well as the share of total OECD outward FDI accounted for by each country. As can be seen, among the major OECD countries, the percentage increases in FDI outflows are especially noteworthy for the United Kingdom, France and Germany. This development could be expected to contribute to faster inward FDI growth in the United States than in Canada. A reason is that European FDI in the United States has been absolutely and relatively greater than European FDI in Canada.

The importance of European location preferences is illustrated by data in Table 5. The latter table reports the share of inward direct investment to Canada and the United States originating in different regions. Noteworthy of emphasis is the virtual disappearance of European investors as sources of inward FDI to Canada in the latter part of the 1990s. Indeed, investors based in the "NAFTA zone", essentially meaning the United States, became increasingly dominant sources of inward FDI to Canada in the 1990s. At the same time, European investors became essentially the dominant source of inward FDI to the United States with a major concomitant decline in the share of inward FDI coming from outside of Europe and North America. Furthermore, the stock of total inward direct investment in the United States owned by French, German and U.K. investors amounts to around 40% of the total stock of FDI in the United States.[9] In contrast, the entire stock of EU-originated direct investment in Canada is only around 20% of the total stock of FDI in Canada.

The relatively rapid growth of outward FDI from the large EU countries, combined with the latter's overrepresentation in U.S. FDI stocks, could be expected to contribute to a faster growth of inward FDI in the United States than in Canada for reasons discussed above. To be sure, this observation does not explain the historical preference of large European-based companies to invest in the United States. An identification of the source of this preference is presumably a prerequisite to mitigating or reversing the preference. On the basis of other persuasive evidence, we would argue that the preference largely derives from the larger U.S. domestic market combined with sector and nationality-specific agglomeration economies (Globerman, forthcoming and Globerman and Shapiro, 2001). An implication is that Canadian government policies promoting faster real economic growth will also indirectly promote inflows of FDI from European and other developed countries. We shall have more to say about this in the concluding section of the paper.

International Mergers and Acquisitions

Another potentially important recent development for FDI location patterns is the disproportionate share of mergers and acquisitions (M&As) in total FDI flows in recent years. The dramatic increase in international M&A activity is illustrated in Figures 2 and 3. Worth highlighting is the surge of acquisitions made by EU-based investors in the late 1990s and the growing prominence of U.S.-based acquired companies in that period. The importance of M&As as a vehicle for FDI is illustrated by the fact that, by 1999, cross-border M&As (valued at U.S.$720 billion) accounted for the vast majority of the total value of global FDI flows (valued at U.S.$865 billion).[10]

The relevance of the growth in international M&A activity to recent differences in U.S.-Canadian patterns of FDI is suggested by the observation that over the period from 1986- 1998, there was an almost perfect correlation between total recorded FDI in the United States and total acquisitions of U.S. companies by foreign investors (Thomsen, 2000). Moreover, around 80% of FDI in the United States was accounted for by cross-border M&As, whereas the latter accounted for "only" around 60% of the total value of

global direct investments (Thomsen, 2000, p.5). Thomsen infers that the absolutely and relatively robust U.S. economy, combined with the highly liquid and relatively deregulated U.S. equity markets, were special impetuses to increased foreign M&A activity in the United States.

To the extent that the United States was an especially attractive location for foreign M&A activity, the growth of such activity in the 1990s would have contributed further to increased inward FDI in the United States compared to Canada. A related and supporting development is the emergence of Western European investors, and especially those in the United Kingdom, as increasingly important participants in international M&A activity. Table 6 reports the sources of inward and outward international M&A deals for select countries. It is seen that the United Kingdom displaces the United States as the single most important acquiring country in international M&A deals in 1999. By the same token, the United States is an increasingly favoured location for international acquisitions compared to Canada in 1998 and 1999.

In summary, recent differences in the inward FDI experiences of Canada and the United States arguably strongly reflect the growing importance of Western European investors, especially those located in the United Kingdom, in international M&A activity combined with a strong preference of those investors for making acquisitions in the United States. As a consequence of Canada's increasing reliance on the United States as a source of FDI inflows, and the relative decline in U.S. – originated M&A purchases (Table 6), Canada's relative position as an FDI recipient declined in the latter half of the 1990s.

Sectoral Patterns

An obvious question raised by the data presented in the preceding section is why European investors engaged in M&A activity exhibited such a marked preference for the United States, rather than Canada, as the location for their takeover activities in the latter part of the 1990s. One possible reason is that favoured industrial sectors are more heavily represented in the United States. In particular, European investors preferring acquisitions

in New Economy sectors might find acquisition targets disproportionately located in the United States.

Table 7 reports cross-border M&A activity by sector of the selling firm. On a worldwide basis, the tertiary sector is the broad industrial sector accounting for the majority of the value of cross-border acquisitions, and the primary sector accounts for the lowest percentage. Within the tertiary sector, communications and finance account for the majority of acquisitions. Indeed, in 1999, the communications sector accounted for almost one-quarter of all acquisition activity. The share of acquisitions in the tertiary sector has been increasing over time. The share of M&A activity accounted for by the tertiary sector was 28.6% in 1987, and averaged 44.7% for the period 1987-1996.

In comparison to worldwide patterns, M&A activity in the United States was even more disproportionately concentrated in the tertiary sector and in communications and finance specifically, at least in 1999. For example, in that year, over half of all foreign acquisitions in the United States were concentrated in the latter two sectors. However, in 1998, over 70% of foreign acquisitions in the United States were in the secondary sector, whereas less than 30% were in the tertiary sector. Indeed, in 1998, acquisitions in the petroleum and motor vehicle sectors accounted for almost half of all foreign acquisitions in the United States for that year. The point that might be made here is that the sectoral pattern of acquisitions in the United States varies substantially from year-to-year, and there is no dominant pattern of New Economy acquisitions, at least in recent years. Rather, it would appear that foreign acquisitions are motivated by the strategic imperatives of specific acquirers, and those imperatives vary from year-to-year as the identities of acquiring companies and sectors change.

The extent to which Canada has been at a "disadvantage" in terms of attracting corporate acquisitions of domestic companies is further considered with attention to Table 8. The latter shows the percentage inflows of FDI into Canada and the United States by broad industrial sector. One basic point that is underscored by the information in Table 8 is that sectoral concentrations of FDI inflows vary considerably from year-to-

year. This observation makes it difficult to argue that the absolutely and relatively larger flows of inward FDI to the United States in the latter part of the 1990s are the consequence of New Economy businesses being more heavily represented in the United States than in Canada. Moreover, for the time period covered in Table 8, there is no evidence that Canada has had relatively less inward FDI in the tertiary sector than the United States, at least on any systematic basis, including the important and increasingly technology-intensive financial sector.

One difference that is notable in Table 8 is the significantly larger proportion of inward FDI in the secondary sector for the United States compared to Canada for the years 1996-1998. However, as Table 7 suggests, foreign acquisitions made in U.S. secondary industries in 1997 and 1998 were not concentrated in obvious New Economy sectors such as electronics or machinery.

Summary

A consideration of sources of origin of inward FDI to North America in the latter part of the 1990s reveals certain strong patterns. One is that major Western European companies increased their outward FDI disproportionately in the latter part of the 1990s. In particular, outward FDI from the United Kingdom accelerated substantially in 1998 and 1999. The large Western European countries, particularly the United Kingdom, had relatively large accumulated stocks of FDI in the United States and relatively small accumulated stocks of FDI in Canada. All other things constant, agglomeration economies associated with the relatively large historical investments in the United States would have predisposed European investors to concentrate their more recent outward FDI in the United States.

Another operative factor in the latter part of the 1990s is the prominence of mergers and acquisitions as the dominant mode of FDI. All else constant, the more liquid U.S. securities markets are more favourable venues for corporate acquisitions than Canadian securities markets, although this still begs a question as to why U.S. companies were so attractive to foreign acquirers. The hypothesis that U.S. companies are attractive

acquisition targets because they are concentrated in New Economy activities, and that European companies need to acquire U.S. companies in order to obtain needed technological expertise, is contradicted by data which show no concentration of inward FDI in the United States in the late 1990s in conventionally defined technology-intensive sectors. Indeed, sectoral patterns of foreign acquisitions in North America are fairly volatile on a year-to-year basis.

It would, therefore, seem that FDI patterns in North America in the 1990s strongly reflect strategic corporate acquisitions made by European MNCs pursuant to motives that are relatively specific to the individual acquisitions. In this context, it is unclear that the acquisition pattern has very much to say about Canada's general location advantage compared to the United States. As such, policy concerns in Canada related to recent international M&A behaviour may be, at best, premature and, at worst, misplaced. In the following sections, we expand upon these latter points.

EVALUATING HYPOTHESES ABOUT CANADA'S DECLINING LOCATION ATTRACTIVENESS

In this section, we address in more detail the likelihood that differences between Canada and the United States in recent FDI patterns reflect location disadvantages for Canada.

Tax Differences

As noted in an earlier section, it is frequently argued that relatively high Canadian taxes have discouraged inward FDI and will continue to do so unless they are substantially reduced. Any detailed evaluation of this assertion is challenged by several complexities. One is how to measure the *ex ante* tax burden facing potential foreign investors. In this regard, marginal tax rates are more appropriate than average tax rates. In addition, effective tax rates are conceptually more appropriate than nominal tax rates. Thus, the relevant tax burden is the rate of tax on the next dollar of income after all relevant tax deductions, tax credits and tax expenditures are taken into account. Obviously, this tax burden will vary by industry source, by business location, and by size

of company, among other things. It will also be conditioned by the ability of investors to alter the reported geographic sources of income and expenses among tax jursidictions.[11] As a consequence, even comparisons of marginal effective tax rates across broad industrial categories of foreign investors in different countries may be misleading, especially given differences across countries in the industrial distribution of economic activity.[12]

It is beyond the scope of this study to attempt any original empirical analysis of the linkages between tax differences among North American government jurisdictions and FDI patterns in North America. Rather, with the aforementioned caveats in mind, we briefly review and assess the available literature focusing on two issues: 1. What are the differences in the fiscal regimes of Canada and the United States? 2. How important are differences in taxes to foreign investors?

A. Tax Regimes

The relevant effective tax rates to compare across countries are presumably not just at the corporate level, but at the individual level as well. Indeed, it is argued by some observers that high marginal personal tax rates are encouraging outward migration of highly educated Canadians to the United States, especially under the NAFTA Visa provisions.[13] This emigration, in turn, contributes to a reduction in the stock of human capital in Canada. The latter development makes FDI in Canada less profitable than it would otherwise be. Of course, comparisons of marginal personal tax rates are also complicated by a variety of considerations similar to those relevant to comparing corporate tax rates, including the domicile of the taxpayer and differing national treatments of earned versus unearned income.

Chen (2000) shows that marginal effective tax rates vary significantly across industry sectors in Canada as a result of differences in capital structures, statutory rates and relevant capital cost allowance rates. The marginal effective tax rate is lower for manufacturing than for service industries. Chen compares estimated marginal effective corporate tax rates between Canadian and U.S. manufacturing industries, as well as

between Canadian and U.S. service industries. For manufacturing, the 21.2% rate in the United States is marginally below the 22.4% rate in Canada. On the other hand, while the marginal effective corporate tax rate on services in the United States is virtually identical to that for manufacturing, it is significantly higher (at around 26%) in Canada.[14] Chen's estimates therefore suggest that differences in the corporate tax regime are likely to have the most marked effects on the North American distribution of inward FDI in the service industries. However, as earlier reported data show, Canada's share of Canadian plus U.S. inward FDI in the tertiary sector, with some year-to-year variation, actually increased over the period 1987-92 to 1998. Moreover, Canada's share of inward FDI in the financial sector increased quite significantly over that period. This is especially noteworthy given regulatory restrictions that essentially prevent foreign takeovers of Canadian deposit-taking institutions.

B. Impact of Taxes on FDI and Migration

Hines (1996) offers a comprehensive review of studies examining the relationship between tax policy and the activities of MNCs. His review highlights the added complexity induced by considerations such as the home country's tax treatment of the unrepatriated portion of the profits earned by foreign subsidiaries of home country companies. Differences between home countries in their treatment of foreign-sourced income can bias the estimated impacts of host country tax differences on FDI flows if the former are ignored. Furthermore, home country tax provisions that allow domestic companies to claim, as tax credits, income taxes paid to foreign governments contribute to a potentially significant difference between an MNC's nominal and effective tax rate on foreign-sourced income. A failure to acknowledge explicitly such provisions can be expected to lead to errors-in-variables problems in regression models with associated estimation biases.

Hines concludes from the variety of studies examining the FDI-taxation relationship in different contexts that, in spite of all the other economic and political considerations that are clearly very important, taxation exerts a significant influence on the magnitude and location of FDI. However, he cautions that existing studies are

unsatisfactory in a number of respects including their failure to incorporate general equilibrium effects of taxes, such as changes in factor and product prices, into the specified models.

Since none of the studies reviewed by Hines focus specifically on MNC decisions to invest in the United States rather than Canada, extrapolation of his review to the distribution of FDI in North America might be inappropriate. Moreover, a cursory review of recent and major acquisitions of U.S. companies suggests the importance of strategic considerations rather than tax considerations as motives for the acquisitions. Table 9 reports 8 transactions among the largest 20 acquisitions over the years 1998 and 1999. All but one of the transactions reported are "horizontal" in nature, suggesting the prominence of motives such as geographic expansion and economies of scale.

A perusal of various press reports issued at the time of the mergers also fails to uncover any mention of taxation as a factor in the acquisition, although there are references to various types of synergies.[15] Moreover, it is worthy of note that most of the transactions listed in Table 9 occurred in industries where foreign ownership in Canada is restricted, either through regulations (telecommunications and banking) or state-ownership (utilities). Absent such restrictions, it is conceivable that some large Canadian companies might have appeared on the list of acquisitions.

There is very little evidence bearing upon the impacts of personal tax rates on the migration of managers and related professional workers. A recent survey for Canada reported in Globerman (2000) casts doubt on the strength of U.S.-Canada tax differences as a motive for emigration from Canada. Specifically, the opportunity to work for leading companies in New Economy industries is apparently a stronger motive for Canadian migration to the United States.

Infrastructure

Martin and Porter (2001) allege specific factors in the "microeconomic business environment" have contributed to Canada's deteriorating competitiveness. One is a

decline in Canada's investment in specialized human resources to support innovation and skill upgrading. A second is less competitive domestic markets compared to the United States. In a recent study, Globerman and Shapiro (2001) review various findings bearing upon the relationship between social infrastructure and FDI. The findings confirm the assertion that a "superior" educational infrastructure encourages inward FDI and that government regulations that raise costs and reduce competition discourage inward FDI. However, Globerman and Shapiro also estimate the impacts of broader measures of social and physical infrastructure on FDI. One, a Human Development Index (HDI), is constructed as a weighted aggregate value of three specific sub-indices (GDP per capita, education and life expectancy). A second is a Governance Index constructed as a weighted aggregate value of six sub-indices that measure such phenomena as government effectiveness, regulatory burden on business, rule of law and government corruption. For specific years in the 1990s, Canada scores higher than the United States on both indices. In particular, it scores higher on the Governance Index. Furthermore, the latter is statistically more important than the Human Development Index in their regression models explaining inward FDI.

An implication of the preceding finding is that, broadly defined, the "microeconomic" business environment for investment in Canada is not unambiguously less favourable than that in the United States, at least in terms of foreign investment. This is not to say that Canada's location advantages cannot be improved by policies promoting additional skill upgrading and increased competition in domestic markets. Rather, it is to say the indices cited above are linked in no obvious way to the surge in foreign acquisitions of U.S. companies in the late 1990s. That is, broad international measures of infrastructure cannot explain the surge of foreign acquisitions in the United States rather than in Canada.

Summary

In this section, we briefly assess two broad arguments that have been put forth to "explain" Canada's declining share of inward FDI to North America. Perhaps the most prominent argument is that higher taxes in Canada discourage investment by both

domestic and foreign investors. While relevant Canadian tax rates are higher than in the United States, the differences observed in inward FDI behaviour between the two countries are not consistent with taxes being a major cause of those differences. For example, corporate tax rates for tertiary industries are especially unfavourable in Canada relative to the United States. Yet inward FDI in Canadian tertiary industries did not decline relative to inward FDI in U.S. tertiary industries.

Canada's declining capacity to innovate and support "new Economy" activities has also been identified as a major component of Canada's less desirable microeconomic climate for investment. Again, the evidence offers no obvious support for this assessment. For example, there is no identifiable trend for inward FDI in Canadian New Economy industries to decline relative to inward FDI in counterpart U.S. industries. Furthermore, broader measures of the domestic business climates in both countries, specifically indices of social and political infrastructure, show that Canada has a relatively favourable environment compared to the United States.

We did not explicitly consider the impact of the two major regional free trade agreements that Canada implemented in the past two decades, i.e., the Canada-U.S. Free Trade Agreement and the North American Free Trade Agreement. Very few economists tie Canada's declining share of inward FDI relative to the United States to the trade agreements. It is at least plausible that the enhanced ability to ship goods into Canada at less cost owing to lower tariffs encouraged European and other foreign investors to invest less in Canada than they would otherwise have done. Specifically, the trade agreements made it more economical to centralize production facilities in the (much larger) U.S. domestic market. While we cannot reject the relevance of this possibility, the concentration of inward FDI from select European countries, most notably the United Kingdom in the late 1990s, seems somewhat idiosyncratic from the prospective of the trade liberalization explanation. Specifically, it is not clear why U.K. investors would be especially drawn by NAFTA to invest in the United States. Nor is it clear why foreign investors would be motivated by regional free trade to accelerate their acquisition

activities in the United States rather than increase the volume of "Greenfields" investments.

OVERALL SUMMARY AND POLICY CONCLUSIONS

There is no gainsaying that inward FDI to Canada in the latter part of the 1990s decreased relative to inward FDI to the United States. Moreover, outward FDI from Canada increased relative to outward FDI from the United States over the same period. Closer examination of the pattern of inward FDI reveals that acquisitions of U.S. companies by European investors, especially those based in the U.K. and, to a lesser extent Germany, heavily condition the observed inward FDI pattern. Indeed, foreign acquisitions are the major form of inward FDI to North America in 1998 and 1999.

There is no obvious sectoral pattern to Canada's declining share of inward FDI. Combined with the concentrated source of inward FDI to North America, the absence of an obvious sectoral pattern casts doubt upon readily available explanations of Canada's location attraction for inward FDI. In particular, the data cast doubt upon the empirical relevance of differences in tax rates or Canada's under-representation in New Economy industries. Indeed, it is tempting to conclude that the North American pattern of inward FDI in the latter half of the 1990s reflects a relative abundance of attractive takeover targets in the United States combined with more liquid capital markets in the United States that facilitate domestic takeovers in that country. A relative abundance of attractive takeover targets in the United States might, in turn, be related to agglomeration economies deriving from the relatively large prior investments in the United States made by European investors, especially U.K. investors. It might also reflect Canadian legal and regulatory restrictions on foreign control in sectors that attracted significant acquisition activity during the period, most notably communications and banking.

While our evaluation of the inward FDI data is qualitative and, admittedly, interpretive, it does not seem to us that the data offer significant support for the view that Canada is suffering a serious long-term decline in its general attractiveness as a location for FDI relative to the United States. Nor does the relative increase in outward FDI from

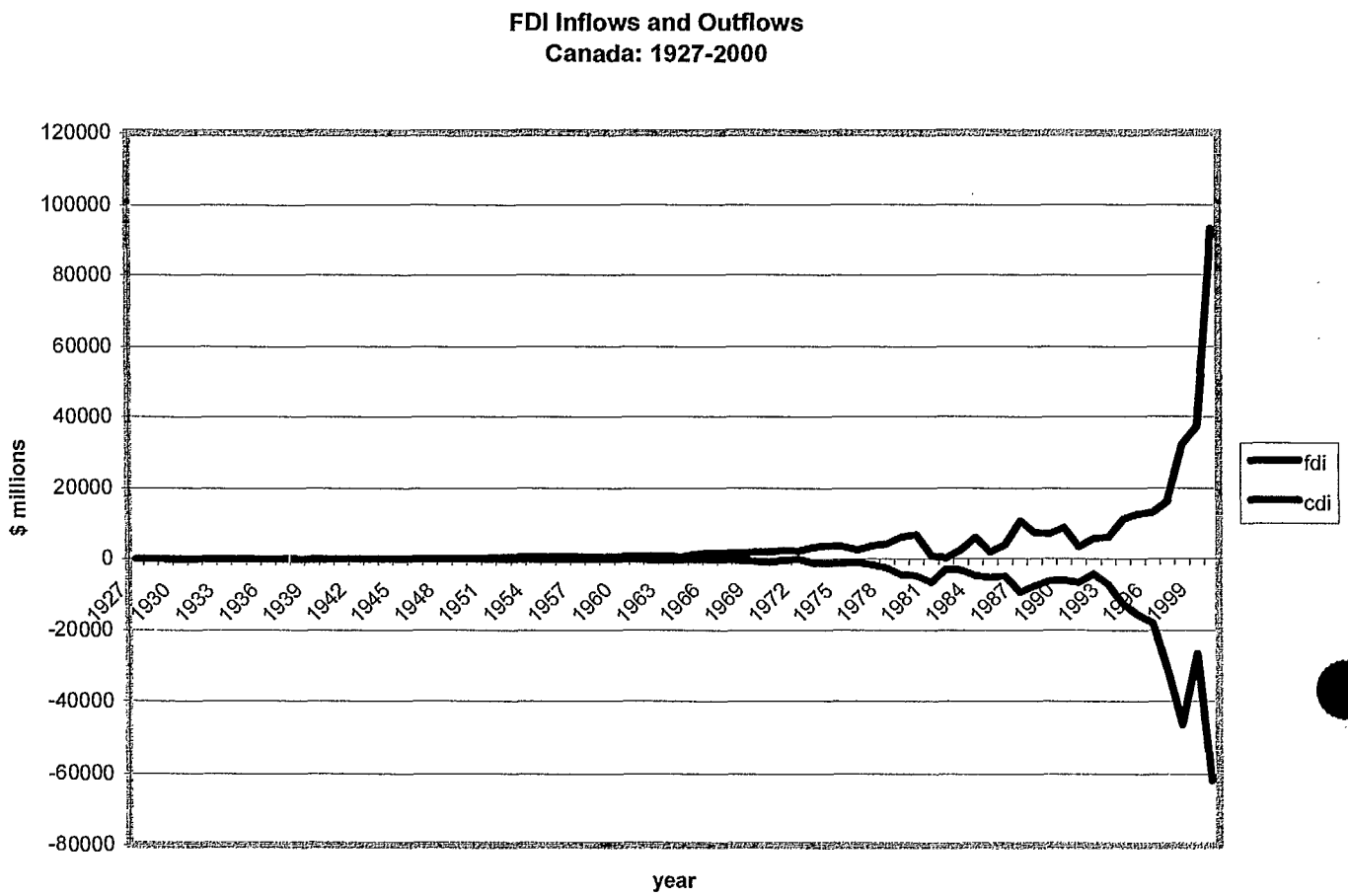
Canada offer grounds for the latter interpretation. Rather, Canada's outward FDI experience seems more consistent with the growing commercial and technological competence of Canadian MNCs, which in turn, allows those companies to compete more profitably in foreign markets. The choice of FDI as the mode for competing in foreign markets is completely consistent with patterns of international business expansion exhibited in earlier periods by U.S., European and Japanese MNCs.

Our interpretation of the FDI data does not mean that Canadian policy makers should be sanguine about incentives for continued foreign and domestic investment in Canada. There is clear evidence that Canada's relative performance in terms of productivity and GDP/capita has been relatively weak in the 1990's (Sharpe, 2001; Martin and Porter, 2001), and this does imply under-investment in human and physical capita. In particular, we do not maintain that Canada's tax structure is "optimal" in any meaningful sense. High marginal tax rates are undoubtedly inflicting relatively large "dead-weight" costs on the domestic economy, even if they are not materially altering the location choices of foreign investors. As well, improved efficiency in the delivery of education, training and other programs to enhance human capital is desirable for economic and social reasons that extend well beyond any marginal impact it might have on inward FDI. The removal of regulations and foreign ownership restrictions that have the effect of reducing competition from both new domestic and foreign companies seems justified without needing recourse to unfavourable comparisons to inward FDI flows to the United States.

The available evidence is unequivocal in identifying the overwhelming importance of a large and growing real domestic economy in attracting inward FDI over the long run. Indeed, even in the short-run, the more robust U.S. economy in the 1990s may have contributed, in part, to the preference of non-North American investors for acquisitions in the United States. To the extent that lower marginal tax rates and other manifestations of an improved microeconomic environment promote faster real economic growth in Canada, they will also promote increased inward FDI. The point to emphasize, it seems to us, is that real economic growth is the relevant policy goal, not increased

foreign ownership of the Canadian economy. Indeed, the latter is desirable only insofar as it promotes the former. While it might be obvious, perhaps trivial, it nevertheless seems useful to caution against making public policy the handmaiden of foreign direct investment patterns.

Figure 1



Source: CANSIM (D58062, D58052)

Table 1
Net FDI Flows – Canada and the United States
Average Annual Values

	Canada	United States	Canada	United States
	(U.S.$Millions)	(U.S.$Millions)	% of GDP	% of GDP
1961-65	300	-3,236	.62	.56
1966-70	484	-4,884	.63	.59
1971-75	107	-7,704	.08	.62
1976-80	-1,373	-7,912	.55	.40
1981-85	-4,083	10,694	.99	.32
1986-90	-2,734	22,874	.45	.47
1991-95	-618	-29,668	.10	.55
1996-99	-772	40,138	.08	.57

Source: Calculated from data provided in International Monetary Fund, *International Financial Statistics Yearbook*, various years.

Table 2
Gross FDI Flows – Canada and the United States

	1988-93 (annual average)	1994	1995	1996	1997	1998	1999
Canada							
Inflows (dollars)	5336	8207	9257	9636	11761	21705	25061
Inflows %	4.7	8.1	9.4	9.2	9.9	18.8	na
Outflows (dollars)	5309	9296	11464	13098	22515	31286	17816
Outflows %	4.7	9.2	11.7	12.5	18.9	27.1	na
United States							
Inflows (dollars)	44781	45095	58772	84455	105488	186316	275533
Inflows %	5.3	4.4	5.3	7.0	8.0	12.8	na
Outflows (dollars)	39323	73252	92074	84426	99517	146052	150901
Outflows %	4.6	7.1	8.3	7.0	7.6	10.0	na
Unites States/Canada							
Inflows	8.39	5.49	6.34	8.76	8.71	8.58	10.99
Outflows	7.41	7.87	8.03	6.44	4.42	4.66	8.46

Source: UNCTAD, *World Investment Report 2000*, United Nations, Geneva, 2000. Dollar amounts are millions of US dollars. % amount is percentage of gross fixed capital formation.

Table 3
Canadian and U.S. Shares of OECD Direct Investment Flows
(Percent)

	1971-80	1981-90	1988-93	1994	1995	1996	1997	1998	1999(P)
Canada									
Inflows %	2.8	3.8	3.5	5.0	4.0	3.8	3.8	3.2	3.5
Outflows %	3.6	3.9	2.5	3.9	3.7	3.8	5.3	4.2	2.3
United States									
Inflows %	29.4	41.9	30.6	27.7	25.5	35.8	36.5	38.0	41.3
Outflows %	43.7	16.6	20.5	30.6	29.8	27.2	26.6	20.9	19.8
United States/Canada									
Inflows	10.5	11.0	8.7	5.5	6.4	9.4	9.6	11.8	11.8
Outflows	15.6	4.3	8.2	7.8	8.1	7.1	5.0	5.0	8.6

Source: Calculated from data in Organization for Economic Cooperation and Development, *International Direct Investment Statistics Yearbook*, Paris: OECD, 2000.

Table 4
Share and Percentage Increase in FDI Outflows, 1996-99

Country	Share of Total OECD Outflows (%)	Percentage Change (%)
United States	22.6	64
United Kingdom	19.2	484
Germany	13.0	94
France	9.1	141
Netherlands	7.3	46
Japan	4.4	-12
Canada	3.7	35
Spain	3.4	534
Switzerland	3.2	11
Sweden	2.8	306

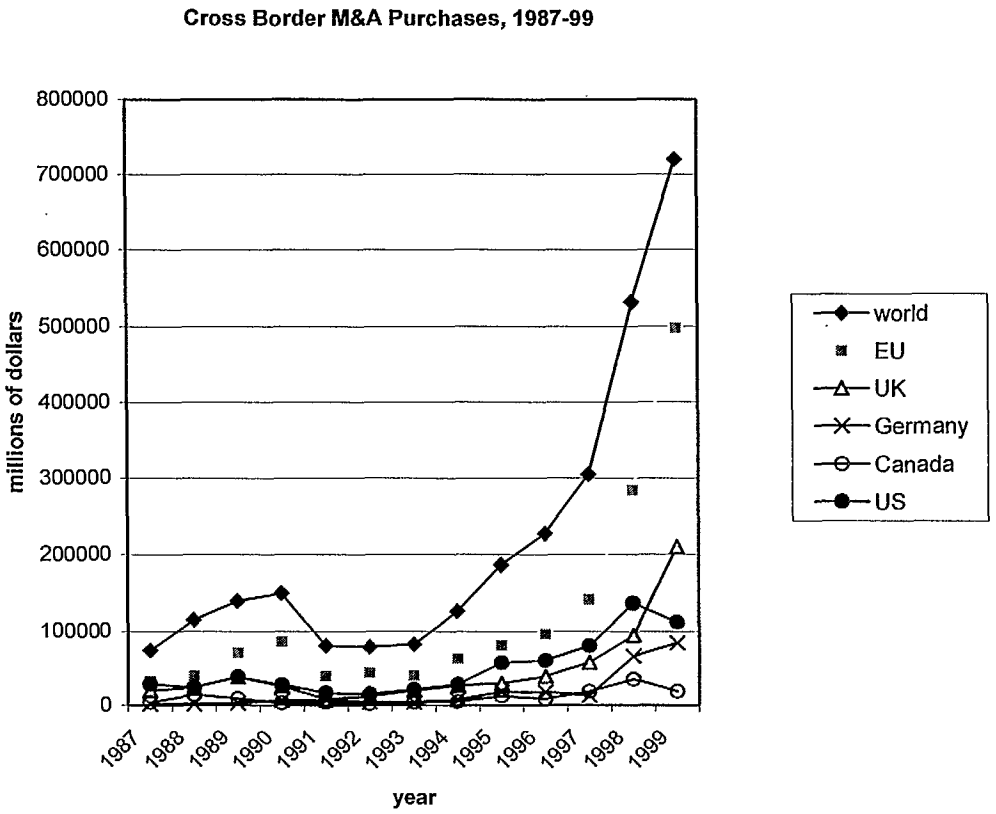
Source: Calculated from data in Organization for Economic Cooperation and Development, *Recent Trends in Foreign Direct Investment*, Paris: OECD, 2000.

Table 5
Direct Investment From Abroad in Canada and the Unites States: Inflows by Zone
Percentage of Total Country Inflows

	1987-92 (annual average)	1993	1994	1995	1996	1997	1998
Canada							
Europe	26	9	-11	-2	1	6	2
NAFTA	46	83	98	63	69	74	86
Other	28	8	13	39	30	19	12
United States							
Europe	55	78	65	68	66	67	89
NAFTA	5	7	13	8	10	15	7
Other	40	13	34	24	38	26	8

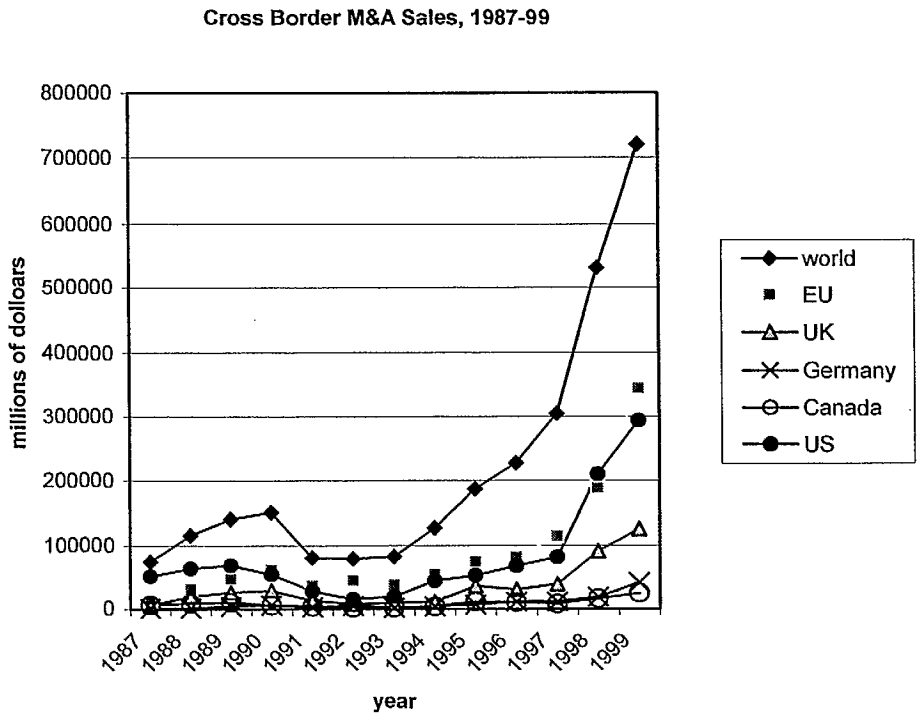
Source: Calculated from data in Organization for Economic Cooperation and Development, *International Direct Investment Statistics Yearbook*, Paris: OECD, 2000.

Figure 2



Source: UNCTAD, *World Investment Report 2000*, United Nations, Geneva, 2000.

Figure 3



Source: UNCTAD, *World Investment Report 2000*, United Nations, Geneva, 2000.

Table 6

International M&A Deals in OECD Countries

Billions of US Dollars and Percent of OECD Total

	Inward				Outward			
	1996	**1997**	**1998**	**1999**	**1996**	**1997**	**1998**	**1999**
US	70.6 (37.8%)	64.3 (26.4%)	190.8 (38.4%)	293 (40.8%)	65.5 (27.1%)	80.8 (26.7%)	132.8 (25.8%)	145.7 (18.9%)
UK	39.2 (21.0%)	55.4 (22.7%)	85.6 (17.2%)	123 (17.1%)	34.8 (14.4%)	32.6 (10.8%)	117.1 (22.7%)	246.2 (32.1%)
Germany	6.7 (3.5%)	19.3 (7.9%)	37.9 (7.6%)	42.4 (5.9%)	27.4 (11.3%)	15.7 (5.2%)	60.4 (11.7%)	93 (12.1%)
Canada	10.4 (5.5%)	12 (4.9%)	15.4 (3.1%)	29 (4.0%)	22.1 (9.2%)	24.7 (8.2%)	42.3 (8.2%)	16.3 (2.1%)
Total OECD	186.6	243.2	496.4	717.8	240.9	301.6	515.4	767.3

Source: KPMG Corporate Finance, Dealwatch Database, 2000, reported in Organization for Economic Cooperation and Development, *Recent Trends in Foreign Direct Investment*, Paris: OECD, 2000.

Table 7

Cross Border M&A Activity by Sector/Industry of Seller

Percent of Total

	World			United States		
Sector/Industry	**1997**	**1998**	**1999**	**1997**	**1998**	**1999**
Primary	2.9	2.0	1.3	2.6	0.5	1.6
Secondary	39.8	49.5	38.2	34.1	71.0	26.8
-food, beverage	7.2	3.2	3.7	1.8	0.5	0.6
-wood	2.2	1.4	1.5	2.5	0.5	0.0
-publishing	.8	2.4	1.3	1.7	5.0	3.0
-petroleum	3.7	12.6	4.1	2.5	25.7	0.2
-chemicals	11.6	6.0	12.0	13.9	2.9	5.3
-minerals/metals	5.2	3.1	2.8	2.3	1.8	2.4
-machinery	2.4	1.7	2.9	2.2	2.5	6.3
-electrical	2.5	6.7	5.3	3.7	8.6	5.9
-motor vehicles	1.3	9.5	2.5	1.7	20.9	1.0
Tertiary	57.3	48.5	60.5	63.2	28.5	71.6
-utilities	9.7	6.0	6.7	0.1	1.4	6.2
-trade	7.1	5.1	5.0	11.0	5.5	3.8
-communications	5.8	9.7	23.3	2.6	5.2	33.4
-finance	16.6	15.6	15.5	21.4	6.7	18.2
-business services	8.6	8.0	6.6	10.3	8.0	6.2
Total (billions of dollars)	305	532	720	82	210	233

Source: Calculated from UNCTAD, *World Investment Report 2000*, United Nations, Geneva, 2000. Only selected industries are reported.

Table 8

FDI Inflows by Industrial Sector

	1987-92	1993	1994	1995	1996	1997	1998
Canada Percentage of Canadian Inflows (classified)							
Primary	19.2	29.5	-1.5	-8.6	35.9	30.5	36.4
Secondary	19.5	45.7	63.4	47.7	8.2	21.0	28.0
Tertiary	61.3	24.7	38.1	60.8	55.9	48.5	35.6
-financial	45.1	8.0	-6.3	21.1	27.4	33.5	26.0
United States Percentage of US Inflows							
Primary	4.4	2.0	3.4	7.5	6.1	3.4	30.8
Secondary	45.9	27.4	46.6	49.6	48.9	35.5	46.3
Tertiary	49.5	70.6	49.9	42.9	44.9	61.1	22.8
-financial	21.1	53.5	18.4	25.0	15.5	24.7	9.7
Canada Percentage of Canadian + US Inflows							
Primary	28.4	55.6	-1.0	-11.1	38.8	50.7	10.9
Secondary	3.8	11.8	16.6	7.7	1.8	6.3	5.8
Tertiary	10.1	2.7	10.0	11.0	11.8	8.4	13.9
-financial	16.4	1.2	-.5.0	6.9	16.1	13.5	21.7

Source: Calculated from data in Organization for Economic Cooperation and Development, *International Direct Investment Statistics Yearbook*, Paris: OECD, 2000. For Canada, substantial amounts of FDI were classified as "unallocated", and so percentages are based on classified allocations. For the US, the 1998 data are the result of the apparent classification of the BP-Amoco merger as being in the primary sector.

Table 9

Largest Cross-Border Acquisitions of US Companies, 1998-99

Year	Value $ bills	Acquiring Firm (home economy)	Industry of Acquiring Firm	Acquired US Firm	Industry of Acquired Firm
1999	60.3	Vodafone (UK)	Telecommunications	AirTouch	Telecommunications
1998	48.2	BP (UK)	Oil and Gas	Amoco	Oil and Gas
1998	40.5	Daimler-Benz (Germany)	Transportation Equipment	Chrysler	Transportation Equipment
1999	12.6	Scottish Power (UK)	Electric, Gas and Water Distribution	PacificCorp	Electric, Gas and Water Distribution
1999	10.8	Aegon (Netherlands)	Insurance	TransAmerica Corp.	Insurance
1999	10.1	Global Crossing (Bermuda)	Telecommunications	Frontier Corp.	Telecommunications
1998	9.3	Nortel Networks (Canada)	Communications Equipment	Bay Networks	Computer and Office Equipment
1999	9.1	Deutsche Bank (Germany)	Banking	Bankers Trust	Banking

Source: UNCTAD, *World Investment Report 2000*, United Nations, Geneva, 2000.

REFERENCES

D. Chen (2000), "The Marginal Effective Tax Rate: The Only Rate That Matters in Capital Allocation", Toronto: C.D. Howe Institute Backgrounder.

N. Duffield and M. Munday (2000), "Industrial Performance, Agglomeration and Foreign Manufacturing Investment in the U.K.", *Journal of International Business Studies*, Vol. 31, No. 1, pp.21-38.

R.G. Eccles, K.L. Lanes and T.C. Wilson (1999), "Are You Paying Too Much for That Acquisition", *Harvard Business Review*, July-August, pp.136-143.

S. Globerman (2000), "Trade Liberalisation and the Migration of Skilled Professionals and Managers: The North American Experience", *The World Economy*, Vol. 23, No. 7, pp.901-922.

S. Globerman (forthcoming), *The Location of Higher Added Activities,* Ottawa: Industry Canada, Occasional Paper 27.

S. Globerman and D. Shapiro (2001), *National Infrastructure and Foreign Direct Investment*, Report Prepared for Industry Canada, mimeo.

K. Head and J. Ries (1999), *Can Small-Country Manufacturing Survive Trade Liberalization: Evidence From the Canada-U.S. Free Trade Agreement*, Ottawa: Industry Canada Research Publications Program, Paper Number 1.

J.R. Hines, Jr. (1996), "Tax Policy and the Activities of Multinational Corporations", Cambridge, Mass.: National Bureau of Economic Research

K. Karimkhany (1998), "Nortel Buys Bay Networks", *Wired News*, June 15, (www.wired.com/news).

K. Klassen, M. Lang and M. Wolfson (1993), "Geographic Income Shifting by Multinational Corporations in Response to Tax Rate Changes", *Journal of Accounting Research*, Vol. 31, Supplement, pp.141-173.

P. Krugman (1991), *Geography and Trade*, Cambridge: The MIT Press.

R.L. Martin and M.E. Porter (2001), "Canadian Competitivness: A Decade After the Crossroads", Toronto: C.D. Howe Institute, mimeo.

J. McCallum (1999), "Two Cheers for the FTA", Toronto: Royal Bank of Canada, Economics Department, Mimeo.

J. Mintz (1999), "Why Canada Must Undertake Business Tax Reform Soon", Toronto: C.D. Howe Research Institute.

E. Reguly (2000), "Canada must innovate or become a forgotten backwater", *The Globe and Mail*, January 10, B. 15.

A.M. Rugman (1990), *Multinationals and Canada-U.S. Free Trade*, Columbia: University of South Carolina Press.

A. Sharpe (2001), "Determinants of Trends in Living Standards in Canada and the United States, 1989-2000", *International Productivity Monitor 2*, Spring, pp.3-10.

D. Swimmer (2000), "Investment Framework Policies and Canada's Declining Share of Inward Foreign Direct Investment", Ottawa: Industry Canada, unpublished mimeo.

S. Thomsen (2000), *Investment Patterns in a Longer-Term Perspective*, Paris: OECD, Working Papers On International Investment.

M. Trajtenberg (2000), *Is Canada Missing the Technology Boat? Evidence From Patent Data*, Ottawa: Industry Canada Discussion Paper Number 9.

L. Waverman (1991), "A Canadian Vision of North American Economic Integration" in S. Globerman, ed., *Continental Accord: North American Economic Integration*, Vancouver: The Fraser Institute, pp.31-64.

ENDNOTES

[1] For discussions and evaluations of the debates surrounding continental investment patterns subsequent to trade integration agreements, see Rugman (1990) and Waverman (1991).

[2] For an extensive discussion and assessment of agglomeration economies, see Krugman (1991). Globerman (2000) provides an overview of the empirical evidence surrounding the scope and magnitude of agglomeration economies.

[3] A recent unpublished study (Swimmer, 2000) identifies Canada-U.S. differences in the corporate capital gains tax rate as a primary factor encouraging increased FDI in the United States relative to Canada.

[4] Some recent evidence on the relationship between domestic market size and FDI is reviewed in Globerman and Shapiro (2001).

[5] See Reguly (2000). Any evaluation of this claim is obviously sensitive to the definition of technological intensity that is chosen. For a broad presentation of evidence that Canada is seriously lagging behind the United States in innovation and entrepreneurship, see Trajtenberg (2000).

[6] By way of illustration, the Canadian dollar exchange rate in 1972 was $.9956CDN/$1U.S. In 1985, it was $1.3975CDN/$1U.S. In 1998, it was $1.5305CDN/$1U.S.

[7] Evidence on this point is provided in Martin and Porter (2001).

[8] The correlation coefficient is statistically significant at the .01 level.

[9] The U.K., by itself, accounts for around 23% of the total stock of inward FDI in the United States.

[10] Acquisitions dominate mergers in terms of both number and aggregate value. For example, fewer than 3% of cross border M&As are mergers.

[11] For evidence on geographic income shifting by multinational companies through transfer pricing, see Klassen, Lang and Wolfson (1993).

[12] For a discussion of the relevant caveats in calculating and comparing effective marginal tax rates across countries, see Chen (2000).

[13] For a review and assessment of this argument, see Globerman (2000).

[14] Mintz (1999) shows that cross-country differences in average effective tax rates are greater than differences in marginal effective tax rates.

[15] See, for example, the discussion of the Vodafone acquisition in Eccles et.al. (1999) and the discussion of Nortel's acquisition of Bay Networks in Karimkhany (1998).

Notes

Economic Integration: Implications for Business Taxation

Bev Dahlby
Department of Economics
University of Alberta
Edmonton, Alberta
bev.dahlby@ualberta.ca

(June 2001)

1. Introduction

> "...as national economies become more integrated, and as barriers to trade in goods and services fall, the importance of international taxation for the efficient functioning of capital markets will become a central concern." Slemrod (1995, p.487)

The integration of global capital markets, the decline in transportation and communications costs, and the removal of tariffs and many regulations governing the movements of goods and services are having profound effects on our business tax system. The growth of trade and direct investment with Mexico and the United States is one aspect of this global economic integration. As the volume of trade in goods and services and direct investment among the NFTA partners increases, business taxation issues will become increasingly important.

This paper deals with the implications of economic integration for Canada's business tax system. Concerns have been expressed that, in an era of high capital mobility and footloose industries, tax competition will lead to an inexorable decline in taxes levied on businesses, shifting the tax burden to the relative immobile inputs, labour, and land. Some view this as a threat to the financial and political underpinnings of the welfare state, which is based on the redistribution of income.

In Section 2, we review international trends in business taxation to see whether there is evidence of a "race to the bottom". We find that while statutory corporate income tax (CIT) rates have declined over the last 20 years, the reliance of OECD countries on taxes on corporate profits (measured either as a share of total tax revenues or as a percentage of GDP) has not dramatically changed.

In Section 3, we have described a model of the international tax system which is consistent with some the stylized facts described in Section 2. The model suggests that the foreign tax credit systems of the major capital exporting countries—the United States, the United Kingdom and Japan— underpin the CIT systems of the smaller capital-importing countries, and that the corporate tax systems will not whither away as long as the capital-exporting countries retain their foreign tax credit systems. However, the model also suggests that globalization of capital markets may lead to the abandonment of the foreign tax credit system if an increasing share of the capital-exporting countries capital is invested abroad. In that event, the smaller capital-importing countries would probably greatly reduce their rates of capital taxation.

In Section 4, we review some of the empirical evidence concerning the effects of the international tax system on business decision-making. A number of econometric studies have indicated that foreign direct investment (FDI) by multinational enterprises (MNEs) is quite sensitive to levels of international taxation. The evidence concerning the MNEs' use of transfer pricing to shift profits from high tax to low tax countries is more mixed, which is not surprising, given the necessity of trying to infer the MNEs' behaviour from examining their "tracks in the snow". We also review the evidence and

policy issues concerning the debt placement policies of corporation with regard to both inbound and outbound investment.

In the final section of the paper, we consider a policy issue that may emerge as North American economic integration proceeds—Should Canada, Mexico, and the United States adopt a formula apportionment system in levying their corporate income taxes? Formula apportionment, which Canada and the United States use to determine the CIT bases of their provincial and state governments, might seem to be the logical conclusion to North American integration. It has been suggested that formula apportionment would reduce administration and compliance costs and pressures to shift profits to low tax jurisdictions through transfer pricing and debt placement. A closer look at North American formula apportionment reveals that the adoption of fiscal apportionment would pose number of difficult problems, but many of these issues, such as harmonization of tax bases, will inevitably arise whether we adopt formula apportionment or not.

2. International Trends in Corporate Taxation: Is There A Race to the Bottom?

Concerns have been expressed that, in an era of high capital mobility and footloose industries, tax competition will lead to an inexorable decline in taxes levied on businesses, shifting the tax burden to the relative immobile inputs, labour, and land. Some view this as a threat to the financial and political underpinnings of the welfare state, which is based on the redistribution of income. In this section, we review international trends in business taxation to see whether there is evidence of a "race to the bottom".

Figures 1 and 2 show the trend in the CIT rates in the G7 and other selected OECD countries over the period 1982 to 2001.[1] These figures indicate that there has been a long-term decline in the CIT rates imposed by these 17 countries. In 1982, the unweighted average CIT rate was 44.4 percent. By 2001, it had declined to 33.6 percent. Furthermore, the variance or dispersion in CIT rates has also declined. In 1982, the tax rates ranged from 25 percent in Italy to 56 percent in Germany, and the standard deviation was 7.84. In 2001, the tax rates ranged from 28 percent in Sweden to 41 percent in Japan, and the standard deviation is 4.05. In addition, a number of countries, including Canada, have announced their intention to reduce their CIT rates in the next few years.[2] While there has been a general trend to lower CIT rates, there are some exceptions. Italy, Japan and Spain have higher CIT rates in 2001 than they had in 1982. See Figure 3. The Nordic countries jacked up their CIT rates in the mid-1980s and then drastically over the period 1989-91.

---

[1] These CIT rates are the "headline" rates, which are the national corporate income tax rates on retained earnings. They do not include sub-national rates or surcharges which are important in some countries such as Canada. They are used to illustrate the changes in the CIT rates in individual countries an d not for comparing the level of corporate taxation in different countries.

[2] Australia and Denmark will reduce their CIT rates to 30 percent in 2002.

There is an interesting time pattern to the tax rate changes revolving around the 1987 cut in the U.S. CIT from 46 percent to 34 percent.[3] In the period before the 1987 U.S. tax cut, there was no discernable trend in the CIT rate. In 1983 and in 1985, the average CIT rate increased, while in 1984 and 1986 it declined, largely due to the U.K.'s rate reduction, in stages, from 52 percent in 1983 to 35 percent in 1986. By contrast, in the five-year period following the 1987 U.S. tax cut, the average tax rates declined each year. Six countries in sample—Australia, Austria, Denmark, France, Greece, and Sweden—cut their tax rates by more than 10 percentage points in the 1988-1992 period. Certainly, the eight percentage point cut in the Canadian CIT rate in 1987-88 was widely acknowledged as a measure required to keep the Canadian corporate tax system competitive with the U.S. Lyons (1996, p. 15) cites a U.S. Treasury study which examined the international implications of the U.S. tax cut and which concluded that reduction in "the average tax rate reduction on foreign dividend income is almost identical to the 12 percentage point reduction in U.S. statutory tax rates" and that the "percentage of firms in an excess-credit position in 1992 is almost the same as in 1984." There is, therefore, some evidence that the tax rate cuts in the late 1980s and early 1990s were initiated by the U.S.'s, and possibly the U.K.'s, CIT rate cuts.

Did the statutory tax rate cuts in the late 1980s and early 1990s lead to significant declines in revenues collected from the corporate sector? Changes in the relative importance of CITs can be measured either in terms of their shares of total tax revenues or by measuring CIT revenues relative to GDP. Figure 4 shows that between 1965 and 1997 taxes on corporate income as a share of total tax revenues declined by 4.6 percentage points in Canada, 3.8 percentage points in Germany, 7.2 percentage points in Japan, and 7.0 percentage points in the United States. In the Italy and the United Kingdom, the share of total tax revenue increased by 2.4 and 5.0 percentage points, respectively.

However, it is hard to attribute the CIT's declining share in revenues in the Canada and the U.S. to these CIT rate cuts because the most significant declines occurred in the 1965-85 period, before the major statutory rate reductions in those countries. The large declines in Japan and Germany can hardly be attributed to the tax rate cuts in those countries because there were no significant CIT tax rate cuts in those countries during that period.[4] Other factors besides the rate cuts have been responsible for the long-term decline in the share of tax revenues from the corporate income taxes.[5]

Figure 5 shows the trend in the taxes on corporate income as a percentage of GDP. For the OECD as a whole, taxes on corporate income *increased* as a percentage of GDP from 2.2 percent in 1965 to 3.3 percent in 1997. For Canada, Germany, and the United States there were declines in the ratio of corporate taxes to GDP, but the declines

---

[3] See Lyons (1996) for a description of the 1986 U.S. tax reforms and their implications for international taxation. As Lyons notes, the 1986 reforms in the U.S. were largely implemented for domestic tax policy reasons.

[4] This does not imply that the revenues collected from the CIT are not affected by the CIT rate. A constant tax rate may lead to a decline in CIT's share of revenue if other countries cut their rates, which leads to the the erosion of the country's CIT base through declines in investment, transfer pricing, or international debt placement. These issues will be discussed in greater detail below.

[5] See Department of Finance (1998) for a discussion of the factors that have lead to the long-term decline in the CIT revenues as a percentage of GDP.

were relatively small, especially in the case of Canada. Most of the decline occurred in Canada and the United States occurred in the 1965 to 1985 period, before the statutory rate reductions in 1987-88. Thus, broadly speaking, there is no evidence of a major shift away from taxes on corporate income among OECD countries or that the cuts in the statutory CIT rates were directly responsible for the any of the decline in CIT revenues.

One reason why CIT revenues did not abruptly decline in the face of statutory rate reductions in Canada, the United States, and the United Kingdom is that the statutory rate reductions were accompanied by tax base broadening measures. Table 1 shows the changes in the statutory tax rates on retained earnings in the manufacturing sector in 10 countries between 1979 and 1994 drawn from a study by Chennells and Griffith (1997). The table also shows the changes in the present value of the capital cost allowances and other deductions on one dollar of investment. The tax rate reductions in Canada, the United States, the United Kingdom, and Ireland were accompanied by reductions in the present value of the allowances, and this would have offset, to some degree, any the revenue reductions from the statutory rate reductions.

It is the combination of the statutory tax rate, capital cost allowances, investment tax credits, and other deductions that determine the average and marginal effective tax rates on business income. The average effective tax rate on investment can be defined as the rate at which the tax system reduces the present value of the income stream from a project. Differences in average effective tax rates between countries may affect the location of new investment projects. The marginal effective tax rates measure the tax that is imposed on an increment in investment spending which just earns the minimum required rate of return for investors. Difference in the effective marginal tax rate between countries may affect the location of incremental investments on existing projects.

Table 1 also shows Chennells and Griffith's calculations of the average and effective marginal tax for inbound (source country) and outward bound (residence country) investments. Low average and marginal effective tax rates on inbound investment make a country more attractive for foreign direct investment. Low average and marginal effective tax rates on outbound investment give a country's domestic firms an advantage in exploiting investment opportunities in other countries. For most countries, average and marginal effective tax rates on in-bound and outward-bound investments declined between 1979 and 1994, but the declines in the average and marginal effective rate were generally smaller than the declines in the statutory rates because of the offsetting changes in investment allowances as noted above. With regard to inbound investment, the Chennells and Griffith's calculations indicate that (not surprisingly) Ireland had the lowest average effective tax rate at 15.9 percent, while Japan had the highest at 32.1 percent, in 1994. Canada had the third highest average effective tax rate, at 26.7 percent. With regard to outbound, Germany had the lowest rate at 20.0 percent, while Italy had the highest at 32.6 percent. Canada ranked 6th at 24.7 percent. The empirical evidence on the effect of international taxes on investment will be discussed in more detail in Section 4 A.

3. International Tax Competition

A. Taxing Capital in a Small Open Economy

This section of the paper provides an analytical framework for discussing the taxation of capital in a small open economy in which goods and services and financial capital are perfectly mobile across international boundaries.[6] We investigate the following questions— What rate of taxation should a small open economy impose on return to capital? Will tax competition lead to the abandonment of source-based capital taxes such as the corporate income tax? Can we explain why small open countries continue to levy corporate income taxes?

There is a well-known (among academic public finance economists) proposition concerning a country's optimal tax structure which states that:

> **Proposition 1**: *The government of a small open economy should not impose a source-based tax on the return to capital if it can set other taxes (such as destination-based consumption taxes, wage taxes, and profits taxes) at their optimal values.*[7]

This proposition is based on the argument that if capital is perfectly mobile, any source-based capital tax will increase the cost of capital to the economy by the full amount of the tax. This means that the burden of source-based capital taxes will be shifted to relatively immobile inputs, such as labour, and to land (i.e. resources that are in fixed supply) because investors will have to be compensated for any tax that is imposed by the small open economy (SOE), otherwise they will not invest in the economy. The increase in the gross return to capital means that less capital will be invested, total output will decline, and input decisions will be distorted because there will be an increase in the cost of capital relative to prices of labour and land. Since the same effective distribution of the tax burden can be achieved by taxing labour and land directly, without creating this distortion in production decisions, it is more efficient to tax labour and land directly and eliminate the source-based taxes on capital.

This is a very strong proposition that seems to suggest that the continued existence of source-based capital taxes in many countries is a policy error. Alternatively, one might argue that the proposition is not relevant today because, while capital is highly mobile, it is not perfectly mobile. Still, the proposition can be viewed as a prediction about the long-run trend in the tax mix as economic integration proceeds and a borderless capital market becomes a reality.

We will focus on some of the reasons why governments may continue to levy source-based capital taxes—the existence of pure profits, the desire to shift the tax burden to foreigners, and concerns about the distributional equity of the tax burden.

---

[6] For a survey of the tax competition literature, see Wilson (1999).

[7] See, for example, Gordon (1986) and Bruce (1992).

The aspect of Proposition 1 that I want to focus on is the availability of optimal taxes on labour and land. In particular, Proposition 1 only holds if a 100 percent tax rate is imposed on the economic profits that are generate by the land or other resources that are in fixed supply to the economy. Economic profit, which is sometimes referred to as pure profits or economic rent, is the return to an input in excess of its opportunity cost. Taxes on economic profit are usually consider to be non-distortionary taxes, and therefore the optimal rate for such taxes is 100 percent.

Two points should be emphasized. First, there are economic rents in our economy. Clearly, at current world market prices, at least some of Alberta's oil and gas deposits generate economic rents. Of course, economic rent is a general concept that is not restricted to land and resources, as the quarter of a billion dollars paid to the baseball player, Ivan Rodriguez, clearly indicates. However, for the purposes of this discussion, I will focus on the economic profits generated by land or resources that are in fixed supply. While the existence of economic rents cannot be doubted, there is a considerable difference of opinion concerning the magnitude of these rents.[8]

Second, it is also clear that our tax system is not "optimal" in the sense that governments do not tax away all of the economic rents. There are limitations on the taxation of economic rents because these rents cannot be readily measured and if the rate of tax on pure profits becomes too high, investors will find ways of characterizing pure profits as other forms of income, which are taxed at lower rates. For example, Gordon and Mackie-Mason (1994) argue that if the tax rate on pure profits exceeds the tax rate on wage income, recorded economic profits will quickly disappear because the owners of firms would pay themselves very high wages and salaries that would be taxed at the lower rates. Thus, information problems prevent governments from imposing 100 percent taxes on pure profits.

What is the implication of a government's inability to completely tax away pure profits? There is a second proposition which states that:

> **Proposition 2**: *If the government of a small open economy cannot impose a 100 percent tax on pure profits, then it should impose positive tax rates on labour income and a source-based tax on capital.*[9]

This proposition explains why a SOE will tax capital—to get at the economic rents that are otherwise incompletely taxed. The question is—Do the limitations on the taxation of pure profits justify the continued existence of high rates of source-based capital taxes in SOEs?

In a technical appendix, I derive the optimal tax rates on labour income and capital for a small open economy where the tax rate on pure profits is constrained to be less than 100 percent. The optimal tax rates are found by equating the marginal cost of

---

[8] Many left-wing commentators seem to think that the entire return to capital is an economic rent, while right-wing commentators seem to deny, or at least overlook, the existence of economic rents in discussing tax policy.

[9] See, for example, Huizinga and Nielsen (1996), and Keen and Marchand (1997).

raising an extra dollar of tax revenue from taxing labour income, $MCF_{\tau L}$, with the marginal cost of raising additional dollar of tax revenue by raising the tax on the return to capital employed in the economy, $MCF_{\tau K}$. To the extent that these taxes distort the allocation of resources in the economy, by reducing the incentive to work or to invest in the economy, the MCFs will be greater than one. With the optimal set of taxes, the cost of raising revenue is the same for all taxes. In measuring the MCFs, I have also incorporated the possibility that distributional preferences may affect the choice of taxes. In particular, a society may place a lower value on a dollar tax burden imposed on the recipients of pure profits than on a dollar of tax burden imposed on labour income if profits accrue disproportionately to the rich or to foreigners, or if it is felt that individuals are not "entitled" to profits.

The optimal tax rate on capital for a SOE is given by the following formula:[10]

$$\tau_K = \frac{(1-\tau_\pi)(\varepsilon_{Kw} - \varepsilon_{Lw})[1 - \beta(1-\tau_w \eta_{Lw})]}{\beta\eta_{Lw}(\varepsilon_{Lc} - \varepsilon_{Kc})(1 - \tau_w) + \varepsilon_{Lw}\varepsilon_{Kc} - \varepsilon_{KLw}\varepsilon_{Lc}} \qquad (1)$$

where:

τ_π is the tax rate on pure profit, $0 \leq \tau_\pi \leq 1$;

ε_{Kw} is the elasticity of demand for capital, K, with respect to the wage rate, w;

ε_{Lw} is the elasticity of demand for labour, L, with respect to the wage rate;

ε_{Kc} is the elasticity of demand for capital, K, with respect to the cost of capital, c;

ε_{Lc} is the elasticity of demand for labour with respect to the cost of capital;

β is the distributional weight reflecting society's valuation of a dollar of pure profits compared to a dollar of wage income, $0 \leq \beta \leq 1$;

τ_w is the ad valorem tax rate on wage income; and

η_{Lw} is the elasticity of the supply of labour with respect to the after-tax wage rate. $0 \leq \eta_{Lw}$

This formula for the optimal tax rate on capital is consistent with Propositions 1 and 2—the optimal tax rate on the return to capital invested in the economy should be zero if the tax rate on pure profits is one, and a positive tax rate should be imposed if $0 \leq \tau_\pi < 1$. Furthermore, the tax rate on capital will tend to be higher when the optimal tax rate on labour is higher and when the distributional weight on profit income is lower. Note that the optimal tax rate on capital is independent of the labour supply elasticity if $\beta = 0$. Otherwise, the effect of the labour supply elasticity on the optimal τ_K is equal to:

[10] All of the own and cross price elasticities of demand are negative and $\varepsilon_{Lw} < \varepsilon_{Kw} < 0$ and $\varepsilon_{Kc} < \varepsilon_{Lc} < 0$. See Keen and Marchand (1997). This implies that the denominator is positive and the numerator is greater than or equal to zero. See Sorensen (2001) for a derivation of the optimal tax rate on capital in a model with imperfect capital flows between countries.

$$\frac{\partial \tau_K}{\partial \eta_L} \gtrless 0 \quad as \quad (\varepsilon_{Kw} - \varepsilon_{Lw})\tau_w \gtrless (\varepsilon_{Lc} - \varepsilon_{Kc})\tau_K \tag{2}$$

This condition implies that if a change in the capital ratio from the wage tax is greater than the change in the capital ratio from the capital tax, an increase in the labour supply elasticity will induce greater reliance on capital taxation.

Few other general results can be gleaned from this formula. However, if it is assumed that aggregate production is based on a Cobb-Douglas production function and $\beta = 0$, then the optimal tax rate on capital is equal to:

$$\tau_K = (1 - \tau_\pi)\alpha_\pi \tag{3}$$

where α_π is the share of pure profits in total income. In other words, if the shares of labour, capital, and the fixed input in total output are constants (a characteristic of an aggregate Cobb-Douglas production function) and the government only cares about burden of taxes on labour, then the optimal tax rate on capital in a SOE is equal to the after-tax share of profits in total income. With a Cobb-Douglas production function and $\beta > 0$, the optimal τ_K will be increasing in α_π if $\tau_w \geq \tau_K$.

I have calculated the optimal tax rates for an economy in which production is given by a Cobb-Douglas production function with labour and capital shares of income equal to 75 percent and 20 percent respectively. This implies that pure profits represent 5 percent of total income or 20 percent of non-labour income. The labour supply elasticity is assumed to be 0.15. Finally, the computation of the optimal tax rates is based on the constraint that pure profits and wages are taxed at the same rate, i.e. $\tau_\pi = \tau_w$, and that the tax system generates revenues equal to 29.4 percent of total output. Given these parameter values and constraints, the optimal tax rates are $\tau_K = 0.00345$, $\tau_w = \tau_\pi = 0.367$ if $\beta = 1$ and society places the same value on wages and profit, and $\tau_K = 0.065$, $\tau_w = \tau_\pi = 0.351$ if $\beta = 0$ and society is only concerned about the effect of the tax system on wage earners. By way of comparison, calculations by McKenzie, Mansour, and Brule (1997, p.27) indicate that the average marginal effective tax rate (METR) on capital under the current Canadian tax system is in the 22 to 27 percent range. Obviously, other parameter values would generate somewhat different values, but these calculations suggest that the optimal tax rates on capital income are much lower than the rates of taxation on capital that are currently imposed by the Canadian tax system.

Again, one might question the relevance of this conclusion because (1) the Canadian economy does not face perfectly elastic supplies of capital or perfectly elastic demands for her export products, and (2) this model does not reflect an important feature of the taxation of capital in Canada—the presence of the corporate income tax and the existence of foreign tax credits on dividends paid to foreign investors in United States, United Kingdom, Japan and other countries. The CIT is a tax on both economic profits and the return on equity financed capital. Thus changes in the corporate income tax rate simultaneously increases the rate of taxation of economic profit and the marginal effective tax rate on capital in the economy. The model described above did not link the

rate of taxation on profits to the rate of taxation on capital, and this linkage may be important in explaining the current rate of taxation of capital. Second, it has long been recognized that the foreign tax credit system means that if the Canadian CIT is fully credited by foreign governments, an increase in the CIT rate on foreign owned capital is effectively borne by treasuries of the foreign governments. This means that a significant share of the CIT burden may be exported to foreigners, which greatly enhances the attractiveness of levying a CIT. In the following section, we outline a simple model the optimal CIT rate in a SOE where foreign tax credits are available to foreign investors.

C. The Marginal Cost of Public Funds From Levying a Corporate Income Tax in a Small Open Economy

In an SOE, the user cost of capital is determined by the rates of return on debt and equity that foreign investors require in order to make investments in the economy comparable to investments in other countries.[11] The cost of capital to the firm will therefore depend on the CIT rate in the economy, u, and the availability of foreign tax credits. Foreign governments limit the foreign tax credit to the rate of taxation that would be applied in their home country, u_f. If the government of the SOE sets its CIT rate above u_f, then the foreign investors will require a higher rate of return in order to make investments in the SOE and the cost of capital to firms in the economy will increase. This is illustrated in Figure 6. On the other hand if the government of the SOE sets its tax rate below u_f, the taxes in the SOE are fully credited and the user cost of capital will not be affected by changes in SOE's CIT rate.

This assumes that there are no other distortions in the CIT system. In particular, it assumes that capital cost allowances equal the true economic rate of depreciation. If capital cost allowances are less than the economic rate of depreciation, then the user cost of capital will also increase as the CIT rate increases below u_f. Whether or not the cost of capital is constant or increasing in the CIT rate below u_f, there will be a "kink" in the cost of capital schedule at u_f when the maximum foreign tax credit is reach. This kink in the cost of capital schedule means that there will be a vertical discontinuity or "jump" in MCF for the CIT when the CIT rate equals u_f.

It also assumes that the MNE cannot defer the additional tax due to the home country by retaining profits in the foreign subsidiary and not remitting dividends to the parent in the home country, or that the MNE is not able to use the low burden to offset high tax burdens in other countries in calculating total foreign tax credit on dividends from MNE's foreign subsidiaries. (These issues will be addressed in Section 4.)

In the technical appendix, I have derived an expression for the marginal cost of public funds for a corporate income tax, MCF_u, for a SOE. The model is highly simplified. There is only one sector. The CIT is levied at the same rate on all firms in the economy. The firms' debt-equity ratios are assumed to be fixed and independent of

[11] Only a thumb-nail sketch of the model is presented here. A more detailed description of the model is contained in a technical appendix..

the tax. It is assumed that there is one foreign government that provides a full tax credit up to its CIT rate, u_f.

The model should be regarded as a prototype that illustrates how capital mobility and foreign tax credits affect the MCF for the CIT. The model does not capture the important distortions that are created when different effective CIT rates are imposed on different sectors of the economy. It does not reflect any distortions in firms' debt-equity ratios as a result of the CIT and does not include other important aspects of international taxation such as transfer pricing or international debt placement.

Within the context of this very simple model, the marginal cost of public funds from the CIT can be shown to equal the following:

$$MCF_u = \frac{-S_c \phi K + \beta[\Pi + (1 + S_c)(1 - u)\phi K]}{\Pi_{corp} + [\tau_K(\varepsilon_{Kc} + \varepsilon_{Lc} S_c) - uS_c]\phi K + \tau_l(\varepsilon_{Kw} + \varepsilon_{Lw} S_c)\phi K} \qquad (4)$$

where:

S_c is the change in labour income when the cost of capital increases by one dollar, i.e.

$$S_c = \frac{L}{K} \cdot \frac{dw}{dc} = \frac{-\varepsilon_{Kw}}{\varepsilon_{Lw} - \eta_{Lw}} < 0.$$

ϕ is the rate of increase in user cost of capital as the CIT rate increases, i.e. $\phi = \frac{dc}{du}$.

Π is total economic profit;

Π_{corp} is total corporate profits;

τ_K is the marginal effective tax rate under the corporate tax system;

As in all marginal cost of public funds formulas, the numerator reflects the burden of a tax rate increase, and the denominator reflects the rate of increase in total tax revenues from a tax rate increase. In this model, the burden of an increase in the CIT rate falls on wages and profits if an increase in the CIT rate increases the user cost of capital for firms. The first term in the numerator is burden of a small increase in the corporate tax rate that falls on labour, and the second term is the (distributionally-weighted) burden that falls on the recipients of the economic rent. In the denominator, the first two terms reflect the increase in CIT revenues and the third term is the rate of change in tax revenues from the wage tax.

The general formula is rather complex, but some insights can be gained from considering the case where $u < u_f$ and the user cost of capital is independent of the CIT rate in the SOE. In this case $\phi = 0$ and the MCF_u is equal to:

$$MCF_u = \frac{\Pi}{\Pi_{corp}} \qquad (5)$$

or the ratio of pure profit to corporate profit. Since corporate profits include the return on shareholders' equity, corporate profits exceed pure profit and therefore the MCF_u is less than one. The underlying reason why the MCF_u is less than one is that the CIT burden on the return to shareholders' equity is exported to foreigners when $u < u_f$. The ratio, Π/Π_c is the fraction of the tax burden that is not exported to foreigners. The notion that the MCF_u can be less than one is not new. Thirsk (1986) and Damus, Hobson, and Thirsk (1991) demonstrated this possibility using a computable general equilibrium model for the Canadian economy.[12]

I have calculated the MCFs for the CIT and the payroll tax using the same values of the variables and parameters that were used to simulate the optimal capital tax rate in the previous section. Parameter values have been chosen to roughly reflect the tax rates in the non-manufacturing sector of the economy as described in McKenzie, Mansour, and Brule (1997). In particular, the parameters reflect an average METR of 22.8 percent when the average statutory tax rate is 44.3 percent. It has been assumed that the average capital cost allowance rate is six percent, which is less than the economic depreciation rate of 10 percent in order to illustrate the effect of this additional distortion. (This assumption might be rationalized by noting that capital cost allowances are not indexed and therefore decline in value with the rate of inflation.) The simulation model implies that the elasticity of capital with respect to the CIT rate ($u = 0.433$) is –0.67 which is very close to the estimated elasticity of foreign direct investment (FDI) with respect to the host country tax rates in a number of econometric studies. (See Hines (1999)). Figure 7 shows the MCFs for the CIT and the wage tax when the tax rate on labour income in 30 percent. As expected the MCF_u is (generally) less than one when $u < u_f$. When u hits u_f, further increases in the CIT rate push up the user cost of capital at a faster rate because the marginal tax rate increases are no longer credited against foreign taxes, and the MCF_u jumps from 1.026 to 1.318. When the u increases to 50 percent, the MCF_u has increased to 1.507. Note that the $MCF_{\tau L}$ for $\tau_w = 0.30$ increases only slightly as u increases and is equal to 1.055 when $u = u_f = 0.40$. Both the MCF_u and the $MCF_{\tau L}$ are smaller than in some other studies because this model does not take into account all of the distortions created by these taxes.

One conclusion that is suggested by these calculations is that is a wide range of tax rates on labour such that the optimal corporate income tax rate will be equal to u_f. The model does not imply that the optimal CIT rate has to be equal to u_f. However, there is likely to be a wide range of parameter values such that u_f is the optimal CIT rate because it maximizes tax exporting with a minimal distortion to the allocation of resources in the economy.

Table 2 shows the computed values of the MCF for the corporate income tax and the wage tax. Case 1 shows the values of the MCF in Figure 7. Case 2 shows the MCFs when tax policy is only concerned about the well-being of workers. In this case, the optimal CIT rate is 0.445 and the optimal tax rate on labour is 0.297. Cases 3 and 4 show that the MCF_u is higher when the share of pure profits in total income is lower. However,

[12] It should also be noted that the Damus-Hobson-Thirsk model also assumed that the demands for Canadian exports were not perfectly elastic, which provides another avenue for exporting the corporate income tax burden.

in both of these cases, the optimal CIT rate is the foreign rate, 0.40. Thus, the model predicts that a SOE will want to levy its CIT at a rate that is close to the CIT rate of its major source of foreign investment, in our case the United States.

D. The Tax Treatment of Foreign Earnings by Capital Exporting Countries: Foreign Tax Credits vs. the Exemption System

Can the model explain why some countries, such as the United States, provide credits for taxes paid on foreign investment income? In this section, I examine a capital exporter's decision regarding the adoption a foreign tax credit system, whereby foreign income taxes are credited against the income taxes that it imposes, or an exemption system, whereby the government exempts active business income earned abroad from further domestic taxation.[13] (The exemption system is also sometimes referred to as a territorial CIT.) In particular, I extend the analysis in Gordon (1992) to explain why, or under what circumstances, capital-exporting countries provide a tax credit to their taxpayers for taxes paid on foreign earnings. Gordon's key insight was that a dominant capital-exporting country, such as United States, would take into account the effect of its tax system on the tax rates chosen by the smaller capital-importing countries, such as Canada. (In technical terms, the dominant capital-exporting country acts as a Stackelberg leader in forming its international taxation policies.) In particular, a dominant capital-exporting country will recognizes that the small capital-importing countries will tend to match its corporate income tax rate if it adopts a foreign tax credit regime, but will not impose a significant capital taxes if the capital-exporting country chooses an exemption system.

It should be noted that there is a third alternative—the deduction system whereby the capital-exporting country taxes the net-of-foreign-tax return on its residents' investments from abroad. Feldstein and Hartman (1979) showed that a dominant capital exporting country, such as the United States, would always prefer the deduction system to the foreign tax credit system. As Table 3 indicates, all major OECD countries use either the exemption or credit systems, and their failure to adopt the deduction system is a puzzling. Gordon (1992) suggested that this might be due to the inability to tax foreign source income. In any case, because deduction systems have not been adopted by OECD countries, I have restricted the analysis to the choice between the credit and exemption systems.

With a foreign tax credit regime, the equilibrium capital allocation is described in Figure 8 where f(K) is the marginal productivity of capital in the large capital-exporting country and g(K*) is the marginal productivity of capital in the rest of the world. Capital invested in the capital-exporting country is measured to the right of O, and capital invested in the rest of the world is measured to the left of O*. It is assumed that the "rest of the world" is made up of many SOEs which take the cost of capital and the tax policy of the dominant capital-exporting country as given. For simplicity, it is assumed that the

[13] The tax treatment of foreign source income has been addressed in by Feldstein and Hartman (1979), Bond and Samuelson (1980), and Oakland and Xu (1996) among others.

world's capital stock of is fixed, i.e. reductions in the return to capital do not affect savings rates. This model assumes that the residents of the dominant capital-exporting country own $\hat{K}$ units of capital with the remainder of the worlds' capital stock owned by residents of the capital-importing countries. In the absence of taxation, K^0 units of capital are invested in the capital-exporting country, and $\hat{K} - K^0$ units of capital are invested in the other countries. If the capital-exporting country introduces a CIT with a foreign tax credit, the net rate of return on investment in the capital-exporting country will be given by the dashed line below f(K). However, because of the tax credit foreign tax credit, the small capital-importing countries will also levy a source-based CIT at (approximately) same rate, and therefore the net rate of return on investment in the capital-importing countries, given by the dashed line below g(K*), also shifts down by the same amount. As a result, the allocation of capital between the capital-exporting and the capital-importing countries does not change as a result of taxation of capital.

Is this good arrangement from the perspective of the capital-importing countries and the dominant capital-exporting country? First, the equilibrium is obviously advantageous for the capital-importing countries because they collect tax revenues equal to bghc while reducing the net incomes of their residents by eghf. In other words, the burden befc is shifted to the residents of the capital-exporting country and the marginal cost of public funds from the CIT from the capital-importing countries' perspective is (eghf)/(bghc) < 1.

Now consider the equilibrium from the capital-exporting country's perspective. The total tax revenue raised by the capital-exporting country is the area abcd. This revenue is raised by reducing the return to the owners of domestic capital by the area aefd. In other words, the CIT with a foreign tax credit has an excess burden or deadweight loss of befc and its marginal cost of funds is equal to (aefd)/(abdc) = $(1 - \Phi)^{-1} > 1$, where Φ is the fraction of the capital owned by the capital-exporting country's residents that is invested in other countries. Therefore, the marginal (and average) cost of public funds from taxing capital under the credit system for the capital-exporting country is higher the larger the proportion of its capital stock that is invested in other countries.

Could the capital-exporting country do better if it dropped its foreign tax credit system and adopted the exemption system? Suppose the capital exporting country switched to the exemption system. In this case, which is illustrated in Figure 9, the net return on capital in the capital-exporting country declines by the effective tax rate on capital, but now the capital-importing countries would not levy a (significant) tax on the return to capital. Consequently, in the new equilibrium, the after-tax return in the capital-exporting country equals the rate of return on capital in the rest of the world, and there is a reduction in capital invested the dominant capital-exporting country from K^0 to K^1. The capital exporting country collects tax revenues equal to abcd, but this imposes a loss equal to abij on its workers (and the owners of fixed inputs) and a loss of jefd on the owners of capital in the capital-exporting country.[14] Consequently, the territorial CIT has

[14] This analysis ignores any loss of tax revenues from taxes on labour income or pure profits. See Gravelle and Smetters (2001) for an analyis of the incidence of a territorial CIT imposed by the United States.

a deadweight loss equal to bic + iefc. The first component of the deadweight loss is the loss associated with the reduction in the use of capital in the capital-exporting country. The second component is the loss of surplus on capital invested abroad.

Which tax system is superior from the perspective of the capital-exporting country—the foreign tax credit system or the exemption system? Suppose the capital-exporting country makes its choice solely on efficiency grounds, i.e. it choose the tax system with the lower deadweight loss for given amount of tax revenue. In the technical appendix, it is shown that the difference in the deadweight loss per dollar of tax revenue between the exemption system and the foreign tax credit system is equal to:

$$\Delta = \frac{\left(\varepsilon_{Kc} + 0.5\varepsilon^{*}_{Kc}\right)\left(\tau_K \varepsilon_{Kc} \varepsilon^{*}_{Kc}\right)}{\left(\varepsilon_{Kc} + \varepsilon^{*}_{Kc}\right)^2} - \frac{\varepsilon^{*}_{Kc}\left(1 - \tau_K \varepsilon_{Kc}\right)}{\varepsilon^{*}_{Kc} + \left(1 - \tau_K \varepsilon^{*}_{Kc}\right)\varepsilon_{Kc}}\left(\frac{\Phi}{1 - \Phi}\right) \qquad (6)$$

where ε_{Kc} is the elasticity of demand for capital in the capital-exporting country, ε^{*}_{Kc} is the elasticity of demand for capital by the rest of the world, (both defined as positive values in this context) and τ_K is the effective tax rate on capital under the exemption system. When Δ is positive, the foreign credit system is preferred to the exemption system by the dominant capital-exporting country because the deadweight loss per dollar of tax revenue is lower under the credit system (and vice versa). While the condition in (6) is rather complex, two important tendencies can be discerned. First, the tax credit system will be more attractive the more elastic the demand for capital in either the capital-exporting country or the capital-importing countries. This occurs because the deadweight loss under the credit system is independent of the elasticity of demand for capital in either region, while the deadweight loss under the exemption system is increasing in the elasticities of demand for capital. Second, and most important for our purposes, the credit system will be preferred to the exemption system if the proportion of the capital stock invested outside the capital-exporting country is sufficient small. If Φ is below some critical value, the capital-exporting country will adopt a CIT with a foreign tax credit and its CIT rate will largely be determined by domestic considerations, i.e. taking into account the MCFs for the other taxes that it levies and the marginal benefits from additional public spending.

The critical value of Φ, such that the capital-exporting country is indifferent between the exemption and the foreign tax credit system, is equal to 0.58 if production in both the capital-exporting country and the rest of the world is based on Cobb-Douglas production functions, with $\alpha_L = 0.70$ and $\alpha_\pi = 0.05$, and equal to 0.27 if $\alpha_L = 0.70$ and $\alpha_\pi = 0.10$.[15] It seems likely that less than one-quarter of U.S. residents' capital is invested abroad, and therefore this model may explain why the U.S. government has chosen to adopt the foreign tax credit system. Furthermore, if capital-exporting country adopts tax policies that place a higher distributional weight on the burden borne by labour than on

[15] These calculations are based on the assumption that the tax rate on capital under the exemption system would be 0.15. The higher the tax rate, the more likely it is that the credit system will be preferred to the exemption system.

capital, then the credit system will be favoured to a greater degree than this analysis indicates because the exemption system places a higher burden on labour than the foreign tax credit system.

This model suggests that economic integration and the globalization of capital markets may have implications for the choice between the credit and exemption systems and therefore the level of capital taxation in the SOEs. Globalization of the capital market may imply that a larger fraction of the capital-exporting countries' capital stock will be invested abroad, either for portfolio diversification reasons, or because economic growth and the demand for capital is greater in the capital-importing countries than in the capital-exporting countries. As a result, the advantage in using the credit system will trend to decline and at some point the capital-exporting countries may switch to the exemption system.[16] If that happens, the SOEs would abandon, or at least greatly reduce, their source-based taxes on capital incomes. If saving around the world-wide is relatively insensitive to the rate of return, then the switch is likely to have detrimental long-run effects from a global perspective. If, however, as endogenous growth models predict, the long-run economic growth rate is directly related to the return on savings, then the switch might be might raise global welfare.

To recapitulate, we have described a model of the international tax system which, at least on the surface, appears to be consistent with at least some the stylized facts regarding the trends in capital taxation described in Section 2. The model suggests that the foreign tax credit systems of the major capital exporting countries, the United States, the United Kingdom and Japan, underpin the CIT systems of the smaller capital-importing countries. The CIT rate reductions by OECD countries in the 1988-1992 period were a predictable response to the 1987 CIT rate cut in the United States, and possibly the earlier U.K. tax cuts. The model suggests that tax competition in a global capital market will not necessary lead to the withering away of the corporate tax systems as long as the capital-exporting countries retain their foreign tax credit systems. However, the model also suggests that globalization of capital markets may lead to the abandonment of the foreign tax credit system if an increasing share of the capital-exporting countries capital is invested abroad. In that event, the smaller capital-importing countries would probably greatly reduce their rates of capital taxation.

4. The Impact of International Taxation on Business Decisions

While the preceding model describes some of the stylized facts concerning the international tax system, it does not account for other aspects of international tax-setting behaviour. For example, a number of countries—Australia, Canada, Denmark, Ireland, Mexico, and Sweden—have cut (or have announced their intention to lower) their CIT rates significantly below the CIT rates in the U.S. and Japan. The model in Section 3 predicts that small capital-importing countries should not set their CIT rates significantly below the CIT rates of the major capital-exporting countries that provide foreign tax

[16] The adoption of an exemption system U.S. has been raised in the U.S. in the context of "fundamental" tax reform that would shift the U.S. tax system to a consumption tax base.

credits. Even though the U.K. rate is now only 30 percent, a weighted average foreign tax credit rate based on that foreign direct investment shares from the Japan, the United States and the United Kingdom would not explain the CIT rate setting behaviour of most of these countries.[17] Furthermore, the model does not explain the apparent success that Ireland has had in attracting direct foreign investment by adopting a 10 percent CIT rate for manufacturing activity.

The inability of the tax credit model to account for the recent CIT rate cuts and the Irish foreign direct investment boom may be due to the fact that the model neglects some key aspects of the international taxation system, such as the deferral of dividends to the parent company, the averaging of taxes from high and low tax countries in calculating the foreign tax credits, the existence of international tax havens, and the fact that tax policies in many countries have to deal with both inbound and outbound direct foreign investment. We will deal with each of these issues in turn.

The foreign tax credit model outlined in Section 3 implicitly assumed that foreign earnings were taxed on an accrual basis. However, under the U.S. tax system, the active business income of a U.S. foreign subsidiaries is only taxed when a dividend payment is made to the U.S. parent.[18] Consequently, a U.S. MNE can defer or postpone the residual U.S. tax liability that arises when the host country tax rate is less than the U.S. rate by retaining the profits in the foreign subsidiary. Deferral reduces the present value of the future U.S. tax liability and in the limit reduces it zero. With deferral, the subsidiary's cost of capital will be an increasing function of the host country's tax rate, even if its is less than the U.S. rate. A higher host country CIT rate will therefore tend to discourage investment.

Furthermore, in calculating its foreign tax credits, a U.S. multinational is able to use the low tax burdens in some countries to offset its excess tax credits on investments in other high tax countries. By averaging taxes from high and low tax sources, the MNE can avoid being put in an excess tax credit position, such that its foreign tax credits exceed its overall U.S. tax liability.[19] Consequently, an increase in the CIT rate in a low tax country may push up the MNE's overall tax rate, and therefore may not be fully credited at the margin. In that case, an increase in the host country's CIT rate increases its user cost of capital even though it rate is below the U.S. rate, with a potentially deleterious effect on the incentive to invest in the host country. In terms of the model of the CIT described in Section 3, deferral and averaging could mean that the MCF_u for the host country is equivalent to the no tax credit case in Figure 7 for $u < u_f$ and that the optimal CIT rate from the host country's perspective might considerably lower than u_f. Indeed, Gordon (2000, p.30) has concluded "it does not appear that the use of tax credits can explain the survival of taxes on capital income, given that profits from foreign subsidiaries are taxed only at repatriation and with world-wide averaging."

---

[17] Australia, Canada, and Ireland receive over 65 percent of its foreign direct investment from Japan and the United States. Chennells and Griffith (1997, Table A.1, p.85).

[18] For a description of the U.S. treatment of foreign source income and an analysis of the repatriation decision by U.S. foreign multinationals, see Ault and Bradford (1990) and Hines and Rice (1994)..

[19] Excess foreign tax credits can be carried forward to offset taxes in future years, but future tax credits are obviously worthless than an immediate tax credit.

The extent to which deferral and world-wide averaging have effectively converted the U.S. credit system into an exemption system is basically an empirical question. Slemrod (1990) analyzed FDI in the United States from countries using the exemption system and the foreign tax credit system over the period 1962 to 1987, and concluded that FDI from exemption countries was not more sensitive to U.S. tax rate changes than FDI from the countries providing foreign tax credits. Auerbach and Hassett (1993) also found no difference in the tax responsiveness of FDI in the U.S. from countries using the exemption or the foreign tax credit systems. However, Hines (1996) found that FDI from countries with exemption systems was much more sensitive to the state CIT rates than FDI from countries with foreign tax credit systems. He found that a one percent increase in a state's tax rate reduced the share manufacturing capital by exemption countries from 9 to 11 percent compared to foreign tax credit counties and that foreign investors from exemption countries were much more likely to invest in states with zero CIT rates than were the investors from the foreign tax credit countries. Finally, Shah and Slemrod (1991) examined the FDI flows into Mexico over the period 1965-87 and tested whether a measure of U.S. multinationals' foreign tax credit status affected FDI from the U.S. to Mexico. They found that in the deficit tax credit case the U.S. tax rate, not the Mexican tax rate, affected FDI to Mexico. However, in general both the U.S. and the Mexican tax rates affected FDI to Mexico. Thus the empirical results indicate that neither view of the foreign tax system— as a de facto exemption because of deferral and world-wide average or as a pure foreign tax credit system—provides an adequate description of the impact of a host country's CIT tax rates on FDI, and therefore the MCF_u should be thought of as a weighted average of the MCFs under the two systems.

The tax credit model in Section 3 also ignores that opportunities that MNEs have to structure transactions among affiliated companies to take advantage of "tax havens" and other low rate countries through transfer pricing and debt placement policies.

Finally, the model in Section 3 assumes that countries are either capital importers or capital exporters. Many countries, such as Canada, have significant levels of both in-bound and out-bound foreign investment. Tax policies are no longer simply dictated by a country's role as a capital-importing or capital-exporting and have to reflect the fact that a country is both a capital importer and a capital exporter.

With these caveats to the foreign tax credit model in mind, we will review some of the literature on the impact of international taxation on foreign direct investment, transfer pricing policies, and debt placement.

A. Foreign Direct Investment

Over the last 15 years, a number of studies have found that international taxation has a significant effect on both in-bound and out-bound U.S. FDI. Hines (1999) has written a recent survey of this literature and has concluded that a substantial number of studies has indicated that the elasticity of foreign direct investment with the tax rate is around –0.6. He concluded that "the large response elasticity of FDI with respect to tax rates, therefore, may contribute to tendencies of governments to 'race to the bottom' with competitive tax reductions for footloose FDI." (Hines (1999, p.312).) I will briefly discuss a few of the empirical studies that either were not included in Hines' survey or

that have a special significance because they deal with Canada, Mexico and other countries besides the U.S.

As previously, noted Shah and Slemrod (1991) estimated an econometric model of FDI in Mexico financed by transfer of funds from U.S. parents and from affiliates retained earnings over the period 1965-87. They found that flows of FDI financed by transfers and retained were sensitive to the marginal effective tax rate in Mexico (with elasticities of -0.79 and –1.5 respectively) and that the elasticity of FDI financed by retained earnings "with respect to the Mexican statutory tax rate is –0.56 and with respect to the differences in Mexican and U.S. taxes is –2.8 (all calculated at 1987 values). A change in the credit status of multinationals toward excess credit positively influenced their decisions to reinvest rather than to repatriate their earnings, with an estimated elasticity of 1.9 at 1987 values." (Shah and Slemrod (1991, p.485).)

Devereux and Griffiths (1998) analyzed the location decisions of U.S. multinational corporations in Europe between 1980 and 1994 and found that a one percentage point increase in the host country's average effective tax rate reduced the probability of investment in the U.K., France, and Germany by 1.3, 0.5 and 1.0 percentage points respectively. They also concluded that "the average effective tax rate does not play a significant role in the choices between producing in Europe abroad as opposed to either exporting to Europe or not serving the European market at all." (Devereux and Griffiths (1998, p.363).)

Cummins (1996) investigated how taxes affect the allocation of a multinational's production between domestic and foreign affiliates and the degree of substitutability among the parent and its affiliates' labour and capital by analyzing the production decisions of a sample of U.S. multinationals with Canadian affiliates between 1980 and 1994. He concluded that:

> U.S. MNEs are able to substitute factor inputs between their domestic and Canadian affiliates rather easily, except domestic and foreign labour which are complements. The elasticity estimates imply that an increase in capital taxation that leads to a 10-percent increase in the relative price of domestic capital would lead to at least a 10-percent decrease in the steady-state ratio of domestic to foreign capital. This level of substitution suggests that countries may face increasing pressure on corporate tax revenues, as companies shift production to the lowest tax countries.
>
> Cummins (1996, p.26)

A study of Canadian multinational with U.S. foreign affiliates by Altshuler and Cummins (1998) also concluded that capital invested in the parent and affiliate is highly substitutable.

McKenzie and Thompson (1997) analyzed the differences between the user cost of capital in Canada and the United States for the period 1971-1996. They found that the user cost of capital (outside the manufacturing sector) was generally higher in Canada

than in the United States, primarily because Canadian real interest rates were higher, but also because the Canadian tax system was less favourable for investment than the U.S. system. They found that differences the cost of capital had a small but significant effect on the relative investment rates in machinery and equipment (but not in structures) in Canada and the United States.

One of the most recent studies on the effect of taxation on international investment is by Grubert and Mutti (2000), who analyzed how host countries' average effective tax rates affected U.S. multinational corporations' in the foreign manufacturing affiliates' capital stocks in 60 countries. They found that the host country tax rate had a significant effect on foreign affiliates' capital stocks with an elasticity with of –3.23 with respect to the average effective tax rate for countries, such as Canada, with an open trade policy. They also found that the capital's responsiveness to the host country tax rate was lower in countries with more restrictive trade policies. In other words, their results confirm the widely-held belief that tax rates become more important in determining foreign (and possibly domestic) investment with economic integration and open borders to trade in goods and services.

Our selective review of the literature, combined with the more comprehensive literature review by Hines, indicates that a county's international tax regime and its average and marginal effective tax rates on investment have a significant impact on levels of foreign direct investment. Furthermore, these econometric studies suggest that as economic integration proceeds the real investments tax competition for internationally mobile capital will be stronger.

B. Transfer Pricing

The tax revenue that a country generates through its business tax system obviously depends on how the tax system affects capital investment and employment decisions. However, the tax system can also be affected by firms' financial and accounting decisions, affecting recorded revenues and costs. Through transfer pricing and debt placement, MNEs may be able to shift reported profits across national boundaries, and this may have a major impact on the tax revenues that a country receives through its corporate tax system. In this section, we examine some of the issues and empirical evidence regarding the impact of transfer pricing. The next section deals with debt placement policies.

The prices that are used to establish the value of goods and services traded between related corporations are known as transfer prices. Through the use of transfer prices, corporations can "shift" reported profits across national boundaries by increasing or lower the value of the goods and services transferred within the corporation. To maximize its global after-tax profit, a multinational firm, headquartered in an country (a) using the exemption system or (b) in an excess foreign tax credit position, will want to increase profits (by increasing the reported revenues or reducing reported costs on intrafirm transactions) for its operations in low tax countries and reduce reported profits (by reducing reported revenues and increasing reported costs on intrafirm transactions) of

operations in high tax countries.[20] Such changes in reported profitability can occur without any changes in the geographic distribution of investment or output with the multinational enterprise.

OECD countries have implemented measures to protect their tax bases from profit-shifting through transfer pricing, and firms now have to justify the transfer prices that are used for transactions with related parties. A survey conducted by Ernst & Young in 1999 reported that 61 percent of multi-national enterprises indicated that transfer pricing was the most important international tax issue facing them. In setting transfer prices, Canada and other OECD countries has adopted the "arm's length principle", i.e. the appropriate transfer prices is the one that would be established if the transaction occurred between unrelated parties. Establishing the appropriate transfer price is often difficult because many of the goods or services transferred within an MNE may be unique, with no close counter parts in the market place. This is especially true of intellectual property such as patents, trademarks, or special services such as management services.

In general, five different methods are used to calculate transfer prices—comparable uncontolled price, resale price, cost plus, profit split and comparable profits.[21] Different transfer pricing methodologies will result in different allocations of profits between the buyer and the seller and therefore different allocations of taxable profits between the home and host country on transactions between a parent and its subsidiary. Thus countries may have conflicting interests concerning which transfer pricing methodology to use.

Other factors, in addition to the efforts of governments to control or restrict the use of transfer pricing for profit shifting, may limit an MNE's use of transfer pricing to minimize its world-wide tax payments. Transfer prices that are out of line with "market" prices may change employees' incentives concerning what to produce and how to produce it, leading to a less efficient organization. Second, a firm may have to change the location of some of its activities in order to take advantage of transfer pricing opportunities, leading to a less efficient geographical organization production and sales activities. Third, if the foreign subsidiary is not 100 percent owned by the parent, then transfer prices that shift report profits from the subsidiary to the parent are detrimental to the interests of the minority shareholders, as well as the host country's treasury. Minority shareholders may have greater access to information on the extent of profit-shifting than the host government, and they may have legal recourse to unfair transfer pricing policies. Profit-shifting may also lower share prices for affiliates, making profit shifting through transfer pricing is less attractive option for to the parent company.

---

[20] A firm headquartered in a country with a foreign tax credit system would only be concerned about the difference in tariff rates between in the home and host country in setting its transfer prices if it is in a deficit tax credit position because the all income is subject to the home country tax rate. However, deferral and world-wide average of foreign tax credits may also create incentives for an MNE from a tax credit country to take advantage of differences in statutory tax rates in setting transfer prices. See Swenson (2001).

[21] See Hoffman (2001, pp18-22) for a description of these alternative methods.

Despite these obstacles to transfer pricing, there is considerable anecdotal evidence that MNEs shift profits in order to reduce their total tax bill. Bartelsman and Beetsma (2000, p.1) cite the example of the German car producer, BMW, "...whose tax payments in Germany as a share of its worldwide tax payments dropped from 88% in 1988 to 5% in 1992 and –16% in 1993. BMW's financial director publicly stated that his corporation tried to shift cost to where taxes were highest, which was Germany." In view of the director's comments, it is not surprising that the Germany has recently reduced its corporate income tax rate.

While theoretical models and anecdotal evidence suggest that profit-shifting through transfer pricing should be a pervasive activity, econometric studies have yielded mix results concerning the existence and economic significance of transfer pricing. The empirical literature on transfer pricing has recently been surveyed Newlon (2000, p.230) who concludes that:

> A number of studies provide evidence consistent with income shifting by MNEs. There are, however, several reasons to be cautious about the interpretation of this evidence. First, some studies find evidence consistent with little or no income shifting. Second, firms and MNEs are heterogeneous in numerous ways that cannot be observed from the data and may confound the results of these studies. We cannot rule out the possibility that tax rates may be correlated with unobservable factors that affect the profitability of MNE affiliates.

I will focus my comments on three recent studies that were not included in Newlon's survey. Bartelsman and Beetsma (2000) searched for evidence of profit-shifting by analyzing the effect of tax rate differentials on the ratios of the value of output to labour costs in OECD countries over the period 1979-1997. (Their hypothesis is that if MNEs engage in transfer pricing the value-labour ratios should be lower in high tax rate countries.) Their econometric results are consistent with the this hypothesis and suggest that a one percentage point increase in the corporate tax rate for a OECD country reduces reported profits by one percentage point, so that, holding production constant, there is no increase in tax revenues. When the effects on production and investment are taken into account, the corporate profit tax base declines by four percent, leading to a three percent decline in corporate tax revenues. In other words, Bartelsman and Beetsma's results suggest that OECD countries are on the negatively sloped part of the Laffer curve for corporate tax revenues.[22]

Swenson (2001) searched for evidence of transfer pricing by analyzing the prices of U.S. imports of manufactured goods from Canada, France, Germany, Japan, and the United Kingdom from 1981 to 1988. She developed a transfer pricing model in which the firm's cost of using transfer prices increases with square of the deviation of from the (unobserved) arm's length price. (These costs reflect the resources that the firm has to use to implement and justify its transfer prices as well as any expected penalties imposed by governments in the host and home countries.) The model predicts that transfer prices

---

[22] Bartelsman, E.J. and R. Beetsma (2000) "Why Pay More? Corporate Tax Avoidance through Transfer Pricing in OECD Countries" CESifo Working Papers, No. 324, Munich, Germany.

from firms headquartered in exemption system countries should be proportional to the differences in the CIT rates of the U.S. and the home country and decreasing in the U.S. tariff rate. She found a statistically significant transfer pricing effect on U.S. import prices, but the overall effect was rather small, such that a 5 percent reduction in the home country tax rate would only lead to a 0.008 percent increase in U.S. import prices.[23] However, as Swenson points out, this import price effect was observed for total imports, which includes both inter-affiliate and non-affiliate trade, and therefore the implied effects on affiliate trade are considerably larger. Furthermore there were significant differences in the magnitudes of the import price effects across different industries, and in certain sectors such as automobiles, (which is an important component of Canada-U.S. trade), the import price effect was considerably larger. Nevertheless, the overall effect on U.S. tax revenues from the transfer pricing effect on imported manufactured goods from the countries included in the study is likely to be very small. Obviously, the Swenson and Bartelsman-Beetsma studies reach drastically different conclusions regarding the economic significance of transfer pricing.

Hoffman (2001) has examined the evidence for transfer pricing by analyzing the tax to asset ratios of 94 Canadian corporations with an international presence (either as a Canadian parent with a foreign subsidiary or as a Canadian subsidiary with a foreign parent) over the period 1987 to 1994. He utilized (confidential) data based on the Corporation Sample File developed by Finance Canada. Hoffman hypothesized that a firm's ratio of income tax to assets would be higher if the corporation had affiliate corporations in countries with CIT rates that are higher than in Canada and vice versa. The regression equations that he estimated were similar in form to those estimated by Harris et al. (1993) and included various categories of expenses, tax credit, and debt leverages variables as control variables. The tax variables were entered either as the differential between Canadian and the other countries' tax rate, or as a dummy variable indicating that the firm had affiliates in high tax or low tax regions (compared to Canada).[24] Both ways of entering the tax variable in the regressions produced similar qualitative results.

