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*Regional Aspects of Confederation*



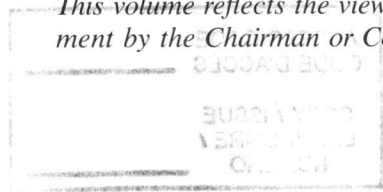
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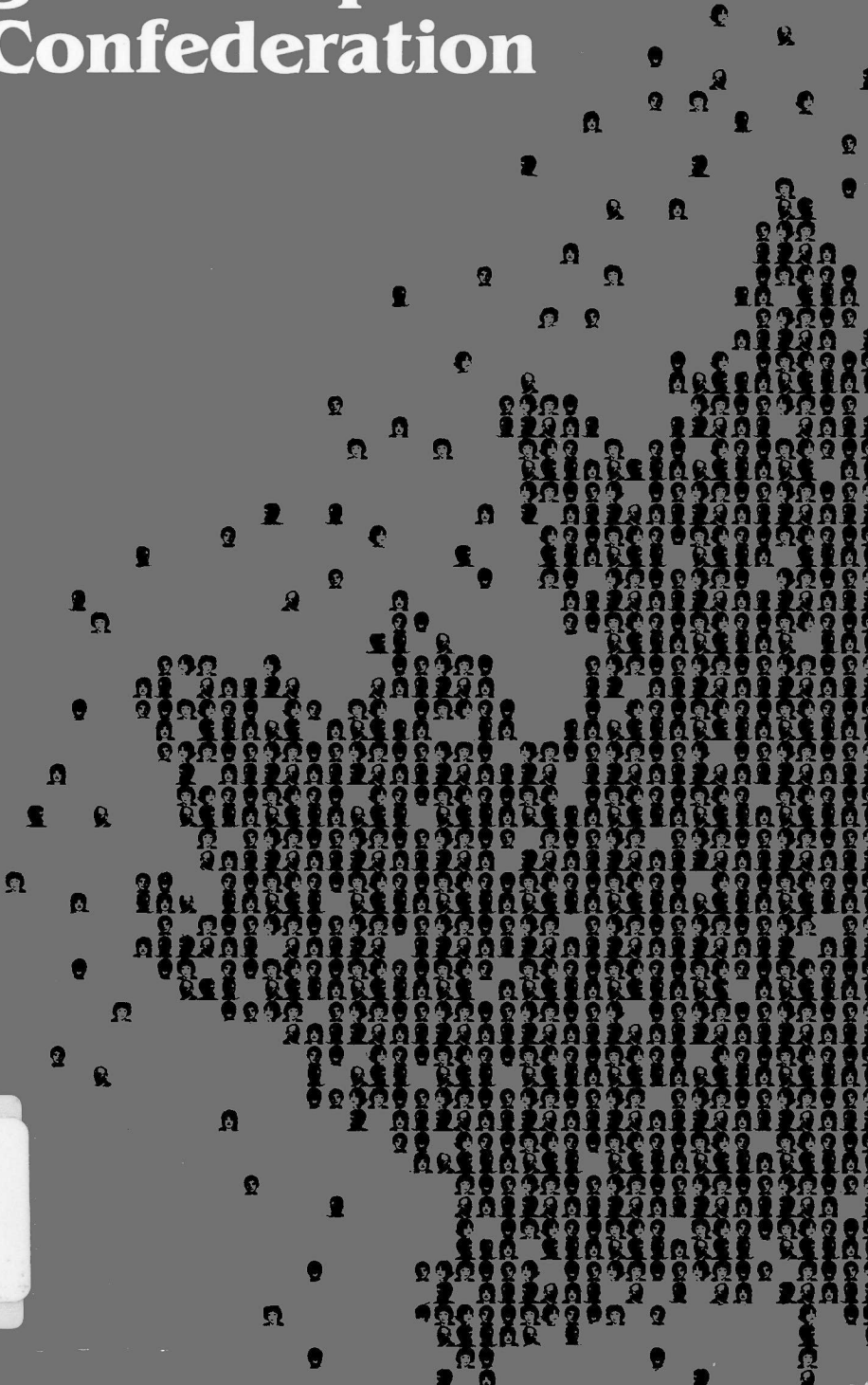
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JOHN WHALLEY and IRENE TRELA

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# Regional Aspects of Confederation





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AND  
IRENE TRELA

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When the members of the Rowell-Sirois Commission began their collective task in 1937, very little was known about the evolution of the Canadian economy. What was known, moreover, had not been extensively analyzed by the slender cadre of social scientists of the day.

When we set out upon our task nearly 50 years later, we enjoyed a substantial advantage over our predecessors; we had a wealth of information. We inherited the work of scholars at universities across Canada and we had the benefit of the work of experts from private research institutes and publicly sponsored organizations such as the Ontario Economic Council and the Economic Council of Canada. Although there were still important gaps, our problem was not a shortage of information; it was to interrelate and integrate — to synthesize — the results of much of the information we already had.

The mandate of this Commission is unusually broad. It encompasses many of the fundamental policy issues expected to confront the people of Canada and their governments for the next several decades. The nature of the mandate also identified, in advance, the subject matter for much of the research and suggested the scope of enquiry and the need for vigorous efforts to interrelate and integrate the research disciplines. The resulting research program, therefore, is particularly noteworthy in three respects: along with original research studies, it includes survey papers which synthesize work already done in specialized fields; it avoids duplication of work which, in the judgment of the Canadian research community, has already been well done; and, considered as a whole, it is the most thorough examination of the Canadian economic, political and legal systems ever undertaken by an independent agency.

The Commission's research program was carried out under the joint

direction of three prominent and highly respected Canadian scholars: Dr. Ivan Bernier (*Law and Constitutional Issues*), Dr. Alan Cairns (*Politics and Institutions of Government*) and Dr. David C. Smith (*Economics*).

Dr. Ivan Bernier is Dean of the Faculty of Law at Laval University. Dr. Alan Cairns is former Head of the Department of Political Science at the University of British Columbia and, prior to joining the Commission, was William Lyon Mackenzie King Visiting Professor of Canadian Studies at Harvard University. Dr. David C. Smith, former Head of the Department of Economics at Queen's University in Kingston, is now Principal of that University. When Dr. Smith assumed his new responsibilities at Queen's in September 1984, he was succeeded by Dr. Kenneth Norrie of the University of Alberta and John Sargent of the federal Department of Finance, who together acted as Co-directors of Research for the concluding phase of the Economics research program.