Table 4 summarizes Hoffman's results for the tax differential specifications, where a "√" indicates a significant tax coefficient estimate consistent with tax-motivated transfer pricing and an "X" denotes a statistically significant tax coefficient estimate which was inconsistent with tax-motivated tax shifting. In the estimates for the entire sample of corporations, there were 8 consistent coefficient estimates and 6 inconsistent estimates (including the coefficient estimate on the tax differential with the United States). The subsample that yielded the results that were most consistent with tax-motivated transfer pricing was the 25.5 percent of corporations in the sample that were subsidiaries of a U.S. parent. For this subsample, there were 10 consistent coefficient estimates (including the U.S. tax differential coefficient) and seven inconsistent coefficients. For the U.S. parent subsample, with the high tax/low tax regional dummy specification, seven out of the 22

[23] The relatively small import price effect measured by Swenson may be due to the fact that many manufactured goods may not present the opportunities for profit-shifting through transfer pricing that are provided by intangible property such as patents and trademarks.

[24] Harris et al.(1993) used a similar the high tax-low tax region dummy variable technique in their study of transfer pricing by U.S. multinationals.

estimated of the tax coefficients were consistent with tax-motivated transfer pricing and the only inconsistent coefficient estimates were for Africa, where as Hoffman argues political instability and exchange rate risks could over-ride tax considerations in setting transfer prices. Hoffman (2001, p.125) found that one percentage point change in Canada's tax rate could lead to a change in Canadian tax liability for a representative corporation of between $0.113 million and $2.280 million, depending on the location of the subsidiary. Although the statistical results were mixed, there was enough evidence of tax-motivated transfer pricing for Hoffman (2001, p.127) to conclude that "lower Canadian corporate tax rates would reduce the degree of income shifting, thus increasing the Canadian tax base...".

C. Debt Placement

Foreign direct investment can be financed in a number of ways:

- equity supplied by the parent or an affiliated foreign subsidiary;
- third-party debt borrowed in the home country or the host countries;
- internal debt from the parent to the foreign subsidiary; or
- retained earnings of the foreign subsidiary.

These different ways of financing the FDI may lead to significantly different tax payments in the home and host countries and affect the world-wide total tax burden of the MNE.[25] In particular, the geographic location of an MNE's debt determines in which country interest deductions are made and in which country the income is taxed. These issues are of importance to Canada, both as an importer and as an exporter of FDI. We begin by examining the debt placement issues that arise from inbound FDI. Later, we examine debt placement issues arising from FDI investment by Canadian-based MNEs.

Debt Financing of Inbound FDI

In the discussing the debt placement issues on inbound FDI, it will be assumed that the parent company is incorporated in the United States because the U.S. is our largest source of FDI and because the United States government has adopted policies which have potentially important impacts on the debt placement policies of its MNEs. The U.S. government has adopted interest-allocation rules which affect the foreign tax credits that U.S.-based MNEs can claim on foreign source income. Detailed descriptions of the interest-allocation rules can be found in Altshuler and Mintz (1995), Shaviro (2001), and Graham (2001). The current U.S. rules, which were enacted in 1986, allocate a fraction of the domestic interest expense incurred by parent corporation to its foreign source income. The fraction of the domestic interest allocated to foreign source income, α, is the ratio of the MNE's foreign assets minus foreign debt to its worldwide assets net of foreign debt. The impact of the interest-allocation rules depends on the tax credit position of the U.S. MNE.

[25] In addition, the tax treatment of the MNE's FDI will depend on whether it is made through a foreign branch of the MNE or through a subsidiary incorporated in the foreign country.

If an MNE's average foreign tax rate is less than the U.S. rate, $u^* < u_{us}$, and it is in a deficit credit position, then the interest-allocation rules have no impact on the firm's U.S. tax liability. The increase in U.S. tax on domestic operations (due to the allocation of interest to foreign source income) is completely offset by the reduction in U.S. tax levied on the foreign source income. An extra dollar of third-party interest expense reduces the MNE's worldwide taxes by the U.S. tax rate, u_{us}, whether it is incurred by the parent or by its foreign subsidiary.[26] Therefore, the interest-allocation rules do not change the firm's incentives regarding borrowing by the parent versus borrowing by the foreign subsidiary.

If $u^* > u_{us}$ and the MNE is in an excess credit position, then the interest-allocation rules increase the amount of tax that the MNE has to pay to the U.S. treasury, with no offsetting reduction in tax paid to the host country. An extra dollar of third-party interest expense reduces its worldwide tax bill by $(1 - \alpha)u_{us}$ if it is incurred by the parent corporation and by u^* if it is incurred by the foreign subsidiary.[27] This strengthens the incentive (that exists in the absence of the interest-allocation rules) for the MNE's foreign to incur debt, thereby reducing the tax payments in the host country.[28] Altshuler and Mintz (2001) show that U.S. interest-allocation rules raised the user cost of capital of U.S. multinationals on their investments abroad (by around 8 percentage points for Canadian FDI) and on investments in the U.S. compared to purely domestic firms.

The empirical literature on the effect of the U.S. tax system on the debt financing strategies of U.S. multinational has recently been survey by Graham (2001, pp.42-44). Here I will only briefly discuss three studies that have a Canadian dimension. Hogg and Mintz (1993) analyzed the debt and distribution behaviour of 28 Canadian subsidiaries of U.S. multinationals between 1983 and 1989. They hypothesized that because of the change in the interest-allocation rules and the decline in the U.S. CIT rate relative to the Canadian rate after 1986:

- the U.S. subsidiaries would increase their debt after 1986;
- interest, management fees, royalties and certain other expenditures (cross-border charges) paid by the foreign subsidiary to the U.S. parent would increase;
- retained earnings of the Canadian foreign subsidiaries would decline and dividend payments would increase.

Their data indicated that the majority Canadian foreign subsidiaries increased their debt and dividend payments, as hypothesized, but cross-border charges did not change significantly. Hoffman (2001) re-examined the Hogg-Mintz data on cross charges and found that there was a the timing response, with cross-border charges temporarily reduced in 1986 and shifted to 1987 anticipation of the lowering of the U.S. tax rate in that year.

---

[26] See Graham (2001, Table 3).

[27] See Graham (2001, Table 3).

[28] Shaviro (2001, p.33) notes that the interest-allocation rules may export U.S. parent's interest expense "even if the taxpayer is more highly leveraged (relative to assets) abroad than at home..." For example, suppose that both the U.S. parent and its foreign subsidiary have 100 in assets, 50 in (third party) debt, and 5 in interest expense. The interest-allocation formula would allocate one third of the U.S. parent's interest expense to the dividend income received from the foreign subsidiary.

Altshuler and Mintz (1996) examined the debt allocations of 17 large U.S. MNEs between 1986 and 1991. They found that the debt-to -asset ratios of the Canadian subsidiaries increased from 0.14 to 0.48 for firms that were in an excess foreign tax credit position, while the Canadian foreign subsidiaries of U.S. firms that were in a deficit tax credit position for at least one year during 1986-91 period increased their debt asset ratios by a smaller amount, from 0.21 to 0.42. Their regression analysis indicated that a one percentage point increase in the interest-allocation ratio increased the ratio of foreign subsidiary debt to worldwide debt by 0.53 points for a parent with excess tax credits.

Jog and Tang (2001) examined the effect of the Canadian CIT rate on the debt to asset ratios of 388 large non-financial corporations operating in Canada between 1986 and 1994. They distinguished the firms by their ownership—Canadian-controlled (CC) or foreign-control (FC)—and on the basis of whether the corporation had foreign affiliates (FAs) or not (NFAs). Their econometric analysis indicated that the debt-asset ratios of Canadian corporations, especially CCNFAs, increase with increases in the Canadian corporate income tax rate.[29] The relative sensitivity of the CCNFAs debt-asset ratios is somewhat surprising given the usual emphasis in the literature on the flexibility that firms with foreign affiliates have in financing their investments. However, Jog and Tang also found that an increase in the Canada-U.S. tax rate differential increased the debt-asset ratios of CCFAs and FCs relative to the CCNFAs, indicating that the tax rate differential has the predicted effects on firms with an international nexus.

The econometric analysis by Jog and Tang indicated that the Canadian CIT rate and the Canada-U.S. tax rate differential affects the debt behaviour of Canadian-controlled corporations with foreign operations. We now turn to a discussion of the some of the issues connected with the Canadian tax treatment of debt to finance foreign investment by Canadian controlled corporations.

Debt Financing of Outbound FDI

Table 5 describes the basic features of Canadian tax treatment of foreign source income.[30] In this section, we will only deal with the tax treatment of the active business income of foreign subsidiaries of Canadian corporations. This income, if it is earned in country with which Canada has a tax treaty, is classified as exempt surplus and is exempt from further taxation at the corporate level in Canada. The Canadian parent corporation can borrow to finance an investment in a foreign subsidiary and deduct its interest expenses from its Canadian taxable income even though the income earned by the subsidiary will be exempt from corporate income tax in Canada. Everything else being equal, the corporation will minimize its worldwide tax bill by borrowing in the country that has the highest tax rate because this will give it the largest deduction of its interest expense. Consequently, the corporation has the incentive to borrow in Canada and finance the foreign subsidiary through equity, if the Canadian tax rate is greater than the tax rate in the host country.

[29] Computations by Jog and Tang indicate that while a reduction in the CIT rate would lead to an offsetting increase in the CIT base as a result of a decline in firms' debt levels and interest deductions, tax revenues would still decline.

[30] For more details see Arnold, Li, and Sandler (1996).

Canada has an extensive network of tax treaties and many these countries—such as Barbados, Cyprus, Ireland, and Israel—the effective CIT rates are substantially below Canadian rates, especially for non-manufacturing activities. Arnold Li, and Sandler (1996) have noted that Canada has no specific rules regarding the allocation of interest expenses, but this is a common situation and other countries such as Australia, Germany, and France have only limited rules regarding the allocation of interest expenses. The United States is the only country with a comprehensive set of interest-allocation rules, and as we have seen these rules are not entirely satisfactory from the perspective of U.S. multinationals or the foreign countries where they operate.

Borrowing in Canada to finance investments abroad that come back to Canada as exempt surplus reduces the revenues generated by the CIT in Canada and effectively subsidizes Canadian direct investments in other countries. For example, consider an investment project in Canada financed by debt that requires a 20 percent rate of return to be profitable because it is taxed at 40 percent rate. A similar investment in a foreign subsidiary would only require a 16.7 percent return if the host country has a 10 percent CIT rate and if the interest is deducted by the Canadian parent.

Is the potential cross-subsidization of foreign direct investment a good thing? Although the research by Cummins (1996) cited early suggests that capital is highly substitutable between a parent and a foreign subsidiary, and therefore the implicit subsidy to FDI may reduce domestic investment in Canada, the relationship between foreign and domestic investment is often complex and likely varies for company to company and project to project. Devereux (1996, p.104) has described some alternative investment scenarios and the possible linkages between domestic and foreign direct investment:

(i) A purely domestic firm spots a new opportunity in a foreign market. It is cheaper to produce abroad to service this market: no effect on domestic investment.

(ii) A shift in costs occurs which implies that it becomes cheaper to produce a good abroad rather than at home: a negative effect on domestic investment—possibly one –for-one with the rise in foreign investment.

(iii) Internalization factors change which make it cheaper to produce abroad rather than to license a third party: no effect on domestic investment.

(iv) A firm aims to produce a new product which requires an intermediate good—for example, a design produced by R&D; the R&D takes place domestically, but production of the final good is cheaper abroad; a positive relationship between domestic investment and outward FDI.

Given the complexity of these relationships between domestic and foreign direct investment in other countries, it is difficult to say, in the absence of more research on this topic, whether implicit tax incentives for outbound FDI, would lead to the expansion or the contraction domestic employment and investment.

Brean (1997) has defended Canada's relatively favourable tax treatment of FDI by Canadian MNEs on the grounds that FDI generates externalities (through the promotion of R&D and head-office activities) and therefore the social rate of return to FDI likely exceeds its private rate of return. While this is likely true in some situations (see case (iv) above), it is also true the some domestic investments generate beneficial externalities and therefore it would be better to subsidize all externality-generating investments (if we could identify them) rather than provide relatively favourable treatment for FDI.

Given the uncertainties about the relationships between domestic and foreign direct investments and the relative magnitudes of their positive externalities, the Technical Committee on Business Taxation (the Mintz Committee) recommended that Canada adopt a level playing field approach, such that domestic and foreign investment receive similar tax treatment. The Committee considered the adoption of interest-allocation formulas, but rejected this approach as either infeasible or potentially highly distortionary for domestic and foreign investment decisions. In the end, the Mintz Committee recommend the adoption of a "tracing" procedure (with a minimum threshold of $10 million of indebtedness related to foreign investments) whereby deductions of interest expense on debt used, directly or indirectly, to finance direct foreign investment would be disallowed. The Mintz Committee recognized that strict enforcement of a tracing procedure is difficult, if not impossible, but that a limited attempt to produce a more neutral tax treatment of domestic and foreign direct investment was desirable. Furthermore, debt placement issue provided additional support for reducing the CIT rates on non-manufacturing activities that the Mintz Committee recommended and that federal government announced in 2000.

5. North American Integration and Formula Apportionment

While global forces are affecting the business tax system, the growth of trade and direct investment with Mexico and the United States will also shape our business tax system. As North American economic integration proceeds, with increasing volumes of trade in goods and services and direct investment among the NFTA partners, business taxation issues will become increasingly important. In this section, I will briefly discuss one of the business tax harmonization issues that will emerge as NAFTA deepens our economic linkages with the United States and Mexico.

At some point, we may want to consider whether the taxation of international business income should continue to be based on "separate accounting", whereby corporate profits are measured and taxes assessed based on the geographic distribution of each units of business, or whether "formula apportionment" should be used to allocate North American profits—or even the global profits—of companies operating in Canada, United States and Mexico. As we have seen in the previous section, transfer pricing and debt placement issues makes determination of the geographic allocation of income

increasingly difficult, arbitrary, and costly. As Weiner (1999, p.38) expressed it, "At some point, identifying 'U.S. income,' 'Canadian income,' or 'Mexican income' may be as irrelevant as, for example, identifying 'California income' and 'Nebraska income' became for corporations doing business in several states within the United States."

Since both the Canada and the United States use formulas to allocate corporate income tax bases among the provinces and states, it is natural to consider the possibility of using an allocation formula for the corporate income tax base among the NAFTA partners.[31] In addition, the possibility of using formula apportion has been considered to allocate the CIT base within the European Union (see McLure and Weiner (2000)) and to allocate world-wide corporate profits (see Mintz (1998)).

There are a large number of questions that have to be addressed in evaluating the merits of switching to a formula apportionment system. What formula would be used? Who would it apply to? What it would it apply to? Would formula apportionment reduce the pressure of tax competition? Would it lower administration and compliance costs?

In Canada, the allocation of a company's corporate tax base among the provinces (in which it has a permanent establishment) is based on a formula that gives equal weight to a province's shares of its sales and its payroll. For example, suppose a corporation has two permanent establishments, one in Ontario and one in Alberta, with half of its payroll in Ontario and half in Alberta. If four-fifths of its sales are made in Alberta, then 65 percent ((1/2)(1/2) + (1/2)(4/5)) of its total taxable profits would be allocated to Alberta. The corporation's provincial CIT rate would be $0.65u_{AB} + 0.35u_{ONT}$.

In Canada, all of the provinces use the same allocation formula. In the United States, the state governments set their own apportionment formulas, and four different systems are used by the 46 states that levy a state corporate income tax. Thirteen states use a formula that gives equal weight to sales, payrolls and property, and 23 states "double-weight" sales, i.e. the share of sales in a state has a 50 percent weight while payrolls and property each have a 25 percent weight. The other 10 states either weight sales by more than 50 percent or have an elective system.[32] The lack of a common formula means that corporate profits may be over, or under, taxed relative to a common allocation formula, and it adds to compliance costs of U.S. businesses.

If the NAFTA partners were to adopt a formula apportionment system, it is clear that they would have to agree on a common formula to avoid the problems that are encountered at the state level in the U.S. But what formula should they adopt? Unfortunately, economics does not provide much guidance on how to divide the "corporate pie", other than to suggest that the formula's incentive structure should maximize (or a least preserve) the size of the pie. Each country would presumably want the formula that would give it the largest share of the corporate tax base. Anand and Sansing (2000) have shown that if labour and capital are not completely mobile between jurisdictions, net exporters (such as Canada and Mexico) prefer a higher weight on input

[31] Coporate income taxes are not levied at the state level in Mexico.
[32] See Anand and Sansing (2000, Table 1, p.190).

shares and a net importer (such as the United States) would prefer a higher weight on sales.

Certainly the adoption of formula allocation among countries has a large potential for re-distributing the corporate tax revenues. Shackelford and Slemrod (1998) used data on 230 U.S. multinationals to estimate the impact on U.S. tax revenues of adopting an equally weighted sales, payroll, and property allocation formula for their world-wide income. For this sample of companies, they found that U.S. tax revenues would be 38 percent higher ($386 million vs. $279 million) with formula apportionment. Shackelford and Slemrod did not indicate which countries would have lost revenue under formula apportionment, but given the importance of Canada and Mexico as locations for U.S. foreign direct investment, we can only presume that we would have lost revenues under this formula.

One might predict that, if formula apportionment is adopted, the chosen formula will preserve the status quo allocation of CIT revenues among the NAFTA partners. However, subsequent changes in exchange rates could substantially change the allocation of revenues, even if the formula replicates that status quo allocation of revenues at the existing exchange rate. A decline in the Canadian dollar would reduce the share of tax revenues allocated to Canada, and exchange rate uncertainty would make corporate tax revenues even more volatile than it currently is. The adoption of an allocation formula would be much more attractive under a fixed exchange rate regime or with a common currency.

Who would the formula apply to? Under the Canadian system, the allocation formula is applied separately to each corporation based on the geographic distribution of its permanent establishments. The incomes of companies with a significant common ownership are not jointly allocated under our allocation system. The absence of a unitary or consolidated reporting requirement means that there is still an incentive for profit-shifting among affiliated companies if there are significant differences in the tax rates in the jurisdictions in which they operate. If formula apportionment were adopted among the NAFTA partners, it would be best to apply to corporate groups with a significant degree of common ownership.

What it would it apply to? Formula apportionment works best when the governments use the same definition of the tax base. In Canada, there is a high degree of tax base harmonization because seven of the 10 provinces use the federally defined corporate income tax base, while the other three provinces which collect their own CIT have adopted tax bases which are very similar to the federal base. As a consequence of this high degree of tax base harmonization and the use of a common formula, the provincial allocation system is considered a model for other countries.[33] In the U.S., there is lesser degree of tax base harmonization among the states but the system works reasonably well.

With the growth of trade and integration of capital markets, there is increasing pressure on governments and regulatory bodies to adopt common accounting standards.

[33] See McLure and Weiner (2000, p.287)

If the NAFTA partners were to adopt formula apportionment, it would produce even greater pressures for harmonization of accounting standards and definitions of tax bases. Given the relative sizes of the U.S., the Canadian, and the Mexican economies, harmonization will in effect mean that Canada and Mexico will adopt U.S. accounting conventions and tax base definitions.

Another issue that would have to be addressed is whether the formula apportionment would apply to companies' worldwide income or only their North American income. In light of European countries opposition to California's attempt to tax the corporations world-wide profits, it is likely that the only the latter could be implemented.

Would formula apportionment reduce the pressure of tax competition? While formula apportionment of the might reduce the incentives for companies to use debt placement to shift profits among their North American operations, formula apportionment and unitary assessment would not entirely eliminate the incentives to use transfer pricing. For example, transfer prices could be used to increase the reported sales revenues from the country with the lowest tax rates, especially for exports from North America.

With formula apportionment, there are still strong competitive pressures to have the same or lower tax rates as in other jurisdictions because the allocation formula converts the CIT into a tax on employment, sales, and investment in jurisdictions with above average tax rates and a subsidy for employment, sales, and investment in jurisdictions with below average tax rates. See McLure (1980) and Dahlby (2000). For example, if Canada had a higher tax rate than the United States or Mexico, the cost of hiring an additional worker in Canada would be the equal to the Canadian wage rate plus the increase in taxes that the firm has to pay as a result of having more of its taxes attributed to Canada because its Canadian payroll has gone up. The cost of hiring an additional worker in Mexico or the United States would be the wage rate less the reduction in tax resulting from increasing the share of its profits attributed to a low tax jurisdiction. With formula apportionment, jurisdictions feel the pressure of tax competition through its impact on firm's average tax rates as well as through the mobility of capital and labour. Therefore the pressures for tax rate competition might be greater under formula apportionment than under separate accounting.

In addition, there would be additional scope for tax exporting by, for example, increasing the use of taxes that are deductible from the corporate income tax base. This might distort the tax policies of the federal governments in Canada, Mexico, and the United States. On the other hand, formula apportionment would remove the need for withholding taxes on interest, dividends, and royalties within North America. This would eliminate some of the capital market distortions created by the withholding taxes.

Would formula apportionment lower administration and compliance costs? As we have seen, formula apportionment would reduce, but not eliminate, the incentive to use transfer pricing and debt placement to shift profits among an MNE's North American affiliates. The magnitude of these cost savings, while difficult to estimate, would be one

of the main advantages from the adoption of formula allocation of the North American CIT base.

References

Altshuler, Rosanne and Jason Cummins (1998) "Tax Policy and the Dynamic Demand for Domestic and Foreign Capital by Multinational Corporations" Working Paper 97-4, Technical Committee on Business Taxation, Ottawa: Dept. of Finance.

Altshuler, Rosanne and Jack Mintz (1995) "United States Interest-Allocation Rules: Effects and Policy" *International Tax and Public Finance* 2,1(May):7-36.

Anand, Bharat and Richard Sansing (2000) "The Weighting Game: Formula Apportionment as an Instrument of Public Policy" *National Tax Journal* 53, 2 (June): 183-199.

Arnold, Brian, Jinyan Li, and Daniel Sandler (1996) "Comparison and Assessment of the Tax Treatment of Foreign-Source Income in Canada, Australia, France, Germany and the United States" Working Paper 96-1, Technical Committee on Business Taxation, Ottawa: Department of Finance.

Auerbach, Alan and Kevin Hassett (1993) "Taxation and Foreign Direct Investment in the United States: A Reconsideration of the Evidence" in *Studies in International Taxation* edited by Alberto Giovannini, R. Glenn Hubbard, and Joel Slemrod, 119-144, Chicago: University of Chicago Press.

Ault, Hugh J. and David F. Bradford (1990) "Taxing International Income: An Analysis of the U.S. System and Its Economic Premises" in *Taxation in the Global Economy* edited by Assaf Razin and Joel Slemrod, NBER and University of Chicago Press, pages 11-52.

Bartelsman, Eric and Roel Beetsma (2000) "Why Pay More? Corporate Tax Avoidance through Transfer Pricing in OECD Countries" CESifo Working Paper No. 324, Center for Economic Studies, University of Munich.

Brean, Donald (1997) "Policy Perspectives on Canadian Tax Treatment of the Foreign Source Income of Canadian-based Multinational Enterprise" working paper, Faculty of Management, University of Toronto.

Bruce, Neil (1992) "A Note on the Taxation of International Capital Income Flows" *The Economic Record* 68 (September): 217-221.

Cummins, Jason (1996) "The Effects of Taxation on S.S. Multinationals and their Canadian Affiliates" Working Paper 96-4, Technical Committee on Business Taxation, Ottawa: Dept. of Finance.

Dahlby, Bev (2000) "Tax Coordination and Tax Externalities" *Canadian Tax Journal.* 48,2 (2000): 399-409.

Damus, Sylvester, Paul A.R. Hobson, and Wayne R. Thirsk (1991) "Foreign Tax Credits, the Supply of Foreign capital, and Tax Exporting" *Journal of Public Economics* 45 (June):29-46.

Devereux, Michael (1996) "Investment, Saving, and Taxation in an Open Economy" *Oxford Review of Economic Policy* 12,2: 90-108.

Devereux, Michael and Rachel Griffith (1998) "Taxes and the Location of Production: Evidence from a Panel of U.S. Multinationals" *Journal of Public Economics* 68(June):335-367.

Feldstein, Martin and David Hartman (1979) "The Optimal Taxation of Foreign Source Investment Income" *Quarterly Journal of Economics* 93 (November): 613-629.

Gordon, Roger (1986) "Taxation of Investment and Saving in a World Economy" *American Economic Review* 76 (December):1086-1102.

Gordon, Roger H. (2000) "Taxation of Capital Income vs. Labour Income: An Overview" in *Taxing Capital Income in the European Union* edited by Sijbren Cnossen, Oxford University Press, Oxford, pages 15-45.

Gordon, Roger H. and Jeffrey K. Mackie-Mason (1994) in *The Effects of Taxation on Multinational Corporations* edited by Martin Feldstein, James R. Hines, Jr. and R. Glenn Hubbard, NBER and University of Chicago Press: Chicago.

Gravelle, Jane and Kent Smetters (2001) "Who Bears the Burden of the Corporate Tax in the Open Economy" Working Paper 8280, NBER, Cambridge MA.

Graham, John (2001) "Taxes and Corporate Finance: A Review" working paper, Duke University.

Grubert, Harry and John Mutti (2000) "Do Taxes Influence Where U.S. Corporations Invest?" *National Tax Journal* 52,4 (December): 825-839.

Harris, David, Randall Morck, Joel Slemrod, and Bernard Yeung (1993) in *Studies in International Taxation* edited by Alberto Giovannini, Glenn Hubbard, and Joel Slemrod, 277-308, Chicago: University of Chicago Press.

Hines, James R. (1996) "Altered States: Taxes and the Location of Foreign Direct Investment in America" *American Economic Review* 86, 5 (December):1076-1094.

Hines, James R. (1999) "Lessons from Behavioral Responses to International Taxation" *National Tax Journal* 52,2 (June):305-322.

Hines, J.R. Jr. and E.M. Rice (1994) "Fiscal Paradise: Foreign Tax Havens and American Business" *Quarterly Journal of Economics* 109: 149-182.

Hogg, Roy and Jack Mintz (1993) "Impact of Canadian and U.S. Tax Reform on the Financing of Canadian Subsidiaries of U.S. Parents" in *Studies in International Taxation* edited by Alberto Giovannini, Glenn Hubbard, and Joel Slemrod, 47-76, Chicago: University of Chicago Press.

Hoffman, Michael (2001) "International Taxation and the Income Shifting Behaviour of Multinational Enterprises", PhD Dissertation, Department of Economics, University of Alberta.

Huizinga, Harry and Soren Bo Nielsen (1996) "Capital Income and Profit Taxation with Foreign Ownership of Firms" working paper, Economic Policy Research Institute, Copenhagen: Copenhagen Business School.

Jog, Vijay and Jianmin Tang (2001) "Tax Reforms, Debt Shifting and Tax Revenues: Multinational Corporations in Canada" *International Tax and Public Finance* 8,1(January):5-26.

Keen, Michael and Maurice Marchand (1997) "Fiscal Competition and the Pattern of Public Spending" *Journal of Public Economics* xxxxx . .

Lyons, Andrew (1996) "International Implications of U.S. Business Tax Reform" Working Paper 96-4, Technical Committee on Business Taxation, Ottawa: Dept. of Finance.

McKenzie, Kenneth, Mario Mansour, and Ariane Brule (1997) "The Calculation of Marginal Effective Tax Rates", Working Paper 97-15, Technical Committee on Business Taxation, Dept. of Finance, Ottawa.

McKenzie, Kenneth and Aileen Thompson (1997) "Taxes, the Cost of Capital, and Investment: A Comparison of Canada and the United States" Working Paper 97-3, Technical Committee on Business Taxation, Ottawa: Dept. of Finance.

McLure, Charles (1980) "The State Corporate Income Tax: Lambs in Wolves' Clothing" in *The Economics of Taxation,* edited by Henry Aaron and Michael Boskin Washington, D.C.: The Brookings Institute.

McLure, Charles and Joann Weiner (2000) "Deciding Whether the European Union Should Adopt Formula Apportionment of Company Income" in *Taxing Capital Income in the European Union*, edited by Sijbren Cnossen, Oxford University Press, Oxford, pages 243-292

Mintz, Jack (1998) "The Role of Allocation in a Globalized Corporate Income Tax" IMF Working Paper 98/134, Washington: International Monetary Fund.

Newlon, T. Scott (2000) "Transfer Pricing and Income Shifting in Integrating Economies" in *Taxing Capital Income in the European Union* edited by Sijbren Cnossen, Oxford University Press, Oxford, pages 214-242.

Oakland, William and Yongsheng Xu (1996) "Double Taxation and Tax Deduction: A Comparison" *International Tax and Public Finance* 3(1) (January):45-56.

Shackelford, Douglas and Joel Slemrod (1998) "The Revenue Consequences of Using Formula Apportionment to Calculate U.S. and Foreign-Source Income: A Firm-Level Analysis" *International Tax and Public Finance* 5,1 (February): 41-59.

Shah, Anwar and Joel Slemrod (1991) "Do Taxes Matter for Foreign Direct Investment" *The World Bank Economic Review* 5(3):473-491.

Shaviro, Daniel (2001) "Does More Sophisticated Mean Better? A Critique of Alternative Approaches to Sourcing the Interest Expense of American Multinationals" working paper, New York University Law School.

Slemrod, Joel (1990) "Tax Effects on Foreign Direct Investment in the United States: Evidence from Cross-Country Comparison." in *Taxation in the Global Economy*, edited by Assaf Razin and Joel Slemrod, 79-117, Chicago: University of Chicago Press.

Slemrod, Joel (1995) "Free Trade Taxation and Protectionist Taxation" *International Tax and Public Finance* 2,3(November):471-489.

Sorensen, Peter (2001) "International Tax Coordination: Regionalism versus Globalism" Economic Policy Research Unit (EPRU) working paper, University of Copenhagen.

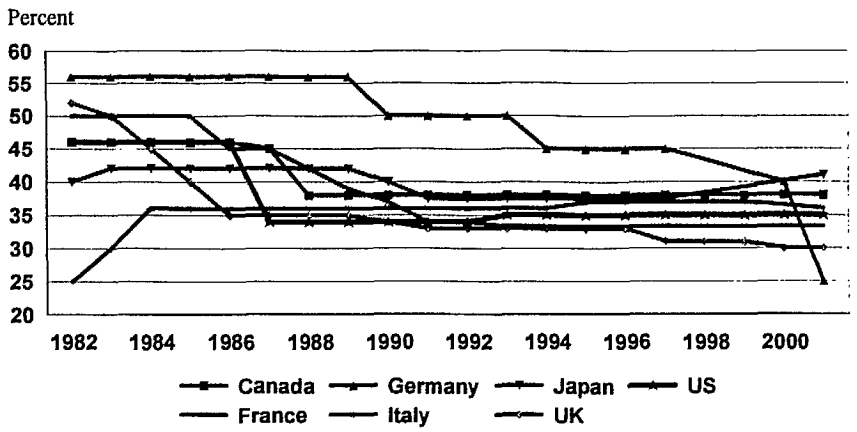
Swenson, Deborah (2001) "Tax Reforms and Evidence of Transfer Pricing" *National Tax Journal* 54,1 (March):7-26.

Thirsk, Wayne (1986) "The Marginal Welfare Cost of Corporate Taxation in Canada" *Public Finance* 41:78-95.

Weiner, Joann (1999) "Using the Experience in the U.S. States to Evaluate Issues in Implementing Formula Apportionment at the International Level" OTA Paper 83, Washington: Office of Tax Policy Analysis.

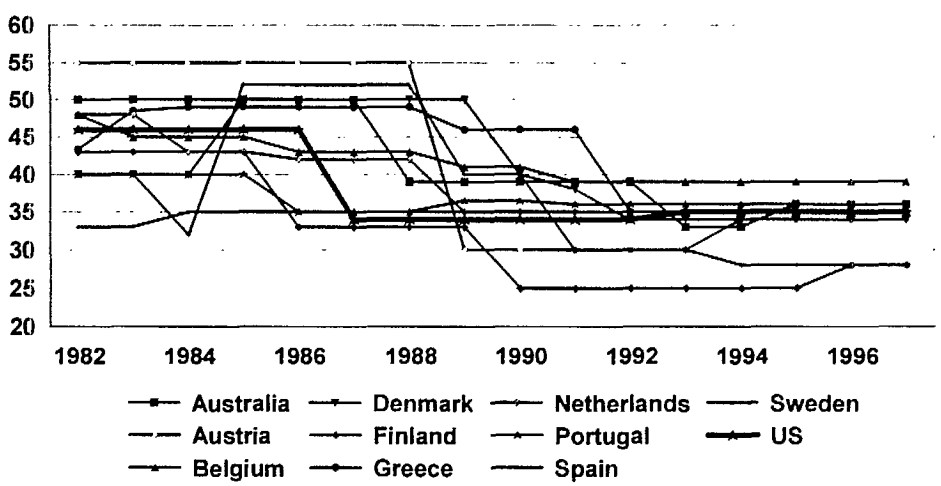
Wilson, John (1999) "Theories of Tax Competition" *National Tax Journal* 52,2 (June):269-304.

Figure 1
CIT Rates Among G7 Countries
1982 to 2001



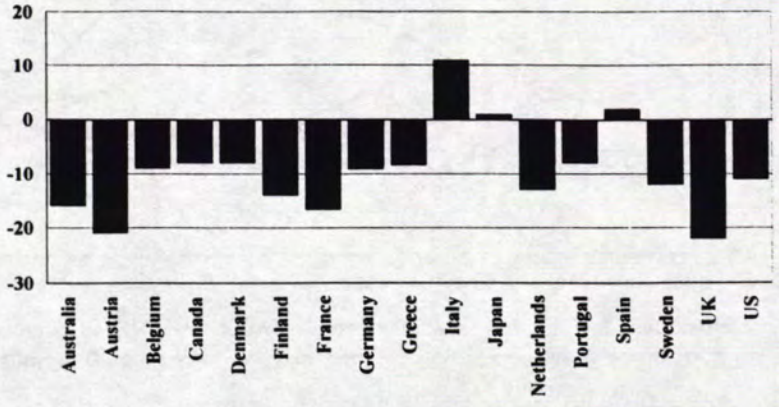
Source: Bartelsman and Beetsma (2000) and Ernst and Young (2001)).

Figure 2
CIT Rates Among Selected OECD Countries, 1982-2001



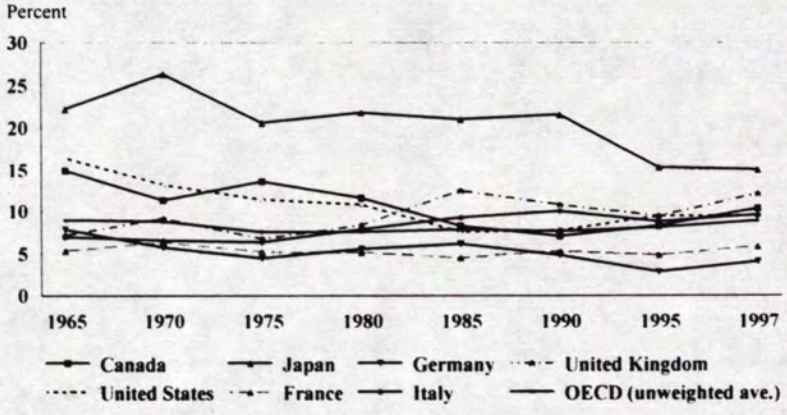
Source: Bartelsman and Beetsma (2000) and Ernst and Young (2001).

Figure 3
Reductions in CIT Rates
Between 1982 and 2001



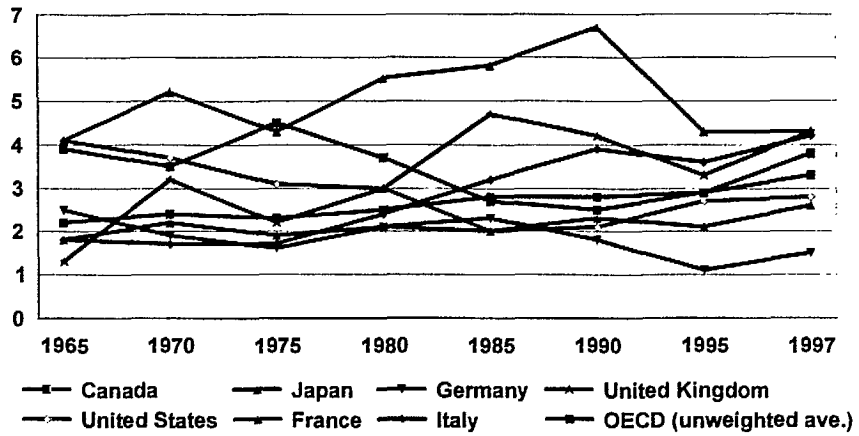
Source: Bartelsman and Beetsma (2000) and Ernst and Young (2001).

Figure 4
Taxes on Corporate Income as a Percentage of Total Taxation



Source: OECD Revenue Statistics (1999, Table 13)

Figure 5
Taxes on Corporate Income as a Percentage of GDP



Source: OECD Revenue Statistics, 1999 Table 12.

Figure 6
Taxes on Corporate Income as a Percentage of GDP

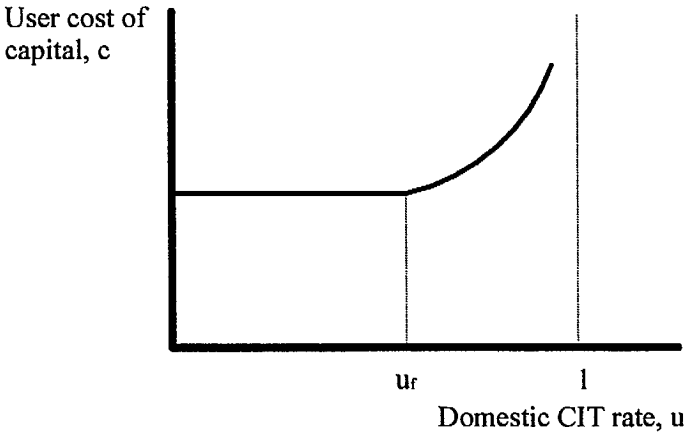


Figure 7
The Marginal Cost of Public Funds for the CIT and a Wage Tax

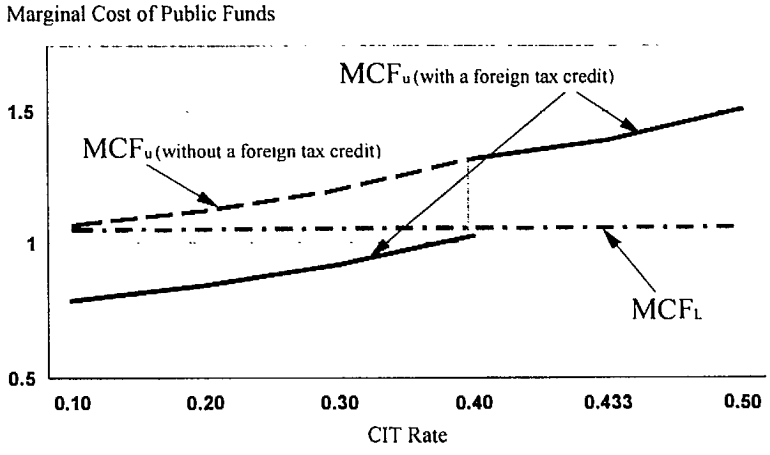


Figure 8
The Deadweight Loss From a CIT with a Foreign Tax Credit

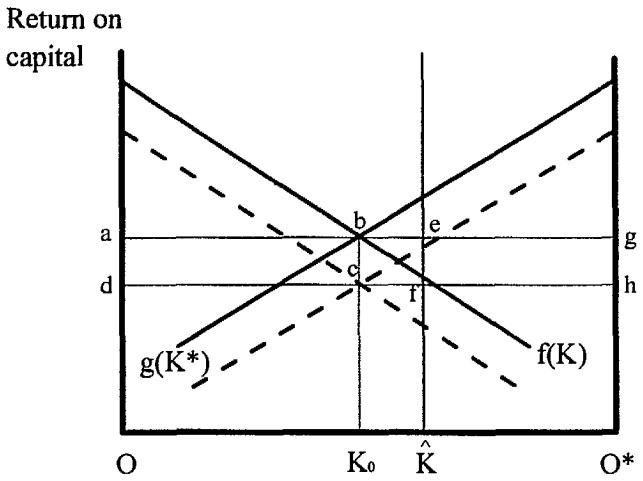


Figure 9
The Deadweight Loss From a CIT under the Exemption System

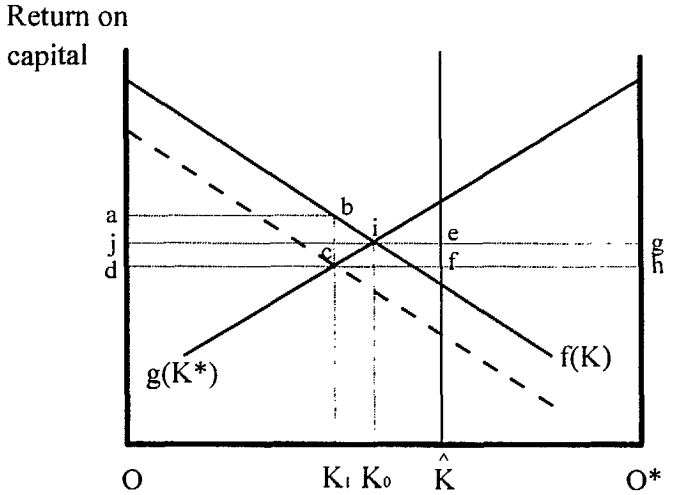


Table 1:
Statutory and Effective Tax Rates for Selected Countries in 1979 and 1994

Country	Year	Statutory CIT Rate	Net Present Value of Allowances	Source Country Tax Rates		Residence Country Tax Rates	
				EMTR	EATR	EMTR	EATR
Australia	1979	50.0	0.71	80.6	36.5	33.6	30.6
	1994	33.0	0.73	50.7	27.5	35.6	25.1
Canada	1979	43.0	0.94	42.9	30.2	44.3	29.5
	1994	34.3	0.73	45.1	26.7	40.7	24.7
France	1979	50.0	0.81	53.6	32.6	30.3	25.5
	1994	33.3	0.81	49.1	24.7	24.8	21.1
Germany	1979	61.8	0.76	60.6	31.6	54.8	27.1
	1994	52.2	0.80	27.5	24.9	35.5	20.0
Ireland	1979	45.0	1.00	14.0	26.2	na	na
	1994	10.0	0.71	33.8	15.9	na	na
Italy	1979	36.3	0.84	35.0	22.2	35.3	28.6
	1994	53.2	0.76	23.6	22.3	110.1	32.6
Japan	1979	52.6	0.70	51.9	27.8	43.5	30.3
	1994	50.9	0.70	61.0	32.1	52.9	28.5
Spain	1979	33.0	0.73	51.4	25.3	41.5	32.0
	1994	35.0	0.70	44.6	25.5	33.5	25.2
United Kingdom	1979	52.0	1.00	17.5	29.0	43.1	29.1
	1994	33.0	0.73	36.1	23.4	31.6	24.1
United States	1979	49.6	0.87	41.5	28.6	40.2	30.5
	1994	39.3	0.78	42.6	25.9	37.2	25.4

Source: Chennells and Griffith (1997).

Table 2:

Computations of the Marginal Cost of Public Funds for a CIT and a Wage Tax

	Case 1		*Case 2*		*Case 3*		*Case 4*	
	$\beta = 1, \alpha_\pi = 0.05$		$\beta = 0, \alpha_\pi = 0.05$		$\beta = 1, \alpha_\pi = 0.02$		$\beta = 1, \alpha_\pi = 0.125$	
CIT Rate	MCF_u	$MCF_{\tau L}$	MCF_u	$MCF_{\tau L}$	MCF_u	$MCF_{\tau L}$	MCF_u	$MCF_{\tau L}$
0.10	0.783	1.049	0.396	1.040	0.719	1.049	0.894	1.047
0.20	0.844	1.051	0.466	1.043	0.798	1.052	0.918	1.048
0.30	0.917	1.053	0.558	1.046	0.902	1.054	0.952	1.050
0.40	1.026 to 1.318	1.055	0.682 to 0.968	1.049	1.045 to 1.413	1.057	1.002 to 1.151	1.051
0.433	1.388	1.056	1.028	1.051	1.478	1.058	1.186	1.052
0.50	1.507	1.058	1.178	1.053	1.648	1.061	1.248	1.053

Other parameter values: $u_f = 0.40$, $\tau_L = 0.30$, $\alpha_L = 0.75$, $\eta_{Lw} = 0.15$, $\delta = 0.10$, $a = 0.06$.

Table 3:
Treatment of Foreign Source Income

	Interest	*Dividends*
Australia	Credit	Exempt
Canada	Credit	Exempt
France	Credit	Exempt
Germany	Credit	Exempt
Ireland	Credit	Credit
Italy	Credit	Credit
Japan	Credit	Credit
Spain	Credit	Credit
United Kingdom	Credit	Credit
United States	Credit	Credit

Source: Chennells and Griffith (1997, Table B.3, p.104).

Table 4:
Estimated Coefficients of the Tax Differential Variable in Hoffman's Tax to Asset Ratio Regressions

Country	Entire Sample	Private Corps.	Public Corps.	Canadian Parent	U.S. Parent	ROW Parent	Manufacturing	Non-Manufacturing
Australia		√	X		√		√	√
Belgium	√		X	√	X		√	
Brazil	X	X		X	X			X
France	√	√		√	√	√		
Germany	X	X	√	X	√		√	
Hong Kong	√	√	√	√	X		X	√
Ireland	√		X	√	X	X	X	
Italy		√			√			
Japan	√	√	√	√				√
Mexico		X	√		√	X		
Netherlands	√	√		√	√	X		
New Zealand	X	X		X	X	√		
Singapore	√	√		√	X		√	√
Spain	X	X			√	X	√	X
Switzerland		√			√	√		√
United Kingdom	√	√	√		√	√	√	X
United States	X	X	X	X	√			X
Tax Havens	X		√	X	X	√	X	

Notes: A "√ "indicates a statistically significant coefficient estimate which is consistent with tax-motivated transfer pricing and a "X" indicates a statistically significant coefficient which is inconsistent with tax-motivated transfer pricing.
Source: Hoffman (2001, Table 5-26, p. 161).

Table 5:
Canadian Tax Treatment of Foreign Source Income

Passive Business Income	Active Business Income	
	Designated Treaty Country	**Non-Treaty Country**
• Property income (interest, dividends, rents, royalties); If earned in a controlled foreign corporation; designated as Foreign Accrual Property Income (FAPI).	• Classified as exempt surplus; Exemption system used; No further Canadian CIT imposed on dividends from a foreign subsidiary; PIT imposed when distributed to Canadian shareholders; Qualifies for dividend tax credit.	• Classified as taxable surplus. Tax credit system; The foreign tax credits are calculated on a country by country basis and are equal to the lesser of foreign income tax paid or the Canadian income tax payable on the foreign source income. Excess foreign tax credits may be carried back for three years and forward for seven years to reduce Canadian income tax.
• Taxed on an accrual basis, with a tax credit for foreign taxes paid.	• Canada has over 75 tax treaties with other countries; over 90 percent of Canadian foreign investment is in treaty countries.	
• A controlled foreign corporation is one where it is controlled by not more than five Canadian residents.	• Based on the assumption that the foreign tax rate is equivalent to the Canadian tax rate; This may not be true in all cases.	• Deferral is possible.

Notes Randy Wiple

Hervey: We should double anti-dumping. But it will never happen.

Eighty Mgt. has grown extremely robust, despite dumping hit.
Can Wheat Board: mutually incompatible allegations. Abolishing it did actually give the US more comp. for Can.

See Table, p. 10: Is there political will to pursue these?

Re Stern et al.:

- NAFTA customs union
  2 → modelling is very difficult: Rules of Origin — devil is in the details.
- admin/legally protection — missing for Modiga model still, should be modelled somehow; sector-specific impacts.
- main results: E imports Can/US/Mex
  Agric **
  Other Bus Services ** } goes against supporters of free trade!

(Mainly refers to textiles + clothing (no longer a constraint in automotive))

Chris Sands (heard Michael Hart 2 weeks ago): Capturing the importance of US will take more. . . needs F.S. business driven.

Note: Most gains are for deals where negotiation (esp. / services is greatest. Bringing in Mexico will create huge problems.

Canada, the United States, and Deepening Economic Integration: Next Steps

Michael Hart[1]

> The cause of freedom rests on more than our ability to defend ourselves and our allies. Freedom is exported every day we ship goods and products that improve the lives of millions of people. Free trade brings greater political and personal freedom. ... Economic freedom creates habits of liberty. And habits of liberty create expectations of democracy.
>
> George W. Bush, 27 February 2001

The combined impact of globalization and liberalization has made the contribution of trade ever more important to North Americans' collective prosperity. Since 1985, the value of trade and foreign direct investment in both the Canadian and US economies has grown exponentially, from some 50 percent of GNP to nearly 90 percent in Canada, and from less than 20 percent to over 30 percent in the United States. Possibly in 2001 but more likely in 2002, the value of Canada's annual two-way trade in goods and services will pass the one trillion dollar mark. Should Canadian exports and imports continue to grow at roughly ten percent a year – substantially more than twice the rate of growth for the economy as a whole but consistent with the pattern of the past decade – total trade should also add up to the equivalent of the value of GDP well before the end of the current decade (See Tables 1 & 2). Bilateral trade with the United States will continue to constitute more than three quarters of the total, passing the two billion dollars per day mark sometime in 2002, and Canada should continue to be the leading destination and source of US exports and imports (See Tables 3 & 4). The leading sectors of both economies are now those most engaged in international exchange, and in both countries, the basis of prosperity is more and more knowledge-based production.

Table 1: Trade and the Canadian economy

Total trade in goods and services					
Year	Exports	Imports	Total GDP	Exports	Imports
	Value (billions C $)			Share of GDP	

[1] Hart is a former Canadian trade official and is now Simon Reisman Professor of Trade Policy in the Norman Paterson School of International Affairs at Carleton University in Canada and a distinguished fellow of its Centre for Trade Policy and Law.

1997	345	331	878	39.1	37.5
1998	371	359	902	41.2	39.8
1999	412	385	958	43.1	40.2
2000	474	426	1039	45.6	41.0
Trade in goods and services with the USA			Total	Share of total	
1997	282	223		81.8	67.5
1998	315	245		84.8	68.2
1999	358	259		86.8	67.3
2000	413	274		87.2	64.3

Source: External Affairs and International Trade Canada, Trade Update 2000 and 2001.

The response of the two economies to the challenges posed by freer bilateral trade and investment has been both remarkable and positive. Nevertheless, the results have created new bilateral tensions, challenges, and opportunities. Deepening integration is exposing a further set of policies and practices that stand in the way of more beneficial trade and investment. Cumbersome rules of origin, discriminatory government procurement restrictions, complex antidumping procedures, intrusive countervailing duty investigations, burdensome regulatory requirements, vexatious security considerations, bothersome immigration procedures, and other restrictive measures remain in place, discouraging rational in vestment decisions and deterring wealth-creating trade flows. While deepening integration may be the result of the cumulative result of millions of discrete daily decisions by consumers and producers alike, government policy on both sides of the border can have an important bearing on the quality and pace of that integration.

Additionally, in the months ahead, a number of perennial trade irritants, such as trade in softwood lumber and pork, will once again demand attention, spotlighting the need for permanent rather than temporary solutions. Experience has demonstrated that permanent solutions are more likely to flow from broad, generic discussions than issue-specific trade-offs.

Table 2: Trade as a share of GDP, 1990-2000

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Total exports	25.7	25.0	27.0	30.1	34.0	37.3	38.4	39.1	41.2	43.1	45.6
Goods	22.4	21.6	23.4	26.2	29.7	32.9	33.6	34.3	35.8	37.6	40.2
Services	3.3	3.4	3.6	3.9	4.3	4.4	4.8	4.8	5.4	5.4	5.4
Total imports	25.7	25.7	27.4	30.2	32.9	34.3	34.4	37.5	39.8	40.2	41.0
Goods	20.8	20.6	22.1	24.4	27.1	28.5	28.6	31.6	33.6	34.1	35.0
Services	4.9	5.1	5.3	5.8	5.8	5.7	5.8	5.8	6.2	6.0	6.0

Source: External Affairs and International Trade Canada, Trade Update 2001, table 1.

Table 3: Two-way Trade, Canada and the United States, 1990-2000

	Value (millions of current dollars)			Annual growth (%)		
	Goods	Services	Goods & Services	Goods	Services	Goods & Services
1990-2000 avg	366,204	49,140	415,343	11.6	9.9	11.4
1997	454,140	57,923	512,063	12.8	8.0	12.3
1998	503,293	63,248	566,541	10.8	9.2	10.6
1999	558,722	67,982	626,704	11.0	7.5	10.6
2000		627,208	72,762	699,970	12.3	7.0 11.7

Source: External Affairs and International Trade Canada, Trade Update 2001, table 2.

In order for Canadians to maintain, let alone improve, their standard of living, Canada needs a confident, dynamic, outward-oriented business sector. It needs entrepreneurs and investors convinced that they can do well in the Canadian economy and persuaded that the policy and regulatory framework supports rather than undermines their efforts. The FTA, and the subsequent NAFTA and WTO, provided a much improved trade policy environment for investors in Canadian-based production. Achieving the full benefits of freer trade, however, requires a wider range of supportive or complementary policies, including fiscal and monetary policy. Since 1985, much has been achieved in placing such policies on a sounder long-term footing; more, however, needs to be done to ensure that the Canadian economy achieves its full potential, including taking further steps to reduce the negative and avoidable impact of Canada-US border administration. In the words of Derek Burney, former Canadian ambassador to the United States, 'benign neglect of the USA by Canada can be very damaging to our well being. Managing this complex relationship has to be a top priority for our government, whether they like it or not. ... There is also scope for bold examination and analysis of new policy options for broader cooperation.'[2] To that end, this paper explores the prospects for further enhancing the rules-based liberalization and management of Canada-US trade and investment relations, to consider recommendations as to what is both desirable and feasible in strengthening bilateral ties, and to provide information and analysis to back up the recommendations.

The impact of freer trade

Any analysis of the prospect for future Canada-US trade initiatives to further facilitate cross-border trade and investment, must take account of the extent to which the Canada-United States Free Trade Agreement (FTA) and the North American Free Trade Agreement (NAFTA) – as well as the World Trade Organization Agreement (WTO) – have worked. Based on more than a decade of experience, it can be concluded that:

- Bilateral freer trade has clearly met the objectives and expectations of the US and Canadian governments and business interests; freer trade has been an important contributor to accelerating the transformation of Canada's industrial structure from its traditional resource-based orientation to one increasingly focused on knowledge-based activities; the fastest growing sectors have been those

[2] 'Accessing the U.S. Market.' Notes for Remarks to the AIAC 39th Annual General Meeting, Ottawa, 18 September 2000.

that have become more specialized and more integrated into the North American economy.[3]

- Freer trade's economic impact has been extensive and, on the whole, beneficial on both sides of the border; during free trade's first decade, trade grew by an astonishing 140 percent in nominal terms, reaching a million dollars of two-way trade every minute and leading trade economist Richard Harris to enthuse that the 'results have been even more successful than one would normally predict.'[4]
- The three agreements – the FTA, NAFTA, and WTO – when viewed as a whole, have considerably strengthened the capacity of officials on both sides of the border to manage relations, settle disputes, and keep problems from becoming crises.
- The new agreements' dispute settlement provisions have provided an extensive array of useful procedures to help settle disputes on a principled basis.
- The fears expressed by freer trade's opponents proved either exaggerated or ill-founded; adjustment, while initially painful, proved manageable and worthwhile; claims of unacceptable collateral effects on such non-trade matters as the capacity of governments to pursue their own health care or environmental protection objectives proved to have little foundation.

The extent of deepening bilateral integration is indicated by more than two-way flows in goods and services. Further evidence is provided by increasing two-way flows in portfolio and direct investment, deepening integration of capital markets, rising mergers, acquisitions, and strategic alliances, growth in the cross-border licensing of product and process technologies, continuing two-way flows in patent and other intellectual property exchanges, and escalating telecommunications traffic. Two-way movements of goods, services, capital, ideas, and people are burgeoning, reflecting the extent to which Canadians and Americans alike are taking advantage of reduced barriers and increased opportunities in each other's markets.[5]

The extent of freer trade's positive economic impact was, in part, shrouded by the short-term negative impact of two parallel policy initiatives. In the late 1980s and early 1990s, the Bank of Canada's concerted attack on inflation led to some additional adjustment pressures, while the Liberals' attack on the fiscal deficit later in the 1990s, involving both reduced government spending and increased taxation, further undermined Canadians' confidence in their economy. In effect, the costs of

---

3 Richard Lipsey, the dean of Canadian trade economists, concludes: 'The FTA was a far less dramatic initiative than its critics assumed. In trade policy, it continued, and nearly completed, the process of reducing trade barriers that began in the 1930s. In broader economic policy, it was part of a new package of reforms that increased the degree of openness of the Canadian economy to market forces. On both counts, it was a marked success – as well as making Canadian access to the US market more secure than ever before.' 'The Canada-US FTA: Real Results Versus Unreal Expectations,' in L. Ian MacDonald, ed., *Free Trade: Risks and Rewards* (Montreal & Kingston: McGill-Queen's University Press, 2000), 106.

4 Richard G. Harris, 'North American Economic Integration: Issues and a Research Agenda,' background paper prepared for an Industry Canada *Roundtable on North American Linkages*, Ottawa, 7 September 2000.

5 As Alan Rugman points out in *The End of Globalization: Why global strategy is a myth and how to profit from the realities of regional markets* (Amacom 2000), much of globalization has involved deepening intra-regional trade flows in each of the three regions of the global economy, with foreign direct investment playing a larger role than trade in creating links at the inter-regional level. In North America, some 50 percent of trade is intra-regional, while only 20 percent of FDI is intra-regional.

the successful assault on the fiscal excesses of the 1970s was cushioned by the positive impact of freer trade. The longer term cumulative impact of these three policy initiatives, however, have placed Canada in a much better position to respond to the economic challenges of the 21st century.

Ironically, freer trade's success both supports and undermines the case for further initiatives. Obviously, if the bilateral FTA and trilateral NAFTA have benefitted both Canada and the United States, more effort along the same lines should be even better. However, unlike economic, trade, and industrial circumstances in the first half of the 1980s, which made the business, economic, and political case for an FTA persuasive, circumstances today, in large measure because of the FTA, seem less troublesome. Positive changes in trade and production patterns make the case for tackling the remaining barriers to trade and investment, while real, seem less compelling. This may be short-sighted. The need for a new round of bilateral negotiations must, of course, rest on a judgement that remaining barriers are sufficiently troublesome to warrant a major effort by the two governments to resolve them, but such a judgement must also be informed by broader concerns related to Canada's longer term economic prospects, and US interest in those prospects.

The extent of remaining trade and investment barriers

Media coverage over the past few years suggest a rather tranquil bilateral trade and investment environment. This tranquility, of course, may reflect no more than good economic times. We are already beginning to see that as the current ten-year economic expansion in the United States falters, Canadians will be reminded once again of how ugly US trade politics can become and how much Canada relies on good rules and procedures to keep US protectionism in check. Nevertheless, the published inventories maintained by the two governments of continuing irritants suggest that the depth and extent of remaining barriers are significantly less onerous than those still in place at the beginning of the 1980s. By distilling the essence from these and other sources, however, a clearer picture emerges of the kinds of barriers that continue to constrain bilateral trade and investment flows. In effect, they confirm that the FTA has proved highly successful in underwriting a significant level of deepening cross-border integration, but they also suggest that reaping the full benefits of this deeper integration requires that the two governments address at least some of the following matters:

- for *customs and border administration*, more progress needs to be made on various initiatives to facilitate, streamline, and even eliminate the need for routine customs clearance of both people and goods;
- for *tariffs and related programs*, such as rules of origin, industry on both sides of the border would benefit from the reduction and harmonization of MFN tariff levels, obviating the need for many of these programs;
- for product and process *standards and regulations*, much more progress can be made in developing either common standards or greater acceptance of equivalence, mutual recognition, common testing protocols, and similar provisions;
- for *services*, there is room to move beyond commitments on market access, to greater reliance on common standards and mutual recognition; sectoral discus-

sions related to *financial, transportation, telecommunications, and professional services,* would also provide further scope for reducing discrimination and enhancing trade and investment opportunities, and increasing healthy competition on a broader basis;

- for *government procurement,* the rules could advance from the limited, entities method pursued in the GATT/WTO Procurement Agreement and expanded in the FTA/NAFTA, to a full national-treatment approach, mandating that governments throughout the region purchase goods and services for their own use on a non-discriminatory, fully competitive basis, at least insofar as North American suppliers are concerned;
- for *trade remedies* – antidumping and countervailing duties – the rules should evolve beyond WTO-like procedural safeguards to common rules about competition and subsidies, reducing the scope for anti-competitive harassment and procedures;
- for *competition policy,* more effort could be devoted to setting out common goals and providing a basis for cooperative enforcement procedures;
- for *investment,* provisions should move further down the track of enforcement of jointly agreed rules of behaviour by the domestic courts; and
- *institutionally,* the two governments may need to move beyond the ad hoc intergovernmental arrangements of the FTA and NAFTA toward more permanent supranational institutions.

These remaining barriers and impediments can be divided into three fundamental kinds of issues:

- The continuing role of the physical border in conditioning trade and investment decisions, including the costs of compliance and the potential costs created by delays.
- The continuing impact of regulatory differences, again involving costs of compliance; both intergovernmental agreements and the pressures of silent integration have accelerated regulatory convergence and narrowed differences, but they have not eliminated existing and even new differences in regulatory design, objectives, implementation, and compliance.
- The need for the two governments to manage the relationship and strengthen institutional and procedural frameworks to iron out differences and reduce conflict.

On all three fronts, there are opportunities for the two governments to negotiate to resolve problems and reduce barriers; success on some or most of these issues would have a clear positive effect on business confidence and thus on bilateral trade flows and investment decisions and the economic prosperity of Canadians and Americans alike. Many of these issues, of course, are closely interrelated so that progress on one would spur progress on others. Addressing tariff and tariff-related programs and standards issues, for example, would obviously have an important bearing on customs and border administration. In addition, a number of related issues, such as the implementation of immigration and security policies, each of which can have an important bearing on trade and investment flows, would also benefit from a concerted, joint effort to find better ways to address them. As

George Haynal, the assistant deputy minister in Canada's Department of Foreign Affairs and International Trade responsible for relations with the United States, explains:

> A process of policy convergence is already well in train. It is becoming more intense. Its end product is still hard to identify, but clearly it is building a level of integration that extends beyond the economy. ... The question is less whether we need to negotiate new instruments to further the process, but whether the public realm is capable of keeping up with emerging forces pushing us into deeper integration.[6]

In effect, Canada would benefit from reducing by a significant margin what John Helliwell has called the border effect.[7] Despite multilateral and bilateral efforts to diminish the impact of the border, he calculates that the propensity for Canadian firms to buy and sell domestically is twelve times higher than their propensity to do business internationally. By way of contrast, the Autopact has virtually eliminated the border effect for trade in automotive products for the states and provinces in which the auto industry is concentrated. The fortuitous circumstances of concentrated ownership that encouraged the negotiation of the Autopact in 1964 also allowed for a high level of cross-border integration over the subsequent twenty-five years. The development of the auto industry in Ontario since 1965 has been one of the major policy-induced success stories of the postwar years. More efficient trade and production and the resulting high-quality jobs are directly attributable to reducing the border effect.[8]

If Canada and the United States can succeed in further reducing the border effect for more industries, there is no reason why more Canadian-based firms and industries cannot become similarly more specialized and productive, leading to more beneficial trade and investment, better jobs, and higher incomes. Progress on these

---

6 Michael Hart, et. al., 'Canada-US Free Trade: Is It Time for Round Two – A Virtual Roundtable,' *Canadian Foreign Policy*, September 2000.

7 In a 1994 study, Helliwell and John McCallum concluded that the existence of a national border between Canada and the United States has a major impact on the level and intensity of trade. By comparing trade between provinces and between states and provinces of comparable size and geographic separation, they estimated that the border effect was in the order of 17 in 1988, i.e., the propensity for trade between Canadian provinces was 17 times higher than that for trade between the provinces and equally sized and distant states. John F. Helliwell and John McCallum, 'National Border Still Matter for Trade,' *Policy Options/ Options politiques* 16 (July/August 1994), 44-8. While one may quarrel about some of their assumptions, the quality of the evidence on which they relied, or the methodology of the study, Helliwell and McCallum made a provocative case that borders continue to have an effect on trade, investment, and distribution patterns. In a later study, Helliwell estimated that the FTA had reduced this border effect to a factor of 12 by 1996 but that there was little prospect for a further reduction. *How Much Do National Borders Matter?* (Washington: Brookings Institution, 1998), 115.

8 Some public policy commentators have expressed concern that the gap between Canadian and US productivity levels did not shrink during the first decade of freer trade. Two reasons suggest themselves: 1) during the same period, the US economy, responding to deregulation and the impact of technological breakthroughs, itself experienced a major spurt in productivity growth, outpacing the improvements in Canada's own performance; and 2) a range of Canadian policies and attitudes continue to hamper further improvements, including continued reluctance to accept the benefits of full competition in such sectors as dairy, air transportation, and financial services. The decision not to allow the financial services sector to restructure to become more globally competitive, for example, had an obvious impact on the performance of the Canadian economy as a whole and on subsequent investment decisions across a range of sectors. The important issue, of course, is not whether or not there is a gap, but whether Canada is pursuing policies that make sense and benefit Canadians.

kinds of issues could have an important bearing on such non-trade issues as the exchange rate and monetary policy, the brain drain, cross-border merger and acquisition activity, and US confidence in Canada's reliability as an economic and security partner. In effect, they could help to reduce what some analysts have called the Canada discount – the extent to which both Canadian and foreign investors factor in such extra costs of doing business in Canada as higher taxes and lower productivity levels – and help to induce more firms to establish or stay in Canada.[9]

Trade policy alone will not eliminate the Canada discount, but efforts to address these and other issues through fiscal and other policy initiatives will prove disappointing in the absence of further movement on the trade policy front to create the necessary additional market access opportunities. Richard Harris concludes:

> The phenomenal US growth during the 1990s, with low inflation and low unemployment, has had a two-fold effect. First, it has quashed a lot of doubts by anti-market proponents as to the performance and merits of US-style market capitalism. Historically, [Canadian] antipathy towards this model of economic development has precluded getting too close to the US. Second, the fact that the US has done so well relative to Canada has raised the export dependency of Canada on the US and increased the potential benefits to catch-up with the US. Together with a lack of progress on the multilateral front this implies that deeper Canada-US integration is the only realistic option for progress in developing significant market access.[10]

Additionally, Canada does not want to fall victim to the Norway syndrome. Norway's proximity to the European Union dictates that much of its trade and commerce is with members of the EU. In order to facilitate cross-border trade and investment, Norway has aligned many of its economic and regulatory policies with those of the EU. In effect, Norway has embraced what has become known as the *acquis communitaire*, the regulatory regime maintained by the EU. Like its neighbour, Sweden, Norway's government concluded in the early 1990s that having cast its economic destiny with the EU, it should become a member state. Sweden did so in 1993; Norway did not. By a narrow margin, the Norwegian electorate rejected EU membership. Norway now finds itself largely subject to rule from Brussels but without a voice in the making of EU decisions.

Geography and history suggest that Canada's economic destiny lies with the US market. More than a third of Canada's economic activity is now generated by exports to the US market and nearly a third of its consumption of goods and services originates in the United States. The extent and depth of this integration is being driven not only by corporate and public policy decisions, but even more by individual Canadians in their daily decisions about what to eat, wear, drive, read, and otherwise spend their resources. Overwhelmingly, those choices favour American products. US markets and suppliers are now the overwhelming preference of Ca-

---

9 See Thomas d'Aquino and David Stewart-Patterson, *Northern Edge: How Canadians Can Triumph in the Global Economy* (Toronto: Stoddart 2000) for a discussion of this concept and ideas on how to eliminate its impact.

10 Richard G. Harris, 'North American Economic Integration: Issues and a Research Agenda,' background paper prepared for an Industry Canada Roundtable on North American Linkages, Ottawa, 7 September 2000.

nadian firms and individuals. To manage a lower level of integration, Canada negotiated a free-trade agreement in the mid-1980s. Accelerating and deepening integration now indicates that more robust instruments may be required to manage relations and ensure that Canada has a voice in the evolution of the *acquis américaine*. As Derek Burney points out:

> History demonstrates that we can harness our proximity to the US to our advantage without compromising our identity or our right to disagree. We are best served by rules, agreements, and treaties which reflect genuine compromise and help temper the enormous power imbalance and by a sense of priority and political will which reinforce the importance of this relationship.[11]

A comprehensive bilateral initiative

For some of the issues that could be addressed jointly, such as customs administration or standards, US interests are roughly similar to those of Canada; for others, such as trade remedies and government procurement, US perspectives are somewhat different. Individually, most of these issues do not appear to have much political curb appeal. Experience has taught Canadian negotiators that it is hard to make stand-alone progress on standards or government procurement preferences. Taken together, however, the issues enumerated above add up to a surprising level of continuing differential treatment for suppliers on one side of the border or the other. They are the kinds of issues that grow in importance as integration deepens. As the Europeans have learned, they are the kinds of problems that need to be tackled as a result of successfully implementing the first level of regional integration. Their resolution requires that the two governments take further steps to reduce discrimination and, in those instances where *de jure* non-discrimination may still mask *de facto* discrimination, make greater use of such instruments as mutual recognition, joint rule-making, and cooperative enforcement mechanisms.

Many of these issues are, of course, already on the bilateral agenda, and specific aspects of each issue may be resolved in due course as part of ongoing efforts to address individual problems. Obviously, if a policy or measure causing conflict is inconsistent with existing trade agreement obligations, dispute settlement is one way to resolve the matter. Most of the difficult disputes, however, are in areas where the rules are vague or inconsistent, requiring political settlement; in such circumstances, dispute settlement cannot substitute for negotiations. Issue-by-issue consultations and negotiations can also prove useful, but usually more so for the United States than for Canada. There are many examples of Canada negotiating pragmatic solutions to accommodate a US interest or concern, from softwood lumber to durum wheat; there are not many examples in the other direction, the 1965 Autopact being a prominent exception. The exigencies of the highly fragmented US political system make it very difficult for US officials to accommodate foreign interests on an issue-by-issue basis, while the capacity to exercise raw power makes it relatively easy to insist that foreign governments accommodate single-issue US interests. Before

[11] 'Accessing the U.S. Market.' Notes for Remarks to the AIAC 39th Annual General Meeting, Ottawa, 18 September 2000.

the FTA negotiations were joined in 1986, Canada sought to replicate the success of the Autopact in other sectors in the 1983 sectoral initiative. Officials learned once again how difficult it is to build political support for narrowly conceived or issue-specific initiatives.[12] Most governments, but particularly the US government, need comprehensive initiatives in order to build the necessary broad base of support to overcome highly focussed opposition groups. Canada's trade and investment relationship with the United States is too big and important to rely on the inertia created by existing channels of communications. It requires dynamic and creative management of the agenda.

Canadian and US medium-term bilateral trade interests

Canada	*United States*
• trade remedy law	• agricultural supply management
• government procurement preferences	• Canadian content and similar cultural policies
• security-based restrictions	• border restrictions (e.g., refugee policies, customs procedures, security)
• border restrictions (e.g., temporary entry, customs procedures)	• provincial and federal agricultural programs and practices
• state and federal agricultural programs and practices	• intellectual property rights issues
• standards-related issues	• telecommunications
• competition policy	• investment restrictions
• investment restrictions	
• dispute settlement provisions	

In order to gain appreciable support in the United States, a bilateral initiative must be sufficiently broad and creative to capture the imagination of leading US political figures. While a broad initiative is needed to attract US attention, willingness to address a wide range of specific issues important to individual American political and commercial interests is critical to sustaining any initiative. It will thus require that Canada be willing to come to grips with some difficult issues. Any initiative that makes significant progress in tackling remaining barriers to the US market will involve serious matching commitments by Canada. Agriculture provides a good example. The current system of supply management will not survive such a bilateral initiative, nor will the state trading practices of the Canadian Wheat Board. It should be noted, however, that Canada will also be under intense pressure in any future WTO negotiations to address these issues. Similarly, some Canadian cultural protection programs will be hard to defend in any bilateral initiative. Again, however, these programs are already facing mounting pressures generated by technological and market factors as well as critical scrutiny under existing trade agreement dispute settlement provisions. Within a bilateral initiative, there may be greater opportunity to find some accommodation and pursue Canadian export interests as

[12] See Michael Hart with Bill Dymond and Colin Robertson, *Decision at Midnight: Inside the Canada-US Free Trade Negotiations* (Vancouver: UBC Press 1994), 57-62.

well. Without a bilateral initiative, such policies may erode in ways that Canada can neither manage nor control.[13]

While Canada will come under intense pressure to accommodate US interests, there is no guarantee that the United States will be prepared to accommodate sufficient Canadian interests to justify opening negotiations at the bilateral level. The incentives for the United States are not of the same order as those for Canada. As the world's premier economy, the United States enjoys advantages that place it ahead of all others in attracting investment. As the world's only remaining superpower, it is also hard for US officials to see the need for accommodating the interests of others. The Washington mindset that the rest of the world should adjust to US policy preferences and choices is hard to undo. Nevertheless, past experience demonstrates that Canadians have been reasonably successful in moving US officials along with good ideas, particularly good ideas embedded within broad initiatives. While the FTA negotiations, for example, at times appeared hopeless, in the end Canada managed to satisfy many of its objectives because in the final analysis US political leaders could not abide the failure of the negotiations. Only by pursuing an initiative that is bold, broad, and deep will it be possible to test the extent to which US interests can be sufficiently engaged to accommodate Canadian priorities.

The range of issues on the agenda is thus most likely to be resolved within the context of a broadly based initiative. A comprehensive approach, however, also risks raising the whole spectrum of Canadian fears about closer trade and economic ties with the United States. Canadians may react positively to individual efforts to resolve many of the specific issues discussed earlier. They are prepared to accept that such efforts could facilitate trade and investment and benefit Canadian firms and consumers. Many Canadians are less sanguine, however, about the impact closer integration might have on a wider spectrum of issues, ranging from resource management to defense, foreign policy, and national security considerations. Canadians are prepared to see cross-border trade and investment increase, but most would shy away from imposing sanctions on third parties to meet US foreign policy objectives. They are prepared to see more streamlined customs and immigration procedures, but would be wary of common approaches to controls on guns, drugs, and refugees. To succeed, therefore, a comprehensive approach needs to be carefully explained and managed to ensure that Canadians – and Americans – appreciate the difference between reducing a wide spectrum of regulatory and other barriers to increased cross-border trade and investment, and efforts to establish a more formal type of arrangement such as a customs or economic union.

Much of the agenda outlined above can be achieved without taking the additional step of negotiating a full-fledged customs or economic union.[14] The added

---

[13] It is also worth noting for those worried about Canada's productivity performance that each of these policies contribute to undermining Canadian productivity. More than US interests are at stake in adjusting these policies to the demands of deepening integration.

[14] In economic literature, a customs union is the second level of regional integration following a free-trade area, and involves establishment of a common external trade policy, allowing for the free circulation of goods and services within the customs union. The third stage involves establishment of a common market,

benefit of a customs or economic union lies in the ease with which some specific issues could be resolved, such as the burdensome nature of rules of origin. The benefits of proceeding to a customs or economic union, however, may not outweigh the resultant complications, particularly those only indirectly related to trade and investment. Many of the issues on the agenda provide, within the context of a comprehensive round of negotiations, room for making useful trade-offs and building cumulative support. No negotiation is likely to resolve all issues, but with sufficient will and imagination, a comprehensive round is likely to address a sufficient number of issues to make possible the critical mass of breakthroughs necessary to deal with some of the more difficult matters on the agenda.

In assessing the pros and cons of any trade initiative, it is also important to keep in mind that while the current Canada-US environment is relatively calm, failure to address the kinds of issues identified earlier will have a slow but corrosive impact on business decisions to invest in Canada. As the smaller partner in North America, Canada faces the hard truth that the United States is by default the preferred location. That preference is predicated on a wide range of considerations starting with the size and proximity of the US market. For any entrepreneur, it is usually more profitable to service the small market from the large market than vice versa. In addition, US advantages ranging from tax levels to research policies act as a powerful magnet. Ironically, long-standing Canadian desires to diversify trade by strengthening ties with Europe, Japan, and others would be improved if the impact of the border between Canada and the United States could be reduced. The challenge for Canadians has always been to adopt policies that offset to some extent the natural attraction of US investment locations. Canada is failing to meet this challenge. Trade policy alone cannot offset this failure, but trade negotiations can play an important part in reversing the trend. As global integration deepens and the competition for investment intensifies, Canadians need to pay careful attention to what is required to make Canada an attractive location within North American for new or expanded investments. The FTA made a large contribution. A new round of bilateral negotiations can make a further contribution.

Finally, in considering any initiative, it is important to distinguish between the impact of proximity and the role of laws, policies, and agreements. Much of the political debate in Canada in the past was predicated on a simplistic tendency to equate the two. For good or for ill, proximity to the United States is a fact of life;

---

allowing for the free circulation of all factors of production (goods, services, capital, and technology), followed by an economic union which usually involves a single currency and monetary policy. The further governments move along the integration spectrum, the more the need for institutions of common governance and the greater the implications for sovereign decision-making.

The distinction between free-trade areas and customs unions is built into GATT Article XXIV, the provision which sets out the basic trade rules governing regional preferential trade arrangements. Interestingly, it is not carried over into the much newer General Agreement on Trade in Services: GATS Article 5's scope relates to regional integration agreements in general.

Such distinctions ease the task of economic and legal analysis, but they do not necessarily reflect the fluidity and complexity of modern economic interaction and integration. The FTA already anticipates elements of a common market, but does not include critically important elements of a customs union. Further bilateral negotiations would provide an opportunity to deal creatively with specific problems without necessarily meeting all of the exigencies of a specific economic or legal category.

through laws, policies, and agreements Canadians and Americans address the problems and opportunities proximity creates. As former Canadian ambassador to Washington, Allan Gotlieb, observes, '[Canadians] believe the US has an obligation to be nice to us whether or not we are nice to them. But if our political survival does not depend on relations with the US, our prosperity does. That is why the greatest foreign policy challenge for Canada is the management of our relations with the US.'[15]

For Canada, proximity ensures that the United States will exercise an overwhelming presence in every aspect of Canadian life, from culture to tax levels. As John Kenneth Galbraith observed many years ago, 'I was brought up in southwestern Ontario where we were taught that Canadian patriotism should not withstand anything more than a five dollar wage differential. Anything more, and you went to Detroit.'[16] Whether governments like it or not, the stick by which matters are measured in Canada is provided by the United States. For most Canadians, the issue is not how well Canada may do on the UN Human Development Index, but how well Canada stacks up against the United States in income levels and in access to goods and services. Policy can be used to reduce the disparities that now exist between Canadian and US economic performance.

In sum, a comprehensive Canada-US bilateral trade and investment initiative provides a unique basis for resolving a wide range of issues between Canada and the United States that will strengthen Canada's attractiveness as an investment location to serve the Canadian, North American, and world markets. Failure to tackle some of the issues raised earlier will have a subtle, harmful impact on investor confidence in the Canadian economy. As a result, given other advantages naturally enjoyed by the United States, Canadians will slowly but inexorably see the gap between US and Canadian standards of living widen as more and more of Canada's brightest individuals and productive firms see their destiny in the United States rather than in Canada.

Political considerations

The above analysis suggests that there exists a credible business and economic case for further negotiations to facilitate cross-border trade and investment. What then of the political case – can support be built for such an initiative? The political mood in both Washington and Ottawa would suggest that in the immediate term there may not be sufficient support. But, such was also the case for the FTA in the early 1980s; by 1985, the mood in both capitals had sufficiently changed to make the FTA initiative plausible and eventually successful. Such may also be the case for further bilateral negotiations: a well-developed initiative stands a reasonable chance of success in the medium term. One additional factor makes the case for a deeper bilateral integration agreement more difficult today than was the case for the FTA: the Mexico factor. Again, however, with careful management, this is an issue that can be addressed. We now examine each of these conclusions in turn.

---

15 *National Post*, B11, 7 August 1999.

16 McLean's – full citation.

The mood in Washington

Past experience has taught that any initiative to improve bilateral trade and investment flows must emanate from Canada. The combination of US chauvinism and Canadian paranoia dictates that any initiative must originate in Canada. Such initiatives, however, need also to capture attention and imagination in Washington. Gaining attention in the US capital is no easy task. The cacophony created by the hundreds of internal and external initiatives clamouring for attention in Washington at any one time can be deafening. Capturing the imagination of influential voices is even more challenging. The beginning of a new administration, however, is a good time to capture that attention, and the federal government has already made a good start. Longer term success, however, will require support among business and other economic interests, particularly among those with interests in Canada.

Table 4: Leading US Trading Partners
Share of total exports and imports

	Share of US imports					Share of US exports				
	1994-1996	1997	1998	1999	2000	1994-1996	1997	1998	1999	2000
Canada	19.5	19.2	19.0	19.3	18.8	23.4	22.0	23.0	23.9	22.9
EU	17.9	18.1	19.3	19.1	18.1	21.4	20.4	21.8	21.8	21.1
Mexico	8.4	9.9	10.4	10.7	11.2	13.4	10.4	11.5	12.5	14.3
Japan	16.2	14.0	13.4	12.8	12.0	8.3	9.5	8.5	8.3	8.3
China	6.2	7.2	7.8	8.0	8.2	2.0	1.9	2.1	1.9	2.1

Source: External Affairs and International Trade Canada, Trade Update 2000 and 2001.

To gain that attention, Canadian business and political leaders will need to be vigorous about promoting the importance of Canada to US trade and economic interests. American political and business elites need to be made much more aware that, throughout the 1990s, Canada was a better customer than Europe and Japan. In 2000, Canadians bought nearly three times as many goods and services as Japan, and nearly twice the goods and services exported to Mexico. Canada is a reliable, cash customer. Canada is the number one foreign supplier of energy to the US market, including oil, gas, electricity, and uranium, and has proven a reliable supplier.

Canada is also a reliable partner in pursuing a more open, rules-based trade regime. Over the past sixty-five years, no other country has as consistently and creatively been at the forefront in establishing the international trade order so highly valued by US officials.[17] To make progress on the bilateral trade front, Canadians need to be much more aggressive about reminding Americans of these fundamental facts of life and how an initiative can further both specific bilateral trade and investment interests and add momentum to efforts to find creative solutions to global trade and economic challenges.

[17] See Michael Hart, *Fifty Years of Canadian Tradecraft: Canada at the GATT 1947-1997* (Ottawa: Centre for Trade Policy and Law 1998).

Americans need also to be reminded that Canadians' capacity to remain a good customer requires further progress in reducing the impact of the border. Canadian ability to be a good customer is directly related to continued sales to the United States. More than any other US bilateral trade relationship, trade between Canada and the United States is two-way. A large proportion of the goods Canadians sell to Americans incorporate US components and vice versa. This has long been a characteristic of the automotive sector, but has also become a feature of trade in information technology, machinery, and other high-tech sectors. By 1996, the import content of Canadian merchandise exports had reached 31.7 percent.[18] The extent of bilateral industrial integration underlines the importance of progress on border and related issues to US trade and economic interests.

American legislators tend to be unaware of such facts and continue to focus more on overseas trade than on their own back yard. The past few years have also suggested an increasingly difficult, even ugly, trade policy climate in Washington, in large part due to lack of executive leadership. It would be difficult to point to a postwar US executive that sent out more confusing signals on trade issues than the last administration. One of President Clinton's first speeches in office was a rousing address at American University in February 1993 that met every trade policy specialist's highest expectations. Several more times he rose to the occasion, including in convincing a skeptical Congress to pass legislation implementing the NAFTA in 1993 and the WTO Agreement in 1994, and again in 2000 in convincing Congress to grant permanent normal trade relations to China. With these exceptions, however, there was little else to cheer about. Clinton's Trade Representatives (Mickey Kantor and Charlene Barshefsky) failed to inspire either Congress or the business community.

Part of their problem related to deep divisions between those members of Congress who are committed to including labour and environmental issues in trade agreements (largely Democrats and their union supporters) and those who are opposed to integrating such issues into trade agreements (most Republicans in the House and Senate and their supporters in business). As a result, the Clinton administration focussed narrowly on enforcing US rights and to hectoring others to catch up to the United States in opening their markets. Enforcing rights may be critical to maintaining US support for future trade negotiations, but leadership also requires a wider range of skills, including a vision of the future and ideas to expand and improve the trading system.

The Clinton administration's uninspired outlook was particularly worrisome because it coincided with economic conditions that placed the United States in a remarkably favourable position. Since its historic break with its protectionist past in the 1930s, previous outbreaks of US protectionist myopia tended to reflect difficult economic times. By March 2001, however, the United States had entered into an unprecedented eleventh year of continued economic expansion, universally regarded as the world's only economic, political, and military superpower. While

[18] See G. Cameron and P. Cross, "The Importance of Exports to GDP and Jobs," *Canadian Economic Observer*, November 1999.

economic growth has appreciably slowed since the fall of 2000, most economic indicators point to, at worst, a slowdown rather than a recession. Thus, while confidence may have been somewhat eroded, there is no fundamental reason for US pessimism about its economic future. Nevertheless, a protectionist outlook for many members of Congress remains almost a constitutional requirement. With few exceptions, however, all but the most rabidly protectionist members have, for the past sixty-seven years, been prepared to back a president with vision and give him room to pursue a creative US trade agenda, subject to congressional oversight and eventual approbation. President Clinton and his trade team, however, proved unable to convince Congress to extend the administration such authority. As a result, his second administration became largely a matter of drift and lost opportunities.

It is tempting to conclude that the negative mood will continue under the Bush administration. Indeed, there are those who argue that the end of the Cold War has removed one of the most important ideological underpinnings for US trade policy leadership and allowed parochial concerns to again become a dominant factor. There is no question that US political leaders have become more inward-looking. As US trade lawyer Chip Roh argues:

> The dawn of the new millennium finds Americans in most respects feeling awfully pleased with themselves, even for Americans. The remarkably long American economic boom shows no immediate sign of abatement. On the security front, there are some worries about terrorism and about potential rivalries with China or Russia, but no single state constitutes a security rival in the sense that the Soviet Union once did. All this prosperity and relative security, however, does not necessarily make us wiser or more sensitive, and clearly has not made Americans more inclined toward greater international cooperation and engagement. Quite the contrary, the absence of a superpower rivalry often seems to make us less sensitive to the need to be aware of the interests and concerns of other countries, because there is no risk of them joining a rival sphere of influence. And the apparent ability of the US economy to thrive for the past few years – even as other countries have experienced lower growth rates and in some cases economic crises – makes it difficult for the time being to make the case that US prosperity hinges on measures to advance international prosperity and cooperation. [19]

Nevertheless, bleak as the trade policy outlook may have been in the recent past, there are good reasons to believe that the situation is neither permanent nor unrelated to the incumbent in the White House. Trade policy is an issue on which the Bush administration can shine. With proper leadership, a well-crafted agenda, and evidence of appropriate attention to business and other interests, Congress is likely to be prepared to grant the next administration the requisite authority to negotiate trade agreements. In his appointment of Robert Zoellick as his trade representative, Bush has indicated a determination to make progress on the trade front. Both have featured trade policy prominently in their public statements. Zoellick, for example, told a congressional committee on 7 March 2001 that 'trade policy is the bridge between the President's international and domestic agendas.' A day earlier, in a press release setting out the administration's trade policy agenda, Zoellick em-

[19] Michael Hart, et. al., 'Canada-US Free Trade: Is It Time for Round Two – A Virtual Roundtable,' *Canadian Foreign Policy*, September 2000.

phasized that 'the United States ... must build a new consensus to promote open markets for trade in the decades to come. The Bush administration is strongly committed to a trade policy that will remove trade barriers in foreign markets, while further liberalizing our market at home.'[20]

The key to re-establishing that leadership is for the administration to gain fast-track negotiating authority. President Bush has already indicated that central to his trade agenda is 'reestablishing the bipartisan Executive-Congressional negotiating partnership that has accomplished so much. One of the top priorities is to reestablish trade promotion authority – based on the fast-track precedent.'[21] In April, the president sent a message to Congress formally seeking trade promotion authority. An early capacity to demonstrate results, for example in a creative use of that authority in negotiations with Canada and Mexico, would be important to both administration and Congress. Progress in launching a new round of WTO negotiations and completing the FTAA negotiations, while important, are unlikely to bring visible results during the Bush administration's first term. Progress on the bilateral front can be made much more immediately. Achieving such a result requires laying the groundwork today. Thus, while the immediate past in Washington may have been discouraging, there is no reason to conclude that a more promising mood can not be fostered by a well-organized and executed campaign involving prominent business and other leaders on both sides of the border.

One of the benefits Canada has traditionally enjoyed in Washington and across the United States is a relative absence of jingoistic concerns about matters Canadian. Opportunists like Montana Senator Max Baucus or South Dakota Governor Bill Janklow may make artful use of a particular irritant to advance their standing with specific constituencies, but most American political and business leaders continue to be well disposed toward Canada and would welcome efforts to strengthen cross-border trade and investment ties.

This traditional outlook on matters Canadian, however, may not always be the case, underlining the need to tackle the Canada-US agenda with some urgency. Demographic and political trends in the United States suggest that there will be steady erosion in Canada's ability to develop a strong base of support for Canadian-oriented issues. Two trends are of particular significance: the steady move of the political center of the United States from the north and east to the south and west, that is, away from Canada's economic and commercial heartland, and the steady erosion in the power of the president and the traditional institutions of foreign policy.

Canada can do little about the first except to ensure that it is well placed to influence the new class of political leaders. The second presents a more difficult challenge. The United States constitution decrees that political power in the United States should be widely diffused in order to prevent any individual from exercising too much power. During the era of the imperial presidency from Franklin Delano

---

20 Office of the United States Trade Representative, 'USTR Trade Policy Agenda and 2000 Annual Report,' Press Release 01-13, 6 March 2001.

21 Ibid.

Roosevelt through Lyndon Johnson, however, presidents exercised considerable authority, particularly in the pursuit of foreign policy objectives. Canadian officials learned to be effective players in that Washington and had considerable success in advancing Canadian interests during the era of the 'special relationship.' That era is long over.[22]

Over the past three decades, there have developed important new institutional constraints on the power of the US president and the executive branch, emanating from:

- Fiscal constraints, evident, for example, in decreasing commitments of resources to foreign policy institutions and issues.
- Rival sources of power and authority – George Soros has committed more to the rebuilding of Eastern Europe than the United States; Ted Turner committed a sum of one billion dollars to the UN, equivalent to the US arrears; NGOs (e.g., Jodi Williams and the landmines treaty) can use the Internet to exercise considerable influence on public and political opinion.
- Diffusion of power – power is now more widely dispersed within the federal government and between the federal and state governments; as well, the role and influence of the State Department is declining.
- Increasing influence of the popular media on foreign policy.

The waning authority of the president is further complicated by changes in American value structures. Postwar presidents built foreign policy coalitions out of interest groups and legislators committed either to multilateral, cooperative solutions or to a *realpolitik* swayed by circumstances and US interests. They were able to marginalize the influence of isolationists and often succeeded in co-opting unilateralist hardliners. Such coalitions are now harder to build and sustain while it is becoming more possible to build coalitions dedicated to reducing the international role of the United States.

If anything, Americans continue to be blissfully ignorant about Canada, a state of affairs that creates both problems and benefits. Canada may rank first in the feelings of Americans, but it ranks fifth in interests.[23] In today's Washington, for Canada to make progress on issues, it can no longer count on the president or the administration alone. Canadian officials now also need to be involved in building issue-specific coalitions for which presidents act more as coordinators than as leaders. The embassy in Washington has made the transition to defending Canadian interests in this new Washington. Politicians and officials in Ottawa, and business lead-

---

22 I examine the decline of the special relationship in 'Of Friends, Interests, Crowbars, and Marriage Vows in Canada-United States Trade Relations,' in Leen d'Haenens, ed., *Images of Canadianness: Visions on Canada's Politics, Culture, Economics* (Ottawa: University of Ottawa Press, 1998) and in 'The Road to Free Trade,' in L. Ian MacDonald, ed., *Free Trade: Risks & Rewards* (Montreal and Kingston: McGill-Queen's University Press, 2000).

23 The Chicago Council on Foreign Relations has for years conducted a quadrennial survey of US attitudes on foreign policy in which Canada consistently scores highest on the thermometer of feelings toward various countries. In 1999, Canada scored a warm and fuzzy 72 degrees. Noted President John Reilly, 'Americans like Canada because it's our neighbour, because it's a loyal ally and a member of NATO, and we don't have any problems with Canada, although Canada has various problems with us.' *Toronto Star*, 12 May 1999. Typically, however, Canada was not mentioned in the summary released to the press and on the Council's web site.

ers across the country, are less aware of these changes and less adept at exploiting them. To succeed in any new initiative, they will have to learn quickly and prove good students.

Finally, on the plus side, it is important to remember that one of the main systemic arguments against special trade policy consideration for Canada, the difficulty of creating precedents for other trading partners, was effectively disposed of with the FTA. There now exists a special Canada-US regime, enshrined in a regional agreement, on which to build. The expansion of the FTA into the NAFTA may have complicated the nature of the regime and require that Canada take steps to differentiate between the NAFTA and broader issues of Canada-US trade and economic relations. Overall, however, the medium-term prospects of a receptive audience for a well-crafted initiative to address remaining barriers to cross-border trade and investment appears to be positive.

The mood in Ottawa

There are similar reasons for cautious optimism in Ottawa. The government of Prime Minister Jean Chrétien has proven that it prefers a pragmatic approach to government. Trade policy is no exception. The government fully accepted the free-trade revolution of the 1980s; there was no effort to reverse the policies the Liberal party bitterly opposed during the 1988 election. At the same time, during its eight-year tenure, the Chrétien government's trade policy initiatives, with the exception of the OECD investment negotiations, have been largely low-risk, feel-good efforts. Free-trade negotiation with Israel, Chile, Costa Rica, Singapore, and the remaining members of the European Free Trade Association (EFTA – Norway, Switzerland, and Iceland) have validated the free-trade direction charted by the Mulroney government, while at the same time upholding the long-standing Liberal desire to diversify Canada's export markets. Enthusiasm for the FTAA and APEC initiatives satisfy the same criteria: low risk and consistent with the long-standing Liberal diversification impulse. In the throne speech setting out priorities for its third mandate, the government affirmed its commitment to pursue freer trade. What is less clear is whether the government is prepared to pursue higher risk strategies.

The government persevered in the ill-fated MAI negotiations initiated by the United States and European members of the OECD, but breathed a sigh of relief when it finally collapsed. Ministers saw it as a high-risk policy with few tangible political benefits. The government's preparations for the doomed Seattle meeting bore signs of the negative fall out from the MAI debacle. Unlike for previous multilateral negotiations, Canada did not make the best use of its resources to provide intellectual leadership at the point where its influence is greatest: the early stages of a negotiation. Canada generally took a wait-and-see attitude. Preparations for the April 20-22 Summit of the Americas suggested continued commitment to the basic direction but little enthusiasm for pushing hard on controversial matters. Nevertheless, Prime Minister Chrétien's strong performance at the Summit helped to stimulate renewed momentum for the Free Trade Area of the Americas initiative and hinted that the government may be prepared to take a more pro-active role on the trade file more generally.

Part of the government's caution relates to its continued fascination with the claims of free trade's opponents. Protestors, nationalists, environmentalists, human rights activists, and other 'civil society' groups have captured the government's trade policy agenda out of all proportion to their weight in society and capacity to make constructive contributions. The government seems unprepared to accept that most of them are animated by values and preferences that most Canadians do not share. Nevertheless, the government has sent out confusing signals about the need to accommodate their claims and preferences.

The government's stance is not unrelated to the fact that business has been content to let its critics seize the initiative, making the trade minister's job more difficult, in cabinet and in the public square. If there is to be any progress on the trade agenda, bilateral or otherwise, business will need to become more aggressive about its priorities. Business leaders need to be prepared to advance an alternative, positive vision of a global economy and to demonstrate that open markets and rules-based trade are the surest way to advance the causes of both human decency and prosperity.

The response by the prime minister and some of his ministers to the opportunities created by US preoccupation with its energy security suggests changing attitudes. While there is not an energy crisis in the United States, problems in the distribution system as well as lagging investment in refining, generating, and distributing energy has led to some serious re-evaluation of US energy policy and the prospect for forging closer Canada-US energy relations. The energy 'card' certainly creates some leverage for Canada, but one that will need to be deployed with great care. Energy sales to the United States sit less well with some Canadians than with others and thus any aggressive efforts to use the energy card could create a political backlash. Additionally, linking energy issues to border issues of greater concern to Canada than the United States creates its own problems.

On the basis of their eight-year record, therefore, only the most recent events suggest ministers disposed to take on a bold initiative with the United States. They may be prepared to concede that there are good business and economic reasons to pursue such an initiative, but their political antenna may also indicate that the long-term economic benefits, while real, are outweighed by the short-term political risks. The government likes to portray itself as pragmatic and has demonstrated a highly practical approach to problem solving, but it shares the misgivings of many members of the political class that closer ties to the United States bring limited political benefits but do raise strong and uncomfortable opposition from Canada's economic and cultural nationalists, enough of whom have excellent ties to the media to gain instant and frequent hearings.

These misgivings do not reflect the attitudes of Canadians as a whole. Polling done over the course of the past few years indicates the extent to which Canadians have come to terms with the post-FTA atmosphere of trade liberalization and closer Canada-US trade and investment ties. In a March 1999 Ekos poll,[24] for example,

[24] Ekos Research Associates, 'Canadian Public Opinion: International Trade Issues 1999,' as presented to a May 20 Multistakeholder Consultation hosted by the Minister for International Trade.

most respondents generally felt either indifferent (25 percent) or positive and optimistic (52 percent) about globalization, and similarly about trade liberalization (70 percent or more describe themselves as either indifferent or optimistic and confident that liberalization will be rewarding for Canada). Nearly half of those polled believed that trade has contributed to Canadian technology development and innovation and increased jobs while fewer than a quarter expressed concerns about the impact of trade on cultural identity. Interestingly, while Canadians continue to believe that the government should not allow trade agreements to compromise social and environmental programs, only a quarter of respondents placed cultural and national identity issues near the top of their concerns. More recent polling confirms this generally positive outlook.[25]

Canada's political and media elites, for whom freer trade in general and closer economic ties with the United States in particular, still conjure up negative images, appear to be out of touch with the mood in the country, as was the case in the early 1980s when polling similarly indicated high, if perhaps uninformed, levels of support for freer trade with the United States. Sustained opposition by economic and cultural nationalists gradually reduced this support to a bare plurality, while the pain of post-FTA adjustment (deepened by the Bank of Canada's attack on inflation) reduced support even further. The combined effect of the FTA's positive longer term economic impact and the extent to which the anxieties of the 1988 electoral campaign proved unwarranted have restored support for freer trade and good Canada-US trade and economic relations to historically more normal levels.[26]

In the Ekos poll noted earlier, 80 percent of Canadians agreed that the main goal of international trade agreements should be to set clear and enforceable rules of trade. That has been the enduring political lesson of the FTA debate. Canadians have become much more aware of the importance of trade and of trade agreements and accept that, for Canada, a rules-based approach is critical. Any future Canada-US initiative must build on this positive attitude among Canadians. This attitude also indicates that there is a basis within the Canadian electorate to build awareness of the benefits of a comprehensive initiative and to warn about the dangers of erosion in Canada's ability to be a full partner in the further evolution of North American trade and investment. Thus, while the government may not be likely to take the lead on such an initiative, a well prepared initiative from the business community may well prove acceptable.

---

25 Another Ekos poll taken in the Spring of 2001, for example, indicated that while 58 percent of Canadians did not foresee the likelihood of Canada joining the United States in the foreseeable future, only 22 percent did not anticipate the evolution of deeper North American economic integration over the same time period. *National Post*, 4 June 2001. A broader assessment of public attitudes to international trade and trade agreements can be found in Matthew Mendelsohn and Robert Wolfe, 'Probing the Aftermyth of Seattle: Canada Public Opinion on International Trade 1980-200,' paper prepared for the National Policy Research Conference, Ottawa, 1 December 2000.

26 Since polling began in the 1930s, bilateral free trade has generally garnered majority support; it was the staunch opposition of Canadian manufacturers that made the issue politically unacceptable before the 1980s.

Bilateral and/or trilateral approaches?

And what of the Mexico dimension? Just as Canada-US trade has mushroomed, so has US-Mexico trade, while Canada-Mexico trade remains at minuscule levels, representing less than one percent of total North American trade flows. An examination of investment flows yields a similar picture. There is as yet very little evidence of the emergence of a North American economy. Instead, there now exist two robust and mutually beneficial bilateral trade and investment relationships joined at the hip by a common free-trade agreement. Mexican trade is concentrated in the Southwestern quadrant of the United States, but is gradually spreading north and east, while Canadian trade is concentrated in the Northeast quadrant, but is expanding steadily west and south.

That is one reality. The second is that while Canada and Mexico may share many concerns and issues, the political economy of these issues in the United States is not the same for each country. Both relationships have long histories and are important to the United States, economically and geo-politically, but they have followed divergent paths and responded to different imperatives. The negotiation of the NAFTA stimulated a high level of interest in finding or promoting common elements in the three relationships, but these efforts have met with limited success. The three foreign ministers have met on occasion, as have business leaders and other elites, with a view to promoting the evolution of a North American community. These efforts may eventually bear fruit, but the results to date are modest.

These harsh realities place the United States, in particular, in a difficult position. Canada and Mexico may have many similar objectives to pursue in negotiations with the United States, but the United States has different priorities and sensitivities that arise in each relationship. What it may be prepared to do in negotiations with Canada, the United States would find very difficult in negotiations with Mexico. Issues that are critical to building support in the United States for negotiations with Mexico are irrelevant in the Canadian context. In short, deepening and expanding the NAFTA into a North American customs union or common market, as has been suggested by Mexican President Vicente Fox, raises much more daunting considerations than a mere matter of negotiating bilateral NAFTA-plus accords.

In the FTA and NAFTA, the three governments succeeded in tackling and resolving the relatively easy issues. Their efforts met with considerable success, first in facilitating cross-border trade, evident in the spectacular increase in bilateral trade flows, and second in changing moods and mindsets, evident in the structural changes that have taken place. What has *not* emerged, however, is a North American economy. Thus the choice governments and businesses alike face now is whether they want to take steps to further strengthen and deepen the existing bilateral relationships or to actively promote and pave the way for a much more integrated North American economy. At one level, Canada and Mexico could each pursue an initiative with the United States to explore what may be needed and what is feasible. Such discussions could be pursued in parallel, and officials should be prepared to discuss with one partner progress being made with the other. At a second level, officials would, from the start, look at what needs to be done to create the rules and institutions required to truly integrate the three economies.

In considering these options, officials will need to struggle with a further complication: the web of free-trade agreements Canada and Mexico have negotiated with other trading partners. Canada has entered into free-trade agreements with Israel, Chile, and Costa Rica and has initiated negotiations with the remaining members of the European Free Trade Agreement (Switzerland, Norway, and Iceland) and the remaining members of the Central American Common Market, and has hinted at a desire to extend its network of such agreements to Singapore and other trading partners. Similarly, Mexico has concluded more than a dozen such agreements, including with most of its principal trading partners in Central and Latin America, as well as with the European Union. To date, the United States has only concluded an FTA with Israel, but there appears to be growing interest to explore the prospect of agreements with others.

The structure of the NAFTA, like most free-trade agreements, fully protects the right of members to negotiate free-trade arrangements with other partners. Customs-union and common-market arrangements, however, are by definition less flexible. Members of either kind of arrangement must extend basically the same treatment to all non-parties. Negotiation of a North American customs union or common market, therefore, would require either that all three members extend the same free-trade arrangements to any country with which one or more has concluded such an arrangement or that existing arrangements be abrogated.

In the final analysis, the extent to which any new bilateral arrangements need to be made a part of the NAFTA or maintained on a separate track is an issue that need only be addressed in light of the results of future discussions. It is important to maintain a clear distinction between form and substance. The first priority should be to address the substance of remaining barriers to cross-border Canada-US trade and investment. To the extent that Mexico shares these concerns and is able and willing to be part of the solution, there is no *a priori* reason to reject eventual Mexican participation in finding solutions. At the same time, Canada and the United States should proceed to explore what may be feasible and desirable on a bilateral basis. Should the stage of negotiations be reached, the issue of Mexican participation can be addressed. In the event that all three parties consider it desirable to proceed trilaterally, Canada can insist, as it agreed prior to the NAFTA negotiations as the third party to those negotiations, that if Mexico can not be a part of the solution, for either Mexican or US reasons, it should be prepared to stand aside. Whether any resulting bilateral commitments would still need to be made a part of the NAFTA is an issue that can be addressed on its merits at that time.

The complication created by the network of existing and potential Canadian and Mexican FTAs would, of course, be eased considerably with the successful conclusion of the Free Trade Area for the Americas (FTAA) negotiations. Launched in 1995, these discussions have continued steadily in clearing away underbrush, developing common data and information bases, and building confidence. At the third Summit of the Americas held in Quebec City in April 2001 leaders provided renewed momentum to the initiative and expressed satisfaction on progress to date. There remains, however, considerable skepticism that either the United States or Brazil is prepared to invest these discussions with sufficient political will to bring

them to a successful conclusion. At a minimum, such skepticism will not be dispelled until the Bush administration gains fast-track negotiating authority from Congress that includes an FTAA as an important negotiating objective.

More fundamentally, however, many in the United States and elsewhere see the FTAA process as largely a preparation for the next round of WTO negotiations. It stands as an important testament to the new-found enthusiasm in Latin America and the Caribbean for freer trade and rules-based trade relations, but it is also a voyage of discovery. The intense discussions in the working groups, the preparations for summits of leaders and meetings of ministers and senior officials, the sharing of responsibility for chairing various sessions, and similar activities have created a momentum and commitment that are new to many of the countries. Training courses offered by the OAS and private institutions, as well as participation in the working groups, are developing a new level of knowledge and experience among officials in the region. Discussion in the Business Forum and in other private sector groups is adding to the momentum of the FTAA process. For the first time, the full implications of membership in the WTO and in regional agreements are being studied and discussed in capitals.

Successfully concluding and implementing an FTAA, however, will require that participants accept obligations that go well beyond their WTO obligations. That is a larger step than most of the countries of the region appear ready to take at this time. If the FTAA process succeeds, well and good, with the added bonus that it will considerably ease addressing the complication created by the Canadian and Mexican networks of FTAs. If it does not, these networks will either require US, Canadian, and Mexican negotiators to exhibit considerable ingenuity in finding ways to achieve their goals, or Canada and Mexico will need to make some difficult choices.

Concluding Observations

Given developments in the global economy, the intensification of private-sector led integration in North America, and the stresses created by diverging Canada-US economic performance, Canada and the United States need to consider jointly whether they can take steps to remove remaining barriers to cross-border trade and investment. The combined success of the FTA, NAFTA, and WTO negotiations has exposed policies and practices that do or might impede further growth in trade and investment. These policies and practices go beyond what can be resolved on a piecemeal, issue-by-issue basis and are of a type and nature unlikely to receive the attention they require in pending WTO multilateral negotiations or ongoing regional FTAA or APEC discussions. They are most likely to be resolved on the basis of a comprehensive initiative that can capture the imagination of political leaders on both sides of the border and generate the level of support necessary to overcome narrowly focussed opposition.

Such a comprehensive initiative should be considered initially on a bilateral Canada-US basis and without prejudice to the advisability or necessity of including Mexico or incorporating the results of any discussions into the NAFTA framework. Initially, it is more important to define the issues and the feasibility of their resolu-

tion than to focus on their form or the institutional basis for administering the results of any new commitments. Similarly, it is not necessary at this stage to determine whether Mexico should participate in any future negotiations. That issue can similarly be addressed on the basis of the results of preliminary discussions and in light of Mexican interests and capacity.

Proceeding in this direction, of course, would have implications that go beyond trade and commercial considerations. Some Canadians, for example, are concerned that closer commercial ties might drag them into applying US geopolitical trade barriers that are inimical to Canadian values and interests. Others worry that closer trade and commercial integration could undermine governments' ability to nurture Canadian culture and identity. Still others fear that further negotiations could require Canada to share its resources and leave Canadians without adequate capacity to ensure that they benefit from this asset. Some Canadians are suspicious that governments' approach to health care, education, regional development, and other defining policies could be compromised.

These are serious concerns to which there are serious answers. Some of these fears relate more to the forces of proximity than to the nature of the rules in place to manage the flow of cross-border exchanges of goods, services, capital, and technology. Canadians can do little about the fact that they live next door to the world's largest, most energetic economy, but the negotiation of better rules can provide an improved basis for managing the frictions created by proximity and ensure that Canadians are able to reap the full benefits of their geography. Other concerns are matters that would need to be addressed with care in the negotiation of the terms and conditions that would apply. Like Canadians, Americans also have worries that would need to be addressed. As in the 1985-87 FTA negotiations, the essence of any negotiation involves resolving such issues and finding mutually acceptable compromises. They can only be determined, however, by engaging each other, by analyzing the issues as they emerge, and by determining where there is room for accommodation and where there is not.

The time has come to take a serious look at the next level of rule-making. Canada and the United States need to consider what needs to be done to complete the work started in the early 1980s to achieve a seamless market governed by a single set of rules implemented and administered by the two governments to achieve their common interest in a well-functioning North American economy. It is a prudent way for Canada to manage its deepening economic relations with its giant neighbour to the south. It is also a good way for the United States to demonstrate to its other trading partners that it remains committed to rules-based internationalism and that it is prepared to adapt that system to the challenges and demands of deeper integration. For both, reducing the impact of the border may prove the best way to preserve Canada's status as an independent, reliable, and vibrant partner of the United States in the pursuit of common trade, economic, and security interests.

Ottawa
12 June 2001

Notes

Impacts on NAFTA Members of Multilateral and Regional Trading Arrangements and Initiatives and Harmonization of NAFTA's External Tariffs

Drusilla K. Brown, Tufts University
Alan V. Deardorff, University of Michigan
Robert M. Stern, University of Michigan

For presentation at Industry Canada conference, "North American Linkages: Opportunities and Challenges," June 20-22, 2001, Delta Bow Valley Hotel, Calgary.

June 15, 2001

Address correspondence to:
Robert M. Stern
Gerald R. Ford School of Public Policy
University of Michigan
Ann Arbor, MI 48109-1220

Tel. 734-764-2373
Fax 810-277-4102
E-mail: rmstern@umich.edu
www.umich.edu/~rmstern/

Impacts on NAFTA Members of Multilateral and Regional Trading Arrangements and Initiatives and Harmonization of NAFTA's External Tariffs

Drusilla K. Brown, Tufts University
Alan V. Deardorff, University of Michigan
Robert M. Stern, University of Michigan

Abstract

We have used the Michigan Model of World Production and Trade to simulate the economic effects on the NAFTA member countries and other major trading countries/regions of a prospective new round of WTO multilateral trade negotiations, the variety of free trade agreements (FTAs) that the NAFTA members have negotiated or are considering, and the adoption of a system of common external tariffs by the NAFTA members.

We estimate that an assumed reduction of post-Uruguay Round tariffs on agricultural and industrial products and services barriers by 33 percent in a new WTO trade round would increase world welfare by $613.0 billion, with gains of $177.3 billion for the United States, $13.5 billion for Canada, $6.5 billion for Mexico, and significant gains for all other industrialized and developing countries. If there were global free trade, world welfare would increase three-fold to $1.9 trillion and the country/region gains would be similarly larger.

Regional FTAs such as an expansion of NAFTA to include Chile and a Western Hemisphere FTA would increase global and member-country welfare but much less than a new WTO multilateral trade round would. Separate bilateral FTAs negotiated or being considered by Canada, Mexico, and the United States would have positive, though generally small, welfare effects on the partner countries, but potentially disruptive sectoral employment shifts in some countries. There would be trade diversion and detrimental welfare effects on some nonmember countries for both the regional and bilateral FTAs analyzed.

If the NAFTA members were to adopt a system of common external tariffs to replace their existing differentiated external tariffs, a system based on trade weights would have less distortive effects on trade and welfare than a system based on simple averages or production-weighted tariffs.

Impacts on NAFTA Members of Multilateral and Regional Trading Arrangements and Initiatives and Harmonization of NAFTA's External Tariffs

Drusilla K. Brown, Tufts University
Alan V. Deardorff, University of Michigan
Robert M. Stern, University of Michigan

I. Introduction

The purpose of our paper is to assess how the members of the North American Free Trade Area (NAFTA) – Canada, Mexico, and the United States – may be impacted by: (1) a new round of multilateral trade negotiations to be carried out under the auspices of the World Trade Organization (WTO); (2) the variety of free trade agreements (FTAs) that the NAFTA countries have actually negotiated and some others currently being considered; and (3) the adoption of a common external tariff that would replace each country's national tariffs and do away with rules of origin. In the foregoing assessments, we rely on the Michigan Model of World Production and Trade. The Michigan Model is a multi-country, multi-sector computational general equilibrium (CGE) model that we have used now for more than 25 years to analyze changes in trade policies.

In Section II, we first analyze the potential economic effects of the liberalization of trade in agricultural products and services, which are currently in the early negotiation stages of a new WTO trade round as part of the built-in agenda mandated in the Uruguay Round. We also consider the liberalization of trade in industrial products, which is yet to be decided pending agreement among the WTO members on the agenda for a new trade round. In Section III, we analyze regional negotiating options of interest to the present NAFTA member countries. These options include the expansion of NAFTA to include Chile and what we refer to as a Western Hemisphere FTA (WHFTA), which is an approximation of the Free Trade Area of the Americas (FTAA). In Section IV, we analyze several bilateral FTAs that each of the NAFTA members has already carried out or is currently considering. Section V contains an analysis of

the economic effects of the harmonization of NAFTA's external tariffs. Conclusions and implications for policy are discussed in Section VI.

II. Computational Analysis of the Prospective WTO Round of Multilateral Trade Negotiations

In this section we analyze the economic effects of the trade liberalization that may occur in a new negotiating round. As mentioned, we will use CGE model-based simulation analysis to assess these effects. We begin by providing a brief overview of the Michigan Model.

Overview of the Michigan CGE Model

The distinguishing feature of the Michigan Model is that it incorporates some aspects of the New Trade Theory, including increasing returns to scale, monopolistic competition, and product heterogeneity. Some details follow.[1] A more complete description of the formal structure and equations of the model can be found on line at www.Fordschool.umich.edu/rsie/model/.

Sectors and Market Structure

The version of the model to be used here consists of 20 countries/regions (plus rest-of-world) and 18 production sectors. The country/region and sectoral coverage are indicated in the tables below.[2] Agriculture is modeled as perfectly competitive with product differentiation by country of origin, and all other sectors as monopolistically competitive with free entry and exit of differentiated-product firms.

Expenditure

Consumers and producers are assumed to use a two-stage procedure to allocate expenditure across differentiated products. In the first stage, expenditure is allocated across goods without regard to the country of origin or producing firm. At this stage, the utility function is Cobb-Douglas, and the production function

[1] Readers not interested in the model details may proceed directly to the computational results.

[2] The individual countries listed in table 1 below, and the industries in table 2, are self-explanatory, as is the European Union (EU). EFTA is the European Free Trade Association and here includes Iceland, Norway, and Switzerland. Rest of Asia is India, Sri Lanka, and Vietnam. CCS is Caribbean, Central and South America, consisting of Argentina, Brazil, Colombia, Uruguay, Venezuela, and the Rest of the Andean Pact. The Middle East and North Africa consists of Morocco, Turkey, and the Rest of North Africa.

requires intermediate inputs in fixed proportions. In the second stage, expenditure on monopolistically competitive goods is allocated across the competing varieties supplied by each firm from all countries. In the case of sectors that are perfectly competitive, since individual firm supply is indeterminate, expenditure is allocated over each country's industry as a whole, with imperfect substitution between products of different countries. The aggregation function in the second stage is a Constant Elasticity of Substitution (CES) function.

Production

The production function is separated into two stages. In the first stage, intermediate inputs and a primary composite of capital and labor are used in fixed proportion to output.[3] In the second stage, capital and labor are combined through a CES function to form the primary composite. In the monopolistically competitive sectors, additional fixed inputs of capital and labor are required. It is assumed that fixed capital and fixed labor are used in the same proportion as variable capital and variable labor so that production functions are homothetic.

Supply Prices

To determine equilibrium prices, perfectly competitive firms operate such that price is equal to marginal cost, while monopolistically competitive firms maximize profits by setting price as an optimal mark-up over marginal cost. The numbers of firms in sectors under monopolistic competition are determined by the condition that there are zero profits.

Capital and Labor Markets

Capital and labor are assumed to be perfectly mobile across sectors within each country. Returns to capital and labor are determined so as to equate factor demand to an exogenous supply of each factor. The aggregate supplies of capital and labor in each country are assumed to remain fixed so as to abstract from

[3] Intermediate inputs include both domestic and imported varieties.

macroeconomic considerations (e.g., the determination of investment), since our microeconomic focus is on the intersectoral allocation of resources.

World Market and Trade Balance

The world market determines equilibrium prices such that all markets clear. Total demand for each firm or sector's product must equal total supply of that product. It is also assumed that trade remains balanced for each country/region, that is, any initial trade imbalance remains constant as trade barriers are changed. This assumption reflects the reality of mostly flexible exchange rates among the countries involved. Moreover, this is a way of abstracting from the macroeconomic forces and policies that are the main determinants of trade imbalances.

Trade Policies and Rent/Revenues

We have incorporated into the model the import tariff rates and export taxes/subsidies as policy inputs that are applicable to the bilateral trade of the various countries/regions with respect to one another. These have been computed using the "GTAP–4 Database" provided in McDougall et al. (1998). The export barriers have been estimated as export-tax equivalents. We assume that revenues from both import tariffs and export taxes, as well as rents from NTBs on exports, are redistributed to consumers in the tariff- or tax-levying country and are spent like any other income. When tariffs are reduced, this means that income available to purchase imports falls along with their prices, and there is no bias towards expanding or contracting overall demand.

Model Closure and Implementation

We assume in the model that aggregate expenditure varies endogenously to hold aggregate employment constant. This closure is analogous to the Johansen closure rule (Deardorff and Stern, 1990). The Johansen closure rule consists of keeping the requirement of full employment while dropping the consumption function. This means that consumption can be thought of as adjusting endogenously to ensure

full employment. However, in the present model, we do not distinguish consumption from other sources of final demand. That is, we assume instead that total expenditure adjusts to maintain full employment.

The model is solved using GEMPACK (Harrison and Pearson, 1996). When policy changes are introduced into the model, the method of solution yields percentage changes in sectoral employment and certain other variables of interest. Multiplying the percentage changes by the levels projected for the year 2005, which is when the Uruguay Round provisions will have been fully implemented, yields the absolute changes, positive or negative, which might result from the various liberalization scenarios.

The Data

Needless to say, the data needs of this model are immense. Apart from numerous share parameters, the model requires various types of elasticity measures. Like other CGE models, most of our data come from published sources.

As mentioned above, the main data source is "The GTAP-4 Database" of the Purdue University Center for Global Trade Analysis Project (McDougall et al., 1998). The reference year for this database is 1995. From this source, we have extracted the following data, aggregated to our sectors and regions:

1. Bilateral trade flows among 20 countries/regions, decomposed into 18 sectors. Trade with the rest-of-world (ROW) is included to close the model.
2. Input-output tables for the 20 countries/regions, excluding ROW
3. Components of final demand along with sectoral contributions for the 20 countries/regions, excluding ROW
4. Gross value of output and value added at the sectoral level for the 20 countries/regions, excluding ROW
5. Bilateral import tariffs by sector among the 20 countries/regions
6. Elasticity of substitution between capital and labor by sector
7. Bilateral export-tax equivalents among the 20 countries/regions, decomposed into 18 sectors

The monopolistically competitive market structure in the non-agricultural sectors of the model imposes an additional data requirement of the number of firms at the sectoral level. These data have been drawn from the United Nations, *International Yearbook of Industrial Statistics, 1998*.[4]

We also need estimates of sectoral employment for the countries/regions of the model. These data have been drawn from: UNIDO, 1995, *International Yearbook of Industrial Statistics*, and the World Bank, 1997, *World Development Report*. The employment data have been aggregated according to our sectoral/regional aggregation to obtain sectoral estimates of workers employed in manufactures. The *World Development Report* was used to obtain data for the other sectors.[5]

We have projected the GTAP-4 1995 database to the year 2005 by extrapolating the labor availability in different countries/regions using an average weighted population growth rate of 1.2 per cent per annum. This figure was computed from the growth-rate forecasts for the period 1997-2010 provided for various countries in table 2.3 of the World Bank's 1999 *World Development Indicators*. All other major variables have also been projected, using an average weighted growth rate of GDP of 2.5 per cent per annum, for all of the countries/regions of our model during the period 1990-1997, as per table 11 of the 1989/99 *World Development Report*.[6]

The projected database provides us with an approximate picture of what the world could be expected to look like in 2005 if the Uruguay Round (UR) negotiations had not occurred. The UR reductions in trade barriers were implemented beginning in 1995 and will be completed by 2005. In Brown, Deardorff, and Stern (2001), we have analyzed the impact of the UR-induced changes that are expected to occur over the course of the 10-year implementation period as a consequence of the negotiated reductions in tariffs and non-tariff barriers. We then readjusted the scaled-up database for 2005 to mimic the world as it might look in the post-UR implementation. In what follows, we use these re-adjusted data as the starting point to carry out the liberalization scenarios for a forthcoming WTO

[4] This source does not provide number-of-firms data for all countries. We have used the number-of-firms data for similar countries in these cases.
[5] We also need data on supply elasticities from ROW, which have been taken from the Michigan Model database.
[6] See Hertel and Martin (1999) and Hertel (2000) for a more elaborate and detailed procedure for calculating year 2005 projections.

negotiating round, involving possible reductions in tariffs on agricultural products and manufactures and reductions of barriers to trade in services.

Computational Scenarios

As already mentioned, the built-in agenda of the Uruguay Round mandated that multilateral negotiations under WTO auspices would commence for agriculture and services in 2000. It had been expected that the agenda for a broader WTO negotiating round would be approved at the WTO Ministerial Meeting held in Seattle in December 1999. However, because of the lack of consensus in Seattle among the WTO members,[7] decisions on the details of the negotiating agenda for a new round were put off until some future date. Although at the time of writing (June 2001) nothing definite yet has been decided, it may nonetheless be instructive to use the Michigan Model to assess the magnitudes of the economic effects that may result from a new round. Accordingly, we have run what we refer to as the Millennium Round liberalization scenarios. These scenarios assume 33 percent reductions in post-Uruguay Round tariffs and services barriers, as follows:

MR-1 *Agricultural liberalization is modeled as a 33 percent reduction in post-Uruguay Round agricultural import tariffs.*[8]

MR-2 *Liberalization of industrial products is modeled as a 33 percent reduction in post-Uruguay Round tariffs on mining and manufactured products.*

MR-3 *Services liberalization is modeled as a 33 percent reduction in estimated post-Uruguay Round services barriers.*

MR-4 *This combines **MR-1, MR-2, and MR-3**.*

In addition to the foregoing scenarios, we thought it would be of interest to run a scenario of global free trade, as follows:

MR-5 *Global free trade is modeled as complete removal of all post-Uruguay Round tariffs on agricultural products and industrial products as well as services barriers.*

---

[7] See Deardorff and Stern (2001) for discussion of the differences that prevented consensus in Seattle.

[8] Reductions in post-Uruguay Round agricultural export subsidies will presumably also be negotiated in a new trade round, but they are not included in this scenario.

With regard to MR-3, services liberalization, we may note that, while services issues were addressed in the Uruguay Round, the main accomplishment was the creation of the General Agreement on Trade in Services (GATS). The GATS is an umbrella agreement setting out the rules governing the four modes of providing services transactions internationally. These modes are: (1) cross-border services (e.g., telecommunications); (2) services provided in the country of consumption (e.g., tourism); (3) services requiring a domestic presence in the form of foreign direct investment (FDI); and (4) movement of natural persons. In an earlier study, Brown and Stern (2001) developed a new version of the Michigan Model for the purpose of analyzing the behavior of multinational firms, which are major providers of services, both intra-firm as well as in the production and sales of foreign affiliates located in host countries.[9] To approximate existing services barriers, Brown and Stern used estimates of barriers to FDI provided by Hoekman (2000), based on the gross operating margins of services firms listed on national stock exchanges for the period, 1994-96. These gross operating margins, which were calculated as the differences between total revenues and total operating costs, are indicated in percentage form in table 1 for construction, trade & transportation, other private services, and government services.

Some of the differences between total revenues and costs are presumably attributable to fixed cost. Given that the gross operating margins vary across countries, a portion of the margins can also be attributed to barriers to FDI. For this purpose, we have selected as a benchmark for each sector the country with the smallest gross operating margin, on the assumption that operations in that country can be considered to be freely open to foreign firms. The excess in any other country above this lowest benchmark is then taken to be due to barriers to establishment by foreign firms. That is, the barrier is modeled as the cost increase attributable to an increase in fixed cost borne by multinational corporations attempting to establish an enterprise locally in a host country. In this paper, we further assume for purposes of analysis that we can interpret this cost increase as an ad valorem equivalent tariff on

[9] Because of computer-capacity constraints, Brown and Stern use a 3-sector aggregation consisting of agriculture, manufactures, and services and the same 20-country/region breakdown as is being used here. They also differ from the present analysis by making allowance for international flows of FDI and increases in capital stocks in response to the multilateral trade liberalization that they analyze.

international services transactions generally. Our simulation MR-3 assumes then that these services barriers are to be reduced by 33 percent in a new trade round.

Computational Results

To help the reader interpret the results, it is useful first to review the features of the model that serve to identify the various economic effects that are being captured in the different scenarios. Although the model includes the aforementioned features of the New Trade Theory, it remains the case that markets respond to trade liberalization in much the same way that they would with perfect competition. That is, when tariffs or other trade barriers are reduced in a sector, domestic buyers (both final and intermediate) substitute toward imports, and the domestic competing industry contracts production while foreign exporters expand. With multilateral liberalization reducing tariffs and other trade barriers simultaneously in most sectors and countries, each country's industries share in both of these effects, expanding or contracting depending primarily on whether their protection is reduced more or less than in other sectors and countries. At the same time, countries with larger average tariff reductions than their trading partners tend to experience a real depreciation of their currencies in order to maintain a constant trade balance, so that all countries therefore experience mixtures of both expanding and contracting sectors.

Worldwide, these changes cause increased international demand for all sectors, with world prices rising most for those sectors where trade barriers fall the most. This in turn causes changes in countries' terms of trade that can be positive or negative. Those countries that are net exporters of goods with the greatest degree of liberalization will experience increases in their terms of trade, as the world prices of their exports rise relative to their imports. The reverse occurs for net exporters in industries where liberalization is slight -- perhaps because it already happened in previous trade rounds.

The effects on the welfare of countries arise from a mixture of these terms-of-trade effects, together with the standard efficiency gains from trade and also from additional benefits due to elements of the New Trade Theory. Thus, we expect on average that the world will gain from multilateral liberalization, as resources are reallocated to those sectors in each country where there is a comparative

advantage. In the absence of terms-of-trade effects, these efficiency gains should raise national welfare measured by the equivalent variation for every country, although some factor owners within a country may lose, as will be noted below. However, it is possible for a particular country whose net imports are concentrated in sectors with the greatest liberalization to lose overall, if the worsening of its terms of trade swamps these efficiency gains.

On the other hand, although the New Trade Theory is perhaps best known for introducing new reasons why countries may lose from trade, in fact its greatest contribution is to expand the list of reasons for gains from trade. It is these that are the dominant contribution of the New Trade Theory in our model. That is, trade liberalization permits all countries to expand their export sectors at the same time that all sectors compete more closely with a larger number of competing varieties from abroad. As a result, countries as a whole gain from lower costs due to increasing returns to scale, lower monopoly distortions due to greater competition, and reduced costs and/or increased utility due to greater product variety. All of these effects make it more likely that countries will gain from liberalization in ways that are shared across the entire population.

In perfectly competitive trade models such as the Heckscher-Ohlin Model, one expects countries as a whole to gain from trade, but the owners of one factor – the "scarce factor" – to lose through the mechanism first explored by Stolper and Samuelson (1941). The additional sources of gain from trade due to increasing returns to scale, competition, and product variety, however, are shared across factors, and we routinely find in our CGE modeling that both labor and capital gain from liberalization. That is often the case here.

In the real world, all of the foregoing effects occur over time, some of them more quickly than others. Our model is however static, based upon a single set of equilibrium conditions rather than relationships that vary over time. Our results therefore refer to a time horizon that is somewhat uncertain, depending on the assumptions that have been made about which variables do and do not adjust to changing market conditions, and on the short- or long-run nature of these adjustments. Because our elasticities of supply and demand reflect relatively long-run adjustments and because we assume that

markets for both labor and capital clear within countries, our results are appropriate for a relatively long time horizon of several years – perhaps two or three at a minimum.

On the other hand, our model does not allow for the very long-run adjustments that could occur through capital accumulation, population growth, and technological change. Our results should therefore be thought of as being superimposed upon longer-run growth paths of the economies involved. To the extent that these growth paths themselves may be influenced by trade liberalization, therefore, our model does not capture that.

Aggregate Results[10]

The aggregate effects on economic welfare of the individual Millennium Round scenarios (MR-1-MR-4) and global free trade (MR-5) are presented in table 2,[11] and the sectoral employment results of scenario MR-4 for Canada, Mexico, and the United States are presented in table 3.

MR-1: Agricultural Liberalization – The assumed 33 percent reduction in post-Uruguay Round agricultural-import tariffs is shown in table 2 to increase global welfare by $10.8 billion. The welfare increases for Canada ($67 million) and Mexico ($111 million) are relatively small, whereas the United States records a welfare decline of $4.1 billion. The expansion of U.S. agriculture apparently has the effect of drawing resources away from the monopolistically competitive, non-agricultural sectors, thereby producing negative scale effects in these sectors. Similar negative welfare effects are also noted for Australia and New Zealand, both of which are net exporters of agricultural products.

MR-2: Liberalization of Industrial Products –The assumed 33 percent reduction of post-Uruguay Round manufacturing tariffs results in an increase in global welfare of $210.7 billion, which is considerably greater than the $90.3 billion welfare gain from the Uruguay Round liberalization of manufacturing tariffs noted in Brown, Deardorff, and Stern (2001). Liberalization of manufactures in a

[10] The potential gains from a new WTO trade round are also analyzed in Hertel (2000), based on the GTAP CGE model, which is a widely used modeling structure. The version used by Hertel assumes perfect competition in all sectors. It also assumes national product differentiation (i.e., the Armington assumption), which may tend to exaggerate terms-of-trade effects.

[11] The aggregate results for the effects on exports, imports, and the returns to capital and labor, are available in Brown, Deardorff, and Stern (2001).

new trade round is seen to increase welfare in all of the countries/regions listed. While not noted in the table, there are positive effects as well on real wages and the return to capital. There are welfare gains of $63.3 billion for EU/EFTA, $57.8 billion for Japan, $31.3 billion for the United States, $2.8 billion for Canada, and $1.1 billion for Mexico. While the welfare gains for the developing countries/regions are much smaller in absolute terms, the percentage gains tend to be larger, ranging from 0.5 percent for China to 3.5 percent for the Philippines.

MR-3: Services Liberalization – As noted above, the Uruguay Round negotiations on services resulted in creation of the GATS, but no significant liberalization of services barriers occurred. Following the conclusion of the Uruguay Round, there have been successful multilateral negotiations to liberalize telecommunications and financial services. While it would be desirable to assess the economic effects of these sectoral agreements, we cannot do so here because of lack of data. What we have done then is to use the estimates of services barriers based on the calculations of gross operating margins for services firms in the countries/regions in our model, as already described above and as shown in table 1. These estimates of services barriers are intended to be indirect approximations of what the actual barriers may be and thus should not be taken literally. Assuming that the ad valorem equivalents of these barriers are reduced by 33 percent, it can be seen in table 2 that global economic welfare rises by $389.6 billion, which exceeds the $210.7 billion welfare increase for manufactures liberalization. All of the countries/regions listed experience positive welfare gains as well as increases in real wages and returns to capital. The United States has the largest welfare gain of $150.0 billion, compared to $103.4 billion for EU/EFTA and $61.6 billion for Japan. Canada's welfare gain is $10.6 billion and Mexico's gain is $5.2 billion. For several of the smaller industrialized and developing countries, the percentage increases in welfare are noteworthy.

MR-4: Combined Liberalization Effects (MR-1 + MR-2 + MR-3) – The results for **MR-4** are the sum of the other three scenarios. Overall, in table 2, global welfare rises by $613.0 billion. Canada's welfare gain is $13.5 and Mexico's gain is $6.5 billion. The United States has a welfare gain of $177.3

billion, EU/EFTA a gain of $168.9 billion, and Japan a gain of $123.7 billion. The percentage welfare gains are sizable in most of the smaller industrialized countries and in the developing countries.

MR-5: Global Free Trade – Since our model is linear, the effects of removal of all tariffs and services barriers would then be some three times the results of MR-4. Thus, in table 2, global free trade would increase global welfare by $1.9 trillion. The welfare gains for the United States are $537.2 billion (5.9 percent of GNP), EU/EFTA, $511.9 billion (4.7 percent of GNP), Japan, $374.8 billion (5.8 percent of GNP), Canada, $40.9 billion (5.6 percent of GNP), and Mexico, $19.6 billion (5.6 percent of GNP). The gains as a percentage of GNP for the other industrialized countries and the developing countries are also sizable, ranging from 3.5 percent for Australia to 17.0 percent for Singapore.

Sectoral Results

The sectoral employment results for MR-4 for Canada, Mexico, and the United States are presented in table 3.[12] For all three NAFTA countries, there are notable employment declines in textiles, wearing apparel, leather products and footwear, and in some service sectors, while employment increases especially in agriculture and most of the remaining manufactures sectors. The sectoral employment results for global free trade in Scenario MR-5, which are not shown here, are some three times the amounts shown in table 3.

Conclusion

The foregoing computational results suggest that there are substantial welfare gains for the NAFTA countries and the other industrialized and developing countries to be realized from a new WTO multilateral negotiating round. The sectoral employment increases for the NAFTA countries are concentrated in agriculture and the relatively more capital-intensive industries, and there are sectoral employment decreases in the relatively labor-intensive industries. This is the case for the assumed 33 percent reductions in the post-Uruguay Round tariffs and barriers to services, and even more so if there were global free trade.

---

[12] Sectoral results for percentage changes in exports, imports, output, and scale economies are given in Brown, Deardorff, and Stern (2001).

We should note, as discussed above, that our computational model is based on a comparative static approach, meaning that we move from an initial position to a new equilibrium in which all of the liberalization and adjustment to it is complete. That is, we abstract from a variety of dynamic and related effects that may occur through time, especially with the international mobility of real capital, increases in capital accumulation via real investment, and technological improvements. Our results should thus be interpreted as a lower limit to the economic benefits that may ultimately be realized from a new WTO multilateral negotiating round and, if it were possible, from a movement to global free trade.[13]

III. Analysis of Regional Negotiating Options

In this section, we consider two regional negotiating options that are actively being pursued by the NAFTA member countries. These include an expansion of NAFTA to include Chile, and an approximation to the Free Trade Area of the Americas (FTAA) that we refer to as a Western Hemisphere FTA (WHFTA) that involves the NAFTA countries. These scenarios are:

RA-1: *NAFTA-Chile FTA – elimination of all bilateral post-Uruguay Round agricultural and manufactures tariffs and services barriers between the NAFTA members and Chile.*

RA-2: *Western Hemisphere FTA (WHFTA) – elimination of all bilateral post-Uruguay Round agricultural and manufactures tariffs and services barriers among the NAFTA members and Chile and an aggregate of countries comprising Central America and Caribbean and Other South America (CCS).*[14]

---

[13] Brown and Stern (2001) have used their 3-sector, 20-country CGE model that incorporates the behavior of multinational corporations (MNCs) and their foreign affiliates and international mobility of FDI-related capital to assess the effects of 33 percent reductions in post-Uruguay Round tariffs and services barriers. Making allowance for imperfect mobility of real international capital and fixed world capital stocks, they estimate that the combined reductions in tariffs and services barriers would increase global welfare by $193.2 billion. The welfare increase for Japan is $3.1 billion and for the United States, $45.8 billion. When allowance is made for increases in the world capital stock of 2 percent in response to the assumed liberalization, the increase in world economic welfare rises to $612.4 billion, with an increase for Japan of $80.2 billion and for the United States, $178.4 billion. International capital mobility combined with an increase in capital accumulation may therefore generate welfare changes that are different in size and geographical distribution as compared to the results generated in the more disaggregated, sectoral version of the Michigan Model used here, which abstracts from the behavior of MNCs in response to trade liberalization. Time and resource constraints have thus far prevented Brown and Stern from expanding the sectoral coverage of their FDI model to analyze the more detailed responses to trade liberalization for the world's major trading countries and regions.

[14] The CCS aggregate comprises: Central America and Caribbean; Venezuela; Colombia; Rest of Andean Pact; Argentina; Brazil; Uruguay; and Rest of South America.

In each of these cases, our reference point is the post-Uruguay Round, 2005 database described above together with the post-Uruguay Round tariff rates on agricultural products and manufactures and the specially constructed measures of services barriers used in the Millennium Round scenarios in Section II preceding. Four scenarios have been carried out for each of the two arrangements noted: (A) removal of agricultural tariffs; (M) removal of manufactures tariffs; (S) removal of services barriers; and (C) combined removal of agricultural and manufactures tariffs and services barriers. Because of space constraints, we report only the latter combined results, denoted RA-1C and RA-2C.

RA-1C: NAFTA-Chile FTA – Table 4, column (1), indicates the results of a FTA involving the NAFTA member countries and Chile.[15] The complete removal of all post-Uruguay Round bilateral tariffs on agriculture and manufactures and services barriers vis-à-vis Chile increases global welfare by $5.5 billion. The welfare of the NAFTA members rises, with a gain of $4.2 billion for the United States, $290 million for Canada, and $411 million for Mexico. Chile's welfare increases by $740 million, which is 0.92% of its GNP. There is some evidence of trade diversion for a number of countries, including the aggregate of Central America and Caribbean and Other South American (CCS) countries. The sectoral employment effects for the NAFTA members and for Chile are shown in columns (1)-(4) of table 5. The U.S. employment effects are negligible, as are those for Canada and Mexico. The employment effects for Chile are noticeably larger, with increases in agriculture, mining, metal products, and other private services, and reductions in textiles and wearing apparel, some other manufacturing sectors, and trade and transport and government services.

RA-2C: Western Hemisphere Free Trade Agreement (WHFTA) – Discussions have been ongoing for several years to create a Free Trade Area of the Americas (FTAA).[16] The most recent efforts to move forward in achieving a FTAA were made at a Summit of the Americas meeting of the 34 member nations in Quebec City in April 2001. Since the country detail in our model does not include the individual members of the FTAA, we have chosen to approximate it by combining the United States,

[15] For a more comprehensive analysis of the accession of Chile to the NAFTA, see Brown, Deardorff, and Stern (2000).
[16] See Office of the United States Trade Representative (20001a).

Canada, Mexico, and Chile with an aggregate of the Central American and Caribbean and Other South American (CCS) nations into what we refer to as a Western Hemisphere Free Trade Agreement (WHFTA). The complete removal of all bilateral tariffs on agriculture and manufactures and services barriers can be seen in table 4, column (2), to increase global welfare by $77.9 billion. The welfare of the NAFTA members rises by $52.7 billion for the United States, $2.8 billion for Canada, and $2.8 billion for Mexico. The welfare of Chile rises by $2.0 billion and the CCS aggregate by $18.4 billion. There is evidence of trade diversion for Australia, New Zealand, EU/EFTA, some Asian developing countries, and the Middle East and North Africa. The sectoral employment effects are indicated in columns (5)-(9) of table 5. The United States shows relatively small employment declines in agriculture, mining, food, beverages, and tobacco, and other private and government services, and increases in all other sectors. While the employment effects for Canada are also small, the absolute employment increases for Mexico, Chile, and the CCS aggregate are noteworthy. This suggests that the smaller countries would experience more employment adjustments than the largest countries in a WHFTA.

IV. Analysis of Bilateral Negotiating Options

As already mentioned, the NAFTA countries are currently engaged in or are considering a number of bilateral trading arrangements. For Canada, these include negotiation of a FTA with Chile and possible consideration of an FTA with the European Union (EU). Mexico has concluded FTAs with Chile, the EU, and several other Latin American countries, and it is considering an FTA with Japan. The United States has recently concluded a bilateral FTA with Jordan and is actively considering FTAs with Chile, Singapore, and Korea.[17] In what follows, we analyze the effects on economic welfare and sectoral employment of the following bilateral arrangements:

C-ChFTA: *Canada-Chile FTA*
C-EUFTA: *Canada-European Union FTA*[18]

[17] See Office of the United States Trade Representative (2001b,c) and United States International Trade Commission (2001) for information on the U.S. FTA initiatives.
[18] Since in our model, the EU is combined with the (much smaller) EFTA countries, this and other scenarios listed below as involving FTAs with the EU are actually modeled to include EFTA as well.

M-ChFTA: *Mexico-Chile FTA*
M-EUFTA: *Mexico-European Union FTA*
M-JFTA: *Mexico-Japan FTA*

US-ChFTA: *U.S.-Chile FTA*
US-SFTA: *U.S.-Singapore FTA*
US-KFTA: *U.S.-Korea FTA*

As with the regional scenarios, we report only the results of the combined removal of agricultural and manufactures tariffs and services barriers, denoted by C-ChFTA-C, etc. The results for the separate removal of the agricultural, manufactures, and services barriers are available on request. We should emphasize that our computational analysis does not take into account other features of the various FTAs, such as the negotiation of explicit rules and the development of new institutional and cooperative arrangements (e.g., covering investment, labor standards and the environment) that could be beneficial to the countries involved. These factors do not lend themselves readily to quantification, however. By the same token, we have not made allowance for rules of origin that may be negotiated as part of each FTA and that could be designed with protectionist intentions.

C-ChFTA-C: Canada-Chile Free Trade Agreement – The welfare effects of a Canada-Chile FTA are noted in column (1) of table 6. Global economic welfare rises by $354 million, with Canada's welfare rising by $257 million and Chile's welfare by $124 million. The sectoral employment effects for both countries, which are available on request, are negligible.

C-EUFTA-C: Canada-European Union Free Trade Agreement – As noted in column (2) of table 6, a Canada-EU/EFTA FTA increases global welfare by $22.6 billion. Canada's welfare increases by $6.9 billion (0.95 percent of GNP), and EU/EFTA welfare increases by $16.9 billion (0.15 percent of GNP). There is some evidence of trade diversion for Mexico, the United States, Japan, and several Asian countries. The sectoral employment effects are noted in table 7. For Canada, there are employment increases especially in agriculture, food, beverages, and tobacco, and most manufactures sectors, and employment declines in mining, labor-intensive manufactures, trade and transport, and other private services. The employment changes for EU-EFTA tend to be the obverse of those for Canada, but they are relatively very small.

M-ChFTA-C: Mexico-Chile Free Trade Agreement – In table 8, column (1), it can be seen that a Mexico-Chile FTA increases global welfare by $466 million, with an increase of $416 million for Mexico and $138 million for Chile. Both the Mexican and Chilean gains are relatively small percentages of GNP. The sectoral employment changes, which are available on request, are negligible for both countries.

M-EUFTA-C: Mexico-European Union Free Trade Agreement – In table 8, column (2), a Mexico-EU/EFTA FTA increases global welfare by $10.2 billion, Mexico's welfare by $3.6 billion, and EU/EFTA welfare by $7.3 billion. There is small evidence of trade diversion for a number of countries. The sectoral employment effects are indicated in table 9, column (1). There are employment increases in Mexico in agriculture, labor-intensive and durable manufactures, and employment declines in the services sectors. The employment changes in the EU/EFTA are the obverse but are relatively very small.

M-JFTA-C: Mexico-Japan Free Trade Agreement – In table 8, column (3), a Mexico-Japan FTA increases global welfare by $7.3 billion, Mexico's welfare by $1.9 billion, and Japan's welfare by $6.3 billion. The sectoral employment results in table 9, column (2) indicate employment increases for Mexico in trade and transport and other private services and employment declines in all other sectors. While relatively very small, the sectoral employment effects for Japan are negative for agriculture and labor-intensive manufactures and positive for durable manufactures and services except for trade and transport.

USCFTA-C: U.S.-Chile Free Trade Agreement – To supplement the regional scenario noted for the expansion of NAFTA to include Chile, the results of a U.S.-Chile FTA are indicated in column (1) of table 10. Global welfare increases by $4.7 billion, with U.S. welfare increasing by $4.2 billion and Chile's welfare by $479 million. The sectoral results for the United States are shown in column (1) of table 11 and indicate relatively small employment declines in U.S. agriculture, mining, food, beverages, and tobacco, wearing apparel, leather products and footwear, and other private services, and employment increases in the other sectors. The sectoral employment effects for Chile show employment increases in agriculture, mining, metal products, and other private services and employment declines in several

manufacturing sectors and services. A number of these sectoral changes for Chile are relatively large and indicate the adjustments that may occur with a U.S.-Chile FTA.

USSFTA-C: U.S.-Singapore Free Trade Agreement – The welfare effects of a U.S.-Singapore FTA are noted in column (2) of table 10. Global welfare rises by $20.6 billion, with U.S. welfare rising by $16.7 billion and Singapore's welfare by $2.0 billion. The sectoral employment effects for the United States are indicated in column (2) of table 11. There are positive, but relatively small, employment increases in all U.S. sectors, except for wearing apparel, trade and transport, and other private services. For Singapore, there are relatively large sectoral employment increases in wearing apparel and trade and transport services and declines in most other sectors.

USKFTA-C: U.S.-Korea Free Trade Agreement – The welfare effects of a U.S.-Korea FTA are shown in column (3) of table 10. Global welfare rises by $38.8 billion, with U.S. welfare rising by $29.2 billion and Korean welfare by $8.2 billion. A U.S.-Korea FTA shows no evidence of trade diversion. The sectoral employment effects are indicated in column (3) of table 11. U.S. employment increases notably in agriculture and food, beverages, and tobacco and declines in most of the manufacturing and services sectors. For Korea, there are noteworthy employment declines in agriculture, food, beverages, and tobacco, non-metallic mineral products, construction, and other private services and increases in most manufacturing sectors and trade and transport services.

V. Harmonization of NAFTA's External Tariffs

In this section, we suppose that NAFTA is turned into a customs union, with a common external tariff and elimination of rules of origin and other types of restrictions. Ideally for this purpose we should use the highly disaggregated tariff schedules of Canada, Mexico, and the United States. But time and resource constraints prevent us from doing so. Instead, as an approximation, we will use the sectoral tariff averages that are contained in our model database. The problem here is that these tariff rates, which have been calculated as part of the GTAP database, are themselves import-weighted averages from lower levels of aggregation. In any event, what we have done is to calculate a vector of common external tariffs

by sector for the three NAFTA countries on the following alternative assumptions: (1) simple arithmetic average; (2) import-weighted average; and (3) production-weighted average. We then use our model to calculate the effects of changing existing post-Uruguay Round tariffs to these common external ones.

The existing post-Uruguay Round average tariff rates for the NAFTA countries are given in table 12 together with the calculated harmonized rates. It should be noted that these are the averages for all trading partners, whereas in the model there is one set of tariff rates for each trading partner. Nonetheless, these average rates provide some indication of the heights of the tariffs for the individual sectors in the NAFTA countries. We should note also that the estimated services barriers have not been included in the harmonization experiment, since these barriers have been imputed from cost-price margins and should therefore not be interpreted in the same manner as the statutory import tariffs on traded goods.

Computational Results

The aggregate effects on economic welfare for the NAFTA countries and other countries/regions covered in our model are indicated in table 13. With the simple average tariffs that are higher than each of the weighted schemes, it turns out that the United States would in this case have to raise its tariffs. The end result is a rather large decline in the volume of trade for the United States and most non-NAFTA countries, whereas the trade of Canada and Mexico expands. As noted in table 13, column (1), U.S. economic welfare rises by $13.5 billion due in large measure to improved terms of trade. Canada's welfare rises by $1.9 billion and Mexico's welfare by $2.3 billion due to the pervasive trade diversion.

Tariff changes are smaller with the trade-weighted and production-weighted harmonized tariffs. There are accordingly larger tariff reductions for Canada and Mexico and both experience a deterioration in the terms of trade. In table 13, columns (2) and (3), it can be seen that Canada's welfare declines while Mexico's welfare rises insofar as the efficiency effects outweigh Mexico's worsened terms of trade. Global welfare increases by $134.5 million for the import-weighted tariffs and declines by $2.4 billion for the production-weighted tariffs. It thus appears that the adoption of a trade-weighted common external

tariff is much less disruptive to trade and welfare than a simple average or the production-weighted system.

The sectoral employment effects are shown in table 14. For all three countries, the signs and magnitudes of the effects for the simple-average tariffs in column (1) do not correspond well with the trade- and production-weighted tariff effects in columns (2) and (3). For Canada, there are negative employment effects with the trade- and production-weighted tariffs in mining, textiles, wearing apparel, leather products & footwear, and services, and increases in employment in the remaining sectors. The sectoral employment effects for Mexico with the trade- and production-weighted tariffs are relatively small, except for machinery and equipment and other manufactures. Finally, for the United States, the sectoral employment effects for the trade- and production-weighted tariffs appear relatively small. It can be concluded therefore that the adoption of a common external tariff based on trade or production weights would by and large have minimal employment impacts in the NAFTA countries.

VI. Conclusions and Implications for Policy

We have used the Michigan Model of World Production and Trade to simulate the economic effects of the trade liberalization that may be negotiated in a new trade round to be conducted under WTO auspices, as well as a variety of regional and preferential trading arrangements. We have also analyzed the economic effects of the harmonization of NAFTA's external tariffs. The overriding conclusion that emerges from our model simulations of a new trade round is that multilateral trade liberalization has positive and often sizable impacts on the economic welfare of the NAFTA countries as well as on all of the other industrialized and developing countries/regions covered in the Michigan Model.

A second conclusion is that while regional and bilateral FTAs may be welfare enhancing for the member countries directly involved, these welfare gains are considerably smaller than those resulting from multilateral trade liberalization, even comparing the complete elimination of regional and bilateral tariffs to reduction of multilateral tariffs by only one third. Thus, the benefits of FTAs to the developing country partners appear somewhat limited, and, in some cases, could be disruptive because of

intersectoral shifts in output and employment, depending on how rapidly the FTAs would be implemented. It is also the case that most of the regional and bilateral FTAs involve elements of trade diversion and are therefore detrimental to some non-member countries.

Finally, the effects of adopting a common external tariff for the NAFTA member countries will depend on the method of calculation. A trade-weighted harmonized tariff appears to be less disruptive to trade and welfare than a simple average or production-weighted average. There would be relatively small sectoral employment impacts with both trade- and production-weighted tariffs.

References

Brown, Drusilla K., Alan V. Deardorff, and Robert M. Stern. 2000. "Computational Analysis of the Accession of Chile to the NAFTA and Western Hemisphere Integration," *The World Economy* 23:145-74.

Brown, Drusilla K., Alan V. Deardorff, and Robert M. Stern. 2001. "CGE Modeling and Analysis of Multilateral and Regional Negotiating Options," in Robert M. Stern (ed.), *Issues and Options for U.S.-Japan Trade Policies*, University of Michigan Press, forthcoming.

Brown, Drusilla K. and Robert M. Stern. 2001. "Measurement and Modeling of the Economic Effects of Trade and Investment Barriers in Services," *Review of International Economics*, forthcoming.

Deardorff, Alan V. and Robert M. Stern. 2001. "What the Public Should Know about Globalization and the World Trade Organization," *Review of International Economics*, forthcoming.

Hertel, Thomas W. and Will Martin. 1999. "Would Developing Countries Gain from Inclusion of Manufactures in the WTO Negotiations?" Presented at the Conference on the "WTO and the Millennium Round," Geneva, September 20-21.

Hertel, Thomas W. 2000. "Potential Gains from Reducing Trade Barriers in Manufacturing, Services and Agriculture," *Federal Reserve Bank of St. Louis Review* 82:77-99.

Hoekman, Bernard. 2000. "The Next Round of Services Negotiations: Identifying Priorities and Options," *Federal Reserve Bank of St. Louis Review* 82:31-47.

McDougall, Robert et al. 1998. *Global Trade: Assistance and Protection: GTAP-4 Database*, Purdue University, W. Lafayette, IN.

Office of the United States Trade Representative (USTR). 2001a. "Accomplishments of the FTAA Ministerial," Fact Sheet (April 7).

Office of the United States Trade Representative (USTR). 2001b. "Joint Declaration of the Proposed U.S.-Singapore Free Trade Agreement," Press Release 00-08 (January 17).

Office of the United States Trade Representative (USTR). 2001c. "United States and Chile Free Trade Agreement: Third Negotiating Round," Press Release 01-19 (April 2).

Stolper, Wolfgang and Paul A. Samuelson. 1941. "Protection and Real Wages," *Review of Economic Studies* 9:58-73.

United States International Trade Commission (USITC). 2001. "ITC to Analyze Impact of a U.S.-Korean Free Trade Agreement," News 01-003, Inv. No. 332-425 (January 11).

Table 1
Average Gross Operating Margins of Services Firms
Listed on National Stock Exchanges, 1994-96
(Percent)

Price - Cost / Price

	Construction	Trade & Transportation	Other Private Services	Government Services	Average
NAFTA Countries					
United States	20	35	46	40	40
Canada	14	21	42	15*	33
Mexico	26	35	47		39
Industrialized Countries					
Japan	14	23	27	43	27
Australia	15	8*	15*		13
New Zealand	15	21	27		21
EU/EFTA	20	24	34	38	29
Developing Countries					
Asia					
Hong Kong	14	16	23		19
China	42	36	72	75	49
Korea	15	24	41		24
Singapore	11*	13	21	26	18
Taiwan	21	28	50		35
Indonesia	23	32	58		44
Malaysia	19	17	22	26	18
Philippines	41	42	50		45
Thailand	38	42	49	41	45
Rest of Asia	23	23	34		27
Other					
Chile	69	32			41
Cent., Carib., & S. Amer.	29	40	49	32	38
Middle East & N. Africa	40	35	48		39
Rest of World	12	19	32	19	22
Average	**22**	**27**	**35**	**36**	

*Taken as benchmark country = lowest

Source: Adapted from Hoekman (2000).

Table 2
Global Welfare Effects of Multilateral Trade Liberalization
(Percent of GNP and Billions of Dollars)

	WTO Millennium Round – 33% Reductions in:								Global Free Trade	
	Agricultural Tariffs—MR-1 (1)		Manufactures Tariffs—MR-2 (2)		Services Barriers—MR-3 (3)		Combined Liberalization—MR-4 (4)		All Barriers Removed—MR-5 (5)	
NAFTA Countries										
Canada	0.01%	$0.1	0.38%	$2.8	1.46%	$10.6	1.85%	$13.5	5.62%	$40.9
Mexico	0.03	0.1	0.32	1.1	1.49	5.2	1.84	6.5	5.58	19.6
United States	-0.04	-4.1	0.34	31.3	1.65	150.0	1.95	177.3	5.92	537.2
Industrialized Countries										
Japan	0.07%	4.3	0.89%	57.8	0.95%	61.6	1.90%	123.7	5.77%	374.8
Australia	-0.04	-0.2	0.56	2.5	0.65	2.8	1.16	5.1	3.52	15.5
New Zealand	-0.04	-0.0	1.88	1.4	1.20	0.8	3.04	2.2	9.22	6.8
EU and EFTA	0.02	2.2	0.58	63.3	0.94	103.4	1.54	168.9	4.67	511.9
Developing Countries										
Asia										
Hong Kong	0.02	0.0	1.56	2.0	1.78	2.3	3.36	4.3	10.18	13.1
China	0.18	1.6	0.54	4.9	0.79	7.1	1.50	13.6	4.55	41.2
Korea	0.16	0.9	1.40	8.0	0.91	5.2	2.48	14.1	7.51	42.7
Singapore	0.12	0.1	2.85	2.1	2.62	1.9	5.60	4.2	16.96	12.6
Taiwan	0.71	2.5	1.58	5.6	0.49	1.7	2.78	9.8	8.44	29.6
Indonesia	0.06	0.1	0.06	0.1	0.79	2.0	1.65	4.2	5.00	12.7
Malaysia	0.28	0.3	1.99	2.4	0.54	0.6	2.81	3.4	8.51	10.2
Philippines	0.20	0.2	3.52	3.1	1.68	1.5	5.40	4.8	16.38	14.5
Thailand	0.03	0.1	1.47	3.0	1.12	2.3	2.62	5.4	7.94	16.4
Rest of Asia	0.40	2.3	0.90	5.2	0.47	2.7	1.78	10.2	5.38	30.8
Other										
Chile	-0.05	-0.0	1.29	1.0	1.17	0.9	2.40	1.9	7.28	5.9
Cent., Carib., S. Amer.	-0.03	-0.5	0.31	5,.1	1.13	18.9	1.41	23.6	4.28	71.4
Middle East & N. Africa	0.09	0.8	0.92	8.0	0.88	7.6	1.90	16.4	5.75	49.7
Total		**10.8**		**210.7**		**389.6**		**613.0**		**1,857.4**

Note: These numbers have been rounded.

Table 3
Sectoral Employment Effects for Canada, Mexico, and the United States of 33 Percent Reductions in Post-Uruguay Round Agricultural and Manufactures Tariffs and Services Barriers (Percent of Employment and Number of Workers)

Sector	Canada (1)		Mexico (2)		United States (3)	
Agriculture	2.96%	18,705	0.33%	31,653	3.23%	132,608
Mining	-0.44	-834	0.26	438	0.08	577
Food, Beverages & Tobacco	1.05	5208	0.05	270	0.29	9,113
Textiles	-3.71	-1,275	-0.31	-858	-1.55	-18,826
Wearing Apparel	-7.86	-11,324	-1.71	-3,241	-4.37	-47,605
Leather Products & Footwear	-9.36	-702	-1.56	-2,023	-6.21	-9,042
Wood & Wood Products	1.08	5,256	0.04	156	0.13	5,765
Chemicals	0.53	2,129	0.21	523	0.27	7,792
Non-metallic Min. Products	0.17	135	0.06	1,895	-0.13	-1,019
Metal Products	0.75	2,108	1.02	2,968	0.17	4,792
Transportation Equipment	0.41	779	0.76	993	0.18	3,496
Machinery & Equipment	1.03	1,459	1.05	2,187	0.63	18,216
Other Manufactures	-0.48	-279	-1.74	-436	0.47	8,534
Elec., Gas & Water	0.21	1,599	0.08	651	0.19	8,919
Construction	0.13	2,122	-0.13	-2,340	0.10	13,049
Trade and Transport	0.10	4,284	0.22	26,328	-0.14	-43,127
Other Private Services	-0.86	-28,571	-0.98	-52,116	-0.25	-92,052
Government Services	-0.04	-800	-0.24	-7,050	-0.00	-1,191
Total		**0.0**		**0.0**		**0.0**

Note: The total labor force is assumed fixed, so that the intersectoral employment shifts sum to zero.

Table 4
Global Welfare Effects of Regional Negotiating Options
(Percent of GNP and Billions of Dollars)

	NAFTA-Chile FTA (1)		WHFTA (2)	
NAFTA Countries				
Canada	0.040	$0.3	0.383	$2.8
Mexico	0.116	0.4	0.806	2.8
United States	0.046	4.2	0.581	52.7
Industrialized Countries				
Japan	0.002%	0.1	0.006%	0.4
Australia	-0.003	-0.0	-0.009	-0.0
New Zealand	-0.001	-0.0	-0.004	-0.0
EU and EFTA	-0.001	-0.1	-0.008	-0.9
Developing Countries				
Asia				
Hong Kong	0.003	0.0	-0.034	-0.0
China	-0.002	-0.0	-0.008	-0.1
Korea	-0.004	-0.0	-0.028	-0.2
Singapore	0.004	0.0	0.036	0.0
Taiwan	0.003	0.0	0.015	0.1
Indonesia	-0.001	-0.0	-0.002	-0.0
Malaysia	0.005	0.0	0.069	0.1
Philippines	0.005	0.0	0.013	0.0
Thailand	0.002	0.0	-0.003	-0.0
Rest of Asia	0.001	0.0	-0.001	-0.0
Other				
Chile	0.922	0.7	2.478	2.0
Cent., Carib., S. Amer.	-0.010	-0.2	1.103	18.4
Middle East & N. Africa	-0.003	-0.0	-0.017	-0.1
Total		**5.5**		**77.9**

Note: These numbers have been rounded.

Table 5
Sectoral Employment Effects of a NAFTA-Chile FTA and WHFTA
(Percent of Employment and Number of Workers)

	NAFTA-Chile FTA								WHFTA									
Sector	U.S. (1)		Canada (2)		Mexico (3)		Chile (4)		U.S. (5)		Canada (6)		Mexico (7)		Chile (8)		CCS (9)	
Agriculture	-0.02%	-656	-0.02%	-110	-0.03%	-2907	0.45%	4896	-0.48%	-19640	-0.20%	-1254	-0.16%	-15595	0.71%	7728	0.97%	216949
Mining	0.00	14	0.01	17	-0.02	-33	1.24	1196	-0.20	-1400	-0.49	-946	-0.12	-191	-1.18	-1138	0.64	7179
Food, Bev. & Tobacco	-0.01	-193	-0.01	-52	-0.01	-47	-0.04	-99	-0.34	-10610	-0.05	-251	0.02	75	-0.37	-838	0.67	28096
Textiles	0.02	198	-0.01	-2	0.13	364	-1.28	-467	0.47	5685.	-0.40	-137	0.61	1660	-1.21	-439	0.14	1746
Wearing Apparel	-0.02	-204	-0.02	-25	-0.03	-52	0.26	157	0.53	5778	-0.63	-906	-1.15	-2179	0.72	429	2.10	35488
Leather Prod. & Footwear	-0.03	-42	-0.07	-5	-0.01	-11	0.62	27	-0.41	-604	-1.52	-114	-0.33	-426	0.08	4	2.92	9996
Wood & Wood Products	0.00	187	-0.02	-86	-0.03	-118	0.21	89	0.09	3884	-0.08	-385	-0.32	-1384	0.28	120	-0.91	-12007
Chemicals	0.02	511	0.00	-15	0.04	98	-1.97	-1577	0.13	3784	0.18	730	0.31	772	-1.36	-1087	-0.42	-10756
Non-metallic Min. Products	0.00	37	0.00	-2	0.01	399	-0.55	-50	0.04	321	0.01	9	0.36	12221	-1.53	-139	-0.66	-1730
Metal Products	0.00	-109	-0.01	-42	0.06	163	1.72	1902	0.04	1092	-0.04	-100	-0.25	-724	2.47	2731	-0.48	-8372
Transportation Equipment	0.02	340	-0.02	-29	0.25	322	-2.89	-296	0.15	2995	0.52	986	1.25	1638	4.89	501	-1.45	-13332
Machinery & Equipment	0.02	468	0.06	86	-0.05	-105	-5.27	-760	0.38	11145	0.19	273	-0.46	-954	-3.33	-480	-3.00	-34525
Other Manufactures	0.00	68	0.00	-1	-0.04	-11	-1.92	-20	0.68	12358	-0.27	-159	-0.46	-114	0.66	7	-1.33	-1394
Elec., Gas & Water	0.01	268	0.00	17	0.01	94	0.04	101	0.07	3137	0.02	163	0.02	134	0.01	20	-0.22	-11475
Construction	0.00	488	0.00	70	0.01	256	-0.05	-284	0.04	5444	0.05	846	0.10	1809	0.19	1086	-0.27	-26865
Trade and Transport	0.00	323	0.01	240	0.01	1340	-0.54	-7756	0.00	1066	0.05	1917	0.05	6231	-0.71	-10226	-0.49	-105770
Other Private Services	0.00	-1597	0.00	-96	0.00	10	0.59	5466	-0.03	-12453	-0.01	-325	-0.06	-3462	0.59	5474	-0.22	-48196
Government Services	0.00	-100	0.00	36	0.01	238	-0.42	-2525	-0.04	-11983	-0.02	-348	0.02	490	-0.62	-3752	-0.16	-25030
Total		**0.0**		**0.0**		**0.0**		**0.0**		**0.0**		**0.0**		**0.0**		**0.0**		**0.0**

Note: The total labor force is assumed fixed, so that the intersectoral employment shifts sum to zero.

Table 6
Global Welfare Effects of Canadian FTA Initiatives
(Percent of GNP and Millions of Dollars)

	Canada-Chile FTA (1)		Canada-EU/EFTA FTA (2)	
NAFTA Countries				
Canada	0.04%	$257	0.95%	$6,912
Mexico	-0.00	-0	-0.03	-96
United States	0.00	1	-0.01	-899
Other Industrialized Countries				
EU and EFTA	-0.00	-6	0.15	16,937
Japan	0.00	1	-0.00	-165
Australia	-0.00	-1	0.00	0
New Zealand	-0.00	-0	-0.00	-2
Developing Countries				
Western Hemisphere				
Chile	0.15	124	0.01	8
Central America, Caribbean, and Rest of South America	-0.00	-16	0.00	2
Asia				
Hong Kong	0.00	0	0.01	11
China	-0.00	-2	-0.01	-64
Korea	-0.00	-1	-0.00	-1
Singapore	0.00	0	-0.01	-6
Taiwan	-0.00	-0	-0.01	-44
Indonesia	-0.00	-0	-0.00	-12
Malaysia	0.00	0	-0.02	-28
Philippines	0.00	0	-0.00	-4
Thailand	0.00	0	0.01	14
Rest of Asia	-0.00	-0	0.00	25
Middle East and North Africa	0.00	-2	-0.00	-29
Total		**354**		**22,560**

Note: These numbers have been rounded.

Table 7
Sectoral Employment Effects of a Canada-EU/EFTA FTA
(Percent of Employment and Number of Workers)

Sector	Canada (1)		EU/EFTA (2)	
Agriculture	1.35%	8,546	-0.07%	-6,145
Mining	-1.75	-3,352	0.48	4,513
Food, Beverages & Tobacco	0.73	3,594	-0.02	-1,193
Textiles	-0.18	-63	0.04	619
Wearing Apparel	-0.10	-147	0.05	974
Leather Products & Footwear	-2.14	-160	0.23	876
Wood & Wood Products	0.87	4,212	-0.07	-2,608
Chemicals	0.59	2,352	0.01	676
Non-metallic Min. Products	0.10	80	-0.01	-205
Metal Products	1.45	4,075	-0.02	-1,221
Transportation Equipment	1.87	3,517	-0.04	-1,018
Machinery & Equipment	2.36	3,341	-0.08	-3,523
Other Manufactures	1.37	800	-0.04	-686
Elec., Gas & Water	0.13	975	0.01	570
Construction	0.06	919	0.01	820
Trade and Transport	-0.09	-3,615	-0.01	-1,568
Other Private Services	-0.77	-25,741	0.03	12,905
Government Services	0.03	668	-0.01	-3,786
Total		**0.0**		**0.0**

Note: The total labor force is assumed fixed, so that the intersectoral employment shifts sum to zero.

Table 8
Global Welfare Effects of Mexican FTA Initiatives
(Percent of GNP and Millions of Dollars)

	Mexico-Chile FTA (1)		Mexico-EU/EFTA FTA (2)		Mexico-Japan FTA (3)	
NAFTA Countries						
Canada	-0.00%	$-0	-0.01%	$-65	-0.01%	$-33
Mexico	0.12	416	1.02	3,615	0.54	1,912
United States	-0.00	-30	-0.00	-476	-0.01	-750
Other Industrialized Countries						
EU and EFTA	-0.00	-18	0.07	7,341	-0.00	-121
Japan	-0.00	-6	-0.00	-178	0.10	6,343
Australia	-0.00	-1	0.00	5	0.00	9
New Zealand	-0.00	-0	-0.00	-1	0.00	2
Developing Countries						
Western Hemisphere						
Chile	0.17	138	0.01	9	-0.00	-1
Central America, Caribbean, and Rest of South America	-0.00	-25	0.00	22	-0.00	-21
Asia						
Hong Kong	0.00	0	0.00	5	-0.00	-4
China	-0.00	-2	-0.00	-18	0.00	0
Korea	-0.00	-4	-0.00	-17	-0.00	-13
Singapore	0.00	0	-0.01	-6	-0.00	-3
Taiwan	0.00	2	-0.01	-35	-0.01	-26
Indonesia	-0.00	-1	-0.00	-5	0.00	5
Malaysia	0.00	1	-0.02	-22	-0.01	-10
Philippines	0.00	0	-0.00	-4	-0.00	-1
Thailand	-0.00	-0	0.00	6	0.00	1
Rest of Asia	-0.00	-0	0.00	20	-0.00	-3
Middle East and North Africa	-0.00	-5	0.00	17	0.00	16
Total		**466**		**10,211**		**7,302**

Table 9
Sectoral Employment Effects of a Mexico-EU/EFTA FTA and a Mexico-Japan FTA
(Percent of Employment and Number of Workers)

Sector	Mexico-EU/EFTA FTA (1)				Mexico-Japan FTA (2)			
	Mexico		EU/EFTA		Mexico		Japan	
Agriculture	0.46%	43,777	-0.04%	-3,639	-0.07%	-6,833	-0.02%	-746
Mining	0.09	145	-0.04	-418	-0.12	-200	-0.12	-80
Food, Beverages & Tobacco	0.28	1,400	-0.02	-809	-0.03	-168	-0.01	-367
Textiles	0.29	785	-0.02	-356	-0.40	-1,080	-0.01	-41
Wearing Apparel	0.11	211	-0.01	-192	-0.39	-736	-0.01	-109
Leather Products & Footwear	-0.03	-41	-0.04	-162	-0.20	-264	-0.02	-20
Wood & Wood Products	-0.03	-146	-0.00	-42	-0.26	-1,157	-0.00	-32
Chemicals	-0.09	-237	0.01	544	-0.34	-848	0.01	200
Non-metallic Min. Products	-0.37	-12,375	0.01	298	-0.23	-7,844	0.00	47
Metal Products	1.00	2,918	0.01	297	-0.29	-858	0.02	560
Transportation Equipment	0.83	1,089	0.02	594	-0.61	-793	0.05	318
Machinery & Equipment	1.99	4,156	0.01	295	-0.07	-136	0.06	1,397
Other Manufactures	0.95	238	-0.01	-248	-1.22	-305	0.05	277
Elec., Gas & Water	0.10	852	0.00	176	-0.05	-414	0.01	262
Construction	-0.34	-6,044	0.01	1,328	-0.03	-531	0.01	607
Trade and Transport	-0.10	-11,756	0.00	566	0.21	24,374	-0.02	-2,730
Other Private Services	-0.40	-21,238	0.00	2,237	0.03	1,722	0.00	405
Government Services	-0.13	-3,735	-0.00	-467	-0.13	-3,930	0.00	53
Total		**0.0**		**0.0**		**0.0**		**0.0**

Note: These numbers have been rounded.

Table 10
Global Welfare Effects of United States FTA Initiatives
(Percent of GNP and Millions of Dollars)

	U.S.-Chile FTA (1)		U.S.-Singapore FTA (2)		U.S.-Korea FTA (3)	
NAFTA Countries						
Canada	0.005%	$34	-0.012%	$-90	0.035%	$252
Mexico	-0.001	-5	-0.015	-53	0.017	61
United States	0.046	4,215	0.184	16,724	0.322	29,226
Other Industrialized Countries						
EU and EFTA	-0.000	-42	0.009	956	0.002	196
Japan	0.002	130	0.018	1,180	0.004	268
Australia	-0.002	-10	0.032	140	0.002	10
New Zealand	-0.001	-1	0.026	19	0.003	2
Developing Countries						
Western Hemisphere						
Chile	0.596	479	0.014	11	0.008	6
Central America, Caribbean,	-0.008	-129	-0.002	-32	0.008	135
and Rest of South America						
Asia						
Hong Kong	0.003	4	-0.021	-27	0.061	78
China	-0.001	-11	-0.006	-57	0.005	42
Korea	-0.003	-17	0.017	96	1.436	8,172
Singapore	0.004	3	2.701	2,009	0.022	16
Taiwan	0.002	7	-0.003	-10	0.000	0
Indonesia	-0.001	-3	0.007	17	0.013	34
Malaysia	0.004	5	-0.204	-244	0.013	16
Philippines	0.004	4	-0.035	-31	0.014	12
Thailand	0.002	4	0.003	6	0.005	11
Rest of Asia	0.001	4	-0.005	-28	0.014	82
Middle East and North Africa	-0.002	-16	0.003	24	0.023	200
Total		**4,652**		**20,612**		**38,821**

Note: These numbers have been rounded.

Table 11
Sectoral Employment Effects of U.S. FTAs with Chile, Singapore, and Korea
(Percent of Employment and Number of Workers)

Sector	U.S.-Chile FTA (1)				U.S.-Singapore FTA (2)				U.S.-Korea FTA (3)			
	United States		Chile		United States		Singapore		United States		Korea	
Agriculture	-0.02%	-730	0.30%	3,258	0.09%	3,794	-2.71%	-127	1.28%	52,508	-3.93%	-111,888
Mining	-0.00	-10	1.14	1,094	0.08	586	-2.97	-18	-0.10	-707	0.67	207
Food, Beverages & Tobacco	-0.01	-206	-0.11	-251	0.04	1,118	-5.23	-2,796	0.12	3,958	-0.92	-4,836
Textiles	0.02	216	-0.77	-280	0.05	614	-4.91	-223	-0.45	-5,429	4.86	31,653
Wearing Apparel	-0.02	-203	0.24	144	-0.03	-372	15.28	8,411	-0.68	-7,452	8.68	50,828
Leather Products & Footwear	-0.03	-40	0.36	16	0.18	263	-5.40	-139	-0.78	-1,131	7.03	7,398
Wood & Wood Products	0.00	49	0.08	35	0.03	1,145	-4.63	-1,944	-0.03	-1,317	0.08	298
Chemicals	0.02	507	-1.74	-1,395	0.06	1,649	-5.87	-8,483	0.01	223	0.24	1,540
Non-metallic Min. Products	0.00	27	-0.46	-42	0.04	304	-3.33	-545	-0.02	-154	-0.67	-2,764
Metal Products	-0.00	-95	1.41	1,556	0.07	1,975	-7.13	-2,989	-0.06	-1,568	0.71	6,888
Transportation Equipment	0.02	373	-2.15	-220	0.06	1,151	-5.43	-202	-0.08	-1,546	0.24	376
Machinery & Equipment	0.02	515	-5.20	-749	0.15	4,296	-4.42	-3,067	0.01	194	1.37	6,708
Other Manufactures	0.00	78	-1.95	-21	0.18	3,270	-4.69	-1,355	-0.34	-6,164	4.74	23,587
Elec., Gas & Water	0.01	269	0.03	89	0.02	694	-0.79	-298	0.01	294	0.24	2,310
Construction	0.00	514	-0.05	-263	0.00	482	-0.05	-98	-0.00	-218	-0.08	-2,812
Trade and Transport	0.00	341	-0.41	-5,927	-0.07	-21,804	1.89	14,225	-0.06	-17,633	0.61	22,198
Other Private Services	-0.00	-1,568	0.54	5,011	-0.00	-206	0.60	1,911	-0.00	-650	-0.87	-31,933
Government Services	-0.00	-38	-0.34	-2,055	0.00	1,041	-1.60	-2,265	-0.05	-13,210	0.01	241
Total		**0.0**		**0.0**		**0.0**		**0.0**		**0.0**		**0.0**

Note: The total labor force is assumed fixed, so that the intersectoral employment shifts sum to zero.

note size of Sum Δ → adjustment mechanism

Table 12
NAFTA Post-Uruguay Round External Tariff Rates
and Calculated Harmonized Tariff Rates
(Percentage)

Sector	Average Tariff Rates			Harmonized Rates		
	United States	Canada	Mexico	Simple Average	Trade Weighted	Production Weighted
Agriculture	4.5	1.2	2.8	2.8	4.1	3.9
Mining	0.3	13.5	8.3	7.3	1.5	3.2
Food, Beverages & Tobacco	18.8	6.8	5.0	10.2	17.2	17.3
Textiles	9.9	17.9	13.6	13.8	11.0	10.7
Wearing Apparel	11.3	22.2	17.0	16.8	12.1	12.2
Leather Products & Footwear	8.3	14.1	17.4	13.3	8.9	10.7
Wood & Wood Products	2.1	3.9	9.8	5.3	2.5	2.7
Chemicals	5.2	7.0	8.7	7.0	5.5	5.6
Non-metallic Min. Products	8.2	5.7	15.1	9.7	8.2	8.5
Metal Products	3.8	6.0	9.3	6.3	4.2	4.2
Transportation Equipment	2.7	6.2	12.6	7.2	3.2	3.4
Machinery & Equipment	3.2	3.2	9.4	5.3	3.4	3.5
Other Manufactures	2.9	3.0	15.0	7.0	3.2	3.7

Table 13
Global Welfare Effects of NAFTA Tariff Harmonization
(Percent of GNP and Millions of Dollars)

	Simple Average (1)		Trade Weighted (2)		Production Weighted (3)	
NAFTA Countries						
Canada	0.261%	$1,899.1	-0.108%	$-789.4	-0.084%	$-612.7
Mexico	0.639	2,255.2	0.164	579.8	0.202	713.1
United States	0.148	13,468.9	0.008	764.0	0.017	1,567.5
Other Industrialized Countries						
EU and EFTA	-0.092	-10,116.3	-0.003	-328.9	0.005	597.5
Japan	-0.187	-12,167.5	-0.001	-49.0	-0.008	-542.1
Australia	-0.059	-260.4	-0.010	-44.9	-0.039	-169.4
New Zealand	-0.185	-135.7	-0.002	-1.8	-0.002	-1.5
Developing Countries						
Western Hemisphere						
Chile	-0.253	-203.4	-0.001	-0.5	-0.015	-12.1
Central America, Caribbean,	-0.206	-3,438.6	0.005	82.1	-0.057	-950.0
and Rest of South America						
Asia						
Hong Kong	-0.491	-632.3	-0.006	-7.6	-0.011	-14.0
China	-0.283	-2,565.7	-0.003	-30.5	-0.048	-435.6
Korea	-0.339	-1,927.9	-0.005	-27.1	-0.018	-103.5
Singapore	-0.614	-456.4	-0.002	-1.4	-0.046	-34.0
Taiwan	-0.715	-2,506.7	-0.004	-15.7	-0.025	-86.9
Indonesia	-0.278	-703.8	0.004	9.7	-0.039	-99.9
Malaysia	-1.381	-1,651.1	-0.008	-9.9	-0.064	-76.5
Philippines	-1.267	-1,118.1	0.005	4.5	-0.119	-104.9
Thailand	-0.540	-1,113.2	0.004	7.4	-0.069	-141.4
Rest of Asia	-0.316	-1,807.4	-0.003	-15.7	-0.012	-70.0
Middle East and North Africa	-0.642	-5,544.4	0.001	9.5	-0.216	-1,863.4
Total		**-28,725.8**		**134.5**		**2,439.7**

0

preferred -- cost distortive.

Table 14
Sectoral Employment Effects for Canada, Mexico, and the United States of NAFTA Tariff Harmonization
(Percent of Employment and Number of Workers)

	(1) Simple Average						(2) Trade Weighted						(3) Production Weighted					
Sector	Canada		Mexico		U.S.		Canada		Mexico		U.S.		Canada		Mexico		U.S.	
Agriculture	-0.66%	-4,168	-0.19%	-17,723	-1.19%	-48,627	0.59%	3,711	0.02%	1,747	-0.08%	-3,474	0.47	2,986	0.00%	-21	-0.20%	-8,034
Mining	-1.05	-2,013	-0.07	-120	2.33	16,532	-2.11	-4,029	-0.08	-138	0.50	3,564	-1.83	-3,510	0.02	25	1.20	8,504
Food, Beverages & Tobacco	0.21	1,063	0.13	651	-0.67	-21,199	1.24	6,135	0.20	1,004	-0.11	-3,329	1.25	6,188	0.21	1,032	-0.11	-3,437
Textiles	-2.41	-828	-0.05	-146	1.15	13,946	-3.64	-1,251	-0.17	-465	0.25	3,020	-3.93	-1,350	-0.21	-580	0.11	1,320
Wearing Apparel	-3.06	-4,403	0.93	1,753	3.28	35,772	-6.09	-8,770	-0.01	-19	0.46	5,013	-6.29	-9,062	0.00	-1	0.43	4,657
Leather Products & Footwear	0.52	39	0.24	309	5.14	7,486	-4.99	-374	-0.67	-863	0.45	648	-2.01	-151	-0.23	-294	3.28	4,772
Wood & Wood Products	-0.47	-2,302	-0.15	-678	0.10	4,408	0.15	725	-0.30	-1,328	-0.01	-638	0.07	339	-0.31	-1,345	-0.02	-715
Chemicals	0.61	2,420	-0.28	-700	-0.11	-3,066	0.54	2,170	-0.32	-786	-0.01	-260	0.58	2,318	-0.29	-726	-0.05	-1,485
Non-metallic Min. Products	1.03	814	-0.14	-4,702	-0.06	-431	0.92	727	-0.16	-5,423	-0.05	-398	0.98	770	-0.15	-4,972	-0.02	-137
Metal Products	0.61	1,730	0.07	211	0.01	213	0.66	1,859	0.35	1,023	-0.07	-1,789	0.59	1,650	0.27	797	-0.11	-3,124
Transportation Equipment	1.85	3,476	1.08	1,408	0.46	9,078	1.06	1,988	0.41	537	-0.09	-1,824	1.06	1,993	0.44	579	-0.07	-1,333
Machinery & Equipment	0.59	843	2.09	4,356	-0.54	-15,545	0.61	862	1.87	3,891	-0.14	-3,936	0.50	714	1.81	3,764	-0.26	-7,403
Other Manufactures	3.09	1,808	-1.15	-288	2.04	37,049	0.82	481	-2.75	-688	0.10	1,744	1.16	682	-2.48	-620	0.42	7,721
Elec., Gas & Water	0.10	747	0.12	979	-0.03	-1,595	0.01	97	0.04	362	-0.01	-520	0.02	188	0.05	414	-0.02	-984
Construction	0.11	1,848	0.12	2,165	0.03	3,558	0.00	-38	0.02	346	0.00	116	0.01	144	0.03	546	0.00	161
Trade and Transport	-0.05	-2,049	0.06	7,062	-0.09	-27,877	0.00	10	0.05	6,440	0.00	-1,016	-0.01	-254	0.05	6,210	-0.01	-3,991
Other Private Services	-0.02	-720	0.08	4,364	-0.08	-29,723	-0.04	-1,167	-0.02	-999	0.00	124	-0.03	-1,084	-0.01	-632	0.00	-1,340
Government Services	0.08	1,693	0.04	1,099	0.07	20,021	-0.14	-3,136	-0.16	-4,642	0.01	2,956	-0.11	-2,561	-0.14	-4,177	0.02	4,848
Total		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0

Note: The total labor force is assumed fixed, so that the intersectoral employment shifts sum to zero.

Notes Gerard Boychuk

Has Social Policy convergence taken place? – A: yes & no.

U: "this yr. OAS eligibility goes fr 65 to 67

– except for Alberta, no increase in prov. variation

(~ Courchene: # of No-So economies → differential policy responses)

CONVERGING AND DIVERGING PARADOXES

National and Sub-National Variation in Income Maintenance Programs in Canada and the United States

Gerard W. Boychuk and Keith G. Banting

pol. sci. Waterloo

Conference on North American Linkages: Opportunities and Challenges for Canada
Industry Canada, Calgary Alberta, June 20-22, 2001

INTRODUCTION

During the postwar era, the welfare states developed by OECD countries were highly diverse. In 1974, for example, social spending as a proportion of GDP varied widely, ranging from 8 percent in Japan to 27 percent in the Netherlands. Program structures also varied enormously, to the point that analysts could identify distinct models of social policy, each reflecting a different conception of the social role of the state. Esping-Anderson (1990), for example, pointed to three models of welfare capitalism: a social-democratic Scandinavian model; a liberal, anglo-saxon model; and a corporatist, christian-democratic model. Other analysts suggested extensions to the typology, adding a "southern" model here or an "Australian" model there.[1] Shining through the welter of categories, however, was a simple point. There was no single model of the welfare state in OECD nations during the postwar era.

In the contemporary period, the pressures generated by globalization have raised questions about the scope for diverse social policy regimes. Do countries still preserve the capacity to chart distinctive social futures in an era defined by deeper integration of the global economy? Or are pressures for harmonization slowly leading advanced industrial democracies to converge on a common approach to social policy? This question takes on a special urgency in Canada. Public opinion surveys suggest that many Canadians associate their sense of national identity and collective accomplishment with their social programs. However, those same polls and wider polls debates reflect an underlying anxiety that increasing economic integration with the United States is narrowing the scope for a distinctive social policy path on the northern part of the continent.

This paper examines the scope for national diversity in social policy in the North American context. In so doing, it seeks to extend the existing literature in the field by examining several possible objections to previous research, objections that point to the importance of supplementing studies at the national level with an examination of sub-national patterns. The findings point to unexpected paradoxes in the patterns of convergence and divergence in social policy, with important implications for our understanding of the role of national and regional programs.

The Scholarly Literature

There is now a substantial body of literature that is sceptical of the proposition that globalization is generating social policy convergence across OECD countries. Few countries can escape the need to adjust their social policy regimes to the new economic order, but differences in national politics still condition they way in which countries react, mediating the impact of economic pressures on the social contract. As a result, there is no reason to presume that social policy will converge on a single approach to the social needs of citizens.

The evidence for this conclusion takes different forms. Banting (forthcoming, 1997) has pointed out that social spending as a proportion of GDP in OECD countries continues to inch upwards, and that there is no overall pattern of convergence in the proportion of their national resources

that different countries devote to social programs. Nancy Olewiler's detailed analysis of taxation trends and Geoffrey Garrett's analysis of both taxation and public expenditures similarly find no evidence of significant convergence across OECD countries (Olewiler 1999, Garrett 1998). These themes recur in a variety of other studies (Krugman 1996; Martin 1996; Esping-Andersen 1996; Swank 2001, 1998; Iversen 2001).

This emerging consensus does not extend automatically, however, to a second form of economic integration, the emergence of regional trading blocs such as the European Union and NAFTA. Europe presents a fascinating case. In the postwar era, the welfare states of Europe were especially diverse, reflecting the primacy of national political traditions on the continent that first gave the world both the nation state and the welfare state. Each of Esping-Andersen's three worlds of welfare capitalism has deep roots here. However, these historic differences are now challenged by a powerful integrative project. The political determination to build an ever closer union, the creation of supra-national political structures, and the introduction of a single monetary regime and common currency, have generated pressures that go well beyond those implicit in the global economy alone (Liebfried and Pierson 1995). It is therefore perhaps not surprising that there is stronger evidence of convergence in social policy within the European Union than across OECD nations generally. Social spending as a share of GDP shows a clear pattern of convergence, although it is worth noting that this pattern is due as much to considerable increases in spending in southern countries such as Portugal, Spain and Greece as to the slowing of growth in northern Europe (Banting forthcoming).

Even in the EU, however, the depth of convergence should not be overstated. Convergence in spending co-exists with national diversity in program structure. The diverse social policy models on the continent tend to respond to similar economic pressures in different ways. Despite the adoption by member states of a formal resolution in favour of a voluntary convergence in social protection regimes, a study by the European Commission could find no consistent pattern of convergence implicit in the program adjustments of the 1980s: "There has certainly been a convergence in the problems to be solved....(but) there is no clear evidence of convergence of social protection systems in the Community of the 1980s (Commission of the European Communities 1994: 9; also Montanari 1995). The 1990s witnessed more intense pressures, especially with the approach of monetary union, and there has been a trend towards more market-sensitive forms of social interventions across the continent (Rhodes 1998). Nevertheless, there is as yet no single European model of the welfare state on the horizon.

But what of the North American case? NAFTA does not create the same depth of economic integration, and there is no prospect for supra-national political institutions on the horizon. Nevertheless, there are reasons to anticipate that social policy convergence might be strong. Despite the mythologies woven around social policies by many Canadians, comparative analysts of the welfare state tend to regard the Canadian and American approaches to social policy, especially outside of health care, as variations on the same 'liberal' model of the welfare state. Moreover, the overwhelming dominance of the American market and the deeply asymmetrical relationship between the two countries would seem to create especially potent pressures for convergence.

Despite these differences, the conclusions that emerge from previous research on convergence in social policy between Canada and the United States tend echo findings elsewhere. Studies suggest that the differences between the two systems, while perhaps small, do matter (Card and Freeman 1993). Core programs such as pensions and health care continue to evolve along separate pathways, reacting to common pressures in different ways. Convergence has taken emerged in specific programs, to be sure, with unemployment insurance and child benefits emerging as the clearest cases. Nevertheless, the overall picture is one of persisting differences (Banting 1997a, 1997b; Boychuk 1997, 2000; Hoberg, Banting and Simeon forthcoming; Skogstad 2000). Social programs have been restructured in both countries in the last two decades; some benefits have been cut; some benefits have been expanded. But restructuring is not the same as convergence. To quote one recent survey:

> "As the century drew to a close, the Canadian and American welfare states were as different as they were in the mid-1970s, the highwater mark of the postwar welfare state. The two systems have changed, and they are different in different ways than they were in the 1970s. But convergence is not the big story. In social policy at least, the conclusion seems clear. The border still matters. Distinctive cultures and politics still matter. The costs of distinctiveness may be rising, but significant degrees of freedom remain (Banting forthcoming).

Possible Objections to the Recent Research

These conclusions about the Canadian scope for choice might be questioned from three perspectives. The first objection, which might be labelled the "lagged effect" argument, contends that the full logic of economic integration is still unfolding and that a pervasive pattern of convergence between the Canada and U.S. policy systems is sure to emerge over time. There are two forms of this argument. An economic version of the argument holds that there is a natural sequencing in adjustments to integration, with the first wave of adjustments emerging in industrial structures, and that pressures to narrow tax and expenditure differentials will build over time. A cultural version of the argument holds that economic integration will inevitably produce greater cultural integration between the two countries. In the years to come, Canadians will inevitably bring more American values to their own politics, and Canadian social programs will slowly come to resemble those south of the border.

This objection is impossible to counter fully, since the reply to evidence of continuing policy divergence can always be that the anticipated lag is simply longer. However, the potential objection does point to the need to update the analyses of the trajectories of the two countries.

A second possible objection is that convergence is not evident in federal programs or aggregate national social policy indicators because these are not the best places to look. A weakness of previous studies is that they have tended to focus on federal programs in the two countries, or to rely on some average program or statistical aggregations of provincial and state programs. However, this focus on federal programs or aggregate nation-wide indicators might miss

important dynamics. There are several reasons to suspect that cross-border convergence would emerge earlier and more forcefully at the provincial level rather than the federal level. First, provinces and states have control over some of the policy levers that are most important in adjusting to increasing economic integration and competitive pressures, including programs with significant implications for labour markets. Second, both countries have recently decentralized authority over important social programs, widening the scope for interprovincial variations in the patterns of social policy development.

This second objection points to several possibilities. One possibility is that there is greater variation within each of these two countries than between them, that intra-country diversity is growing rapidly as political authority is decentralized, and that the extent of policy overlap between the two countries is therefore increasing significantly. A related possibility is that Canadian provinces are not simply increasingly diverse in their approaches to social policy, but that they are tailoring their social programs to the patterns prevailing in the U.S. states with which they compete, usually their immediate neighbours south of the border. Courchene has argued the case most vigorously, and it is worth quoting the argument at length:

> It is time to view Canada as a series of north-south, cross-border economies with quite distinct industrial structures. British Columbia is oriented toward the Pacific Rim and the U.S. Northwest; the energy-based Alberta economy competes with the oil and gas producing regions of the Texas gulf; the breadbaskets of Saskatchewan and Manitoba keep a competitive watch on the U.S. midwest; the Great Lakes economies of Ontario and Quebec are integrated with each other and with their counterparts south of the border; and the fortunes of Atlantic Canada likely will increasingly be linked to the Atlantic Rim and the Boston/New York axis....
>
> One of (the consequences) is that the manner in which a Great Lakes economy might want to integrate apprenticeship, training, welfare, UI/EI, education, and the transition to work will likely differ from the way a Pacific Rim economy like British Columbia might like to forge the same integration....the economy diversity across Canada's regions also implies policy diversity, the common term for which is asymmetry (Courchene with Telmer. 1998: 289, 291)

This second possible objection therefore points to the importance of examining the extent of variation in social programs across regions in Canada and the United States, and of looking for patterns of cross-border convergence at the regional level. A more careful examination at these levels may well blur the image of two essentially different welfare states co-habiting uneasily on the North American continent.

A third possible objection to the prevailing literature is that it focuses to much on convergence, and too little on non-convergent forms of adjustment to economic integration with the United States. In this particular context, it is possible that provinces are adopting social policies that do not precisely emulate those of their southern neighbours but which are in fact designed to

position their economies for competition with them. Even if economic integration does not lead to increasing similarity in social policy in cross-border regions, Courchene's argument implies that there will be greater divergence among provinces as they react to competitive pressures at differing rates and in different ways. US states themselves have widely divergent social policy configurations, and these inter-state differences seem to be growing in response to the significant decentralization of American federalism over the 1990s.

Once again, this third possible objection points to the importance of examining the extent of inter-provincial variation. Sorting out whether distinctive provincial policy trajectories that do not lead to convergence with contiguous U.S. states are really driven by external economic competition on one hand, or by regional differences in domestic politics and cultures across Canada on the other hand, would be a difficult analytical task. Nevertheless, establishing whether provinces are utilising their greater discretion in different ways is a useful first step. If there are not, the general objection is open to question.

This paper seeks to respond to these possible objections to previous studies. First, it looks for a lag effect by updating previous analyses of the extent of convergence in federal and nation-wide social programs in recent years. Second, it examines the provincial/state levels of social policy more thoroughly, examining the extent of variation within as well as between the two countries. Third, it looks for growing similarity between the policy regimes of adjacent cross-border regions.

Methodology

In examining these issues, the paper focuses on income maintenance policy. This sector was chosen for two reasons. First, income maintenance programs ought to be particularly sensitive indicators of Canada-US social policy convergence, since they are tightly intertwined with labour market flexibility and encompass several of the areas identified by Courchene as being key to divergent responses to economic integration (Courchene with Telmer, 1998; 291).

Second, income maintenance is marked by interesting jurisdictional gradations. Some programs, such as Old Age Security, the Guaranteed Income Supplement, unemployment insurance and child benefits are exclusively federal in nature. Other programs are predominantly provincial in jurisdiction, such as social assistance and workers compensation. Moreover, there are different levels of entanglement between programs and governments within the sector. For example, with the exception of the provincial role in amending the Canada Pension Plan and the need for parallelism between the Canada and Quebec Pension plans, retirement income programs are less entangled with provincial programs and the domain can be considered as "federal dominant." Child benefits and social assistance, in contrast, are deeply entangled, and in recent years the two levels of government have developed a joint strategy for their reform. They can be seen as a "mixed" domain. Finally, although there are important interactions between Workers Compensation and the disability benefits provided by the Canada and Quebec Pension Plans, Workers Compensation can be seen as a "provincial dominant" domain. Selecting income maintenance programs thus allows one to explore whether one sees a growing incidence of

regional diversity and cross-border convergence as one moves from primarily federal programs, through areas of mixed jurisdiction, to primarily provincial programs.

The following sections undertake a broad quantitative overview of program indicators.[2] A complete study would also require more nuanced, qualitative assessments of such issues as changes in the detailed regulations governing access to programs, and so on. But such analysis goes beyond the scope of this paper. Finally, to make the analysis manageable, the paper focuses the analysis of cross-border convergence at the regional level to two cases: Ontario and the Great Lakes states; and British Columbia and Washington state.

The analysis proceeds through four sections, each focusing on separate program areas: retirement incomes policy, unemployment insurance, social assistance and family benefits, and workers compensation. A final section summarizes the patterns and reflects on their implications.

I. RETIREMENT INCOME POLICY

The most politically sensitive of all programs, pensions, has become the subject of intense policy debates and political struggles across OECD countries (OECD 1998). The demography of aging populations, the long-term slowing of real wage growth, changing family structures, and shifting political doctrines have generated intense pressures in many countries. Governments almost everywhere have adjusted, refined or reformed pension programs inherited from earlier times. Despite pervasive tinkering, however, governments have tended to respond to common pressures in different ways, and pension programs continue to reflect considerable diversity, in defiance of occasional suggestions for movement towards 'one best practice' (World Bank 1994; James 1997). This continued diversity is rooted in two powerful forces. First, pension programs represent a classic case of path dependency, in which choices made in the past constrain the options available in the future.[3] Second, the continuing vibrancy of domestic political traditions across western nations limits the scope for convergence, especially since political leaders often prefer the political cover of a relatively broad coalition supporting pension reforms, especially those including benefit restrictions (Myles and Pierson 2001; Myles and Quadagno 1997).

This pattern is reflected in the case of Canada and the United States. Both countries have reformed their pension systems during the last twenty years in response to similar demographic, social and economic pressures. Yet the pattern of change reflects greater divergence than convergence, as changes have tended to enhance traditional differences between the two systems.

The structure of Canadian and US programs differs in important respects. Both systems can be characterized as having three tiers: a contributory tier with earnings-related benefits; a non-contributory tier of benefits financed from general revenues; and a tax-related tier that supports occupational pensions and private savings. However, the balance across the tiers – especially the first and second tiers – differs significantly on the two sides of the border, with powerful consequences for retired citizens. In the United States, the dominant tier is the contributory plan officially titled Old Age and Survivors Insurance (OASI) but commonly known as Social

Security. The second tier consists of a means-tested benefit know as Supplementary Security Income (SSI), which is subject to quite stringent income and asset tests and plays a comparatively limited role. In Canada, the contributory tier, the Canada and Quebec Pension Plans, plays a smaller role, and more of the load is assumed by the second tier programs: the Old Age Security program, which until 1989 was a universal, flat-rate benefit; and the Guaranteed Income Supplement (GIS), an income tested benefit that supports low and medium income elderly Canadians. The relative role of these tiers in the two countries can be seen in Table 1.

TABLE 1 Public Spending on Tiers of the Pension System, Canada and the United States, 1999.

[percent of total spending/revenues foregone]

	Canada	United States
Contributory Earnings-Related Programs	33.7	68.6
Non-Contributory Benefits		
a) means- or income-tested	8.8	1.3
b) universal or quasi-universal	29.9	--
Tax Treatment of:		
a) occupational pensions	11.5	20.1
b) voluntary retirement savings	12.9	5.2
c) miscellaneous credits and deductions	3.2	4.8

Source: Data kindly supplied by Kent Weaver.

Despite the differences in program structure, the role of the state in providing retirement income was traditionally quite similar for the average citizen in Canada and the United States. Public programs provided comparable portions of the income of those aged sixty-five and over on both sides of the border. The biggest difference has been the more redistributive character of the benefit structure in Canada, and especially the power of targeted programs (Banting 1997). Close to 40 percent of the elderly Canadians, including many who had average earnings before

retirement and who held significant assets during retirement, have received a GIS payment. In the United States, the Supplementary Income Supplement (SSI) has always had stringent income limits and required individuals to exhaust most of their assets before they can qualify. As a result, it reaches only about 4 percent of the elderly population

During the last 20 years, both countries repeatedly debated changes in their retirement income policies. The major changes that were actually adopted are summarized in Table 2.

Table 2 Summary of Major Changes in Pension Programs, Canada and the United States, 1977-97

Program Component	Canada	United States
Benefits	1982: "Six and Five" program (little impact on pensions) 1997: Year's Basic Exemption Increase from 3 to 5 years of pre-retirement earnings as base for benefit calculation	1977: reduction in initial benefit of most future retirees 1981: modest cuts and elimination of minimum benefit 1983: gradual increase in standard retirement age from 65 to 67 (to be phased in between 2000 and 2021 six-month delay in indexing of benefits greater benefit reduction for early retirement 1996: denial of SSI benefit to most non-citizens,

		including current recipients. 1997: limited reinstatement of SSI benefits to non-citizens (to those who were already recipients in 1996)
Taxation of Benefits	1989: Clawback of OAS benefits from affluent recipients	1983: OASI benefits of high-income recipients made taxable
Contribution rates	1997: C/QPP rates to rise from 5.85% to 9.90% over six years Year's Basic Exemption frozen	1977: modest increase
Fund Investment	1997: Investment of portion of CPP funds in equities	

Given the deferred nature of some of these changes, their cumulative impact will not show up in data on the incomes of the elderly for some time. Nevertheless, the direction of change in the two countries is clear. The most striking contrast has been in the balance between benefit reductions and increased revenues. In the United States, virtually all of the adjustment has taken the form of restrictions in benefits, with the biggest change being the gradual increase in the age of eligibility for OASI from 65 to 67, beginning in 2000 and ending in 2021. There have been no significant, general increases in the contribution rate since this pattern of incremental change began in 1977.

On the Canadian side, the balance has been different. There have been some modest restrictions in benefits, but the biggest change has been the phasing in significant increases in C/QPP contribution rates. Admittedly, the Canadian contribution rates started from a much lower position, reflecting the larger role of non-contributory plans here, and there is a convergence

underway in the two systems. [See Figure 1.] But on the benefit side, the differential retirement ages and other features are opening up a growing gap in strength of public pension benefits for average citizens in the two countries.