I am confident that the efforts of the Research Directors, research coordinators and authors whose work appears in this and other volumes, have provided the community of Canadian scholars and policy makers with a series of publications that will continue to be of value for many years to come. And I hope that the value of the research program to Canadian scholarship will be enhanced by the fact that Commission research is being made available to interested readers in both English and French.

I extend my personal thanks, and that of my fellow Commissioners, to the Research Directors and those immediately associated with them in the Commission's research program. I also want to thank the members of the many research advisory groups whose counsel contributed so substantially to this undertaking.

DONALD S. MACDONALD



At its most general level, the Royal Commission's research program has examined how the Canadian political economy can better adapt to change. As a basis of enquiry, this question reflects our belief that the future will always take us partly by surprise. Our political, legal and economic institutions should therefore be flexible enough to accommodate surprises and yet solid enough to ensure that they help us meet our future goals. This theme of an adaptive political economy led us to explore the interdependencies between political, legal and economic systems and drew our research efforts in an interdisciplinary direction.

The sheer magnitude of the research output (more than 280 separate studies in 70+ volumes) as well as its disciplinary and ideological diversity have, however, made complete integration impossible and, we have concluded, undesirable. The research output as a whole brings varying perspectives and methodologies to the study of common problems and we therefore urge readers to look beyond their particular field of interest and to explore topics across disciplines.

The three research areas, — *Law and Constitutional Issues*, under Ivan Bernier; *Politics and Institutions of Government*, under Alan Cairns; and *Economics*, under David C. Smith (co-directed with Kenneth Norrie and John Sargent for the concluding phase of the research program) — were further divided into 19 sections headed by research coordinators.

The area *Law and Constitutional Issues* has been organized into five major sections headed by the research coordinators identified below.

- Law, Society and the Economy — *Ivan Bernier and Andrée Lajoie*
- The International Legal Environment — *John J. Quinn*
- The Canadian Economic Union — *Mark Krasnick*

- Harmonization of Laws in Canada — *Ronald C.C. Cuming*
- Institutional and Constitutional Arrangements — *Clare F. Beckton and A. Wayne MacKay*

Since law in its numerous manifestations is the most fundamental means of implementing state policy, it was necessary to investigate how and when law could be mobilized most effectively to address the problems raised by the Commission's mandate. Adopting a broad perspective, researchers examined Canada's legal system from the standpoint of how law evolves as a result of social, economic and political changes and how, in turn, law brings about changes in our social, economic and political conduct.

Within *Politics and Institutions of Government*, research has been organized into seven major sections.

- Canada and the International Political Economy — *Denis Stairs and Gilbert Winham*
- State and Society in the Modern Era — *Keith Banting*
- Constitutionalism, Citizenship and Society — *Alan Cairns and Cynthia Williams*
- The Politics of Canadian Federalism — *Richard Simeon*
- Representative Institutions — *Peter Aucoin*
- The Politics of Economic Policy — *G. Bruce Doern*
- Industrial Policy — *André Blais*

This area examines a number of developments which have led Canadians to question their ability to govern themselves wisely and effectively. Many of these developments are not unique to Canada and a number of comparative studies canvass and assess how others have coped with similar problems. Within the context of the Canadian heritage of parliamentary government, federalism, a mixed economy, and a bilingual and multicultural society, the research also explores ways of rearranging the relationships of power and influence among institutions to restore and enhance the fundamental democratic principles of representativeness, responsiveness and accountability.

*Economics* research was organized into seven major sections.

- Macroeconomics — *John Sargent*
- Federalism and the Economic Union — *Kenneth Norrie*
- Industrial Structure — *Donald G. McFetridge*
- International Trade — *John Whalley*
- Income Distribution and Economic Security — *François Vaillancourt*
- Labour Markets and Labour Relations — *Craig Riddell*
- Economic Ideas and Social Issues — *David Laidler*

Economics research examines the allocation of Canada's human and other resources, the ways in which institutions and policies affect this

allocation, and the distribution of the gains from their use. It also considers the nature of economic development, the forces that shape our regional and industrial structure, and our economic interdependence with other countries. The thrust of the research in economics is to increase our comprehension of what determines our economic potential and how instruments of economic policy may move us closer to our future goals.

One section from each of the three research areas — The Canadian Economic Union, The Politics of Canadian Federalism, and Federalism and the Economic Union — have been blended into one unified research effort. Consequently, the volumes on Federalism and the Economic Union as well as the volume on The North are the results of an interdisciplinary research effort.

We owe a special debt to the research coordinators. Not only did they organize, assemble and analyze the many research studies and combine their major findings in overviews, but they also made substantial contributions to the Final Report. We wish to thank them for their performance, often under heavy pressure.

Unfortunately, space does not permit us to thank all members of the Commission staff individually. However, we are particularly grateful to the Chairman, The Hon. Donald S. Macdonald; the Commission's Executive Director, J. Gerald Godsoe; and the Director of Policy, Alan Nymark, all of whom were closely involved with the Research Program and played key roles in the contribution of Research to the Final Report. We wish to express our appreciation to the Commission's Administrative Advisor, Harry Stewart, for his guidance and advice, and to the Director of Publishing, Ed Matheson, who managed the research publication process. A special thanks to Jamie Benidickson, Policy Coordinator and Special Assistant to the Chairman, who played a valuable liaison role between Research and the Chairman and Commissioners. We are also grateful to our office administrator, Donna Stebbing, and to our secretarial staff, Monique Carpentier, Barbara Cowtan, Tina DeLuca, Françoise Guilbault and Marilyn Sheldon.

Finally, a well deserved thank you to our closest assistants: Jacques J.M. Shore, *Law and Constitutional Issues*; Cynthia Williams and her successor Karen Jackson, *Politics and Institutions of Government*; and I. Lilla Connidis, *Economics*. We appreciate not only their individual contribution to each research area, but also their cooperative contribution to the research program and the Commission.