In addition, the traditional difference in the allocation of benefits across income classes persists An actuarial study of the two systems in 1999 (Brown and Ip 2000) came to broadly the same conclusion as earlier studies.[4] The Canadian package provides greater minimum protection for the elderly, especially for those with low incomes. This finding is consistent whether the comparison is based on the amount of minimum total benefits or on pay-replacement ratios. In the United States, in contrast, the emphasis is on actuarial equity, with a closer relationship between contributions and benefits at all levels of income.

Another difference has grown in recent years. In 1997, Canada decided to invest some CPP revenues in equities through an arms' length investment board, extending a practice first introduced by the Quebec Pension Plan. From the introduction of the QPP in 1965, the *Caisse de dépôt et du placement du Québec* has invested a portion of its funds in both direct and portfolio investment in Quebec corporations, establishing a model that the rest of the country has now adopted. In the United States, such a strategy is much more intensely controversial, especially on the Republican right (Myles and Pierson 2001; Weaver forthcoming).

Because the retirement income policies to not embody explicit regional variations (with the exception of modest differences in the benefit structures of the Canada and Quebec pension plans), regional differences in benefits reflect regional differences in incomes rather than policy choices, and there is little to be gained by extending the analysis to inter-provincial variations and cross-border convergence at the regional level.

Thus the pattern of the last twenty years has not been dominated by convergence. With the exception of C/QPP contribution rates, the pattern is one of divergence in benefits, investment practices and redistribution towards the low-income elderly. Nor are the changes already in place likely to alter these patterns over time. Although the freezing of the level of earnings exempt from the C/QPP contributions at the 1997 level will erode one source of implicit redistribution in the package as a whole, the primary source of the redistributive difference lies in the contrasting roles of the OAS-GIS and SSI, and nothing indicates those historic differences will narrow. Moreover, a little noticed default procedure written into the 1997 Canadian legislation suggests that increases in contribution rates are likely to continue playing a more important role north of the border than to the south.[5]

II. *UNEMPLOYMENT INSURANCE*

In contrast to the case of pensions, there has been substantial convergence in unemployment insurance over the course of the 1990s. Moreover, this care presents our first evidence of a paradox in the patterns in the income maintenance system. Although unemployment insurance is a federal program, it represents the strongest case of interprovincial variation and cross-border

convergence at the regional level.

a) National Convergence/Divergence

While there are broad enduring differences in unemployment insurance in Canada and the US (such as the existence of maternity benefits in Canada which are not available in the US), there has been strong convergence between the two countries over the 1990s. The major change has been in the ratio of beneficiaries to the total number of unemployed persons (the b/u ratio).[6] Traditionally, the Canadian program provided benefits to a much higher proportion of the unemployed than did the US program. However, a moderate increase in US b/u ratios combined with a striking drop in Canadian b/u ratios has resulted in sharp convergence between the both countries. [See Figure 2] Changes in the ratio of total beneficiaries to unemployed persons are driven in part by economic conditions and changes in the labour market structure, but a significant element was clearly driven by federal policy changes as well.[7] (For an overview of changes, see HRDC, 1998; McIntosh and Boychuk, 2000; Boychuk, 2001.)

b) Interprovincial Variation

Not surprisingly, considering the operation of the federal EI program in Canada, there is very little dispersion among provinces in unemployment insurance benefits as a proportion of provincial average weekly wages. However, dispersion among provinces in terms of b/u ratios is significant and increasing. Interestingly, it is now higher than dispersion among US states programs. [See Figure 3]

c) Cross-Border Convergence/Divergence at the Sub-National Variation

To explore the extent of cross-border convergence at the sub-national level, the analysis relies on an unemployment insurance "generosity" index, which is calculated by multiplying the b/u ratio multiplied by the replacement rate (the average weekly benefits as a proportion of the provincial/state average weekly wage).

Comparing Canadian regions with the average pattern in the U.S. reveals tremendous differences in the extent to which Canadian regions have moved towards the US pattern. For example, the index for Ontario and the western provinces now closely approximates the US average, whereas convergence in the Atlantic provinces has been much more moderate and considerable distance between them still exists. [See Figure 4] In 1990, no province had a generosity index lower than those in any American states, and this is still the case for Atlantic Canada. However, the number of states with higher generosity indices has increased for all other provinces, especially for Ontario, Alberta and British Columbia. For example, while no states had higher generosity indices than Ontario in 1990, twenty-two states did so by 1999. [See Figure 5]

Cross-border regional convergence is also clear. Ontario's generosity index was significantly above those of the Great Lake states in the mid-1980s, and drew even further away in the late 1980s. [See Figure 6] By 1998, however, Ontario's index had plummeted to slightly below the

average for Great Lakes states. A similar pattern is evident in the indices for British Columbia and Washington, with B.C.'s index being significantly lower for the late 1990s. [See Figure 7.]

The pattern is clear but paradoxical. Unemployment Insurance combines all three of the patterns identified in the introduction: growing convergence with the U.S. pattern, increased inter-provincial variation and growing cross-border convergence at the regional level. The pattern of policy development in unemployment insurance, a purely federal program, looks very much like what one might expect *if* unemployment insurance were a provincial program and *if* provinces like Ontario and British Columbia were responding to competitive pressures generated in their respective cross-border regions.

III. SOCIAL ASSISTANCE AND FAMILY BENEFITS

Social assistance and family benefits constitutes an area marked by complex patterns of distinctiveness and convergence. Once again, however, the patterns are paradoxical. Cross-national convergence is strongest in family benefits, which is dominated by the federal government in Canada. There is no strong evidence of cross-national convergence in program areas where provinces dominate, such as social assistance, and limited evidence of cross-border convergence at the regional level.

a) National Convergence/Divergence

To explore the patterns in this sector requires a separate examination of social assistance and family benefits, and then a look at the combined impact.

Social Assistance: Comparing social assistance programs is difficult in the absence of qualitative examination of social assistance provision in the individual provinces. Expenditure and recipiency data do not adequately control for variations in economic conditions, especially unemployment rates. However, focusing on benefit levels only risks overlooking important differences in access. This section relies on all three indicators, but these limitations should be borne in mind.

There is little quantitative evidence of convergence in social assistance programs in Canada and the US. In terms of total expenditures, the broader trend since the early 1980s has been one of divergence. Expenditure differences did narrow at the end of the 1990s, but national-level differences were no less marked at the end of the decade than they were at the outset. [See Figure 8] Comparing the number of beneficiaries in Canada and the United States is complicated by the variety of means-tested programs in the United States. In terms of recipiency rates, Canadian rates have historically fallen between those of Food Stamps (a program with broad coverage but low benefits) and those of AFDC/SSI (programs with higher benefits but narrower coverage.) However, as caseloads have fallen somewhat more significantly in the US than in Canada over the 1995-1998 period, Canadian rates have come to approximate recipiency rates for the Food Stamp program.[8] [See Figure 9.] Moreover, differences in recipiency rates may well grow further

as federally stipulated time limits begin to take effect in the U.S., depending on the ways in which states use the discretion granted them under the new system. Finally, social assistance benefit rate comparisons (while overstating the differences between the two countries – see Appendix B) demonstrate continuing distinctiveness between the two countries. [See Figure 11]

Family Benefits: In contrast, there has been significant convergence in family benefits, which is actually dominated by the federal government in both countries. Over the last 30 years, Canada moved away from a universal family allowance program, and established income-tested refundable tax credits under the Child Tax Credit and, later, the Canada Child Tax Benefit and National Child Benefit Supplement. [For an overview of these changes, see McIntosh and Boychuk, 2000; Boychuk, 2001, and forthcoming (a) and (b)] The United States has moved in a similar direction with its Earned Income Credit (EIC). There are important differences between the EIC and CCTB: the EIC only provides benefits to families with earned income unlike the CCTB; and income-tested family benefits in Canada provide support much further up the income scale than does the U.S. program. [See Figure 10.] Nevertheless, in comparison with postwar period, when Canada had a universal family allowance and the U.S. had no such benefit, the two countries have clearly moved closer together.

The late 1980s and early 1990s saw a major convergence in benefit levels as well, as a result of massive program expansion of the EIC program. From 1985 to 1995, recipiency rates more than doubled and average credit amounts tripled so that, by 2000, the total value of benefits under the program were over 8 times their 1985 value in real dollars (United States, *Greenbook 2000*, Table 14-14). The result was a notable convergence in per capita expenditures and the average credit per family. [See Table 3] However, this convergence almost certainly began to fade again after the 1998 inception of the Canada Child Tax Benefit and the National Child Benefit Supplement in Canada as the federal government began to devote more resources to the program (Boychuk, 2001).

Table 3: United States Earned Income Credit (EIC) and Canada Child Tax Benefit (CCTB), 1993, 1998

		Beneficiary Families (per 1,000 pop.)	Total Benefits (per capita constant US$ 1998)	Average Credit per family (constant US$ 1998)
US	1993	58.6	$67.9	$1066
	1998	67.6	$100.5	$1480
Canada	1993	107.3	$158.8	$1865
	1998	105.5	$161.4	$1789

Sources: Canada, Human Resources Development Canada, Social Security Statistics (on-line) Table 106, 107 [http://www.hrdc-drhc.gc.ca/stratpol/socpol/statistics/74-75/table.shtml]; United States, *Green Book 2000*, Table 14-14.

The Integrated Impact: The paradoxical pattern of convergence in federal family benefits and divergence in provincial social assistance shapes the combined impact of these programs in Canada and the United States. The levels of combined federal and state/provincial social assistance benefits for families with no earned income have not converged significantly between the mid-1980s and the present. [See Figure 11] This is because the Canadian package for such families combines social assistance and family benefits, whereas such families receive no benefit from the EIC in the United States.

In contrast, there has been a marked convergence in income maintenance benefits in Canada and the US for low-income families with some earned income. [See Figure 12] The domestic roots of convergence are found in two trends. Most important has been the massive growth in the EIC program. However, a secondary factor has been declining real social assistance rates in Canada, since partial benefits can be received by some families with income roughly equivalent to minimum wage in some provinces.

b) Interprovincial Variation

Quantitative indicators of social assistance provision in the Canadian provinces show little evidence of consistent pattern of convergence or divergence. Variation among provinces decreased sharply in the late 1980s as the two highest spending provinces (British Columbia and Quebec) came to much more closely approximate the provincial average. [See Figure 13] Divergence in both expenditures and numbers of beneficiaries emerged after 1990, driven in part by above average expenditures in Ontario, British Columbia and Quebec. However, the most important factor increasing provincial variation after 1990 has been the strong deviation of Alberta from national norms in social assistance. [See Figures 13 and 14] It is unclear to what extent this divergence is the result of deliberate policy shifts (especially in 1993) or unemployment rates that have tended to be significantly below the national average. [For expenditure and beneficiary data for Alberta, see Appendix B.]

Variation in the combined benefits package for families with no earned income has remained low and stable from 1986 to the present. [See Figure 15.] The picture is more complex for families with earned income. The level of variation in provincial benefits for single parent families with income at the equivalent of the Canadian average minimum wage has fluctuated considerably partly as a result of changes in basic benefit levels and earning exemptions policies in individual provinces. While variation in provincial benefits has increased considerably since 1995, by the end of the decade it had returned to the level prevailing in 1990. Variation in provincial benefits for single parent families at full-time average wage is dampened considerably by the increasingly significant role of federal income-tested benefits, which comprise a significant proportion of total benefits at this income level.

c) Cross-Border Convergence/Divergence at the Sub-National Level

The broad trend in the case of both Ontario and British Columbia has been divergence from their respective cross-border counterparts, although sharp re-orientations in both provinces in the

second half of the 1990s may signal a new trend toward convergence with their American counterparts. Ontario approximated other Great Lakes jurisdictions in total expenditures per capita and social assistance beneficiaries in the late-1980s and early 1990s. [See Figures 16, 17 and 18] Over the course of the first half of the decade, the province began to pull away sharply from those of the neighboring Great Lakes states, although the second half of the decade saw movement back towards the Great Lakes states. Overall, however, these indicators of social assistance provision look less like those of the neighboring Great Lakes states at the end of the 1990s than they did at the start. A roughly similar pattern emerges in considering British Columbia and Washington – sharp divergence in the first half of the 1990s, and convergence in the second half. But once again, these indicators of social assistance are no more similar at the end of the decade than at the outset.

IV. WORKERS' COMPENSATION

There is no evidence of convergence in workers' compensation in Canada and the US; rather, the overall picture is one of moderate but continuing distinctiveness. However, within this pattern, there is some limited evidence of moderately increasing variation among provinces. However, the patterns are not what one might expect to see given expectations of provincial-level adjustment to American social policies. In the case of Ontario, the picture is one of striking divergence with maximum benefits in Ontario becoming increasingly dissimilar relative to most Great Lakes states – states which Ontario closely mirrored in the mid-1980s and early 1990s. Conversely, in the case of British Columbia and Washington, striking convergence occurs; however, it occurs from the American side with Washington coming to much more closely approximate the relatively unchanged program in British Columbia.

a) National Distinctiveness

There are broad differences in the parameters of workers compensation programs across the American states and Canadian provinces (Sullivan 1997).[9] The percentage of a claimant's wage used to calculate benefit entitlements is, again with few exceptions, uniformly higher in Canada than in the United States and this difference has not been diminishing over time.[10] Similarly, differences in waiting periods, which are uniformly longer in the US, have not diminished over time. Finally, some states have maximum benefit periods and/or maximum limits on total benefits neither of which exist in the Canadian provinces. Differences in these program parameters have remained largely unchanged over the course of the past twenty years and the overall pattern is one of continuing distinctiveness.

This image of distinctiveness fades somewhat in considering maximum benefits and non-medical expenditures on workers' compensation in the two countries. Average weekly maximum benefits across states and provinces have remained very close in both countries in real dollar terms with differences hovering between 3% and 6% over the 1987-1999 period. Benefits as a percentage of median family income are higher in Canada and the differences have remained remarkably stable over time. [See Figure 22.] While there are marked differences in the medical

costs associated with workers' compensation in the two countries, the costs of compensation for work-related disabilities and fatalities have also been very similar in the two countries in real dollar terms.[11] [See Figure 23.]

b) Interprovincial Variation

There is some variation among provinces both in terms of percentage of wage used to calculate benefits as well as in waiting periods for compensation. However, these differences are muted and, while there have been some minor shifts over time in individual provinces, this variation has not been increasing. [See Table C1, Appendix C.] The evidence on program operation is mixed. Levels of variation among provinces in total compensation costs per capita (which are obviously strongly driven by labour force composition) have decreased somewhat over the 1990s. [See Figure 24.] Variation in maximum benefits as a proportion of median household income has remained stable over time. However, variation in maximum benefits (the most clearly policy-driven of the three indicators) has been increasing moderately over the 1990s. Thus, there is, at best, limited evidence of moderately increasing variation.

c) Cross-Border Convergence/Divergence at the Sub-National Level

The patterns that emerge in examining Ontario and British Columbia relative to their cross-border neighbors are not what one might expect. A notable shift in maximum benefits occurred in Ontario and this change is clear in comparisons of Ontario with Great Lakes states. [See Figure 25.] While maximum benefits appeared roughly average among Great Lakes states at the beginning of the 1990s, Ontario's maximum benefits were the highest of all jurisdictions by the end of the decade despite the fact that maximum benefits as a percent of median household income remained stable in all of the Great Lake states.

A comparison with Michigan highlights growing difference between Ontario and its closest neighboring state within a context of relatively unchanging program structure. Neither Michigan nor Ontario have time limits or global benefit limits although Michigan's waiting period (7 days) is considerably longer than Ontario's one day waiting period. Both have relatively similar benefit determination schedules (80% of "spendable" income in Michigan, 85% of net average earnings in Ontario.) As of 1987, maximum benefits as a percent of median household income were lower in Ontario than in Michigan; however, by the early 1990s, this position reversed and, by 1999, maximum benefits were over 25% higher in Ontario. It is not surprising that, in 1998, total compensation costs per capita were over 36% higher in Ontario than in Michigan.

The workers' compensation systems in British Columbia and Washington, in terms of percent replacement of wages (ranging from 60%-75% gross in Washington, 75% gross in BC) and maximum weekly benefits in dollar terms are virtually identical. In neither jurisdiction are benefits time limited or limited by amount. Per capita costs are higher in Washington ($196 in Washington in 1998, $151 in BC). Together, these two jurisdictions have the highest overall compensation costs per capita in the two countries. However, the similarities that exist between the two jurisdictions is obviously not the result of harmonization of BC's workers' compensation

system to American norms. Rather, while workers' compensation program parameters and maximum benefit levels have remained relatively unchanged in British Columbia since the mid-1980s, significant changes have taken place in Washington state. In the 1987-1999 period, maximum weekly benefits in Washington increased by just under 80% in real terms. [See Figure 25.] Thus, workers' compensation in Washington and British Columbia provides an interesting example of American harmonization upwards to Canadian levels of social provision.

SUMMARY AND CONCLUSIONS

This paper has sought to extend existing research on the extent of convergence in the social programs of Canada and the United States. Previous studies have concluded that the large number of adjustments in social programs in the two countries over the last two decades have not produced a pervasive pattern of convergence. Although specific programs have become more similar – especially unemployment insurance and family benefits – the overall pattern is one of two societies adjusting to common pressures in different ways, and thereby preserving or even enhancing small differences that matter. This paper considers three possible objections to those studies:

- There may be a lag in the impact of economic integration, and a pervasive pattern of convergence may still predominate over time.
- By focusing on federal programs and national aggregates of provincial programs, the research may miss growing interprovincial diversity and cross-border convergence at the regional level.
- By focusing on convergence rather than non-convergent adjustment, the existing research may miss the most important consequences of economic integration.

The findings in the paper extend our understanding of the first and second of these issues, and has some indirect relevance to the third.

The paper finds little evidence of a lagged effect. Recent policy changes have not reflected an increasingly pervasive pattern of convergence. The major cases of convergence identified in earlier research, unemployment insurance and family benefits, remain the classic cases. Recent changes in some major areas, such as retirement income programs, have been as likely to generate divergence than convergence, and differences between other Canadian and U.S. programs such as social assistance and workers' compensation were as great at the end of the 1990s as at the beginning. As anticipated in the introduction, this does not disprove the lagged effect hypothesis, since a more pervasive pattern of convergence may be just around the corner. At a minimum, however, the corner does seem to be getting further away.

The most interesting findings relate to interprovincial variation and cross-border convergence at the regional level. Focusing on variation within Canada and the United States as well as between them does blur the image of two different welfare states co-existing uneasily on the North American continent. The growing overlap in unemployment insurance is striking. In once sense, these findings simply reinforce the traditional view that, outside health care, Canadian and U.S.

approaches to income maintenance represent variations on common model, as Esping-Andersen and others have observed. The differences in the overall structures still matter. But they are getting smaller in important areas.

However, the intriguing aspect of the sub-national patterns lies elsewhere. Most commentary has emphasized the scope for growing interprovincial diversity and cross-border convergence in programs managed by provincial governments, especially in the wake of greater decentralization in both Canada and the United States. Paradoxically, the strongest patterns of convergence are to be found in programs controlled by the federal government in Canada, unemployment insurance and family benefits. The pattern of policy development in unemployment insurance, a purely federal program, approximates what one would expect *if* unemployment insurance were a provincial program and *if* provinces like Ontario and British Columbia were responding to competitive pressures in their respective cross-border regions. In contrast, provincial programs such as social assistance and workers' compensation show less consistent evidence of greater interprovincial variation and cross-border convergence at the regional level. The most powerful convergence in these areas, support for low-wage families, is driven primarily by federal components of the system in both countries, child benefits in Canada and the EIC in the United States.

These paradoxes, if they persist, may prove important for our understandings of the processes of adaptation to economic change in federal systems. In addition, the lack of growth in diversity in provincial programs may have implications for the objection that the focus on convergence misses the significance of non-congruent adaptation to economic integration at the regional level. But pursuing those implications fully is a subject for other papers and other times.

Figure 1

CANADA PENSION PLAN AND OASDI, EMPLOYEE PAYROLL TAX RATES, 1965-2009

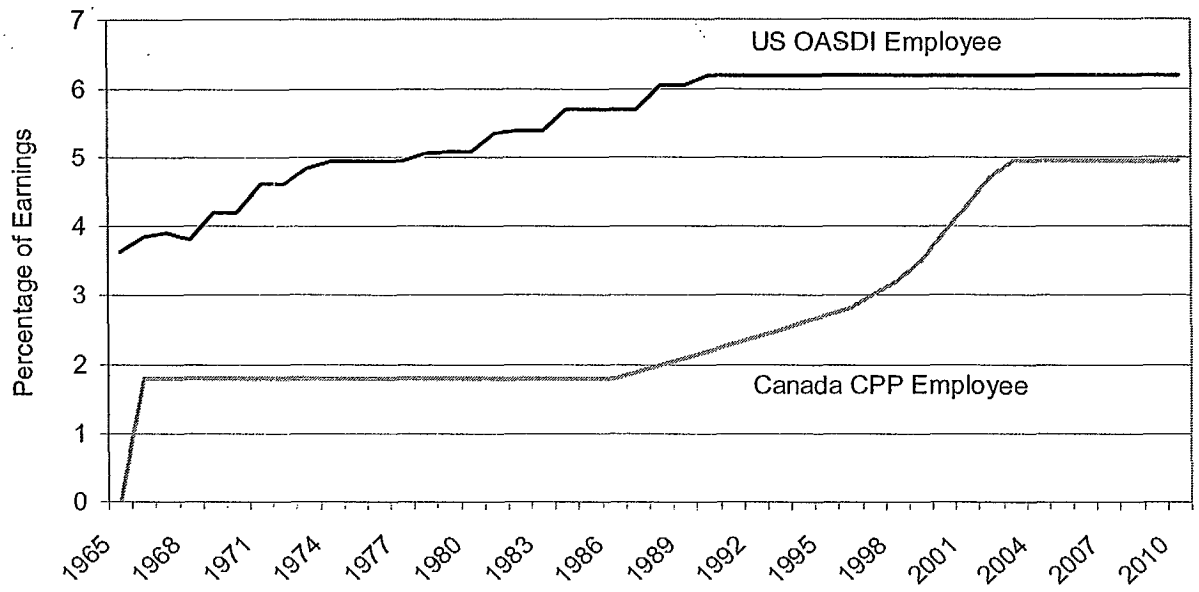
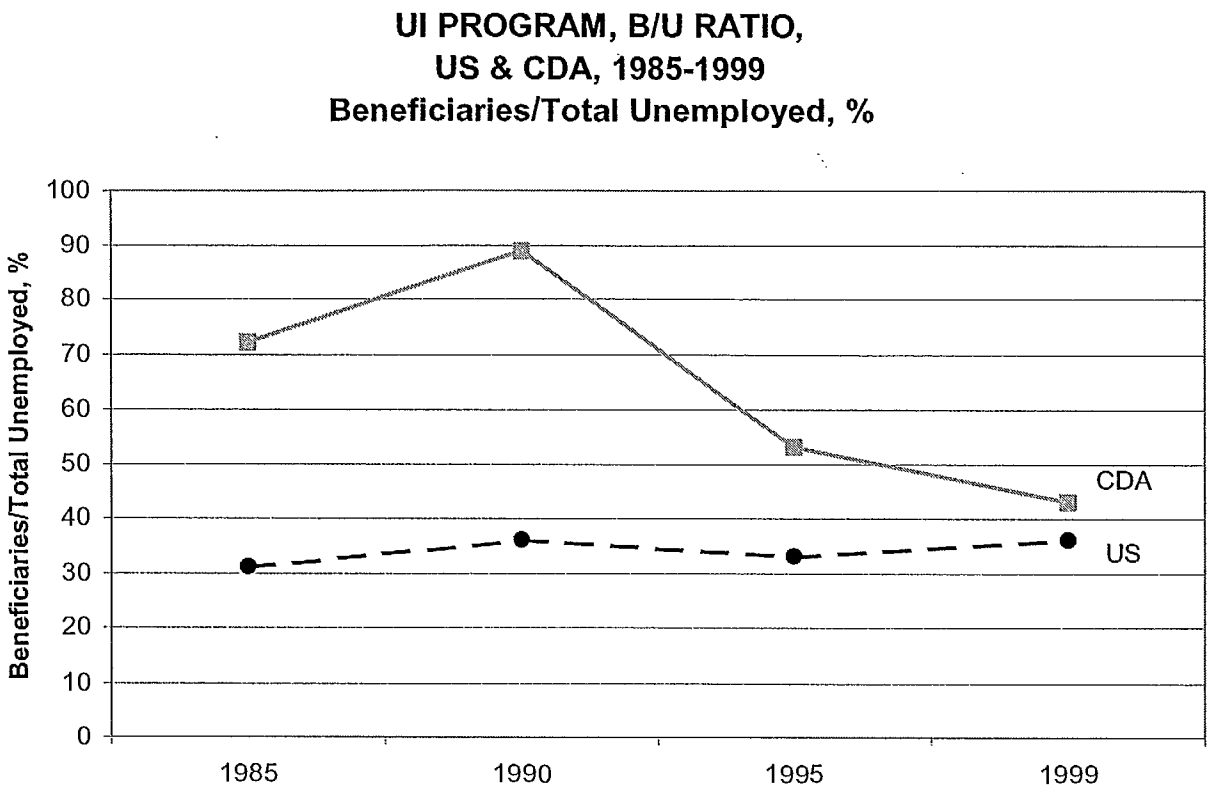


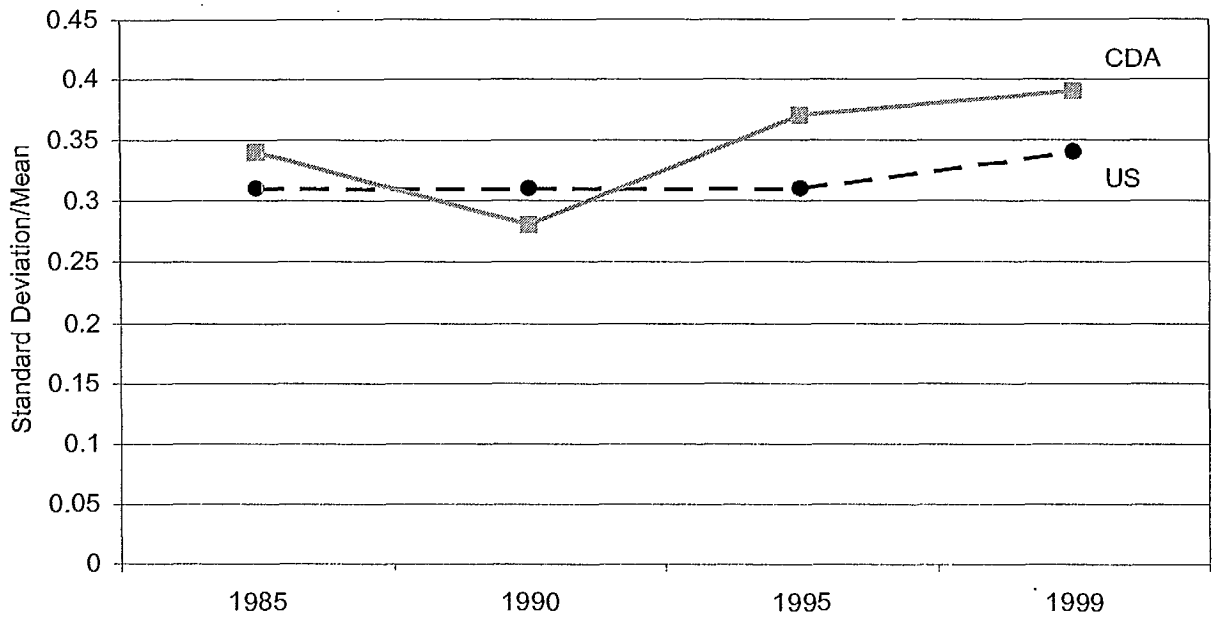
Figure 2



Source: See Appendix A.

Figure 3

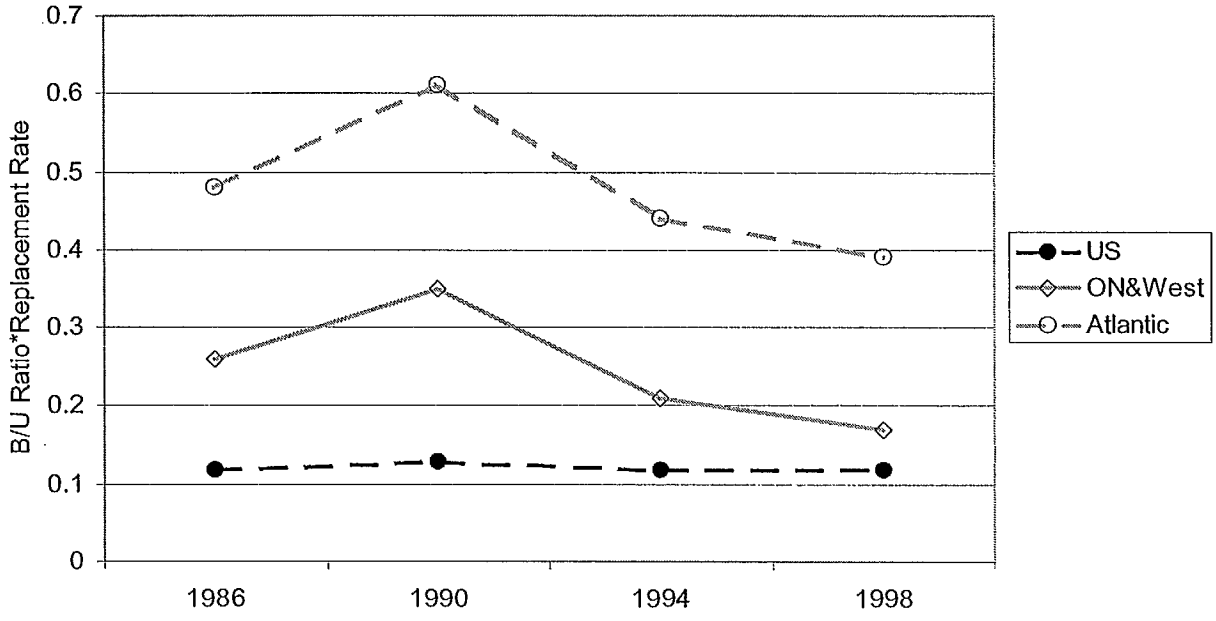
DISPERSION, UI PROGRAMS,
States & Provinces, 1985-1999
Beneficiaries/Total Unemployed



Source: See Appendix A.

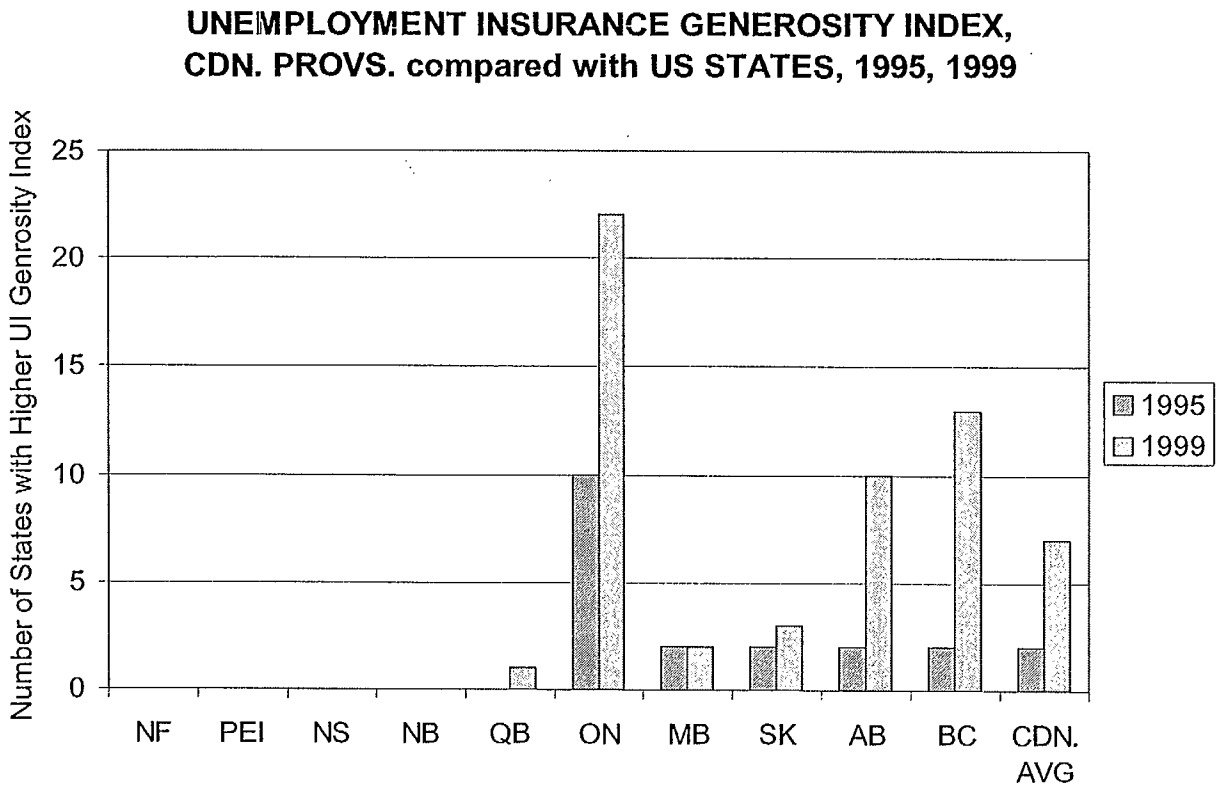
Figure 4

UNEMPLOYMENT INSURANCE, GENEROSITY INDEX, 1986-1998 Cdn. Regions & US Avg.



Note: For sources and methodology, see Appendix A.

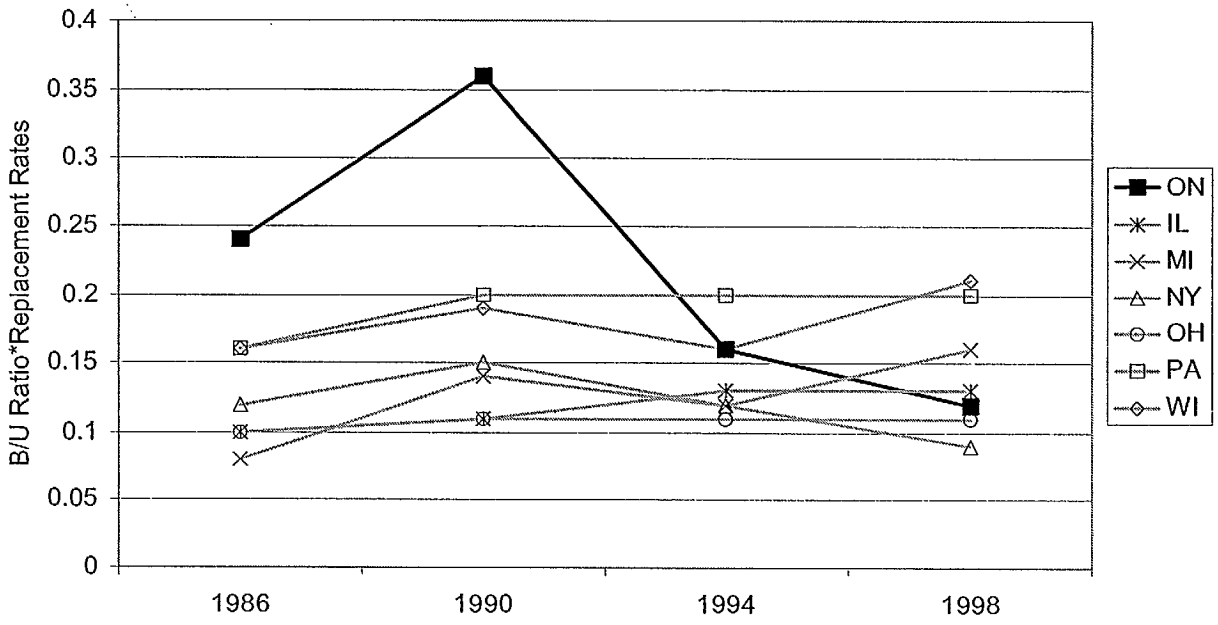
Figure 5



Notes: For sources and methodology, see Appendix A.

Figure 6

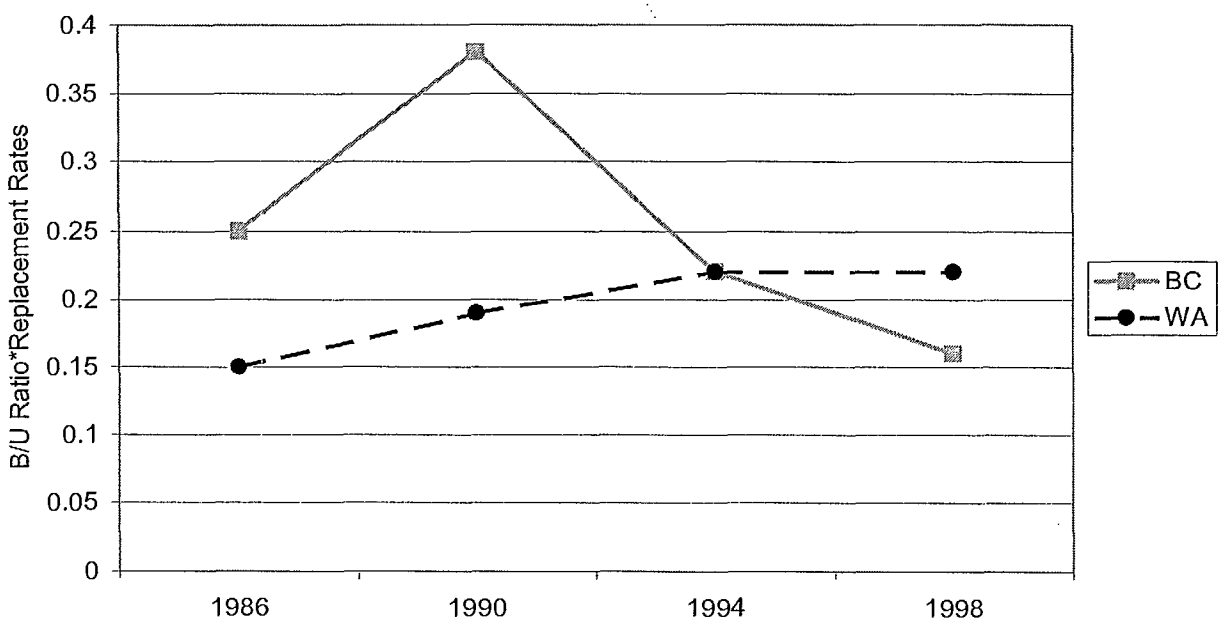
UNEMPLOYMENT INSURANCE, GENEROSITY INDEX, 1986-1998
Ontario and Great Lakes States



Notes: For sources and methodology, see Appendix A.

Figure 7

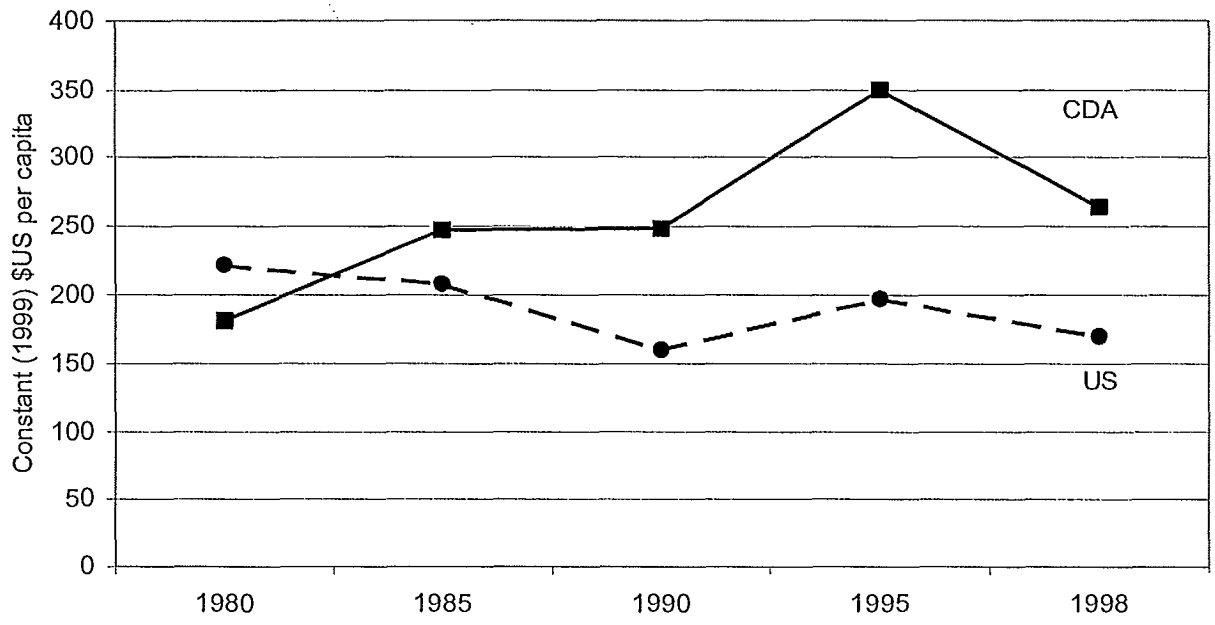
UNEMPLOYMENT INSURANCE, GENEROSITY INDEX, 1986-1998
British Columbia and Washington



Notes: For sources and methodology, see Appendix A.

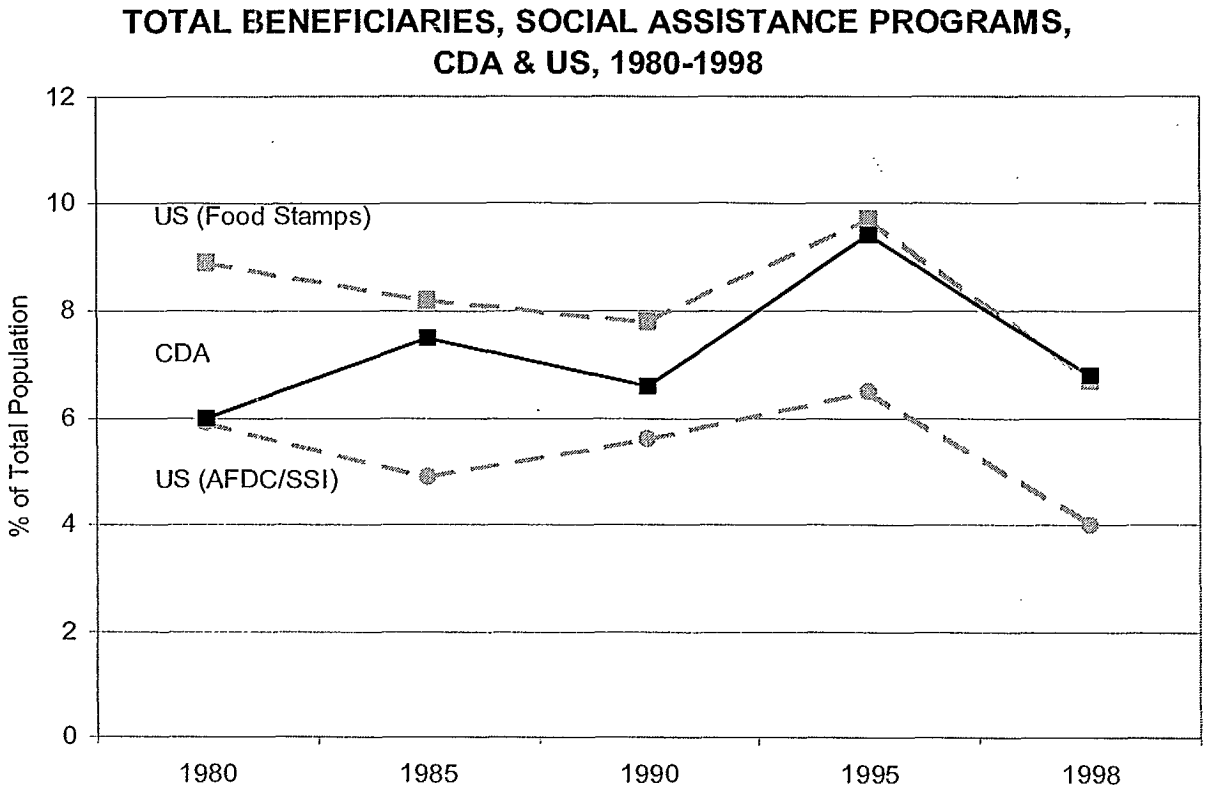
Figure 8

**TOTAL PER CAPITA EXPENDITURES,
SOCIAL ASSISTANCE BENEFITS,
CDA & US (Entitlement Programs Only), 1980-1998**



Notes: For sources and methodology, see Appendix B.

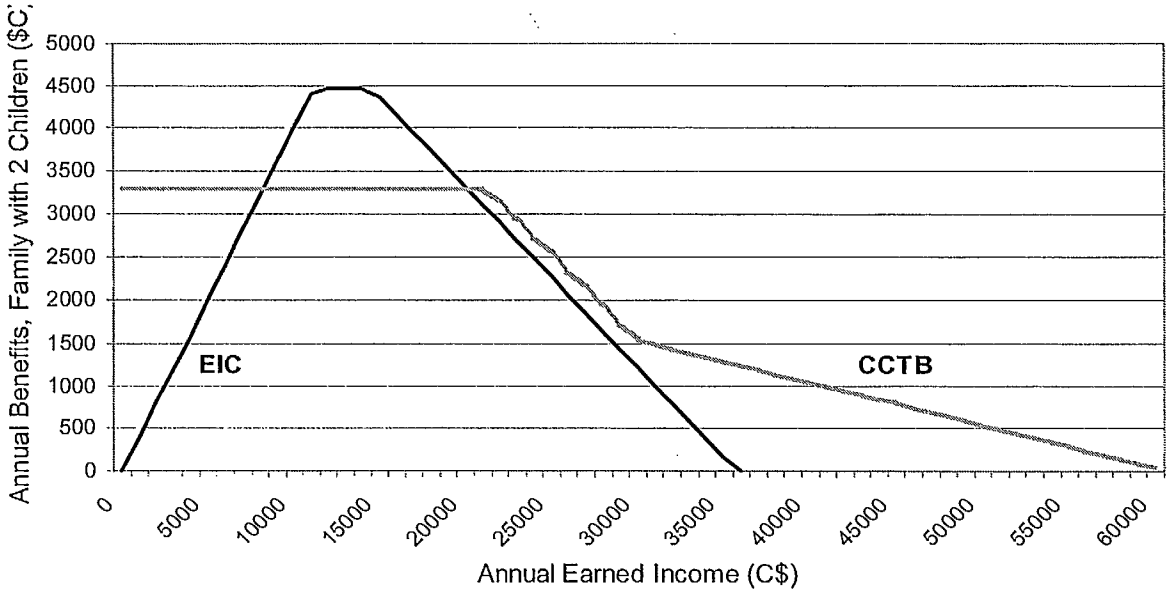
Figure 9



Notes: For sources and methodology, see Appendix B.

Figure 10

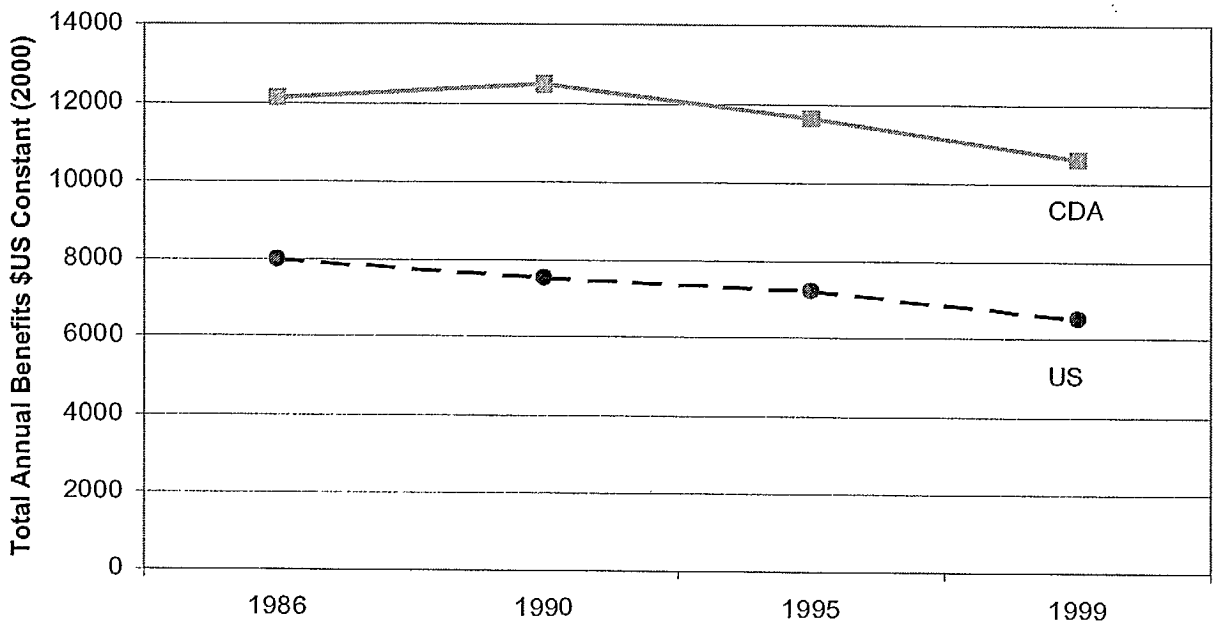
EIC/CCTB, EARNINGS AND BENEFITS, 2000
Family with Two Children



Sources: See Appendix B.

Figure 11

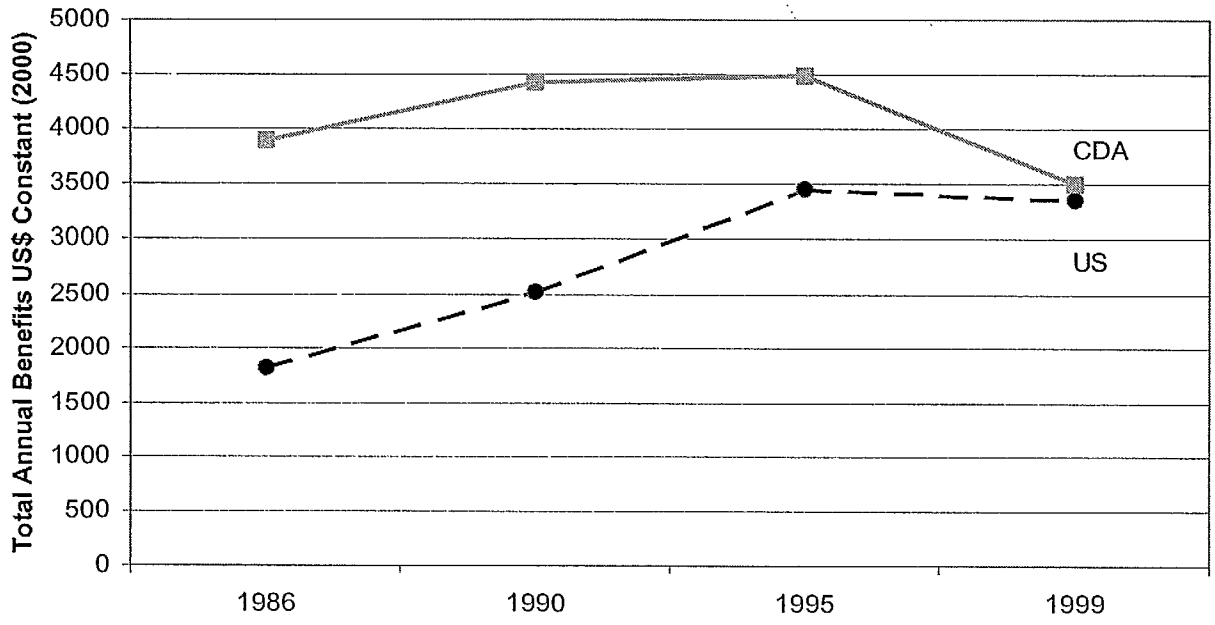
SOCIAL ASSISTANCE and FAMILY BENEFITS
CANADA & US (Entitlement Programs Only), 1986-1999
Single Parent, 1 Child, No Earned Income



Notes: For sources and methodology, see Appendix B.

Figure 12

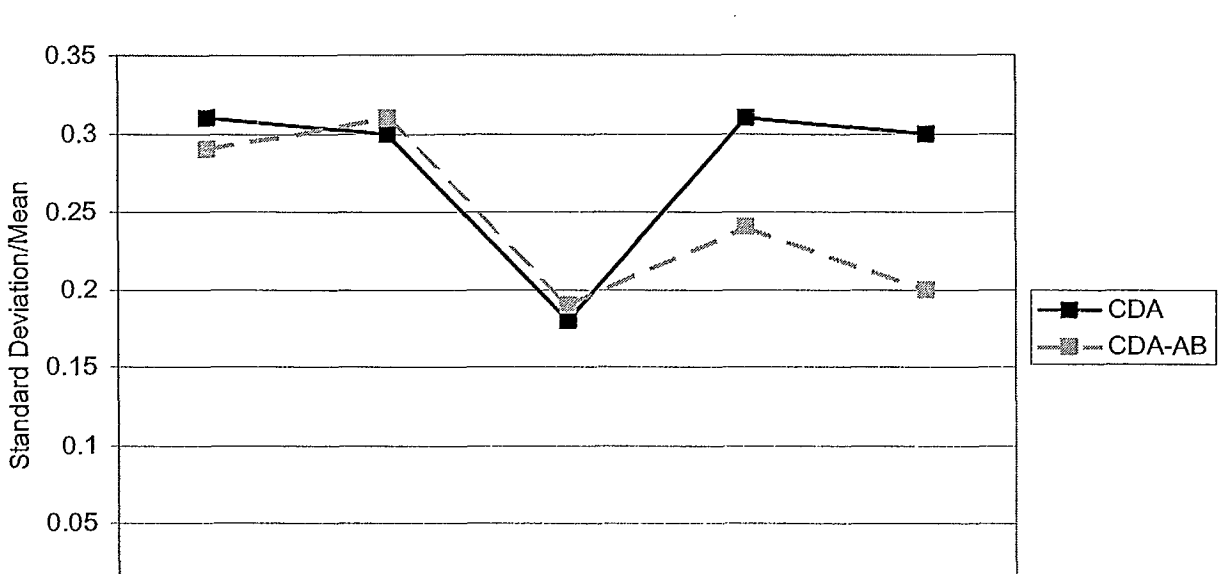
SOCIAL ASSISTANCE and FAMILY BENEFITS
CANADA & US (Entitlement Programs Only), 1986-1999
Single Parent, 1 Child @ Full-Time Minimum Wage



Notes: For sources and methodology, see Appendix B.

Figure 13

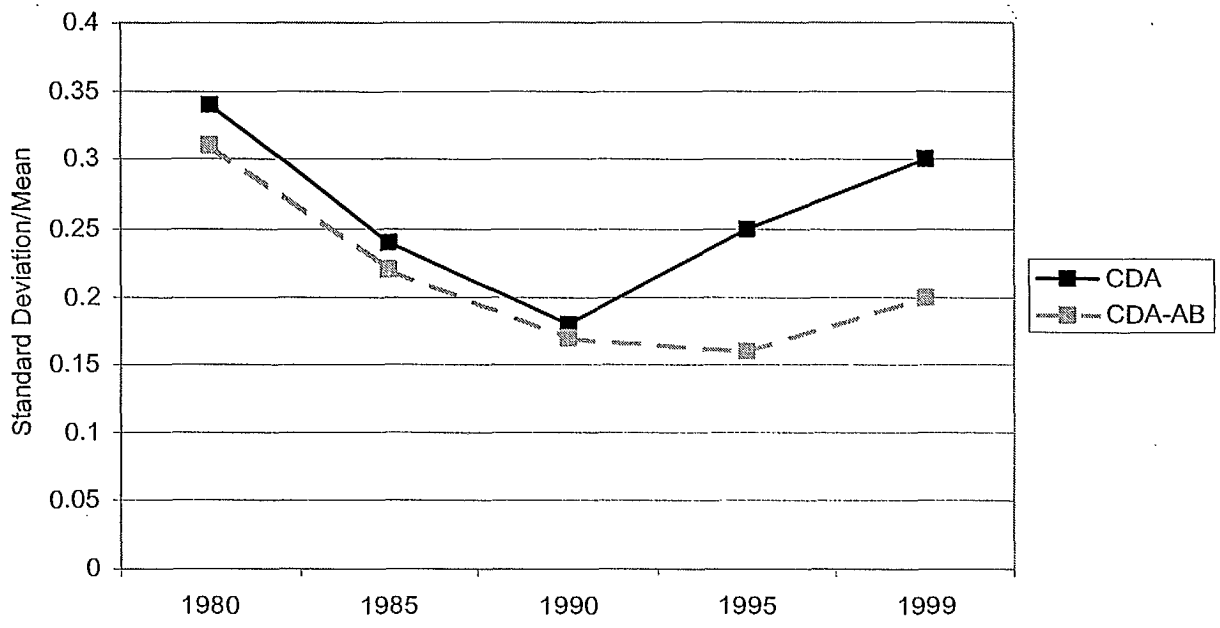
DISPERSION, SOCIAL ASSISTANCE,
Canadian Provinces, 1980-1999
Expenditures (per capita)



Sources: See Appendix B.

Figure 14

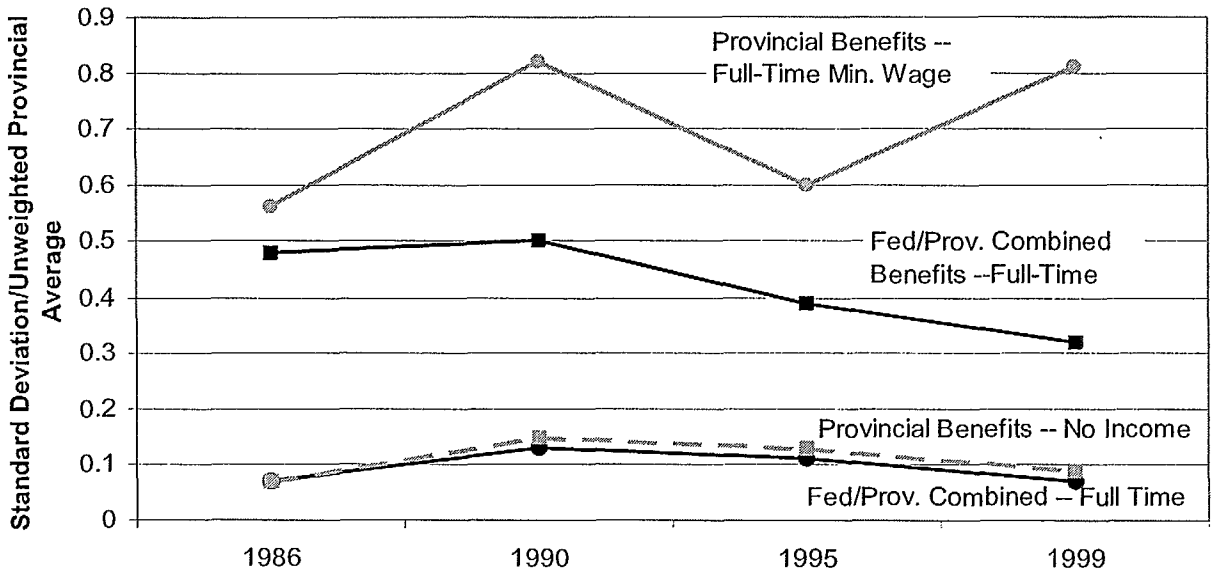
DISPERSION, SOCIAL ASSISTANCE BENEFICIARIES,
Canadian Provinces, 1980-1999
Beneficiaries (% total pop.)



Sources: See Appendix B.

Figure 15

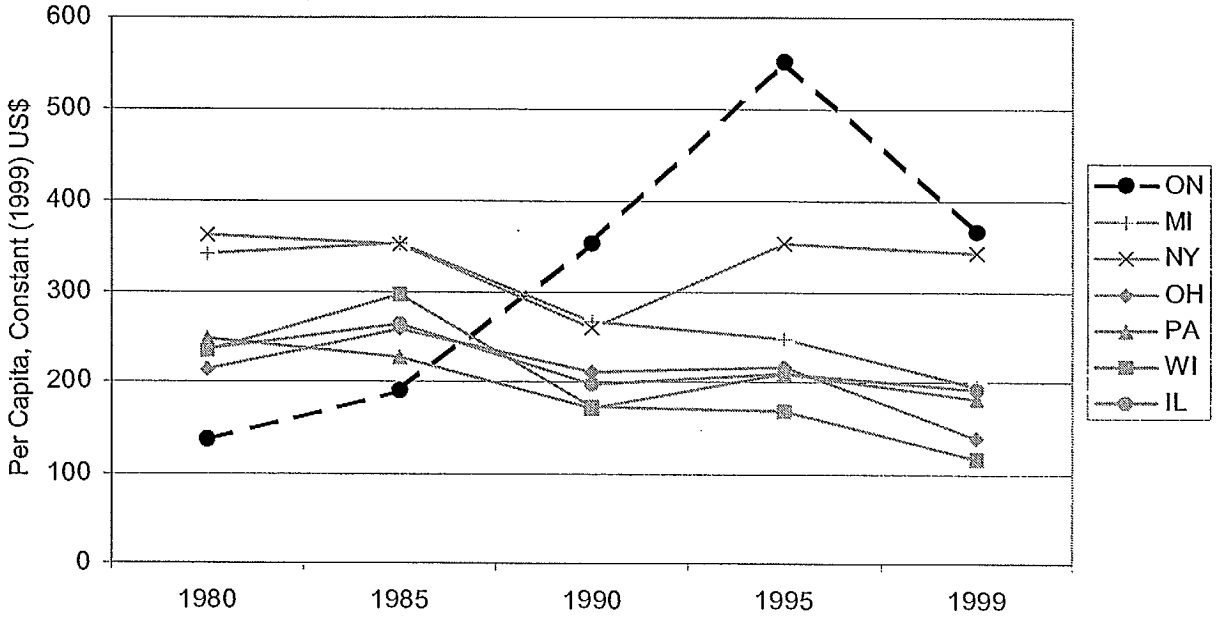
DISPERSION, SOCIAL ASSISTANCE BENEFITS, 1986-1999
Provincial Benefits and Fed/Prov. Combined Benefits
Single Mother, 1 Child -- No Income/Full-Time @ Avg. Min. Wage



Notes: For sources and methodology, see Appendix B.

Figure 16

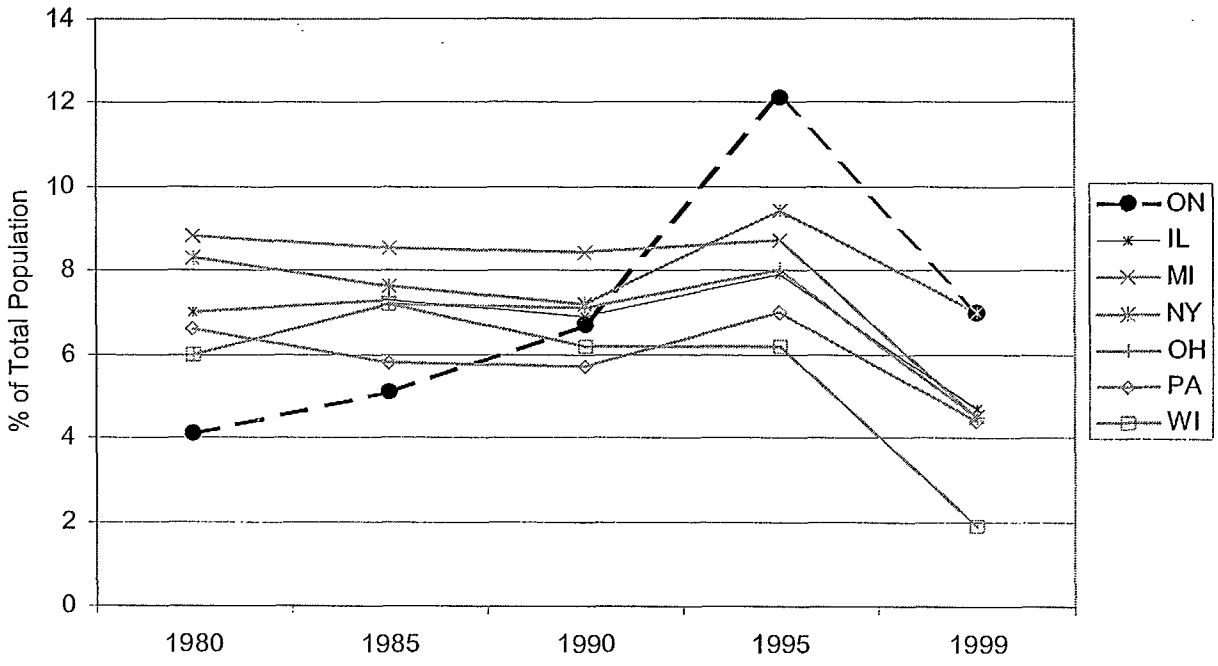
TOTAL BENEFIT EXPENDITURES PER CAPITA, SOCIAL ASSISTANCE PROGRAMS, 1980-1999
Ontario and Great Lakes States (Entitlement Programs Only)



Sources: See Appendix B.

Figure 17

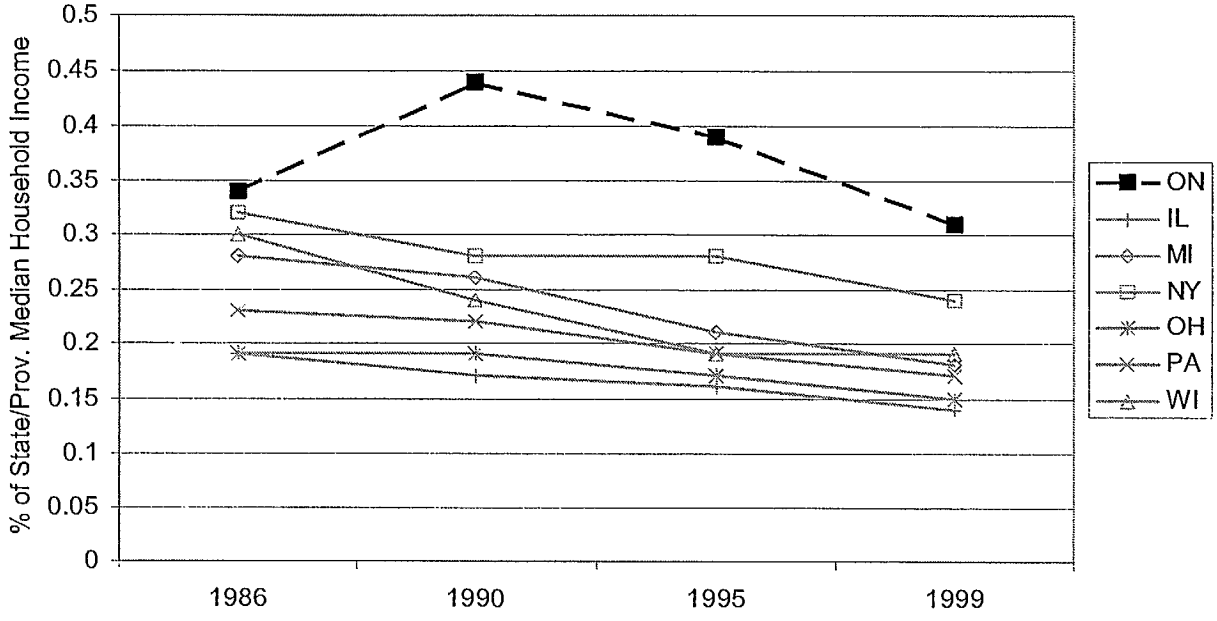
BENEFICIARIES, SOCIAL ASSISTANCE, 1980-1999,
Ontario and Great Lakes States (AFDC-TANF/SSI Non-Aged)



Sources: See Appendix B.

Figure 18

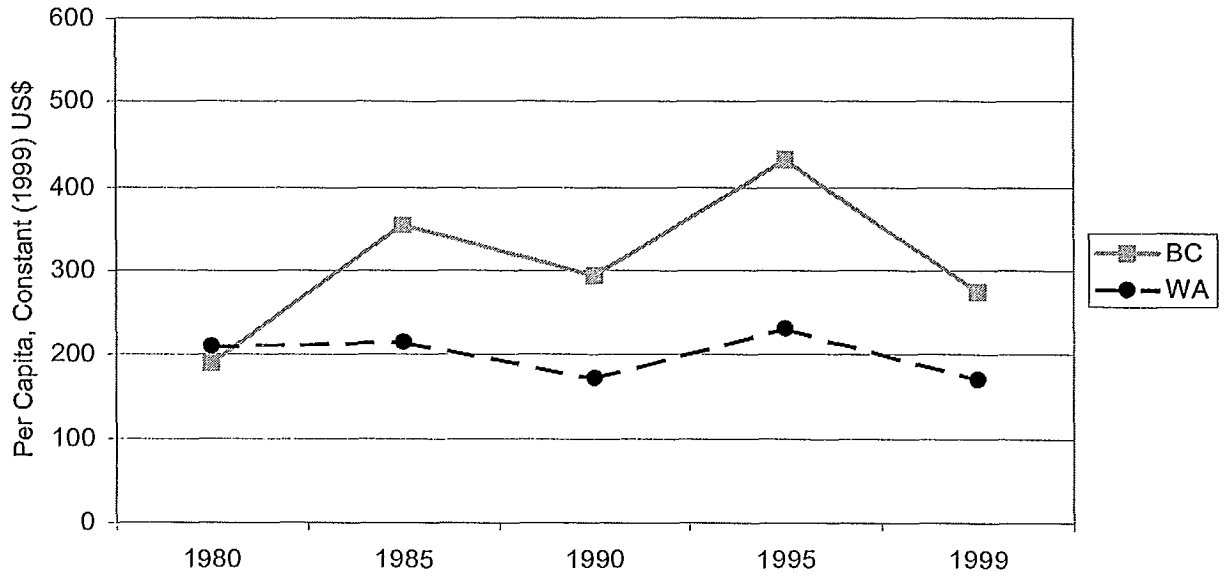
SOCIAL ASSISTANCE and FAMILY BENEFITS, 1986-1999
SINGLE PARENT, 1 CHILD, No Income
Ontario and Great Lakes States (Entitlement Programs Only)



Sources: See Appendix B.

Figure 19

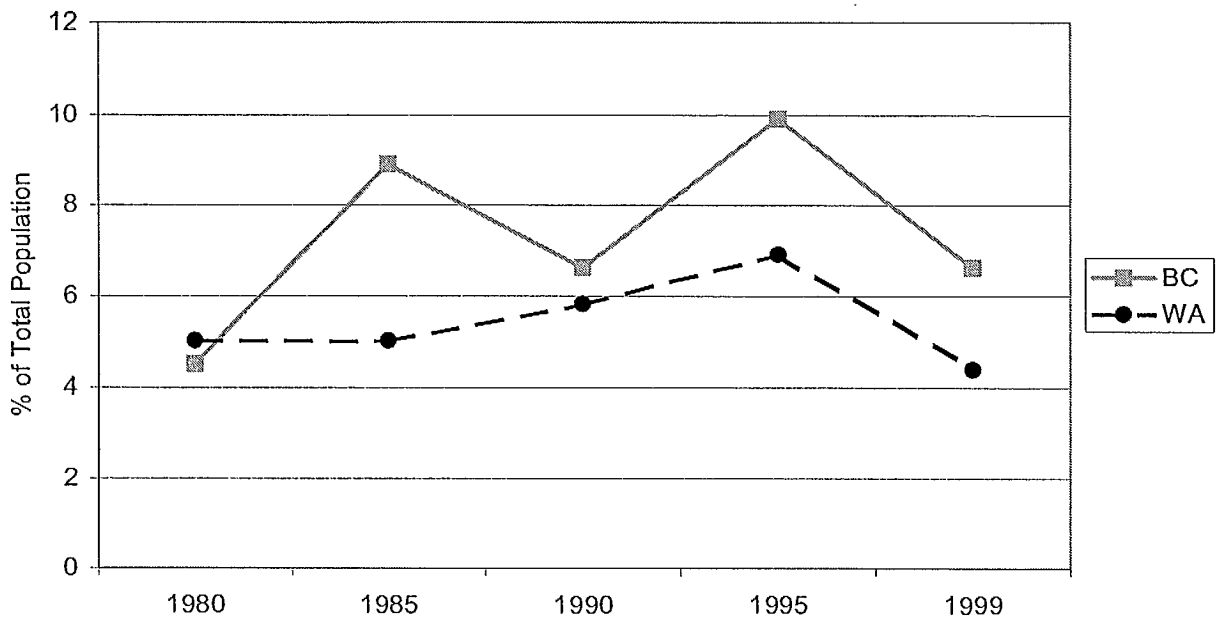
TOTAL BENEFIT EXPENDITURES PER CAPITA, SOCIAL ASSISTANCE PROGRAMS, 1980-1999
British Columbia and Washington (Entitlement Programs Only)



Sources: See Appendix B.

Figure 20

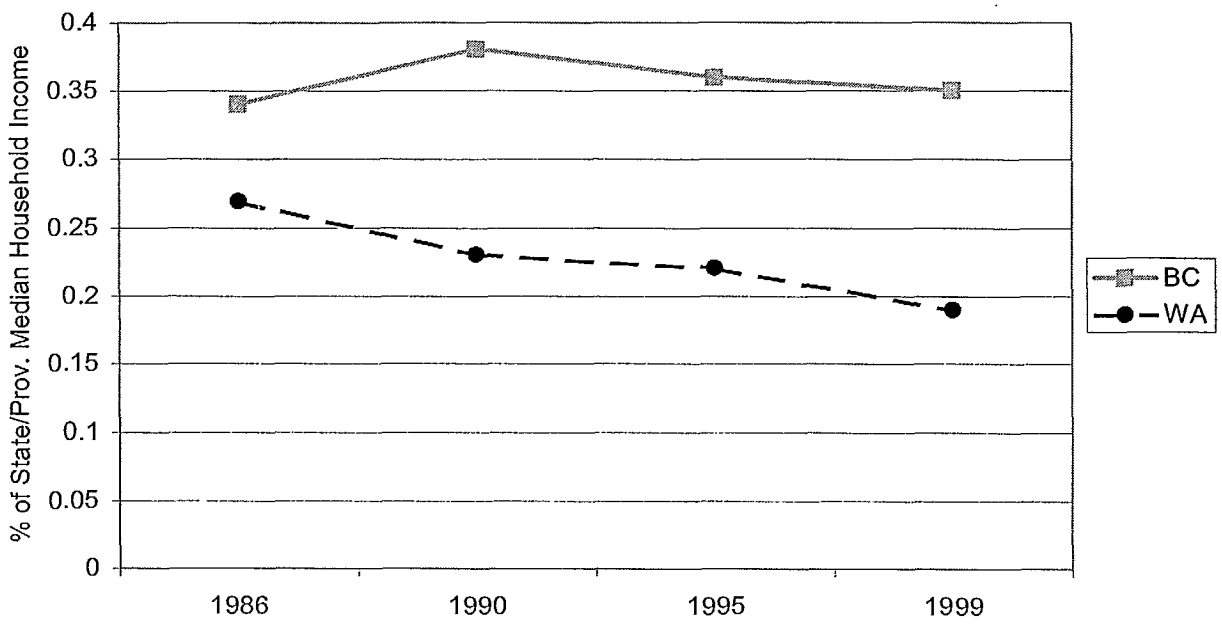
BENEFICIARIES, SOCIAL ASSISTANCE, 1980-1999, British Columbia and Washington (AFDC-TANF/SSI Non-Aged)



Sources: See Appendix B.

Figure 21

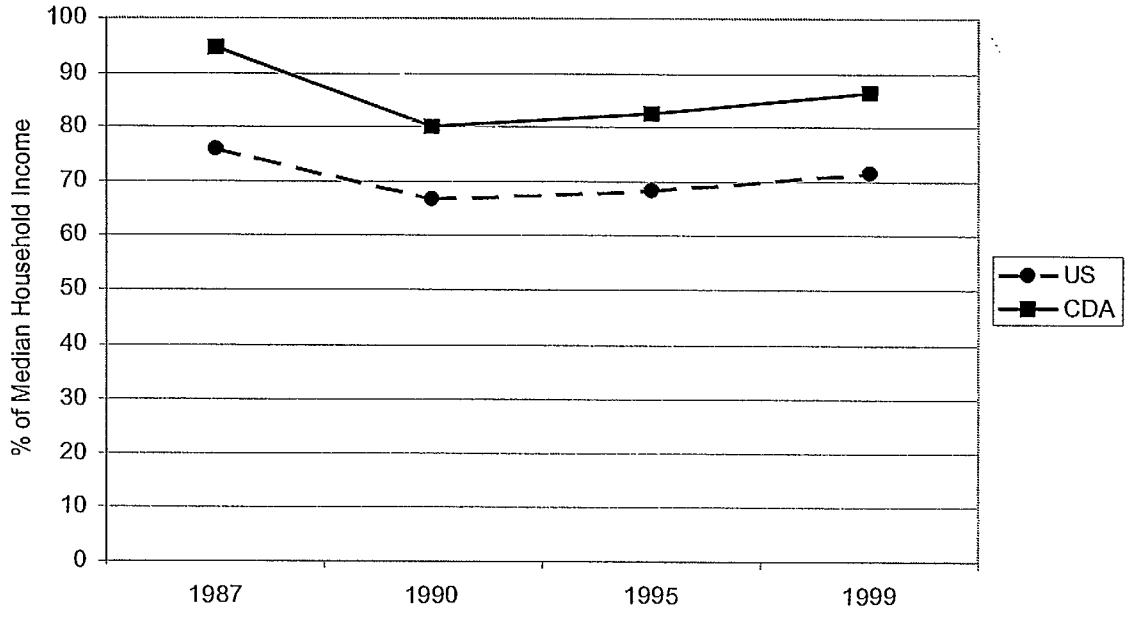
SOCIAL ASSISTANCE and FAMILY BENEFITS, 1986-1999
SINGLE PARENT, 1 CHILD, No Income
British Columbia and Washington (Entitlement Programs Only)



Sources: See Appendix B.

Figure 22

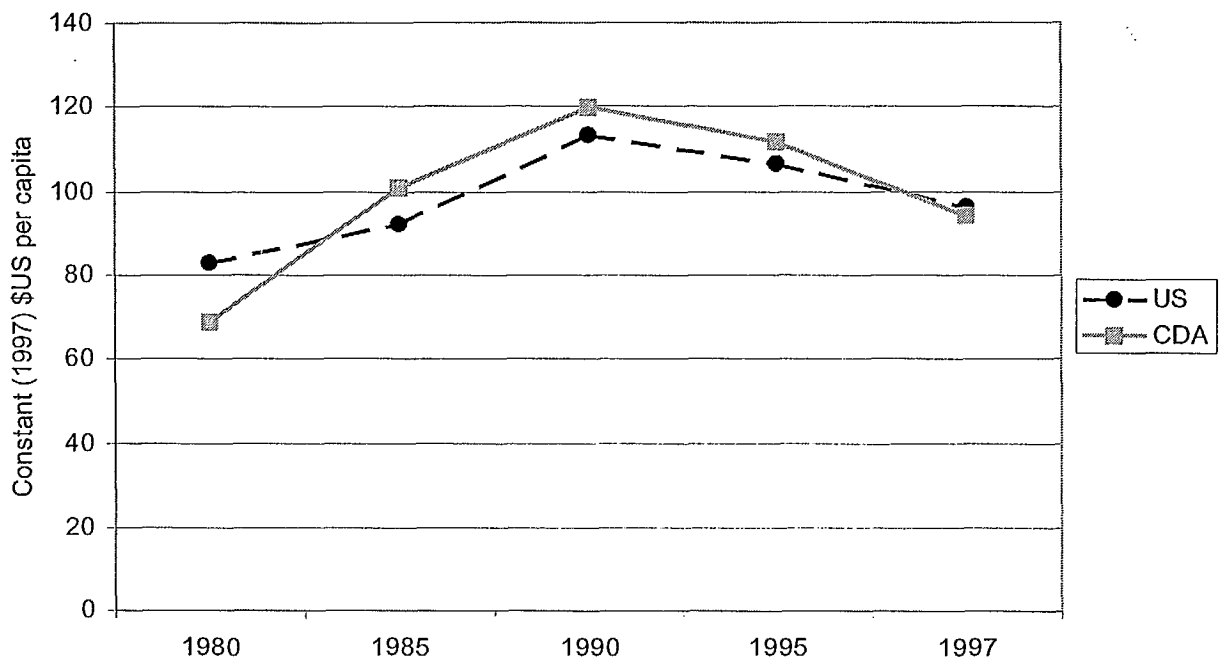
WORKER'S COMPENSATION, MAXIMUM BENEFITS, CDA & US, 1987-1999



Sources: See Appendix C.

Figure 23

WORKERS' COMPENSATION, COMPENSATION BENEFITS, TOTAL PAYMENTS PER CAPITA, CDA & US, 1980-1997

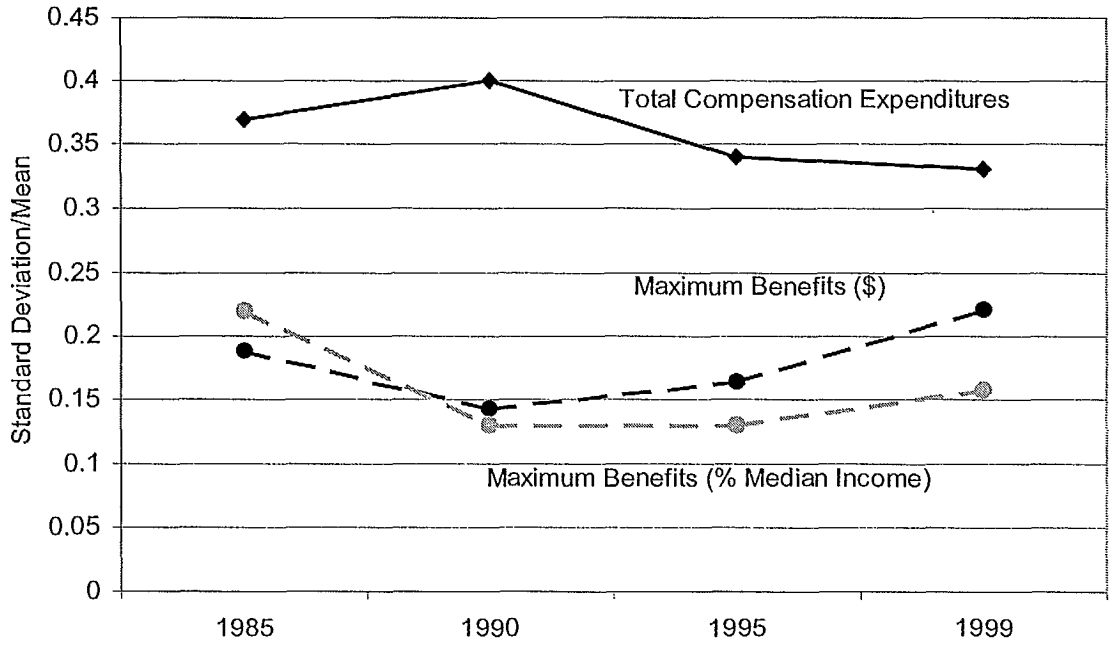


Notes: Data to last year currently available for Canada in HRDC, Social Security Statistics. Compensation benefit data by state and type of benefit (compensation vs. medical) is only available for 1997 and 1998.

Sources: See Appendix C.

Figure 24

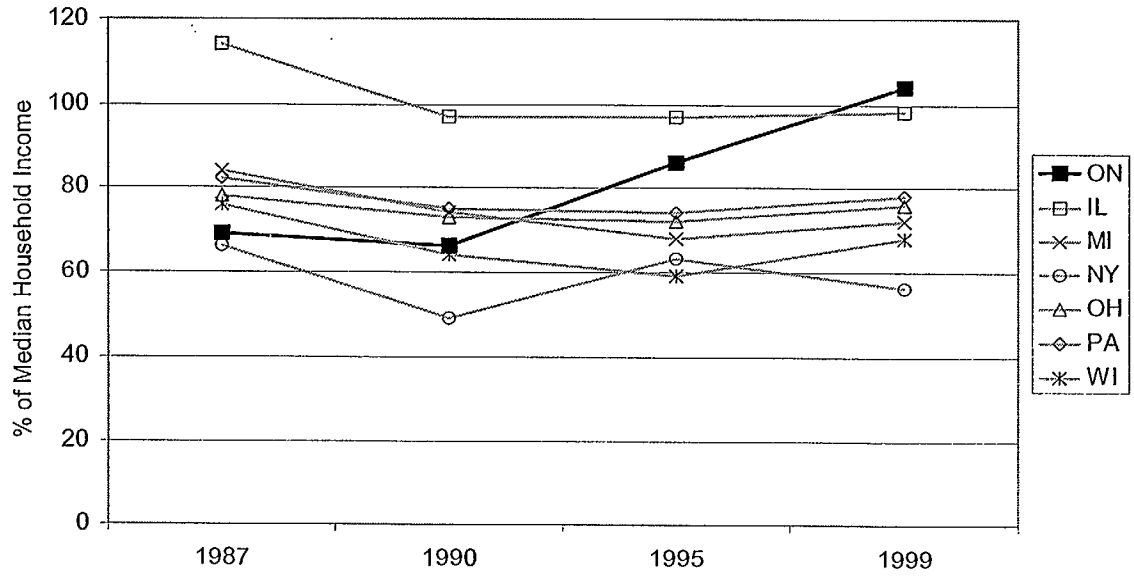
DISPERSION IN WORKERS' COMPENSATION,
Canadian Provinces, 1987-1999
Maximum Benefits and Total Benefit Payments



Sources: See Appendix C.

Figure 25

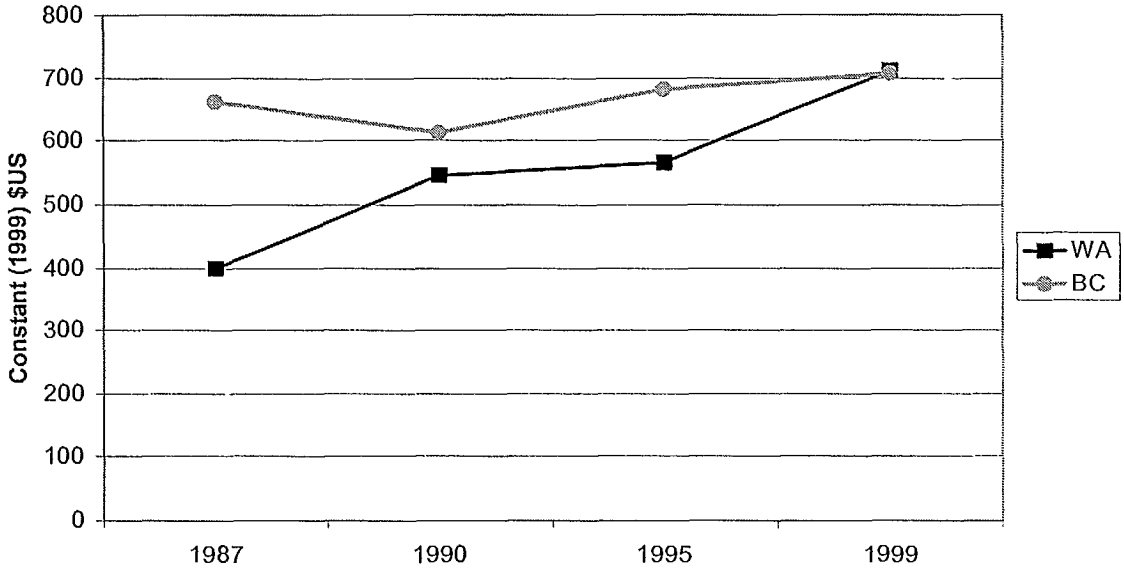
WORKERS' COMPENSATION, MAXIMUM BENEFITS, 1987-89
% of Median Household Income by State/Prov.
Ontario and Great Lakes States



Sources: See Appendix C.

Figure 26

WORKERS' COMPENSATION, MAXIMUM WEEKLY BENEFITS,
Constant US$, 1987-1999
British Columbia and Washington



Sources: See Appendix C.

APPENDIX A – UNEMPLOYMENT INSURANCE AND MISCELLANEOUS DATA

Miscellaneous Data Used in Authors' Calculations

Purchasing Power Parities

All purchasing power parties are taken from the OECD's *PPPs for GDP - Historical series* in downloadable MS-Excel format from the OECD PPP site. [http:/www.oecd.org/std/ppp/pps.htm]

Real Dollar Deflators

All values in real dollars are calculated using US CPI-U as reported in Table No. 768, Consumer Price Indexes (CPI-U) by Major Groups, 1980-1999, United States, Census Bureau, *Statistical Abstract of the United States*, 2000. All values in Canadian real dollars are calculated using CANSIM CPI (label D28608), accessed electronically.

Population

All US population figures are taken from United States, Census Bureau, *Statistical Abstract of the United States, 2000*, Table 20. Resident Population by State: 1980-1999. All Canadian population figures are taken from Canada, Statistics Canada, *Canada Year Book 2000*, Table 3.9 – Population by Age, Canada, the Provinces and Territories.

Median Household Income

United States, Census Bureau, *Statistical Abstract of the United States, 2000*, Table 742— Median Income by State in Constant (1998) Dollars: 1988-1998.

Canada, Statistics Canada, *Income Distribution by Size*, various years. Cat. 13-207-XPB. Table 34 – Percentage Distribution of Families and Unattached Individuals by Income Groups and Provinces. (Table includes median income for all households by province.)

Unemployment Insurance Calculations

B/U Ratios

Calculated by authors following methodology in Canada, Human Resources Development Canada, *1998 Employment Insurance Monitoring and Assessment Report.* [http://www.hrdc-

drhc.gc.ca/ei/employ/sp121898/sum.shtml]

Unemployment Insurance Generosity Index

Calculated by authors. B/U ratio (as above) multiplied by unemployment insurance replacement rates (average weekly benefits/average weekly wage.) See sources below.

Unemployment Insurance Sources

US, Total Number of Unemployed
United States, Census Bureau, *Statistical Abstract of the United States, 2000*, Table 680—Total Unemployed and Insured Unemployed by State: 1980-1999.

United States, Average Weekly Unemployment Insurance Benefits and Total Unemployment Insurance Beneficiaries
United States, Census Bureau, *Statistical Abstract of the United States*, Table —State Unemployment Insurance, by State and Other Areas, various years.

United States, Average Weekly Wage
United States, Department of Labour, *ET Handbook No. 394.* Electronic Access [http://www.workeforcesecurity.doleta.gov/external/lpext.dll/HB/HB%2039/lnk75.html]

Canada, Total Number of Unemployed
CANSIM. Electronic Access. Unemployment/15+/Annual Averages, Series: D984892, D985286, D985568, D985850, D986132, D986414, D986696, D986978, D987260, D987542, D987824.

Canada, Total Number of Beneficiaries
Canada, Human Resources Development Canada, *Social Security Statistics: Canada and the Provinces, 1974/75 to 1998/99*, Table 223 Employment/Unemployment Insurance, Annual Average Number of Regular Beneficiaries, by Province and for Canada, Fiscal Years ending March 31, 1974-75 to 1998-99.

Canada, Average Weekly Unemployment Insurance Benefits
CANSIM, Labels D730479-730489, electronic access.

Canada, Average Weekly Earnings
Statistics Canada, *Employment, Earnings and Hours, 2000.* Cat. 72-002-XPB. Table 9 – Average Weekly Earnings, All Employees, Industrial Aggregate.

APPENDIX B – SOCIAL ASSISTANCE AND FAMILY BENEFITS

METHODOLOGY

Total Expenditure and Beneficiary Comparisons

Canada

Comparisons of social assistance expenditures are based on data for provincial and municipal social assistance benefit expenditures. For years prior to the end of the Canada Assistance Plan in 1996, these include federal transfers.

Total Social Assistance Expenditures
Canada, Human Resources Development Canada, *Social Security Statistics*, Table 438 – Provincial and Municipal Social Assistance Program Expenditures, by Province and for Canada, 1980-81 to 1998-99.

Total Social Assistance Beneficiaries

Canada, National Council of Welfare, Historical Provincial and Territorial Statistics. Electronic access. [http://www.ncwcnbes.net/htmdocument/reportprowelfare/appendix.htm]

Canada, National Council of Welfare, Fact Sheet: Welfare Recipients. Electronic access. [http://www.ncwcnbes.net/htmdocument/principales/numberwelfare.htm]

United States

Social assistance expenditure and beneficiary data include Aid to Families with Dependent Children (AFDC) and Supplemental Security Income (SSI) excluding the aged which, in Canada, fall under the rubric of pensions rather than needs/tested social assistance. Notably, these expenditure figures exclude expenditures for housing benefits which are not available on a state basis in comparable form across the time period examined here.

Two recipiency rates for the US are presented. The first includes only AFDC/TANF and SSI for the non-aged. However, there are a wide range of programs (including housing benefits and Food Stamps) which may be considered social assistance but, for which, individuals need not be AFDC/SSI recipients. Calculating the total number of beneficiaries of all these social assistance programs is complicated by the fact that a large number of recipients for any given program are simultaneously recipients of other programs. The second recipiency rate presented is based on Food Stamps on the assumption that beneficiaries of all other programs receive Food Stamps. As

not all beneficiaries of other social assistance programs receive Food Stamps, this recipiency rate still understates the total number of persons who receive some form of needs-tested benefits in the US although it is a closer approximation of this total than AFDC/SSI.

Total Beneficiaries and Expenditures

United States, Department of Health and Human Services, Administration for Children and Families. Change in TANF Caseloads 7/00-9/00. Electronic access. [http://www.acf.dhhs.gov/news/stats/welfare.htm]

United States, Department of Health and Human Services, Administration for Children and Families. Change in TANF Caseloads. Electronic access. [http://www.acf.dhhs.gov/news/stats/caseload.htm]

United States, Social Security Administration, *Social Security Bulletin: Annual Statistical Supplement,* various years.

Table 9.G.2—AFDC/TANF, Average Monthly Numbers of Families and Recipients of Cash Payments and Total Amount of Payments by State.
Table 7.B.1—Supplemental Security Income, Number of Persons Receiving Federally Administered Payments and Total Annual Amount, By Category. (Authors' calculations to total recipients and payments to the non-aged only.)

United States, Census Bureau, *Statistical Abstract of the United States*, various years. Table 630—Federal Food Stamp Program by State.

United States, House of Representatives, Committee on Ways and Means, *Greenbook 2000.* Table 15-9—Food Stamp Recipients by Jurisdiction, Selected Fiscal Years, 1975-1999.

Social Assistance and Family Benefit Comparisons

Social assistance benefit calculations for the United States include entitlement programs only – programs for which individuals, if eligible, automatically receive benefits. Many low-income individuals in the US may be eligible for numerous programs (the most important of which being federal housing benefits) under which benefits may be considerable (housing benefits in some states can be the equivalent of AFDC/TANF benefits) but which recipients may or may not receive. Under entitlement programs such as Aid to Families with Dependent Children (AFDC), Supplemental Security Income, and Food Stamps, recipients who meet program requirements receive benefits.

Full-Time Employment at Minimum Wage

The comparisons do not compare benefit packages at minimum wage rates in each province and state but rather earnings equivalent to the US federal minimum wage in order to eliminate

distortionary effects of differences in minimum wage rates across states and provinces. Social assistance and family benefits for single parents with children are drawn from US Greenbook. The Greenbook benefit figures are adjusted to represent benefits for a single-parent family with one rather than two children in order to make the family unit comparable to the family unit used in Nation Council of Welfare (Canada) data. In addition, benefits are adjusted to reflect benefit packages at earned income equivalent to full-time employment at the federal (rather than state) minimum wage in order to minimize the impact of variation in minimum wage rates. In making these adjustments, the authors' relied on earnings exemptions data provide in Urban Institute, *State TANF Policies as of July 1999*, Table II.A.1 Earned Income Disregards for Benefit Computation, July 1999. (Prior to TANF, earnings exemptions were uniform across states with the exception of federally-granted state waivers. However, under TANF, earnings exemptions vary.) This data is also available electronically from the Urban Institute's Welfare Rules Database. [http://newfederalism.urban.org/nfdb/index.htm]

A minimum wage equivalent to the US federal minimum wage is calculated for Canada using OECD purchasing power parities. Benefit packages for families at this earning equivalent are then calculated on a province by province basis using benefits and earnings exemption information (National Council of Welfare) and tax credit adjustments (various sources.)

While the amounts of benefit packages are *not* based on actual minimum wage rates in the states and provinces, they do roughly approximate benefit levels that would be received at minimum wage employment in the Canadian provinces. [See Table B1.]

Sources:

Canada, National Council of Welfare, *Welfare Incomes*, various years.

Benefits calculations for the United States are drawn from information on AFDC/TANF, Food Stamps, and EIC presented in United States, House of Representatives, Committee on Ways and Means, *Greenbook*, various years.

CCTB/EIC Earnings and Benefits

Calculated by authors.

Sources:

Canada Customs and Revenue Agency. *Your Canada Child Tax Benefit*. Electronic access. [http://www.ccra-adrc.gc.ca/E/pub/tg/t4114eq/t4114eq-06.html]

United States, House of Representatives, Committee on Ways and Means, *Greenbook 2000*. Table 13-12—Earned Income Credit Parameters, 1975-99.

Minimum Wage Rates

Table B1: US Federal and Provincial Minimum Wage, 1999

	Minimum Wage ($ domestic)	Minimum Wage (US$, ppp=1.17)
US Federal	$5.15	$5.15
NF	$5.25	$4.49
PEI	$5.40	$4.62
NS	$5.50	$4.70
NB	$5.50	$4.70
QB	$6.90	$5.90
ON	$6.85	$5.85
MB	$6.00	$5.13
SK	$6.00	$5.13
AB	$5.65	$4.82
BC	$7.15	$6.11
CDN (Mean)	$6.02	$5.15

Sources: US federal minimum wage rate from United States, Census Bureau, *Statistical Abstract of the United States, 2000*, Table 699 – Federal Minimum Wage Rates: 1950-1999.