IVAN BERNIER  
ALAN CAIRNS  
DAVID C. SMITH



The Canadian Economic Union figured prominently in Canada's political debate when the Commission was being formed. Interprovincial barriers to the movement of products and the factors responsible for such barriers were of particular concern. Political rhetoric was highly charged at that time. However, the only available estimate of the economic costs of such restrictions — rudimentary and fragmentary as they were — suggested that the resource misallocations at issue were actually quite small. It was, therefore, an obvious task for the Commission to attempt to resolve the apparent paradox. This study by John Whalley and Irene Trela is our contribution to that debate. It provides a complete and up-to-date discussion of the number and variety of interprovincial barriers and constitutes the first rigorous attempt to assess their economic costs.

The study goes further, however.

In the course of their work, the authors concluded that provinces tend to erect economic barriers partly as a defensive reaction to other economic and social policies which are considered to be unfair to, or at least not supportive of, their provincial interests. In this context, barriers are recognized as part of a larger concept — a concept referred to by the authors as the “Balance Sheet of Confederation”. Accordingly, the authors have incorporated other work on policy-related modelling which has been supported in part by the Social Sciences and Humanities Research Council of Canada. The authors have thus underscored their attempt to provide a thorough and rigorous analysis of a variety of long-standing policy issues. Some readers may question the authors’ “Balance Sheet” approach, but none can deny that their work repre-

sents a significant advance in our knowledge of the functioning of the Canadian Economic Union.

The original draft was completed in late 1984 and has been updated where feasible.

KENNETH NORRIE



## ACKNOWLEDGMENTS

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First and foremost, we would like to acknowledge the contributions of our collaborators Robert Hamilton, Richard Jones and France St-Hilaire, all of whom were associated with the Economics Department at the University of Western Ontario when this study was conducted. Each made special and unique contributions to the project. We are grateful for the support we received at the Royal Commission from Ken Norrie, David Smith and Alan Nymark, as well as the assistance and comments provided by Joyce Martin and Mireille Éthier. We also received help from the Social Science Computing Laboratory at the University of Western Ontario. Valuable comments on earlier drafts were provided by Robin Boadway, Thomas Courchene, Wayne Thirsk, François Vaillancourt, Anwar Shah, and anonymous referees. Outstanding secretarial support was provided by Barb Ross. Diane Paquette and Sue Mousseau of the Royal Commission word processing unit provided excellent typing of the original draft and revisions. Ruth Crow, Anna Jarvis and Janice Russell provided editorial support for which we are most grateful.

J.W. AND I.T.



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# Introduction

The main purpose of this study is to draw together and, where possible, advance the current state of knowledge about the regional impacts of various policy elements within Confederation, without in any way pretending to be able to settle matters once and for all. The approaches used expand on the existing but limited quantification of regional issues under Confederation. The main theme developed is that while the interregional interplay among policy elements within present-day Confederation is indeed complex, a few key policy features are dominant. Also, the regional impacts of some of the policy elements at issue appear to operate in ways which are opposite to either conventional wisdom or their intended effects.

Two recent developments provide the main points of departure from previous work. The first is new data on interprovincial trade flows and demand and production by region, which provide a more complete source of interregional accounts than has been available to previous researchers working on these issues. The second is quantitative general equilibrium modelling, which in recent years has come to be labelled “applied general equilibrium analysis.”

Using these techniques, analytically well-defined behavioural economic models can be numerically specified in a way that enables the regional impacts of the various policy elements to be evaluated within a single consistent framework. The compounding and offsetting effects of policies with one another can be investigated and component policies ranked in terms of their relative significance to particular regions. These techniques enable the researcher to quantify by region the gains and losses from the various policy elements. This technique is used alongside traditional partial equilibrium analysis, whose application

through diagrammatic techniques to regional issues of Confederation is surprisingly underdeveloped.

The policies examined include:

- federal nation-building policies that seek to insulate and, in the minds of some, to strengthen the national economy, such as energy policies, transportation policies, and protection under the national tariff;
- intergovernmental transfers, including those under equalization, Established Programs Financing, and the Canada Assistance Plan;
- provincial policies that fragment the economic union, such as government procurement preferences for in-province contractors, limits on interprovincial mobility of labour, and special arrangements intended to attract investments into the province; and
- other policies with significant regional impact, such as federal tax and transfer policies, foreign trade policies beyond the tariff (i.e., textile quotas and protection for domestic agricultural producers), and federal expenditure policies applying to regional development.

All of these elements have surfaced at times in debates on the future of Confederation, either as evidence of fragmentation of the national economy and the need for a strong centralizing force, or as evidence that one region gains from Confederation at the expense of others and that federalism is unbalanced. Quantification of their regional impacts is clearly central to any attempt to move debates on Confederation onto a higher plane.

In addition to regional gains and losses from individual policy elements, a number of other issues are discussed in the study. These include the impact of our federal arrangements on the national allocation of resources, both spatially and across industries, and the extent to which the various policy elements compound and offset one another. Our results are intended to give some indication of the degree to which Confederation misallocates resources and of the implications of our federal arrangements vis-à-vis the international economy. Is there a surplus from Confederation, as is often claimed, which is dissipated through inappropriate policies? Or do our federal arrangements take the Canadian economy in opposite directions to those dictated by international comparative advantage, so that rather than a surplus being associated with Confederation, there is a deficit?

## **Policy Elements within Confederation**

The evolution of Confederation since 1867 has brought different elements into the policy mix that characterizes federal-provincial arrangements of today. The three components of policies that are emphasized here are nation-building policies, intergovernmental transfers, and policies that fragment the economic union. Table 1-1 lists the major policy

**TABLE 1-1 Key Policy Elements within Confederation with  
Regional Impacts**

---

**Federal Nation-Building Policies**

The federal tariff  
Transport policies  
Energy policies

**Intergovernmental Transfers**

Equalization payments to provinces  
Established Programs Financing (EPF)  
Canada Assistance Plan (CAP)

**Provincial Policies that Fragment the Economic Union**

Barriers/distortions affecting the free flow of goods between provinces (i.e., government procurement policies, provincial marketing boards, liquor commissions, provincial trucking regulations, provincial taxes, standards)

Barriers to interprovincial labour mobility (e.g., provincial licensing of professions, restrictions in trades)

Barriers/distortions affecting interprovincial capital allocation (e.g., tax preferences to in-province investment, business subsidies, provincial heritage funds, provincial Crown corporations)

**Other Policies with Significant Regional Impacts**

Features of the federal tax system that favour or discriminate against industries that are regionally concentrated (e.g., the manufacturers' sales tax, the manufacturing and processing incentive in the corporate tax, and the corporate tax itself)

Other aspects of federal taxes and transfers (e.g., unemployment insurance benefits, impacts of the progressive federal income tax when provinces differ in per capita incomes, transfers to the elderly when average age differs by province)

Wider aspects of trade policies beyond the tariff (i.e., textile quotas under the Multi-Fibre Arrangement, the Auto Pact, agricultural protection through federal marketing boards)

Regional development programs administered by the Department of Regional Industrial Expansion

Agricultural policies (e.g., cash payments, cheap loans)

---

elements involved and groups them under the categories identified earlier. Table 1-2 outlines the main features of each policy. More details on these policies are given in the appendix to this volume.

Nation-building policies have their origins in the National Policy of 1879. Perhaps the most important feature of the policies of that time still remaining today is the national tariff, which was introduced with the aim of providing a secure domestic market for domestic products. More recent policies relating to energy also fit within the nation-building category, with self-sufficiency in crude oil and increased Canadian ownership and control of the energy industry as their major objectives.

**TABLE 1-2 Summary of the Main Features of Policies Listed in  
Table 1-1**

Federal tariff	Tariffs on selected imports (primarily manufactures) (average tariffs on manufactures currently around 8 to 10 percent)
Transport subsidies	Subsidies on grain shipments under the Crow's Nest Pass Agreement and subsequent National Transportation Acts
Energy policies <sup>a</sup>	Price controls on conventional old oil and natural gas at below world prices; exploration and development grants under PIP; oil import subsidies; increased Canadian ownership and control of energy industry through Canadianization program
Equalization payments	Transfers to provinces with below five-province average "fiscal capacity"; financed from federal tax revenues
Established Programs Financing	Equal per capita transfers to provinces to fund health care and post-secondary education
Canada Assistance Plan	Federal funding for welfare assistance and social services on a cost-shared basis
Provincial impediments to free flow of goods	Assortment of policies affecting free flows of goods between provinces
Provincial impediments to capital flows	Policies used by provinces to encourage in-province investment by residents
Provincial impediments to labour mobility	Restrictions on interprovincial mobility for certain trades and professions
Federal manufacturers' sales tax	Manufacturing-level sales tax on manufactures produced in or imported into Canada
Federal manufacturing and processing incentive	Reduced corporate tax rate on profits associated with manufacturing and processing activity
Corporate tax (federal)	Tax on profits of incorporated business
Federal transfers to persons	Old age security and other federal transfer programs
Unemployment insurance	Benefits to cover periods of unemployment; benefit period depends on regional unemployment rate
Restrictions on textiles	Bilateral restraint agreements and quotas under the Multifibre Arrangement
Auto Pact	Bilateral free trade between the United States and Canada in autos and parts, negotiated in 1965
Federal marketing board protection	Prohibitions, quotas on imports of certain foodstuffs
DRIE	Regional incentive program to develop depressed regions
Agricultural policies	Cash payments, cheap loans, and other programs to aid farmers

a. This description is prior to the energy agreement of spring 1985.

The major present-day intergovernmental transfer programs have their origins in the 1930s and the problems associated with the Depression, especially the inability of provinces to raise sufficient funds to pay for local goods and services. The central elements are equalization payments, federal-provincial transfers under Established Programs Financing (EPF), and cost-sharing arrangements under the Canada Assistance Plan (CAP).

Provincial policies which are seen as fragmenting the economic union are a more recent addition to the set of policies whose regional impacts have entered debates on Confederation. They were the subject of much discussion during the constitutional debate in 1979 and 1980, and remain central to current debates. The concern voiced at the time by the federal government was that provincial policies designed to provide in-province preferences of various kinds have the net result of fragmenting the economic union. The implication is that the use of these policies should be controlled in order to preserve the gains from the economic union. The range of these policies is large and difficult to document precisely. A valuable summary by Trebilcock et al. (1983) divides these policies into those that impact on interprovincial flows of goods and those that impact on interprovincial factor flows.

Beyond these three broad areas of policy elements in Confederation, there are also other policies that have substantial regional impacts but do not fit naturally into these classification groups. These are mainly federal policies which usually do not have the explicit objective of generating particular regional impacts but nonetheless produce significant regional effects. Included are the federal tax and transfer systems (including unemployment insurance) and foreign trade policies beyond the federal tariff. Many other federal policies, such as those applying to agriculture or regional development, also have explicit regional impacts.

## **Perceptions of Regional Impacts of Policies**

Over the years, different arguments have been made about whether and how these policy elements bring about gains or losses to particular regions. These debates have led to the widespread acceptance of various perceptions of regional impact that have been crucial in framing the response from regions of the country to possible changes in federal arrangements. In most cases these perceptions reflect a particular model of the way the economy works, and it is useful for the purposes of later discussion to make these models explicit.

Table 1-3 summarizes some of the more common perceptions of regional impacts of policies within Confederation, along with the key assumptions necessary for the claimed effects to occur. In Table 1-4 these perceptions are presented in summary form as a qualitative picture of possible impacts by region, with the Atlantic provinces consolidated into a single region.

**TABLE 1-3 Some Common Perceptions of Regional Gains and Losses from Policy Elements within Confederation**

	Losers	Gainers
<b>Nation-Building Policies</b>		
Federal tariff	Western and Atlantic provinces	Manufacturing provinces (Ontario, Quebec)
Transport subsidies	Tax-paying non-Prairie provinces	Prairie provinces
Energy policies	Energy-producing provinces	Energy-consuming provinces
<b>Intergovernmental Transfers</b>		
Equalization	“Have” provinces	“Have not” provinces
Established Programs Financing	Tax-paying wealthier provinces	Low per capita income provinces
Canada Assistance Plan		
Welfare assistance	Tax-paying provinces with a low proportion of welfare recipients	Provinces with a high proportion of welfare recipients (usually high unemployment provinces)
Social services	Other tax-paying provinces	Provinces with a stronger preference for cost-shared services
<b>Provincial Impediments to Goods and Factor Flows</b>		
Provincial barriers to flows of goods		
<i>If</i> provinces are small, open, price-taking economies:	Provinces imposing the barrier	None <sup>a</sup>
<i>If</i> provinces can influence their terms of trade:	Probably province facing the barrier	Probably province imposing the barrier