Canadian minimum wages from Canadian Council on Social Development, Minimum Wage Rates, Canada the Provinces. Electronic access. [http://www.ccsd.ca/fs_minw.htm]

ALBERTA – Total Social Assistance Expenditures and Beneficiaries
Figure B1

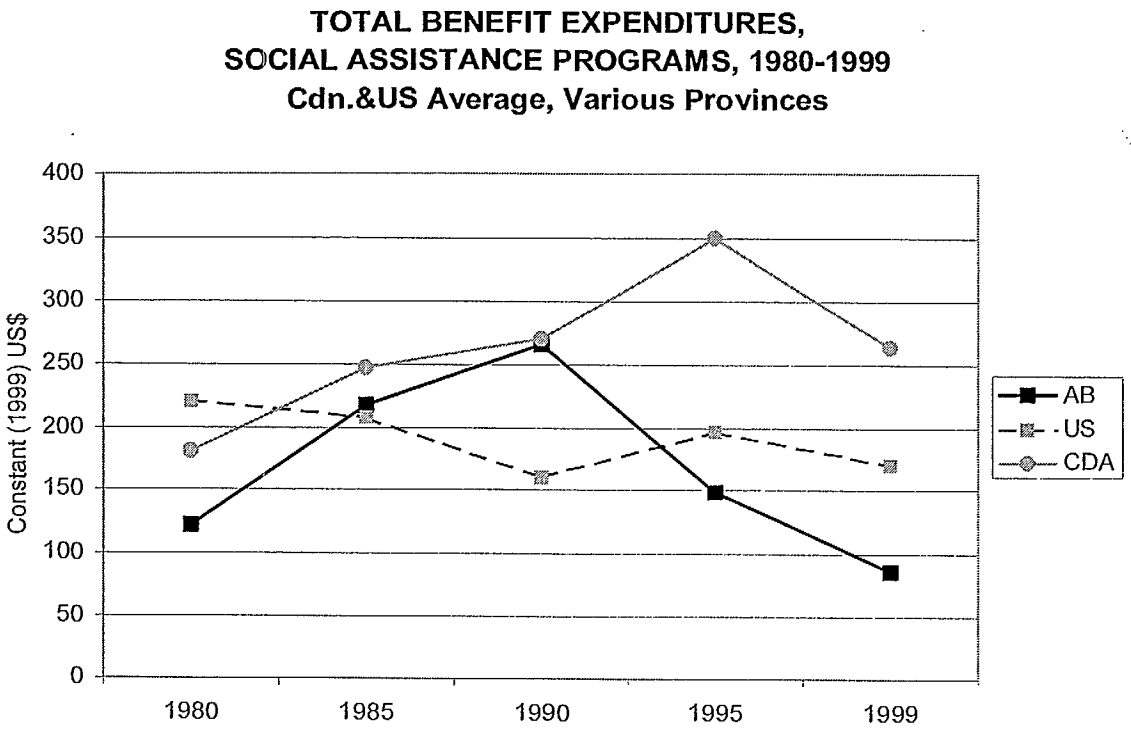
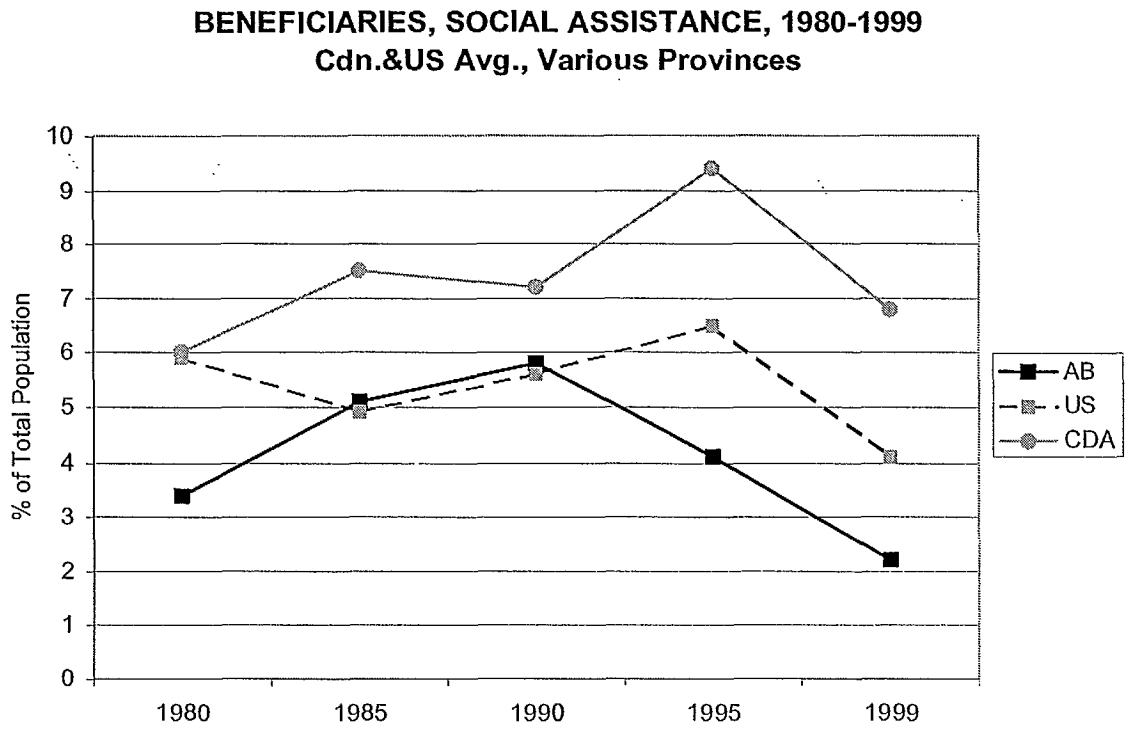


Figure B2


BENEFICIARIES, SOCIAL ASSISTANCE, 1980-1999
Cdn.&US Avg., Various Provinces
% of Total Population
10
9
8
7
6
5
4
3
2
1
0
1980
1985
1990
1995
1999
AB
US
CDA

APPENDIX C – Workers' Compensation

Data and Methodology

One of the main difficulties in comparing total expenditures and beneficiaries in Canada and the US is the starkly differing relationship between workers' compensation programs and the health care system in each country. In Canada, injured workers have access to universal health care regardless of whether the file a successful workers compensation claim. In the US, the provision of health care under workers' compensation (which workers might otherwise have to pay through private insurance or out of pocket) provides a considerably stronger incentive to file workers' compensation claims. Likely as a result of this dynamic, waiting periods in the US are, with very few exceptions, uniformly longer than in Canada. In addition, medical costs comprised a much higher proportion of total workers' compensation costs in the US than in Canada. Finally, due to the incentive effects for injured workers to apply for compensation in order to receive medical benefits, compensation costs are likely higher in the US than they would be in the context of a universal health care system.

Sources

Maximum Benefits, Percent of Wage for Benefit Calculation, Waiting Periods

All data on program parameters and benefit levels in American states and Canadian provinces taken from United States Chamber of Commerce, *Analysis of Workers Compensation Laws*, various years.

Total Compensation Expenditures

United States, Social Security Administration, *Social Security Bulletin: Annual Statistical Supplement, 2000.* Table 9.B.3—Workers' Compensation Benefits, By Type of Insurer and Medical Benefits, by state, 1998. (Total non-medical compensation benefits calculated by authors as total compensation minus "medical amount".)

Canada, Human Resources Development Canada, *Social Security Statistics*, Table 250—Workers' Compensation, Total Payments, by Province and for Canada, 1974-97 and Table 246—Workers' Compensation, Expenditures for Medical Care and Funeral Services, By Province and for Canada, 1974-97. (Total non-medical payments calculated by authors as total payments minus payments for medical care and funeral services.)

Table C1: Workers' Compensation Program Parameters, Canadian Provinces, 1990-1999

	Percent of Wages	Percent of Wages	Waiting Period	Waiting Period
	1990	1999	1990	1999
NF	90% net	80% net	1 day	1 day
PEI	fixed ($450 mo.)	80% net for 39 wks., 85% after	1 day	1 day
NS	90% net	75% net for 26 wks., 85% after	3 days	2 days
NB	80% net	85% net	1 day	3 days
QB	n/a	90% "weighted net"	day of injury	day of injury
ON	90% net	85% net	1 day	1 day
MB	75% gross	90% net for 24 mos., 80% after	1 day	1 day
SK	90% net	90% net	next day	next day
AB	90% "weighted net"	90% "weighted net"	1 day	1 day
BC	n/a	75% gross	1 day	1 day

Source: United States Chamber of Commerce, *Analysis of Workers Compensation Laws*, various years.

REFERENCES

Banting, Keith, 1997a. "The Social Policy Divide: The Welfare State in Canada and the United States," in Keith Banting, George Hoberg and Richard Simeon, editors, *Degrees of Freedom: Canada and the United States in a Changing World.* Montreal: McGill-Queen's University Press.

_____, 1997b. "The Internationalization of the Social Contract," in Thomas Courchene, editor, *The Nation State in a Global/Information Era.* Kingston: John Deutsch Institute for the Study of Economic Policy, Queen's University.

_____, forthcoming. "What's a Country For? The Social Contract in the Global Era," in R. Roberge and D. Wolfish, editors, *Reinstating the Line: The Canada-US Border.* Ottawa: University of Ottawa Press.

Banting, Keith, George Hoberg and Richard Simeon, forthcoming. "North American Integration and the Scope for Domestic Choice: Canada and Policy Autonomy in a Globalized World," in George Hoberg, editor, *Capacity for Choice: Canada in a New North America.* Toronto: University of Toronto Press.

Boychuk, Gerard. W. 1999. "Resemblance and Relief: Social Assistance Provision in the American States and Canadian Provinces." *American Review of Canadian Studies,* Vol 29 (2) (Summer): 259-85.

_____, 2001. "Aiming for the Middle: Challenges to Federal Income Maintenance Policy," 123-44. In Leslie A. Pal, ed., *How Ottawa Spends, 2001-2002: Power in Transition.* Don Mills: Oxford University Press.

_____, forthcoming (a). "Social Union, Social Assistance: An Assessment." In Tom McIntosh, ed., *Perspectives and Directions: The Social Union Framework.* Regina: Canada Plains Research Centre.

_____, forthcoming (b). "À la remorque de l'OCDE ? Sécurité du revenu et valorisation du travail au Canada et aux États-Unis." *Lien social et politiques*, 45 (2001), forthcoming.

Brown, Robert and Jeffrey Ip. 2000. "Social Security – Adequacy, Equity, and Progressiveness: A Review of Criteria Based on Experience in Canada and the United States," *North American Actuarial Journal*, vol. 4 (1): 1-19.

Canada. Human Resources Development Canada. 1998. *1998 Employment Insurance Monitoring and Assessment Report.* [http://www.hrdc-drhc.gc.ca/ei/employ/sp121898/sum.shtml]

_____. *Social Security Statistics: Canada and the Provinces, 1974-75 to 198-*

99. [http://www.hrdc-drhc.gc.ca/stratpol/socpol/statistics/74-75/table.shtml]

Commission of the European Communities. 1994. *Social Protection in Europe: 1993.* Directorate-General for Employment, Industrial Relations and Social Affairs. Luxembourg: Office of the Official Publications of the European Communities.

Courcehene, Thomas with Colin Telmer, *From Heartland to North American Region State.* Toronto: Centre for Public Management, Faculty of Management, University of Toronto.

Esping-Andersen, Gosta. 1990. *The Three Worlds of Welfare Capitalism.* Princeton, NJ: Princeton University Press.

_____ 1996. Editor. *Welfare States in Transition: National Adaptations in Global Economies.* London: Sage.

Garrett, Geoffrey. 1998. "Global Markets and National Politics: Collision Course or Virtuous Circle?" *International Organization*, vol. 52: 787-824.

Iversen, Thorben, "The Dynamics of Welfare State Expansion: Trade Openness, De-industralization, and Partisan Politics," in Paul Pierson, editor, *The Politics of the Welfare State.* Oxford: Oxford University Press.

James, Estelle. 1997. "Canada's Old Age Crisis in International Perspective, in Keith Banting and Robin Boadway, editors, *Reform of Retirement Income Policy: International and Canadian Perspectives*. Kingston: School of Policy Studies, Queen's University.

Krugman, Paul 1996. *Pop Internationalism.* Cambridge, Mass: MIT Press.

Leibfried, Stephan and Paul Pierson, editors, *European Social Policy: Between Fragmentation and Integration*. Washington, DC: Brookings Institution.

Martin, Andrew, 1996. "What Does Globalization Have to Do with the Erosion of the Welfare State: Sorting Out the Ideas," *ARENA Working Paper*, No. 17.

McIntosh, Tom and Gerard W. Boychuk. "Dis-Covered: EI, Social Assistance and the Growing Gap in Income Support for Unemployed Canadians," 65-158. In Tom McIntosh, ed., *Federalism, Democracy and Labour Market Policy in Canada.* Montreal and Kingston: McGill-Queen's University Press, 2000.

Montanari, B. 1995. "Harmonization of social policies and social regulation in the European Community," *European Journal of Political Research*, vol. 27 (1): 21-45.

Myles, John and Paul Pierson, 2001. "The Comparative Political Economy of Pension Reform," in Paul Pierson, editor, *The New Politics of the Welfare State.* Oxford: Oxford University Press.

Myles, John and Jill Quadagno (1997). "Recent Trends in Pension Policy Reform: A Comparative View," in Keith Banting and Robin Boadway, editors, *Reform of Retirement Income Policy: International and Canadian Perspectives*. Kingston: School of Policy Studies, Queen's University.

OECD 1998. *Maintaining Prosperity in an Aging Society.* Paris: OECD.

Olewiler, Nancy. 1999. "National Tax Policy for an International Economy: Divergence in a Converging Word," in Thomas Courchene, editor, *Room for Manoeuvre? Globalization and Policy Convergence*. Kingston: John Deutsch Institute for the Study of Economic Policy, Queen's University.

Rhodes, Martin. 1998. "Subversive Liberalism: Market Integration., globalization and West European welfare states," in William Coleman and Geoffrey Underhill, editors, *Regionalism and Global Economic Integration: Europe, Asia and the Americas*. London and New York: Routledge.

Skogstad, Grace 2000. "Globalization and Public Policy: Situating Canadian Analyses," *Canadian Journal of Political Science*, vol. XXXIII: 4, pp.805-828

Sullivan, Terry. 1998. "Outcome Research: Payer and Provider Applications in Canada and the United States," 213-20. In Jeffrey S. Harris and Ronal R. Loeppke, ed., *Integrated Health Management*. Washington: American College of Occupational and Environmental Medicine.

Swank, Duane 1998. "Funding the Welfare State: Globalization and the Taxation of Business in Advanced Market Economies," *Political Studies*, 46 (4): 671-92.

_____ 2001. "Political Institutions and Welfare State Restructuring: The Impact of Institutions on Social Policy Change in Developed Democracies," in Paul Pierson, editor, *The New Politics of the Welfare State*. Oxford: Oxford University Press.

Thomason, Terry and John F. Burton, Jr. 2000. "The Cost of Workers' Compensation in Ontario and British Columbia," 260-298. In Morley Gunderson and Douglas Hyatt, ed., *Workers' Compensation: Foundations for Reform*. Toronto: University of Toronto Press.

Thomason, Terry, Timothy P. Schmidle, and John F. Burton, Jr. 2001. *Workers' Compensation: Benefits, Costs and Safety Under Alternative Insurance Arrangements*. Kalamazoo: W.E. Upjohn Institute for Employment Research.

United States. Census Bureau. *Statistical Abstract of the United States*, various years. Washington: Government Printing Office.

_____, House of Representatives, Committee on Ways and Means, *Greenbook: Overview*

of Entitlement Programs. Washington, DC: Government Printing Office, various years.

_____, Social Security Administration. *Social Security Bulletin: Annual Statistical Supplement*. Washington DC: Government Printing Office, various years.

United States Chamber of Commerce. *Analysis of Workers' Compensation Laws*. Washington: US Chamber of Commerce, various years.

Weaver, Kent, forthcoming. "The Politics of Pension Reform in Canada and the United States," unpublished manuscript.

World Bank 1994. *Averting the Old Age Crisis: Policies to Protect the Old and Promote Growth*. Washington DC: World Bank and Oxford University Press.

NOTES

[1] See for example, Castles 1989, Liebfried 1992 and Ferrera 1996.

[2] We recognize that more detailed and nuanced qualitative examinations of programs – especially social assistance programs – may reveal important patterns of policy development. However, such an examination remains outside the scope of this project.

[3] Mature pay-as-you-go pensions present the clearest example of path dependent constraints on future change. Proposals for a shift to a funded program confront a formidable "double payment" problem; current workers would have to simultaneously pay for existing pension commitments and save for their own retirement.

[4] Brown and Ip, 2000. For an assessment of replacement rates at different levels of income in the two systems as they existed a decade earlier, see Banting 1997, table 7.6.

[5] Under the revised legislation, if the chief actuary of the CPP concludes that the plan is not sustainable, the federal and provincial governments are obliged to agree on needed changes. If they do not agree, contribution rates will increase automatically to meet half of the anticipated deficiency (phased in over three years) and indexation of CPP benefits will be frozen for three years. In the assessment of Kent Weaver of the Brookings Institution, this makes reliance on contribution rate increases more likely in Canada than in the United States, where they are likely to remain off the agenda (Weaver forthcoming).

[6] Average weekly benefits as a proportion of average weekly rates reveal moderate differences between the two countries which have remained largely stable over the 1985-2000 period.

[7] For an analysis which attempts to untangle the effects of policy changes from changes in labour market structure, see HRDC, 1998.

[8] More recent comparisons of beneficiary rates are hampered by the unavailability of more recent state data on SSI. However, there is little evidence, considering the most recent national data for TANF recipiency in the US and social assistance recipiency in Canada, that Canadian rates are converging on the American average.

[9] In both Canada and the US, workers' compensation is largely a provincial/state issue. (Sullivan, 1997: 214.) In Canada, workers' compensation is provided by no-fault government monopolies. In the US, there are a variety of forms of public, private and self provision with only six states offering workers compensation through an exclusive state fund. (Thomsason and Burton, 2000) As Thomason and Burton note: "...in all North American jurisdictions, benefit levels and eligibility conditions are established by statute. These statutes also create agencies charged with the responsibility of administering the program." (Thomason and Burton, 2000:

293)

[10] In Canada, the average is between 80-90% of net and 66 2/3% of gross in American states. (We have not calculated equivalencies between net and gross percentages; however, judging from the use of gross and net income in state and provincial calculations, the Canadian net income parameters are likely equivalent to roughly 75% of gross.)

[11] Thomason and Burton have developed a impressively rigorous approach to estimating the overall cost of workers' compensation in different jurisdictions. See Thomason and Burton, 2000; Thomason, Schmidle and Burton, 2001.

Why so few envir. trade actions

Worry | Chapter 11, NAFTA — was intended to protect US investors in Mexico
Corp's are using it against
10 of 17 are envir. related — most all decisions pro in favor of corp.
Is being considered for revision.

Tim Bradford

Rics: re Chapter 11: of 17, only a few have been settled; only 1 is decided (Metalclad) — Ethyl invested $20M
Ethyl did not go decision — was settled
A: all cases are complicated. Ethyl. Methanex. failure in Canada. Had the case come first now, Can. could have won.
Metalclad: problems did get worse, w/ devolution to local level.

Key problem of Water Quality: how to incorp. local hot spots.

Notes Nancy Olewiler

Demand for Envir. Quality is Y-elastic.

Scale effect ... ↑ → ⇒ rising Y ⇒ envir. higher on agenda
⇒ socially acceptable

Composition effect
ambiguous whether rising Y ⇒ more pollution-intensive ind.

Technique effect

Data on envir. quality is pathetic.

US: CO_2/GDP = going down (vs. CO_2 still ↑)

Toxic emissions (US, Can): now available ... to local area, on the Web.
Forest Cover: increasing
Soil Productivity
Overall: some good, some bad news.

Re: Pollution Haven: PACE exp.: data no longer collected!
effect on profits ↓ slightly going back to 70's
Envtl. could be attractive to industry!

Re: Race to the bottom: no evidence
drop in enforcement = a issue (↓ devolution to local govts.)
increased reliance on vol. compliance
?: who's monitoring?

Re: Growth is Bad: Environmental Kuznets Curves (EKC)
Conclusion: ambiguous.

Re: Trade Agr. undermining Policy:

OVER

North American Integration and the Environment

Nancy Olewiler

Department of Economics

Simon Fraser University

June 2001

Conference Draft: Not for quotation

Economies of the world are becoming more integrated due to a host of factors. These include reduced barriers to trade and foreign investment, technological changes in communication and information flows, and relative price changes such as lower transportation costs. Greater integration has, in turn, led to large increases in economic activity with substantial growth in GDP and trade and investment flows in most countries over the past 30 to 50 years.

The question this paper addresses is what impact has economic integration had on the natural environment. The focus is on North America. The natural environment of any country or region consists of its natural resources – minerals and energy, aquatic and terrestrial species, forests, soils, water, and the atmosphere. While economists typically look at natural resources individually, ecosystems, with their complex relationships among species and physical resources, are the fundamental resource base of a country. The difficulty for environmental and resource economics is that there is no summary statistic such as GDP that measures the state of a region or country's ecosystems.

Indicators of environmental quality represent snapshots and time trends of component parts of ecosystems.

Put simply, the key questions asked in this paper are as follows:

1. Is economic integration bad or good for the environment?
2. Are environmental regulations good or bad for the economy?
3. Do trade agreements and increasing trade and investment flows undermine a country's regulatory efforts to improve environmental quality?

A very large literature has emerged over the past 15 years to examine these questions. The questions may be simple, but the answers are complex and can be ambiguous. Moreover, there appears to be a large divergence between what the public and many policy makers believe about the impacts of trade and economic growth on the environment and the impact of regulation on the economy and what economists have been observing empirically. This gap is in part due to the complexity of the topic and the absence of consistent sets of high quality data. But it also reflects the political economy of environmental regulation in an integrating world.

The outline of the paper is as follows. A very brief review of why market economies fail to provide the optimal level of environmental quality makes the key point that environmental regulation and clear assignment of property rights are essential for any economy regardless of its degree of integration with other economies. Environmental quality indicators are presented for North America to set the stage for the analysis. While it is very difficult to get consistent and comparable data for all three countries, some interesting trends are illustrated. A series of hypotheses regarding the relationship between trade, growth, the environment, and environmental regulation are then examined

in some detail. Relevant literature is reviewed and recent data presented. These hypotheses are:

- Stringent environmental regulations undermine a country's competitiveness, leading to job losses and driving investment to countries/regions where environmental regulations are less stringent. This is called the 'pollution-haven hypothesis' – pollution-intensive industries will seek to locate in regions with low levels of environmental regulation.
- Because of pollution havens, there will be a 'race to the bottom' wherein countries/regions compete for industries by reducing the stringency of their environmental regulations until the lowest common denominator prevails. A weaker version of the race to the bottom hypothesis is the 'no race at all' or 'regulatory chill' hypothesis that says that governments will be reluctant to enforce environmental regulations. They will mollify environmental interest groups by introducing regulations, but these will not be binding on producers.
- Economic growth leads to lower levels of environmental quality. Greater economic integration exacerbates the situation by contributing to higher growth rates in output and incomes.
- Trade agreements interfere with a country's domestic environmental policies.

Debate surrounding these hypotheses affects environmental policy makers. The political economy of environmental policy is driven in part two perceptions – first, there is an unambiguous negative effect of integration on the environment and second, that environmental regulation adversely affects economic growth and productivity. If the facts do not support these perceptions, it means that environmental policies should be a complement to trade and investment policies. It is not a case of a country needing one or the other. The last section of the paper draws on the investigation of the trade and growth hypotheses and develops some policy implications for Canada.

1. Optimal Levels of Environmental Quality

Why do environmental problems exist? Environmental degradation is a by-product of human activity and natural processes. Wastes are generated from production and consumption activities. When property rights to the natural environment are not well defined, there is no incentive for anyone to take into account the impact their waste generation is having on the natural environment and other economic agents. If one can dispose of wastes freely, why incur costs of treating waste products and reducing their deleterious effects? The key problem is that much of the natural environment is an open access resource. No one effectively owns the atmosphere, most water bodies, and even many land resources. Consumers and producers do not bear the full costs of their waste disposal; it is shared by society. Thus, too much waste is produced relative to the social optimum, with an implicit price of waste discharge that is too low. This is an environmental externality that causes ecosystem degradation.

When private property rights exist and are well enforced, those who deposit waste products on another's property will be required to clean them up and/or compensate the property owner. The efficient level of waste generation then ensues because the environmental externality is internalized. However, when environmental externalities are pervasive, affecting many people and producers, and it is difficult to associate an emission with a particular source (such as air pollution from automobiles or pesticide runoff from agriculture), assigning private property rights to the environment becomes virtually impossible. Some form of regulatory policy is required.

Degradation can also occur from land uses that do not incorporate impacts on the natural environment. For example, a farmer may drain a wetland to increase acreage on which to plant crops. The decision is made based on the expected returns from the land in crops, not the potential social value of the wetlands in the form of downstream water purification, wildlife habitat, biodiversity enhancement, and so on. This too is an externality that occurs because the social value of the wetland is not reflected in market prices. Without some form of government incentive to conserve wetlands or private initiatives to offer compensation to the farmer for not draining the wetlands, there will be an insufficient supply of wetlands from society's viewpoint. There is no well-defined market for the products of the wetlands.[1] Thus environmental degradation comes from the failure of markets to price all the benefits that arise from the use of the natural environment.

Regulation can take many forms. The two main generic categories are command and control regulations and market-based initiatives. Command and control policies directly restrict waste flows or the processes that generate wastes. They are like quantity controls in the form of standards. Standards can act directly on waste products limiting emissions into the natural environment (emission or effluent standards),[2] or require producers (or consumers) to install specific types of pollution control and abatement equipment or use specific operating techniques. These are called design standards. The chief characteristic of standards is that they require the waste discharger to meet specific

[1] Individuals may of course bargain with the farmer to preserve wetlands. This has happened in practice through organizations such as Ducks Unlimited that uses funds from its members (waterfowl hunters) to compensate farmers to preserve wetlands in Canada and the United States.

[2] Emissions refer to waste products released to the atmosphere, while effluents are the wastes discharged into bodies of water. To simplify discussion, discharges of waste to any environmental medium will be called emissions.

conditions set out in the regulation, or face penalties. They do not set an explicit price on wastes. There may be an implicit price that emerges from the quantity constraints. By contrast, the principle of a market-based initiative is to set a price for polluting activities. The goal is to set that price at the point where the marginal damage caused by the polluting activity is equal to the marginal costs of controlling emissions. The discharging party (the 'polluter') then faces this price for each unit of emissions it contemplates releasing into the natural environment. The waste-discharge services of the environment then effectively becomes another input into production or consumption activities and are used efficiently if no other market distortions exist. Examples of market-based policies include pollution taxes or charges, tradeable pollution permits, and subsidies. Whether governments use command and control or market-based policies depends on a host of factors including the type of pollutant (its toxicity, whether local, regional, or global), likely elasticities of response to implicit or explicit pollution prices, administrative feasibility, and so on. No single policy instrument is appropriate for all types of environmental problems.

A key component of efficient environmental policy is to levy the tax, standard or other policy instrument as directly as possible on the source of the emission, rather than to use indirect policies. For example, an emission tax on motor vehicle wastes is a more efficient instrument than an excise tax on gasoline, if the environmental target is to reduce air pollution from motor vehicles. The emission tax provides an incentive for vehicle owners to adjust all aspects of their driving (kilometres driven, the vehicle's characteristics, gasoline used, etc.) to reduce their tax liability. A gasoline tax may be a good proxy for an emissions tax when it is technically difficult to levy the emissions tax,

because air pollutants are highly correlated with gasoline consumption. Thus reducing gasoline use will also decrease emissions. But it won't provide an incentive for drivers to switch to a different type of gasoline that produces fewer emissions unless the tax rates vary by fuel type. As a practical matter however, it may be physically impossible or administratively prohibitive to use emissions-based policies.

If a country has socially efficient environmental policies (particularly market-based policies) in place that internalize environmental externalities, its degree of integration with other countries should not affect the state of the natural environment in theory. As investment and trade flows increase and GDP grows, the country's environmental policies will ensure that domestic pollution remains at the optimal level because prices for polluting activity correctly reflect environmental quality targets. In practice, countries do not have optimal environmental policies. Many environmental externalities remain unpriced or unregulated. If this is the case, increasing the degree of openness of a country may exacerbate environmental degradation. A theoretical literature examines this issue, typically from the viewpoint of developing versus developed economies. The models assume that developing countries have less stringent environmental regulation that developed countries. Increased trade flows may make them worse off as economic activity expands bringing with it more waste flows and land use changes that increase environmental degradation (e.g., deforestation, loss of fish habitat). Chichilnisky (1994) assumes that developing countries will have less well-defined property rights and thus more open access environmental resources. This gives it a comparative advantage in natural resources. Increasing trade and investment flows will then lead to greater production of natural resources and hence, more environmental

degradation. The culprit is thus insufficient definition and enforcement of property rights and policies to use environmental resources socially efficiently, not increased integration per se. Copeland and Taylor (1994) also model trade between developed (the 'north') and developing (the 'south') countries in a general equilibrium analysis. They consider a local pollutant that is confined to each country, i.e., it does not spill over national boundaries. They describe their results in terms of three distinct, but related effects of trade and growth on the environment that were first used by Grossman and Krueger (1991). These are:

- The *scale effect.* Trade liberalization contributes to higher levels of GDP. GDP growth means more production and consumption, and hence more waste and environmental degradation produced. Environmental quality will thus decline if regulatory policies do not keep up with the GDP growth, i.e., if optimal environmental policies are not in place. The scale effect may not be monotonic with rising income levels. If environmental quality is income elastic, as incomes rise, a country's inhabitants will want higher levels of environmental quality and thus pressure their governments to introduce more stringent environmental policies that ensure growth does not lead to worsening environmental quality. Higher incomes may also lead consumers and producers to voluntarily reduce their emissions and engage in more environmentally friendly activities. For example, more recycling and process changes that produce less pollution per unit output may occur.

- The *composition effect* captures any industrial restructuring that occurs because of trade and economic growth. Trade and growth can affect the pollution intensity of production. With increased trade, if the expanding export sectors are less pollution intensive than the contracting import-competing sectors, the pollution intensity of a country's output will decline, and vice versa. What happens depends on a country's comparative advantage in pollution-intensive goods. Of course, not all countries can specialize in environmentally friendly goods; some will become relatively more

pollution intensive (if there are no offsetting effects elsewhere). This is one reason for protests against trade liberalization. The composition effect is also connected to scale. Rising incomes may lead consumers (as noted above) to prefer goods that are less environmentally damaging, they alter their demands for goods which in turn affects the mix of pollution-intensive versus environmentally-friendly production. Thus both traded and non-traded goods production and consumption may shift toward those that have a smaller adverse impact on the environment.

- The *technique effect* looks at how production technologies change with more trade and higher growth. The effect can go either way – toward less or more environmentally damaging production. Again, it is linked to the other effects. If efficient environmental regulations are in place or regulations become more stringent as economic scale rises, they will provide strong incentives for producers to seek new technologies that reduce the cost of meeting environmental targets. These technologies may result in lower emissions. Alternatively, as economic scale rises, technologies may become more pollution intensive as the natural environment degrades, more and more resources may have to be used to achieve a given level of output.

Copeland and Taylor assume that the north has more stringent environmental regulations than the south because of their higher income level. As trade increases, pollution-intensive industries in the north contract while those in the south expand. The composition effect thus leads to lower levels of pollution intensity in the north and higher levels in the south. The scale effect leads pollution levels to rise in both regions, but it also increases the willingness to pay for environmental quality, thus leading to more stringent regulation. This stimulates the technique effect to kick in and lower pollution per unit output. In their model, if the income elasticity of the demand for environmental quality exceeds one, the technique effect offsets the scale effect, and would lead to rising

environmental quality.[3] But this still leaves the composition effect that improves environmental quality in the north, but reduces it in the south. Aggregate environmental quality declines because the average pollution intensity of output rises due to the composition effect in the south. Aggregate output of pollution intensive goods rises due to specialization of production in the south and the lack of compensating rises in environmental regulation.[4] Thus, if trade could some how be balanced so that environmental regulation kept up with the rising pollution intensity in the south, environmental quality need not decline. Another implication is that if trade liberalization leads to income convergence (at a higher, not lower level than before), threats to environmental quality will diminish.

Both Chichilnisky and Copeland-Taylor assume that comparative advantage is dependent on a country's environmental policies and property rights, other things equal. Developing countries then have a comparative advantage in pollution-intensive goods because they have lower income levels and hence, have less stringent regulations and property rights that are not as well defined and enforced as in developed countries. As is

[3] Antweiler, Copeland and Taylor (1998) use sulphur dioxide as an environmental indicator to estimate scale, composition and technique effects for 44 countries using data from 1971-96. The composition effect is unclear. Capital appears to flow from middle-income countries to the highest and lowest income countries. Capital migration to high-income countries supports the prediction that pollution intensity will rise in capital-intensive countries if pollution and capital intensity are highly correlated. The move to the lowest income countries is not consistent with this, but may reflect regulatory stringency. However, they also find that the technique effect dominates the scale effect. For example, a 1 percent increase in economic activity increases SO_2 emissions by 0.3% (scale effect), but the technique effect reduces these emissions by 1.4 percent, leading to a combined effect of a reduction of 1.1 percent.

[4] A variant on the Copeland-Taylor argument for investment is presented by Beladi et. al. (2000). In their theoretical model, the north is capital-rich and resource-poor, while the south is the opposite. Trade liberalization leads to greater investment by north in the south's natural resource industries (their example is agriculture), but this simply serves to accelerate depletion of natural resource stocks through pollution (and presumably extraction rates above replacement for renewable resources). The south therefore needs more and more capital over time to produce the same output. This is reflected in an upward sloping demand curve for capital by south. Pollution levels and environmental degradation are then ever increasing.

discussed below, the empirical evidence is mixed. However, there are other problems with the assumptions. A study done for the WTO by Nordström and Vaughan (1999) argues that it is the absolute difference in regulatory stringency that matters for comparative advantage, not measures such as the pollution abatement and control expenditures (PACEs) in each country. Differences in PACEs across countries or regions are a common indicator of regulatory stringency used in the literature. This is largely because there is no readily measurable indicator of regulatory stringency.[5] The use of PACEs is however problematic for several reasons. First, this data is extremely hard to obtain, if available at all. The U.S. discontinued its survey of PACE of firms in 1994. Canada has approximately three years of PACE data, done by special surveys that ended during the budgetary cutbacks of the 1990s. There is thus no data at the level of the plant that can be used to look at effects post-NAFTA. Second, even if PACE data were available, what does it really tell us? High levels of PACEs in any given year could indicate that the region had previously had very lax environmental targets and was now trying to catch up with other regions. It does not necessarily mean that this is a region that has had stringent policies. PACEs could also be high because the region is rich in other factor inputs that pollution-intensive industries use intensively. These could be primary resources, but could also be capital. Many pollution-intensive industries are also capital intensive, for example, chemicals and oil and minerals refining. Developed countries have a comparative advantage in capital-intensive goods, so this implies using the Copeland-Taylor model that pollution-intensive production will increase in the north rather than the south. Their results would then be reversed. Aggregate pollution levels should fall, not rise. Ultimately, the effects must be determined empirically. The next

[5] More on this below.

section examines a variety of indicators of environmental quality, investment, trade flows, and the pollution-intensity of production in North America from the early 1990s (pre-NAFTA or at the time it was adopted) to the most recent year available.[6]

2. Trends in Environmental Quality in North America

As noted in the introduction, there is no universal indicator of environmental quality. Many countries are now collecting a wide variety of data on a number of different indicators, but there is no way to aggregate these largely physical measures to arrive at an overall number. The result is that for North America, there is good news and bad news, and one is left with subjective methods of determining whether or not environmental quality overall is declining or not. Another difficulty is that indicators are not necessarily measured (or reported) in comparable ways across countries. This is a problem in North America for most indicators. Thus again, interpretation of the data tends to be subjective. A third problem is that data at the country or even regional level may well hide 'hot spots' – regions where environmental quality is much lower than suggested by the aggregate figures due to a concentration of pollutants in that region. This can be due to physical factors (geography, meteorology, hydrology) and agglomeration of polluting sources (industry, agriculture, urban areas). Caution in

[6] One problem with many studies examining trade and growth effects on the environment and environmental regulation is that they use data that predates major changes in trade liberalization. This is being remedied now with the publication of work that uses much more recent data. This paper thus does not review much of the literature that is based on data from the 1970s and 1980s. There are many good surveys of this literature. See, for example, Levinson (1997), Nordström and Vaughan (1999), Olewiler (1994), Jaffe (1995).

interpreting the data is thus warranted. Finally, there is insufficient data for many types of environmental indicators, for example, biodiversity, to get a clear indication of trends.

The data presented are thus snapshots and fairly brief time trends. The basic message is that there is good and bad news. Examples illustrate potential scale, composition, and technique effects at work.

Air Quality

Some of the 'best' environmental data is on air quality. Figures 1 and 2 present air quality data for Canada and the United States for the so-called criteria pollutants – sulphur dioxide (SO_2), nitrogen oxides (NOx), carbon monoxide (CO), volatile organic compounds (VOC), particulate matter (PM), and ground-level ozone (O_3). Mexican data is sparse as it began being collected in 1988 and there is still no data on a national level. Data is collected for the criteria pollutants in major cities. The news is generally 'good' for Canada and the United States and improving in Mexico.[7] Ambient concentrations (and/or emissions) of SO_2, CO, and VOC have declined over time in Canada and the U.S., and in major Mexican cities such as Mexico City. This is good news as all these contribute to health problems, productivity losses, and ecosystem damage. However other criteria pollutants have increased. Ambient levels of ground-level ozone have risen in Canada and remain high in Mexico. Ground-level ozone is a main component of urban smog, formed from emissions of VOCs plus NOx in the presence of sunlight. In the U.S., while emissions of VOC have declined since 1995, emissions of NOx have remained relatively constant, thus smog remains a problem in its urban areas as well. NOx emissions in Mexico City have risen 25 percent from 1988 to 1996 and ground-level ozone remains a very serious problem for all major Mexican cities. Levels exceed their

'good' standard for 9 out of 10 days in Mexico City. But generally, smog in Mexican cities is not getting worse. It is just not getting better for the largest cities (although it is improving somewhat in some smaller ones). The health effects of smog include exacerbating lung diseases, inducing respiratory inflammation, and other cardiovascular impacts. It damages materials and reduces agricultural productivity. The major sources of VOC and NOx are motor vehicles.

Figure 3 shows what has been happening in the U.S. [Canadian data will be added] to fuel consumption by motor vehicles and average miles per gallon since the 1970s. There is a U-shaped relationship in fuel consumption, but fuel efficiency has been gradually rising, reflecting fuel efficiency regulations. Miles driven per vehicle per year have increased as well (from just under 10,000 miles in 1970 to approximately 12,200 miles in 1998). The increase in fuel consumed may reflect a potentially negative composition effect within an industry – the shift to less fuel-efficient vehicles (e.g., sport utility vehicles) due to very low real fuel prices and fads. This data also may illustrate the scale effect at work, and points to the necessity of targeting policy to the correct environmental indicator. Improving fuel efficiency does not necessarily lead to less pollution if the increase in miles driven per year offsets the fuel efficiency gains.

When examining the change in the emissions and ambient levels of criteria pollutants over time, it becomes apparent that the components of urban air pollution – NOx, VOC, and the resulting ground-level ozone are not declining. The major sources of these emissions are motor vehicles. It indicates that regulatory policies (discussed below) have not kept up with the increasing number of motor vehicle in urban areas. The number of vehicles has risen due to population and income growth.

---

[7] The sources for the Mexican data are Fraser Institute (1999) and Guzmán (1999).

Emissions of particulate matter have decreased in Canada fairly consistently since 1979, but follow a very complex path in the United States, with levels rising dramatically in the mid-1980s, then falling until 1995, but now rising again. Particulate matter comes from fossil-fuel fired power plants, motor vehicles, construction, and natural sources such as fires and volcanoes. It is viewed as one of the most serious air pollutants affecting human health, causing cardiovascular problems, cancers, and premature deaths.[8]

Figure 4 presents emissions of carbon dioxide (CO_2) and the ratio of CO_2 to GDP for Canada and the United States. While aggregate emissions have risen, the carbon intensity of production is falling. This illustrates a potentially beneficial composition effect. However, the rise in aggregate emissions shows the role of the scale effect.

The final air pollution examples illustrate two 'success stories' for environmental regulation: the removal of lead in gasoline and the Montreal Protocol to eliminate the production and use of stratospheric ozone-depleting compounds. Since the ban on leaded gas in the U.S. and Canada, emissions have fallen dramatically, then stabilized, as Figure 5 indicates. Mexico introduced unleaded gasoline in 1990 and has banned leaded fuel in Mexico City effective in 2000. The Montreal Protocol of 1987 established a timetable for the elimination of CFCs and other ozone-depleting compounds. CFCs were banned in Canada effective in 1995.

---

[8] PM is one of the most serious air pollutants world wide. The numbers given in Figures 1 and 2 are for PM-10 which refers to particulate matter less than 10 microns in size. The current scientific analysis suggests that PM-2.5 may be even more important to monitor for health reasons. The U.S. started measuring these emissions in 1990.

[8] The success in reducing phosphorus is largely due to Canadian-U.S. cooperation through the institution of the International Joint Commission on boundary waters.

Energy Consumption and the Energy Intensity of Output

Energy use is a good indicator of environmental quality impacts because most energy consumed is derived from fossil fuels and the by-products of consumption release the local and global air pollutants discussed above. Energy production also has environmental impacts whether it is fossil-fuel based or not (e.g., hydro-electricity and nuclear power). Figure 6 shows energy consumption in the United States [Canadian data will be added] in aggregate, per capita, and per unit GDP. While aggregate and per capita consumption have been rising continually, energy consumption per dollar of GDP has fallen since the 1970s. This data illustrates the competing forces of the scale effect versus what might ultimately be environmentally beneficial composition and technique effects. The technique effect is probably the factor most responsible for the reduction in energy use per unit GDP, as producers and consumers have substituted into more energy efficient equipment after the oil-price shocks of the 1970s and greater environmental awareness (and higher incomes) of the 1980s and 1990s.

Water Quality

Water quality is measured for individual bodies of water. There are thus no national measures that can be easily summarized. Again, there is good and bad news. Due to regulatory efforts, the amount of phosphorus released into the Great Lakes has declined significantly since the late 1970s. For example, Figure 7 illustrates the declining phosphorus concentration in Lake Ontario.[9] Phosphorus (and other nutrients such as nitrates) is a major source of eutrophication of surface waters caused by an

[9] The success in reducing phosphorus is largely due to Canadian-U.S. cooperation through the institution of the International Joint Commission on boundary waters.

overabundance of plant material (largely algae). This reduces the oxygen content of the water, killing fish and other aquatic fauna. Figure 8 illustrates another example of water quality improvements due to regulation – the ban on PCBs.

However, recent events in Canada suggest that the bad news is that our water treatment infrastructure has been declining in recent years. There has been an increase in the number of water supplies contaminated by bacteria and parasites. These have resulted in 'boil water' advisories for many parts of the country, e.g., over ½ of Newfoundland's water supplies, many water districts in the interior of British Columbia, and of course the highly publicized case of Walkerton, Ontario, and more recent problems in North Battleford, Saskatchewan. There are also cases of groundwater contamination due to pesticides and other persistent toxins. Time and space prohibit an in-depth examination of water quality in the U.S. and Mexico. The evidence in Canada, does however suggest that there are problems.

Water Supply

Water supply – the total amount available for consumption and use is another indicator of environmental quality. Again, time prohibited obtaining figures on a national basis for each country. The simple story is that each country does not have a water supply problem in aggregate, but particular regions are facing potential water shortages due to the depletion of groundwater supplies and the total commitment of existing surface waters to current uses. Water as a commodity is also a very contentious issue in NAFTA and other trade agreements. It is beyond the scope of this paper (indeed

it is a paper in itself) to address that issue. The key point is that there is concern about the available quantity of water is some regions.

Toxic Emissions

Toxic compounds are those deemed by regulators to pose a threat to human health or ecological processes, or are highly resistant to chemical and biological breakdown by natural processes and therefore persist in the ecosystem after release, or if they accumulate in the food chain.[10] Table 1 compares toxic emissions in Canada and the U.S. in 1994 for industries at the two-digit SIC level.[11] Note that the emissions-intensity of releases can differ substantially between the two countries.[12] Canada is over 50 percent more emissions intensive than the U.S. for virtually all of the most emissions-intensive industries: paper and allied products, rubber and plastics, non-metallic minerals, chemicals and chemical products, and refined petroleum and coal. The U.S. is over 50

---

[10] This is paraphrased from the Canadian Environmental Protection Act of 1988. Similar wording occurs in U.S. legislation covering toxic releases.

[11] This data comes from the National Pollutant Release Inventory (NPRI) for Canada and the Toxic Release Inventory (TRI) from the United States. Dasgupta, Lucas, and Wheeler (1998) have collected data on the emissions of air pollutants from a sample of 6000 Mexican manufacturing plants and calculated emissions intensity per employee for large, medium and small plants. This data cannot be directly compared to the NPRI and TRI data because the emissions covered are not the same. However the ratios for Mexico suggest that the pollution intensity of industries differs among the countries. This should not be surprising given differences in factor endowments and regulation. For example, taking the most emissions-intensive ratio for Mexico for what is a pollution-intensive industry in Canada and the U.S., petroleum products, the ratio is 638 pounds per employee for large firms. The ratio in Canada for all toxic releases is 3486 tons per employee and 770 tons per employee in the United States. The most emissions-intensive firms in Mexico in this sample are small firms in the wood industry, with a ratio of 1050 tons of emissions per employee. By comparison, Canada' s ratio is 16 and the U.S.'s is 57.

[12] The data should be adjusted to reflect toxic intensity, not just emissions-intensity, where toxic intensity reflects the projected toxicity of each of the compounds released by each industry. In Table 1, compounds of what might be very different toxicity are aggregated by weight. See Olewiler and Dawson (1998) for a measure of the toxic intensity of Canadian industries. Lucas et al. (1992) derive toxicity measures for U.S. manufacturing industries. In these toxicity-weighted measures, most industries which are emissions-intensive are also toxic intensive. For example, industries in Canada with the highest overall toxicity are (in descending order of toxicity): refined petroleum and coal, chemicals and chemical products, mining, crude petroleum and natural gas, primary metal, paper and allied products, rubber, plastics, and non-metallic minerals. These industries are also the top seven in Table 1.

percent more emissions intensive in the less pollution-intensive industries such as electrical and electronics, fabricated metal, food and beverage, furniture and fixtures, machinery, leather, and wood and lumber. Overall, emissions per dollar of output from Canadian manufacturing industries are 50 percent higher than releases from U.S. manufacturing. Table 1 thus illustrates a key point: pollution-intensity can differ significantly among similar industries operating in different countries. There are many potential reasons for these differences including technology, product mix, comparative advantage in pollution absorption (although this is not too convincing given these compounds are not assimilated by the natural environment), and of course, regulatory stringency.

Table 2 [to be added] shows that there have been some significant changes in Canadian data since the mid-1990s, with emissions from some of Canada's most pollution-intensive industries such as paper and allied products and chemicals declining substantially. The decline is due to regulatory changes and voluntary actions by industry to reduce emissions (more on this below). However, these results are not so optimistic when one looks at aggregate toxic emissions to Canadian environmental resources (air, surface water, land, underground) over the period 1993-98.[13] The top half of Figure 9 illustrates the time trend in toxic releases unweighted by toxicity. The largest decline is in discharges to surface water. There are increases in discharges to air, land, and underground injection since 1993. An implication of this trend is that polluters may be simply reallocating their wastes to another medium – away from water and on to soils in response to differences in the stringency of regulations. The bottom half of Figure 9 presents the toxicity weighted releases. The aggregate levels have risen somewhat over

time (up for air and land, down for water and underground injection ignoring 1993 for that medium). This suggests that polluters could be shifting from high volume but low toxicity emissions to low emission-high toxicity releases.

Forest Cover[14]

Data on forest cover is available for all three countries for 1990 and 1995. This is the total number of hectares with either natural forests or plantations. Both Canada and the U.S. had a very small increase in total hectares, rising 0.3 percent in Canada and 1.4 percent in the United States. Total forest cover fell in Mexico by 4.4%. However, the sum of total forests in the NAFTA countries rose marginally from 511.2 million to 512.5 million hectares. Thus, aggregate forest cover has not declined after the passage of NAFTA. These aggregates do not of course reflect some significant forest use issues such as the harvest of 'old growth' forests in British Columbia and the Pacific Northwest of the United States. The aggregate data do not take forest quality into account.

Prestemon (2000) examines the impact of NAFTA on Mexican forest cover using a general equilibrium model that incorporates land use and ownership characteristics of the country. His theoretical model assumes that a proportion of forest land is in private hands where land owners maximize their land value by allocating it to timber or other uses, depending on which yields the largest present value of net returns over time. All timber markets are assumed to be competitive. Public forest land is divided into two components – publicly managed and open access. Open access harvests are assumed to

[13] The data for this figure is taken from Antweiler and Harrison (2000).

be illegally poaching trees and weigh the value of tree against penalties for being caught. There is no interest in long-term sustained management of the forest because there is no security of tenure. Passage of NAFTA changes a number of factors that affect timber harvests on all lands. Effects are complex due to the need to examine both short and long-term incentives to harvest timber. A key result is that if all forest lands are public (with some proportion open access), if prices rise in a post-trade liberalization environment, forest cover will fall because this raises the return to poaching.[15] The impact on forest cover of NAFTA is thus dependent on how forest product prices change and the share of forest land in open access versus private ownership. Mexican forest ownership is complex with private lands and public lands held not as open access, but by communities and as ejidos where rights are assigned communally. Public lands comprise about 80 percent of total forest land. The federal government regulates harvests on the ejidos and requires sustained forest use of the land, so it cannot be interpreted as completely open access forest, although some illegal harvesting occurs. This also means that if timber prices fall, the public forest land cannot be converted to another land use (such as agriculture). The community shares in the profits from the timber harvest. There are also protected forests where timber harvests are forbidden.

Using data from Mexico and results from other general equilibrium models, a variety of scenarios are presented for different land use elasticities, timber and agricultural prices, and percentage of land under different property rights. If NAFTA simply removes domestic distortions, forest cover rises modestly with increases in public

[14] Data for forest cover and the next four categories comes from World Resources Institute (2000), *World Development Data*, various tables.

lands offsetting reductions in private forest land. This is because timber prices fall slightly. If NAFTA causes domestic timber prices to reach international prices, timber prices fall by a much larger amount. There is a large increase in forest cover, reflecting the prediction that virtually all threatened public lands are held in timber in perpetuity and all private forests are converted to other uses. Because the majority of Mexico's forests are public, this increases forest cover. These results assume no policy changes on the part of the federal government. For example, if timber prices fall, the government does not decide to reduce the stock of protected forest. The prediction that timber prices in Mexico would fall after NAFTA seems reasonable because Mexico is a net importer of timber products. Note that these are long-run changes. Thus the decrease in forest cover observed in the data from 1990 to 1995 may be consistent with the model as private land owners harvest their timber then convert their land to other uses. The paper thus illustrates what Chichilnisky's paper argued – property rights to natural resources are a key determinant of the impact of trade liberalization of the natural environment.

Fish Stocks

World Resources (2000) data does not isolate fish harvests from NAFTA countries as they are presented for geographical regions of major oceans. However, it is clear that a large number of North American marine fish stocks have declined, some to the point of collapse, for example, cod. All fisheries in the Atlantic ocean with the exception of those in the southwest Atlantic are characterized as 'overfished'. NAFTA is not however the cause of overfishing; all these regions were 'fully fished' prior to its passage. Chomo and Ferrantino (2000) argue that while harvests in many North

[15] This result is consistent with other papers on deforestation.

American fisheries exceed their sustainable level and declining stocks are a major concern, NAFTA-related policies are unlikely to have had any effect on the stocks. This is because tariffs were already near zero prior to NAFTA. Where tariffs did exist (for Mexican products), the trade flows are low relative to harvests. Fish stock harvesting techniques and fisheries management have however been subjects of trade disputes.[16] Pacific fisheries are somewhat less threatened, but again predictions are that they will be fully fished within the next few years. It is clear that wild fish stocks are an environmental resource whose sustainability is in question.

Soils/Agriculture

Ideally, one would like data on land/soil productivity or soil loss over time. I could not find this sort of data for the three countries. Total hectares in agricultural use has declined for Canada and the U.S. from 1987 to 1997, down less than $1/10^{th}$ of 1 percent in Canada and 4.7 percent in the United States. In Mexico, total cropland has risen by 7.1 percent (perhaps conversion from forestry?). Overall, cropland has declined about 2.8 percent. Data is also available on average annual fertilizer use per hectare of farmland. Fertilizer use has environmental impacts. Runoff of excess fertilizer (beyond what plants take up) can contaminate ground water and, as noted above, contribute to eutrophication of surface waters. Fertilizer use rose in Canada and the U.S., 31.4 percent and 32.5 percent respectively, but fell almost 24 percent in Mexico. This is an intriguing result, given the cropland data. More intensive farming appears to be occurring in Canada and the U.S., but not in Mexico. This may reflect comparative advantages and

[16] These are the tuna-dolphin and shrimp-turtle cases that came under provisions of the GATT. The trade disputes were over the ability of a country to extend natural resource conservation regulation extra-

relative price changes for agricultural goods, product mixes, or the type of farming techniques used (composition and technique effects). This is the subject for another paper.

Concluding Comments

This somewhat lengthy section presents crude environmental indicator data and illustrates that possible impacts of greater economic integration through trade liberalization, investment, and economic growth on the natural environment are complex and ambiguous. The list of indicators is by no means complete, nor can a definite conclusion be drawn regarding the actual impacts of integration on the environment. Different sides in the debate can draw their own conclusions with use of selected data. What can be said is that the evidence does not support a massive change in either direction for most of the indicators. It may also be that too little time has passed to infer anything concrete. This data provides a modest empirical check on some of the hypotheses now to be examined.

3. Hypotheses on the Links between Integration and the Environment

Four hypotheses are examined to try to determine how greater economic integration affects the natural environment and how environmental regulation affects the economy. In each case, a snapshot of the relevant literature is presented along with some recent data.

---

territorially. These actions were held in violation of trade and not covered by exemptions for conservation.

Hypothesis #1: Competitiveness and Pollution Havens.

Stringent environmental regulations undermine a country's competitiveness and provide a strong incentive for capital and jobs to flee to regions with less stringent regulation.

A number of factors must be present to make a country's competitiveness, jobs, and productivity highly dependent on the stringency of its environmental regulations. First and foremost, environmental regulations will have to lead to a significant enough decline in a company's profits that it must scale back its production or contemplate relocating in a region with less stringent regulations. It is key to focus on profits, not just costs, as both total revenues and total costs can be affected by environmental regulation. Environmental regulations typically increase a polluter's total costs of production. To comply with regulations, the firm may have to cut output, incur higher capital costs due to the need to install pollution abatement equipment, or face higher operating costs. However, it may change its production techniques and even possibly lower total costs. Any or all of these cost changes can occur. The debate is over how much a polluter's costs rise. The type of regulatory policy used also plays a role. The theoretical and empirical literature shows that market-based policies are generally more cost effective than command and control – they reach the same environmental target at lower total costs to society, including costs to the polluter. This should be borne in mind throughout the discussion because with a few notable exceptions (the sulphur dioxide trading program in the U.S.), most environmental regulation in North America has been command and

control. Substituting market-based policies for command and control could have a significant impact on the cost of compliance.[17]

Environmental regulations have been present in Canada and the United States since the 1970s. What has happened in practice? The early literature (pre-1990s)[18] examining competitiveness and productivity issues found that pollution abatement and control costs were on average less than 2 percent of total costs and rarely exceeded 5 percent of total production costs. These results are widely cited and pertain to industry aggregates. There are at least two reasons why these numbers may be an underestimate: pollution-intensive industries (or firms within industries) will face higher costs and costs may be rising over time as regulations are phased in and gradually become more stringent. An example of the former is a study of the U.S. copper industry (Chapman, 1991) that examined environmental regulations and worker health and safety. Regulation was estimated to lead to a 20 to 25 percent increase in production costs.[19] In a 1990 study, the U.S. Environmental Protection Agency (EPA, 1990), estimated that PACEs would rise as a percentage of GDP from an average of 1.7 percent for the 1972-90 period to 2.6 percent by 2000. A key reason why PACEs are expected to rise over time is that as (or if) regulation becomes more stringent, firms will be moving up their marginal abatement cost curves, facing higher unit costs of controlling additional increments in pollution. Unfortunately, we cannot test these predictions against more recent data because as noted above, neither Canada nor the U.S. currently survey and report PACE

[17] Aggregate costs of compliance with SO_2 standards has estimated to have fallen by between 30 and 50 percent under the sulphur trading program compared to the command and control regulations that it replaced.

[18] See Olewiler (1994) for a more detailed summary of the early literature.

[19] Unfortunately, the breakdown between environmental regulations versus health and safety isn't provided.

data. There are thus no current estimates of PACEs except for studies of individual sectors and anecdotal information.

However, it is by no means certain that pollution abatement costs must rise over time. If the regulations induce technological and/or process changes, costs may fall. This might be an explanation for why PACEs did fall in the U.S. from the period 1973 to 1988 (the last year this data was available). PACEs as a percentage of total capital expenditures fell from 12.1 over the period 1973-1980 to 7.4 percent for 1981 to 1988 for mineral processing, 9.1 to 5.3 percent for chemicals, 11.7 to 6.5 percent for pulp and paper, and 10 to 7.1 percent for petroleum. By comparison, for all manufacturing, the drop was 6.2 to 3.8 percent.[20] In Canada, a study of the costs of compliance with Ontario's MISA regulations found that they were significantly lower than estimated at the time the regulations were first introduced.[21] Other recent evidence supports what has become known as the 'Porter hypothesis' – that regulation induces commercially valuable processes or products. Morgenstern et al. (1997) estimates from survey data on PACEs that a one-dollar incremental expenditure on PACEs leads to a 13 cent increase in production costs on average across their sample.[22] Berman and Bui (1998) examined oil refineries over the period 1977-93 and found that those facing the most stringent regulations in the U.S., had the fastest productivity growth that they attribute to new technology. However, the Porter hypothesis remains controversial.[23] For example, Jaffe and Palmer (1997) find that PACEs stimulate R&D, but provide limited direct

[20] U.S. Department of Commerce, "Plant and Equipment Expenditures by Business for Pollution Abatement" *Survey of Current Business*, various years.
[21] Donan (2000). A number of contributing factors were conjectured in addition to technological change, including the closure of older, less efficient plants.
[22] Their standard deviation was high at 69 cents.
[23] See the articles by Palmer, Oates, and Portney and van der Linde and Porter in the *Journal of Economic Perspectives* (1995), Vol. 9(4), pp. 97-132.

commercial value to the firm incurring the abatement costs (but this does not rule out public benefits from the spillover of technological knowledge). Attempts to quantify the cost saving due to regulation-induced technological innovation (e.g., see the discussion in Nordström and Vaughan, 1999), fail to find very significant impacts. The key message is that environmental regulations do add to a firm's costs of production, but the increments appear to be small, except perhaps for the most pollution-intensive firms. One should also not forget that society is interested in net benefits – the total costs versus total benefits of improving environmental quality. The distribution of these net benefits is often what is of concern to policy makers.

At least two factors are at work on the total revenue side. If firms have any degree of market power and environmental regulations do increase their costs, they may be able to pass along these cost increases to consumers of their products. If firms take world prices as given, and other producing countries do not have comparable environmental regulations, then profits will fall from what they would be without regulation. However, firms may be able to brand and market themselves as environmentally friendly, and thereby differentiate their product from that of other polluters.[24] This would shift their demand curve out if buyers respond positively to this branding. There is some evidence to support the view that investors and consumers do care about a company's environmental record. Cohen and Fenn (1997) examined financial and environmental data from the Standard and Poors 500 companies, dividing them into 'green' firms who had environmental records better than the median firm, while 'brown' companies were the environmental deadbeats. The green portfolio outperformed the brown in 80 percent of the cases (but not only statistically significantly

in 20 percent of all cases), where the cases were based on different ways of measuring a company's environmental record. The conclusion is that being green doesn't appear to penalize the company. Repetto (1995) gets similar results.

Finally, one must compare any potential impacts of environmental regulation on a firm's profits to changes in other input prices and availability that may be occurring simultaneously. Econometric techniques can of course do this by specifying all the factors that may influence a firm's decision of how much to produce and where to locate. Evidence from econometric studies finds little support for the pollution haven hypothesis. A brief review of the most recent literature illustrates these findings. See Levinson (1997) and the OECD (1997) for a more extensive review of the earlier literature on foreign direct investment flows and pollution havens.

There are two strains of the literature – the first examines flows of foreign direct investment, FDI, or trade flows, (generally from the U.S. to other countries), the other looks at inter-state investment flows within the U.S. in response to differences in environmental regulation among states. The FDI studies are reviewed first.
A study by Leonard (1988) for the period 1973-85 and updated by Olewiler (1994) to 1991 found that while pollution-intensive industries' (in these studies, chemicals and mineral processing) share of total FDI rose over time, the change was minimal – rising from 25.7 percent in 1973 to 28.9 percent in 1991. The share of FDI from chemicals and mineral processing going to developing countries (who are alleged to be the pollution havens, an assumption challenged elsewhere in this paper) peaked in 1982, falling thereafter. Similar findings are repeated for later years. Repetto (1995) noted that developing economies received a much smaller share of FDI from the U.S. in pollution-

[24] Environmental branding or eco-labeling is discussed again in hypothesis #4 and in section 4.

intensive industries (5 percent) compared to total FDI from the U.S. (45 per cent). Developed countries, on the other hand, received 24 percent of the pollution-intensive FDI from the United States. Albrecht (1998) examines the U.S.'s FDI inflows and outflows and finds that outward FDI is growing faster in clean industries, while inflows of FDI are growing faster in dirty industries. Table 3 presents FDI inflows to the U.S. in 1994 and 1999 from all countries, then isolates that from Canada and Mexico. While aggregate inflows of FDI have increased dramatically in the post-NAFTA period for all pollution-intensive industries except chemicals, the share of inbound FDI in the pollution-intensive sectors has fallen relative to that of services and a number of other less polluting sectors. While this does not contradict Albrecht's findings, it suggests the data should perhaps be interpreted with care. The World Bank (1998) calculates the net exports of pollution-intensive goods for 1986 to 1995 and finds that developing countries do not specialize in these industries. The import more pollution-intensive goods than they export. These results suggest that other components of a country's comparative advantage dominate differential environmental regulations.

The numbers above simply look at aggregates and do not try to explain FDI or trade flows as a function of factors reflecting a country's comparative advantage. A number of papers try to do this. Some examples are given. Xing and Kolstad (1998) perform a cross-sectional regression of U.S. FDI for two pollution-intensive industries (that is, industries that are pollution-intensive in the U.S.) and four industries that are not pollution intensive. The explanatory variables are corporate tax rates, market size (GDP per capita), industry profitability, and the stringency of environmental regulations. Because stringency cannot be directly measured, they use a country's SO_2 emission levels

in that year as a proxy. The coefficient on SO_2 is significant and positive for the pollution-intensive industries, but not for the others, thus supporting the pollution haven hypothesis. The estimated impact was relatively small. For example, a 1 per cent increase in SO_2 emissions in a country is predicted to attract $0.27 million of additional FDI from the U.S. chemical industry. Total annual FDI by the U.S. chemical industry in recent years was $4 billion, of which most went to developed countries, who presumably have environmental regulations with similar stringency.[25]

Using an environmental indicator as a measure of environmental stringency is problematic. The level of emissions in any year can be a function of a host of factors including regulatory stringency (e.g., current and past regulation, physical features, characteristics of the pollutant, etc.). Results may also be sensitive to the indicator chosen. For example, in a framework analogous to Xing and Kolstad, Kwan (1999) uses three different environmental quality indicators as proxies for stringency and finds that the results are sensitive to the variable chosen. The pollution-haven hypothesis is only supported for one of her variables. What to use as the indicator of regulatory stringency is an unresolved problem in all of the environmental literature.

Low (1992) examined U.S. – Mexico trade patterns for 48 industries that had high PACEs. These industries accounted for 12 percent of all exports to Mexico, but had a growth rate of 9 percent annually prior to NAFTA, compared to 3 percent for all exports. This could be interpreted as support for the pollution-haven hypothesis. But, Low also estimated that if pollution abatement costs in Mexico rose to those in the U.S. (presumably by increasing regulatory stringency), Mexican export earnings would drop by 2 percent. This suggests that changes in trade flows due to environmental regulation

[25] Nordström and Vaughan (1999), p. 41.

are relatively small. Xu (1999) examined exports of pollution-intensive goods for 34 countries and found they were unchanged between the 1960s and the 1990s, even though most developed countries brought in environmental regulations in the 1970s. Grossman and Krueger (1991) regress U.S. imports from Mexico relative to total imports on factor shares (labour and capital), effective tariffs, and PACEs. While the coefficient on PACE is positive, it is insignificant. This result is typical of the many studies trying to find support for pollution havens by examining trade and FDI flows. There is either no support for the hypothesis or if positive, it is small.

Early studies of investment flows within the United States typically found no significant impact of environmental regulations on plant location. One criticism was that insufficient time had passed since the implementation of the regulations. More recent studies still use data that ends just as NAFTA was signed, so there are as yet, no studies examining the post-NAFTA period. See Fredriksson and Millimet (2000), List and Co (2000), Gray (1997), and Levinson (1996). Levinson's results, for example, suggest that the average state's probability of attracting new domestic firms decreases by 0.89 percent when aggregate PACE increase by one standard deviation. This translates into a loss of 65 production jobs over a 5-year period – hardly a substantial effect. List and Co (2000), using the same sort of conditional logit model as does Levinson, estimate the probability that foreign investment (FDI inbound to the U.S.) locates in a state. Their data is on occurrence of investment, not the level. Their regulatory stringency variables (four proxies were used in different estimations) were highly correlated with the probability of investment, suggesting that foreign investment is more sensitive to regulatory stringency than domestic (comparing their results to Levinson). However the magnitudes are still

not large. The median state's probability of attracting a new foreign firm decreases by 2.07 percent when real PACE expenditures per $1000 of value added rise by 10 percent. The state would lose 174 jobs over the period 1986 to 1993. While they call this impact 'large', it would be surprising if it were anywhere close to the investment and job loss if wage rates rose by 10 percent.

These studies also yield what seems at first to be a surprising result. While the effects are still small, the stringency of environmental regulation appears to have an effect on the location of both pollution-intensive and non-intensive plants. In some cases the impact of environmental regulation is stronger on the non-intensive industries than pollution-intensive firms. The authors find this perplexing and contrary to expectations. It suggests to me that the pollution-haven hypothesis is fundamentally flawed because it focuses on the wrong variable. Perhaps what studies should be looking at is the state of the environment in a region, not the stringency of environmental regulation. The reason industries don't differ is that no one wants to enter a 'dirty' state. Why? A number of factors may be at work. First, regions with more stringent regulations in the U.S. are ones that typically are non-attainment areas. This means their pollution levels exceed mandated environmental targets. Under various U.S. policies, no new plants can locate in a non-attainment area if they release emissions unless they can find another plant that will reduce its emissions and hence, offset those from the new entrant. Thus investment is curtailed. Even industries that don't release much pollution may be affected by these regulations. It should not be surprising that the regulations work – they are meant to keep pollution levels from rising and they do (modestly). This is the objective of the policy. It is not really a test of the pollution-haven hypothesis when some regions are constrained

and others not in the degree to which new investment can enter. Secondly, all firms and their workers may care about the quality of the environment (whether the firms themselves are pollution intensive or not). People don't want to live in a polluted area. Firms don't want to face higher absenteeism from pollution-related illnesses. Moreover, firms don't want to risk future liability for environmental damages suffered by their employees. They may also be liable if they locate on land that was previously contaminated by others. Even with assurances that the site was 'cleaned up', they cannot be sure some unforeseen toxin left by previous industry is not still active and they will have to clean it up or compensate affected parties. Non-attainment areas may also be ones where economic activity in general is declining because of the quality of life there (or other factors such as weather). The general migration of people and firms from the 'rust belt' of the U.S. to the 'sun belt' may dominate any environmental regulatory impacts. Finally, firms may expect that a region that is has more stringent regulation today because it is dirtier than the standard, may have to increase the stringency even more in the future if pollution levels do not fall to the target level. These results suggest that rather than dwelling on environmental regulation as a deterrent to competitiveness, we might want to focus on environmental quality as a positive attribute for investment and environmental regulation as a necessarily component to ensure that environmental quality is improved or sustained.

In summary, over 20 years of empirical studies have not supported the hypothesis that a country or region with stringent environmental regulations becomes less competitive and sees its companies and jobs relocating to pollution havens. The popular and political rhetoric still seems to think otherwise.

Hypothesis #2: The 'race to the bottom' or 'regulatory chill'[26]

Economic integration exacerbates competition by countries/regions for industries. Governments will reduce the stringency of their environmental regulations until the lowest common denominator prevails. Or, governments will pass regulations they have no intention of enforcing.

The race to the bottom (RTTB) or 'regulatory chill' (weak enforcement of regulations) is a logical extension of the pollution haven hypothesis. If the pollution haven hypothesis were supported by the data, we might expect to see destructive competition among governments to weaken environmental regulations to the lowest common denominator (that of the havens), or at best, to pass regulations they have no intention of enforcing. In principle, an examination of the state of environmental regulation within North America can be used to test the RTTB hypothesis. A RTTB would be supported if:

1. Regulations are converging among all three countries to some level lower than what prevailed before NAFTA came into effect.
2. Regulations haven't been weakened on paper, but enforcement has decreased over time.
3. Environmental quality is declining over time.

Taking the last statement first, from section 2, we know it is not possible to state unambiguously whether environmental quality has declined or not. As noted,

[26] Information from this section is taken from a number of sources including the web pages of each country's federal environmental agencies: www.ec.gc.ca (Canada), www.epa.gov (U.S.), www.ine.gob.mx (Mexico). Other sources include the OECD *Environmental Performance Review* for Mexico (1998), Canada (1995) and U.S. (1995), and United States-Mexico Chamber of Commerce (1998).

environmental quality indicators are moving both up and down, but it clearly is not uniformly down. Therefore, the data does not support overall declining environmental quality. As with empirical evidence on environmental quality, it is not an easy task to tackle the other two indicators of a RTTB because there is no way to aggregate all the different types of environmental regulation in North America.

Convergence of Environmental Regulations?

A number of summary points can be made from an examination of environmental regulations in North America and how they have changed over time. These will be supported with examples drawn from important areas of environmental regulation that parallel the environmental indicators examined in section 2.

- There is no evidence of at RTTB in federal environmental regulation in North America. Regulations, if they move at all, are generally converging to more, not less stringent levels.
- While the period 1994-1997 was characterized by little activity on environmental regulation for Canada and the U.S., Mexico was engaged in major changes to its environmental regulations, tightening them toward those of Canada and the U.S.
- There has been a general upsurge in environmental initiatives since the late 1990s in all North American countries, but regulatory interest at the federal level is highly variable over time.
- Local governments are being given more responsibility for environmental regulation in Canada and Mexico. This may lead to lower levels of environmental quality because of local governments restricted capacity for funding environmental capital, a restricted set of policy instruments, and lack of expertise. On the other hand, there are

examples in all three countries of a 'race to the top' to remove waste sites from communities. The NIMBY sentiment – 'not in my backyard' is alive and well all over North America.

Evidence for convergence of environmental policies is as follows.

1. *Toxic compounds.* Canada introduced its NPRI in 1993, which is largely modeled on the TRI of the U.S. that began in 1987. Mexico has also recently introduced its Pollution Release and Transfer Registry that is also modeled after the TRI. These are federal government policies that require all companies employing at least 10 people to annually report releases and transfers of designated toxic compounds in quantities in excess of a minimum level. The data reported to the government must also be made available to the public annually. While the exact wording of the regulation differs and the lists of toxic compounds are not exactly the same in Canada and the U.S., the regulations are virtually identical. Canada and the U.S. have also been converging toward banning the production and consumption of a number of highly toxic compounds (DDT, PCBs, dioxins, furans, mercury in certain uses, etc.) Mexico is beginning to move in the same direction. Canada has frequently lagged the U.S. because the introduction of federal regulations governing toxics has been gradually occurring over time.[27] The toxic inventory data is readily accessible by the public and could be one reason for strong local initiatives to improve environmental quality.

[27] The Canadian Environmental Protection Act (CEPA) was introduced in 1988 (replacing other legislation) and amended in 1998 to give the federal government more power to regulate toxic compounds. The U.S. legislation (e.g., CERCLA) was passed prior to CEPA, 88.

2. *Federal Air Quality Regulations.* Canada and the U.S. have ambient air quality targets. They are mandatory federal standards in the United States; enforced at the state level, and non-binding federal guidelines in Canada. Provinces can legislate these objectives as standards or introduce their own targets. Table 4 lists the present targets for Canada, with U.S. standards in parentheses. All of the targets meet or exceed guidelines established by the World Health Organization. In Table 4, the column headed 'maximum acceptable concentrations' is the current Canadian target and the reference point given in data comparing actual ambient concentrations to a guideline. Maximum desirable is a long-run goal, and maximum tolerable is for areas that have been far below the acceptable level. The U.S. has a set of complex standards for areas that do not meet the standard – the non-attainment regions. Canada has no comparable guidelines. Mexico also has ambient standards that are similar to those in the United States, but have merged them into an index of air quality. As noted in Section 2, their large urban areas typically exceed their standards. The actual targets shown in Table 4 are not identical in Canada and the U.S., but there is no discernable pattern of differences. Sometimes Canadian guidelines are more stringent than those in the U.S. and vice versa. A key point is that the targets did not change for many years. Both countries introduced their targets in the 1970s and they remained there until the late 1990s, when the EPA proposed legislation to tighten standards for particulate matter and ozone. The legislation was stopped by the Supreme Court after a legal challenge by a company, and the EPA is now appealing this decision. There are proposals in Canada to tighten some of its guidelines as well.

3. *Motor Vehicle Fuel Economy Targets.* Canada and the U.S. have fuel efficiency targets for motor vehicles.[28] Again, the targets are mandatory standards in the U.S. and non-binding guidelines in Canada. They apply to all new motor vehicles produced each year. The producer has to meet an average fuel efficiency rating for its entire fleet (pooled together). There are separate standards for automobiles and light-duty trucks (includes sport utility vehicles). Targets for automobiles were brought in many years ago and very gradually raised. They have been constant however since the mid-1980s. Targets were introduced for light-duty trucks in 1990 with gradual implementation of higher targets over time. The Canadian targets are identical to those in the United States. This is a good example of where economic integration has contributed to a uniform environmental target independent of whether that target is mandatory or not. Because the North American auto industry is basically fully integrated, all domestic manufacturers meet the U.S. standards. There have been periods where planned tightening of the standards was delayed, but these occurred prior to NAFTA. Thus while there is no evidence of a RTTB, the targets appear to be 'stuck' at the status quo – their existing level. Canada has proposed some tightening and making the guidelines standards recently, but no action has been taken.

4. *Acid Precipitation.* Canada took lead in the 1980s pushing the U.S. to stronger, not weaker regulations. Eastern Canada was hard hit by acid precipitation coming from several large Canadian sources (mineral smelters in Sudbury, Ontario Hydro, oil refineries) and coal-fired power plants in the eastern and mid-western

[28] These are the Corporate Average Fuel Efficiency (CAFÉ) standards for the U.S. and CAFC for Canada.

United States. After years of dragging its feet, the U.S. introduced legislation for the very innovative tradeable permit market for SO_2 – the key pollutant in acid precipitation, in the amendments to the Clean Air Act of 1990. The market has been operating since the mid-1990s and has contributed to reductions in SO_2 to levels below the targets. Neither Canada nor Mexico participates in this market, nor do they have any tradeable emission markets. Canada has run some pilot programs for NOx and has studied a market mechanism for greenhouse gases.

5. *Water Quality.* Mexico has probably the worst water quality among OECD countries. Only about 14 percent of its households have treated water. Its delivery and treatment infrastructures are primitive. However, since NAFTA and joining the OECD, regulatory reform has accelerated. A program launched in 1995 introduces a number of market-based policies such as progressive pricing, discharge fees, and infrastructure construction. There is a long way to go, but the direction is positive. Canada and the U.S. have extensive water treatment and delivery systems with major funding programs introduced in the 1970s. Cuts to public budgets largely eliminated these federal programs in the 1990s. The infrastructure has deteriorated with resulting decreases in water quality in many regions as noted in section 2. Only in the past few years, has there been a resurgence in federal attention to the infrastructure. On water quality targets, the U.S. has mandatory federal standards; Canada has federal guidelines that are not binding. Following the Walkerton incident last year, several provinces (e.g., Ontario and B.C.) are in the process of implementing binding standards.

6. *Lead and CFCs.* Airborne lead emissions are a major health hazard, especially for children as lead is a neurotoxin reducing cognitive ability at low levels and leading to permanent brain damage at higher levels. As noted in section 2, Canada and the U.S. have eliminated lead from gasoline by 1990 (the U.S. was first). Mexico began to eliminate lead from its gasolines in 1990 and continues to phase it out. The regulations are thus being harmonized at the most stringent level. All three countries are signatories to the Montreal Protocol to eliminate the production and use of stratospheric ozone-depleting compounds (ODCs). CFCs and some other ODCs have been eliminated in Canada and the United States. Mexico signed the Montreal Protocol as a developing country. This allowed it to continue to use ODCs over a longer phase out period. In the mid-1990s, Mexico announced that it will attempt to speed up the phase out.
7. *Natural Resources Management.* This is a huge topic. The key point to make is that all three countries still have many subsidies (including preferential tax treatment compared to other industries) for the extraction, protection, and bailout of these industries (e.g., fishing, energy, agriculture, and some parts of the forest industry). These subsidies generally lead to faster rates of exploitation than would be the case if market prices prevailed, and thus contribute to environmental degradation. Trade agreements may be a 'friend of the environment' by not allowing domestic subsidies to violate national treatment provisions. This is one example where very little progress has been made to change regulations to be more compatible with sustainable resource use. Governments seem to be stuck at the bottom.

8. *Climate Change.* One hesitates to enter this quagmire. All three countries were signatories to the Kyoto Accord, but have not ratified the treaty domestically. It is now unlikely that Kyoto targets will be approved by Parliament or the U.S. Congress. Canadian and U.S. federal governments are clearly dragging their feet and are behind much of the European Community on implementing any sort of environmental policies to deal with carbon emissions.[29] Reasons are complex and range from unresolved scientific debate and how to account for carbon sinks to the political power of industrial sectors (the fossil fuel and electricity-generating industries) and regional interests (Alberta, Texas, and Alaska). The indicators in section 2 show continued increases in greenhouse gas emissions in aggregate and per capita terms, so this issue is not going to go away even if governments try to ignore it now. It is not clear what role North American integration may be playing in this regulatory stalemate.

Compliance with Environmental Regulations

One of the major concerns about NAFTA was that greater integration would lead to less compliance with existing regulations; governments would not publicly announce that they are weakening standards and guidelines, they simply would not monitor polluters as vigorously nor enforce the existing regulations. Mexico's record on compliance was very poor prior to NAFTA. What has happened? The short

[29] Recent Canadian announcements about climate change policies focus on voluntary actions, and technological fixes such as substitution of fuel cells for internal combustion engines. These policies may well contribute to significant changes in energy use over time, but in the short term may do little. They clearly signify a different strategy than the Europeans who have introduced taxes and are proponents of tradeable permits. The U.S. is in a state of flux with the new federal administration signaling that it views climate change as less of a problem that the current level of energy prices and energy supplies.

answer is that we do not know for sure. A major problem is finding and interpreting the data. Ideally, one would like to know monitoring and enforcement inputs and outcomes – how many inspections are done, what percentage is this of total possible, what percentage of those inspected are in compliance, and so on. This sort of data is typically only available by starting at the local level and working up, as in all three countries, much of the enforcement is local or state/provincial. The definitive work has not yet been written. What follows is just a snapshot of some general observations.

- Mexico has increased efforts at monitoring and enforcement. It works with the U.S. through the Border XXI initiative to improve inspection frequency and probability of detecting violators. It's environmental inspection arm of SEMARNAP (the main environmental/natural resource agency), PROFERA, reports a large reduction in serious violations from 1993 to 1996 (72 percent), and a substantial increase in compliance (43 percent) of maquiladora facilities over the same period (US-Mexico Chamber of Commerce, 1998). It is hard to judge how meaningful these numbers are, but evidence does suggest no race to the bottom.[30]
- All three countries suffer from inadequate resources being devoted to compliance. Budgetary cutbacks of the 1990s greatly reduced personnel in Canadian environment ministries. Decentralization of environmental responsibilities to

[30] A study (Dasgupta, Hettige, and Wheeler, 2000) has examined Mexican survey data to determine what factors improve compliance. The key factors include regulatory pressure, environmental training for plant personnel, being a publicly-held firm, being a large plant, and education.

lower levels of government has also contributed to the loss of personnel for monitoring and enforcement. Canada seems somewhat stuck in the mud.

- All three countries have increased their dependence on voluntary compliance. [31] This means working with companies to enable them to undertake environmental audits so they can identify pollution problems and take remedial actions and to report emissions to the government authorities. Voluntary compliance is on the agenda of not only environment ministries but other organizations dealing with environmental issues (e.g., the OECD, World Bank, WTO, environmental NGOs), but it is not clear what sort of impact it will have on actual compliance rates. International branding is also at work. The International Standards Organization (ISO) has created a set of standards for environmental management systems in its ISO-14001 program, created in 1996. This is fully voluntary, but many firms, especially multinational ones, seek the ISO-14001 certification, for both themselves and for subcontractors they may use in different countries. All three countries have voluntary eco-certification programs, and some (e.g., Mexico) provide incentives to assist companies in meeting the standards.[32] Integration may not have made environmental ministries more dependent on voluntary compliance, but it has certainly increased the incentives for companies to eco-brand. While all sounds positive and cooperative, it still suggests that the fox is being asked to guard then chicken coop. This is an area to watch.

[31] An example in Canada is the "3P Program" – Pollution Prevention Pays where companies are working with environmental ministries to reduce emissions and use natural resources more efficiently. The participants in the program are so far, very positive (and excited) about the program.

[32] These programs may result in trade actions if they are deemed to be subsidies available only to domestic firms.

In summary, there is no support for a race to the bottom in environmental regulation as a result of greater economic integration. There may have been some tendency for Canada and the U.S. to be a bit 'stuck in the status quo' with little initiative on some environmental issues up to the end of the 1990s. Regulatory interest has again been sparked by all sorts of environmental concerns from global (climate change) to very local (water quality and waste sites). Integration may be playing a positive role in this recent policy upswing – linkages of economies and better information flows have increased the public's awareness of environmental problems and demand for action. Whether the environment can stay on the burner is uncertain; there have been too many cycles of vacillating interest over the past 35 years for one to be sanguine.

Hypothesis #3: Growth is bad for the environment.

Greater integration leads to higher levels of output and incomes. This puts more stress on the environment because the scale effect dominates any positive impacts of the composition and technique effects. More income/output means more consumption and production and hence more waste flows, resource use and environmental degradation.

Hypothesis three is related to the first two. The main theoretical and empirical relationship examined is the environmental Kuznets curve (EKC). The EKC represents a functional relationship between environmental indicators such as presented in section 2 and measures of growth, typically GDP per capita. It may also include other explanatory

variables. One additional variable that some of the literature has investigated is the country's degree of openness. There are dozens of papers that have estimated EKCs for data across countries at a point in time, time series within a country, and a few with panel data.[33] The theory suggests that if environmental quality is an income-elastic good, the EKC between pollution levels and income will be either falling or an inverted U-shape.

The main conclusion from the EKC studies is that there is no consistent relationship between rising GDP and indicators of pollution. The evidence does not show that pollution *must* rise with economic growth, so hypothesis #3 is only supported for some environmental indicators. Caution is in order because there are many difficulties with this work. For example, where the results yield the inverted U shape, the turning point can be at a per capita income level higher than most countries can hope to achieve for many years. Few countries in the world have per capita incomes higher than $10,000 US. While per capita incomes in Canada and the U.S. obviously exceed this amount, Mexico's is $3415 (1995 U.S. dollars). This can bias both the shape of the curve and the location of the turning point at which pollution starts to fall with increases in per capita GDP.

One example of the type of EKCs that are generated when income and the degree of a country's openness are included in cross sectional data for the late 1990s is Olewiler (2001). The environmental indicators examined are unsafe drinking water, sanitation availability, deforestation, sulphur dioxide in urban areas, and carbon dioxide emissions. The EKCs estimated are:

[33] See Shafik (1994) Seldon and Song (1994, 1995), Barbier (1997) and the other papers in the special issue of *Environment and Development Economics* 2(4), 1997 on the EKC.

- Falling (almost L-shaped) for unsafe drinking water, and lack of sanitation. Once income levels reach between $4,000 and $5,000 U.S. (1995 dollars) per capita, levels of safe water and sanitation approach 100 percent.
- Falling for sulphur dioxide until per capita incomes pass $32,000 U.S. where the curve begins to slope up again very gradually.
- Inverted U-shaped for deforestation, with a turning point of around $30,000 U.S.
- Different shapes for CO_2 depending on the indicator used. CO_2 emissions per capita yields an inverted U-shaped curve with a turning point of approximately $28,000 U.S., net CO_2 (aggregate emissions minus carbon sequestration) and aggregate CO_2 emissions are rising functions.

Openness (exports plus imports as a proportion of GDP) enters each of the equations (except for per capita CO_2) negatively; more open countries have lower pollution levels. The openness coefficient is generally not significant (except for per capita CO_2), but its inclusion always adds to the equation's explanatory power. Openness thus cannot be said to increase a country's pollution level. This result is consistent with other studies examining openness and environment impact. Hypothesis #3 remains ambiguous.

- **Hypothesis #4: Trade agreements undermine environmental policy setting**

Provisions within trade agreements inhibit a country's autonomy in setting environmental policy and therefore prevent a country from reaching its domestic environmental targets.

In the early 1990s, part of the debate over the merits of NAFTA focused on its potential adverse environmental impacts. The maquiladoras on the Mexico-U.S. border free trade zone were cited as being a leading indicator of the forthcoming rising environmental degradation. The area was already heavily polluted and many companies

operating there were branches of multinational companies from OECD countries. It was a classic pollution haven and critics of NAFTA felt this was just the beginning of more degradation if NAFTA came into force.

Concern over the environmental impacts of NAFTA by NGOs and the public led to the inclusion of an environmental side agreement, the North American Agreement on Environmental Cooperation, language about sustainable development in the preamble of the main agreement, and a strengthening of sanitary and phytosanitary trade requirements. New institutions and programs were set up under the side agreement to address environmental concerns within NAFTA countries. These institutions included the Commission for Environmental Cooperation (CEC) a trinational body with the authority to investigate allegations of non-enforcement of environmental regulations within each country and to monitor environmental impacts of NAFTA. The Border Environmental Cooperation Commission and North American Development Bank were established to help provide resources for U.S.-Mexican border communities to improve environmental infrastructure. These joined the Border XXI Program, a set of initiatives to help improve environmental quality, improve enforcement, and provide data on environmental impacts.

Concern over the environment thus led to the creation of environmental institutions within NAFTA. How much impact the environmental institutions have had on environmental quality and environmental regulatory processes is open to debate (and beyond the scope of this paper). A casual examination of the activities of the CEC for example, does not reveal a very impressive list of achievements.[34] One problem is that it need not make public all its actions, so it is difficult for independent assessment to occur.

[34] In fairness to the CEC, some reviews of its work have mentioned that its budget is too small to meet its mandate.

Criticism and praise of the other institutions is also present in the popular and academic literature. Whatever the verdict, it is probably fair to say that environmental concerns have a higher profile given the existence of these institutions than it would have it they were not present.

The more pressing issue is the presence in NAFTA (and other trade agreements) of provisions that inhibit a country's autonomy in setting environmental regulations to meet target levels of environmental quality. This is what hypothesis #4 asserts. According to Mann (2000) and IISD (2001)[35], trade laws such as NAFTA can affect environmental policy in a number of ways. These include:

- National treatment (non-discrimination) clauses. Parties in the agreement should not be treated less favourably then domestically producers. This forbids the adoption of protectionist measures and gives foreign producers equal opportunity to access a country's market. In the context of environmental policy, it means that a tariff on a pollution-intensive good cannot be introduced unless the same good produced within the country faces an identical tax. A related implication is as follows: If the producer of a hazardous/polluting product is only located in a foreign country (there are no domestic producers), how can equal treatment be given? Will tariffs designed to internalize environmental externalities arising in the consumption (or disposal) of the good in the importing country be forbidden? If so, this would give producers of toxic compounds the incentive to locate all production abroad.
- Environmental policies cannot be implemented which are disguised barriers to trade. This leaves open the issue of what exactly is a disguised barrier to trade. NAFTA's side agreement does recognize a country's need to protect its environment. The

GATT (and now WTO) also recognized that environmental regulations could be exceptions (limited and conditional) from the other obligations of the agreement.

- Environmental policies might have to be based on sound scientific analysis. This is required for sanitary and phytosanitary regulations, but not for most types of environmental regulations, although there is some uncertainty about the burden of proof required for environmental regulations. But even if 'sound science' isn't a direct requirement, it may be a necessary component of the process of setting an environmental regulation – establishing that risk assessment has been done, the environmental objective identified, and an appropriate risk management tool selected. This sort of process, while probably implicitly underlying the determination of environmental policies anyhow, will have to be more explicit and transparent to avoid trade disputes from interfering with domestic environmental policy making. Risk assessment need not be done for environmental regulation, but if it is done, and does not use sound science, the regulation could be open to the charge that it is a disguised barrier to trade.
- A country that wishes to establish a regulation different from international standards, must prove why the difference is necessary.
- There is a principle that says the least trade restrictive measure consistent with the environmental objective should be used (e.g., GATT, 1994,article XX and NAFTA, Article 2101).
- Product taxes and charges can be levied on imports, but process taxes/charges cannot. For example, a government can levy an excise tax on fuel produced domestically and

[35] The author of IISD (2001) is also Mann.

imported. It cannot put a tax on the energy consumed in producing a tonne of imported steel because that is a tax on the production process.

- These provisions and conditions apply retroactively to policies adopted prior to NAFTA coming into force. This implies that regulatory decisions taken before the 'rules of the trading game' were known can give rise to trade disputes.
- In NAFTA, actions can be taken against a country when there is the potential for a trade barrier to exist. It is not necessary to prove that an actual impact has occurred.

These features of trade agreements suggest that there may well be major concern over the ability of policy makers to pursue environmental objectives without running into trade disputes. Many past, present, and potential environmental regulations would not survive trade law challenges. However, Mann argues that for most trade agreements (e.g., the GATT and WTO), it is unlikely that that there would be many cases brought against environmental policies. There are three reasons: First, trade challenges must be brought by governments against other governments. Most governments will not be spending scarce time and funds looking for environmental regulations to challenge in other countries. This may initiate retaliation and a costly trade war. Second, even if a country loses a case brought against it, there are no penalties (under the WTO), nor does it have to give up the regulation. It must make the regulation consistent with international standards. Under NAFTA (Article 2018) the regulation would have to be removed or not implemented, but a replacement measure could be introduced. Third, under GATT rules, a ruling made does not have to be not adopted.

Thus while there is definitely reason for concern about impingement on domestic regulatory authority, the trade provisions listed above do not seem to be a major threat. Since NAFTA was adopted, there have been no trade and environment cases initiated between the three governments. In the WTO, something like three cases involving the environment have come before it. However, NAFTA contains a provision not in the GATT or WTO that is a major threat to the environmental policy. This is the now infamous Chapter 11 provision that allows a corporation to bring suit against a government and seek compensation for expropriation of its actual or potential earnings. The provision gives foreign investors much more extensive rights and remedies than other trade agreements. It goes far beyond anything in the GATT or WTO. Chapter 11 was brought in to protect investment in Mexico from appropriation; it was not intended as a way of challenging environmental policy. However, of the 17 actions brought under Chapter 11 (to March 2001), 10 concerned adopted or proposed environmental regulations. The tribunals hearing the cases have generally ruled in favour of the foreign investor (corporations). The tribunals consist of three members, one from each of the member countries. Their deliberations are secret and need not even be published unless one of the parties in the case chooses to do so.

The cases heard thus far suggest, if they are not overturned on appeal, or amendments to Chapter 11 made, that NAFTA could undermine environmental policy making. Mann (2000, p. 39) concludes that Chapter 11 cases have successfully argued that new environmental laws, especially those with a larger impact on one company than others, expropriate the investor's business and that compensation is required. At least one tribunal has determined decisions (the Metalclad case against Mexico) that the

motive for the regulation is not relevant. The tribunal didn't even mention environmental protection in that case. In that case expropriation was defined as "covert or incidental interference with the use of property" (Mann, 2000, p. 32). This is a very broad interpretation of expropriation that challenges a jurisdiction's police power (or peace, order and good government in Canada). It could imply that any environmental regulation that interferes with the use of investments to generate profits could fall under Chapter 11 and require compensation. There could be numerous suits brought by corporations to impede governments who try to introduce environmental regulations that affect their business.

This gloomy view is tempered by several factors. First, some of the decisions involving environmental regulations under Chapter 11 are under appeal and may be reversed. Second, there is concern with this provision of NAFTA by the signatories and the provision may be revised. However, the uncertainty about the future impact of Chapter 11 and fallout from past decisions could certainly dampen a regulator's enthusiasm for introducing new environmental policies. In the Ethyl Corporation v. Government of Canada Chapter 11 case, Canada tried to ban the import of the fuel additive MMT that has potential health impacts (and damages air pollution equipment in cars) and lost.[36] The government backed down and removed the import ban after the corporation won the case, and even had to sign a letter that said there was no proof that MMT is harmful.

[36] The case is complex and there were problems with the Canadian policy and risk assessment of the compound. There were inadequate data on health risks from MMT, so Health Canada could not consider MMT a health risk under CEPA, 1988. MMT is a manganese-based fuel additive that the automobile industry argues damages air pollution equipment in vehicles. MMT is not used in gasoline in the U.S., only in Canada. Under CEPA, Canada could not ban a compound that damages cars, only one that damages people and they did not have enough scientific evidence to prove at the time that MMT damages people.

Much more could be written on the Chapter 11 cases than can be covered in this paper.[37] To date, it seems clear that there is support for hypothesis #4. Provisions such as Chapter 11 have had an impact on government's ability to introduce environmental policy that is potentially socially efficient, i.e., that balances the benefits to society from less pollution/higher levels of environmental quality against the costs to producers of the pollution. The tribunals have so far not been interested in the benefits to society, only the costs to businesses.

4. Policy Implications for Canada

The evidence reviewed in this paper does not support the view that greater integration of the North American economies must result in lower levels of environmental quality. Some environmental quality indicators have improved, while others have declined, but there is no compelling evidence that the source of the changes in environmental quality is greater economic integration. While the long-term impact on the environment of increased trade and investment flows and higher rates of growth is still not clear, there is no evidence that integration within North America has promoted the development of pollution havens or a race to the bottom for environmental regulation. Regulations, if they have moved at all, appear to be converging to at least the status quo level (before NAFTA) of country with the most stringent regulations. There appears to be a trend toward tightening regulations and a very slow creep toward the use of more cost effective market-based policies.

CEPA 1998 may have changed the powers of the federal government regarding the definition of toxicity. The Ethyl Corporation was asking for $251 million in damages; it received $13 million U.S. from Canada.

[37] For a summary of Chapter 11 (in non-legal terms) see IISD (2001).

While current features of trade agreements do restrict the set of instruments policy makers can use to address domestic environmental problems, with the exception of the provisions within Chapter 11 of NAFTA, these constraints would not appear to be a significant impediment to adoption of socially efficient policies. Trade agreements may even promote better policy that improves environmental quality. For example, if countries are nudged toward reducing their subsidies to pollution-intensive industries and the primary sectors because they violate principles of national treatment and can be viewed as nontariff barriers, this may help reduce non-sustainable natural resource production.

The principles incorporated in Chapter 11 and the processes established to adjudicate cases brought under this provision are flawed and pose a threat to socially efficient environmental policy making. This provision of NAFTA should be deleted or changed significantly to ensure that net social benefits are paramount as justification for environmental regulations.[38] If environmental cases under Chapter 11 continue to favour corporate investors, it could handicap policy makers at all levels of government, but especially local governments who do not have the resources to ensure that their environmental actions do not violate these investment provisions.

In the past ten years the trend in Canadian environmental policy has been toward decentralization of responsibility for environmental regulation to lower levels of government. This presents some tradeoffs in an integrating North America. Local regulations can be tailored to the specific conditions within the community. Good

[38] Environment ministers from the three NAFTA countries expressed concern about Chapter 11 in 1999. The governing body of NAFTA may now also be interested in revisiting provisions of Chapter 11 as they apply to environmental regulation. See IISD (2001).

environmental policy should reflect the marginal damages and abatement costs, resource endowments, etc. within the region. Harmonization of policies is not consistent with efficiency if conditions differ among regions – local pollutants may be regulated most efficiently by local governments. But then at least two problems emerge in the context of economic integration. As noted above, local governments may lack the resources and expertise necessary to ensure that efficient environmental policy is consistent with principles of trade agreements. Second, while there is no evidence in North America of a race to the bottom for environmental policies, decentralization may contribute to being stuck at the status quo because policy makers fear introducing policies that deviate from the perceived norm. Canadian environmental policies (at all levels) have been a bit stuck in the status quo. The Canadian constitution and political economy of federalism hampers a strong federal role in environmental policy except in areas of international environmental treaties and where the federal government has carved out a role through regulations such as CEPA.[39] As was noted in section 3, Canadian federal environmental regulations are guidelines, not binding targets. This is in sharp contrast to the United States, were federal regulations are binding, and the government can use threats (e.g., without state funding) if states are lax in enforcing the regulations. Canada uses moral suasion. This may be the kinder, gentler route to improving the environment, but it also means that Canada may be moving more slowly than is possible to reach environmental targets. This may actually harm Canadian competitiveness and economic growth over time, if as the empirical studies discussed in this paper suggest, investors and people want to move to regions where environmental quality is high, not to pollution havens.

[39] Even in the cases of international treaties the federal government may have difficulty implementing conditions in a treaty if provinces refuse to cooperate with the policies under consideration.

Integration, more particularly the protests against trade and investment agreements has played a role in making the public more aware of environmental issues. There is pressure on governments, regulatory agencies, and corporations to provide more and better information about environmental impacts of integration, their policies and actions. This is a very good thing for many reasons. First, one of key problems in analyzing the relationships between integration and the environment is the lack of data and public access to it. During the years of public sector budget restraint, a number of environmental data series were terminated. These should be reinstated and expanded so both the public and policy makers know what is happening. Ignorance and mis-information feeds the rhetoric from the two extreme sides of the integration and environment debate – those who oppose all trade and investment agreements and those who favour complete integration without environmental safeguards. Second, without information on environmental damages, costs of abatement, trends in emissions, and so on, good policy making is impossible. Third, regulators will have a higher probability of getting environmental measures implemented without trade and investment challenges if they have all their facts and analysis straight. Fourth, data helps corporations and individuals make their own environmentally responsible decisions, i.e., it facilitates voluntary actions to improve environmental quality. Eco-labeling or branding and pollution prevention programs are examples of cases where reliable information flows are essential. Governments can help play a role in these voluntary actions by testing and certifying the information released by companies.[40]

---

[40] Recent federal government announcements (e.g., *Toronto Star*, June 11, 2001, p.) on measures taken to help meet global climate change targets (whatever they now are) and urban smog problems have a large component of information collection and dissemination. The government will be telling Canadians how

Finally, consider two starkly different scenarios of the relationship between integration and the environment.

Scenario I: Governments won't impose efficient and effective environmental regulations because they are convinced by special interest groups that this will destroy the economy's competitiveness. Subsidies to pollution-intensive and resource using sectors are maintained to protect jobs and investment in those industries, despite the fact that this contributes to inefficient use of natural resources and environmental degradation, and tilts the playing field against less environmentally damaging industries. Trade and investment agreements are signed without environmental safeguards. Provisions such as Chapter 11 exist and reinforce regulatory inaction on the environment for fear of being sued and having to pay out large sums of compensation. Economic growth does indeed occur and output and incomes rise. But pollution also increases because environmental regulations have not kept pace with the increase in economic scale. Only weak regulatory incentives thus exist to stimulate research and development of new technologies to control emissions and reduce the environmental impact from production and consumption per unit output, because there is no payoff to this sort of investment. This economy may be healthy in the short term, but rising pollution levels continue to degrade the environment to the point where the sustainability of not just natural systems, but economic ones are threatened. Thresholds will be crossed where it will take billions of dollars to repair environmental damages, if indeed, it can be done at all.

Scenario II: Governments use socially efficient environmental policies that balance the costs of the improving the environment against the benefits of higher levels of

---

changing their driving habits, vehicles used, etc. will improve things. This is useful policy. However, it should not be the only type of policy in place.

environmental quality. They welcome economic integration and sign trade and investment agreements that have environmental safeguards that work. Growth increases and environmental regulations keep pace to ensure that pollution does not rise above the level consistent with social efficiency. The gains from trade may even be high enough to 'pay for' raising the environmental targets over time. In other words there can be increases in the standard of living from both the perspective of real incomes and environmental quality. Investors will want to locate in this country and people will want to live there. Pollution-intensive industries may leave, but may also stay and develop better and cheaper ways of controlling their emissions over time so that they become less pollution intensive.

These scenarios are of course overly pessimistic and optimistic. Canada is now at a point in between. The key message is that even if one rejects the hypothesis that economic growth is bad for the environment, it does not mean that economic growth alone will sustain or improve environmental quality. Economic growth, combined with cost effective and socially efficient environmental policies, are essential companions to a healthy environment. As a number of the world's well-known economists and ecologists (Arrow et al., 1995)[41] have stated:

> Economic growth is not a panacea for environmental quality; indeed, it is not even the main issue. What matters is the content of growth— the composition of inputs (including environmental resources) and outputs (including waste products). This content is determined by, among other things, the economic institutions within which human activities are conducted. These institutions need to be designed so that they provide the right incentives for protecting the resilience of ecological systems. Such measures will not only promote greater efficiency in the allocation of environmental resources at all income levels, but they would also assure a sustainable scale of economic activity within the ecological life-support system.

[41] As cited in Nordström and Vaughan, 1999, p. 59).

References

Albrecht, J. (1998) "Environmental Policy and Inward Investment Position of US Dirty Industries", *Intereconomics* , July/August, pp. 186-194.

Antweiler, W., B. Copeland, and S. Taylor (1998) "Is Free Trade Good for the Environment?" Discussion Paper No. 98-11, Department of Economics, University of British Columbia, Canada.

Arrow, K., B. Bohlin, R. Costanza, P. Dasgupta, C. Folke, C.S. Holling, B.O. Jansson, S. Levin, K.G. Maler, C. Perrings, and D. Pimentel (1995) "Economic Growth, Carrying Capacity, and the Environment", *Science* , April 18, pp. 520-21.

Barbier, E. (1997) "Introduction to the Environmental Kuznets Curve Special Issue." *Environment and Development Economics* (Special Issue: The Environmental Kuznets Curve), Vol. 2(4), pp. 369-81.

Beghin, J. and M. Potier (1997) "Effects of Trade Liberalization on the Environment in the Manufacturing Sector" *The World Economy* 20(4), pp. 435-455.

Beladi, H., N.H. Chau, and M.A. Khan (2000) "North-South Investment Flows and Optimal Environmental Policies" *Journal of Environmental Economics and Management* 40, pp. 275-296.

Berman, E. and L. Bui (1998) "Environmental Regulations and Productivity: Evidence from Oil Refineries", NBER Working Paper No. 6776, November.

Chapman, D. (1991) "Environmental Standards and International Trade in Automobiles and Copper: The Case for a Social Tariff" *Natural Resources Journal* 31, pp. 449-461.

Chichilnisky, G. (1994) "North-South Trade and the Global Environment", *American Economic Review* 84(4), pp.851-74.

Chomo, G.V. and M.J. Ferrantino (2000) "NAFTA Environmental Impacts on North American Fisheries" Discussion Paper for the 1st North American Symposium on Understanding the Linkages between Trade and the Environment.

Cohen, M., and S. Fenn (1997) "Environmental and Financial Performance: Are they Related?", mimeograph, Department of Economics, Vanderbilt University, Nashville.

Copeland, B. and S. Taylor (1994) "North-South Trade and the Environment", *Quarterly Journal of Economics* , pp. 755-87.

Dasgupta, S., H. Hettige, and D. Wheeler (2000) "What Improves Environmental Compliance? Evidence from Mexican Industry" *Journal of Environmental Economics and Management* 39, pp. 39-66.

Donnan, J. (2000) MISA, mimeo.

Environmental Protection Agency (1990) *Environmental Investments: The Cost of a Clean Environment,* EPA0230-90-084, Washington, D.C.

Fredriksson, P.G. and Millimet,D.L. (2000) "Is there a Race to the Bottom in Environmental Policies? The Effects of NAFTA" , mimeo, September 5, 2000.

Grossman, G.M. and A.B. Krueger (1991) "Environmental Impacts of a North American Free Trade Agreement", NBER Working Paper No. 3914, November.

Grossman, G.M. and A.B. Krueger (1993) "Environmental Impacts of a North American Free Trade Agreement", in P. Garder (ed.), *The U.S.-Mexico Free Trade Agreement* , MIT Press, Cambridge, Massachusetts, USA.

Grossman, G.M. and A.B. Krueger (1995) "Economic Growth and the Environment", *Quarterly Journal of Economics* 110(2), pp. 353-77.

Hettige, H., R.E.B. Lucas, and D. Wheeler (1992) "The Toxic Intensity of Industrial Production: Global Patterns, Trends and Trade Policy", *American Economic Review*, Vol. 82(2), pp. 478-81.

Hettige, H., M. Mani, and D. Wheeler (1998) "Industrial Pollution in Economic Development (Kuznets Revisited)", in P.G. Fredrikkson, ed., *Trade, Global Policy, and the Environment,* World Bank Discussion Paper No. 402, World Bank, Washington D.C.

IISD (2001) *Private Rights, Public Problems, A Guide to NAFTA's Controversial Chapter on Investor Rights,* Winnipeg, International Institute for Sustainable Development.

Jaffe, A., S. Peterson, P. Portney, and R. Stavins (1995) "Environmental Regulation and the Competitiveness of U.S. Manufacturing: What does the Evidence Tell Us?" *Journal of Economic Literature,* XXXIII, pp. 132-63.

Leonard, H.J. (1988) *Pollution and the Struggle for the World Product,* Cambridge, Cambridge University Press.

Levinson, A. (1996a) "Environmental Regulations and Industry Locations: International and Domestic Evidence", in J. Bhagwati and R. Hudec (eds.) *Fair Trade and Harmonization* , The MIT Press, Cambridge, Massachusetts, USA, and London, UK.

Levinson, A. (1996b) "Environmental Regulations and Manufacturer's Choices: Evidence from the Census of Manufacturers" *Journal of Public Economics* 62, pp. 5-29.

List, J.A. and C.Y. Co (2000) "The Effects of Environmental Regulation on Foreign Direct Investment" *Journal of Environmental Economics and Management* 40(1), pp. 1-20.

Low, P. (1992) "Trade Measures and Environmental Quality: The Implication for Mexico's Exports," in P. Low (ed.) International Trade and the Environment, World Bank Discussion Paper 159, the World Bank, Washington, D.C., USA.

Low, P. and A. Yeats (1992) "Do Dirty Industries Migrate?", in P. Low (ed.) *International Trade and the Environment* , World Bank Discussion Paper 159, the World Bank, Washington, D.C., USA.

Lucas, R., D. Wheeler, and H. Hettige (1992) "Economic Development, Environmental regulations and the International Migration of Toxic Industrial Pollution: 1960-1988", in P. Low (ed.) *International Trade and the Environment*, World Bank Discussion Paper No. 159, the World Bank, Washington D.C.

Mann, H. (2000) "Assessing the Impact of NAFTA on Environmental Law and Management Processes", Discussion Paper for the 1st North American Symposium on Understanding the Linkages between Trade and the Environment.

Morgenstern, R., W. Pizer, and J. Shih (1997) "Are We Overstating the Economic Costs of Environmental Protection?", Discussion Paper 97-36, Resource of the Future, Washington D.C., USA.

Nordström, H. and S. Vaughan (1999) *Trade and Environment.* World Trade Organization, Geneva.

OECD (1997) "Foreign Direct Investment and the Environment: An Overview of the Literature", December. Available at: www.oecd.org/daf/investment/fdi/fdienv.htm.

Olewiler, N. (1994) "The Impact of Environmental Regulation on Investment Decisions", in Benidickson, J., G.B. Doern, and N. Olewiler, *Getting the Green Light: Environmental Regulation and Investment in Canada,* Policy Study 22, C.D. Howe Institute.

Olewiler, N. (2001) "Globalization and the Environment" forthcoming in M. Ariff and F. Flatters, eds.,"Globalization and the Knowledge Economy: Perspectives for Malaysia" , Malaysian Institute for Economic Research.

Olewiler, N. and K. Dawson (1998) "Analysis of National Pollutant Release Inventory Data on Toxic Emissions by Industry", Working Paper 97-16, prepared for the Technical Committee on Business Taxation, Department of Finance, Canada.

Palmer, K., W. Oates, and P. Portney (1995) "Tightening Environmental Standards: The Benefit-Cost or the No-Cost Paradigm?" *Journal of Economic Perspectives* 9(4), pp. 119-132.

Porter,M., and C. van der Linde (1995) "Toward a New Conception of the Environment-Competitiveness Relationship" *Journal of Economic Perspectives* 9(4), pp. 97-118.

Prestemon, J. P. (2000) "Public Open Access and Private Timber Harvests: Theory and Application to the Effects of Trade Liberalization in Mexico" *Environmental and Resource Economics* 17, pp. 311-334.

Rao, P.K. (2000) *The World Trade Organization and the Environment*, London: Macmillan Press.

Repetto, R. (1995) "Jobs, Competitiveness and Environmental Regulation: What Are the Real Issues?" World Resources Institute, Washington D.C., May.

Reppelin-Hill, V. (1999) "Trade and Environment: An Empirical Analysis of the Technology Effect in the Steel Industry" *Journal of Environmental Economics and Management* 38, pp. 283-301.

Selden, T. M. and D. Song (1994) "Environmental Quality and Development: Is there a Kuznets Curve for Air Pollution Emissions?", *Journal of Environmental Economics and Management* 27, pp. 147-62.

Selden, T. M. and D. Song (1995) "Neoclassical Growth, the J Curve for Abatement, and the Inverted U Curve for Pollution", *Journal of Environmental Economics and Management* 29, pp. 162-68.

Shafik, N. (1994) "Economic Development and Environmental Quality: An Econometric Analysis" *Oxford Economic Papers* 46, pp. 757-73.

United States-Mexico Chamber of Commerce (1998) "Environmental Issues in Mexico under NAFTA", May. At www.usmcoc.org/environment.html.

World Bank (1992) *World Development Report 1992: Development and the Environment* Oxford University Press, Oxford, UK.

World Resources Institute (2000) *World Development Indicators*, Washington D.C.

Xing, Y. and C. Kolstad (1998) "Do Lax Environmental Regulations Attract Foreign Investment?", Mimeograph, May, University of California, Santa Barbara, USA.

Xu, X. (1998) "Export Performance of Environmentally Sensitive Goods: A Global Perspective", Pacific Economic Paper No. 278, April, Australia-Japan Research Centre, the Australian National University, Australia. [Is now published somewhere].

Figure 1 Annual Average Levels of Air Contaminants in Canada, 1979-1996

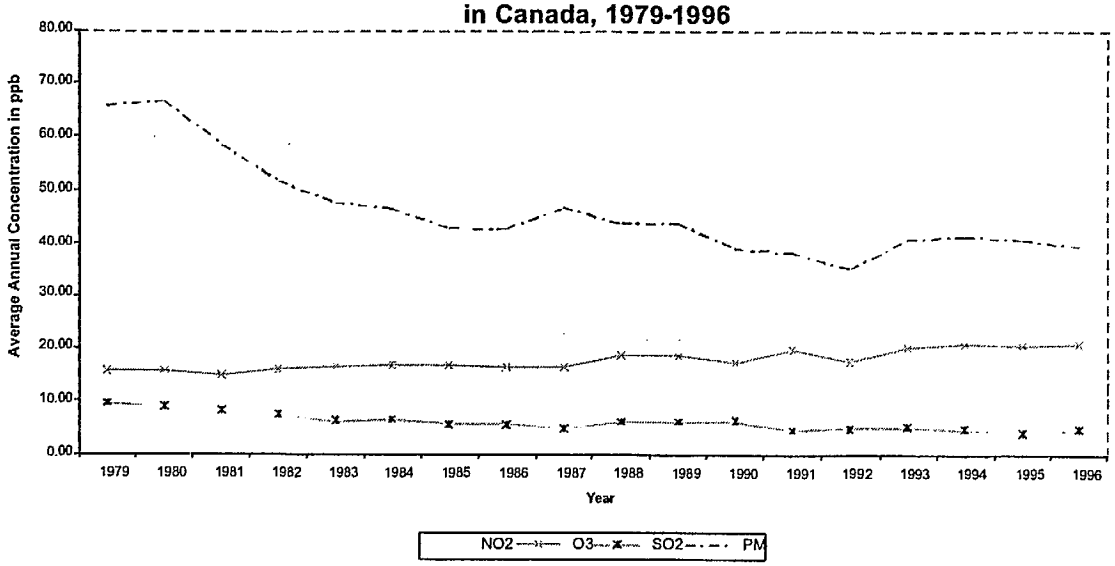


Figure 2 U.S. Total National Emissions of Criteria Air Pollutants

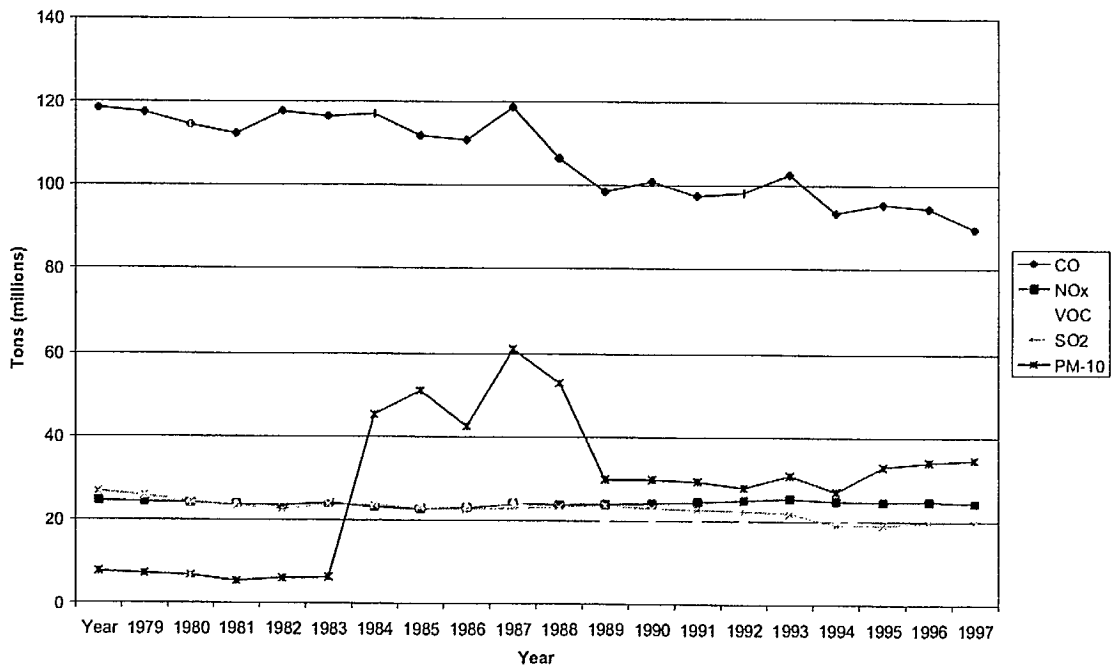


Figure 3 U.S. Motor Vehicle Fuel Consumption and Fuel Efficiency, 1970-1998

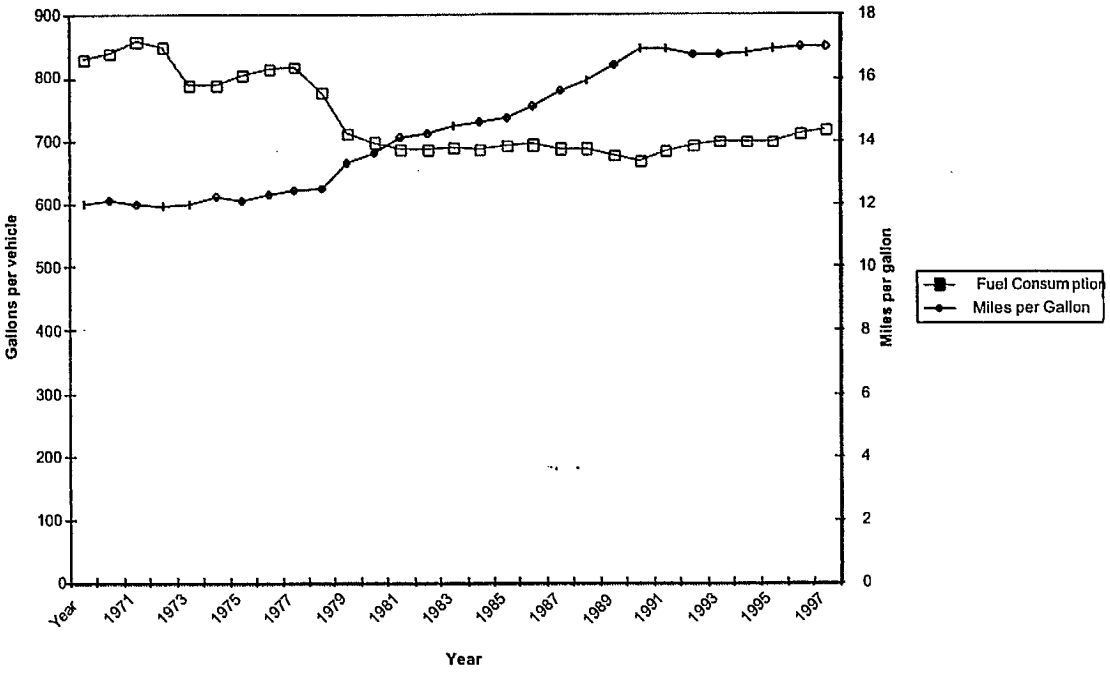


Figure 4 Canadian Carbon Dioxide Emissions from Fossil Fuels, GDP and CO2 /GDP, 1958-1997

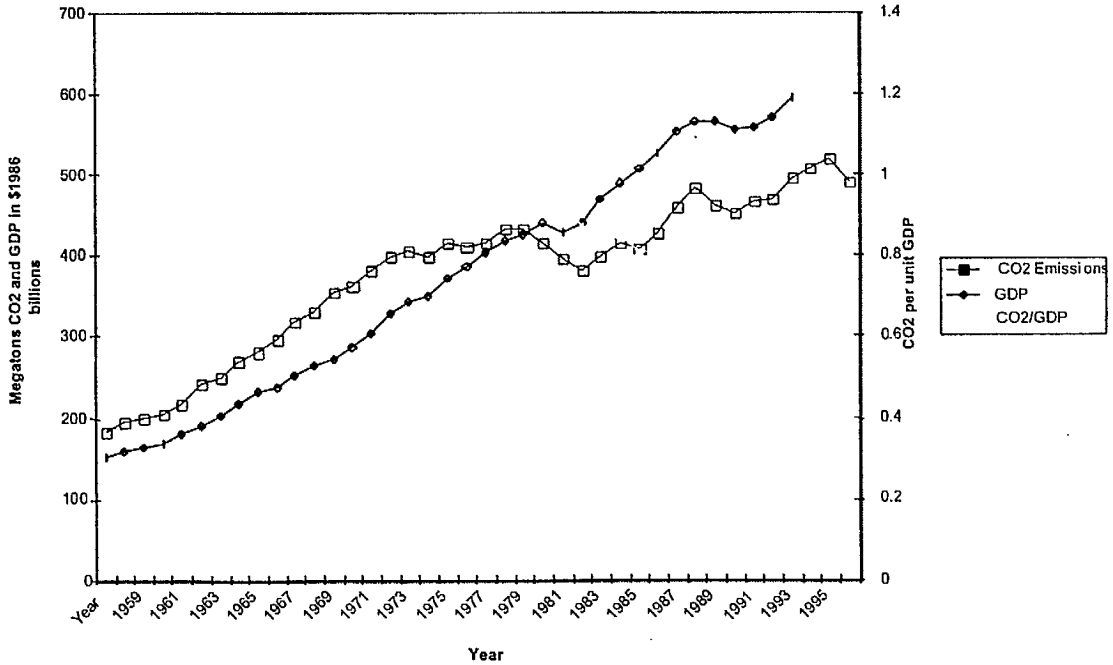


Figure 4 U.S. CO2 Emissions, GDP, and CO2/GDP, 1949-1999

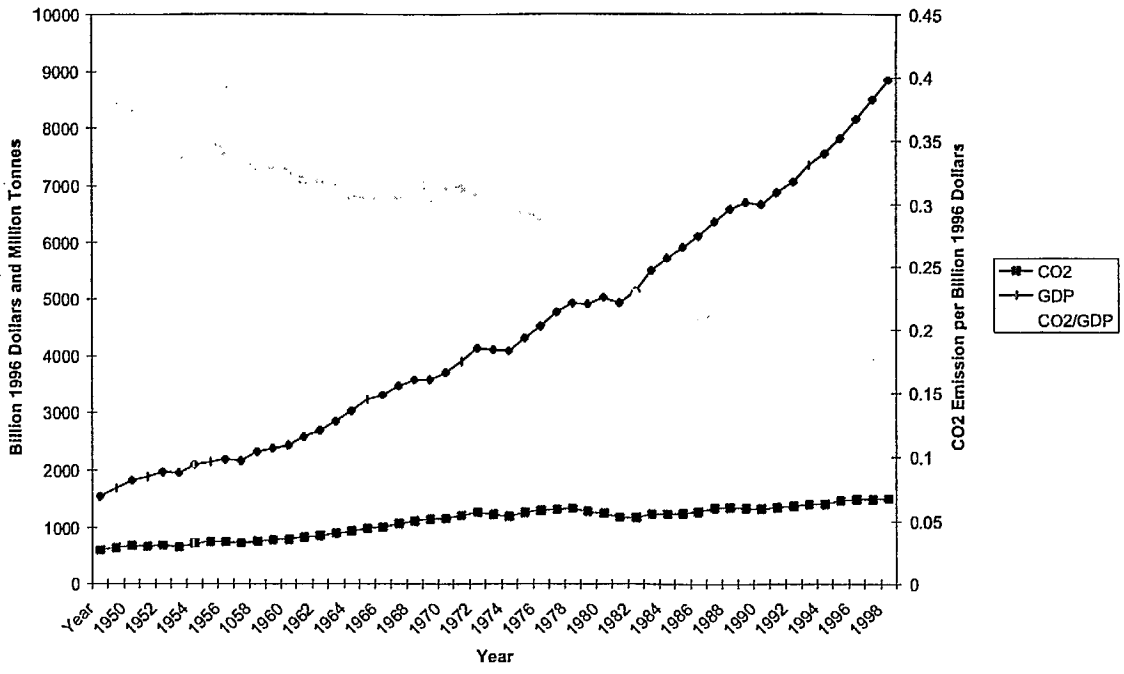


Figure 5 U.S. Lead Emissions, 1970-1998

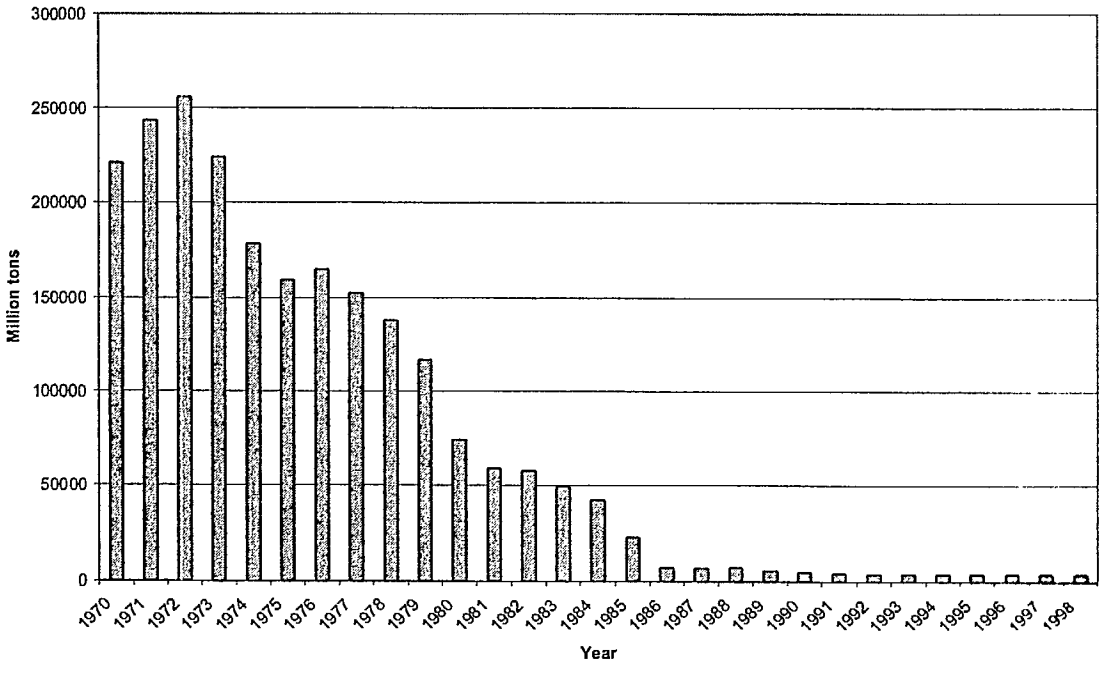


Figure 6 U.S. Energy Conumption: Aggregate, Per Capita, Per Dollar GDP, 1949-1998

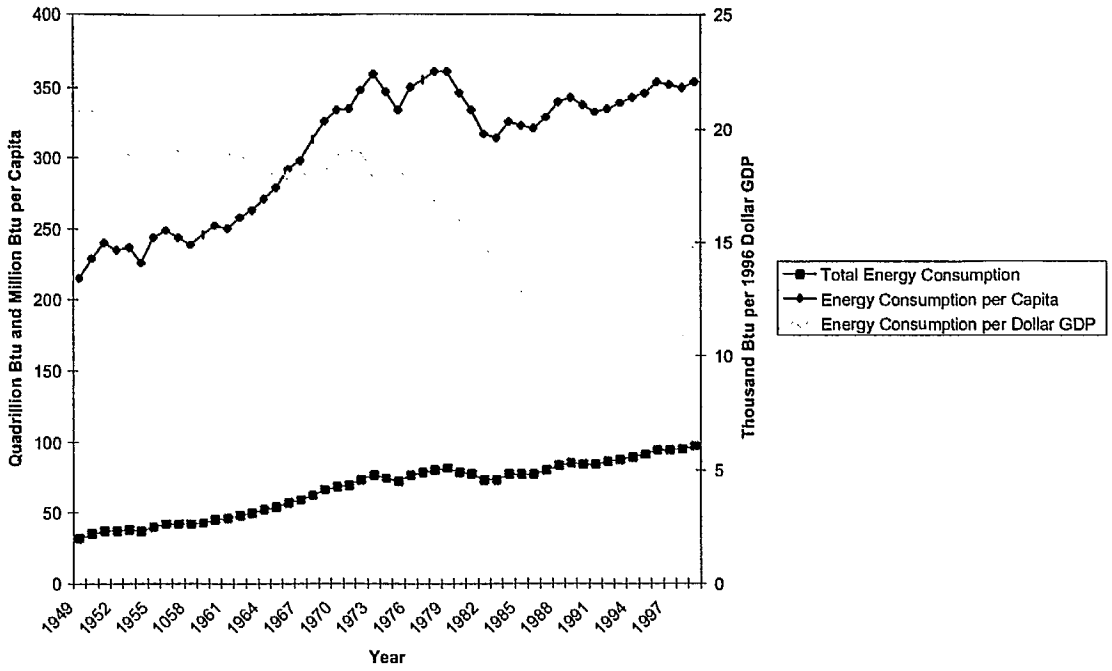


Figure 7 Total Phosphorus Concentrations in Lake Ontario, 1971-1993

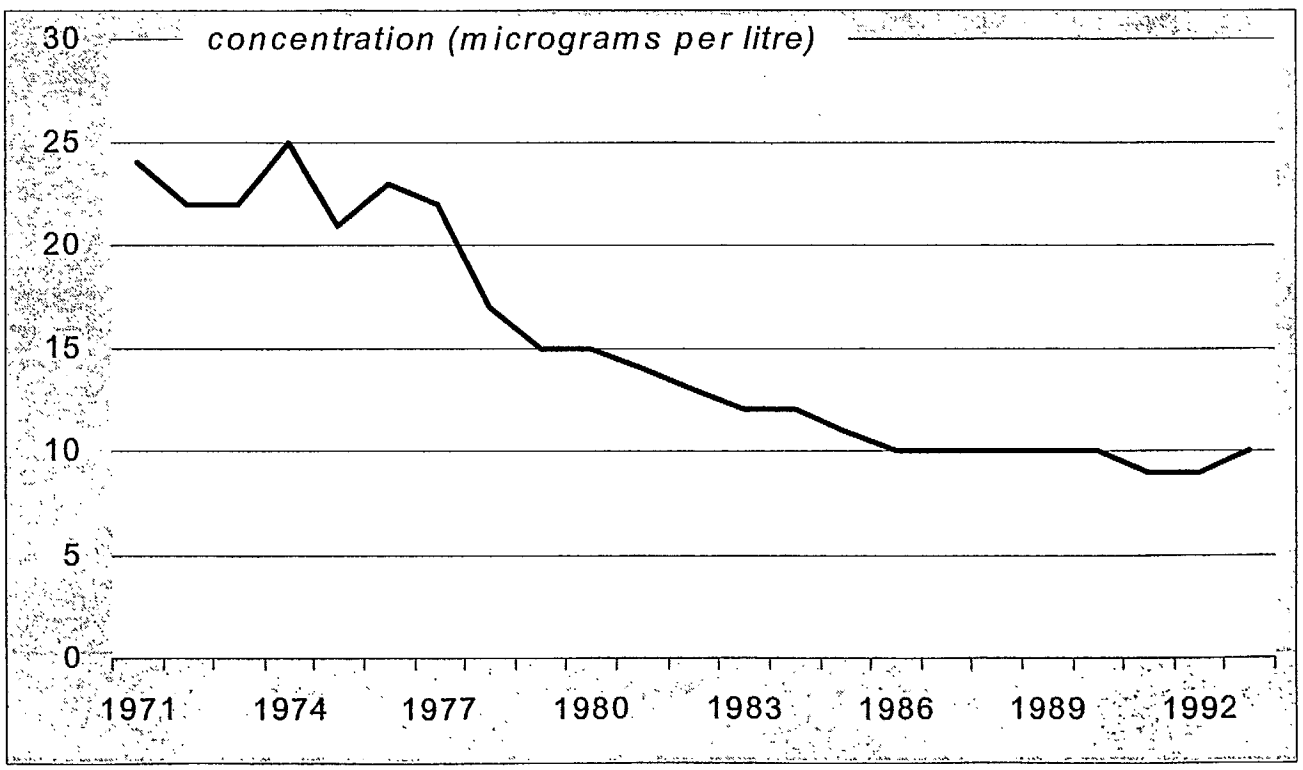


Figure 8 Concentration of PCBs in Canadian Surface Waters, 1979-1992

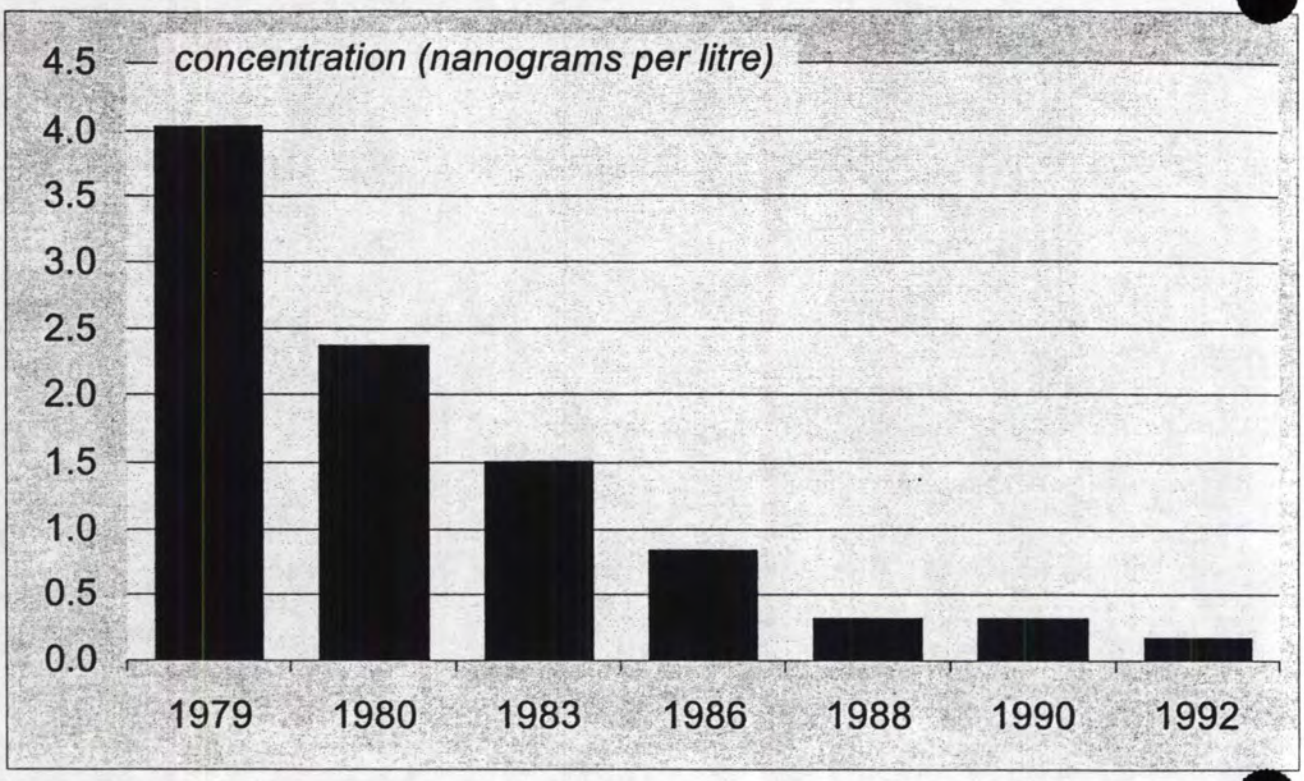
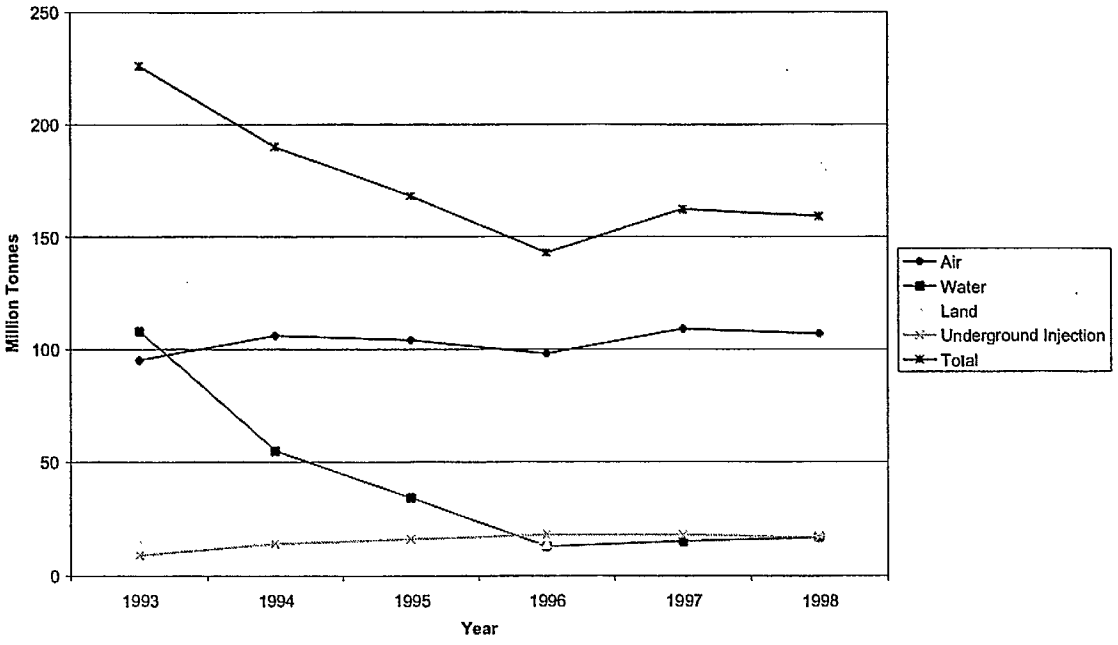


Figure 9 Canadian Toxic Emissions to Environmental Media, 1993-1998 Unweighted by Toxicity



Canadian Toxic Emissions Weighted by Toxicity

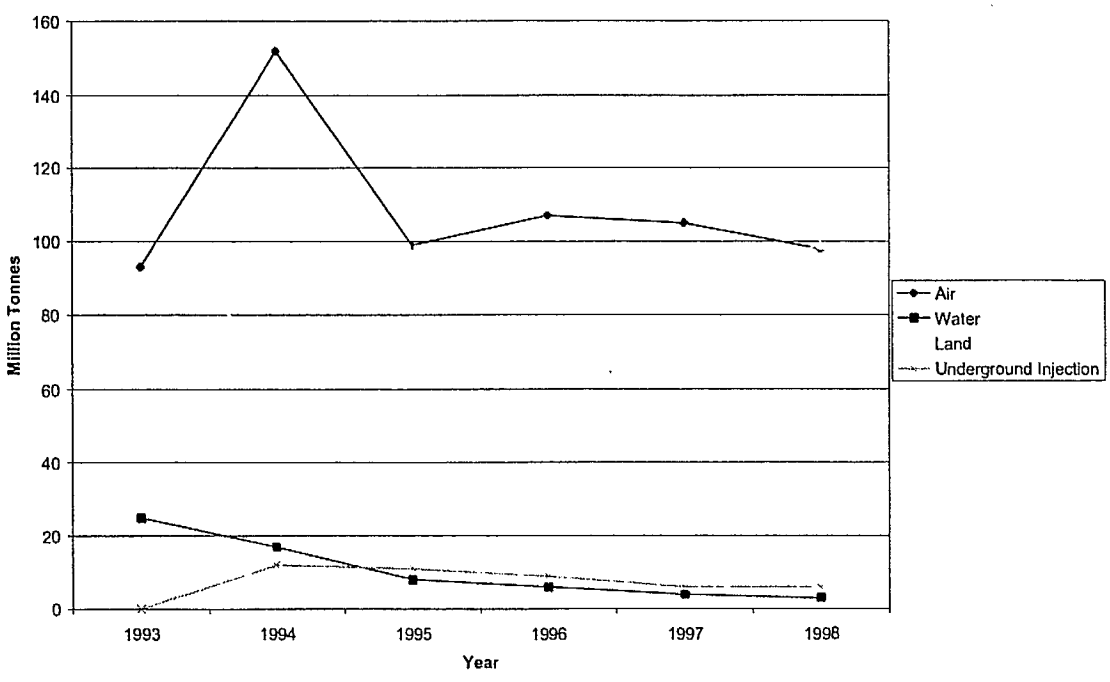


Table 1 Canada and U.S. Emissions of Toxic Compounds to Output Value Ratios (E/$Q), 1994

CDN SIC	Sector	E/$Q	US SIC	Sector	E/$Q
10	Food	43	20	Food	260
11	Beverage	27			
15	Rubber	3568	30	Rubber & Plastics	1427
16	Plastics	3430			
17	Leather	429	31	Leather	1261
18	Primary Textiles	281	22	Textiles	544
19	Textile Products	452			
25	Wood	172	24	Lumber	710
26	Furniture & Fixtures	567	25	Furniture & Fixtures	1534
27	Paper & Allied Products	7286	26	Paper & Allied Products	3456
28	Printing & Publishing	412	27	Printing & Publishing	212
29	Primary Metal	7290	33	Primary Metal	6077
30	Fabricated Metal	1099	34	Fabricated Metal	965
31	Machinery	60	35	Machinery	147
32	Transportation Equip	1090	37	Transportation Equip	609
33	Electrical & Electronic	281	36	Electrical & Electronic	288
35	Non-metallic Mineral	1797	32	Stone/Clay/Glass	530
36	Refined Pet. & Coal	9293	29	Petroleum & Coal	1643
37	Chemicals & Chem Prod	11,557	28	Chemicals & Allied	4844
39	Other Manufacturing	444	39	Misc. Manufacturing	497
			38*	Instruments & Related	189
	Canadian Average	2791		U.S. Average	1484

Notes: E/$Q are emissions in pounds per million Canadian dollars.
Emissions = releases plus transfers
* = Instruments & related products are included in SIC 39 in Canada

Sources: Canadian emissions = NPRI, 1994, Canadian value added = Statistics Canada, *Manufacturiing Industries of Canada,* Cat. No. 31-2-3-XPB.
US emissions = TRI, value added = Bureau of the Census *Annual Survey of Manufacturers M95(AS)-1,* converted to Canadian dollars.

As cited in Olewiler and Dawson (1998)

Table 3
Inbound FDI into the United States, 1994 and 1999

INDUSTRY	1994						1999					
	All Countries	% of total	Canada	% of total	Mexico	% of total	All Countries	% of total	Canada	% of total	Mexico	% of total
All industries	45095		4585		1058		271169		12228		1214	
Petroleum	1665	2.6	177	2.8	2	0.1	5558	1.7	386	2.1	6	0.5
Total Manufacturing	19673	30.4	1705	27.1	823	48.7	72610	22.4	5780	32.1	968	77.3
Food and beverage	-1375		480	7.6	D		-2285		-539		-36	
Chemicals	10820	16.7	-11		D		9416	2.9	399	2.2	D	
Primary & fab metals	1982	3.1	265	4.2	-1		1619	0.5	626	3.5	D	
Machinery	3826	5.9	61	0.9	-18		24132	7.4	2217	12.3	-7	
Other manufacturing	4419	6.8	909	14.5	590	34.9	39729	12.3	3078	17.1	-162	
Wholesale trade	5785	8.9	698	11.1	45		11853	3.7	346	1.9	-105	
Retail trade	1532	2.4	-50		-1		2478	0.8	95	0.5	D	
Depository insurance	3800	5.9	327	5.2	-29		18331	5.7	354	2.1	97	7.7
Finance except Dep ins	1751	2.7	408	6.5	-14		8793	2.7	1855	10.3	D	
Insurance	2759	4.3	488	7.8	*		27014	8.3	2203	12.2	*	
Real estate	259	0.4	-10		3	0.2	1341	0.4	824	4.6	3	0.2
Sevices	2303	3.6	177	2.8	53	3.1	16876	5.2	-17		56	4.5
Other	5570	8.6	664	10.6	175	10.3	106315	32.8	401	2.2	122	9.7

Note: * indicates less than $500,000
D indicates information suppressed to avoid disclosure of company data
Minus sign indicates a net outflow

Source: www.bea.doc/gov/bea/di/fdi.21

Table 4
Canada's National Ambient Air Quality Objectives (NAAQOs) [U.S. standards shown in parentheses)

Pollutant	Averaging Time	Maximum desirable concentration	Maximum acceptable concentration	Maximum Tolerable Concentration
Sulphur dioxide	Annual	11 ppb	23 ppb (30)	--
	24-hour	57 ppb	115 ppb (140)	306 ppb
	1-hour	172 ppb	344 ppb (500)[a]	--
Suspended particulates	Annual	60 $\mu g/m^3$	70 $\mu g/m^3$ (50)	--
	24-hour	--	120 $\mu g/m^3$(65)[b]	400 $\mu g/m^3$
Ozone	1-hour	50 ppb	32 ppb (80)[b]	153 ppb
Carbon Monoxide	8-hour	5 ppm	13 ppm (9)	17 ppm
	1-hour	13 ppb	31 ppb	--
Nitrogen dioxide	annual	32 ppb	53 ppb	--
	24-hour	--	106 ppb	160 ppb
	1-hour	--	213 ppb	532 ppb

Source: Environment Canada "Urban Air Quality, SOE Technical Supplement No. 99-1,
National Environmental Indicator Series. Also available at www.ec.gc.ca.
Notes: a = 3-hour average, b = proposed limit (in legal dispute)

luncheons

Notes Sent

Canada 1980 – now

- key exchg → now Can know they have an impact
- missile defence → deal struck: Can: agree to disagree; US: no threat on NORAD
- energy

① Can & Americans are more aware of each other the longer ago
② Can. ec. policy options are already being constrained by US policies
③ US pol. & Can. become increasingly sophisticated

WTO or Special Relationship? A: Center: WTO

culture: Can be a Can-US dialogue

US fear: need to give the room, if not they did now only for free trade

Q: use our networks

THE PROS AND CONS OF NORTH AMERICAN MONETARY INTEGRATION

Sven W. Arndt
The Lowe Institute of Political Economy
Claremont McKenna College

This Draft: June 11, 2001

I. Introduction

There has been a groundswell of renewed interest in the choice of monetary arrangements in North America. This is not surprising, in light of the establishment of the North American Free Trade Area (NAFTA) and the introduction of the Euro. The creation of NAFTA raises questions about further integration and the coming of the Euro provides a concrete example of monetary union. Furthermore, the disruption and welfare losses created by a spate of financial crises around the globe have raised fundamental questions about the optimal exchange rate regime.

The Euro is of particular interest because no one would argue that the European Union (EU) constitutes an optimal currency area - either in terms of the group of countries which are currently members of the Economic and Monetary Union (EMU) or of the larger group which is expected to join in the years to come. In the minds of many, it is less the "pull" to a perfect monetary union than the "push" from inferior alternatives that provided the impetus in Europe. This, and the unique political considerations, which have been the driving force behind European economic integration from the beginning. The crises of the nineties have created a strong bias in favor of the so-called corner solutions of floating rates, on the one hand, and hard fixes like currency boards, dollarization and currency union, on the other.

Finally, a more uniquely Canadian concern has raised questions about the implications of alternative exchange rate regimes for development of the "new economy"

in resource-rich countries. Specifically, the question revolves around the possibility that the floating rate may have retarded the shift from old to new manufacturing in Canada. This concern has been stimulated in part by the sustained depreciation of the Canadian dollar in a period of world deflation in commodity prices and in part by recent innovations in the theory of endogenous growth. This question shifts the discussion of optimum currency areas beyond the traditional focus on macroeconomic stability, with its short-and medium-run perspectives, to the longer-run issue of economic structure.

The aim of this paper is to evaluate the pros and cons of monetary union in the North American context. For the most part, the debate has focused on closer monetary integration between Canada and the United States. The major options would appear to be the currency board and dollarization, which Canada or any other country can implement unilaterally, and currency union, which would require U.S. cooperation. Several Latin American countries, including Argentina, Ecuador, and Mexico expressed interest in exploring or have experimented with alternative approaches, but there the options have been limited to currency boards and dollarization.

The paper begins in Section II with a brief review of the traditional arguments for and against fixed rates and proceeds in Section III to examine additional considerations, particularly those associated with adjustment in the presence of nominal rigidities. Section IV then turns to the role of exchange-rate regimes in the evolution of economic structure. Section V addresses the important question of causality. Section VI provides a detailed comparison between dollarization and currency union, while Section VII takes up the political dimension of closer monetary cooperation between Canada and the United States. Section VIII concludes.

II. Traditional Arguments For and Against

The basic arguments and insights have been worked out in the theory of optimum currency areas. (See McKinnon (1963), Mundell (1961), Tower and Willett (1976). See

also Berg and Borensztein (2000b), and De Grauwe (1997).) They are well known and hence will be sketched only briefly here. The chief argument in favor of a common currency is that it is efficient and reduces transactions costs. Individuals are able to engage in trade without having to incur the costs of currency conversion. Courchene and Harris (2000) estimate currency conversion costs at about .5 percent of GDP (p.10), while Murray (2000) pegs annual transactions costs at approximately $3 billion, which translates into a discounted present value of about one tenth of current GNP (p.47). To these basic savings of transactions costs would be added a variety of other savings relating to accounting, hedging, invoicing, and so on.

Unlike floating rates and pegged-rate systems, a common currency eliminates uncertainties with respect to future values of exchange rates and thereby improves the efficiency of decision-making. Grubel (2000) adds the expectation that elimination of the exchange-rate risk will reduce Canadian interest rates, which will reduce the cost of servicing the Canadian national debt and will provide assorted other benefits.

Benefits will also flow from the greater ease with which price comparisons can be made across borders. It is important to note, however, that to obtain the full value of these benefits, the exchange rate must be truly fixed. Systems which allow exchange rate pegs to be adjusted periodically, for example, do not eliminate all the costs and uncertainties associated with variable rates.

A second argument in favor of fixed rates focuses specifically on inflation-prone countries. Such countries can "import" price stability by joining a low-inflation currency union. This argument applies to many Latin American countries and would explain why countries like Argentina and Ecuador would pursue the currency board or dollarization solutions. This is, however, not a decisive issue in Canada. As Murray (2000) and others have argued, the U.S. inflation performance over the long run has been marginally better than Canada's, but in recent years Canada's inflation rate has actually been lower than the U.S. rate. Furthermore, unlike the U.S., Canada has announced inflation targets,

which are viewed by some as providing stronger assurances that low inflation will continue to be an important objective into the future.

The major traditional arguments against currency boards, dollarization and currency unions have been that countries suffer seigniorage losses and incursions into their macro policy independence. For the small country, the loss of monetary policy sovereignty is a serious issue under all pegged exchange-rate regimes. With respect to seigniorage, for example, Grubel (2000) estimates Canada's seigniorage profits to be running at about $2 billion per annum (p. 21). As for the loss of policy independence, it is severe in the realm of monetary policy, but imposes limitations on the conduct of fiscal policy as well.

The loss of policy independence matters particularly where the participants in a currency arrangement differ significantly in terms of economic structure and when labor and other markets are subject to rigidities. Differences in economic structure imply that country-specific shocks and disturbances create conflicts with respect to optimal monetary policy. If, for example, one country is a resource exporter while the other is not, then a decline in world resource demand will destabilize one country but not the other. Monetary policy, however, is a system-wide instrument, which makes it less than optimal for targeting country- or sector-specific disturbances.

With policy autonomy, the national central bank can adjust monetary policy in response to a country-specific shock. Under fixed rates, such a response risks destabilizing exchange markets. With the currency board and dollarization the country has no power to do anything, And in the context of currency union, it must persuade its partner to support such a policy response.

Economists and policy makers have long recognized that loss of the exchange rate instrument does not have to cripple the economy's ability to adjust to shocks. Loss of independence simply shifts the burden of adjustment to variables such as wages, prices,

employment and output. Nominal exchange-rate rigidity, moreover, does not remove adjustment pressures from the real exchange rate or the terms of trade.

Serious adjustment problems arise, however, when the alternative channels of adjustment function less well or not at all, as will be the case when prices and wages are sticky and labor is immobile among sectors. In such cases, loss of the exchange rate instrument creates serious problems.

In addition to their role in long-run adjustment to shocks, floating rates have been valued for their apparent ability to shelter the economy from external shocks and disturbances. As Murray describes it, "...movements in the nominal exchange rate can work to offset some of the effects of a temporary shock and facilitate the transition to a new steady state if the shock proves to be permanent (2000, p. 43)." This buffer function, however, has recently come under critical scrutiny, as we shall see.

The considerations examined thus far barely scratch the surface of the arguments involved in the choice of exchange-rate regime, but they give an early flavor of the issues at stake. While the arguments presented apply generally to currency unions and their hard-peg alternatives, there are nevertheless significant differences among alternative regimes. In the current Canadian debate, however, the choice has essentially been narrowed to floating rates, on the one hand, and the currency board, dollarization or currency union, on the other.

III. Further Considerations: Volatility and Misalignment

Criticisms which have been raised against the current floating rate regime include excessive volatility and sustained misalignment of rates. Many observers see in exchange-rate fixity a way of reducing both. In building their case for greater fixity in exchange rates, Courchene and Harris (2000) observe that "...real exchange rates are substantially more volatile under a flexible rate regime than under a fixed one, and almost all of this volatility is due to movements in the nominal exchange rate. (p. 4)" They also

express serious concerns over what they believe to have been large and sustained misalignments of the exchange rate.

Whether exchange-rate movements are excessive or not depends on the specifics of the adjustment process, and particularly upon how adjustment to a disturbance is distributed between the exchange rate and other variables in the system. It is widely recognized that exchange rates are usefully viewed as asset prices, and that asset prices tend to adjust faster than goods and factor prices. This implies that asset prices and the exchange rate may have to carry the brunt of adjustment in the short run, with adjustments in other variables taking place over time. This perspective was first examined rigorously in the Dornbusch "overshooting" model and has since been widely adopted in the "new" macroeconomics and in related work on the new Phillips curve.

When prices are sticky in a floating-rate regime, the real exchange rate will closely follow movements of nominal rates until prices become unstuck and start to adjust in response to the shock. After overshooting its long-run, steady-state value, the exchange rate converges towards it. This type of volatility could be a problem if agents mistake the short-run move as the steady-state solution. They would then be led to respond by reallocating resources in the direction indicated by the exchange-rate change, only to be forced to (partially) reverse that decision when the exchange rate recedes from its short-run level. In theoretical models this problem is "solved" by assuming that agents know the long-run equilibrium value of the exchange rate.

The moral of this discussion is that concern should not focus on the volatility of the exchange rate per se, but on the extent to which it gives rise to inefficient resource allocations. There is little evidence that exchange rate movements at high frequencies affect the allocation of resources; at lower frequencies, the debate continues on whether resource movements and subsequent reversals are necessarily inefficient. Hence, criticisms that exchange rates display "excess" volatility are still very much judgment calls.

In a system of fixed rates and sticky prices, on the other hand, the real rate cannot respond to a shock as long as prices remain stuck. But it would be inappropriate to interpret this absence of exchange-rate movement as a sign of smooth adjustment and hence as evidence of superior performance. Adjustment simply occurs through other channels. In the typical sticky-price model, one such channel is a decline in output and employment. Another is greater volatility in interest rates. The proper comparison, therefore, is not between the volatility of exchange rates, but between exchange-rate volatility and volatility in the variables which adjust when the exchange rate cannot.

When the experience with volatility is compared across exchange rate regimes, it is important to include the very large discrete realignments of fixed rates from one peg to another in order to provide an accurate picture of volatility under pegged rates. These realignments typically occur under crisis conditions and exact very heavy burdens in lost output and employment, and in economic and social instability. It is precisely the cost of disruptions caused by exchange-rate crises in adjustable-peg systems that has contributed to the widely-held belief that only the so-called corner solutions - of fully floating rates and hard pegs - remain as viable options for most countries.

Along with excessive volatility, floating rate systems are often seen as permitting sustained "misalignments" of exchange rates. Misalignments may be defined in terms of departures from purchasing power parity (PPP) or as sustained inconsistencies with rates implied by macro-economic fundamentals. The critics see misalignments as evidence of system failure and market inefficiency. Misalignments also occur in a variety of fixed-rate systems, however, as the rash of crises of recent years amply demonstrates. The misalignment issue is thus an argument not for fixity, but for certain types of fixity - including dollarization and monetary union. It is, in fact, the fear of sustained misalignments followed by realignments in the midst of crisis that have decimated the popularity of pegged-rate regimes.

The criticism of volatility and misalignment is typically embedded in arguments that forces operating in exchange markets push rates away from fundamentals. At times, these forces may include speculative attacks. In reporting the results of recent work by economists at the Bank of Canada, however, Murray (2000) argues that the long-run behavior of the real Canada-U.S. exchange rate is largely explained by the inflation differential, the relative price of energy, and the relative price of non-energy commodities. Speculation is not an important issue in this relationship, so that volatility in the exchange rate is readily traced to volatility in the underlying variables. Indeed, according to other work at the Bank of Canada, in a number of episodes increased volatility in the exchange rate has been due to stabilizing rather than destabilizing speculation (p. 53)

Excessive volatility and misalignment can clearly complicate the effectiveness of floating rates, but misalignment in particular is also a problem that arises in the context of pegged rates and volatility is by definition excessive during the exchange rate crises which often terminate pegged rate regimes. If these concerns are important in the choice of exchange rate regime, then they eliminate certain types of fixity from consideration, which narrows the choice among feasible fixed rate regimes down to currency boards, dollarization, and currency union.

IV. Exchange Rates and Economic Structure

The interest among some Canadians in exploring alternative exchange-rate arrangements stems from unhappiness with the current floating-rate regime, an unhappiness engendered by the perception that floating rates are inflicting long-run damage on the Canadian economy. The concern is that the sustained depreciation of the Canadian dollar, driven by deflation in world commodity prices, has retarded technological innovation and the modernization of the Canadian manufacturing sector.

Here, critics, including Courchene and Harris (2000) and Grubel (2000) interpret the "floating-rate-as-buffer"argument not as a strength of floating rates but as weakness. They assert that movements of the Canadian dollar have been excessively dominated by shocks in world commodity prices. Deflationary pressures in world commodity markets are seen as the primary cause of the dollar's depreciation. While this protection via the exchange rate has doubtlessly been beneficial from the point of view of resource-based industries, it has shielded other sectors, and particularly Canadian manufacturing, from foreign competition and has thereby undermined incentives to invest, innovate, and modernize. This line of causation is accepted as a possibility by McCallum (1999, 2000), who is otherwise a strong supporter of the floating rate.

This is no longer an argument about macro-stability in the context of a given economic structure, but about the long-run evolution of that structure. Here, the buffering function of the floating rate is not the benign force described in the earlier quotation from Murray, but as a source of long-term decline. The depreciation shields one sector against permanent changes in world prices, but it does so at the cost of reduced competitiveness in the rest of the economy.

Exchange-rate buffering generates efficiency and welfare losses analogous to those of tariffs and other forms of protection.

The concern with growth and structural transformation introduces a new and important dynamic element into the discussion. The traditional debate sees little or no connection between the exchange-rate regime and economic growth; growth is largely exogenous and unaffected by exchange-rate arrangements. The modern challenge to this perspective draws heavily on recent developments in the theory of endogenous growth.

This is not to say that the potential effects of exchange-rate regimes on industrial structure have been ignored. Frankel and Rose (1998) have argued in the context of EMU that monetary integration will contribute to synchronization of business cycles among member countries by increasing trade linkages. These trade linkages will also

contribute to greater similarity of industrial structure and thus reduce the problems associated with asymmetric shocks. This view has also been expressed by the European Commission. This will be particularly true in monetary unions in which intra-industry trade rather than inter-industry trade dominates. Among such countries business cycle movements will become more correlated.

This view is challenged by Krugman (1993) and others, according to whom the greater specialization brought about by trade and monetary integration will sharpen differences among countries and thus intensify the problem of managing asymmetric shocks. (See Figure A1 for a stylized representation of the debate.)

The outcome is likely to hinge on the roles of inter- and intra-industry trade in the integrated area. Where inter-industry trade dominates, greater specialization and hence heightened asymmetry is likely to be the outcome. This may be more of a threat therefore to currency unions involving industrialized and industrializing countries. Where intra-industry trade is the dominant feature, as in the European Union, trade can readily be seen to increase similarity and thus reduce the problems of asymmetric shocks.

Recent developments in offshore assembly, component trade and intra-product specialization, moreover, point to a new force tending to increase cyclical linkages and thus to reduce the problem of asymmetric shocks even in, or perhaps especially in, monetary unions which bring together industrialized and industrializing economies. As production in major industries, including motor vehicles, textiles, and electronics, spreads across national borders, specialization moves from the level of end-products to that of parts, components and assembly. Global demand or supply shocks to such industries now affect every country which has a piece of the action. The recent slow-down in demand for passenger vehicles and electronics, for example, may be expected to affect producers in the United States, Canada and Mexico in similar ways. A decline in world demand for aircraft affects not only Boeing and Airbus, and thus the countries in which

they are assembled, but all the many countries which supply parts and components to Boeing and Airbus. (See Arndt (1998) and Arndt and Kierzkowski (2001) for details.)

Price Deflation in the World Resource Sector

As noted above, the type of shock that has stimulated the contemporary Canadian debate on the optimal exchange rate regime are changes in the world price of raw materials, natural resources, and agricultural commodities. Consider, for example, the sustained deflation in world commodity prices of recent years. Under floating rates, the relative decline in world prices shifts world demand away from Canadian goods. The Canadian dollar depreciates, the extent of that depreciation depending on the magnitude of the shock and on the importance of commodity trade in Canada's total trade, and on the degree of nominal rigidities.

While the exchange rate is a general price, it moves because market conditions in a particular sector have changed. As it changes, it affects not only decision makers in the sector in question but everywhere in the economy where exchange rates matter. Thus, the effects of a sector-specific shock are immediately spread to the entire economy. Let us suppose for convenience that the rest of the economy consists of manufacturing. The relative price of natural resources falls, signaling the need to shift labor and capital out of that sector. In a fixed-rate system, the world-wide deflation of commodity prices generates downward pressure on domestic prices in that sector. There is no depreciation of the nominal exchange rate. But once again, relative prices within the economy move in favor of the manufacturing sector, signaling the need to reallocate labor and capital into manufacturing.

Under conditions of profit-maximization, marginal firms are driven out of business and marginal workers lose their jobs. The details of adjustment are influenced by the aforementioned rigidities, but over time relative price changes clearly favor contraction of the resource sector and expansion of manufacturing. Downward rigidities

of wages and inter-sectoral immobility of workers create additional problems, especially in the short run, and may give rise to calls for government policy intervention. If nominal rigidities are asymmetric, with downward flexibility of wages more problematic, then the adjustment of relative prices will be facilitated by exchange rate depreciation.

The foregoing is very much the conventional story. What distinguishes the contemporary Canadian debate is the argument that adjustment under floating rates has adverse effects on the evolution of the rest of the manufacturing sector. What concerns many Canadians is the possibility that exchange-rate movements occasioned by price deflation in the resource sector may provide a measure of protection to domestic manufacturing industries which impedes the development of modern, high-tech manufacturing and thus slows or prevents the emergence of the "new economy" with its emphasis on knowledge-intensive industries.

The focus here is not on the relative price between domestic manufacturing and domestic resource industries, but on the relative price between domestic and foreign manufacturing industries, particularly those in the United States. The increase in the former clearly creates incentives for expansion of manufacturing; the increase in the latter may create disincentives for modernization. Manufacturing may very well expand, but the depreciation will favor older, more traditional types of manufacturing over newer, more modern ones.

This issue is at the heart of the call for monetary union by economists like Courchene and Harris. It is acknowledged as a potential problem by opponents of monetary union like McCallum (1999,2000). The question is part of the public debate in Canada, but it is of relevance to countries like Norway and Iceland as well (Gylfason (2000)). The evidence, however, is far from clear, with a great deal more research needed before any policy-related conclusions would be justified. (See Appendix B for selective information drawn from the OECD). In any event, as McCallum (2000) notes,

this is at best an argument for a stronger dollar rather than currency union. It would have to be combined with other arguments in order to make the case for monetary union.

The Role of Productivity

The lack of evidence notwithstanding, however, the stakes in the debate have clearly been raised by the possibility that exchange-rate policies may have implications for economic growth. Whereas the traditional view treats economic growth as exogenous, the new view employs insights from endogenous growth theory to argue that the choice of exchange-rate regime may have significant implications for economic growth. If growth is affected by the exchange-rate regime, then the discussion moves significantly beyond the traditional focus on macroeconomic adjustment and stability.

Richard Harris has been in the forefront of this discussion. In a recent paper (Harris, 2001) he develops a two-sector model for a small open economy which imports technology. One of the two sectors consists of "old economy" industries (which may or may not include natural resources), the other is made up of "new economy" industries. An important feature of the model is that the labor markets serving the two sectors are subject to structural differences. In the labor market serving the old economy the nominal wage is constant, perhaps because of the presence of strong labor unions; in the labor market of the new economy wages are flexible and competition ensures full employment.

Harris uses this model to examine the "buffering" effect of a floating exchange rate regime. Buffering occurs either as a deliberate result of policy, in which the nominal rate is targeted so as to keep domestic prices in line with those abroad or as a result of overall market responses. As noted above, if old-sector trade looms large in the country's total trade, then global changes in old-sector prices will dominate exchange rates.

Now, the economy in this model, is disturbed by the arrival of a general purpose technology (GPT) shock in the new economy together with a world price decline in the

old economy. This double whammy is intended to mirror the stylized facts of the past decade or so during which the information revolution coincided with depressed world commodity prices. In the Harris model, exchange rate buffering is shown to stabilize employment in the old economy and thus overall unemployment in the economy as a whole. But it also retards investment in technological change and the reallocation of labor from the old to the new economy. The role of general purpose technology shocks in fostering creative destruction is an important feature of the model in terms of the endogeneity of productivity growth. The buffering effect of the floating rate manifests itself by dampening the forces of creative destruction.

There is much to be said for this new perspective on the role of exchange rates. While the Harris model may not be the only or best way to model the stylized facts, it makes a contribution through its focus on key dynamic aspects of adjustment in open economies. Modelers in this area have paid insufficient attention to these issues by way of assuming that productivity growth was independent of the exchange-rate regime.

If we now return to the main thread of our argument, we recall that the issue was one of distinguishing between the effects of the rise in the price of Canadian manufactures relative to commodities, which occurs under both fixed and floating rates in response to a shock in world commodity prices, and the effects of the rise in the price of Canadian manufactures relative to U.S. manufactures, which occurs only (or mainly) under floating rates. In order to incorporate the Harris critique into this framework, we need to distinguish between old and new manufactures and to assume that Canada is an importer of technology.

A key feature of the model are the assumptions governing labor market adjustment, particularly the presence of nominal rigidities in the old economy. Traditionally, such rigidities form the basis for rejecting fixed rate regimes. They were a problem in Europe under the EMS exchange rate regime and continue to represent a major threat to the new EMU (Soltwedel et al. (2000)). This raises important questions

with respect to the importance of labor-market reforms in the run-up to currency union (Hughes Hallett and Viegi (2000)). Harris does not say how the problems associated with these rigidities will affect adjustment in the enlarged currency union. It is to be expected, of course, that the influence of Canada's resource-based industries over the external exchange rate will decline.

There is no doubt that rigidities in certain sectors of the economy are an important, but not the only, reason for the results in the Harris model. This suggests that labor market reforms not only represent an important pre-condition for monetary union, as the older literature would have it, but an alternative to currency union, especially if the major objective of currency union is to move productive resources from the resource-based sector and from more traditional forms of manufacturing into the new economy.

The other element which matters in the Harris model is the assumption that modern technology is imported into Canada from the United States and that sustained undervaluation of the Canadian dollar raises the cost of technology imports and reduces the expected return. To the extent that this helps explain the stylized facts, however, it is again more an argument for a strong dollar than for currency union.

Collecting the Pieces of the Argument

There is a widely held view among economists that neither Canada nor the US constitutes an optimal currency area. Some, including Robert Mundell, have argued that if there could only be two currency areas in North America, a north-south rather than east-west division of the continent would have been better.

In assessing the extent to which Canada satisfies the optimum currency area criteria, most economists would give it a low or failing grade on labor-market flexibility and on exposure to asymmetric shocks. The problem arises in part for geographical reasons and in part precisely for the reasons which have engaged the current debate,

namely, the structural dissimilarities between the resource based sectors and the rest of the economy.

According to opponents of the existing floating rate, on the other hand, Canada must abandon the floating rate because a dominant, structurally unique region subject to asymmetric shocks dominates the movement of the exchange rate in ways that are detrimental to the economic future of the rest of the economy. One solution for the "rest of Canada" would be to break away from the currency union called Canada. This "solution" would be difficult to sell, no doubt, except perhaps in the province of Quebec. It would be difficult to sell for political reasons, but also because the "resource-based sector" does not overlap neatly with existing provinces. While it would contain much of western and Atlantic Canada, it would cover parts of Northern Ontario and parts of Quebec.

Thus, the solution proposed instead is to merge Canada into a monetary union with the United States, which would have the effect of reducing the resource sector's domination of the exchange rate. First, there would no longer be a variable exchange rate between Canada and the United States, and the resource sectors of the U.S. and Canada combined would be smaller in relation to the rest of the U.S. and Canada combined and thus exert less influence on the exchange rate between the continental currency and third currencies.

While the aim of reducing the influence of the resource sector on the economic fortunes of the rest of Canada would be certain to be achieved, the proposed currency union may simply rearrange the pattern of asymmetries between the rest of Canada and the United States without making overall adjustment any easier. Here, the likely outcome depends significantly on the structural compatibility between most of Canada and the U.S. relative to the structural compatibility between the rest of Canada and the resource sector.

Courchene and Harris (2000), as well as Grubel (2000), tend to see strong compatibilities, while Murray (2000) suggests that the two countries' economic structures display significant differences. In the latter's view, asymmetric shocks will be a problem in a North American common currency area. The problem does not get any easier when Mexico is brought into the equation, although the similarity-enhancing tendency toward cross-border production needs to be kept in mind.

One piece of evidence provided by Murray is the behavior of the two countries' terms of trade, which have tended to move in opposite directions. A second is based on structural VAR estimations which also support the presence of asymmetric shocks. The work of Bayoumi and Eichengreen (1994) provides similar evidence. It seems that we cannot be sure how currency unification will affect asymmetries in the region.

It is also unclear how currency union will affect Canadian factor-market rigidities. Nor is it clear what the effect will be on inter-country factor mobility. Capital and skilled workers are already highly mobile between the U.S. and Canada. To the extent that Courchene and Harris (2000) believe that the emigration of skilled workers has been driven by income inequalities produced by the depressed Canadian dollar, they would expect the "brain drain" to abate in the expectation that currency union will reduce income inequality. But such an outcome is far from a foregone conclusion.

It is also unclear how monetary integration will affect the mobility of unskilled workers. It may force workers in resource sectors and/or old manufacturing into relocating if nominal rigidities in those sectors channel adjustment to asymmetric shocks into unemployment and plant closures. The result may, however, come closer to European experience in recent years where declines in competitiveness have resulted in higher unemployment.

V. Determining the Direction of Causality

In the preceding discussion, causality has tended to run from an exogenous decline in world commodity prices to a depreciating Canadian dollar. There may be some questions about the extent to which the depreciation was supported at times by macroeconomic policy, but the direction of causality was never in doubt.

While this scenario is in Canada's case a very plausible one, it is by no means the only possible scenario. Grubel (2000), for one, suggests another which runs from wage-setting union behavior via monetary accommodation to currency depreciation. Briefly, union demands for wage increases in excess of productivity gains, create unemployment and related market changes, all of which are met by the central bank with monetary expansion. While such a policy is intended to stimulate aggregate demand, it allows prices to rise along with nominal wages and thereby keeps the growth of real wages in check. The rise in domestic prices relative to those abroad, causes the home currency to depreciate.

This is very much the European scenario. Indeed, it was this cycle which induced Austria to adopt the hard-currency peg to the Deutsche Mark many years ago in order to break the cycle from wages to prices and exchange rates (Arndt (1982)). The policy worked extremely well, disciplining both wage-setting and price-setting in Austria, forcing both into conformity with the inflation guidelines established by the Bundesbank. Courchene and Harris (2000) refer to the Austrian case in their discussion of a possible fixed-rate scenario for Canada.

Grubel (2000) questions the causal link from world commodity prices, arguing that the econometric evidence is not very strong. As an alternative - or additional - explanation, he cites some evidence which relates the depreciation of the Canadian dollar to the growing debt of Canadian governments and particularly to the share of this debt that is held abroad. This debt requires the payment of interest to foreigners, the repatriation of which places downward pressures on the Canadian dollar.

In Grubel's view, the evidence overall is too scanty to permit a firm conclusion. However, as noted earlier, a depreciation gives producers outside the resource sector room to raise prices, profits and wages. When world commodity prices eventually rise and the Canadian dollar appreciates, hysteresis effects make it difficult for these industries to reduce wages and prices. Consequently, they find themselves in a weakened position as exports fall and imports rise. There is thus a debilitating ratchet effect at work as the cycle continues.

The important lesson which Grubel draws from these considerations is that labor-market rigidities and behavior may be endogenous to the exchange-rate regime. Before Austria adopted its hard-currency peg to the Deutsche Mark, workers and labor unions knew that negative employment effects resulting from their wage-setting behavior would be countered by the central bank with a monetary expansion and that any anti-competitive consequences of such a policy on domestic prices would be met by a devaluation of the schilling. After adoption of the hard-currency peg, Austrian monetary policy was credibly tied to German monetary policy, so that excessive wage increases would not be accommodated by monetary expansion and currency depreciation; they would lead to unemployment and lost output. The pattern of wage-setting changed drastically, with wage growth now governed by productivity and the inflation targets of the Bundesbank.

It is easy to see why, from this perspective, monetary and exchange-rate policy autonomy may appear as a curse rather than a blessing. Austrians who lived through both periods, the pre-hard currency period during which Austria enjoyed monetary and exchange-rate policy autonomy, and the hard-currency period, when the exchange rate was fixed and Austrian monetary policy was firmly tied to that of the Bundesbank, had little difficulty deciding which regime they preferred.

VI. Dollarization vs. Currency Unification

As noted earlier, while exchange-rate fixity may be achieved in a number of ways, running from the softer varieties of pegged but adjustable rates to the hard peg of the currency board, dollarization, and finally currency union. Although soft pegs would help achieve some of the objectives discussed in the foregoing, they also leave open many of the risks which the move away from floating is designed to eliminate.

This leaves the currency board, dollarization, and monetary union as the viable alternatives to floating rates. The first may be undertaken unilaterally by Canada and Mexico, the last two require cooperation on the part of the United States. Once implemented, these provide little if anything in the way of exit strategies. That's why they are hard fixes. The currency board has the advantage of being the softest of the hard pegs. Exit, though costly, is easier because implementation of the currency board does not call for the wholesale dismantling of the country's institutional structure. The domestic currency survives, as does the central bank. Policy reversal is much more difficult and costly in the case of dollarization, and still more in the case of currency union.

All three bring the benefit of reduced risk premia and lower international borrowing costs. Dollarization brings the loss of seigniorage (unless the United States is willing to share seigniorage). Currency union typically provides for seigniorage sharing. Currency boards and dollarization face very tight constraints on the lender-of-last-resort function.

The central bank survives in the case of monetary union. In the U.S.-Canada case, the typical scenario sees the Bank of Canada as the thirteenth district bank of the new federal Reserve System. It is not clear, however, why such a rearrangement would be optimal, in view of the asymmetries that exist in Canada.

Instead of one district for the whole of Canada, the country might more advantageously be divided into several regions, each with its own district bank.

Alternatively, the existing Fed districts which come up to the Canadian border could be expanded vertically to absorb the respective Canadian regions.

VII. The Politics of Monetary Union

Although many proponents of North American currency union see a model in the EMU, it is important to recall that political motives have typically been the driving force behind ecomic integration in Europe. Time and again, when the case for further integration was difficult to make on economic grounds, political need saved the day. There is no counterpart to this important force in North America. Economic arguments must carry a much greater share of the case.

The matter is complicated by a lack of interest in the United States. Although an element of public opinion is sympathetic to the argument that closer monetary cooperation is in the enlightened interest of the United States, because it will contribute to stability, the public at large and the U.S. Congress at large are not interested. It is sometimes argued that it is surely not in the U.S. interest to allow a possibly growing number of countries in the hemisphere to engage unilaterally in linkages of one sort or another to the dollar. It is further argued, that the appearance of the euro and challenge it is sure to mount against the dollar, make it important for the dollar area to be expanded. The mood in the United States is one of disinterest.

This means that Canadians - and Mexicans - will have to make their case in the U.S. This would not be the first time, given that Canada took the initiative with respect to the Canada-U.S. free trade area and that Canada and Mexico spearheaded the move the NAFTA. The arrival of Vicente Fox on the Mexican scene is probably an important advantage. As the Washington jargon likes to put it: Canada and Mexico will have to be the "demandeurs."

It is, however, unclear that there is broadly based political support for currency union in Canada. Canadians are skittish about their cultural independence from the

United States. Rather than monetary union, supporters might have an easier sell if they copied the European example of gradually deeper integration. This may not only be good from the political point of view, but may make economic sense as well. Here the question is whether the approach to currency unification presupposes deeper economic integration?

VIII. Conclusion

It is very easy to dismiss the case for currency unification (and by extension for currency boards and dollarization in Canada). The thrust of optimum currency area theory says it wont work. Current realities say it isn't needed. From the macro perspective at least, Canada is outperforming the United States. The country does not need to be rescued from its own policy foibles. The politics on both sides of the border say it's a non-starter.

Of course, the voices of doubt and uncertainty cannot be entirely stilled. On virtually every occasion when Europe took a major step forward, there were voices proclaiming that the attempt would come to nought. That was especially true in the run-up to Maastricht. And yet it came to pass. Is it because populations do not value policy sovereignty, national moneys, and the other trappings of economic autonomy as much as we think. Or is it that under a common economic and monetary order, we are assured of living more peacefully with our neighbors?

Traditional arguments, for and against, are not strong enough to give a clear-cut answer. That is why a strong political tail wind would be needed to get this ship out of the harbor. The new argument, which links growth and modernization to the exchange rate regime, is potentially a very powerful argument, but it is presently too undeveloped and untested. A great deal more work would have to be done and more evidence collected before it could make the case for such a major enterprise. Evidence is needed not just on the deleterious effects of floating rates on growth and industrial structure, but

on the curative effect of monetary union. One way to obtain information on the latter, is to allow the effects of EMU to work their way in Europe.

Meanwhile, it may well be appropriate to think more fully about the preconditions -especially in terms of deeper integration - needed to make monetary union work. Questions about the optimal order of economic integration are of concern to theoreticians and practitioners alike.

REFERENCES

Alexander, V. and G.M. von Furstenberg (2000), "Monetary Unions-A Superior Alternative to Full Dollarization in the Long Run," North American Journal of Economics and Finance, 11, No. 2, December.

Arndt, S.W. (1982), The Political Economy of Austria (Washington, D.C.: AEI Press)

_____ (1998), "Super-specialization and the Gains from Trade," Contemporary Economic Policy, 16, October

____ (2001), "Offshore Sourcing and Production Sharing in Preference Areas," in S.W. Arndt and H. Kierzkowski (eds.), Fragmentation: New Production Patterns in the World Economy (New York: Oxford University Press)

Bayoumi, T. & B. Eichengreen (1994), "One Money or Many? Analyzing the Prospects for Monetary Unification in Various Parts of the World," Princeton Studies in International Finance, No. 76, September

Begg, D. (2000), "Beyond the Design of Monetary Policy Alone: Fiscal Commitment, Macro Coordination, and Structural Adjustment," CEPR, Discussion Paper, No. 2637, December.

Benigno, G. & P. Benigno (2000), "Monetary Policy Rules and the Exchange Rate," Bank of England, May.

Benigno, P. (2001), "Optimal Monetary Policy in a Currency Area," CEPR Discussion Paper, No. 2755, April.

Berg, A. and E. Borensztein (2000a), "The Choice of Exchange Rate Regime and Monetary Target in Highly Dollarized Economies," IMF Working Paper, WP/00/29, February

_____ (2000b), "Full Dollarization: The Pros and Cons," IMF Economic Issues, N0. 24, December. (Based on "The Pros and Cons of Full Dollarization," IMF Working Paper, WP/00/50, March.)

Cohen, D. and O. Loisel (2000), "Why Was thye Euro Weak? Markets and Policies," CEPR Discussion Paper No. 2633, December.

Coricelli, F., A. Cukierman, & A. Dalmazzo (2001), "Economic Performance and Stabilization Policy in a Monetary Union with Imperfect Labour and Goods Markets," CEPR Discussion Paper, No. 2745, March.

Courchene, T.J. and R.G. Harris (2000), "North American Monetary Union: Analytical Principles and Operational Guidelines," North American Journal of Economics and Finance, 11, No. 1, August.

De Grauwe, P. (1997), The Economics of Monetary Integration, 3rd ed. (Oxford: Oxford University Press)

Eichengreen, B.(1997), European Monetary Unification: Theory, Practice, and Analysis (Cambridge:MA: MIT Press)

Emerson, M. et al.(1990), "One Market, One Money: An Evaluation of Forming an Economic and Monetary Union," European Economy, 44

Ferguson, N. & L.J. Kotlikoff (2000), "The Degeneration of EMU," Foreign Affairs, 79, No. 2, March/April.

Frankel, J.A. & A.K. Rose (1998), "The Endogeneity of the Optimum Currency Area Criteria," Economic Journal, 108 (449), July

_____ (2001), "An Estimate of the Effect of Common Currencies on Trade and Income," Harvard University, mimeo, April.

Grubel, H.G. (2000), "The Merit of a Canada-US Monetary Union," North American Journal of Economics and Finance, 11, No. 1, August

Gylfason, T. (2000), "Fix or Flex? Alternative Exchange Rate Regimes in an Era of Global Capital Mobility," North American Journal of Economics and Finance, 11, No. 1, December

_____ & G. Zoega (2001), "Natural Resources and Economic Growth: The Role of Investment," CEPR Discussion Paper No. 2743, March.

Harris, R.G. (1999), "Determinants of Canadian Productivity Growth: Issues and Prospects," Ottawa: Industry Canada, Discussion Paper No. 8, December

_____(2000), "The Case for North American Monetary Union," ISUMA, vol. 1, No., 1 Spring

_____(2001) "The New Economy and the Exchange Rate Regime," Adelaide University: Centre for International Economic Studies, Discussion Paper No. 0111, March

Hochreiter, E. (2000), "Exchange Rate Regimes and Capital Mobility: Issues and Some Lessons from Central and Eastern European Applicant Countries," North American Journal of Economics and Finance, 11, No. 2, December.

Hughes Hallett, A. & N. Viegi (2000), "Labour Market Reform and Monetary Policy in EMU: Do Asymmetries Matter?"

Krugman, P. (1991), Geography and Trade (Cambridge, MA: MIT Press)

McCallum, John (1999), "Seven Issues in the Choice of Exchange Rate Regime for Canada," Current Analysis, Royal bank of Canada, February.

_____ (2000), "Engaging the Debate: Costs and Benefits of a North American Common Currency," Current Analysis, Royal Bank of Canada, March

McKinnon, R.I. (1963), "Optimum Currency Areas," American Economic Review, 53,

_____ (2000), "On the Periphery of the International Dollar Standard: Canada, Latin America, and East Asia," North American Journal of Economics and Finance, 11, No. 2, December

Masson, P. and C. Pattillo (2001), "Monetary Union in West Africa: An Agency of Restraint for Fiscal policies?" IMF Working Paper, WP/01/34, March.

Mundell, R.A. (1961), "A Theory of Optimum Currency Areas," American Economic Review, 51

Murray, J. (2000), "Why Canada Needs a Flexible Exchange Rate," North American Journal of Economics and Finance, 11, No. 1, August

Rose, A.K.(2000), "One Money, One Market: The Effect of Common Currencies on Trade," Economic Policy

_____& C. Engel (2001), "Currency Unions and International Integration," CEPR Discussion Paper, No. 2659, January.

Soltwedel, R., D. Dohse& C. Krieger-Boden (2000), "EMU Challenges to European Labour Markets," IMF World Economic Outlook:Supporting Studies.

Tower, E. & T.D. Willett (1976), "The Theory of Optimum Currency Areas and Exchange-Rate Flexibility," Princeton Special Papers in International Economics, No. 11 , May

Wagner, H. (2000), " Which Exchange Rate Regimes in an Era of High Capital Mobility?" North American Journal of Economics and Finance, 11, No. 1, December

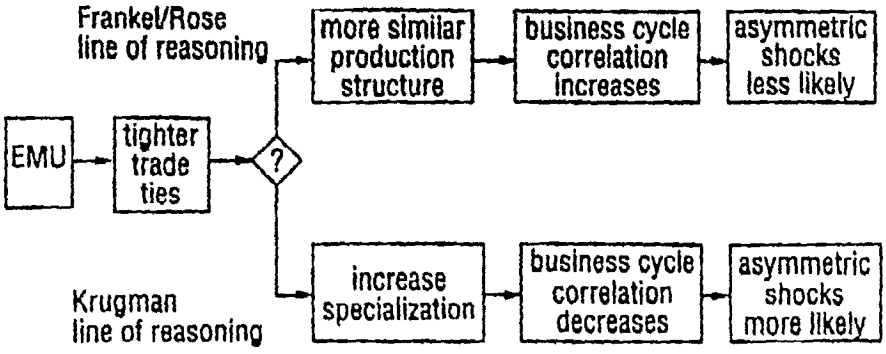
Willett, T.D. (2001), "Truth in Advertising and the Great Dollarization Scam," Journal of Policy Modeling, 23, forthcoming.

Tab 17

Arndt

Figure A1

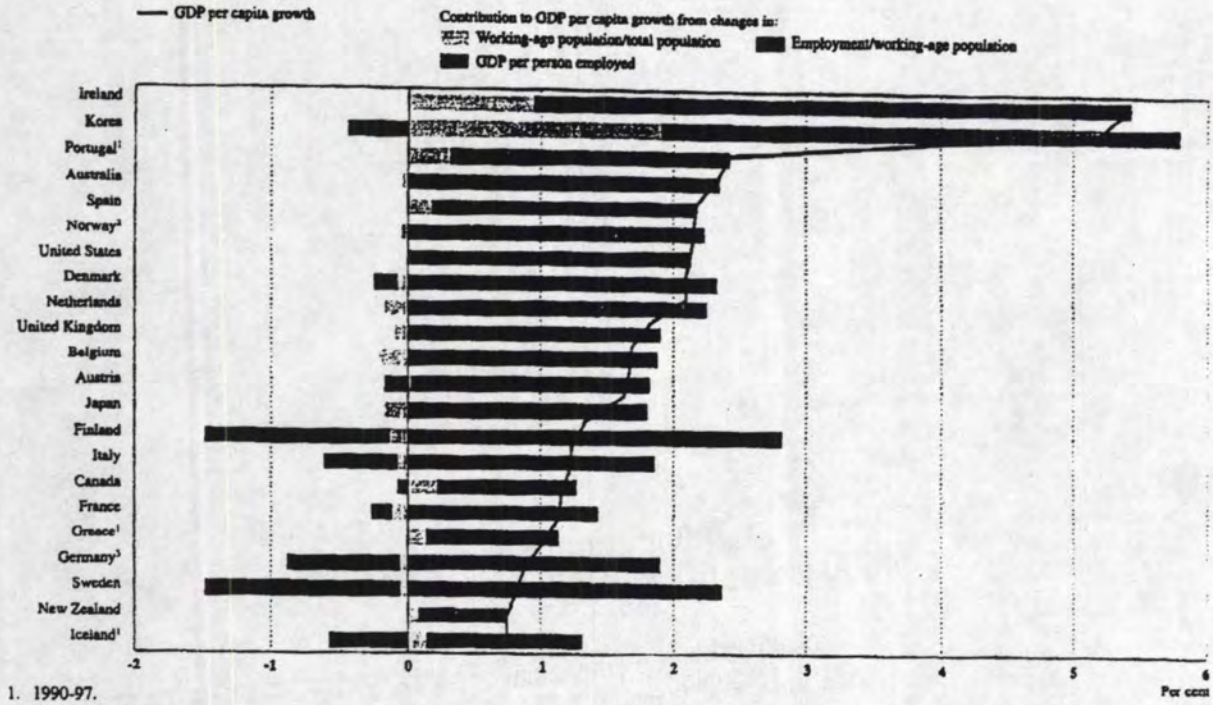
Integration, Specialization, and Asymmetric Shocks



Source: Soltwedel, Dötsch & Krieger-Boden

Trend growth in GDP per capita and its components, 1990-98

Average annual percentage change

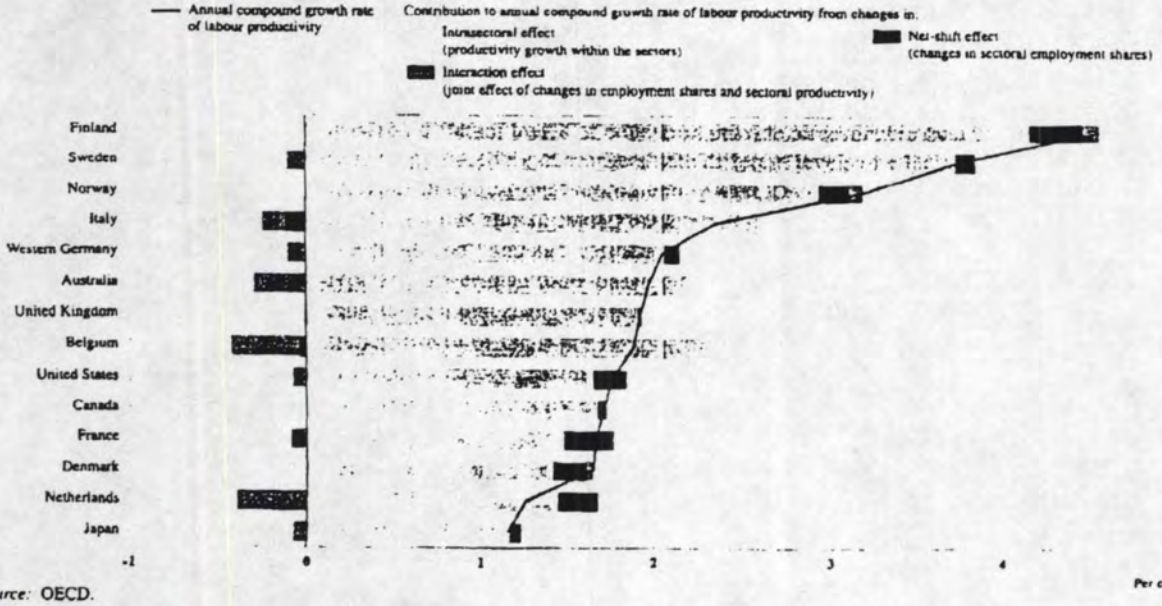


1. 1990-97.
2. Mainland only.
3. 1991-98.

Source: OECD.

Breakdown of compound growth rate of labour productivity into intra and inter sectoral effects, 1990-97

Non-farm business sector



Source: OECD.

Estimates of Multi-Factor Productivity growth rates in the G7 countries, 1980-98

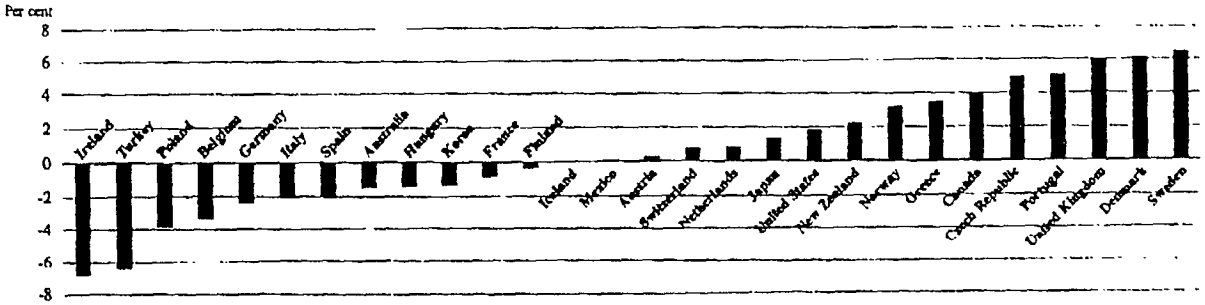
Average annual growth rates
(based on trend series time-varying factor shares)

		1980-90	1990[a]-98[b]	1995-98[b]	1990[a]-96
United States	MFP growth	0.8	1.0	1.0	1.0
	with control for human capital	0.8	0.8	1.0	0.9
	... and composition/quality of physical capital	0.6	..	..	0.8
Japan	MFP growth	2.0	1.6	1.6	1.5
	with control for human capital	..	..	..	..
	... and composition/quality of physical capital	..	..	..	..
Germany[c]	MFP growth	1.6	1.4	1.5	1.4
	with control for human capital	1.6	1.9	1.3	2.0
	... and composition/quality of physical capital	1.5	..	..	..
France	MFP growth	2.1	1.1	1.1	1.1
	with control for human capital	1.9	0.7	1.0	0.5
	... and composition/quality of physical capital	1.5	..	..	0.4
Italy	MFP growth	1.5	1.2	1.0	1.2
	with control for human capital	1.4	0.6	0.7	0.5
	... and composition/quality of physical capital	1.3	..	..	0.4
United Kingdom	MFP growth	..	1.3	1.4	1.3
	with control for human capital	..	0.5	1.2	0.5
	... and composition/quality of physical capital	..	..	..	0.3
Canada	MFP growth	0.4	0.8	0.8	0.8
	with control for human capital	0.4	0.8	0.8	0.8
	... and composition/quality of physical capital	0.2	..	..	0.4

Note: For each country, the first line shows estimated MFP growth rate without control for composition/quality changes in labour and capital; the second controls for changes in the composition of labour; while the third also controls for composition/quality changes in physical capital.
a) 1991 for Germany.
b) 1997 for Italy and United States, 1996 for United Kingdom.
c) Western Germany before 1991.
Source: OECD.

Real wage growth minus labour productivity growth, 1996-99

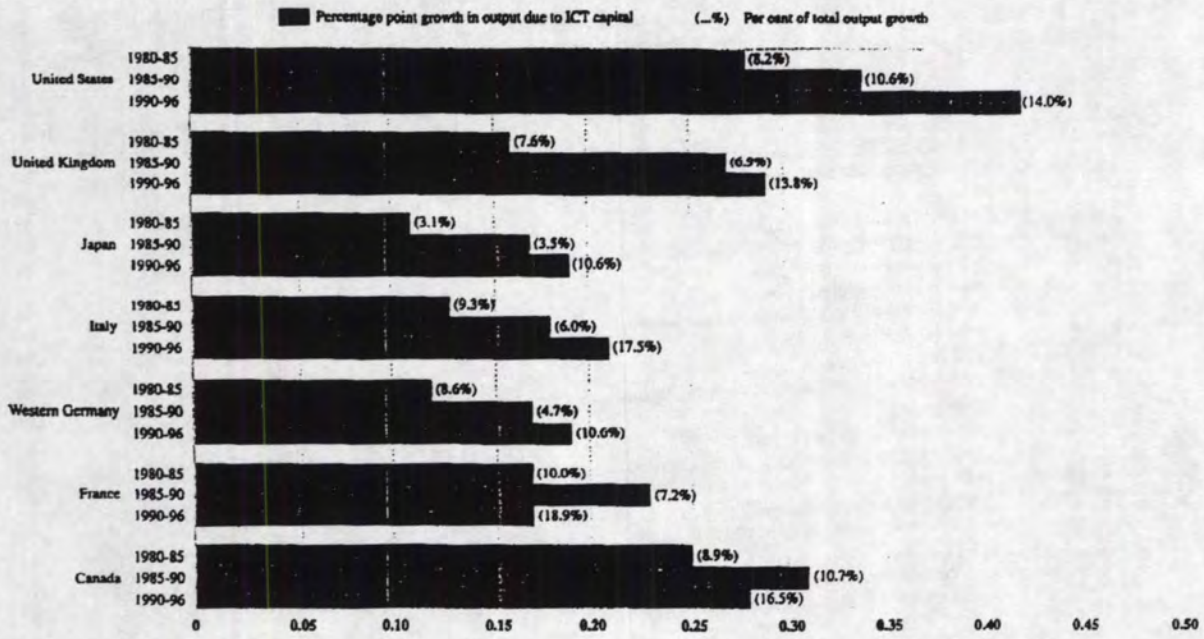
Cumulative changes



Note: Real wages are defined as compensation per employee in the business sector divided by the business sector GDP price deflator; labour productivity is defined as GDP per employed person in the business sector.
Source: OECD.

The contribution of ICT capital to output growth

Total industries, based on harmonised ICT price index

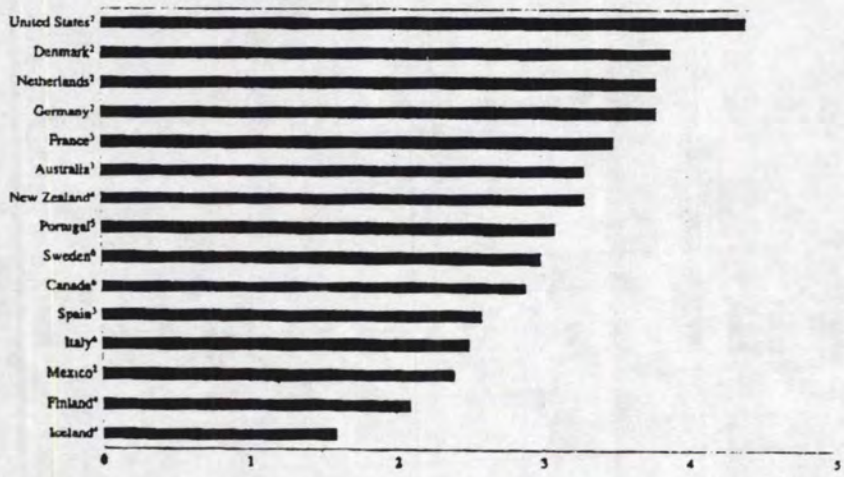


Source: Schreyer (2000).

OECD

Share of value added of ICT industries[1] in total GDP, mid-1990s

Per cent of GDP

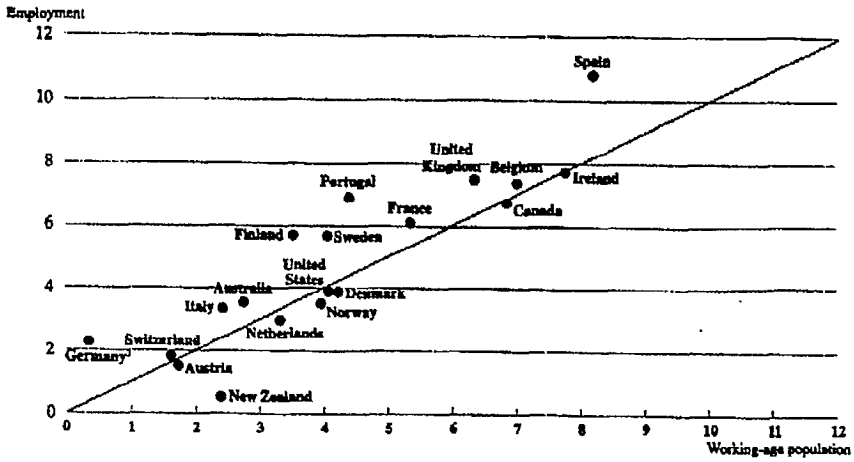


1. Defined as ISIC Rev 2 classes 3825 (Office and computing equipment), 3832 (Radio, TV and communication equipment) and 72 (Communication services).
2. 1996.
3. 1997.
4. 1995.
5. 1993.
6. 1994.

Source: OECD (2000), *OECD Information Technology Outlook*, Paris.

Human capital growth in total working-age population and in employment, 1989-96

Percentage point change of the share of individuals with higher educational levels[1] in total

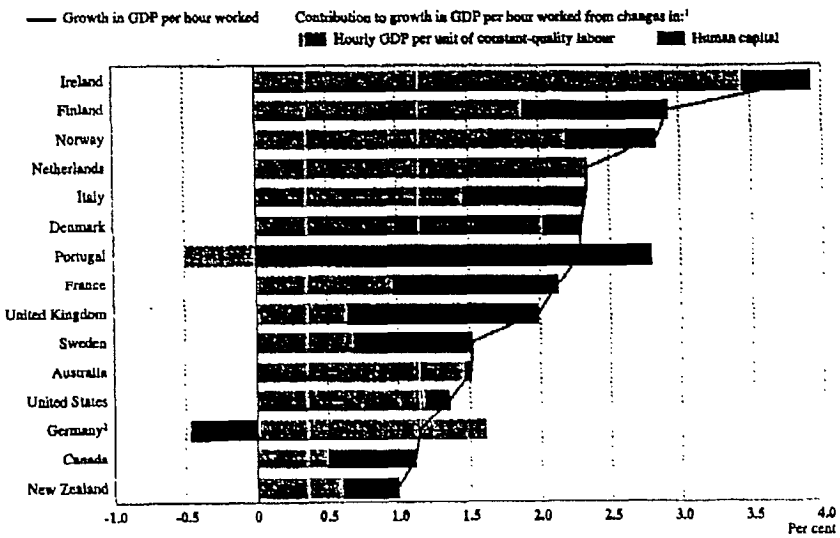


1. Higher education levels refer to ISCED codes 5, 6 and 7.
2. 1991-96.

Source: Calculations based on data from OECD, *Education at a Glance*, various issues.

Effects of human capital on growth of hourly labour productivity, 1985-96

Average annual percentage change

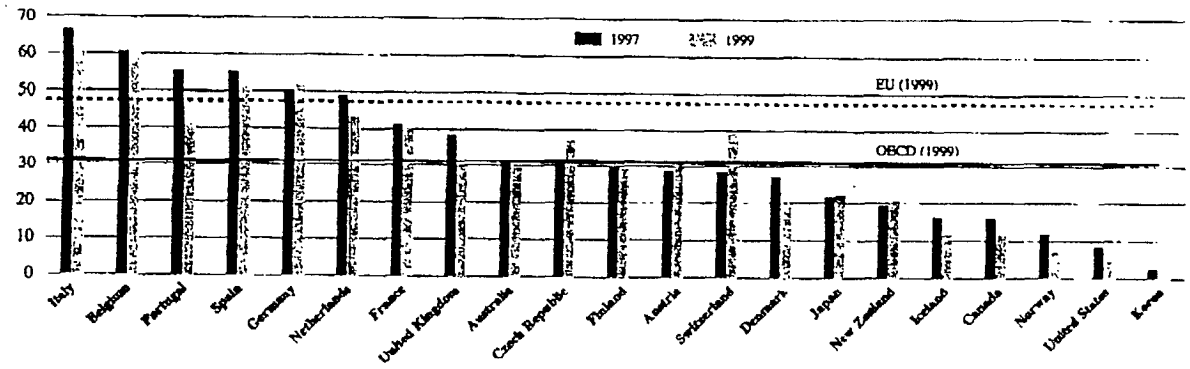


1. This is based on a simple quantitative decomposition: growth in GDP per hour worked = (labour productivity adjusted for hours and human capital) + (growth in human capital). Changes in human capital are proxied by changes in the education composition of employment, see main text.
2. Before 1991, data refers to Western Germany.

Source: OECD.

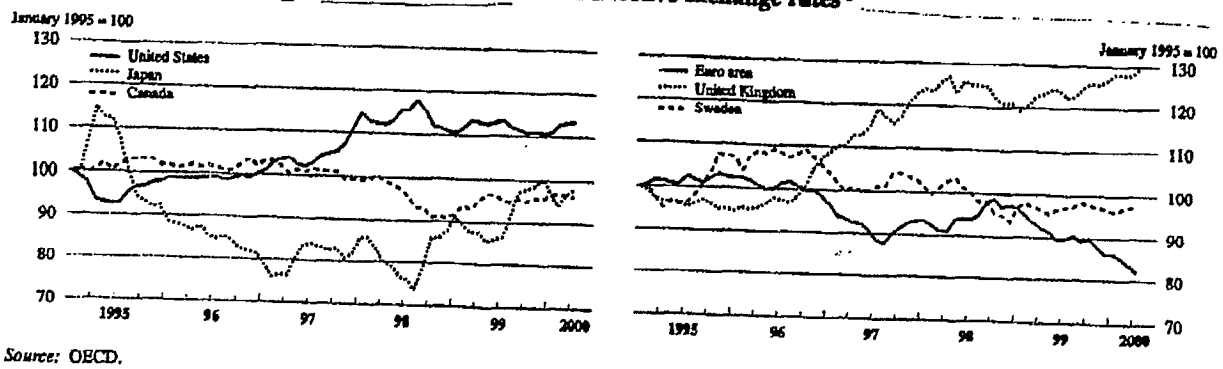
Incidence of long-term unemployment (12 months or more)

As a percentage of total unemployment



Source: OECD, *Employment Outlook*, Paris, 2000.

Real effective exchange rates



Source: OECD.