Provincial interferences with free interprovincial capital flows	None	Province imposing the barrier
<i>If</i> provinces are small, open, price-taking economies:		
<i>If</i> provinces can influence rental rates on natural capital market:	Probably province imposing the barrier	Probably province facing the barrier
Provincial barriers to labour mobility		
<i>If</i> provinces are small, open, price-taking economies:	None	Province imposing the barrier
<i>If</i> provinces can influence wage rates on national labour markets:	Probably province imposing the barrier	Probably province facing the barrier

**Federal Tax System**

Manufacturers' sales tax	Ontario, Quebec	Western and Atlantic provinces
<i>If</i> tax is borne primarily by consuming provinces:		
<i>If</i> tax is borne primarily by producing provinces:	Western and Atlantic provinces	Ontario, Quebec



**TABLE 1-3 (cont'd)**

	<b>Gainers</b>	<b>Losers</b>
Manufacturing and processing incentive in the corporate tax	Western and Atlantic provinces	Ontario, Quebec
<i>If tax break benefits manufacturing-consumer provinces:</i>		
<i>If tax break benefits manufacturing-producing provinces:</i>	Ontario, Quebec	Western and Atlantic provinces
The corporate tax		
<i>If tax passed forward to consumers as higher prices:</i>	Western and Atlantic provinces	Ontario, Quebec
<i>If tax borne by recipients of corporate profits:</i>	Ontario, Quebec	Western and Atlantic provinces
Progression in the federal income tax	Provinces with lower per capita income (Atlantic provinces)	Provinces with high per capita income (Ontario, Alberta)
<b>Federal Transfers to Persons</b>		
Old age security	Provinces with larger fractions of retirees (Quebec, Atlantic provinces)	Provinces with smaller fractions of retirees (western provinces, Ontario)
Unemployment insurance	Provinces with more generous benefit formulae and with higher unemployment rates (e.g., Atlantic provinces)	Other tax-paying provinces

### Non-Tariff Trade Policies

Textile quotas	Quebec	Textile-consuming provinces
Restrictions on energy exports	Unclear	Energy-producing provinces
Auto Pact	Ontario <sup>b</sup>	Other provinces <sup>b</sup>
Protection through marketing boards	Producers in all provinces	Consumers in all provinces

### Regional Development Programs

DRIE	Atlantic provinces, Quebec	Other tax-paying provinces
------	----------------------------	----------------------------

### Agricultural Policies

Cash payments, cheap loans	Prairie provinces	Other tax-paying provinces
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a. Later in this study, an interregional transfer effect from interprovincial barriers to goods flow is emphasized which can occur even in the small, open, price-taking economy case. Where provinces are jointly price takers in international trade, with some provinces being interprovincial exporters and others interprovincial (and international) importers, the effect of a federal tariff (assuming interprovincially immobile factors) is to cause an interregional transfer in favour of the interprovincial exporting region. This effect can be offset by the interprovincial (and international) importing region imposing a trade barrier against interprovincial imports. This effect, however, has not yet entered popular discussion of the impacts of interprovincial barriers and so is not included in the table above.

b. There are no provisions of the Auto Pact that are formally either detrimental to regions other than Ontario, or beneficial to Ontario. This popular perception is based on the argument that Canada has used its international trade negotiating opportunities to yield benefits to an industry heavily concentrated in Ontario. In fact, the benefit to Ontario is duty-free access to the larger U.S. market for its auto and auto parts exports, but other regions also benefit from lower consumer prices on autos.

TABLE 1-4 A Synthesis of Commonly Perceived Gains and Losses From Policies by Region

Policy Element	B.C.	Alberta	Sask.	Manitoba	Ontario	Quebec	Atlantic Provinces
Federal tariff	-	-	-	-	+	+	-
Transport subsidies	-	+	+	+	-	-	-
Energy policies	-	-	+	+	+	+	+
Equalization	-	-	-	+	-	+	+
Established Programs Financing	-	-	+	+	-	+	+
Canada Assistance Plan	?	-	-	+	-	+	+
Provincial barriers to goods flows	?	?	?	?	?	?	?
Provincial barriers to capital flows	?	?	?	?	?	?	?
Provincial barriers to labour mobility	?	?	?	?	?	?	?
Manufacturers' sales tax	?	?	?	?	?	?	?
Manufacturing and processing incentive	?	?	?	?	?	?	?
Corporate taxes (federal)	?	?	?	?	?	?	?
Progression in the federal income tax	-	-	+	+	-	+	+
Old age security	-	-	-	-	?	+	+
Unemployment insurance	- (?)	-	-	?	-	+	+
Textile quotas	-	-	-	-	-	+	+
Restriction on energy exports	-	-	?	?	?	?	?
Auto Pact	?	?	?	?	+	?	?
Marketing board protection	-	+	+	+	-	-	-
DRIE	-	-	-	-	-	-	+
Agricultural policies	-	+	+	+	-	-	-

The arguments surrounding the regional impacts of each of these policies run approximately as follows.

### *The Federal Tariff*

While the federal tariff is not explicitly designed to have interregional effects, it is commonly seen as benefitting manufacturing industry, which is mainly concentrated in Ontario and Quebec, at the expense of the manufacturing-consuming provinces in the West and in Atlantic Canada. The argument underlying this view is based on the fact that there are higher tariffs on manufactures than on non-manufactured products. This permits manufacturers in central Canada to sell their goods behind a tariff wall at a price above the world price, and enjoy higher sales to other provinces than would occur in the absence of the tariff. The manufacturing-consuming provinces and consumers throughout Canada are worse off, since they are forced to pay higher prices than would exist were the tariff absent. This view, of course, reflects the explicit intent of the National Policy, which was to promote a strong national market. The fact that this perception of regional impact is so deeply ingrained in the Canadian political economy should therefore hardly be surprising.

Central to this argument, however, is the assumption that factors of production are interregionally immobile. Existing empirical studies of the regional effects of the federal tariff all reflect this assumption. Shearer et al. (1971), for instance, concludes that in income terms, British Columbia would be made better off by around 5.5 percent if the federal tariff were unilaterally removed. Pinchin (1979) estimates that in income terms, Ontario and Quebec are made better off by around 1 percent due to the tariff.

More recently, this perception has been questioned on several grounds. One is that while it may be realistic in the short run to assume interregional factor immobility, in the longer run this assumption is invalid. Indeed, if factors of production are perfectly mobile interregionally, there will be no interregional impacts on factor incomes from the tariff, since factor rewards will be equalized across provinces. In this event, it becomes difficult to talk in terms of particular regions being made better or worse off by the tariff.

Another line of argument recently advanced is that the federal tariff operates so as to make all provinces worse off. In Harris's (1984) recent work on trade policy in Canada, for instance, a key feature is the domestic rationalization effect in manufacturing produced by elimination of the federal tariff. Economies of scale are assumed to exist in Canadian manufacturing, as well as non-competitive behaviour by firms. In the non-competitive case, collusion is assumed to occur among Canadian manufacturers around a focal point of the world price gross of

the tariff. Removing the tariff would lower domestic prices and force a reduction in the number of firms as each firm moves down its average cost curve, producing a national gain as Canadian manufacturing is rationalized. Manufacturing-consuming provinces would gain from lower prices, but manufacturing-producing provinces would also gain — by exploiting economies of scale in order to meet increased competition from abroad.

Melvin (1985) implicitly makes the same point but invokes a different argument. He emphasizes the role of the federal tariff in inducing east-west interprovincial trade, which involves high transportation costs, in place of international north-south trade, which involves lower transportation costs. In the extreme case, where the tariff exactly offsets the differential between interregional and international transportation costs, the tariff raises prices to consumers but leaves manufacturing producers no better off. The West and Atlantic provinces are worse off and central Canada no better off than without the tariff, since it merely serves to generate socially wasteful transportation activity. Removing the tariff in this analysis can benefit all regions.

Another criticism of the traditional view of the interregional impact of the federal tariff is the danger of attributing all gains and losses caused by the tariff within a region to the residents of that region. Because of interregional asset ownership, even if factors of production are assumed immobile between regions, it does not follow that changes in rewards to factors located in a region will be reflected in changes in the incomes of residents of that region. Thus, if manufacturing located heavily in central Canada is assumed to gain from the tariff, but due to financial intermediation the residents of western Canada (or even abroad) have significant claims on the incomes of factors used in these industries, not all the effects of protection will be borne by residents of central Canada. Unfortunately, the strength of these effects cannot be assessed because there are currently no data available on the degree of interprovincial asset ownership.

These alternative views of the regional impacts of the tariff have not yet been assimilated into popular discussions of regional impacts within Confederation. The federal tariff is still seen as protecting central Canadian manufacturing industries and inflicting higher prices on western and Atlantic provinces. It therefore remains as one of the main western grievances in Confederation and, to western eyes at least, is frequently portrayed as living evidence of how central Canada uses Confederation to exploit the West. However, the issues raised in discussing regional impacts of the tariff — i.e., the importance of interregional factor mobility, whether the relative effects across regions sum to zero, and the complications of interregional asset ownership — arise in evaluating regional impacts of all policy elements within Confederation, not just the tariff.

## *Transport Subsidies*

Over the years, transportation subsidies under the Crow Rate have provided low-cost transportation for grain producers in the Prairie provinces. Although there is some disagreement as to whether the subsidies benefit only grain producers or whether consumers also benefit, they are usually seen as benefitting the Prairie provinces at the expense of the tax-paying non-Prairie provinces.

The argument runs as follows. Canada is assumed to be a price taker for grains on world markets, and therefore subsidies on transportation of grain have no effect on the world price. Consequently, the effect of such subsidies is to raise the price received by grain producers in the Prairie provinces (net of transportation costs), benefitting Prairie farmers.

The counter argument, that the subsidy benefits central Canadian consumers as well as western Canadian producers, is based on the alternative assumption that Canada is a significant supplier of grain to world markets. In this case, transportation subsidies increase the supply of grain, which in turn drives down world prices. In the limiting case where the world demand function for grain is perfectly inelastic, transportation subsidies leave prices received by Prairie farmers unchanged, but lowers prices to consumers, including those in central Canada. Western farmers are made no better off by the subsidy, but consumers abroad and in central Canada gain. Nationally, Canada loses from the subsidy since we receive lower prices for our exports.

A further argument is that because of the Crow Rate, political pressure from Prairie states in the United States has resulted in subsidized transportation for grain down the Mississippi River. Thus, Canadian transport subsidies have the effect of driving down the world price for our grain by inducing reciprocal policy actions on the part of our major competitor in export markets.

However, the consensus view remains that the Crow Rate subsidy represents a transfer to western farmers paid for largely by taxpayers in central Canada. This view has been repeatedly endorsed in government background papers and other documents, including the recent Gilson Report (1982) on Western Grain Transportation. The force of this argument will, of course, weaken in the years ahead as the subsidy element in the Crow Rate is reduced. While less important than the Crow Rate subsidy, other policies have also been alleged to have interregional effects, one being long/short haul discriminatory pricing by the railways.<sup>1</sup>

## *Energy Policies*

The common perception of energy policies is that because price controls restrict domestic energy prices to below world prices, the gainers are the

energy-consuming provinces and the losers the energy-producing provinces. This issue of interregional impacts of energy policies was interregionally divisive in the late 1970s and early 1980s when the gap between controlled and world prices was large. As the gap narrowed through the 1980s, the level of interregional conflict fell, and with the signing of the Western Accord in the spring of 1985, regional conflict over the issue has been even less marked.

Put simply, the argument is that Canada faces fixed world prices for energy products which remain unchanged regardless of the energy policies adopted by Canada. The effect of ceiling prices on energy (with similar producer prices applying to exports) is to lower prices to both consumers and producers. In addition to their effects on production and consumption, a further effect is a transfer of energy rents from energy-producing to energy-consuming provinces.