Medium-term reference scenario summary

Per cent

	Real GDP growth	Inflation rate[a]		Unemployment rate[b]		Current balance[c]		Long-term interest rate	
	2002-2005	2001	2005	2001	2005	2001	2005	2001	2005
United States	3.1	2.3	2.3	4.2	5.3	-4.4	-3.9	6.8	6.4
Japan	2.0	-0.1	0.2	4.8	4.0	2.9	3.2	2.2	3.5
Germany	1.9	1.4	1.4	7.7	7.2	0.4	2.0	6.2	5.6
France	2.2	1.6	1.6	8.8	8.2	2.6	2.5	6.3	5.6
Italy	2.4	2.2	1.8	10.5	9.8	2.2	2.8	6.4	5.7
United Kingdom	2.2	3.2	2.4	5.8	6.0	-2.0	-2.6	6.1	5.8
Canada	2.8	2.3	2.1	6.6	6.5	0.6	0.7	6.6	6.3
Total of above countries	2.6	1.8	1.8	5.7	5.9	-1.3	-0.9	5.8	5.6
Australia	3.5	2.8	2.4	6.4	6.6	-4.1	-3.8	7.2	7.1
Austria	2.2	1.8	1.7	4.5	4.8	-2.7	-2.2	6.4	5.8
Belgium	2.3	1.3	1.7	7.8	7.5	3.4	3.4	6.4	5.8
Czech Republic	3.3	4.4	2.6	10.5	7.8	-2.9	-2.4	6.8[d]	6.0[d]
Denmark	2.1	2.5	2.1	5.4	6.0	2.7	3.3	6.6	6.3
Finland	2.7	2.6	2.4	8.5	8.0	7.7	7.2	6.3	5.8
Greece	3.6	2.7	2.7	9.8	8.9	-3.0	-2.4	5.1[d]	4.5[d]
Hungary	4.9	5.2	3.5	6.2	5.5	-5.2	-3.2	10.6[d]	7.7[d]
Iceland	2.2	6.1	5.1	1.9	3.8	-6.2	-3.9	11.9	9.5
Ireland	6.5	4.3	4.9	3.3	5.0	-0.3	-0.2	6.4	5.9
Korea	5.8	2.7	2.5	4.1	3.6	1.9	0.4	10.6	8.5
Luxembourg	3.8	1.7	1.6	2.7	4.3	0.0	0.0	6.4	5.8
Mexico	4.8	8.5	4.4	2.4	2.5	-3.6	-4.0	14.5	9.8
Netherlands	2.0	3.0	2.8	2.1	3.0	6.0	5.7	6.3	5.7
New Zealand	2.7	2.3	1.9	6.0	5.9	-6.0	-3.4	7.5	6.5
Norway	2.3	0.9	2.4	3.6	4.0	13.9	12.7	7.1	5.5
Poland	4.7	6.5	3.9	13.1	10.2	-7.4	-5.9	14.0[d]	9.5[d]
Portugal	3.1	2.9	2.9	4.0	4.8	-10.5	-9.6	6.4	5.8
Spain	2.7	2.9	2.6	12.9	11.0	-3.2	-3.3	6.5	5.8
Sweden	2.3	2.3	2.4	4.3	5.4	2.1	2.1	6.3	6.0
Switzerland	1.8	1.7	2.0	1.8	1.8	12.4	12.4	4.7	4.2
Turkey	5.5	21.0	10.5	7.2	6.2	-2.1	-2.5	23.1	25.0
Memorandum items									
Total of above European countries	2.5	2.4[e]	2.1[e]	8.1	7.4	0.9	1.1	6.5[e]	5.8[e]
Total of above OECD countries	2.8	2.2[e]	2.0[e]	6.1	5.9	-1.0	-0.8	6.4[e]	5.9[e]
Euro area	2.3	1.9	1.9	8.5	7.9	1.2	1.7	6.3	5.7

Note: For further details see "Sources and Methods".
a) Percentage change from the previous period in the GDP deflator.
b) Per cent of labour force.
c) Per cent of nominal GDP.
d) Short-term interest rate.
e) Excluding Turkey.
Source: OECD.

Notes Eduardo Martinez Carriel

Mr. face of McDonald on $10 bill designed by a Mexican?

Poverty & Trade: how NAFTA benefits been passed on to them?

John Murray

The broader account of the C$ (↓) makes no sense on fundamentals

The major BoC equation = driven by:

1) US-Can ↓ Δ
2) intr Δ
3) p of energy
4) p of non-energy ex raw materials (= most important)

10 yrs old

no lags - simple structure.

How to ↓ underestimated benefits of can currency?

- 2 papers by Frankel & Rosen (1998; 2001):
  earlier research: misguided — rest on set of very small countries
  — Rodrick: results not robust.

- Evidence from Europe: Canada, Denmark; UK

∴ We have open mind...

Preliminary Draft

Mexico's and Canada's Changing Trade Specializations with the United States

Aaron Sydor

Gary Sawchuk

June 2001

Abstract

With the FTA, the NAFTA and the rapid transition of the Mexican economy, it was expected that the Canadian and Mexican economies would both gradually see some adjustment in their trade structures, and even larger changes in their specialization of exports to the United States. It was also believed that Mexico and Canada would specialize in different exports — with Mexico having an advantage in manufactures benefitting from more labour-intensive activities. This paper explores the changing nature of Mexico's and Canada's trade specialization with the United States in manufactures, focusing on those industries in each country that are contributing most to recent gains. An interesting question is whether prospective shifts in export specialization bring Mexico and Canada into greater export competition. Another question concerns the factors behind each country's increased exports to the United States, and whether their export growth results in greater intra-industry or inter-industry specialization. We also briefly consider Mexico's and Canada's exports and trade flows with the United States in the wider context of trade with the rest of the world.

JEL Classification: F15, F14
Key Words: Trade, Integration, Mexico, Canada, United States

Gary Sawchuk, Micro-Economic Analysis, Industry Canada, Ottawa, Ontario, K1A 0H5. Email: Sawchuk.Gary@ic.gc.ca (613) 941-0640
Aaron Sydor, Strategic Investment Analysis, Industry Canada, Ottawa, Ontario, K1A 0H5. Email: Sydor.Aaron@ic.gc.ca (613) 952-3906

Contents

1. Introduction

Change continues to affect many aspects of our increasingly linked North American economies. This paper explores the changing nature of Mexico's and Canada's trade specialization with the United States, with a special focus on recent patterns of growth in Mexico's and Canada's exports. With the Canada-United States Free Trade Agreement (FTA) and the North American Free Trade Agreement (NAFTA), it was expected that the Canadian and Mexican economies would both gradually see some adjustment in their trade structures, and even larger changes in their specialization of exports to the United States.[1] It seemed reasonable, too, to expect that Mexico and Canada would specialize in different exports — with Mexico having an advantage in manufactures benefitting from more labour-intensive activities.[2]

A few key questions

In this paper, we will mainly address these four questions:

- Are we seeing a gradual adjustment in Mexico's and Canada's export specializations with the United States?
- What are the factors behind each country's increased exports to the United States?
- Do recent trade and export trends/shifts actually bring Mexico and Canada into greater export competition with one another?
- And if not immediately, is there any likelihood there might be greater Mexico-Canada export competition in U.S. markets in the foreseeable future?

How are these important?

Trade patterns are inevitably linked to industry growth and the transformation of national economies.

---

[1] (References)

[2] For example, see ___.

And shifting export specializations are often associated with economic change. By gauging recent adjustments, Question 1 provides an important starting point, that could shed some light on the pressures facing the two U.S. neighbours, their responsiveness to recent events and the implications for wider economic change and growth.

Lying behind question 2, is the need to identify key export drivers, and to understand whether Mexico's and Canada's drivers are similar with respect to U.S. import markets. To this end, the nature of Mexico's and Canada's traditional comparative advantages can be investigated. Also, with growing integration, we need to ask the supplemental question whether Mexican and Canadian firms, through MNCs, share and benefit from similar technologies, or do Mexican exports reflect production techniques designed to take advantage of Mexico's ample labour and lower-cost labour advantages?

The third and fourth questions get at the fact that both Mexico and Canada are changing. Although Canada may be generally producing goods higher up the value-chain, are Mexico's exports also moving up the value-chain? What impact might this have for future Mexico-Canada competition in exports to the United States? Of interest, too, is whether Mexico and Canada are becoming increasingly competitive in certain industries, and pursuing new comparative advantages in similar industries. Or alternatively, will there always be room for both in the U.S. market? These issues could have important implications, certainly for the future growth of particular Canadian industries. Consequently, certain similar and important exports of each country will be analyzed in somewhat greater detail.

Organization of the paper

In section 2, we will first review and analyze some interesting facts associated Mexico's and Canada's trade and export relations with the United States, documenting recent changes in trade patterns and exports, and focusing on those industries in each country that are contributing most to recent export

ns. In so doing, we will address the above questions in sequence. Then, in section 3, we will carry-out some additional diagnostics, paying special attention to the insights afforded by somewhat more detailed analyses. An assortment of tools will be used. Finally, we will end with a summary of the key messages plus some concluding thoughts.

2. Some interesting facts and analysis

Fast growth in Mexico's and Canada's trade with the United States

Both Mexico and Canada have seen a dramatic increase in their trade in manufacturers with the United States over the past decade. This is shown in figure 1. And while Canada trades considerably more with the United States in absolute terms, we can see from figure 2 that Canada's tremendous 1980-1998 trade growth in manufactures with the United States of 390% actually falls far short of Mexico's even more spectacular growth of over 800%! Since 1990, Mexico's manufactured trade with the United States has increased from US$46 billion to US$155 billion (1998), an average annual increase of 16.4%. Canada's trade in manufactures with the United States rose from US$149 billion in 1990 to US$292 billion in 1998, an average annual increase of 8.8%.

Manufactures trade with the United States accounts for the vast majority of all manufacturing trade for both countries. Figure 3 shows that the United States accounted for 88.9% of Mexico's total manufacturing exports in 1998. The figure for Canada is only slightly less at 86.9%. (By comparison, only 1.3% of Mexican exports go to Canada and a minuscule 0.3% of Canadian exports go to Mexico.) Consequently, the United States is by far Mexico's and Canada's key trading partner and most critical market for exports.

However, not only is the United States the most important trading partner of both Canada and Mexico, but Canada and Mexico are also among the U.S.'s top trading partners. Canada sits in first place,

but Mexico is fourth behind Japan and Europe. More than one-third of U.S. exports a destined to one of its two NAFTA partners.[3]

It is interesting that while Canada had been among the top 3 in 16 (of 20) industry-defined U.S. import markets in 1990, and 15 in1998; Mexico had but two 3rd-place rankings in1990 (see table 1). However, Mexico soared to be among the top 3 rankings in 10 industries by 1998. This is a dramatic advancement for Mexico.

Mexico's and Canada's exports still appear complementary, in so far as they are not in the top 3 in all the same industries. In 1998, both Mexico and Canada were ranked among the top 3 exporters in 6 industry-defined U.S. markets, and among the top 5 in 12 markets.

Mexico's and Canada's export performance have been particularly strong

Both countries have been running significant trade surpluses with the United States in manufactures. Canada has maintained an annual trade surplus of about US$ 4.0 billion. Mexico had a 1998 trade surplus of US$10.8 billion. Canada's exports comprise a larger proportion of the U.S. import market (US$xx.x billion versus US$xx.x billion for Mexico, in 1998), but Mexico's export growth to the United States, has been much quicker.

Figure 4 shows growth rates of Mexico's and Canada's exports by industry[4]. What immediately becomes apparent is that <u>not only</u> is Mexico's overall export growth to the United States nearly twice as high as Canada's, but this holds across <u>nearly all</u> manufacturing industries. In only three industries was Canada's export growth to the United States superior to that of Mexico: Drugs and Medicine, Petroleum Refineries and Products and Ship Building and Repair. The difference in growth rates between the two

---

[3] In 1998, xx% of U.S. trade was with Canada, xx% with Europe ( ), X% with Japan and x% with Mexico.

[4] The growth rates of manufacturing industry exports for Mexico are shown in table 2, and for Canada in table 3. The individual industry shares of total manufacturing exports and their growth rates for Mexico and Canada are shown in table 4.

untries is the greatest in some high-tech / knowledge-intensive industries including Machinery (which includes computers) and Motor Vehicles.

Figure 5 shows the top five U.S.-bound exports of Mexico and Canada. For Mexico, the key industries for exports to the United States are Electrical and Electronics, Motor Vehicles and Machinery, followed by Textiles and Professional Goods. This may be a surprise to some. Three of the top five positions are held by "high-tech" industries (Electrical and Electronics, Machinery and Professional Goods). For Canada, the key export industries are Motor Vehicles, Wood Products and Machinery, followed by Paper and Paper Products and Electrical and Electronics. These are traditional export areas — two are based on natural resources. Only two would be considered "high tech" by the OECD definition of the term.

Surprisingly too, is that the same three major industries (Motor Vehicles, Electrical and Electronics and Machinery) are contributing most to export growth in both countries (see figure 6). In Mexico, these three industries accounted for nearly two-thirds of Mexico's export growth in the 1990s,[5] and Canada, almost one-half (insofar as Mexico and Canada appear to be competing in these same industries in the U.S. market, it would initially appear that Mexico is outperforming Canada). In all three, Mexico outpaced Canada in export growth to the United States.

Due to the importance of these industries in export growth for both countries in the 1990s and the simple fact that both countries share these same industries, they will receive special attention in the forthcoming analysis. Another reason for interest in these industries is because they also have relatively high productivity and wages compared to other domestic industries in both countries.

What's driving Mexico's and Canada's exports in these areas?

What are the factors behind each country's increased exports to the United States, especially in

---

[5] Despite Canada's large share in Automotives, the top five industries account for 79% of Mexico's exports to the United States while the top five in Canada account for only 65%. And while the top five industries are gaining importance in Mexico, having increased 8.1 percentage points since 1990. In Canada the top five industries have decreased two percentage points from 67% in 0.

similar industries? We begin by looking at the importance of (1) rising U.S. demand, versus (2) improved export competitiveness (as demonstrated through increases in their relative share of U.S. imports). We will review aggregate findings here, and explore the influence of these two factors a little more fully (at the industry-level) in section 3.

U.S. import demand has increased dramatically during the last decade. Mexico and Canada have been fortunate to be so close to growing U.S. markets. Their export success reflects efforts by their business communities to engage outside markets — and for most businesses, this means the United States. Canada has for some time benefited from having a population stretched out along the U.S. border in close proximity to the centres of the U.S. economy: New York, Chicago, Detroit, et cetera. A common shared heritage and language have also helped to cement this relationship.

Decomposing Mexico's and Canada's export growth in manufactures with the United States, Canada's export performance is found to be largely dependant on increased U.S. demand, refer to table 5. On the other hand, Mexico's export growth was uncovered to be more a result of increased competitiveness. In fact, for Mexico, increased competitiveness makes twice the contribution to export growth as does U.S. demand. For Canada, U.S. demand is almost entirely responsible for export growth by a factor of eight-to-one. In fact, Canada's rapid export growth barely kept up with U.S. import growth, generally. Figure 7 documents how Canada's share of U.S. imports has remained relatively constant for the past two decades, even falling off somewhat from the early 1980s.

But Mexico, too, is reaping the rewards from being a U.S. neighbour, benefiting particularly from the boom in the southern United States. This is especially the case for some goods such as Electrical and Electronics and Machinery. Plus, U.S. demand for automobiles has been very robust over the last 10 years. Mexico rapidly gained import market share in the United States, increasing from 2.7% in 1980 to 10.0% in 1998, a more than three fold increase — with much of this gain made in the 1990s!

In the three industries (Motor Vehicles, Electrical and Electronics, and Machinery) that have driven export growth to the United States in both countries, Mexico has consistently outperformed U.S. demand growth, whereas Canada's export growth has been entirely driven by increased demand from the United States. In this sense, there is nothing remarkable about Canada's increase in exports — a fact borne out by a review of table 6, which shows U.S. import demand, by industry, from Mexico, Canada and the rest of the world (ROW).

It is not possible to discuss Mexican trade patterns in the 1990s without mentioning the Peso Crisis (see figure 8). The year 1994 was the first year of the NAFTA. It was also in December of 1994 that Mexico suffered the Peso Crisis. Prior to 1994, Mexico was undertaking an aggressive program of structural reform. Massive amounts of foreign capital flowed into the country resulting in capital account deficits equal to 7% of GDP. The trigger for the crisis was not clear. What is clear is that in an extremely short period of December 1994, the peso lost nearly half of its value and foreign capital hemorrhaged out of the country. The IMF and the United States provided a financial bailout package that was combined with effective domestic stabilization policies. Mexico quickly recovered. However, the value of the Peso, which dropped from US$3.38 to US$6.42 during the crisis, has continued to fall. By some measures, it still is considered over-valued.

An important component of U.S. trade with its two NAFTA partners — and an important explanation for the high degree of dependancy on the U.S. market is intra-firm trade (see figure 9). Both Mexico and Canada rely heavily on trade done between U.S. affiliates and their parent in the United States For Mexico, more than a quarter of all trade is simply the movement of goods between parent and affiliate. For Canada, the figure is one-third. Consequently, changes in corporate structure and organization could have a more powerful force in driving the restructuring of the North American economy than the NAFTA itself. The high degree of intra-firm trade is also why exports and imports in both Mexico and Canada often track one another quite closely.

Mexico's and Canada's export specializations?

Does the increased competitiveness of Mexican exports reflect any shifts in comparative advantages? How about for Canada? One way to look at this is by examining Mexico's and Canada's revealed comparative advantages (RCAs).[6]

Figure 10 shows that on the whole, the RCAs for Mexico and Canada in 1998, are fairly complementary.

- In only one industry does Mexico and Canada both have a strongly positive RCA, and that is in Motor Vehicles. The United States accounts for about three-quarters of the industry in both countries. The low ratio of value-added to shipments provide some evidence that Mexico and Canada are for the most part involved in the assembly of finished cars.
- Mexico has strong positive RCAs in Electrical and Electronics, and somewhat weaker RCAs in Professional Goods, Textiles and Non-Metallic Mineral Products.
- Canada, on the other hand, has high RCAs in transportation, and resource-based industries as well as chemicals.

It is also interesting to note that Mexico has only two-thirds the number of industries showing RCAs in the plus-one range as does Canada — demonstrating, again, the more focused nature of Mexican exports.

Figure 11 vividly shows that Mexico and Canada are increasing their RCAs in many of the same industries. Motor Vehicles put forward a strong showing in both countries, further indicating that there may be a certain amount of competition for the U.S. market in this industry. Both countries are also showing rising RCAs in Textiles, Professional Goods and Other Transportation Equipment. Consistent with previous findings, Canada has an increasing RCA in many more industries than Mexico does. However, these

---

[6] The RCA that Canada has in a particular product sold in the United States is calculated as Canada's share of the U.S.'s imports of the commodity divided by Canada's share of the U.S.'s total imports. A measure of less than one suggests that Canada does not have a comparative advantage in the U.S. market. A country's RCA for all its exports in a foreign market always averages to 1.00.

[redacted]ustries are almost entirely confined to resource-based industries.

Table 7 shows Mexico's and Canada's industry trade balances with the United States:

- Canada has positive trade balances in resource-based industries and transportation industries. Canada's largest deficits are in Machinery, Electrical and Electronics.
- Mexico's trade balances are generally growing faster in industries with already positive trade balances.

This highlights another interesting observation: both countries have growing RCAs in areas in which they already have a positive industry trade balance with the United States. This suggests the exploitation of existing and traditional advantages (or creation of new advantages within already strong export sectors).

Table 8 provides the results of a shift-share analysis, which essentially decomposes changes in Mexico's and Canada's export intensities into *within* industry changes (industries becoming more export-[redacted]ensive) and *between* industry changes (movement toward industries already more dependent upon exports). (Please note, that this paragraph will be reviewed upon recalculating the results in table 8). We quickly see that both Mexico's and Canada's increased export intensity is largely due to *within* changes in intensity. The results for Mexico are much more extreme — Mexico actually experienced a slight shift towards less export intensive industries, which was more than compensated by an increase in the individual industries' export intensities. The Electrical and Electronics contributed to almost half of Mexico's increase in export orientation. For Canada, the *within* changes in intensities were somewhat more muted, accounting for three-quarters of the overall increase in export intensity while shifts to more export intensive industries accounted for the other quarter. The shifts toward the more export-intensive industries of Motor Vehicles, Wood Products and Furniture, Machinery and Chemicals was also much more even.

The importance of resources and comparative advantages in activities built around the extraction or [redacted]ources notwithstanding, Table 9 shows the growing significance of intra-industry trade:

- For Canada, intra-industry trade accounts for the majority of trade in all but two industries (Wood Products and Furniture, and Professional Goods). And for most industries, intra-industry trade has increased in importance.

- Mexico also demonstrates a high degree of intra-industry trade, but there is a much wider variation between industries — from a low of 7.6% in shipbuilding to a high of 96.3% in Machinery. Many of the industries that have achieved the highest export growth in the 1990s also have the highest share of intra-industry trade. We also see many more industries where the importance of intra-industry trade is declining than we do with Canada.

- Such trade is instead frequently associated with product differentiation, economies of scale, and productivity improvements based on the same (see section 3).

The issue arises whether Mexico and Canada may be producing dissimilar goods in common industries, or at the very least using very different mixes of capital and labour. In the Textile industry, the Canadian Textile Industry is significantly more capital intensive than is the Mexican Textile industry. For example, the labour intensity in Mexico is more than double that for Canada. However, a lower real wage rate in Mexico more than compensates for the greater use of labour.

How about productivity? Motor Vehicles, Electrical and Electronics, and Machinery are industries in which Mexico's productivity and wages are rising faster. Table 10 compares labour productivity levels and growth for Mexico and Canada in 1990 and 1998 in national currency units. As one would expect, Canada holds a small labour productivity advantage (levels) in most industries. Somewhat unexpected, Mexico lags Canada considerably in some key industries where Mexico's export growth has been strongest, such as Electrical and Electronics, Professional Goods and Textiles. In many industries, Mexico's labour productivity is growing much more quickly.

Table 11 compares the average annual labour compensation per person (employee) for the two countries, in national currency units. In expected fashion, Canada's average wage rate is higher in most industries and there is a strong correlation between relative wage rates and labour productivity levels.

Interestingly, Mexico's average wage rate per person has grown rapidly over the 1990s even though labour productivity growth has been modest. Table 12 summarizes the results from the previous two tables for our three industries of particular interest. What becomes clear is that, in national currency units, the differences in labour productivity between Mexico and Canada are not fully compensated for by wage rate difference. Canada would therefore hold a unit labour cost advantage in Machinery, Electrical and Electronics and Motor Vehicles. Furthermore, the unit labour cost advantage, measured in national currency units, has widened in Canada's favour.

The story changes drastically however, when the comparison is made in common currency units. We find that due to the low and declining value of the Mexican Peso relative to the Canadian Dollar, Mexico holds a unit labour cost advantage in every industry and the gap is widening.

So is there a "Battlefield U.S.A.?" Does Mexico's ascendancy as an exporter to United States pose problems for Canadian export interests? Despite the recent growth in exports from Mexico and Canada to the U.S., and their exports in the same key industries, the two countries overall export patterns reveal that there is still a great deal of complementarity. As well, within similar industries, the above review of labour intensity backs up the fact that Mexico has labour advantages that take the form of more labour-intensive exports. Greater direct competition with Canadian exporters is a possibility, especially in the key industries of Motor Vehicles, Electrical and Electronics and Machinery. These industries are characterized with much intra-industry trade. As well, these are industries that are better-paying, and depend on higher productivity than domestic average of both countries. As productivity and wage-levels in these industries rise in Mexico, the products and competition of the two countries could become more aligned. Should U.S. demand slow, Canada will not be able to maintain its export growth without becoming relatively more competitive with other countries' exports — and this will increasingly include Mexico. These areas of the economy do not rely on advantages from natural resource endowments.

Rather, the mechanism for improving export growth will involve greater competitiveness, preferably achieved through improved productivity.

What about the future?

Within the past 15 years, change in Mexico has accelerated. And Mexico is embarking upon a relatively greater shift towards openness. This could result in considerable future change — Mexico's economic potential is large, and its population is large and fast-growing, and these could have implications on trade flows and patterns in the future. Even a small rise in the GDP/population will create considerable additional domestic demand. As well, the middle-level consumers are expanding in number, and education levels are rising. A more educated workforce will open new possibilities for manufacturing, including for export.

Of course, it is important to consider Mexico's and Canada's exports and trade flows with the U.S., in the wider context of trade with the rest of the world (ROW) and possible future developments (e.g., the movement towards a free trade area of the Americas and possible further multilateral reductions in trade impediments). For instance, it is assumed that the NAFTA has contributed to the growth in trade amongst the North American partners. Some of this increase might properly be described as trade creation, but some, too, as trade diversion — the NAFTA may have deflected trade internally that would otherwise take place between individual North American countries with the ROW (reflecting lower prices for insider North American-sourced exports within North America relative to outside exports).

What will be helpful to know, is whether the NAFTA resulted in new trade opportunities within North America, or simply diverted trade from the ROW's manufacturing exports to North America. And if the latter, what should happen to existing trade and export patterns if world trade impediments should continue to decline (i.e. should growing interest lead to the opening up of the NAFTA's trade liberalization plans to

ticipation by additional countries). On the other hand, if the NAFTA is simply contributing to more vigorous trade competition and growth, it may be leading to higher income-induced import demand that will be of sufficient magnitude to overcome any relative price-induced trade diversion effects of ROW exports of manufactured goods to North America.

Here, we do not do a detailed analysis of the issue. But we do examine some key evidence, namely the change in distribution of trade flows. Figure 12 builds on the 1998 trade share information presented earlier in figure 3, by including information for 1990 (3 years before NAFTA was implemented). Figure 12 shows that the trade flow distribution between the NAFTA countries and the ROW did not change a great deal between1990 and1998. Trade within North American increased relative to trade with the ROW, but the increase is slight. Mexico's trade share with the ROW changed very little, from xx.x to xx.x%. Canadian trade with the ROW decreased a bit, from a share of xx.x% to xx.x%. (The share of U.S. trade h the ROW decreased from xx.x% to xx.x%, with most of that decrease attributed to greater U.S. trade with Mexico.)

What does one read into this? Well, since the share of total trade between the North American countries increased only slightly, this suggests that if there were trade diversion, it was small. Did the NAFTA shift trade away from countries outside of NAFTA, or did the NAFTA simply result in an expansion of trade within North America at a faster rate than with the ROW. Figure 13 and table 13 show that trade with countries outside North America also grew, but not as fast as total trade between North American countries. So trade diversion is a possibility. But it is unlikely to be a major problem. (Please note, figure 13 will be amended to include Mexico, Canadian and United States trade with one another and the row for two years.)

3. Some additional diagnostics — five analytic modules

Now, let us turn our attention to some further and more detailed analyses on aspects of the findings sented in section 2. We will do this through five short and simple, analytic modules.

- First we return to our decomposition exercise of Mexico's and Canada's export growth — re-examining the importance of U.S. demand and relative export competitiveness in the U.S. import market.

- Second, we will examine the nature of Mexico's and Canada's export specialization, analyzing whether recent export growth contributes to inter-industry trade and a strengthening of traditional comparative advantages, or to intra-industry trade with its greater emphasis on product differentiation and economies of scale.

- Third, to supplement our understanding of changing export intensity, we will undertake a shift-share analysis.

- Fourth, we make the link between export growth and their implications for industrial structure and adjustment.

- Finally, we further explore the possibility of trade diversion by looking at industry-level trade of Mexico, Canada and the United States with the ROW.

Analytic Module 1

What's driving exports to the United States?
— Decomposing Mexico's and Canada's export growth

In section 2, we looked at Mexico's and Canada's export growth in terms of the growth in U.S. import demand, and the competitiveness of Mexican and Canadian exports relative to other U.S. imports. Here we provide the simple analytics behind the decomposition. Basically, Mexico's and Canada's growth in exports to the United States can be examined in terms of the following expression:

$$\Delta E_i = (\Delta s_i)\, E_{Ti} + s_{i0}\, (\Delta E_{ti})$$

where ΔE_i is its growth in exports from industry i , E_{Ti} are total exports from all countries to the United States, and s_i is a share coefficient representing the competitiveness of Mexico's exports relative to the world's exports to the United States. The first term, then shows the relative competitiveness of Mexico's or Canada's exports and the second term shows the impact on Mexican or Canadian exports of fast-growing import demand in the United States To carry out this analysis, we draw upon data from the OECD's Bilateral Trade Database, using the same 16 industries from section 2. The results were shown for Mexico in and Canada in table 5.

Results

The basic finding, presented in section 2, was that Canada's export growth with the United States was largely due to rising U.S. demand for imports, while in Mexico's case, its exports reflected an increase in relative competitiveness.

For Canada, what are some of the more industry-detailed findings? For the major exports of Electrical and Electronics, and Machinery, the competitiveness coefficient was actually negative during the 1990-98 period. It was the same for the two important resouce-based exports, Paper and Petroleum, and as

well for Chemicals. Similarly for Aircraft. The only two industry-defined exports that showed an increase in relative competitiveness vis-à-vis others' exports to the U.S. were Food and Textiles.

How about for Mexico? For Machinery, Electrical and Electronics, and Motor Vehicles, the rise in U.S. import demand was a significant factor for their export growth. But clearly, their relative competitiveness with others' exports was more important. The same was true for Food, Textiles, Paper, Rubber and Plastics, and Professional Goods. The industries where U.S. import demand was predominant included Wood, Chemicals, Drugs and Medicines, and Aircraft.

The bottom-line for Canada is that the exports of many industries that might be considered "higher-tech", including Electrical and Electronics, and Machinery, are being "carried along" by the current buoyancy of U.S. import markets. And for those industries for which Canada has strong resource advantages, they are actually going through rather difficult times, once the growth in U.S. import demand is taken into consideration. The opposite situation exits for Mexico, which saw the relative competitiveness of its major exports increase during the period even after taking rising U.S. import demand into consideration. The underside to Mexico's story is the importance played by a declining Peso in its export performance.

Analytic Module 2

Traditional or new comparative advantages?
— Analyzing Mexico's and Canada's international specialization

In this section, we further examine the nature of Mexico's and Canada's trade specialization with the United States In particular, we observe whether the growth in specific industry exports from Mexico and Canada led to more inter-industry versus intra-industry specialization.

As stated in section 2, such is important for inferring whether Mexico and Canada are increasing their exports on the basis of traditional comparative advantages or if they are developing new ones. Greater inter-industry specialization refers to international specialization across industries, and is frequently associated with the exercise of existing comparative advantages, e.g. from with natural resource abundance or from relative labour or capital abundance or perhaps better technology. On the other hand, intra-industry trade — that is, the trade of similar goods within the same industry — frequently characterizes the more dynamic areas of countries' economies and can involve new and more highly-processed goods (goods further up the value-chain) and plentiful intra-firm trade. Rising intra-industry trade is also consistent with the transfer of technology between firms within an industry. Within these industries, firms rely on product differentiation, economies of scale, product mandates and the creation of new advantages through feature and process design.

We begin by defining gross trade as the sum of exports and imports. Net or inter-industry trade is the difference between exports and imports. Intra-industry trade is measured as the difference between gross trade and inter-industry trade (see Grubel and Lloyd, 1975 and Fuentes-Godoy, Hansson and Lundberg, 1996). That is, we measure international specialization, and inter-industry and intra-industry specialization, as:

$$g_i = a_i (E_i + M_i)$$

$$n_i = a_i (E_i - M_i)$$

$$z_i = g_i - n_i = a_i (E_i + M_i - |E_i - M_i|)$$

where E_i, M_i and a denote exports and imports of an industry in nominal prices, and a_i is the value-added per dollar of output of industry i (e.g. Y_i/V_i where Y_i is value-added and V_i is total shipments of industry i). Note, we are weighting each country's international specialization by its national value-added; later, to facilitate comparisons, we will similarly weight industry trade by industry value-added.

Results

Section 2 reported the rapid rise in intra-industry trade — more so in Mexico's case. Table 9 showed that industry effects are diverse in both Mexico and Canada. It displays intra-industry trade as a percent of total trade, and inter-industry trade can be calculated as the remainder from 100%.

Canada's international specialization is mostly of an intra-industry nature. Further, intra-industry trade is increasing. There are two industry exceptions: the growth in Wood exports is contributing to already high inter-industry specialization (i.e. its positive net exports as a share of trade are rising); so too is the export growth in Professional Goods. Canada's Machinery and Electrical and Electronics industries demonstrate about the same amount of intra-industry trade, 66% in 1998. However, during the 1990-98 period, Machinery was becoming slightly more intra-industry — while Electrical and Electronics displayed a slight decline in its intra-industry trade.

In Mexico's case, inter-industry trade (growth in net exports as a percent of total industry trade) rose in half of all industries (including in Motor Vehicles). Other industries sharing the same experience included Paper, Chemicals, Drugs and Medicine, and Petroleum. On the other hand, intra-industry was high in the

tal industries, Food and Professional Goods. Mexico's Machinery and Electrical and Electronics industries exhibited very high levels of intra-industry trade — 96% and 84%, respectively. The Mexican industries with high inter-industry trade include Paper and Drugs and Medicines.

In some ways, the upward movement in the share of total trade that is intra-industry reflects the growing integration of the Mexico-United States and the Canadian-United States economies. The inter-industry share of trade is highest in areas in which Canada has a known advantages: namely, the Wood industry. However, the present levels and growing importance intra-industry international specialization in Mexican and Canadian manufacturing suggests that the main factors behind Mexico's and Canada's future export and trade specialization patterns will be increasingly the ability to exploit advantages like economies of scale, product differentiation, product mandates, and the development of new and better process and product features. In some cases, this may reflect a movement up the value-chain, or development of new mparative advantages within industries.

Analytic Module 3

How are exports changing within industries?
— extending the shift-share analysis

(Please note: this module will be rewritten after calculating new figures for table 8 and table 14, but the story-line will likely remain the same).

In the previous subsection, Module 2, we learned that a considerable proportion of the changes in Mexico's and Canada's export activity involves intra-industry trade with the United States. In this module, we further examine the changes in Mexico's and Canada's export intensities or international specialization, and consider whether the *within* industry changes (highlighted in section 2) similarly account for most of the changes occurring amongst the subset of industries characterized by a high degree of intra-industry trade and similarly those that have associated with them more inter-industry trade.

To carry this out, we return to our simple shift-share and decomposition analyses. The shift-share analysis was for the export-intensity of a given industry, and is expressed as the export/value-added ratio (E / Y, where E denotes exports from Mexico or Canada to the U.S.; Y is the industry value-added). We then have the shift-share equation:

$$\Delta(E / Y) = \sum_i \Delta p_i e_i + \sum_i p_i \Delta e_i$$

where p denotes the share of industry *i*'s output in total value-added; and *e* is export/value-added ratio in industry *i*.

The first term on the right hand-side relates to shifts in Mexico's or Canada's industry composition towards more export-intensive industries and the second term relates to changes in export-intensity. This time, in addition to the aggregate, we look separately at the two groups of industries: 1) those showing considerable intra-industry trade, and 2) inter-industry trade. The high intra-industry trade are industries are

se with at at least 80% of total trade involves intra-industry trade; the low intra-industry trade industries are those with less than 60% trade is intra-industry. We again use trade data from the OECD's Bilateral Trade Database.

Results

Table 14 will bring together the results from the shift-share, decomposition and specialization analyses (as originally shown in tables 5, 8 and 9).[7]

(We will be recalculating the shift-share analysis. However, much of the same information can be gleaned from table 2 while focusing on the industry groupings from table 14. We will present below what we expect to find from the shift-share analysis ...)

- Basically, the findings for the intra-industry and inter-industry groups should be consistent with the specialization and decomposition analyses for aggregate manufacturing in both Mexico and Canada, except we can now focus on where the competitiveness changes are mostly occurring for Mexico — *within* the industries characterized by higher degrees of intra-industry trade.

- In Mexico, the industries with a high proportion of intra-industry trade are comprised of a mixture of relatively high-tech industries (Electrical and Electronics, Machinery and Professional Goods), plus metals (Iron and Steel, Non-Ferrous Metals, and Metal Products) and Food. With the exception of Food, these industries exhibit above-average export-intensities and above-average value-added growth rates.

- It will be remembered, that competition within industries that are characterized by considerable intra-industry trade tends not to depend as much upon such advantages as superior resource endowments. Rather, the nature of competitiveness within these industries is such that there is greater emphasis on economies of scale, product differentiation, features and processes that enable the more productive use of resources. Rising export intensities have been crucial to these industries export growth, however the economy's shift towards these industries was not negligible.

- Mexico's industries with low intra-industry trade (and high inter-industry trade), with the exception of the small but fast-growing Drugs and Medicine, can basically be characterized as low export-intensity, low growth industries. Rising export intensities were the major contributing factor for their rise in exports — moreso than for the high intra-industry group.

---

[7] Note: At present, Table 14 only compiles information from tables 8 — which we will be recalculating — and table 9, but will be including table 5's information from the decomposition findings.

- For Canada, a somewhat different story emerges. It is noteworthy that, unlike in Mexico, only Motor Vehicles from among the three key export industries, makes it to the group of high intra-industry industries (for Mexico, it was the exact opposite). Canada's high intra-industry industries are generally made-up of high export intensity industries: namely, Chemicals, Metals (Iron and Steel, Non-Metallic Minerals, Metal Products), Motor Vehicles, Aircraft, Other Transport Equipment. Rising export intensities account for much of their export growth, but shifts between industries are more important for this group than for the low intra-industry trade group..

- Exceptions are for Food and Textiles. While their export intensities are not so high, their recent export growth is more than modest — especially for textiles. These two industries are turning more to international markets, including in the U.S. Faster export growth in these industries is helping to maintain overall industry levels (especially in the case of textiles, whose production would shrink faster without exports and a rising export intensity).

- Canada's low intra-industry (but high inter-industry) industries include a mixture of old traditional export-industries (Wood, Petroleum, and Non-Ferrous Metals) and "high-tech" or "new economy" types, i.e., Drugs and Medicine and Professional Goods. Canada's Petroleum and Wood industries are extremely strong exporters. Rising export intensities account for much of their export growth, and especially for Petroleum and Non-Ferrous Metals.

Analytic Module 4

Mexico's and Canada's exports and their industrial structure and adjustment

Even slight shifts in North American trade patterns and export specialization will of course have some implication for Mexico's and Canada's industrial structure and for setting the direction of future economic growth. One significant measure discussed in section 2, and as well in the previous module, was the export intensity of individual industries. It was noted how the export intensity is rising for most industries in both Mexico and Canada. Another way of looking at U.S. export intensities, is as a measure that shows how much individual industries must depend upon U.S. import markets as a mainstay for their growth and vitality. The higher their U.S. export intensities, the more the industry's growth and development will depend upon its success in the U.S. import market. And the greater their export growth, the more significant will be the induced impacts upon output growth.

An examination of tables 2 and 3 reveals that many of the industries with high U.S. export intensities are definitely industries considered important to the Mexican and Canadian economies' future. For Mexico, such industries include Electrical and Electronics, Machinery and Motor Vehicles. Figure 5 documented that these three industries comprised almost two-thirds (64.7%) of Mexico's 1998 exports to the U.S. It was also pointed out that these industries provide above average wages and are among the more productive of the Mexican economy. It is difficult to imagine the present size of these industries in Mexico without their ability to export to the U.S. But these industries also play an important role in the Canadian economy. The U.S. import markets are also crucial for the strength and ebullience of traditional Canadian exports such as Wood, Chemicals, Petroleum, Non-ferrous Metals, and as well for Aircraft. Without the U.S. import markets, these Canadian industries might not be as successful, and would have a more limited future.

Table 15 explores what the contribution Mexican and Canadian exports to the U.S. have made to the wth of individual industries in the two countries, and for setting the direction their economies are heading.

...

(We still need to also finish this section. Table 15 will include, for both Mexico and Canada, rows of industry data, with a column indicating the share distribution of industry output or value-added, and another showing export intensity — for the time being, one can obtain information about export intensity and value-added distributions from table 2 for Mexico and table 3 for Canada. Our intention is to add two columns that will compare current share distributions with what the share distribution of manufacturing output would look like in the absence of exports to U.S. markets. We will present below what we expect to find from the analysis ...)

- Several of the largest industries in the Mexican and Canadian economies (represented by their large percentage of total output or value-added) show a significant reliance on U.S. import markets. But smaller industries, perhaps critical for the future (e.g. high-tech) also have relatively high rates of export intensity in both countries.

- For example, many of Mexico's relatively high-tech industries (e.g. Electrical and Electronics, Professional Goods, Machinery, and Motor Vehicles) benefit tremendously from U.S. import markets — these industries have the highest export intensities in Mexico. Others Mexican industries with high export intensities include Textiles and Wood.

- For Canada, Motor Vehicles and the relatively high-tech industries of Electrical and Electronics, and Machinery, are among the five industries with the highest export intensities and depend greatly upon exports to the United States for their growth. The other two industries are Petroleum and Non-ferrous Metals (they comprise an important 4% of the economy).

- Right now, these three Canadian industries comprise about one-quarter (24.4%) of the economy (the latter two, 13.2%), up –% from 1990.

- These are among the fastest growing parts of the Mexican economy, too. Their total share remains small, only 16% of the economy's value-added in 1996. However, this is an improvement of –% from 1990, and in the future their share should be higher.

- Canada's industries with lower export intensities (e.g. Food, Textiles, and Drugs and Medicines, are among the more slowly growing segments of the economy).

- When we add the two columns that will compare current share distributions with what the share distribution of manufacturing output would look like in the absence of exports to U.S. markets, we will likely see a very different make-up for Mexican and Canadian economies. This distracts greatly from reality, of course, but drives home the relationship exports to the U.S. play in terms of our industrial make-up and their growth.

Analytic Module 5

What about the future?
— trade creation/diversion and the WTO and FTAA

At the end of section 2, we briefly reviewed the likelihood that there has been trade diversion as a result of the NAFTA. The basic finding was that if there was trade diversion, it was likely small. Trade between North American countries with the ROW also grew, but not as fast as between North American countries. More detailed results are presented in table 13, which shows U.S. trade with Mexico, Canada and the ROW, documents that for most industries, trade with the ROW increased between 1990 and 1998.

(Finally, we apologize that we still need to amend table 13. When completed, we expect that table 13 will show that although trade diversion may be fairly small in the aggregate, it is not completely constant across all industries. What might we find ...)

- Some industries may show evidence of significant industry-level diversion effects.
  - While the net aggregate effect may be still small, the industrial incidence may be sufficient to affect trade patterns and export specialization.
  - We would like to identify particular industries in Mexico and Canada that could be more vulnerable by the movement toward an FTAA or lower world protection.
  - In particular, we could check the results for Electrical and Electronics (and perhaps Machinery, Professional Goods), which might be more vulnerable in Mexico to a movement toward an FTAA, since new participating countries might share greater similarities with Mexico in the kinds of products exported in these industries, and how the products are made and the features they incorporate.
  - But Canada, too, might be affected.

4. Conclusion

Summary of key messages

What have we learned?

- Mexico's and Canada's exports to the United States have increased quickly over the past 8 years. Perhaps surprisingly to many, is the fact that at an aggregate industry-level, Mexico's and Canada's strongest areas of export to the United States are in similar industries — Motor Vehicles, Electrical and Electronics and Machinery. In all three, Mexico's export growth performance to the United States was superior. Mexico's export intensity in Motor Vehicles and Machinery are also growing quite strongly. These are among the "better" industries, associated with higher productivity and wages compared with other domestic industries.

- Canada's exports growth has depended on rising U.S. demand. In fact, Canada's share of the U.S. import market is not rising.

- On the other hand, Mexico's share of the U.S. import market is rising quickly — Mexico's export inroads prominently reflect the increased competitiveness of its exports relative to other countries' exports to the United States. This includes in the key industries of Motor Vehicles, Electrical and Electronics and Machinery. However, Mexico's falling peso has likely played a large role.

- Mexico is now increasingly competing with Canada for a large stake in U.S. import markets. In 1998, Mexico and Canada were both ranked among the top 3 exporters in the same 6 (of 20) industry groups. And in 12 industry groups, they were both in the top 5. This is a dramatic increase from a few years ago, and reflects the rising importance of exports from Mexico.

- Nevertheless, Mexico's and Canada's comparative advantages on the whole still appear complementary. Altogether, in 1998, Canada is among the top 3 exporters to the U.S. in 15 industries, and Mexico in 10 industries. For instance, both countries are deepening their trade linkages with the U.S. most quickly in other strong industries (notably textiles for Mexico and wood resource products for Canada).[8]

- Intra-industry with the United States is growing for both Mexico and Canada. A great deal of this involves intra-firm trade. Intra-industry trade is associated with product differentiation, competition in designing and incorporating process and product features, economies of scale, and the associated improvements in productivity.

- *Room for both?* Despite the rise in exports from both countries, and the increase in intra-industry trade, it appears still true that Canadian and Mexican exports are dissimilar in many industries. A review of labour intensity supports the contention that Mexico's exports reflect more labour-intensive activities. But as Mexican wages and productivity rise, especially in their key

[8] Paper products did drop, however, between 1990 and 1998.

industries, there is the possibility of greater direct competition with Canadian exporters. Plus, Canadian exports have been rising based primarily on growing U.S. import demand. As U.S. demand slows, it will be more difficult for Canada to maintain its export growth without becoming relatively more competitive with other countries' exports — and this will increasingly include Mexico. The best way for Canada to compete and improve its competitiveness — that will bring benefits to its workers and consumers — will be through improved productivity.

- Its noteworthy, that the growth in exports from Mexico and Canada are unlikely to represent any significant trade diversion effects emanating from the NAFTA. Trade between the United States with countries outside North America also grew, but not as fast as total trade with Mexico and Canada. So trade diversion is a possibility. But it is unlikely to be a major problem. This is important regarding continuing interest by many in pursuing further reductions in international protection through an FTAA or multilateral reductions.

Concluding thoughts

There is a need for more detailed industry analysis to more closely analyze and understand the nature of individual industry adjustments. This would be particularly useful for better determining the degree to which the tariff reductions of the FTA/NAFTA explain the domestic shifts in industry structure, as well as more gradual restructuring.

One interesting puzzle that remains to be studied relates to the increased linkages between the three North American economies resulting from the greater movement of goods back and forth across the border at various stages of processing.

References

Alberro, José Luis. 1997. "Productivity, Trade Liberalization, and Productive Restructuring: The Unequal Performance of the Mexican Economy During 1970-1996." Incomes and Productivity in North America, papers of the 1997 Seminars, Commission for Labor Cooperation, North American Agreement on Labor Cooperation, Co-published by Bernan Press and the Commission for Labor Cooperation, Dallas, Texas.

Fuentes-Godoy, Paul Hansson and Lars Lundberg. 1996. "International Specialization and Structural Change in Swedish Manufacturing, 1969-1992." Weltwirtschaftliches Archiv. 132:3, pp. 523-43.

Gould, D. 1998. "Has NAFTA Changed North American Trade?" Economic Review. Federal Reserve Bank of Dallas, First Quarter, pp. 12-23.

Gu, Wulong and Gary Sawchuk. 2000. "How Canadian Provinces are Adjusting to a Larger and More Integrated North American Market." Paper presented to Rethinking the Line: The Canada-United States Border Conference, Vancouver, B.C., October 22-25.

Grubel, Herbert G. and P. J. Lloyd. 1975. Intra-Industry Trade. MacMillan Press.

Harris, Richard G. and Samer Kherfi. 2000. "Productivity Growth, Convergence and Trade Specialization." Mimeo, Simon Fraser University.

International Monetary Fund. 1995. "Mexico: Recent Economic Developments." Washington, Western Hemisphere Department, June.

Karemera, David and Kalu Ojah. 1988. "An Industrial Analysis of Trade Creation and Diversion Effects of NAFTA." Journal of Economic Integration. 13:3, pp. 400-25.

Krueger, A. O. 1999. "Trade Creation and Trade Diversion Under NAFTA," Working Paper No. 7429, National Bureau of Economic Research, Cambridge, MA.

Lustig, Nora. 1998. Mexico: The Remaking of an Economy, Second Edition. Washington, D.C.: Brookings Institution Press.

Lustig, Nora. 2001. "Life is not Easy: Mexico's Quest for Stability and Growth" Journal of Economic Perspectives, 15 (1), pp. 85-106.

Lustig, Nora and Miguel Szekely. 1998. "Economic Trends, Poverty and Inequality in Mexico." Washington, D.C.: Inter-American Development Bank.

OECD. 1999. Regulatory Reform in Mexico. Paris, France.

OECD. 1999. OECD Economic Surveys 1998-1999, Mexico. Paris, France.

Bhagariya, Arvind. 2000. "Preferential Trade Liberalization: The Traditional Theory and New Developments." Journal of Economic Literature. June, 38, pp. 287-331.

Richter, Charlene and Kevin Richter. 1994. "Recent Evidence on the Impact of the Canada-US Free Trade Agreement on Canadian Production, 1980-1992." Centre for Trade Policy and Law, (Ottawa). June.

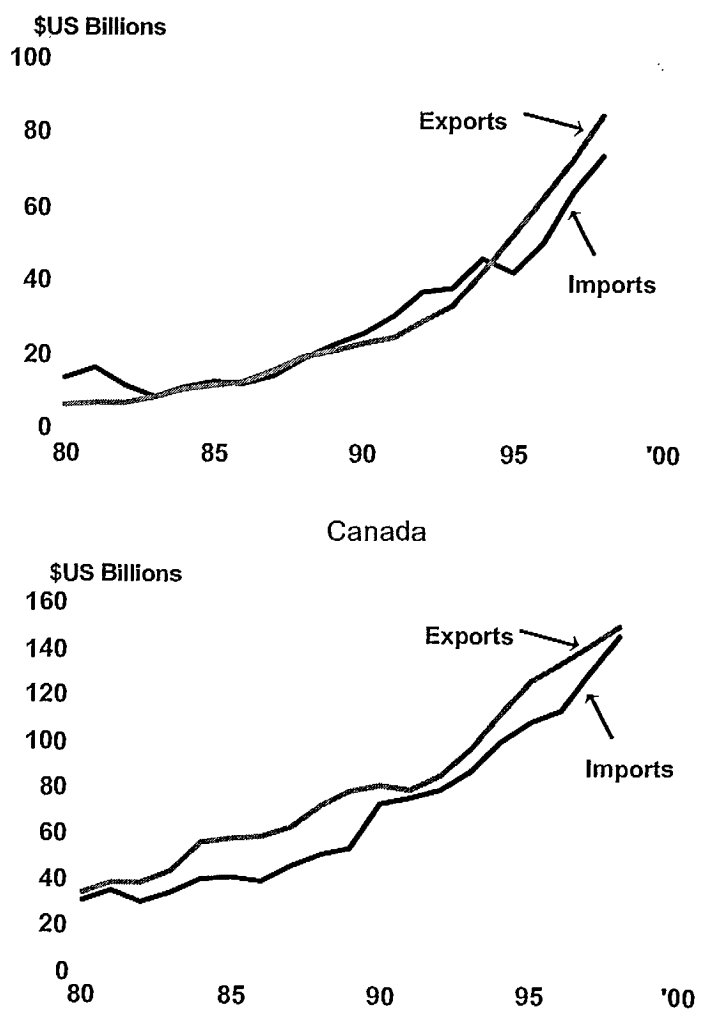
U.S. International Trade Commission. 1997. "Impact of the North American Free Trade Agreement on the U.S. Economy and Industries: A Three year Review," Washington, D.C.

U.S. Trade Representative. 1997. "Study on the Operation and Effect fo the North American Free Trade Agreement." Washington, D.C. (Http://www.ustr.gov/reports/naftareport/contents.pdf).

Wylie, Peter J. and Raymond F. Wylie. 1996. "NAFTA and Manufacturing Trade Diversion: Empirical Estimates and Implications for Public Policy," in Economic Integration in the Americas. Christos C. Paraskevopoulos, Ricardo Grinspun and George E. Easton eds., Brookfield: Edward Elgar Press.

Figure 1

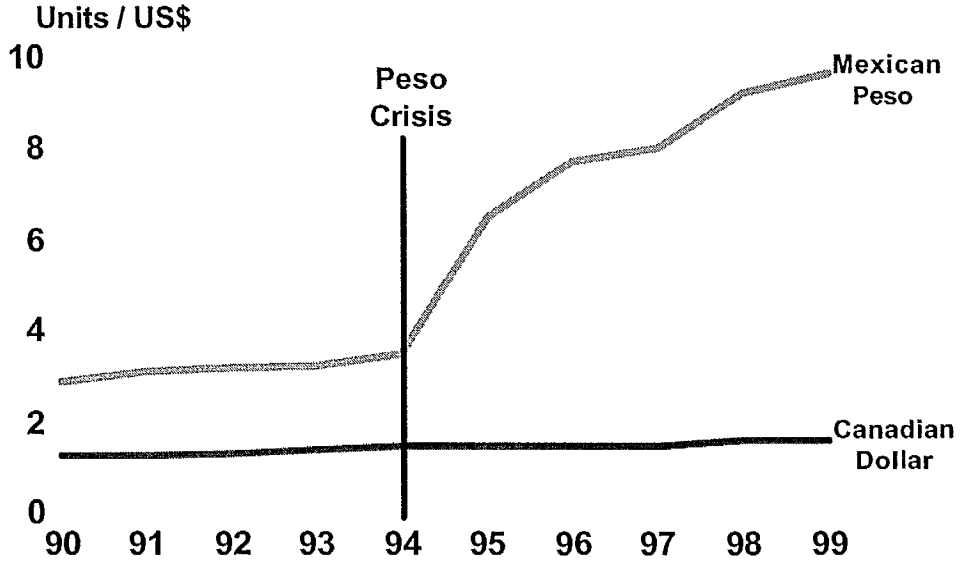
Mexico's and Canada's Manufacturing Trade with the U.S.



Source: OECD

Figure 2

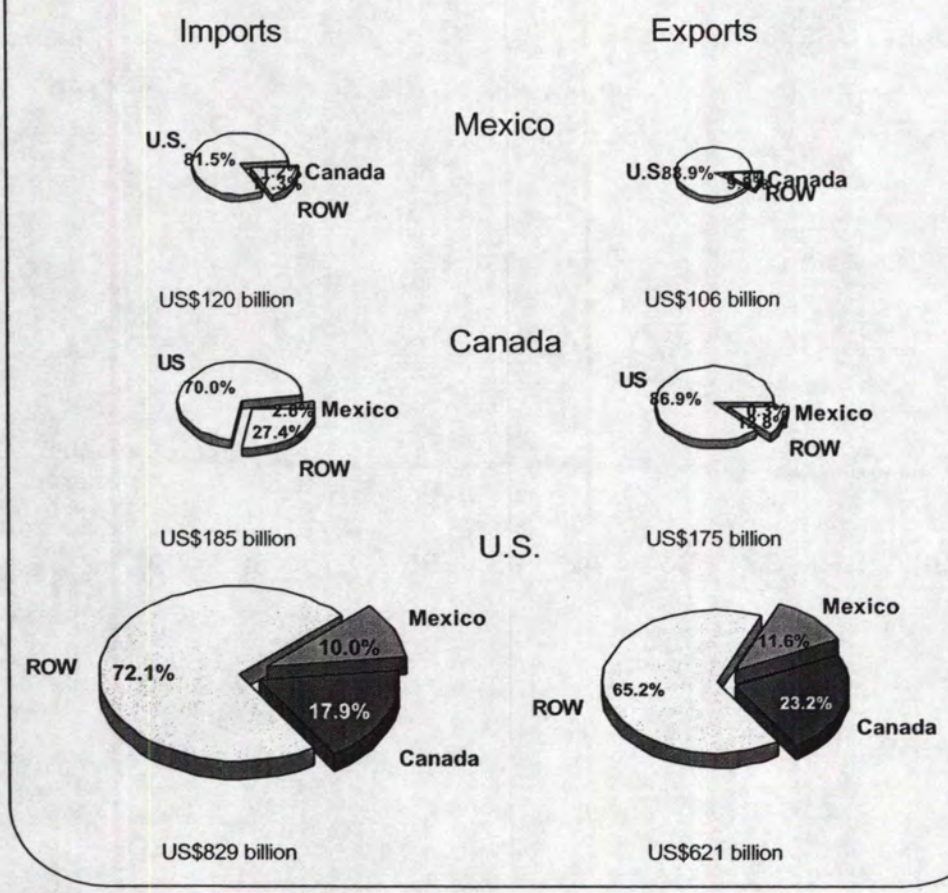
Value of the National Currency Relative to the U.S. Dollar



Source: IMF

Figure 3

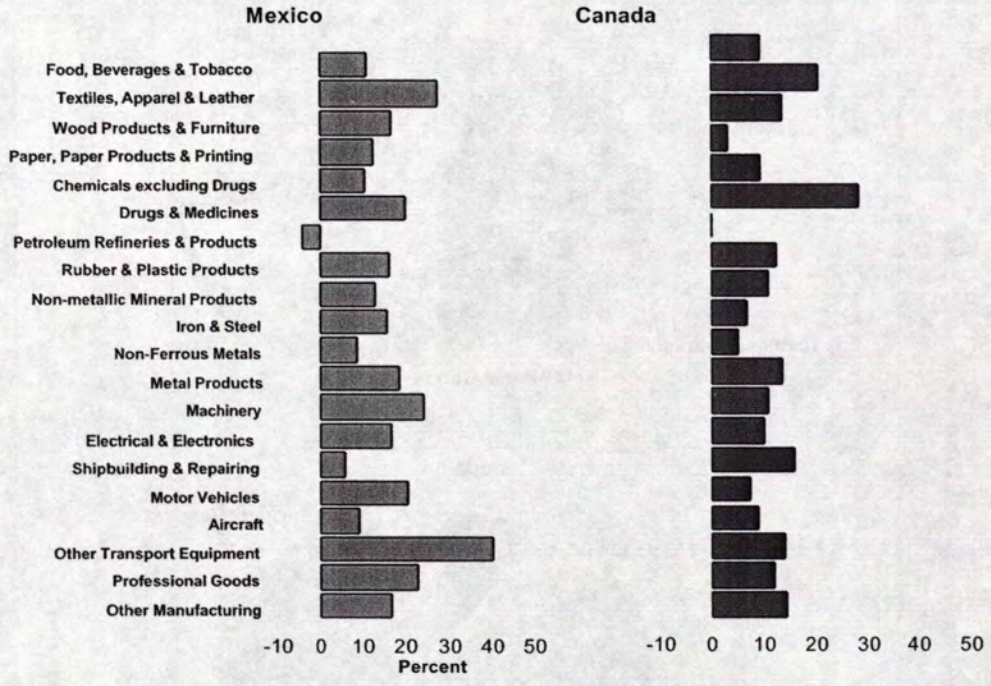
Direction of Trade, 1998



Source: OECD

Figure 4

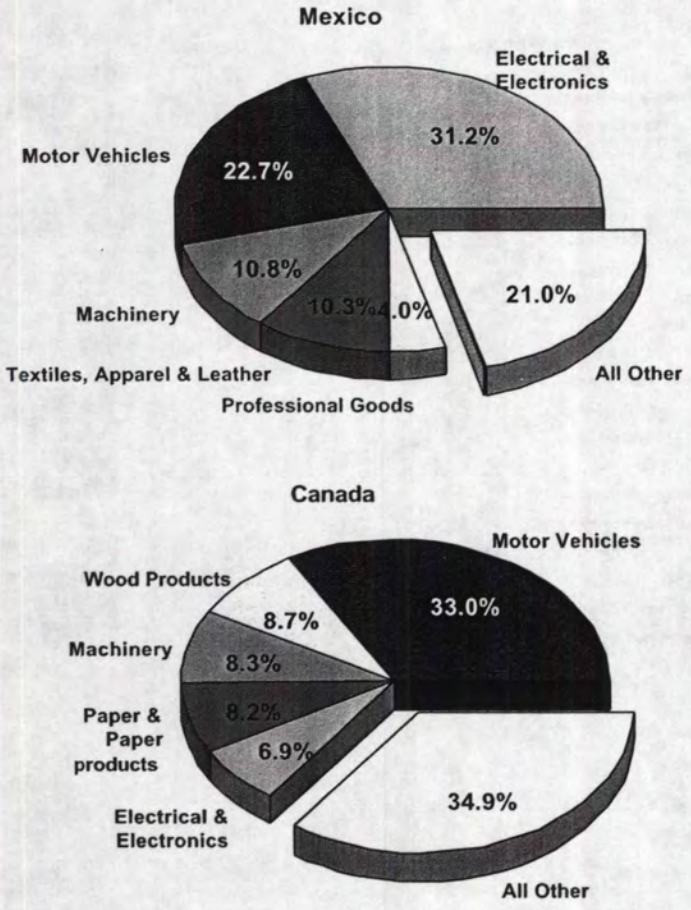
Mexico's and Canada's Manufacturing Exports to the U.S.
Average Annual Growth, 1990-98



Source: OECD

Figure 5

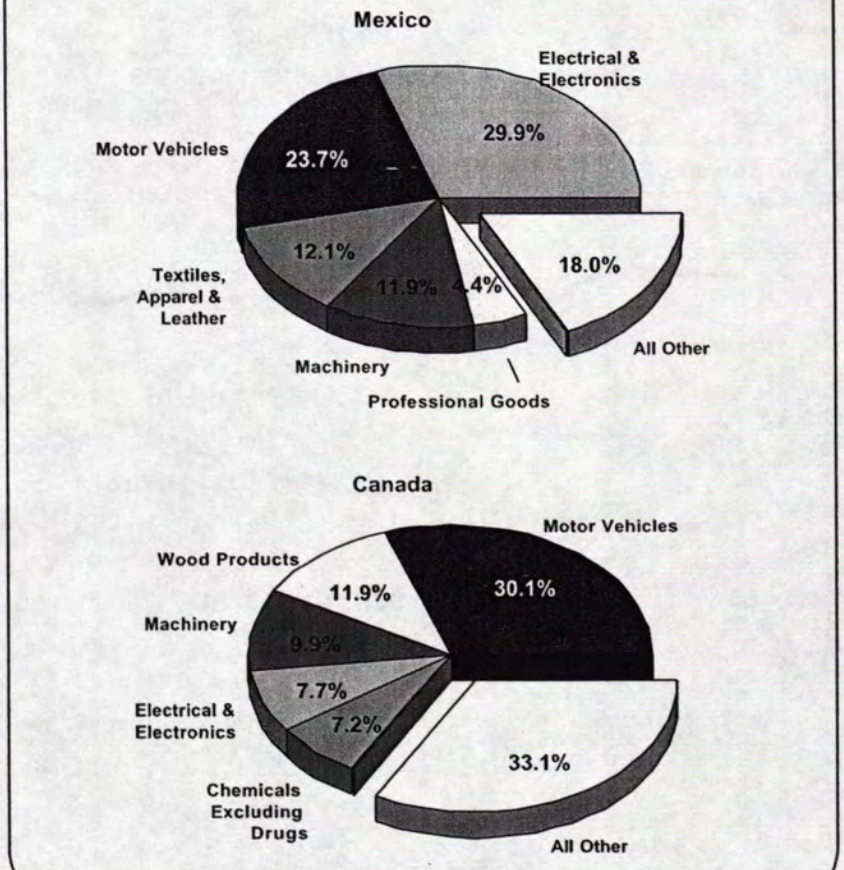
Mexico's and Canda's
Top 5 Manufacturing Exports to the U.S., 1998



Source: OECD

Figure 6

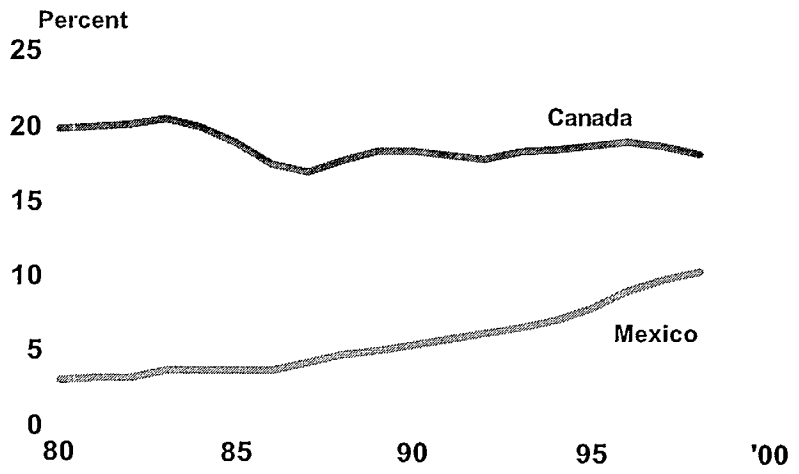
Contribution to Mexico's and Canda's Manufacturing Export Growth to the U.S., 1990-98



Source: OECD

Figure 7

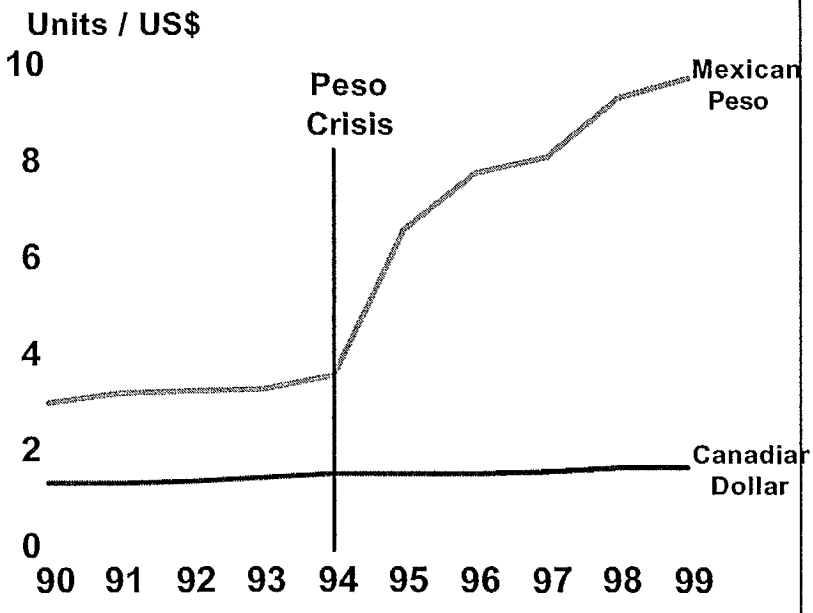
Mexico's and Canada's
Share of U.S. Manufacturing Imports



Source: OECD

Figure 8

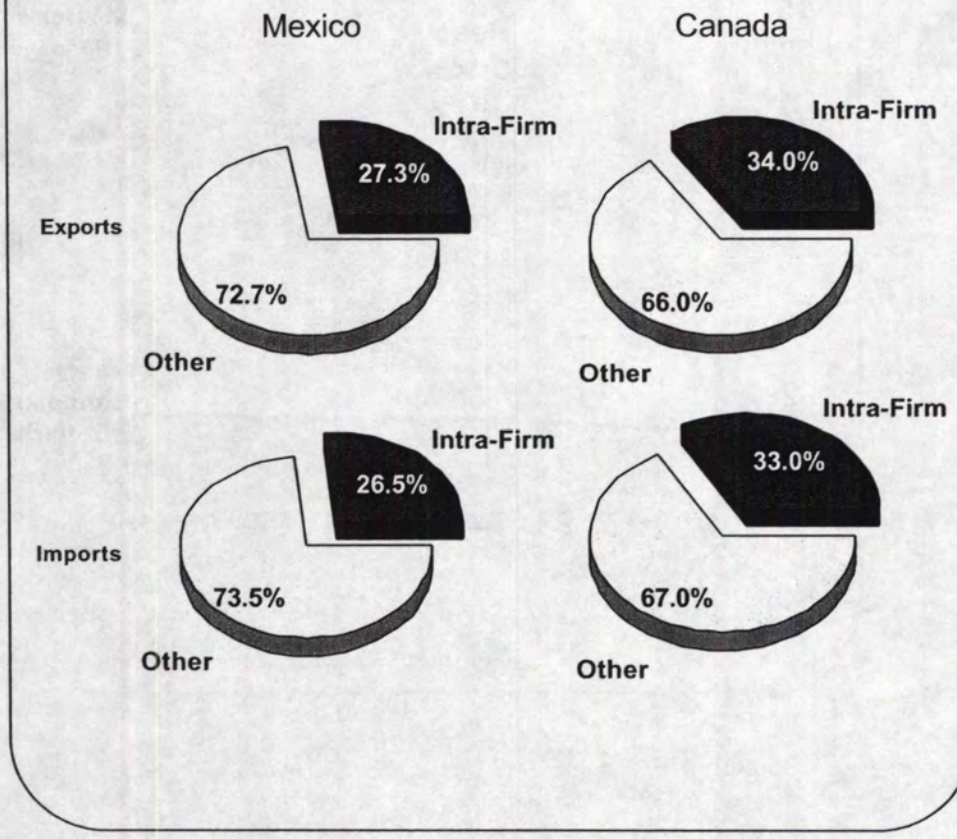
Value of the National Currrency Relative to U.S. Dollar



Source: IMF

Figure 9

Intra-firm Trade as a Share of Total Trade with the U.S.
Mexico and Canada *, 1998

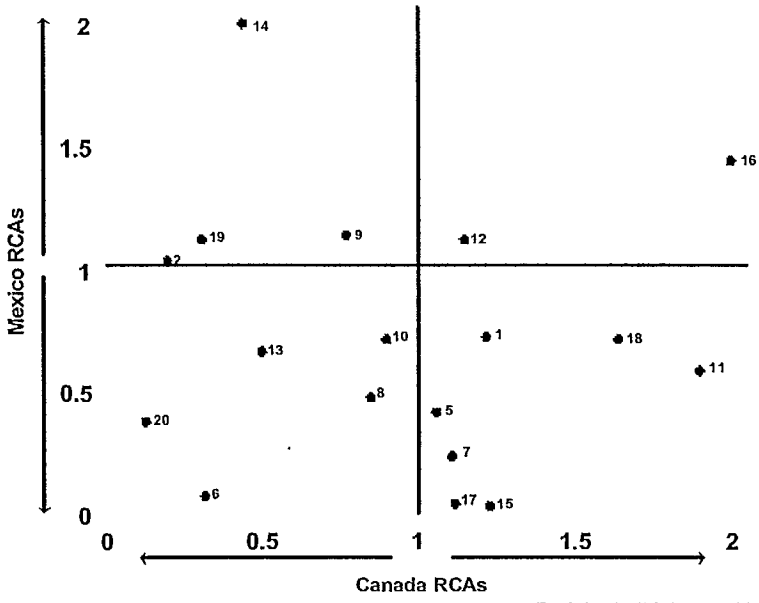


* U.S. multinationals only
Source: U.S. Bureau of Analysis

Figure10

Figure 10

Mexico - Canada Revealed Comparative Advantage (RCA)



Legend

1	Food, Beverages & Tobacco
2	Textiles, Apparel & Leather
3	Wood Products & Furniture
4	Paper, Paper Products & Printing
5	Chemicals excluding Drugs
6	Drugs & Medicines
7	Petroleum Refineries & Products
8	Rubber & Plastic Products
9	Non-metallic Mineral Products
10	Iron & Steel
11	Non-Ferrous Metals
12	Metal Products
13	Machinery
14	Electrical & Electronics
15	Shipbuilding & Repairing
16	Motor Vehicles
17	Aircraft
18	Other Transport Equipment
19	Professional Goods
20	Other Manufacturing

Two Industries Exluded : 3 and 4
Both very high RCA for Canada

Figure11

Figure 11

Change in Mexico - Canada Revealed Comparative Advantage (RCA)

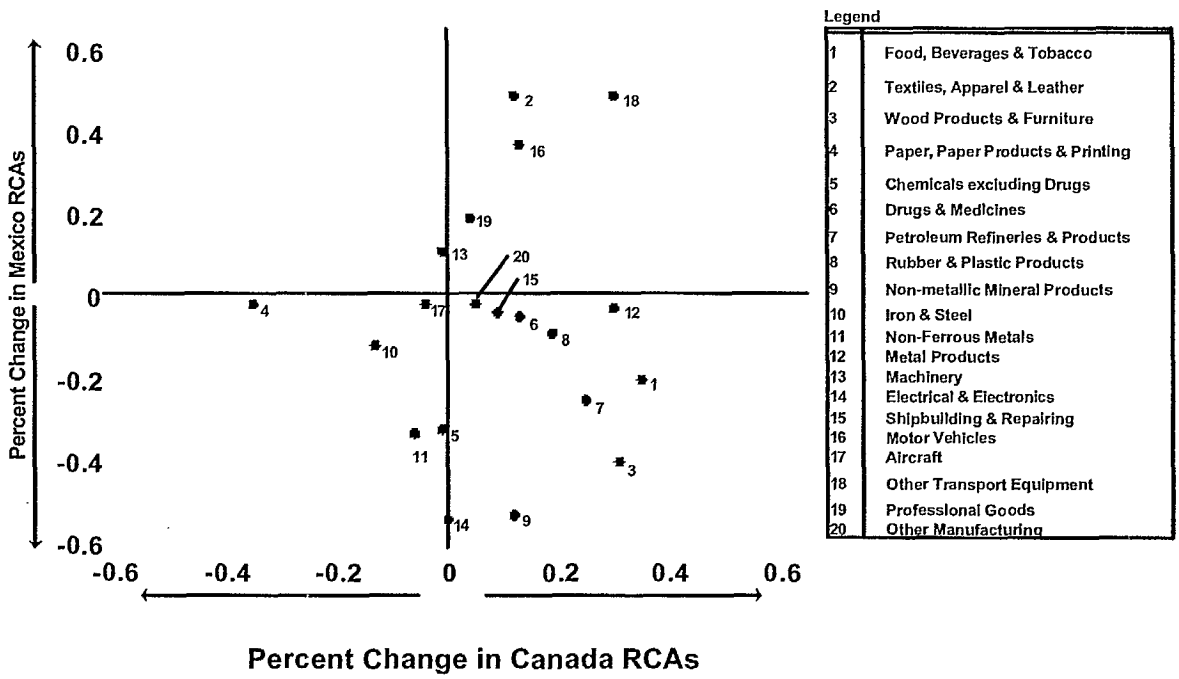
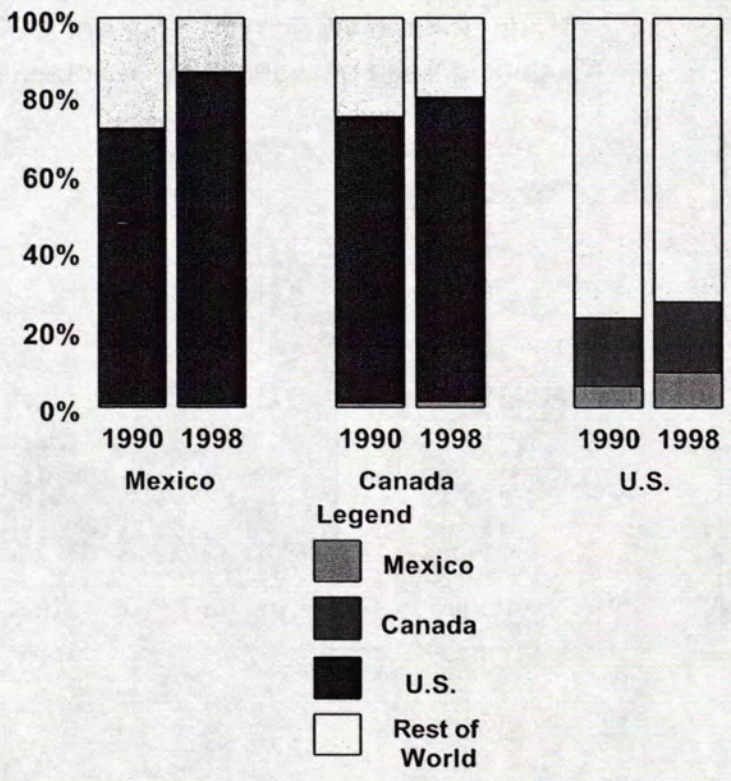


Figure 12

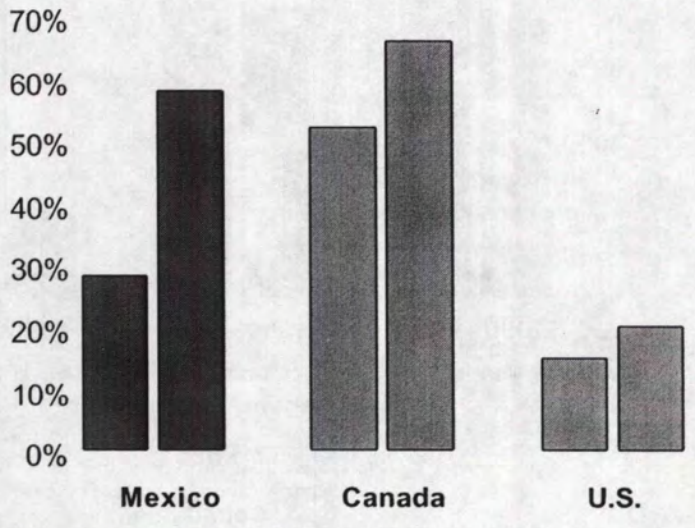
Trade Shares of NAFTA Countries



Source: OECD

Figure 13

Trade with the World as a Share of GDP
(Excluding trade between NAFTA countries)



Source: Still to be prepared

Table 1
Mexico's and Canada's Ranking in Share of U.S. Import Market

	Mexico		Canada	
	Rank 1990	Rank 1998	Rank 1990	Rank 1998
Food, Beverages & Tobacco	5	2	1	1
Textiles, Apparel & Leather	8	2	13	7
Wood Products & Furniture	3	3	1	1
Paper, Paper Products & Printing	6	6	1	1
Chemicals excluding Drugs	5	7	1	1
Drugs & Medicines	16	16	9	6
Petroleum Refineries & Products	6	3	1	1
Rubber & Plastic Products	8	5	3	2
Non-metallic Mineral Products	4	4	3	2
Iron & Steel	7	3	2	2
Non-Ferrous Metals	3	2	1	1
Metal Products	5	5	3	1
Machinery	8	2	3	3
Electrical & Electronics	6	1	3	4
Shipbuilding & Repairing	20	24	2	2
Motor Vehicles	4	3	2	1
Aircraft	16	17	2	2
Other Transport Equipment	9	5	3	1
Professional Goods	6	2	5	6
Other Manufacturing	10	6	12	9

Table 2

Mexico

	Value-Added		Exports		
	Level 1996, US$ billion	Growth 1990-96	Level 1996, US$ billion	Growth 1990-96	Export Intensity
Food, Beverages & Tobacco	16.63	5.86	1.64	10.85	9.88
Textiles, Apparel & Leather	5.13	0.95	5.20	27.50	101.43
Wood Products & Furniture	1.59	-2.47	1.76	16.77	110.91
Paper, Paper Products & Printing	2.81	0.95	0.44	12.39	15.68
Chemicals excluding Drugs	5.65	1.89	1.94	10.65	34.40
Drugs & Medicines	1.90	8.09	0.05	19.92	2.47
Petroleum Refineries & Products	1.20	-2.24	0.46	-4.30	38.25
Rubber & Plastic Products	1.98	3.49	0.86	16.29	43.19
Non-metallic Mineral Products	4.25	2.89	0.98	12.63	23.11
Iron & Steel	2.83	3.03	1.41	15.82	49.91
Non-Ferrous Metals	1.14	3.32	0.69	8.46	60.42
Metal Products	2.51	2.48	1.75	18.59	69.75
Machinery	2.91	9.60	5.73	23.94	196.84
Electrical & Electronics	3.87	5.31	18.67	16.43	482.06
Shipbuilding & Repairing	0.02	-5.90	0.02	5.65	116.22
Motor Vehicles	8.80	12.45	16.06	20.33	182.57
Aircraft	0.16	13.46	0.03	9.06	19.81
Other Transport Equipment	0.19	-7.47	0.10	40.20	51.71
Professional Goods	0.58	7.69	2.30	22.75	397.10
Other Manufacturing	0.96	0.80	0.98	16.68	102.22

Source: OECD

Table 3

Canada

	Value-Added		Exports		
	Level 1996, US$ billion	Growth 1990-96	Level 1996, US$ billion	Growth 1990-96	Export Intensity
Food, Beverages & Tobacco	14.01	1.38	5.34	9.38	38.16
Textiles, Apparel & Leather	4.25	-2.11	2.24	20.65	52.78
Wood Products & Furniture	7.57	5.68	11.23	13.44	148.40
Paper, Paper Products & Printing	12.48	-1.56	11.81	2.99	94.58
Chemicals excluding Drugs	6.06	0.06	9.25	9.23	152.63
Drugs & Medicines	2.21	3.00	0.41	28.23	18.62
Petroleum Refineries & Products	0.93	0.07	3.91	-0.28	420.66
Rubber & Plastic Products	3.97	4.12	3.08	12.48	77.49
Non-metallic Mineral Products	2.29	-3.42	1.39	10.76	60.55
Iron & Steel	2.82	3.27	3.46	6.68	122.83
Non-Ferrous Metals	2.74	0.87	5.99	4.97	218.12
Metal Products	6.07	-1.40	3.98	13.33	65.49
Machinery	6.40	2.91	10.66	10.91	166.41
Electrical & Electronics	6.76	1.78	8.62	9.91	127.54
Shipbuilding & Repairing	0.49	1.03	0.69	15.88	138.75
Motor Vehicles	11.21	5.22	43.67	7.29	389.45
Aircraft	2.93	3.07	3.17	8.68	108.14
Other Transport Equipment	0.86	4.59	0.95	13.98	110.64
Professional Goods	1.85	2.41	1.36	11.87	73.67
Other Manufacturing	0.89	0.76	0.65	14.29	72.79

Source: OECD

Table 4
Mexico's and Canada's Export Specializations, 1990 and 1998

	Mexico			Canada		
	Share of Total Manufacturing Exports		Change in Share	Share of Total Manufacturing Exports		Change in Share
	'1990	'1998	1990-1998	'1990	'1998	1990-1998
Food, Beverages & Tobacco	4.3	2.6	-1.7	4.0	4.4	0.3
Textiles, Apparel & Leather	5.6	10.3	4.7	0.9	2.0	1.2
Wood Products & Furniture	3.3	3.0	-0.3	6.0	8.7	2.7
Paper, Paper Products & Printing	1.1	0.7	-0.4	12.2	8.2	-4.1
Chemicals excluding Drugs	4.3	2.5	-1.8	6.3	6.7	0.4
Drugs & Medicines	0.1	0.1	0.0	0.1	0.4	0.3
Petroleum Refineries & Products	2.1	0.4	-1.7	3.8	1.9	-1.8
Rubber & Plastic Products	1.6	1.4	-0.2	1.9	2.6	0.7
Non-metallic Mineral Products	2.3	1.6	-0.7	0.9	1.1	0.2
Iron & Steel	2.1	1.8	-0.3	2.7	2.4	-0.3
Non-Ferrous Metals	2.4	1.2	-1.2	5.2	4.1	-1.2
Metal Products	3.2	3.3	0.1	2.4	3.4	1.0
Machinery	7.4	10.8	3.4	6.9	8.3	1.4
Electrical & Electronics	35.2	31.2	-4.0	6.1	6.9	0.8
Shipbuilding & Repairing	0.0	0.0	-0.0	0.1	0.2	0.1
Motor Vehicles	19.7	22.7	3.0	35.7	33.0	-2.6
Aircraft	0.1	0.1	-0.1	2.9	3.0	0.1
Other Transport Equipment	0.1	0.4	0.3	0.6	1.0	0.3
Professional Goods	3.0	4.0	1.0	0.9	1.1	0.3
Other Manufacturing	1.6	1.4	-0.2	0.3	0.5	0.2

Source: DECD

Table 5

Decomposition of Mexico's and Canada's Export Gains, 1990-1998

	Mexico			Canada		
	Competit-iveness	U.S. Demand	Comp/Dem	Competit-iveness	U.S. Demand	Comp/Dem
Food, Beverages & Tobacco	62.7	37.3	1.7	54.4	45.6	1.2
Textiles, Apparel & Leather	85.4	14.6	5.8	74.9	25.1	3.0
Wood Products & Furniture	40.0	60.0	0.7	15.4	84.6	0.2
Paper, Paper Products & Printing	73.5	26.5	2.8	-54.5	154.5	-0.4
Chemicals excluding Drugs	14.6	85.4	0.2	-3.7	103.7	-0.0
Drugs & Medicines	-1.9	101.9	-0.0	47.1	52.9	0.9
Petroleum Refineries & Products	20.5	79.5	0.3	-956.5	1056.5	-0.9
Rubber & Plastic Products	56.1	43.9	1.3	34.1	65.9	0.5
Non-metallic Mineral Products	41.9	58.1	0.7	26.9	73.1	0.4
Iron & Steel	58.2	41.8	1.4	-38.0	138.0	-0.3
Non-Ferrous Metals	41.2	58.8	0.7	-13.6	113.6	-0.1
Metal Products	64.4	35.6	1.8	39.7	60.3	0.7
Machinery	70.3	29.7	2.4	-5.4	105.4	-0.1
Electrical & Electronics	50.8	49.2	1.0	-3.6	103.6	-0.0
Shipbuilding & Repairing	-273.5	373.5	-0.7	8.4	91.6	0.1
Motor Vehicles	80.4	19.6	4.1	12.2	87.9	0.1
Aircraft	-4.0	104.0	-0.0	-10.0	110.0	-0.1
Other Transport Equipment	90.3	9.7	9.3	26.9	73.1	0.4
Professional Goods	71.9	28.1	2.6	19.7	80.3	0.2
Other Manufacturing	64.2	35.8	1.8	54.4	45.6	1.2
Total Manufacturing	65.5	34.5	1.9	11.7	88.3	0.1

Table 6

Table xx will be put here. It will show compare U.S. imports from Mexico, Canada and the ROW, to show whether Electrical & Electronics, Machinery and Automobiles are the largest U.S. imports from the ROW as well.

Table 7

Mexico's and Canada's Manufacturing Trade Balances with the U.S.

	Mexico		Canada	
	'1998 US$ Billions	Percent Change	'1998 US$ Billions	Percent Change
Food, Beverages & Tobacco	-0.7	344.2	1.2	74.1
Textiles, Apparel & Leather	3.2	1313.8	-0.6	-24.5
Wood Products & Furniture	1.3	603.0	10.1	193.1
Paper, Paper Products & Printing	-1.9	125.5	6.7	2.8
Chemicals excluding Drugs	-5.2	231.8	-3.4	149.9
Drugs & Medicines	-0.2	107.8	-0.9	166.5
Petroleum Refineries & Products	-1.4	410.8	1.7	-17.3
Rubber & Plastic Products	-2.1	384.6	-0.3	-11.4
Non-metallic Mineral Products	0.7	175.3	-0.3	-28.9
Iron & Steel	0.2	-183.2	0.2	-46.7
Non-Ferrous Metals	-0.2	-237.5	3.5	43.4
Metal Products	-0.7	77.8	-1.2	35.1
Machinery	-0.7	-61.1	-12.1	81.2
Electrical & Electronics	7.2	192.3	-10.3	161.2
Shipbuilding & Repairing	-0.1	227.9	0.0	-150.1
Motor Vehicles	10.0	1171.4	13.2	59.3
Aircraft	-0.7	62.3	1.4	328.2
Other Transport Equipment	0.1	-189.6	0.3	34.6
Professional Goods	1.0	-427.7	-3.6	96.3
Other Manufacturing	0.5	826.9	-1.0	193.6
Total Manufacturing	10.5	-517.6	4.6	-37.6

Source: OECD

Table 8
Shift-Share Analysis

	Mexico			Canada		
	Change Industry	Change Intensity	Contribution	Change Industry	Change Intensity	Contribution
Food, Beverages & Tobacco	-6.87	106.87	9.49	-0.98	100.98	4.13
Textiles, Apparel & Leather	-246.05	346.05	-2.58	-52.36	152.36	3.20
Wood Products & Furniture	109.60	-9.60	4.38	41.03	58.97	18.82
Paper, Paper Products & Printing	30.20	69.80	1.79	328.72	-228.72	-2.22
Chemicals excluding Drugs	26.55	73.45	6.38	-28.82	128.82	8.53
Drugs & Medicines	-77.07	177.07	0.06	10.99	89.01	1.04
Petroleum Refineries & Products	25.93	74.07	4.61	-285.91	385.91	0.36
Rubber & Plastic Products	14.86	85.14	1.83	34.01	65.99	4.15
Non-metallic Mineral Products	13.39	86.61	3.79	-186.09	286.09	0.80
Iron & Steel	55.47	44.53	1.20	41.66	58.34	2.68
Non-Ferrous Metals	4.39	95.61	5.87	-26.54	126.54	2.37
Metal Products	33.91	66.09	3.41	-58.89	158.89	3.92
Machinery	-376.82	476.82	2.01	21.78	78.22	12.84
Electrical & Electronics	-9.76	109.76	46.39	6.98	93.02	8.09
Shipbuilding & Repairing	9195.92	-9095.92	0.00	-3.08	103.08	1.66
Motor Vehicles	-340.65	440.65	8.93	107.77	-7.77	25.20
Aircraft	-10.10	110.10	0.67	110.87	-10.87	0.83
Other Transport Equipment	229.22	-129.22	0.25	47.54	52.46	1.05
Professional Goods	-875.53	975.53	0.23	14.88	85.12	1.63
Other Manufacturing	95.87	4.13	1.31	-8.95	108.95	0.92
All Industries	-25.93	125.93	100.00	25.48	74.52	100.00

Table 9

Mexico's and Canada's Intra-Industry Trade

	Mexico			Canada		
	'1990	'1998	Change In Ratio	'1990	'1998	Change In Ratio
Food, Beverages & Tobacco	92.32	86.05	-5.85	87.55	89.61	1.59
Textiles, Apparel & Leather	89.84	77.03	-5.48	63.73	91.27	8.70
Wood Products & Furniture	85.30	64.74	-3.97	43.01	36.60 -	-0.18
Paper, Paper Products & Printing	36.08	38.92	0.07	48.58	61.91	0.68
Chemicals excluding Drugs	54.29	44.58	-0.38	87.71	85.27	-1.35
Drugs & Medicines	25.61	41.48	0.36	33.86	58.40	0.89
Petroleum Refineries & Products	77.56	32.26	-2.98	48.89	59.94	0.54
Rubber & Plastic Products	61.74	52.69	-0.50	90.49	96.50	18.02
Non-metallic Mineral Products	67.04	64.23	-0.24	76.49	91.20	7.11
Iron & Steel	81.25	93.70	10.53	88.82	96.70	21.36
Non-Ferreus Metals	87.70	92.71	5.58	57.03	58.68	0.09
Metal Products	78.61	88.99	4.41	80.80	89.45	4.27
Machinery	64.56	96.30	24.23	61.61	66.97	0.42
Electrical & Electronics	80.81	83.81	0.97	70.76	66.36	-0.45
Shipbuilding & Repairing	14.74	7.56	-0.09	74.22	94.35	13.81
Motor Vehicles	89.90	63.86	-7.13	82.53	84.41	0.69
Aircraft	N/A	N/A	N/A	92.44	81.70	-7.75
Other Transport Equipment	25.97	79.35	3.49	69.88	87.72	4.82
Professional Goods	80.31	81.54	0.34	42.58	48.09	0.18
Other Manufacturing	91.51	73.26	-8.04	61.93	61.74	-0.01

Table 10

Mexico's and Canada's Labour Productivity (National Currency)

	Mexico			Canada		
	Level 1990	Level 1996	Growth	Level 1990	Level 1996	Growth
Food, Beverages & Tobacco	51829.32	59420.74	2.30	66534.18	72626.16	1.47
Textiles, Apparel & Leather	25812.39	27134.15	0.84	31928.78	35725.77	1.89
Wood Products & Furniture	31603.60	35831.55	2.11	38887.91	41632.51	1.14
Paper, Paper Products & Printing	39926.25	44379.04	1.78	62860.44	63507.28	0.17
Chemicals excluding Drugs	83626.74	119040.83	6.06	96777.27	71581.68	-4.90
Drugs & Medicines	78683.13	95196.73	3.23	108898.81	124394.06	2.24
Petroleum Refineries & Products	75640.11	110080.51	6.45	69333.87	90988.87	4.63
Rubber & Plastic Products	33181.15	32195.05	-0.50	46511.49	57700.09	3.66
Non-metallic Mineral Products	56311.79	77352.67	5.43	60447.48	65625.61	1.38
Iron & Steel	103972.37	272856.18	17.45	57435.81	74992.73	4.55
Non-Ferrous Metals	107270.95	129539.63	3.19	71142.03	99429.50	5.74
Metal Products	32258.36	37103.40	2.36	48412.25	49854.36	0.49
Machinery	32750.78	54827.04	8.97	49867.32	65485.30	4.65
Electrical & Electronics	25510.17	25090.98	-0.28	56712.35	88751.11	7.75
Shipbuilding & Repairing	30275.80	N/A	N/A	45388.16	63056.64	5.63
Motor Vehicles	41451.47	50781.27	3.44	62320.81	74270.27	2.97
Aircraft	N/A	N/A	N/A	61530.79	52963.18	-2.47
Other Transport Equipment	19120.25	24932.38	4.52	56015.58	82567.68	6.68
Professional Goods	22756.39	24147.70	0.99	40771.66	52121.83	4.18
Other Manufacturing	48511.71	44116.90	-1.57	36221.72	39821.96	1.59

Table 11

Mexico's and Canada's Wage Rates Per Person (National Currency)

	Mexico			Canada		
	Level 1990	Level 1996	Growth	Level 1990	Level 1996	Growth
Food, Beverages & Tobacco	11337.68	34588.05	20.43	34537.52	40382.36	2.64
Textiles, Apparel & Leather	9814.46	22887.84	15.16	23661.47	29894.21	3.97
Wood Products & Furniture	7982.03	20592.50	17.11	32518.87	41364.44	4.09
Paper, Paper Products & Printing	15502.43	42356.74	18.24	41551.62	50481.04	3.30
Chemicals excluding Drugs	25136.76	81968.62	21.77	44814.78	54177.53	3.21
Drugs & Medicines	27288.17	101498.88	24.47	42078.78	52124.52	3.63
Petroleum Refineries & Products	22988.89	74657.76	21.69	61000.35	69854.57	2.28
Rubber & Plastic Products	14236.80	37715.66	17.63	34031.15	38578.24	2.11
Non-metallic Mineral Products	15243.40	41321.35	18.08	37921.78	45153.04	2.95
Iron & Steel	28992.00	79216.25	18.24	53480.93	65526.01	3.44
Non-Ferrous Metals	20400.07	49893.87	16.07	53566.73	66172.14	3.58
Metal Products	11604.33	34004.21	19.62	34726.56	38051.39	1.54
Machinery	15311.04	46176.06	20.20	36329.16	44554.83	3.46
Electrical & Electronics	14043.88	38357.44	18.23	37834.81	54843.42	6.38
Shipbuilding & Repairing	23888.25	N/A	N/A	42981.83	48741.33	2.12
Motor Vehicles	18162.46	45028.09	16.34	42801.21	53171.99	3.68
Aircraft	N/A	N/A	N/A	46586.16	57304.12	3.51
Other Transport Equipment	10980.23	27917.77	16.83	38187.46	46248.07	3.24
Professional Goods	13356.78	36365.30	18.17	29913.92	38131.82	4.13
Other Manufacturing	9426.83	28454.54	20.22	26836.43	30312.80	2.05

Table 12

Mexico's and Canada's Labour Productivity and Wages (National Currency)

	Mexico		Canada		
	Level 1996	Growth	Level 1996	Growth	Level Comparison
Productivity					
Machinery	54827.04	8.97	65485.30	4.65	119.44
Electrical & Electronics	25090.98	-0.28	88751.11	7.75	353.72
Motor Vehicles	50781.27	3.44	74270.27	2.97	146.26
Professional Goods	24147.70	0.99	52121.83	4.18	216
Wages					
Machinery	46176.06	20.20	44554.83	3.46	96
Electrical & Electronics	38357.44	18.23	54843.42	6.38	143
Motor Vehicles	45028.09	16.34	53171.99	3.68	118
Professional Goods	36365.30	18.17	38131.82	4.13	105

e 13
rade

	1998				1990
	Intra-NAFTA US$ Billions	Inter-NAFTA US$ Billions	Intra/Inter Percent	Inter/Total Percent	Inter/Total Percent
Food, Beverages & Tobacco	17.39	54.82	31.73	84.06	75.91
Textiles, Apparel & Leather	22.48	91.52	24.56	94.73	80.28
Wood Products & Furniture	18.64	16.92	110.22	62.66	47.57
Paper, Paper Products & Printing	21.68	22.96	94.42	55.43	51.44
Chemicals excluding Drugs	35.00	95.12	36.79	80.14	73.10
Drugs & Medicines	2.57	20.34	12.62	91.66	88.79
Petroleum Refineries & Products	6.24	15.85	39.34	81.09	71.77
Rubber & Plastic Products	15.03	26.79	56.11	78.27	64.06
Non-metallic Mineral Products	6.12	12.91	47.45	75.08	67.82
Iron & Steel	10.62	24.32	43.68	74.44	69.60
Non-Ferrous Metals	11.52	19.31	59.66	68.23	62.63
Metal Products	20.54	28.82	71.26	72.99	58.39
Machinery	56.12	217.57	25.79	83.31	79.49
Electrical & Electronics	84.91	179.24	47.37	83.48	67.86
Shipbuilding & Repairing	0.75	3.42	21.96	84.32	81.99
Motor Vehicles	115.02	91.47	125.75	53.99	44.30
Aircraft	9.90	80.22	12.34	90.34	89.02
Other Transport Equipment	3.09	4.97	62.16	73.16	61.67
Professional Goods	12.80	54.23	23.60	87.24	80.91
Other Manufacturing	4.68	40.95	11.43	94.94	89.74

Source: OECD

(Will replace/add with: U.S. trade with (levels, 1990 and 1998, and growth):
for Mexico Canada Rest of World

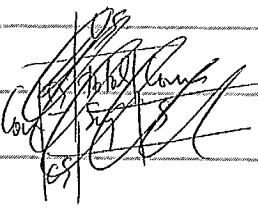
Table 14

		Intra-Industry Trade		Shift-Share		
		Intra-Induutry 1998	Change 1990-98	Change Industry	Change Intensity	Contribution
Mexico	**High Intra-Industry Trade**					
	Machinery	96.30	24.23	-376.82	476.82	2.01
	Iron & Steel	93.70	10.53	55.47	44.53	1.20
	Non-Ferrous Metals	92.71	5.58	4.39	95.61	5.87
	Metal Products	88.99	4.41	33.91	66.09	3.41
	Food, Beverages & Tobacco	86.05	-5.85	-6.87	106.87	9.49
	Electrical & Electronics	83.81	0.97	-9.76	109.76	46.39
	Professional Goods	81.54	0.34	-875.53	975.53	0.23
	Low Intra-Industry Trade					
	Rubber & Plastic Products	52.69	-0.50	14.86	85.14	1.83
	Chemicals excluding Drugs	44.58	-0.38	26.55	73.45	6.38
	Drugs & Medicines	41.48	0.36	-77.07	177.07	0.06
	Paper, Paper Products & Printing	38.92	0.07	30.20	69.80	1.79
	Petroleum Refineries & Products	32.26	-2.98	25.93	74.07	4.61
	Shipbuilding & Repairing	7.56	-0.09	9195.92	-9095.92	0.00
Canada	**High Intra-Industry Trade**					
	Iron & Steel	96.70	21.36	41.66	58.34	2.68
	Rubber & Plastic Products	96.50	18.02	34.01	65.99	4.15
	Shipbuilding & Repairing	94.35	13.81	-3.08	103.08	1.66
	Textiles, Apparel & Leather	91.27	8.70	-52.36	152.36	3.20
	Non-metallic Mineral Products	91.20	7.11	-186.09	286.09	0.80
	Food, Beverages & Tobacco	89.61	1.59	-0.98	100.98	4.13
	Metal Products	89.45	4.27	-58.89	158.89	3.92
	Other Transport Equipment	87.72	4.82	47.54	52.46	1.05
	Chemicals excluding Drugs	85.27	-1.35	-28.82	128.82	8.53
	Motor Vehicles	84.41	0.69	107.77	-7.77	25.20
	Aircraft	81.70	-7.75	110.87	-10.87	0.83
	Low Intra-Industry Trade					
	Petroleum Refineries & Products	59.94	0.54	-285.91	385.91	0.36
	Non-Ferrous Metals	56.68	0.09	-26.54	126.54	2.37
	Drugs & Medicines	56.40	0.89	10.99	89.01	1.04
	Professional Goods	48.09	0.18	14.88	85.12	1.63
	Wood Products & Furniture	36.60	-0.18	41.03	58.97	18.82

Notes Wave

US
TS CS

Game I



Con | TS / CS

US plays CS;
Con's best response: TS

US – w/ Extraterritoriality
TS CS

Con | TS / CS

⇒ strictest policy will prevail,
i.e. that of US
⇒ others' rules don't matter

Extraterritoriality in Practice
- McDonnell Douglas / Boeing (EC)
- CIBA-Geigy / Sandoz (US)
- GE / Honeywell (EC)

have been increasingly superseded by Extraterritoriality, or by bilateral agreements!

Con – US expected to sign
⇒ Positive Comity Agreement = ask other country to take action against a Co. in that jurisdiction, because it is abusing Colus.