The situation in reality is more complicated than this, since in the past the regional impacts of energy price controls have been offset to some extent through federal exploration incentives, such as Petroleum Incentive Program (PIP) grants (except in Alberta, which finances its own PIP grants). However, PIP grants, as introduced in the National Energy Program (NEP), applied only to exploration and development activities and involved no reverse transfer of rents on oil and natural gas discovered prior to January 1, 1981. The PIP grants replaced the earlier super depletion allowance and compensated for the reduction in the earned depletion allowance, both of which resulted in lower corporate taxes for energy industries, and produced a reverse interregional transfer of rents on existing oil and natural gas. One of the major changes under the NEP from the previous system of controls, therefore, was the elimination of a reverse transfer of rents on existing assets which previously counteracted some of the rent transfer from the price controls.

A further complication with this commonly held perception concerns the issue of who would receive the additional rents if price controls were ended. The view that a major interregional transfer of rents occurs from the western provinces to the rest of Canada under the price controls presumes that the rents belong to producing provinces. In fact, however, a substantial fraction of the leases for exploration are owned by foreign (chiefly U.S.) firms. Estimates for 1984 show that foreign ownership of the oil and natural gas industry was in the order of 61 percent of existing proven reserves in Canada.<sup>2</sup> Thus, an alternative view of the impact of energy policies is that price controls primarily transfer rents from foreigners to Canadian consumers. Under this view, western provinces are not so heavily affected by price controls as is often supposed, since western ownership of petroleum and natural gas is smaller than foreign ownership.

The issue is the difference between actual and potential rents accruing to regions. Western claims on energy rents lie not only in the ownership

of energy resources by residents of western provinces, but also in their power to tax them through royalties. Hence, in the absence of price controls, western provinces would be able to collect more of the now larger energy rents through increased royalties. If this occurred, there need be no increase in the rents accruing to foreign-owned oil companies. The issue, therefore, is whether price controls largely transfer potential tax revenues (via foregone taxable rents) from western provinces to consuming provinces, or actual rents from foreigners to Canadian consumers.

Indeed, it has been argued that the reasons why Canadian energy policies have come to rely heavily on price controls lie in the nature of our federal arrangements. Because provinces are able to tax energy rents through royalties, they can extract their portion of these rents before the federal government can lay any claim through further taxes. This sequencing in taxing authority restricts the ability of the federal government to use taxes on energy rents to redistribute rents between provinces. The only other vehicle by which the federal government can redistribute energy rents more widely beyond producing provinces is price ceilings which lower energy prices to consumers. These are available to the federal government because of its powers to regulate interprovincial trade.

The treatment of energy rents has perhaps been the most important issue, quantitatively, in the evaluation of regional impacts of policies within Confederation over the last decade. This has been the case even though the size of the interprovincial transfers involved has fallen in recent years as domestic prices moved closer to world prices. This suggests that careful attention must be paid to the treatment of energy in evaluating regional aspects of Confederation, a theme strongly emphasized in later chapters. The importance of this issue, however, has clearly been reduced since the recent signing of the Western Accord between the governments of Canada and the energy-producing provinces of British Columbia, Alberta and Saskatchewan, and readers should note that the data used in this study relate to a period prior to this agreement.

This Boadway-Flatters argument has attracted a lot of attention and is now widely agreed to present a strong efficiency case for an equalization system. However, the design of the current equalization system does not correspond to what this model would require. Firstly, fiscal equalization is based on the use of a five-province standard consisting of British Columbia, Saskatchewan, Manitoba, Ontario and Quebec. Such an equalization program has created excess fiscally-induced out-migration from Ontario to Alberta (since no direct transfers occur under equalization between the two provinces), and has inhibited market-driven immigration to Ontario from Atlantic Canada. Secondly, the fiscal equalization program is not self-financing. Instead, equalization transfers are



financed out of general federal revenues, implying that some provinces may have above-average fiscal capacity. Thirdly, implicit rents (i.e., hydro-electricity rents and other energy rents beyond royalty revenues) do not show up as provincial revenues (and therefore are not subject to equalization), but rather are passed on to consumers in the form of lower prices. Some therefore argue that Boadway and Flatters have provided a more coherent rationale for equalization than that given by the Rowell-Sirois Commission, and that the equalization system should be changed to more fully offset incentives for fiscally-induced migration.

Courchene (1983b) has augmented the Boadway-Flatters argument by advocating that if efficiency is used as a rationale for equalization-based interregional transfers, then the equalization formula should take into account not only interprovincial differences in fiscal capacity, but also the expenditure needs of provinces. Only an equalization scheme which considers both fiscal capacity and fiscal need would be consistent with the objective of offsetting incentives for fiscally-induced migration. But in practice it is difficult to measure provincial needs on a comparable basis, and therefore the current equalization system continues to be based on tax capacity alone.

### ***Established Programs Financing***

The EPF system, recently renamed to reflect its current, more categorical basis, provides equal per capita transfers to provinces to allow them to provide post-secondary education and health care at specified standards. Under the earlier arrangements, provinces were not obliged to meet minimum standards. As a result of the federal government's concern for national standards for health care,<sup>3</sup> legislation in 1984 separated the three previously "established" programs (hospital insurance, medicare and post-secondary education) into two separate programs: one for post-secondary education and one for insured health services.

Prior to the recent change in the federal-provincial fiscal arrangements, there had been a number of disputes over details of EPF which were perceived to produce interprovincial effects. The transitional guarantees introduced in 1977 tended to favour the low-income provinces. Also, the tax transfers under the program differed by province on a per capita basis and lower-income provinces also tended to benefit from this. However, since 1982, when EPF was modified to provide sufficient financing for equal per capita provision of public services, the major interprovincial redistributive effects have been concentrated on the tax side (i.e., in the ways in which revenues needed to finance EPF have been raised).

Besides these perceptions of regional gain and loss from EPF is the argument that cost-sharing leads to a larger combined public sector than would exist without it. Whether this is in fact the case depends upon

whether regional governments would reduce their tax collections by an amount equivalent to any increase in funds they would receive from the federal government under such programs as EPF. One can argue, however, that under EPF and the new financing arrangements which followed, any previous over-expansion of the public sector was grandfathered into the new arrangements when the programs were changed, although these effects have generally diminished over time due to population growth.

### *Canada Assistance Plan*

The Canada Assistance Plan was designed to encourage the further development and extension of welfare assistance and social services programs by provinces. While CAP is a smaller program than EPF, the arguments over its regional impacts are similar to those with EPF. Cost-sharing of these programs increases disparities between provinces, as those provinces with the stronger preference for cost-shared services and/or larger numbers of welfare recipients spend more and therefore receive a greater share of federal support, with the other tax-paying provinces footing the bill. Another issue similar to that with EPF is whether cost-sharing leads to an over-expansion of the total (federal-provincial) public sector.