Intellectual Property ; modern view : ≠ in conflict w/ competition policy
- both countries have I.P. Guidelines (ours = new)
- Xerox case: I.P. trumps anti-trust laws

19

COMPETITION POLICY AND INTELLECTUAL PROPERTY: ISSUES OF NORTH AMERICAN INTEGRATION

Roger Ware
Queen's University
(with research assistance from Tristan Musgrave)

paper to be presented that the Industry Canada Conference on: North American Linkages: Opportunities and Challenges for Canada, Calgary, June 20-22, 2001

June, 2001

The importance of competition policy in promoting innovation and economic growth

A reality facing advanced national economies is that firms must now operate in an environment of increasing global competition, technological innovation, and macroeconomic instability. Most industrial countries acknowledge the importance of a vigourous competition policy, enforced by the appropriate legal framework. More than 90 countries now have a modern framework of competition law. And yet how much do we really know about the role and value of competition policy in promoting economic efficiency, innovation and economic growth. The short answer is, not very much.

The work most cited as advocating an important role for a strong competition policy is that of Michael Porter (1990). In his seminal book, The Competitive Advantage of Nations, Porter advocates a need for strict competition regulation in domestic industries. By studying ten important trading nations over a four-year period, he finds that competition policy maintains and promotes domestic competition, which increases innovation, efficiency, and ultimately economic growth. These are the roots of a nation's competitive advantage relative to its rivals. However, his argument has been subject to significant criticism. Critics have argued that there is insufficient evidence to establish that widespread enforcement of competition policy leads to higher levels of competition, competitive advantage or still further, higher rates of economic growth.

The underlying theme of Porter's argument is that vigorous domestic competition is the key to sustaining and developing a nation's competitive advantage. Domestic rivalry pressures firms to innovate and to make more efficient use of their resources, specifically, their labour and capital. Indeed, local rivals push each other to lower costs, improve quality and service, and to invest in research and development in order to create new future products and processes.[1] A primary result of competition, therefore, is that the productivity of an industry as a whole increases. When combined with international trade high industry productivity will generally make the nation as a whole more competitive.

[1] Porter, 1990. pg. 118-119

Porter credits high levels of competition in German and Japanese industries as one of the predominant factors that *caused* the large competitive advantage that these nation's enjoyed. Consequently, as strong domestic competition is an essential determinant of national advantage and economic growth, any factor that can be shown to affect competition will also affect the nation's ability to compete abroad. On the other hand, too little competition in any industry may be a serious problem.

The opposite strategy to that of a vigourous competition policy is when a government allows mergers that create a 'National Champion': a firm permitted to dominate their particular domestic industry. First, Porter's evidence suggests that these merged firms generally perform poorly. Efficiency gains from economies of scale or cost savings often prove elusive, and, alternatively, would be best achieved through producing globally instead of merging with a domestic rival. The firms that are the most successful internationally are most often those that face active domestic rivalry.[2] Second, by creating a firm that dominates a national industry the government may be creating an inefficient monopolist that is too politically important to be allowed to fail. Moreover, instead of directing resources into research and development or into improving the efficiency of production, it may channel them into rent seeking activities, such as lobbying government to ensure that its dominant position is preserved. In the long run, these inefficient activities may culminate in a failing or lagging industry that requires government aid to survive. Over time, if the government permits a large number of 'national champions' to exist in an economy, national advantage and economic growth may suffer. Tough antitrust laws can help as part of a solution to this problem.

Porter believes that domestic competition must be buttressed by a nation's commitment to a strict competition policy. He suggests:

> A strong antitrust policy, especially in the area of horizontal mergers, alliances, and collusive behaviour, is essential to the rate of upgrading in an economy.

[2] Porter, 1990. pg. 662

> Mergers, acquisitions, and alliances involving industry leaders should be disallowed... Direct interfirm collusion should be illegal. Cooperative ventures involving direct collaboration between competitors must pass strict guidelines

Although he does mention that firms in a failing industry should not be prohibited from merging and that collusion between firms for the purpose of research and development should be allowed, Porter's stringent prescription of antitrust regulations is based on the assumption that antitrust policy *causes* competition. Thus, he contends that a nation's antitrust policy will contribute directly to its competitive advantage and to economic growth.

McFetridge (1990) attacked the premise of Porter's argument that antitrust laws cause competition:

> The evidence is that, while it may or may not have had an effect on Japanese competitiveness, Japanese antitrust enforcement cannot be characterized as other than permissive. Similarly, while the German cartel offices are very active, the German statute is highly permissive. It is very difficult to believe that Japanese and German competitive advantage is the result, even in part, of vigorous antitrust enforcement.[3]

An attribute of McFetridge's observations is that they draw an important distinction between the presence of antitrust laws and their enforcement. Japanese and German markets were highly competitive without a great deal of competition enforcement; however, it may be possible that the existence of relatively weak antitrust statutes and the possibility of punishment was enough to deter most major violations during that time period. His observations beg the question, however, that if competition authorities had enforced antitrust laws more frequently or if laws had been stricter would the competitive advantage of those nation's have been higher?

[3] McFetridge, 1992. pg. 137

McFetridge also notes that it is possible that national advantage may cause competition, instead of the reverse suggested by Porter. If a nation is more productive in a particular industry it may induce a large number of firms to enter the industry. Conversely, if other industries are less productive they might suffer from a lack of competition. If this suggestion of reverse causality has merit then the importance of competition policy in the broader economic environment is diminished. Antitrust enforcement may indirectly increase national advantage and economic growth by simply maintaining competition and innovation, but its causal role will have disappeared. Indeed, under these circumstances overzealous enforcement of these laws may even be harmful to an economy.

One problem with antitrust investigations is that they can become extremely costly. As demonstrated by the US Justice Department's ongoing legal battle against Microsoft, lawyers, judges, consultants and expert witnesses, amongst others, may cost millions of dollars to both the firm and the taxpayers. As they may continue for many years, competition proceedings can also distract the firm's executives from their corporate goals, and reallocate resources from research and development to the defence of the firm, which may slow the rate of innovation. Each antitrust investigation, therefore, has the potential to be detrimental to the competitiveness of the industry as a whole. Moreover, as the executives of Microsoft would be only to willing to emphasize, misguided antitrust prosecutions can have a chilling effect on efficient practices and on the incentive to innovate.

Although the majority of Porter's analysis remains to be challenged, he may have overestimated the importance of competition policy in promoting innovation, efficiency, and economic growth. There can be little argument that intense competition over time will most likely lead to innovation and a more efficient use of resources. These contribute directly to a nation's competitive advantage. However, he does not give sufficient evidence to support his premise that strict competition laws and their enforcement are a predominant factor in causing competition. Even the presence of permissive laws and the possibility of punishment for their violation may be enough to keep the majority of firms in line. If, on the other hand, national advantage governs the

level of competition that an industry can sustain, antitrust policy may have a reduced role in promoting or sustaining competition. These criticisms by no means go to say that Porter's hypothesis is incorrect. But, we still have strikingly little evidence to support his proactive conclusions.

Multijurisdictional Issues in Competition Policy

Issues relating to multiple jurisdictions but not to the distinctiveness of Canada's framework.

Some theoretical issues

Abstracting from the realities of trade in Canada, consider first some theoretical issues relating to multiple jurisdictions for competition policy – issues that would arise even if the competing jurisdictions had identical laws and objectives for their national competition policy. These issues were first analyzed in a pioneering paper by Head and Ries (1997), followed by a longer, non-technical discussion by Guzman (1998).[4]

Head and Ries work under the assumption that nations with jurisdiction over merging firms pursue an objective of maximizing domestic total surplus in their competition policies. They do not investigate the implications of extraterritorial jurisdiction. Head and Ries derive some basic and important results, that are also discussed in the later paper by Guzman. First, whether or not independent national jurisdictions for competition policy will support mergers that reduce global surplus depends on the worldwide distribution of production and consumption in the relevant product. A product that is entirely consumed outside of the relevant antitrust jurisdictions, will affect those jurisdictions only through profits and not at all through consumer surplus. Thus, any profitable merger or other activity will be approved. At the other extreme, if all nations have a symmetric share of world consumption and production, only those mergers that increase world welfare will be approved by the national jurisdictions.

[4] Guzman does not cite Head and Ries' earlier work, so he may not have been aware of it.

When several jurisdictions have independent frameworks problems are created from the noncooperative nature of the individual country objectives. Assume initially that the objective of both nations competition policy is to maximize total surplus (or the sum of consumer and producer surplus). We start by identifying several benchmark cases.

a. Only producers in A, only consumers in B

Suppose that country A produces a good that, for the sake of argument, is sold only in country B. The effect of this is that all producer surplus is realized in country A, all consumer surplus is realized in country B. If a merger between two firms in country A with no efficiency benefits is proposed, country A's competition authorities would have no objection, since total surplus will increase in A. Country B will suffer the losses in consumer surplus due to any post-merger price increases. Whether or not country B's competition authorities will be able to block the merger depends on the degree of extraterritoriality that they are able to exercise with their competition laws. Assuming no extraterritoriality, then the merger would proceed on the basis of its approval in country A, even though by assumption this merger would lower total surplus.

With large efficiency gains accruing from the merger, gains of sufficient magnitude that they could lead to lower post-merger prices, then total surplus would necessarily increase. Moreover, both jurisdictions would approve of the merger, because post-merger surplus would increase in both countries.

Now suppose that country B can exercise extraterritorial application of its own competition laws, exercised in pursuit of its own surplus, but not that of other countries. The first merger would be prevented by country B, which would be the outcome consistent with maximizing total world surplus. The second merger would be permitted, which is also the outcome that maximizes world welfare. But consider a third merger that involves intermediate efficiency gains, such that prices to residents of country B still increase by a small amount, but that total surplus increases because of the efficiency gains. Country B will now block the merger, even though country A approves it and the merger has the effect of increasing world surplus.

b. Firms in both A and B, but consumers only in B

The only difference this assumption makes is that country B may approve a merger or other action that raises prices, if enough of the increase in profits accrues to the country B firm. Again, assume initially that there is no extraterritoriality for either country. A merger between country A firms will always be approved, whether it increases or decreases total surplus. But a merger between country B firms that increases total surplus will only be approved if enough of the profit gains accrue to country B firms. This is likely to occur if country B firms are larger and more efficient than those in country A. Suppose now that country B can apply its laws extraterritorially, as before. A merger that increases total world surplus because of a substantial efficiency saving, will still be vetoed by country B if most of the profit increase accrues to country A firms. One scenario for this would be a merger between country A firms involving efficiency gains and leading to higher prices and higher profits for firms in both countries. Since the efficiency gain and a large part of the profit increase accrues to country A firms, country B will use its extraterritorial power to veto the merger, despite the fact that it increases total surplus.

c. Firms only in country A, consumers in both countries

Where firms are concentrated but consumers are not, without extraterritoriality, country A will approve activities that increase its own surplus. All global surplus increasing mergers will be approved by country A. Some activities or mergers that reduce total surplus will also be approved by country A, because some of the consumer surplus loss is occurring in country B, which does not have a veto over the merger.

With extraterritoriality, country B will block all mergers that do not reduce its own prices, including mergers that increase global surplus. Thus, only mergers with substantial efficiency gains will be allowed to proceed.

d. Firms and Consumers in both countries

In the general case, with producers and consumers in both countries, each countries attitude toward a potentially anticompetitive activity will depend on the weighting of consumer and producer interests in its own country. Guzman (1998) has analyzed this

general case, both with and without extraterritoriality. Without extraterritoriality, if production and consumption are distributed asymmetrically, then too much merger and other anticompetitive activity will be allowed. This will be less true, the closer the countries come to a symmetric distribution of consumption and production.

With extraterritoriality, Guzman summarizes the result nicely. "A country that can apply its laws extraterritorially will underregulate anticompetitive behaviour if it is a net exporter and overregulate such behaviour if it is a net importer."[5] I have reproduced Guzman's table I below.

TABLE I: THE EFFECT OF TRADE ON ANTITUST POLICY
(WITH EXTRATERRITORIALITY)

Country Characteristics		Percentage of Global Surplus Taken into Account		Policy Result Relative to Optimal Global Policy
Percentage of Global Production of Imperfectly Competitive Goods	Percentage of Global Consumption of Imperfectly Competitive Goods	Producer Surplus	Consumer Surplus	
100	100	100	100	Optimal Regulation
100	0	100	0	Underregulation
0	100	0	100	Overregulation
50	100	50	100	Overregulation
100	50	100	50	Underregulation
x	Y	x	y	If x>y: Underregulation If x<y: Overregulation If x=y: Optimal Regulation

The effect of extraterritoriality is that a country's antitrust policy will be weaker if it cannot apply its laws extraterritorially. Indeed, without extraterritoriality, international antitrust policy will be weaker than the optimal global policy. When countries cannot

[5] Guzman (1998), p1520.

apply their laws extraterritorially, the deviation of national policies from the optimal global policy increases as trade between countries grows. This divergence occurs because, as trade increases, the beneficial effects of regulating anticompetitive activities are felt increasingly by foreign consumers and decreasingly by domestic ones, while the costs of preventing local firms from engaging in similar activities continue to be borne entirely at home.

If every nation can exercise extraterritoriality, the toughest law is the binding law because an inefficient activity imposes a net loss on at least one country, and that country can prevent the activity through extraterritorial application of its antitrust laws. Thus every globally inefficient activity will be prevented, because it will be surplus reducing for at least one country. Some globally efficient activities will also be prevented, however.

Competition Laws with different objectives in different countries

The preceding analysis assumes that competition law in all countries is devoted to the same objective: the maximization of total surplus. The reality is not so harmonious, and Canada and the United States provide an important example of antitrust laws that pursue different objectives, particularly with respect to merger policy.

Up to the recent Federal Court of Appeal decision in *Superior Propane*, it was widely believed that Canada's Competition Act was drafted to allow efficiency gains arising from a merger to play a major role in determining the overall competitive effect. The treatment of efficiency gains arising from a merger in Canada is subject to a great deal of uncertainty at present, arising from the decision of the Competition Tribunal in *Superior Propane* which was remanded by the Federal Court of Appeal. That decision is currently awaiting a decision on leave to appeal to the Supreme Court of Canada. The Competition Tribunal followed a total surplus standard in allowing the merger to proceed, the standard that is most favourable to consideration of efficiency gains likely to arise from a merger. Now that decision has been remanded, one has to be cautious in assigning significant weight to efficiency gains.

In the United States, efficiency gains are accorded only a secondary role in determining the competitive effects of a merger. Recent court decisions, together with guidelines on efficiency issued by the FTC and U.S. Department of Justice, indicate that mergers will be judged on a "price standard", meaning that mergers will only be permitted if they are not expected to raise consumer prices. Following standard theories of oligopoly behaviour, the only way that a merger is likely to lead to lower prices post merger is if substantial efficiency gains accrue as a result of the merger. A range of mergers that increased total surplus, but also were likely to increase consumer prices, would not be allowed under the U.S. guidelines. Interestingly, the Competition Tribunal found the Propane-ICG merger to have precisely these attributes.

Since the Canadian position on efficiencies is especially difficult to perceive at the present time, it is interesting, at least, to analyze the implications of the Canadian position set out in the Merger Enforcement Guidelines, for mergers that have Canada/U.S. cross border ramifications. The effect of extraterritoriality is, in a sense, to give precedence to the country with the "strictest" antitrust policy. Consider then, the net effect on Canada US antitrust policy of the following framework. The U.S. follows a consumer surplus standard and pursues a vigourous extraterritorial application of its antitrust laws. Canada pursues a total surplus standard but does not attempt extraterritorial jurisdiction. The net result would be to completely nullify Canada's total surplus objective, in any mergers or other activities that have cross border implications.

This important proposition can perhaps be best illustrated with some hypothetical examples. Suppose that a major telecommunications equipment maker in Canada were to propose a merger with a major US supplier. The merger is expected to both increase prices, but also to lead to substantial efficiency savings, the net result of which would be a gain in total surplus. Canada's competition policy (prior to the Federal Court of Appeal decision in *Superior Propane*) would permit the merger on the grounds that total surplus would increase. However, the U.S. would block the merger, applying its consumer surplus standard extraterritorially. Note that under these assumptions the U.S. would

block the merger even if it increased total surplus within the U.S., because of the consumer surplus standard.

It is ironic that the US, the nation that has been most active in extraterritorial application of antitrust laws, has one of the "strictest" antitrust frameworks that it wishes to export. In fact, the US would be better off with a "weaker" antitrust framework that uses a total surplus objective, on the condition that the US's trading partners had strict, consumer oriented competition policies themselves. The reason is that a weak framework will benefit US firms, (and increase total surplus) but the US would not choose to exercise its extraterritoriality because the strong consumerist policies of its trading partners would protect US consumers as well from price increases due to anticompetitive activities of their trading partners. Such a configuration would in fact make the US better off than a global policy that maximized total surplus.

As both international trade and merger activity pick up in intensity and more mergers feature a marriage of US companies and non-US companies (see the graph of cross border mergers in the figure below), the importance of US extraterritorial application of its antitrust laws can only increase. In the extreme limiting case, the US will set competition policy for all of its trading partners. The loss of income and efficiency from applying the US consumer surplus standard across all developed countries could be very substantial.

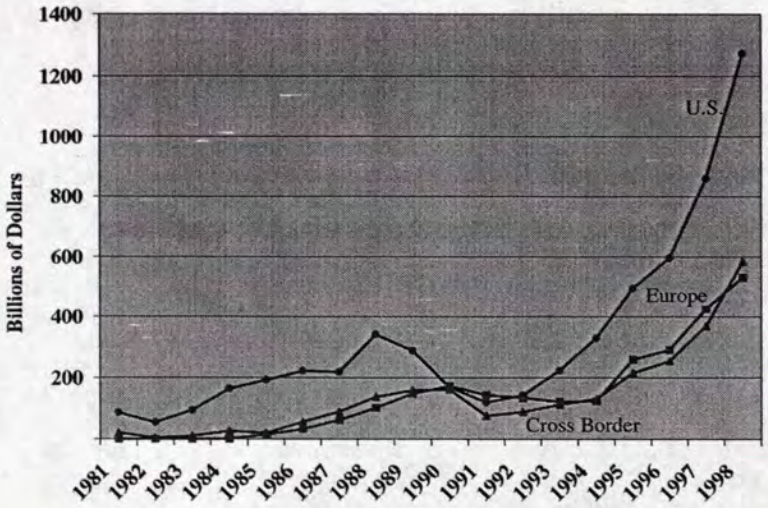


Figure: U.S. and Europe M&A, and Cross-Border M&A (M&A Data provided by Securities Data Corporation)

Extraterritoriality in Practice

The real force of one country's extraterritorial enforcement of its domestic competition laws hit home in 1996 with the planned acquisition of McDonnell Douglas by Boeing. The FTC approved the takeover unconditionally, but three days later the European Union's Antitrust Advisory Committee recommended that the merger be blocked on the grounds that it would harm fair trade. Several US lawmakers were surprised that the EU would attempt to exercise jurisdiction over what appeared to be a merely a merger of two US companies.[6] Although the EU could not actually have blocked the merger, it did have authority to impose multi-billion dollar fines based on 10% of Boeing's world income, given an adverse finding.

Extraterritoriality has also been exerted by the U.S.. In 1996, the FTC required two Swiss pharmaceutical companies that had merged, Ciba-Giegy Ltd. And Sandoz Ltd., to sell off key units of their business and to license a patent to a competitor as a condition for approval of their merger. The FTC reached its decision on the grounds that the merger in

[6] Senator Slate Gorton (R-Washington) put it thus: "I am outraged the Europeans are asserting antitrust authority in an extraterritorial manner where there is no relevance, other than the fact that we sell airplanes in their market."

Switzerland could "quash" domestic competition and thus cause harm to consumers in the United States.

The legal basis of U.S. extraterritorial jurisdiction of its antitrust laws was solidified in the *Hartford Fire* case in 1993.[7] The defendants were largely London, UK based reinsurance companies, who were alleged to have violated the Sherman Act. Both sides agreed, however, that the conduct was legal under UK law, the law applying to the defendant companies. The U.S. Supreme Court held that the Sherman Act did apply to foreign conduct that was unlawful under the Act, and that was meant to have and did have a substantial effect in the United States.

Prior to *Hartford Fire*, the attempt to apply competition laws extraterritorially was largely through the medium of "positive comity", which is a weaker notion than that of full extraterritoriality. When conflicts arise between two or more nations claiming jurisdiction over a matter the doctrine of comity exists for resolving such conflicts. In fact, this notion is enshrined into the U.S./EC Agreement on Antitrust Cooperation of Coordination. Basically, what is says (in Article V) is that U.S. and EU regulators may request the other side to initiate appropriate enforcement activities, if the requesting party believes that its important interests are being adversely affected by anticompetitive practices in the other party's territory.

The problem with the notion of positive comity is that it presupposes that one country will take steps to act in the best interests of another country – an assumption to which an economist would be likely to give exceedingly short shrift! As a result of its inherent implausibility, together with the strong Supreme Court decision in *Hartford Fire*, comity is being superceded by, on the one hand, true extraterritoriality, and on the other hand, bilateral treaties describing the nature of cooperation between two countries on antitrust issues of concern.

[7] 509 U.S. 764 (1993).

One of the model such treaties is the 1995 U.S./Canada agreement on cooperative enforcement of antitrust investigations. The agreement does incorporate comity considerations. If one party believes that its important interests are being adversely affected by anticompetitive activities in the territory of the other party, then a party may request the other party's antitrust authorities to initiate "appropriate enforcement activities." Similar to the U.S./EC Agreement the requested party has full discretion in deciding whether to initiate or proceed with any enforcement activities in accordance with the other party's request.

International Efforts to create a Global Competition Agency

Because of the increasing number of international mergers and other practices with international antitrust ramifications, together with an increasing awareness of the costs imposed by independent investigations by each affected jurisdiction, several parallel groups have instigated talks aimed at setting up global competition agencies. The best known of these is probably the International Competition Policy Advisory Committee (ICPAC), a committee appointed by the U.S. Department of Justice, which issued a report in 2000.

The Global Competition Initiative

The ICPAC report proposed that the US and a number of international organizations collaborate to create a forum where government officials, non-governmental organizations, and private firms can consult on matters concerning competition law and policy. Called the Global Competition Initiative (GCI), its purpose would be to foster a dialogue amongst government officials and other interested parties that covers a broad range of competition policy issues that are relevant to the global economy. It will differ from forums such as WTO trade summits as it will allow member nations to cooperate and enter into policy accords without being bound by international law. The GCI is intended as a place where nations can develop binding agreements, consultations, or non-binding agreements of their own accord.

The scope of the agenda would be quite considerable, and would be driven by the interests of its members and other institutions. Topics of concern might be: to multilateralize and deepen positive comity; to agree upon common consensus disciplines regarding hard-core cartels, merger control laws, appropriate actions of government, and frontier subjects that are global, such as e-commerce; dispute mediation; and even technical services. Simply put, the GCI is an attempt to set the stage at a multinational level for more effective national antitrust enforcement and greater international cooperation.

The structure of the forum would be relatively simple. Membership would attempt to be as inclusive and comprehensive as possible in order to allow for the broadest scope of possible views and opinions. It should be open to developed and developing nations, but also allow non-governmental organizations, NGOs, private firms, and other interested parties to play a valuable role.

Meetings may take place on an annual or semi-annual basis in the form of a set of intergovernmental consultations, similar to the G-7 summits, only less formal. The structure of the model is extremely practical because it demonstrates that nations and interested parties can create a vehicle to exchange views, experiences, and offer advice without investing in a permanent staff or an extensive bureaucracy. Although a great deal of the GCI's analytical and deliberative dimensions are built upon the approaches initiated by the OECD, there is not yet any institution that exists to carry out such a wide range of talks on competition policy matters.

The GCI was proposed as a means to give attention to competition matters that have not received sufficient attention from other international organizations. Although the World Trade Organization (WTO) and the Organization for Economic Cooperation (OECD) are generally concerned with competition policy issues, the scope of their policy coverage is limited.

The WTO is predominantly focused on trade related governmental restraints and does not cover all competition policy issues. Moreover, the issues discussed at the GCI would be done in a consultative manner; hence, the WTO's mandate to negotiate rules that are then subject to dispute settlement would be inappropriate.

The OECD is a very important but limited setting where governments have committed themselves to discussing competition policy. Under the Competition Law and Policy Committee (CLP), as well as within a larger group composed of members of the CLP and the OECD's Trade Committee, competition authorities from the OECD's twenty-nine member nations have conducted very successful studies regarding competition issues. Indeed, the OECD has been extremely effective at promoting soft-convergence of competition policies amongst its members and for providing technical assistance to OECD observers and non-members. However, the OECD has a number of fundamental flaws that make it a poor organization to act as wider forum for policy debate.

Primarily, many nations that have competition policy laws in place or those who are considering incorporating them are not members of the OECD; therefore, they are generally not represented. This is particularly true of developing nations, and their needs may not yet be fully integrated into the OECD's deliberations. Furthermore, the committees have had only limited success in resolving policy disputes. It is important to note that the GCI was not proposed to replace any existing structure that examines competition policy issues, such as the WTO and the OECD. If it is created, the GCI will undoubtedly depend on their support and expertise to become a success. The last forum in which supra-national cooperation on competition issues is being discussed is the FTAA, which will contain a chapter on competition policy.

To a certain extent, meetings such as those envisioned by the GCI exist already. For example, the German competition authority has hosted several meetings of enforcement officials around the world. Similar to the APEC forum, the logic behind the GCI is that it will make such meetings more inclusive and formalize them.

Intellectual Property Issues

As North American economic integration proceeds, the framework for protection of intellectual property in the two countries becomes increasingly important. Since both Canada and the United States have issued *Intellectual Property Enforcement Guidelines*[8] in recent years, it is of interest to note how the two sets of guidelines differ, and whether the differences are based on a tangible variation in either circumstances or objectives.

Intellectual property law and competition law have generally been perceived as being in conflict because, loosely speaking, the former creates monopolies and the latter tries to prevent or destroy them. The views of U.S. courts at least have become more sophisticated over the course of the twentieth century. The Federal Court was able to observe in *Atari Games Corp v. Nintendo of America* "the aims and objectives of patent and antitrust laws may seem, at first glance, wholly at odds. However, the two bodies of law are actually complementary, as both are aimed at encouraging innovation, industry and competition."

The differences in the approach to intellectual property enforcement between the two countries are in fact far less significant than the similarities. Both sets of guidelines emphasize that IP and competition laws are complementary, rather than conflicting; and that intellectual property is much like other kinds of property and should be treated as such for the purpose of investigating infractions of competition law. As Willard Tom put in a recent speech:

> That an inventor may lay claim to the domain marked out by his intellectual property is no more antithetical to antitrust than that a firm lays claim to its factory.....
> ....Recognizing the degree to which intellectual property is like other forms of property for antitrust purposes helps us to recognize that the two bodies of law, far from being inevitably conflicting, are instead complementary ways of achieving a common goal. Competition is a spur

[8] United States Department of Justice and Federal Trade Commission, *Antitrust Guidelines for the Licensing of Intellectual Property* and Competition Bureau, *Intellectual Property Enforcement Guidelines* (Industry Canada, 2000).

> to innovation and a way to spread the benefits of innovation to the consumer; intellectual property helps the inventor reap the rewards of innovation and thereby preserves the incentive to innovate.[9]

The IPEGs draw a fundamental distinction between conduct that constitutes the mere exercise of IP rights (which generally will not be challenged) and conduct which extends beyond such rights (which will be subject to the general provisions of the *Competition Act*). The distinction is not always clear – the IPEGs state for example that refusals to license are an inherent IP right, yet they have been attacked in two recent competition law cases in Canada, *Tele-Direct* and *Warner*.

The differences between U.S. and Canadian interpretation of intellectual property with respect to competition law are likely to emerge in this area of licensing, if new cases are brought, particularly in Canada, to clarify the enforcement position. The U.S. has a "misuse" doctrine in patent law that can remove IP rights altogether if the holder is found to be using them to violate antitrust law. There is no such doctrine in Canada, but Section 32 of the *Competition Act* empowers the Federal Court, upon application by the Attorney General on behalf of the Bureau, to make a wide range of orders affecting IP rights where the rights holders has engaged in certain types of conduct that are likely to lessen competition "unduly". However, despite the fact that this "special IP remedy" predates even the 1986 *Competition Act*, it has never been the subject of a judicial decision on the merits and only a couple of cases have progressed to a settlement. The IPEGs spell out demanding conditions that would have to be met before section 32 would be used. The likely implication of these conditions is that the section would only be applied in an "essential facility" situation.

IP rules that discriminate against Canadian Companies

The US continues to distinguish its patent law from most of the developed world with a "first to invent" requirement for a patent, in contrast with the "first to file" rule employed

[9] W.K. Tom, "Licensing and Antitrust: Common Goals and Uncommon Problems", address to the American Conference Institute, 9th National Conference on Licensing Intellectual Property, October 12, 1998 (available at www.ftc.gov/speeches/other/aciippub.html).

in Canada and most OECD nations.[10] Prior to the NAFTA agreement, a date of invention for a US patent could only be established in the United States, which clearly discriminated against Canadian companies wishing to register US patents for their inventions. However, the amended section 104 now states that (if an invention is made in a NAFTA country) "that person shall be entitled to the same rights of priority in the United States with respect to such invention as if such invention had been made in the United States.."

Section 204 of the U.S. Patent Act is headed "Preference for United States industry" and essentially states that a holder of a U.S. patent can only assign exclusive rights to use that patent to a company that will manufacture the product in the United States. I have not been able to find out to what extent this section acts as an impediment to Canadian companies. However, the section begins by restricting itself to "small business firms" and "nonprofit organizations" which would seem to preclude any major established Canadian company.

Another piece of legislation designed to enhance the competitiveness of US firms relative to their non-US counterparts is the the National Cooperative Research and Production Act of 1993. The legislation was a response to a widespread belief that antitrust fears had inhibited businesses from forming joint ventures and that as a result U.S. firms were not keeping up with foreign competition. The Act mandates rule of reason treatment for any activities falling within the statutory definition, and sets out a new standard for application of the rule of reason to statutory joint ventures. There is little available evidence on whether the act has been successful in its aims.[11] However, there is no restriction on Canadian or other foreign firms registering a joint venture under the Act, providing that at least one of the participants is a US firm. Whatever the net effect of the Act has been, it seems unlikely that it has served to discriminate against Canadian companies wanting to form joint ventures with US counterparts.

---

[10] A pioneering discussion of the economic implications of this difference in patent law is Scotchmer and Green (1990).

[11] Dougherty (1999) provides a comprehensive discussion of the NCRPA.

Conclusion

We have discussed several issues with relevance to Canada that concern multijurisdictional application of competition policies and intellectual property. A notable conclusion in the area of competition policy is that the assertion of extraterritoriality in the application of US antitrust law does diminish the ability of Canada to pursue an independent competition policy of its own.

Although suggestions have been made that US intellectual property law discriminates against Canadian companies in several ways, I have found little evidence, either in the statutes or their application, to suggest that this is the case.

Bibliography

Guzman, A. 1998. "Is International Antitrust Possible?" *New York University Law Review*, 73:1501-1548.

Dougherty, V. 1999. "Antitrust advantages to joint ventures under the National Cooperative Research and Production Act." *Antitrust Bulletin*. 44: 1007.

Head, K. and J. Ries. 1997. "International mergers and welfare under decentralized competition policy." *Canadian Journal of Economics*. XXX: 1104-1123.

McFetridge, D. "Globalization and Competition Policy," in *Productivity Growth and Canada's International Competitiveness*. Edited by T.J. Courchene and D.D. Purvis. Kingston: John Deutsch Institute, 1992, pp. 133-80.

Peck, B. 1998. "Extraterritorial Application of Antitrust Laws and the U.S.-EU Dispute over the Boeing and McDonnell Douglas Merger: From Comity to Conflict? An Argument for a Binding International Agreement on Antitrust Enforcement and Dispute Resolution." *San Diego Law Review*, 35: 1163-1200.

Porter, M.E. *The Competitive Advantage of Nations*. New York: MacMillan, 1990.

Scotchmer, S. and J. Green. 1990. "Novelty and Disclosure in Patent Law." *Rand Journal of Economics*. 21: 131-146.

Notes Catherine Moore

Advocates WTO Tax Agreement (first simplify, then apply technology) (to advertisers)

Goal: compatibility – not harmonization (→ EU)

Steven Oldersma

Does not share enthusiasm for the 'revolution' ≠ internet.
Most important effect = lower transaction cost
Value in harmonizing / simplifying taxes, but ≠ ≠ internet

Total Surplus invites many bad mergers
↳ includes efficiency defence | ∴ US std is better.
Culture: US sees it as misappropriation of I.P. Δ in perspectives will make this difficult to harmonize.

20

Y. ↳ efficiency defence: on books for 15 yrs; used once
proposal: move it out of §96 defence into §92-factor
re IP licensing Anti-Trust: Kodak Guidelines had to include access ← §32 (refusal to deal)
Major Δ: in US, ≠ in Constitution → trump
Should Agency intervene – but comm standards possible.

Can NAFTA

Forge A Global Approach to Internet Governance?

Catherine L. Mann
Institute for International Economics
CLMann@IIE.com

Draft 2: June 14, 2001

ABSTRACT: How will national approaches toward taxation and personal information, fare in the increasingly global, technologically dynamic, information-rich, and network-based Internet marketplace? How policymakers respond to the tensions between national jurisdiction and international transactions will materially affect whether individuals, firms, and countries will benefit from the potential of the Internet marketplace. Building on the NAFTA relationship, can the United States, Canada, and Mexico forge an international approach to Internet governance that could be a model for the world?

Prepared under contract no. U5100-0-0206 on behalf of Industry Canada, Microeconomic Policy.

Catherine L. Mann, Senior Fellow[1]

June 14, 2001

Introduction

Economic activity via the Internet is complex and it bundles globally-sourced goods, services, and information. In contrast, the jurisdictions of government remain national at best. Policies choices by one nation increasingly will impinge upon policy choices made by another nation. How do the NAFTA partners differ in their approaches to Internet policy issues, and can they forge an international approach to reduce conflict and increase benefits with expanded use of the Internet? If the NAFTA partners—with their differing relationships between governments, citizens, and business, and varied level of Internet access and level of development—can find an interoperable approach, it could be an important model for global Internet governance.

This paper addresses two policy areas that are particularly affected by the tension between global marketplace and national jurisdictions: domestic and cross-border taxation (for which the classification of transactions and method of raising revenues are important) and the issue of the Internet and information (where the modalities of protecting personal data are important).

Right now, the NAFTA partners are focusing on establishing approaches and legislation attuned to the domestic arena; there is relatively little attention being paid to the cross-border implications of these efforts. So far, this approach to Internet governance of "live-and-let-live" works because of existing cooperation arrangements and bilateral agreements (as well as shared experiences in various international Internet and e-commerce working groups under APEC, FTAA, OECD and the WTO). However, the increasing economic integration of these three economies coming from CUSFTA and NAFTA demands more explicit development of interoperable approaches. Policymakers should take up the challenge now to forge an NAFTA approach rather than focus only on the domestic arena. It may be easier than you think!

Internet Transactions and Tax Regimes

"Death and taxes (or the death of taxes?) ..." It should come as no surprise that the question of how the Internet and electronic commerce will affect taxes has received such early and intense policy attention.[2] Policymakers are concerned about the potential

[1] Diana Orejas researched the sections on Mexico and Canada.

[2] Among international organizations, the OECD membership, in conjunction with non-member governments and private sector groups representing business and tax accountants, has been analyzing since 1997 how electronic commerce might impact international and domestic taxes. The outcome of that effort was the "Tax Framework Conditions" which reaffirms five key principles that guide governments generally in the application of taxes within the overall regime: neutrality, efficiency, certainty and simplicity,

erosion of their tax revenue.[3] Firms and businesses want to know how much they need to pay and to whom. Consequently, most analyses of e-commerce and tax tend to focus on the specifics of how to administer *existing* regimes in the changing environment.[4] However, e-commerce and the Internet challenge tax regimes that depend on knowing the "who, what, and where" of transactions. Therefore, tax policymakers should be asking, "How should tax regimes evolve in the face of the Internet?"

There are two main forms of raising tax revenues: direct and indirect tax regimes. The Internet challenges them both, but in different ways. For indirect taxes, the issue is how to apply sales and value-added taxes when tax treatment of goods and services differs, where transmission is via electronic channels, and when transactions cross borders (all of which make tracing the "who, what, and where" increasingly difficult). For direct taxes the issues are how e-commerce activities should be treated and income apportioned under the rules of permanent establishment, as well as the equity of taxing capital vs. labor earnings.[5]

Taxes and Tax Systems In The NAFTA Partners

The three NAFTA partners differ in their dependence on direct and indirect taxes for government revenues, in the administrative complexity of the systems, and on the degree of compliance. Only the US has directly considered the impact of Internet transactions on its tax system. While none of the countries has considered the international implications of Internet transactions on taxes, all of them continue to abide by the moratorium on tariffs on Internet transactions. It is only in this latter respect that the countries have considered the international implications of e-commerce transactions. While bilateral tax arrangements exist, the NAFTA partners should work on a NAFTA-basis agreement for apportioning taxes earned on cross-border sales and on income earned.

---

effectiveness and fairness, and flexibility. See http://www.oecd.org//daf/fa/e_com/e_com.htm#top_e_commerce.

[3] Efforts to measure the potential loss of tax revenue are difficult because of dynamic response. For the US, Austan Goolsbee and John Zittrain, "Evaluating the Costs and Benefits of Taxing Internet Commerce," *National Tax Journal*, vol 52 no. 3, September 1999, pp 413-428 calculate a loss over the next few years of less than 2 percent of sales tax revenues. For the full range of countries around the world, Susan Teltscher, "Revenue Implications of Electronic Commerce: Issues of Interest to Developing Countries," mimeo, UNCTAD, April 2000, also finds loss of tax revenues of less than 1 percent overall, although the figure is higher for some countries.

[4] See *International Tax Review*, September 1999 for a review of how the following countries and regions are addressing interpreting existing tax law for electronic commerce: Australian and New Zealand, Canada, Germany, India, Ireland, Israel, Japan, Latin America, the Netherlands, Singapore, South Africa, United Kingdom. See also the June 2001 OECD organized conference, "Tax Administration in a Networked World," http://www.ae-tax.ca

[5] See The OECD Model Tax Convention, which is a blueprint that many countries have used as a framework for bilateral tax treaties. It apportions tax responsibility and revenue so as to avoid double taxation of income earned through foreign investment. An overview is available at <http://www.oecd.org//daf/fa/treaties/treaty.htm>. See also: <http://www.oecd.org//daf/fa/material/mat_07.htm#material_Model> for the most recent information on the articles of the model convention.

In the US states, the federal government raises 60 percent of its revenues from individual income taxes and about 10 percent from corporate income taxes; there is no federal sales or value-added tax. States, on average, raise 25 percent of revenues from sales taxes, 20 percent from property taxes, 15 percent from individual income taxes, and the rest is raised through miscellaneous tax and user charges. For the state sales taxes, the final user (usually at the retail level) pays the taxes, which are applied principally on tangible property (with exceptions) and usually not on services. Business inputs generally are exempt from tax. The administrative burden of the sales tax system comes principally from the 30,000 different tax rates applicable depending on location. Tax ignorance, as opposed to tax avoidance or evasion, is a real issue.

Like the US, most of Canada's federal tax revenue comes from income taxes. But there is a federal level consumption tax that accounts for somewhat less than 20 percent of revenue. This Goods and Services Tax (GST) of 7 percent, is collected on the sale of most goods and services in Canada, is levied on all taxable imports, but is zero on exports. Basic groceries, agricultural products, prescription drugs and medical devices have a zero-rate GST. Also exempted are health and medical services, tolls, education, and financial services. Foreign-based organizations providing services in Canada must register for the GST in order to claim input tax credits. This federal set of taxes is augmented at the provincial level, with the Provincial Sales Tax (PST) that varies by province and is only payable on imports that are not for resale. Several provinces have an agreement with the federal government to combine the GST and the PST, so the resulting Harmonized Sales Tax (HST) is a 15 percent flat rate.[6]

Whereas in the structure of its tax revenue Mexico appears rather similar to the US and Canada, the success of its tax administration effort is quite different. At the federal level, 40 percent of total tax is raised through income taxes. Like Canada, Mexico has a federal indirect tax, which accounts for 30 percent of total tax revenues. This value-added-tax of 15 percent is applied to all sales of goods and services but with broad and many special exemptions: Food and drugs have a zero rate, the border-regions have a tax rate of only 10 percent, and there are exemptions for entire sectors—land transportation, agriculture and fishing. [7] Thus, the key difference for Mexico is apparently low administrative compliance: Mexico's federal value-added tax revenues amounted to 3.3 percent of GDP; and the income tax only 4.6 percent of GDP. Thus, with a tax to

[6] The HTS applies to Nova Scotia, New Brunswick and Newfoundland.

[7] Exemptions for goods transactions include sales of land; residence buildings—not hotels--; construction materials; books; magazines; certain authors copy rights; currency; shares; credit instruments; sales by non-profits, farmer groups, labor unions or government agencies.
Exemptions for rendered services: services from state and local government, social security institutions, official education, insurance, banking, public entertainment, medical services, public transportation by land –except train—
Imports are subject to the same VAT (the taxable value of tangible goods is the value declared for import duties plus the duties).
Exports: zero rate of VAT. This provides an incentive for exporters since they have the right to the refund VAT charged by others on supplies and services used in the production of exports.
Zero rate goods include food, water, patent medicines, farm equipment and chemicals. International freight and international air passenger service are among the zero rate services.

GDP ratio of just 11.5 percent in 1999 Mexico is well below the average ratio for OECD countries (28 percent). [8]

Recognizing both the complexity and compliance issues, President Fox on April 3, 2001 sent to Congress his fiscal reform initiatives. In order to broaden the tax base he proposed changes on the VAT eliminating exemptions and the zero-rate (although as is common with VAT systems, the zero percent rate would still apply for exports). Additionally, tax payments will be carried out when the disbursement takes place not the sale. [9]

Only the US has explicitly considered the impact of Internet transactions on its tax system. In the US, when the Congress passed the Internet Tax Freedom Act in 1998 (which kept domestic Internet transactions free from any "new" taxes for three years but did not revoke existing sales or use taxes), it mandated review of the implications of electronic commerce for domestic sales taxes. A majority of members of this Gilmore Commission opined[10] that digital products downloaded over the Internet (including software, books, or music) should not be taxed and that, in the interests of tax neutrality, their tangible equivalents also would be tax exempt. Since services to the final consumer often are not taxed in the US, this strategy apparently would classify digital products as services and would "harmonize down" the tax treatment of their tangible equivalent.

One objective of the Commission's proposal was to encourage states and localities to harmonize their own rates and reduce the myriad state and local taxes (some 30,000) which are both administratively cumbersome and encourage tax-strategizing behavior. The National Governors Association is examining how to simply sales and use taxes so as to apply computer technologies to tax administration, although not all states are participating in this study effort. [11] Any implications at the international level were not addressed, since the Commission did not have the mandate to address cross-border issues.

At the international level, all three NAFTA countries are maintaining the moratorium on imposing customs duties on Internet transactions. This moratorium was agreed at the WTO Ministerial in Geneva in May 1998, but its formal continuance remains under debate in some quarters, given the outcome at Seattle in November 1999.[12]

How Do Internet Transactions Stress These Tax Regimes? [13]

[8] See OECD Economic Surveys. Mexico 2000, No. 13. OECD, July 2000

[9] Secretaria de Hacienda y Credito Publico at http://www.shcp.gob.mx

[10] The Commission could not formally recommend a plan of action to Congress, because no super-majority view was reached.

[11] See Streamlined Sales Tax project http://www.nga.org/nga/newsRoom/1,1169,C_PRESS_RELEASE^D_1067,00.html December 22, 2000.

[12] "WTO Agreed on Short-Term Net Tax Ban" CNET News December 2, 1999. "WTO Grapples with Next Steps After Failed Ministerial Meeting" Inside US Trade December 10, 1999

[13] For a more extensive treatment of this issue see Chapter 6 in Global Electronic Commerce: A Policy Primer, IIE:Washington, July 2000 by Mann, Eckert, and Knight.

The indirect tax system used to be simple to administer and audit—thus its popularity. However, over time, indirect taxes have tended to become situation-specific (rather than broad-based) as policymakers try to target specific transactions or users. The Internet fuzzes the "who, where, and what" of the transaction, which makes such targeting more difficult. In particular, since cross-border transactions are growing quickly tax authorities do not have the luxury of considering the domestic environment in isolation.

Maintaining different tax rates for goods and services, for exports and imports, for consumers and businesses, which is evident in all three systems becomes a greater issue with the Internet. Products that once were "goods" are now available in digital form, and need to be classified (such as books, music, software, architectural drawings, radiological images, and so on). Transactions among cross-border strategic alliances make it difficult to determine end-user. How should export or import taxes be levied when sales are digital? All told, inconsistencies in the indirect tax system increasingly will lead to tax-strategizing business and consumer behavior. Thus, despite the trend toward increased prevalence of the GST or VAT in recent years, the pressures of the Internet environment will force countries to re-evaluate their dependence on this regime.

For direct taxes, the key issues are international apportionment of income earned on these transactions. There are two different ways to account for business income earned in a cross-border setting: source-based and residence-based.[14] Because source and residence based taxation schemes must yield double-taxation of some income, bilateral and multilateral tax treaties attempt to allocate income earned to the source and to the residence according to "permanent establishment" and give tax credits to minimize double-taxation.

The Internet facilitates partnerships as well as a movement away from vertical integration representing an income tax challenge. Where profits will be taxed will become an important issue since firms (particularly dot-coms) can easily relocate to jurisdictions where tax laws are more beneficial. Furthermore, new business models such as auctions, reverse auctions, new types of intermediaries, and virtual communities raise additional tax issues and make difficult to distinguish sellers from intermediaries.

Permanent establishment is difficult to define for e-commerce transactions.[15] For information-rich and network-based production, physical presence is much less important for value-creation (consider software code). Moreover, mobility of information-based firms further undermines physical presence as well as calls into question the

[14] As a general statement, income earned by US firms and individuals is taxed at US rates regardless of where the income was earned—so-called "residence" based taxation. Other countries, particularly developing countries, tax income earned by non-resident firms operating in the country—so-called "source" based taxation. See Ned Maguire, "Taxation of E-commerce: An Overview," International Tax Review, pp 3-12.

[15] The definition of a permanent establishment rests on two foundations: fixed place of businesses or physical presence and dependent agents who, among other activities, must be able to conclude contracts on behalf of the corporation as a normal course of business. The OECD Fiscal Affairs recently agreed that a web-site did not constitute a permanent establishment... (get cite).

characterization of dependent agents. Finally, the complexity of Internet marketplaces (consider the examples of virtual auctions and exchanges for business-to-business transactions) challenges the notion that there is a single "head" to the organization which could help define either permanent establishment or dependent agent. Consequently, the allocation of income to different governmental jurisdictions will be increasingly difficult. The threat of double taxation increases, along with the incentives for non-compliance. The pressure will be to reduce capital income tax rates.

These observations lead us to examine the third significant source for raising tax revenues: individual income. Among the sources of income to tax, individual income probably remains the least affected by the Internet and electronic commerce. Labor, by and large, remains within the same political jurisdiction as the tax authority—which supports the notion of taxation *with* representation.[16] Firms keep close track of how much they pay workers, even in the Internet markets; so, labor income can be taxed using methods including reporting, audit, or declaration and then apportioned to countries depending on where the value was added. Therefore, from an administrative standpoint, taxation individual income represents the fewest number of transactions to trace, probably the most carefully documented set of transactions, and the factor of production least prone (or allowed) to move in response to tax differences—exactly the recipe for an efficient tax regime.

The questions of fairness inevitably arises when labor income is taxed relatively more than capital income and evasion of labor and capital income taxation is one reason for choosing the VAT or GST systems. Moreover, tax systems often are used to redistribute income across geography as well as class. These issues remain. But the reduced ability to tax value-added, transactions, or corporations raises the stakes on finding appropriate answers and charting a course towards changing tax regimes to reflect the realities of the global and networked production-space and marketplace.

Toward a NAFTA Tax Agreement

Right now, there is no NAFTA agreement on tax issues; rather these issues are addressed in a bilateral manner. Canada and the US have had an income tax treaty since the 1980s. Changes to the treaty were proposed in September 2000 to clarify the issue of residence status of corporations and avoid double taxation. Mexico and the US signed an income tax treaty in September 1992 to avoid double taxation on income and provide limits on the taxation at the source of royalties, dividends and interest.[17] With respect to taxation of Internet transactions, there are no explicit North American bilateral or multilateral agreements, but there is ample cooperation and discussion among customs and tax officials in the three countries.[18]

---

[16] This is not to say that labor cannot move; but it is relatively less mobile than firms, particularly at the margin of electronic commerce.

[17] See http://www.mac.doc.gov/nafta/8504.htm (4/11/01)

[18] At a conference in Washington DC on April 30, 2001, the Mexican Finance Minister confirmed that there is ample cooperation between Mexican and US officials but that such cooperation has been more difficult lately given the change in US Administration and the delays in Treasury Department appointments.

The NAFTA partners should move beyond cooperation and discussion to create an explicit trilateral tax agreement. Each country will be able to maintain a system based on a combination of direct and indirect taxes that will meet their redistributive preferences, although the pressure will increase to focus taxation on the bigger targets (income not transactions) and at the ultimate source of value (people not firms). The foundation for tax apportionment among the member countries already exists in the rules of origin agreements, in the customs and tariff preferences and draw-back procedures. Achieving a trilateral tax agreement will deepen the integration of NAFTA by raising tax efficiency even as each of the partners retains the individual flavor of its relationship between government and citizenry.

The Internet and Personal Information

Data collection on the Internet is pervasive and valuable. Electronic commerce "cookies" and "bugs" track, collect, and compile personal information, which allow the creation and combination of data banks of personal information and preferences. There is a tension between collectors of information (firms as information aggregators) and providers of information (individual business or consumers).

Industry aggregators highly value the collection of information because it can sell the aggregate. Firms want aggregate information and individual information produce uniquely tailored products. Concerned individual consumers and businesses face an undesirable choice: Use the Internet, but be fearful that the information provided online as individuals may be used inappropriately; or don't use the Internet and lose the benefits of this new medium for information and exchange. There is a spectrum of businesses, consumers, and information, meaning that the proper balance between users and providers of information is multi-dimensional.

Is there a role for policy intervention to balance these rights—the rights of individuals to protect their personal information against those who want it to create new products and services? Are policymakers in the NAFTA countries weighting the various parties the same way and choosing the same approach to intervention? Not only is the balancing of these rights difficult, but different governments see their role (and citizens see their governments' role) in the balancing act differently.

Treatment of personal information by the NAFTA partners

The US privacy landscape appears wild and unruly—unlike that of the rest of the world. Most countries that protect privacy through national regulation, including Canada and Mexico, have opted for comprehensive data protection laws. These laws establish government data protection agencies, require registration of databases, and call for institutions to seek consent before processing personal data. However, the NAFTA partners may be more similar than appears. The manner in which the government agencies implement and enforce the environment has yielded a similarity in outcomes, which bodes well for achieving a clearly stated set of principles and approach for NAFTA as a whole.

The US approach to protecting personal information relies on a mix of legislation, self-regulation, and regulatory enforcement. In terms of legislation, there are around 600 federal and state laws addressing the confidentiality of personal information within the US. These laws take the form of sectoral protections (such as for financial information) that, when combined with self-regulatory provisions and case law, loosely cover American citizens' bank records, cable television subscriptions, children's online activities, credit reports, video rental records, library loans, medical records, tax records, and telephone services. [19] And the number of privacy laws is increasing. In 2000, US state legislatures debated approximately 4,000 legislative privacy proposals, resulting in over 300 new laws. Furthermore, two federal laws were passed that include privacy protections for financial and medical information and omnibus privacy legislation was considered by the 2001 US Congress.[20]

A hallmark of the US approach is innovation and self-regulatory commitments that are backed-up by oversight and enforcement. Innovative approaches to protecting information in a way that the user controls are emanating from both individual firms and standards groups. Widely available and inexpensive software programs such as Junkbusters and Anonymizer permit users to block sites from sending cookies. The Platform for Privacy Preferences[21] is browser-embedded software that will allow users specify the types of information they are willing to divulge, as well as whether such information can be shared with third parties.

In terms of self-regulation, organizations such as BBB*Online* and TRUSTe provide guidelines as well as an enforcement mechanism through the use of Web-site privacy seals. Such seals are awarded to companies meeting certain rigorous standards, such as a satisfactory complaint record, and the posting of privacy policies that meet the standards of notice, disclosure, choice, consent, and security. Codes of conduct, such as BBB*Online*'s Code of Online Business Practices and BBB*Online* Privacy Programs provide merchants with guidelines to implement and abide by.

These self-regulatory efforts are being backed-up by oversight and enforcement both by private sector interest groups (e.g. Electronic Privacy Information Center, EPIC) and by government agencies. The Federal Trade Commission (FTC) has considered several cases (e.g., DoubleClick/Abacus, eToys, Amazon, and others) where questionable data protection practices have emerged. In some cases, the onslaught of publicity by privacy groups or just the threat of FTC consideration has changed the behavior of firms; but not always.

In Canada, personal information is protected by both federal legislation and provincial and territorial legislation. For some time now, privacy legislation at the provincial level[22] has covered the collection, use and disclosure of personal information

[19] Also, there is specific legislation to restrict certain practices such as unauthorized use of IDs and passwords—more a fraud issue than a privacy issue.
[20] See Alexander Fowler at http://www.aaas.org/spp/dspp/sfrl/per/per24.htm
[21] P3P developed by the World Wide Web Consortium—W3C—an international academic and industry body devoted to applications, engineering-standard setting and research.
[22] Except PEI and Newfoundland.

held by *government* agencies. Since 1994, comprehensive privacy legislation in Quebec has also covered personal information in the provincially-regulated *private* sector. The legislation provides Canadians with a general right to access and correct their personal information and provide oversight through an independent commissioner authorized to receive and investigate complaints.

Comprehensive privacy legislation was passed in April 2000. Bill C-6 (Personal Information and Electronic Documents Act) lists 10 principles for fair information practices (accountability; identifying purposes; consent; limiting collection; limiting use, disclosure and retention; accuracy; safeguards; openness; individual access and; challenging compliance). The Act states that any covered organization must obtain an individual's consent to collect, use, or disclose any collected personal information. Individuals have a right to access the information held on them by organizations, challenge its accuracy and request it be held private. Personal information includes name, age, opinions, evaluations, comments, "intentions," dispute records (such as complaints to a business) and loan or credit records. The Act will enter into force in three stages. [23]

The first two phases cover federal transactions. In January 2001, the Act will apply to personal information about customers or employees (except "personal health information," which will be covered from January 2002[24]) that is collected, used or disclosed by "federal works, undertakings or businesses" in the course of commercial activities. Federal works, undertakings and businesses include organizations such as the banks, telephone companies, cable television and broadcasting companies, firms engaged in interprovincial transportation, and air carriers. The Act will also apply to personal information that is shared or disclosed for profit or any kind of benefit across the borders of Canada or a province, where the information itself is the subject of the transaction.[25]

By January 2004, the law will cover the collection, use or disclosure of personal information in the course of any *commercial* activity within a province, including provincially regulated enterprises such as retail stores. The Act will apply to all personal information in all inter-provincial and international transactions by all organizations in the course of their commercial activities. The federal government may exempt

---

[23] This section with information from http://www.privcom.gc.ca/information/guide_e.asp?V=print http://www.privcom.gc.ca/legislation http://www.e-com.ic.gc.ca/english/privacy/632d30.html

[24] Health Canada is coordinating a federal/provincial/territorial working group, the Protection of Personal Health Information Working Group, to develop a Harmonization Resolution for the treatment of personal health information in Canada. While not legally binding, this resolution would set voluntary principles for the protection of personal health information across Canada in the public and private sector. Some Canadian jurisdictions already have legislation to deal specifically with the collection, use and disclosure of personal health information by provincial health care organizations and other approved individuals and agencies. (Alberta, Ontario, Saskatchewan and Manitoba have such legislation. To date, only Manitoba's Personal Health Information Act is in force.)

[25] Additionally it will cover all businesses and organizations engaged in commercial activity in Yukon, the Northwest Territories and Nunavut.

organizations and/or activities in provinces that have their own privacy laws that are substantially similar to the federal law. [26]

The Bill does not require companies to obtain explicit consent: "consent can be either express or implied".[27] It does not apply when organizations use personal information for journalistic, artistic and literary purposes, or personal and domestic purposes. Bill C-6 does not define what constitutes "sensitive data" nor does it prohibit the collection of such data. The Act also lists several specific situations where personal information (including data that can be considered sensitive in Europe) may be collected, used or disclosed without the knowledge or consent of the individual. There is no prohibition on the collection of sensitive data. However, it requires organizations to take into account the sensitivity of the information in determining the form of the consent sought for its collection, and recommends that an organization "should" generally seek express consent when the information is likely to be considered sensitive. It does require that more sensitive information be safeguarded by a higher level of protection.

Industry Canada is the guardian of the interpretation of the legislation. Use and disclosure of personal information without the knowledge or consent of the individual is regulated by Industry Canada which limits the secondary uses of the data and provides sufficient and adequate safeguards for this type of data. [28]

Mexico has not yet passed any comprehensive new legislation regarding privacy issues but has amended existing regulations to address the challenges of information sharing on the Internet. A new chapter in the Mexican Consumer Protection Law (Ley Federal de Proteccion al Consumidor) includes provisions for transactions made through electronic media, optic media or other new technologies. The provisions address the issue of confidentiality of information provided by consumers.

Suppliers of services must: Use information provided by consumers in strict confidence. Transmit such information to third parties only with explicit authorization of consumer or by legal order. Use appropriate technology to ensure safety of consumer information. Provide the consumer with information about where and how to make a claim or find additional information on a product. Avoid commercial practices that could mislead or confuse consumers about the goods/services offered. Provide necessary

---

[26] There are other laws that contain provisions to protect privacy of Canadians. The federal Bank Act regulates the use and disclosure of personal financial information by federally regulated financial institutions. Similarly, provincial statutes regulate the activities of financial institutions, such as credit unions and insurance companies. Additionally, consumer protection laws at federal and provincial levels offer limited protections and remedies against illegal and unethical business practices that may constitute an infringement of privacy.

[27] See Canada's Privacy Commissioner "Guide for Businesses and Organizations to Canada's Personal Information Protection and Electronic Documents Act" page 5. At http://www.privcom.gc.ca/information/guide_e.asp?V=Print

[28] See "The adequacy of the Canadian Personal Information and Electronics Documents Act" http://www.europa.eu.int/comm/internal_market/en/media/dataprot/wpdocs/index.htm

warnings of unsuitable content for vulnerable population groups (children, elderly and sick people).[29]

With respect to government activities, the Mexican Penal Code protects against the disclosure of personal information held by government agencies. The law prohibits electronic surveillance in cases of electoral, civil, commercial, labor, or administrative matters and expands protection against unauthorized surveillance to cover all private means of communications, not merely telephone calls. Additionally, messages sent by Internet have the same protection in Mexico than communications sent by mail. Furthermore, Mexican Constitution and Federal Criminal Law punish with 3 to 180 labor community journeys the unauthorized opening of correspondence and any other kind of writing materials.

Are there Economic Theories of Protecting Personal Information? [30]

The flow of information is important for economic development and key for an efficient functioning of some sectors of the economy. Information flows have greatly increased in recent years and will grow further with the spread of the Internet. While posing new regulatory challenges and opening new opportunities for abuse, electronic exchanges of information present a unique opportunity for economic growth and integration. As new national, regional and local regulations are developed to address the challenges posed by the Internet, conflicting regulation could impose restrictions on data exchanges reducing the potential benefits of the new technologies and causing disruption in important sectors of the economy.

There are two approaches that policymakers can take to try to achieve the proper balance of rights and make sure that the spillover inherent in the collection of information is internalized by the information aggregators. Policymakers can mandate a comprehensive approach for how information aggregators will treat data. Or, they can focus on creating incentives for innovative effort so that aggregators improve the range of choices on whether and how data are collected, compiled, and cross-referenced. Which better balances the rights of aggregators of personal information with individual rights?

The economic theory of the second best shows that the market and mandate solutions cannot be ranked as to which one comes closer to achieving the highest levels of economic well-being for a *country* as a whole. And in neither case are all *individual* demands met.

On the one hand, because there are many users and few aggregators, the market approach is likely to yield an incomplete set of "information-use" policies. So, the privacy preferences of each unique user may not be met. What are the consequences? Consider a business example. Suppose a firm worries so much about revealing strategic business information by participating in a B2B marketplace that it refuses to participate;

[29] See http://www.natlaw.com/ecommerce/docs/e-commerce-initiative-mexico.htm (4/23/01)

[30] For a more extensive discussion of the economics of protecting personal information, see pp 37-41 in Global Electronic Commerce: A Policy Primer, op cit and (Rome and Georgetown papers—citations).

the benefits from having such an exchange would be reduced by having fewer players. More generally, the value of the Internet derives from its participants, and increases exponentially with the number of users. So the fear of participating that prevents its use exponentially reduces the benefits of the Internet to both individuals and to society.

On the other hand, the mandate solution is a sort of "one-size-fits-all" policy that assumes that each person or business has the same preference over revealing information as is spelled-out in the mandate. Because people and businesses are not all alike in their attitudes toward privacy, some specific preferences will not be met. In this case, those left out probably would be willing to disclose more information to get more tailored products and services. So, with a mandate policy some buyers and sellers won't bother to log-on. As in the case above, the value of the Internet is reduced exponentially by the lower level of participation.

We can't really tell which policy approach will result in the greater number of unhappy users and this is why we can't rank the alternative policies in terms of their impact on efficiency or society's well-being. So, what is the difference between the two approaches?

So, what is the difference between the market and the mandate approach to policy intervention? Under the market approach, firms continue to face incentives to try to satisfy individuals' privacy demands, particularly if those demands are effectively communicated to the aggregators and are backed by government enforcement. The incentives come in part from the very network benefits that are being lost if the privacy policy is insufficient and users defect. In contrast under the mandate approach, the private sector has fewer incentives to innovate to resolve market imperfections (since there are common rules for all to follow) and the enforcement issues remain. In such a technologically dynamic environment, retaining the incentive for private sector response is crucial. This calls into question a strict rules-based environment.

Toward A NAFTA Framework for Data Protection

The challenge of international privacy legislation is to protect from misuse of information while preventing interruptions in international flows of data. The NAFTA partners appear to be taking very different approaches to regulating privacy: Canada has opted for new comprehensive legislation while the US relies heavily on self-regulation. Mexico is struggling with basic protections, but the wording of its new law is quite strict.

How different are these approaches in fact? A key observation is that Canadian legislation, while comprehensive, is actually quite open to the self-regulatory/agency enforcement model currently being followed by the United States. The language on "explicit consent" and role for Industry Canada put Canadian practice into the model of self-regulation backed-up by private sector and FTC enforcement. Mexico's strict language not-with-standing, the three countries, in fact, are not that far apart in practice.

Moreover, while there is not a common NAFTA approach yet, there are regular contacts between the regulating authorities of the three countries (see USDOC for more details) furthering consultation and practical ties that will form the foundation for a

NAFTA framework for the protection of personal data. In the end, the increasing economic integration in North America will be the market incentive that will lead to a set of privacy solutions to meet the needs of the differing populations.

What will the NAFTA privacy framework look like? It will keep the national legislation as is. But the private sector will have the incentives to continue to innovate privacy solutions to meet the needs of the differing populations in the NAFTA marketplace. This market-driven set of innovations will be backed-up by federal enforcement by Industry Canada, the FTC, and their Mexican counterpart. These three agencies will work more closely together to create a common environment of oversight and enforcement.

One model for this arrangement is the positive comity agreements. When more than one country has the authority to investigate, a positive comity referral makes sure the officials closest to the problem take charge avoiding duplicative efforts. Canada and the US have advanced cooperation schemes in competition law, each country has its laws but they are compatible enough to allow for coordination of procedures.

Conclusion: A NAFTA Approach? Yes. A Global Approach? No.

Tax regimes and personal information are two areas where there are potential conflicts between national jurisdiction of policy and the economics of the Internet marketplace. Policymakers must recognize the demands of their constituents (the voters). But in this fast-paced technologically dynamic environment they must avoid predetermining solutions or codifying exclusionary rules. The key is to create incentives for the private sector to help manage the differences between individuals and businesses and the problems of cross-border jurisdictional overlap. Because the private sector reaps the rewards from network benefits as well as niche markets, it will seek interoperable approaches to solve the problems of spillovers and jurisdictional overlap. Interoperable policies allow national policies to reflect differences in national attitudes yet also allow the network benefits of the global marketplace to shine through. Imposing tight rules and mandates runs the risk of locking in sub-optimal solutions. However, to make sure that the market works towards these goals, policymakers along with private sector representatives must backstop private sector efforts with oversight and enforcement.

In all three countries new regulations are being developed to deal with the new economic reality of the Internet. Because of the economic integration and the NAFTA institutional structure, there is substantial on-going interchange between businesses and between government personnel. As a result, domestic legislation while not homogeneous it is not confrontational. Right now, problems arising from differences are addressed through bilateral agreements, discussions, and cooperation arrangements. The three countries should build on these working relationships to create a NAFTA Tax Agreement and a NAFTA Framework for Data Protection.

Could these NAFTA models be "exported" to the rest of the world? Canada and the United States closely resemble each other in their economic systems and living

standards, although they differ substantially in terms of how citizens perceive the role of the government. Mexico differs both politically and economically. How these countries are more similar that it might appear at first blush is in their attitudes toward the role for the private sector as leader, and government sector as backstopper. The key issue for whether a NAFTA Tax Agreement or a NAFTA Framework for Data Protection are exportable is not economic integration, level of development, or "trust" in government, but rather whether there is workable respect to achieve common goals in the relationship between private and public sectors.

Andrew Sharpe — 17 papers 4 Panelists 3 lunch/dinner speakers

Thematic Overview : 9 Issues

1. motivation for NAL
2. desirable?
3. disconnect ec/non-ec
4. role of Mexico
5. for. dir. inv.
6. FTA — expo
7. multilat vs reg'l
8. ec & soc convergence
9. primacy of Can identity

(1) Why are we interested in NAL?

Harder: most important issue. AS thought: E&L, Health, Ed, ...
policy
V. Dobson: closer integration is not much off for prod'y ? Ok if = means to an end ?

(2) Desirable?

Dunn: neg. interpretation; see also BCNI (HQ losses); Ch. 11
"Deeper integration" will not build a large constituency

(3) Disconnect:

Norrie: econ ts enthusiastic; others less or not
Why: don't understand? too narrow a calculus?
e.g. no disc. here on labour standards.
Ways to bridge the gap

(4) Role of Mexico largely lacking at this Conference. National, but must make effort to develop bilateral relation.

Cont'd on verso page

(5) F.D.I.

Harrison: concern re falling share of E coming from outside N-Am.
-- Paper: large influx in US by small # of countries explains it.
Welfare implications: FDI has + externalities
but: largely driven by M&A eg.

(6) FTA impact on exports (IC paper)

9% of incr. in exports due to FTA
discussants were sceptical of the result — needs more work
more useful: export share. 1991: 25%
2000: 45%

(7) Multilateral vs. Regional

premise issue — trade diversion
impressed by Stern's results of 1/3 tariff reduction —
for more impact from multilateral than regional.
but: slow. Can you do both I mean firm?
resource issue; but given choice, should go multilateral
(for ec-p-o-v)

(8) Impact of integration on convergence

- ∃ convergence on tax
- social: that convergence, both fact & pref.
  even where there was convergence, may not be due to Trade.
- envir: no race to bottom -- opposite, in fact: high
  EQ may attract investment

(9) Primacy of Can identity

Fgroves: 70% of Cdns say this is important.
N-Am identity would be more acceptable than US identity, but
is long way off.

Can NAFTA

Forge A Global Approach to Internet Governance?

Catherine L. Mann
Institute for International Economics
CLMann@IIE.com

Draft 2: June 14, 2001

ABSTRACT: How will national approaches toward taxation and personal information, fare in the increasingly global, technologically dynamic, information-rich, and network-based Internet marketplace? How policymakers respond to the tensions between national jurisdiction and international transactions will materially affect whether individuals, firms, and countries will benefit from the potential of the Internet marketplace. Building on the NAFTA relationship, can the United States, Canada, and Mexico forge an international approach to Internet governance that could be a model for the world?

Prepared under contract no. U5100-0-0206 on behalf of Industry Canada, Microeconomic Policy.

Catherine L. Mann, Senior Fellow[1]

June 14, 2001

Introduction

Economic activity via the Internet is complex and it bundles globally-sourced goods, services, and information. In contrast, the jurisdictions of government remain national at best. Policies choices by one nation increasingly will impinge upon policy choices made by another nation. How do the NAFTA partners differ in their approaches to Internet policy issues, and can they forge an international approach to reduce conflict and increase benefits with expanded use of the Internet? If the NAFTA partners—with their differing relationships between governments, citizens, and business, and varied level of Internet access and level of development—can find an interoperable approach, it could be an important model for global Internet governance.

This paper addresses two policy areas that are particularly affected by the tension between global marketplace and national jurisdictions: domestic and cross-border taxation (for which the classification of transactions and method of raising revenues are important) and the issue of the Internet and information (where the modalities of protecting personal data are important).

Right now, the NAFTA partners are focusing on establishing approaches and legislation attuned to the domestic arena; there is relatively little attention being paid to the cross-border implications of these efforts. So far, this approach to Internet governance of "live-and-let-live" works because of existing cooperation arrangements and bilateral agreements (as well as shared experiences in various international Internet and e-commerce working groups under APEC, FTAA, OECD and the WTO). However, the increasing economic integration of these three economies coming from CUSFTA and NAFTA demands more explicit development of interoperable approaches. Policymakers should take up the challenge now to forge an NAFTA approach rather than focus only on the domestic arena. It may be easier than you think!

Internet Transactions and Tax Regimes

"Death and taxes (or the death of taxes?) ..." It should come as no surprise that the question of how the Internet and electronic commerce will affect taxes has received such early and intense policy attention.[2] Policymakers are concerned about the potential

[1] Diana Orejas researched the sections on Mexico and Canada.

[2] Among international organizations, the OECD membership, in conjunction with non-member governments and private sector groups representing business and tax accountants, has been analyzing since 1997 how electronic commerce might impact international and domestic taxes. The outcome of that effort was the "Tax Framework Conditions" which reaffirms five key principles that guide governments generally in the application of taxes within the overall regime: neutrality, efficiency, certainty and simplicity,

erosion of their tax revenue.[3] Firms and businesses want to know how much they need to pay and to whom. Consequently, most analyses of e-commerce and tax tend to focus on the specifics of how to administer *existing* regimes in the changing environment.[4] However, e-commerce and the Internet challenge tax regimes that depend on knowing the "who, what, and where" of transactions. Therefore, tax policymakers should be asking, "How should tax regimes evolve in the face of the Internet?"

There are two main forms of raising tax revenues: direct and indirect tax regimes. The Internet challenges them both, but in different ways. For indirect taxes, the issue is how to apply sales and value-added taxes when tax treatment of goods and services differs, where transmission is via electronic channels, and when transactions cross borders (all of which make tracing the "who, what, and where" increasingly difficult). For direct taxes the issues are how e-commerce activities should be treated and income apportioned under the rules of permanent establishment, as well as the equity of taxing capital vs. labor earnings.[5]

Taxes and Tax Systems In The NAFTA Partners

The three NAFTA partners differ in their dependence on direct and indirect taxes for government revenues, in the administrative complexity of the systems, and on the degree of compliance. Only the US has directly considered the impact of Internet transactions on its tax system. While none of the countries has considered the international implications of Internet transactions on taxes, all of them continue to abide by the moratorium on tariffs on Internet transactions. It is only in this latter respect that the countries have considered the international implications of e-commerce transactions. While bilateral tax arrangements exist, the NAFTA partners should work on a NAFTA-basis agreement for apportioning taxes earned on cross-border sales and on income earned.

---

effectiveness and fairness, and flexibility. See http://www.oecd.org//daf/fa/e_com/e_com.htm#top_e_commerce.

[3] Efforts to measure the potential loss of tax revenue are difficult because of dynamic response. For the US, Austan Goolsbee and John Zittrain, "Evaluating the Costs and Benefits of Taxing Internet Commerce," *National Tax Journal*, vol 52 no. 3, September 1999, pp 413-428 calculate a loss over the next few years of less than 2 percent of sales tax revenues. For the full range of countries around the world, Susan Teltscher, "Revenue Implications of Electronic Commerce: Issues of Interest to Developing Countries," mimeo, UNCTAD, April 2000, also finds loss of tax revenues of less than 1 percent overall, although the figure is higher for some countries.

[4] See *International Tax Review*, September 1999 for a review of how the following countries and regions are addressing interpreting existing tax law for electronic commerce: Australian and New Zealand, Canada, Germany, India, Ireland, Israel, Japan, Latin America, the Netherlands, Singapore, South Africa, United Kingdom. See also the June 2001 OECD organized conference, "Tax Administration in a Networked World," http://www.ae-tax.ca

[5] See The OECD Model Tax Convention, which is a blueprint that many countries have used as a framework for bilateral tax treaties. It apportions tax responsibility and revenue so as to avoid double taxation of income earned through foreign investment. An overview is available at <http://www.oecd.org//daf/fa/treaties/treaty.htm>. See also: <http://www.oecd.org//daf/fa/material/mat_07.htm#material_Model> for the most recent information on the articles of the model convention.

In the US states, the federal government raises 60 percent of its revenues from individual income taxes and about 10 percent from corporate income taxes; there is no federal sales or value-added tax. States, on average, raise 25 percent of revenues from sales taxes, 20 percent from property taxes, 15 percent from individual income taxes, and the rest is raised through miscellaneous tax and user charges. For the state sales taxes, the final user (usually at the retail level) pays the taxes, which are applied principally on tangible property (with exceptions) and usually not on services. Business inputs generally are exempt from tax. The administrative burden of the sales tax system comes principally from the 30,000 different tax rates applicable depending on location. Tax ignorance, as opposed to tax avoidance or evasion, is a real issue.

Like the US, most of Canada's federal tax revenue comes from income taxes. But there is a federal level consumption tax that accounts for somewhat less than 20 percent of revenue. This Goods and Services Tax (GST) of 7 percent, is collected on the sale of most goods and services in Canada, is levied on all taxable imports, but is zero on exports. Basic groceries, agricultural products, prescription drugs and medical devices have a zero-rate GST. Also exempted are health and medical services, tolls, education, and financial services. Foreign-based organizations providing services in Canada must register for the GST in order to claim input tax credits. This federal set of taxes is augmented at the provincial level, with the Provincial Sales Tax (PST) that varies by province and is only payable on imports that are not for resale. Several provinces have an agreement with the federal government to combine the GST and the PST, so the resulting Harmonized Sales Tax (HST) is a 15 percent flat rate.[6]

Whereas in the structure of its tax revenue Mexico appears rather similar to the US and Canada, the success of its tax administration effort is quite different. At the federal level, 40 percent of total tax is raised through income taxes. Like Canada, Mexico has a federal indirect tax, which accounts for 30 percent of total tax revenues. This value-added-tax of 15 percent is applied to all sales of goods and services but with broad and many special exemptions: Food and drugs have a zero rate, the border-regions have a tax rate of only 10 percent, and there are exemptions for entire sectors—land transportation, agriculture and fishing.[7] Thus, the key difference for Mexico is apparently low administrative compliance: Mexico's federal value-added tax revenues amounted to 3.3 percent of GDP; and the income tax only 4.6 percent of GDP. Thus, with a tax to

[6] The HTS applies to Nova Scotia, New Brunswick and Newfoundland.

[7] Exemptions for goods transactions include sales of land; residence buildings—not hotels--; construction materials; books; magazines; certain authors copy rights; currency; shares; credit instruments; sales by non-profits, farmer groups, labor unions or government agencies.
Exemptions for rendered services: services from state and local government, social security institutions, official education, insurance, banking, public entertainment, medical services, public transportation by land –except train—
Imports are subject to the same VAT (the taxable value of tangible goods is the value declared for import duties plus the duties).
Exports: zero rate of VAT. This provides an incentive for exporters since they have the right to the refund VAT charged by others on supplies and services used in the production of exports.
Zero rate goods include food, water, patent medicines, farm equipment and chemicals. International freight and international air passenger service are among the zero rate services.

GDP ratio of just 11.5 percent in 1999 Mexico is well below the average ratio for OECD countries (28 percent). [8]

Recognizing both the complexity and compliance issues, President Fox on April 3, 2001 sent to Congress his fiscal reform initiatives. In order to broaden the tax base he proposed changes on the VAT eliminating exemptions and the zero-rate (although as is common with VAT systems, the zero percent rate would still apply for exports). Additionally, tax payments will be carried out when the disbursement takes place not the sale. [9]

Only the US has explicitly considered the impact of Internet transactions on its tax system. In the US, when the Congress passed the Internet Tax Freedom Act in 1998 (which kept domestic Internet transactions free from any "new" taxes for three years but did not revoke existing sales or use taxes), it mandated review of the implications of electronic commerce for domestic sales taxes. A majority of members of this Gilmore Commission opined[10] that digital products downloaded over the Internet (including software, books, or music) should not be taxed and that, in the interests of tax neutrality, their tangible equivalents also would be tax exempt. Since services to the final consumer often are not taxed in the US, this strategy apparently would classify digital products as services and would "harmonize down" the tax treatment of their tangible equivalent.

One objective of the Commission's proposal was to encourage states and localities to harmonize their own rates and reduce the myriad state and local taxes (some 30,000) which are both administratively cumbersome and encourage tax-strategizing behavior. The National Governors Association is examining how to simply sales and use taxes so as to apply computer technologies to tax administration, although not all states are participating in this study effort. [11] Any implications at the international level were not addressed, since the Commission did not have the mandate to address cross-border issues.

At the international level, all three NAFTA countries are maintaining the moratorium on imposing customs duties on Internet transactions. This moratorium was agreed at the WTO Ministerial in Geneva in May 1998, but its formal continuance remains under debate in some quarters, given the outcome at Seattle in November 1999.[12]

How Do Internet Transactions Stress These Tax Regimes? [13]

[8] See OECD Economic Surveys. Mexico 2000, No. 13. OECD, July 2000

[9] Secretaria de Hacienda y Credito Publico at http://www.shcp.gob.mx

[10] The Commission could not formally recommend a plan of action to Congress, because no super-majority view was reached.

[11] See Streamlined Sales Tax project http://www.nga.org/nga/newsRoom/1,1169,C_PRESS_RELEASE^D_1067,00.html December 22, 2000.

[12] "WTO Agreed on Short-Term Net Tax Ban" CNET News December 2, 1999. "WTO Grapples with Next Steps After Failed Ministerial Meeting" Inside US Trade December 10, 1999

[13] For a more extensive treatment of this issue see Chapter 6 in Global Electronic Commerce: A Policy Primer, IIE:Washington, July 2000 by Mann, Eckert, and Knight.

The indirect tax system used to be simple to administer and audit—thus its popularity. However, over time, indirect taxes have tended to become situation-specific (rather than broad-based) as policymakers try to target specific transactions or users. The Internet fuzzes the "who, where, and what" of the transaction, which makes such targeting more difficult. In particular, since cross-border transactions are growing quickly tax authorities do not have the luxury of considering the domestic environment in isolation.

Maintaining different tax rates for goods and services, for exports and imports, for consumers and businesses, which is evident in all three systems becomes a greater issue with the Internet. Products that once were "goods" are now available in digital form, and need to be classified (such as books, music, software, architectural drawings, radiological images, and so on). Transactions among cross-border strategic alliances make it difficult to determine end-user. How should export or import taxes be levied when sales are digital? All told, inconsistencies in the indirect tax system increasingly will lead to tax-strategizing business and consumer behavior. Thus, despite the trend toward increased prevalence of the GST or VAT in recent years, the pressures of the Internet environment will force countries to re-evaluate their dependence on this regime.

For direct taxes, the key issues are international apportionment of income earned on these transactions. There are two different ways to account for business income earned in a cross-border setting: source-based and residence-based. [14] Because source and residence based taxation schemes must yield double-taxation of some income, bilateral and multilateral tax treaties attempt to allocate income earned to the source and to the residence according to "permanent establishment" and give tax credits to minimize double-taxation.

The Internet facilitates partnerships as well as a movement away from vertical integration representing an income tax challenge. Where profits will be taxed will become an important issue since firms (particularly dot-coms) can easily relocate to jurisdictions where tax laws are more beneficial. Furthermore, new business models such as auctions, reverse auctions, new types of intermediaries, and virtual communities raise additional tax issues and make difficult to distinguish sellers from intermediaries.

Permanent establishment is difficult to define for e-commerce transactions.[15] For information-rich and network-based production, physical presence is much less important for value-creation (consider software code). Moreover, mobility of information-based firms further undermines physical presence as well as calls into question the

[14] As a general statement, income earned by US firms and individuals is taxed at US rates regardless of where the income was earned—so-called "residence" based taxation. Other countries, particularly developing countries, tax income earned by non-resident firms operating in the country—so-called "source" based taxation. See Ned Maguire, "Taxation of E-commerce: An Overview," International Tax Review, pp 3-12.

[15] The definition of a permanent establishment rests on two foundations: fixed place of businesses or physical presence and dependent agents who, among other activities, must be able to conclude contracts on behalf of the corporation as a normal course of business. The OECD Fiscal Affairs recently agreed that a web-site did not constitute a permanent establishment... (get cite).

characterization of dependent agents. Finally, the complexity of Internet marketplaces (consider the examples of virtual auctions and exchanges for business-to-business transactions) challenges the notion that there is a single "head" to the organization which could help define either permanent establishment or dependent agent. Consequently, the allocation of income to different governmental jurisdictions will be increasingly difficult. The threat of double taxation increases, along with the incentives for non-compliance. The pressure will be to reduce capital income tax rates.

These observations lead us to examine the third significant source for raising tax revenues: individual income. Among the sources of income to tax, individual income probably remains the least affected by the Internet and electronic commerce. Labor, by and large, remains within the same political jurisdiction as the tax authority—which supports the notion of taxation *with* representation.[16] Firms keep close track of how much they pay workers, even in the Internet markets; so, labor income can be taxed using methods including reporting, audit, or declaration and then apportioned to countries depending on where the value was added. Therefore, from an administrative standpoint, taxation individual income represents the fewest number of transactions to trace, probably the most carefully documented set of transactions, and the factor of production least prone (or allowed) to move in response to tax differences—exactly the recipe for an efficient tax regime.

The questions of fairness inevitably arises when labor income is taxed relatively more than capital income and evasion of labor and capital income taxation is one reason for choosing the VAT or GST systems. Moreover, tax systems often are used to redistribute income across geography as well as class. These issues remain. But the reduced ability to tax value-added, transactions, or corporations raises the stakes on finding appropriate answers and charting a course towards changing tax regimes to reflect the realities of the global and networked production-space and marketplace.

Toward a NAFTA Tax Agreement

Right now, there is no NAFTA agreement on tax issues; rather these issues are addressed in a bilateral manner. Canada and the US have had an income tax treaty since the 1980s. Changes to the treaty were proposed in September 2000 to clarify the issue of residence status of corporations and avoid double taxation. Mexico and the US signed an income tax treaty in September 1992 to avoid double taxation on income and provide limits on the taxation at the source of royalties, dividends and interest.[17] With respect to taxation of Internet transactions, there are no explicit North American bilateral or multilateral agreements, but there is ample cooperation and discussion among customs and tax officials in the three countries.[18]

---

[16] This is not to say that labor cannot move; but it is relatively less mobile than firms, particularly at the margin of electronic commerce.

[17] See http://www.mac.doc.gov/nafta/8504.htm (4/11/01)

[18] At a conference in Washington DC on April 30, 2001, the Mexican Finance Minister confirmed that there is ample cooperation between Mexican and US officials but that such cooperation has been more difficult lately given the change in US Administration and the delays in Treasury Department appointments.

The NAFTA partners should move beyond cooperation and discussion to create an explicit trilateral tax agreement. Each country will be able to maintain a system based on a combination of direct and indirect taxes that will meet their redistributive preferences, although the pressure will increase to focus taxation on the bigger targets (income not transactions) and at the ultimate source of value (people not firms). The foundation for tax apportionment among the member countries already exists in the rules of origin agreements, in the customs and tariff preferences and draw-back procedures. Achieving a trilateral tax agreement will deepen the integration of NAFTA by raising tax efficiency even as each of the partners retains the individual flavor of its relationship between government and citizenry.

The Internet and Personal Information

Data collection on the Internet is pervasive and valuable. Electronic commerce "cookies" and "bugs" track, collect, and compile personal information, which allow the creation and combination of data banks of personal information and preferences. There is a tension between collectors of information (firms as information aggregators) and providers of information (individual business or consumers).

Industry aggregators highly value the collection of information because it can sell the aggregate. Firms want aggregate information and individual information produce uniquely tailored products. Concerned individual consumers and businesses face an undesirable choice: Use the Internet, but be fearful that the information provided online as individuals may be used inappropriately; or don't use the Internet and lose the benefits of this new medium for information and exchange. There is a spectrum of businesses, consumers, and information, meaning that the proper balance between users and providers of information is multi-dimensional.

Is there a role for policy intervention to balance these rights—the rights of individuals to protect their personal information against those who want it to create new products and services? Are policymakers in the NAFTA countries weighting the various parties the same way and choosing the same approach to intervention? Not only is the balancing of these rights difficult, but different governments see their role (and citizens see their governments' role) in the balancing act differently.

Treatment of personal information by the NAFTA partners

The US privacy landscape appears wild and unruly—unlike that of the rest of the world. Most countries that protect privacy through national regulation, including Canada and Mexico, have opted for comprehensive data protection laws. These laws establish government data protection agencies, require registration of databases, and call for institutions to seek consent before processing personal data. However, the NAFTA partners may be more similar than appears. The manner in which the government agencies implement and enforce the environment has yielded a similarity in outcomes, which bodes well for achieving a clearly stated set of principles and approach for NAFTA as a whole.

The US approach to protecting personal information relies on a mix of legislation, self-regulation, and regulatory enforcement. In terms of legislation, there are around 600 federal and state laws addressing the confidentiality of personal information within the US. These laws take the form of sectoral protections (such as for financial information) that, when combined with self-regulatory provisions and case law, loosely cover American citizens' bank records, cable television subscriptions, children's online activities, credit reports, video rental records, library loans, medical records, tax records, and telephone services. [19] And the number of privacy laws is increasing. In 2000, US state legislatures debated approximately 4,000 legislative privacy proposals, resulting in over 300 new laws. Furthermore, two federal laws were passed that include privacy protections for financial and medical information and omnibus privacy legislation was considered by the 2001 US Congress.[20]

A hallmark of the US approach is innovation and self-regulatory commitments that are backed-up by oversight and enforcement. Innovative approaches to protecting information in a way that the user controls are emanating from both individual firms and standards groups. Widely available and inexpensive software programs such as Junkbusters and Anonymizer permit users to block sites from sending cookies. The Platform for Privacy Preferences[21] is browser-embedded software that will allow users specify the types of information they are willing to divulge, as well as whether such information can be shared with third parties.

In terms of self-regulation, organizations such as BBB*Online* and TRUSTe provide guidelines as well as an enforcement mechanism through the use of Web-site privacy seals. Such seals are awarded to companies meeting certain rigorous standards, such as a satisfactory complaint record, and the posting of privacy policies that meet the standards of notice, disclosure, choice, consent, and security. Codes of conduct, such as BBB*Online*'s Code of Online Business Practices and BBB*Online* Privacy Programs provide merchants with guidelines to implement and abide by.

These self-regulatory efforts are being backed-up by oversight and enforcement both by private sector interest groups (e.g. Electronic Privacy Information Center, EPIC) and by government agencies. The Federal Trade Commission (FTC) has considered several cases (e.g., DoubleClick/Abacus, eToys, Amazon, and others) where questionable data protection practices have emerged. In some cases, the onslaught of publicity by privacy groups or just the threat of FTC consideration has changed the behavior of firms; but not always.

In Canada, personal information is protected by both federal legislation and provincial and territorial legislation. For some time now, privacy legislation at the provincial level[22] has covered the collection, use and disclosure of personal information

[19] Also, there is specific legislation to restrict certain practices such as unauthorized use of IDs and passwords—more a fraud issue than a privacy issue.
[20] See Alexander Fowler at http://www.aaas.org/spp/dspp/sfrl/per/per24.htm
[21] P3P developed by the World Wide Web Consortium—W3C—an international academic and industry body devoted to applications, engineering-standard setting and research.
[22] Except PEI and Newfoundland.

held by *government* agencies. Since 1994, comprehensive privacy legislation in Quebec has also covered personal information in the provincially-regulated *private* sector. The legislation provides Canadians with a general right to access and correct their personal information and provide oversight through an independent commissioner authorized to receive and investigate complaints.

Comprehensive privacy legislation was passed in April 2000. Bill C-6 (Personal Information and Electronic Documents Act) lists 10 principles for fair information practices (accountability; identifying purposes; consent; limiting collection; limiting use, disclosure and retention; accuracy; safeguards; openness; individual access and; challenging compliance). The Act states that any covered organization must obtain an individual's consent to collect, use, or disclose any collected personal information. Individuals have a right to access the information held on them by organizations, challenge its accuracy and request it be held private. Personal information includes name, age, opinions, evaluations, comments, "intentions," dispute records (such as complaints to a business) and loan or credit records. The Act will enter into force in three stages. [23]

The first two phases cover federal transactions. In January 2001, the Act will apply to personal information about customers or employees (except "personal health information," which will be covered from January 2002[24]) that is collected, used or disclosed by "federal works, undertakings or businesses" in the course of commercial activities. Federal works, undertakings and businesses include organizations such as the banks, telephone companies, cable television and broadcasting companies, firms engaged in interprovincial transportation, and air carriers. The Act will also apply to personal information that is shared or disclosed for profit or any kind of benefit across the borders of Canada or a province, where the information itself is the subject of the transaction.[25]

By January 2004, the law will cover the collection, use or disclosure of personal information in the course of any *commercial* activity within a province, including provincially regulated enterprises such as retail stores. The Act will apply to all personal information in all inter-provincial and international transactions by all organizations in the course of their commercial activities. The federal government may exempt

[23] This section with information from http://www.privcom.gc.ca/information/guide_e.asp?V=print http://www.privcom.gc.ca/legislation http://www.e-com.ic.gc.ca/english/privacy/632d30.html

[24] Health Canada is coordinating a federal/provincial/territorial working group, the Protection of Personal Health Information Working Group, to develop a Harmonization Resolution for the treatment of personal health information in Canada. While not legally binding, this resolution would set voluntary principles for the protection of personal health information across Canada in the public and private sector. Some Canadian jurisdictions already have legislation to deal specifically with the collection, use and disclosure of personal health information by provincial health care organizations and other approved individuals and agencies. (Alberta, Ontario, Saskatchewan and Manitoba have such legislation. To date, only Manitoba's Personal Health Information Act is in force.)

[25] Additionally it will cover all businesses and organizations engaged in commercial activity in Yukon, the Northwest Territories and Nunavut.

organizations and/or activities in provinces that have their own privacy laws that are substantially similar to the federal law. [26]

The Bill does not require companies to obtain explicit consent: "consent can be either express or implied".[27] It does not apply when organizations use personal information for journalistic, artistic and literary purposes, or personal and domestic purposes. Bill C-6 does not define what constitutes "sensitive data" nor does it prohibit the collection of such data. The Act also lists several specific situations where personal information (including data that can be considered sensitive in Europe) may be collected, used or disclosed without the knowledge or consent of the individual. There is no prohibition on the collection of sensitive data. However, it requires organizations to take into account the sensitivity of the information in determining the form of the consent sought for its collection, and recommends that an organization "should" generally seek express consent when the information is likely to be considered sensitive. It does require that more sensitive information be safeguarded by a higher level of protection.

Industry Canada is the guardian of the interpretation of the legislation. Use and disclosure of personal information without the knowledge or consent of the individual is regulated by Industry Canada which limits the secondary uses of the data and provides sufficient and adequate safeguards for this type of data. [28]

Mexico has not yet passed any comprehensive new legislation regarding privacy issues but has amended existing regulations to address the challenges of information sharing on the Internet. A new chapter in the Mexican Consumer Protection Law (Ley Federal de Proteccion al Consumidor) includes provisions for transactions made through electronic media, optic media or other new technologies. The provisions address the issue of confidentiality of information provided by consumers.

Suppliers of services must: Use information provided by consumers in strict confidence. Transmit such information to third parties only with explicit authorization of consumer or by legal order. Use appropriate technology to ensure safety of consumer information. Provide the consumer with information about where and how to make a claim or find additional information on a product. Avoid commercial practices that could mislead or confuse consumers about the goods/services offered. Provide necessary

---

[26] There are other laws that contain provisions to protect privacy of Canadians. The federal Bank Act regulates the use and disclosure of personal financial information by federally regulated financial institutions. Similarly, provincial statutes regulate the activities of financial institutions, such as credit unions and insurance companies. Additionally, consumer protection laws at federal and provincial levels offer limited protections and remedies against illegal and unethical business practices that may constitute an infringement of privacy.

[27] See Canada's Privacy Commissioner "Guide for Businesses and Organizations to Canada's Personal Information Protection and Electronic Documents Act" page 5. At http://www.privcom.gc.ca/information/guide_e.asp?V=Print

[28] See "The adequacy of the Canadian Personal Information and Electronics Documents Act" http://www.europa.eu.int/comm/internal_market/en/media/dataprot/wpdocs/index.htm

warnings of unsuitable content for vulnerable population groups (children, elderly and sick people).[29]

With respect to government activities, the Mexican Penal Code protects against the disclosure of personal information held by government agencies. The law prohibits electronic surveillance in cases of electoral, civil, commercial, labor, or administrative matters and expands protection against unauthorized surveillance to cover all private means of communications, not merely telephone calls. Additionally, messages sent by Internet have the same protection in Mexico than communications sent by mail. Furthermore, Mexican Constitution and Federal Criminal Law punish with 3 to 180 labor community journeys the unauthorized opening of correspondence and any other kind of writing materials.

Are there Economic Theories of Protecting Personal Information? [30]

The flow of information is important for economic development and key for an efficient functioning of some sectors of the economy. Information flows have greatly increased in recent years and will grow further with the spread of the Internet. While posing new regulatory challenges and opening new opportunities for abuse, electronic exchanges of information present a unique opportunity for economic growth and integration. As new national, regional and local regulations are developed to address the challenges posed by the Internet, conflicting regulation could impose restrictions on data exchanges reducing the potential benefits of the new technologies and causing disruption in important sectors of the economy.

There are two approaches that policymakers can take to try to achieve the proper balance of rights and make sure that the spillover inherent in the collection of information is internalized by the information aggregators. Policymakers can mandate a comprehensive approach for how information aggregators will treat data. Or, they can focus on creating incentives for innovative effort so that aggregators improve the range of choices on whether and how data are collected, compiled, and cross-referenced. Which better balances the rights of aggregators of personal information with individual rights?

The economic theory of the second best shows that the market and mandate solutions cannot be ranked as to which one comes closer to achieving the highest levels of economic well-being for a *country* as a whole. And in neither case are all *individual* demands met.

On the one hand, because there are many users and few aggregators, the market approach is likely to yield an incomplete set of "information-use" policies. So, the privacy preferences of each unique user may not be met. What are the consequences? Consider a business example. Suppose a firm worries so much about revealing strategic business information by participating in a B2B marketplace that it refuses to participate;

[29] See http://www.natlaw.com/ecommerce/docs/e-commerce-initiative-mexico.htm (4/23/01)
[30] For a more extensive discussion of the economics of protecting personal information, see pp 37-41 in Global Electronic Commerce: A Policy Primer, op cit and (Rome and Georgetown papers—citations).

the benefits from having such an exchange would be reduced by having fewer players. More generally, the value of the Internet derives from its participants, and increases exponentially with the number of users. So the fear of participating that prevents its use exponentially reduces the benefits of the Internet to both individuals and to society.

On the other hand, the mandate solution is a sort of "one-size-fits-all" policy that assumes that each person or business has the same preference over revealing information as is spelled-out in the mandate. Because people and businesses are not all alike in their attitudes toward privacy, some specific preferences will not be met. In this case, those left out probably would be willing to disclose more information to get more tailored products and services. So, with a mandate policy some buyers and sellers won't bother to log-on. As in the case above, the value of the Internet is reduced exponentially by the lower level of participation.

We can't really tell which policy approach will result in the greater number of unhappy users and this is why we can't rank the alternative policies in terms of their impact on efficiency or society's well-being. So, what is the difference between the two approaches?

So, what is the difference between the market and the mandate approach to policy intervention? Under the market approach, firms continue to face incentives to try to satisfy individuals' privacy demands, particularly if those demands are effectively communicated to the aggregators and are backed by government enforcement. The incentives come in part from the very network benefits that are being lost if the privacy policy is insufficient and users defect. In contrast under the mandate approach, the private sector has fewer incentives to innovate to resolve market imperfections (since there are common rules for all to follow) and the enforcement issues remain. In such a technologically dynamic environment, retaining the incentive for private sector response is crucial. This calls into question a strict rules-based environment.

Toward A NAFTA Framework for Data Protection

The challenge of international privacy legislation is to protect from misuse of information while preventing interruptions in international flows of data. The NAFTA partners appear to be taking very different approaches to regulating privacy: Canada has opted for new comprehensive legislation while the US relies heavily on self-regulation. Mexico is struggling with basic protections, but the wording of its new law is quite strict.

How different are these approaches in fact? A key observation is that Canadian legislation, while comprehensive, is actually quite open to the self-regulatory/agency enforcement model currently being followed by the United States. The language on "explicit consent" and role for Industry Canada put Canadian practice into the model of self-regulation backed-up by private sector and FTC enforcement. Mexico's strict language not-with-standing, the three countries, in fact, are not that far apart in practice.

Moreover, while there is not a common NAFTA approach yet, there are regular contacts between the regulating authorities of the three countries (see USDOC for more details) furthering consultation and practical ties that will form the foundation for a

NAFTA framework for the protection of personal data. In the end, the increasing economic integration in North America will be the market incentive that will lead to a set of privacy solutions to meet the needs of the differing populations.

What will the NAFTA privacy framework look like? It will keep the national legislation as is. But the private sector will have the incentives to continue to innovate privacy solutions to meet the needs of the differing populations in the NAFTA marketplace. This market-driven set of innovations will be backed-up by federal enforcement by Industry Canada, the FTC, and their Mexican counterpart. These three agencies will work more closely together to create a common environment of oversight and enforcement.

One model for this arrangement is the positive comity agreements. When more than one country has the authority to investigate, a positive comity referral makes sure the officials closest to the problem take charge avoiding duplicative efforts. Canada and the US have advanced cooperation schemes in competition law, each country has its laws but they are compatible enough to allow for coordination of procedures.

Conclusion: A NAFTA Approach? Yes. A Global Approach? No.

Tax regimes and personal information are two areas where there are potential conflicts between national jurisdiction of policy and the economics of the Internet marketplace. Policymakers must recognize the demands of their constituents (the voters). But in this fast-paced technologically dynamic environment they must avoid predetermining solutions or codifying exclusionary rules. The key is to create incentives for the private sector to help manage the differences between individuals and businesses and the problems of cross-border jurisdictional overlap. Because the private sector reaps the rewards from network benefits as well as niche markets, it will seek interoperable approaches to solve the problems of spillovers and jurisdictional overlap. Interoperable policies allow national policies to reflect differences in national attitudes yet also allow the network benefits of the global marketplace to shine through. Imposing tight rules and mandates runs the risk of locking in sub-optimal solutions. However, to make sure that the market works towards these goals, policymakers along with private sector representatives must backstop private sector efforts with oversight and enforcement.

In all three countries new regulations are being developed to deal with the new economic reality of the Internet. Because of the economic integration and the NAFTA institutional structure, there is substantial on-going interchange between businesses and between government personnel. As a result, domestic legislation while not homogeneous it is not confrontational. Right now, problems arising from differences are addressed through bilateral agreements, discussions, and cooperation arrangements. The three countries should build on these working relationships to create a NAFTA Tax Agreement and a NAFTA Framework for Data Protection.

Could these NAFTA models be "exported" to the rest of the world? Canada and the United States closely resemble each other in their economic systems and living

standards, although they differ substantially in terms of how citizens perceive the role of the government. Mexico differs both politically and economically. How these countries are more similar that it might appear at first blush is in their attitudes toward the role for the private sector as leader, and government sector as backstopper. The key issue for whether a NAFTA Tax Agreement or a NAFTA Framework for Data Protection are exportable is not economic integration, level of development, or "trust" in government, but rather whether there is workable respect to achieve common goals in the relationship between private and public sectors.

Rick [redacted] Harris

→ final drafts in September; release at early next yr.
Talk to IC re research issues coming out of this Conference.

Renée St-Jacques

re Peter Harder: = means to end, but also: need to be a bit smarter - gap is too large

Table 15

(Module 4)

Dependency of industry-defined exports and industrial output upon U.S. import markets