### *Provincial Impediments to Flows of Goods and Factors*

In examining provincial impediments to the free flow of goods and factors, the issue is not one of regional gain or loss, but rather whether the national interest is undermined by provinces each independently pursuing their own policies to restrict or promote flows. The key arguments revolve around the capacity of provinces to affect the prices at which they trade with each other. One frequent argument concerning provincial impediments to goods flows mimics standard international trade theory. If provinces are small, open, price-taking economies (i.e., if the supply curve they face from other provinces or from abroad is perfectly elastic), then the only effect of erecting an interprovincial trade barrier is to impose losses on themselves. In this case, provinces bear the burden of their own interprovincial trade barriers through higher prices.

Over the last five or so years, the federal government has been concerned about the threat of increased fragmentation of the Canadian economic union which would follow from provinces pursuing beggary-neighbour policies. If provinces can influence their terms of trade, the province imposing the barrier may gain. Whether they gain or not depends upon considerations well known in trade theory involving the

relation between the size of the barrier and the optimal tariff for that region.<sup>4</sup>

The optimal tariff, or optimal level of protection through interprovincial trade barriers, is that level of protection at which further gains from improved terms of trade would be offset by additional losses from lower trade volumes. Generally speaking, optimal trade barriers will be higher the smaller (in absolute value) are the import supply and export demand price elasticities which a province faces in its trade with other provinces. The province facing the barrier is made worse off when such barriers are imposed.

Unfortunately, the empirical evidence as to whether or not provinces are small, open, price-taking economies is limited, making it difficult to settle the issue conclusively one way or the other. Most economists seem to be more inclined towards the small, open economy model as representative of the way provincial economies actually work. To the extent this is true, it suggests both that provinces may bear the burden of their own protection, with little cost imposed on other provinces, and that the incentives to engage in such activity are small. In making such arguments, one has to be careful, however, to treat separately the larger provinces such as Ontario and Quebec and the smaller provinces such as the Maritimes.

A complication in this line of argument is that one role of provincial policies is to offset interprovincial redistribution effects of federal policies. In the case of interprovincial trade barriers, such a line of argument arises from their interaction with federal trade policies such as the tariff. If the federal tariff has the effect of stimulating interprovincial trade and generating an interprovincial transfer, interprovincial trade barriers can be used by provinces that are interprovincial net importers to offset the redistributive effects of federal policies. Such an argument was made by Saskatchewan during the constitutional debate a few years ago. The Saskatchewan argument was that interprovincial barriers are a necessary policy option for provinces in dealing with the inequities of the federal system. A further corollary of this argument is that the severity of provincial impediments may be directly linked to the structure of federal policies — in this case, the federal tariff.

The arguments concerning impacts of interprovincial impediments or inducements to factor flows are similar. If provinces are small, open, price-taking economies on both interprovincial and international capital markets but labour is interprovincially immobile, the main effect of any province subsidizing investment in its region is to expand the amount of capital employed in the province, with no implications for other provinces. In this case there is no capital misallocation between provinces, only misallocation within the province following capital inducement policies. On the other hand, if provinces can influence rental rates on national or international capital markets, a set of issues similar to those

with goods flows will arise. Policies to restrict factor flows can improve the factor terms of trade in much the same way that goods-restricting policies can improve the commodity terms of trade. However, most economists find it more realistic to assume close to perfect interprovincial capital mobility and probably also international capital mobility.

Similar issues arise with labour mobility. If provinces are small, open, wage-taking economies and capital is interprovincially immobile, then provinces that erect barriers to labour mobility bear the burden of their own barriers through foregone real income gains to interprovincially immobile capital. On the other hand, if provinces can influence wage rates on national markets, they can make themselves better off through labour mobility restrictions.

The case where both capital and labour are interprovincially perfectly mobile is difficult to deal with, since the factor which is immobile between provinces and which gains or loses as a result of mobility restrictions needs to be carefully specified. In the modelling analyses of regional impacts of policies described in subsequent chapters, we have assumed the perhaps more realistic case of factors which are partially mobile between provinces, particularly for labour markets where locational preference may be traded off against real income gains from moving.

However, in all cases of barriers to either goods or factor flows, even if provinces can influence their terms of trade or influence rental or wage rates on national markets, it is uncertain whether particular provinces will gain or lose from barriers if all provinces erect barriers jointly rather than unilaterally. One complication with unilateral action is retaliation by other provinces. A province that erects barriers may be better off initially, but worse off after retaliation. Most of the interprovincial barriers at issue are currently used by some or all provinces, and their effect in total is unclear.

The point of comparison when evaluating regional impacts of interprovincial impediments to free flows of goods and factors should clearly be for all provinces to eliminate barriers simultaneously, rather than for one province to eliminate barriers in isolation from other provinces. Existing work in trade theory on these issues, such as Johnson (1958), Gorman (1958) and Hamilton and Whalley (1983), suggests that the larger provinces are more likely to gain from the use of such barriers than smaller provinces, even after all retaliation is complete, since they have more capacity to manipulate the terms at which they trade interprovincially in goods and factor markets.

### *The Federal Tax System*

Analysis of the federal tax system raises issues similar to those with interprovincial barriers — namely that under one set of assumptions

one series of regional implications follows, while under alternative assumptions the implications are reversed. For example, the manufacturers' sales tax is imposed on manufactures imported or produced in Canada, and the issue becomes whether the tax is borne by producers or consumers of manufacturing products. If the tax is borne by consuming provinces, then the tax is shifted from Ontario and Quebec to western and Atlantic manufactures-consuming provinces. On the other hand, if the tax is borne by producing provinces, then the converse situation occurs. There is only limited empirical evidence on the extent of such tax shifting, and to the knowledge of the present authors, no study of the regional impacts of the manufacturers' sales tax exists.

Similar issues arise with the manufacturing and processing incentive in the corporate tax which lowers the corporate tax rate on these industries. Here, if the tax break is assumed to be passed on to consuming provinces in the form of lower product prices, western and Atlantic provinces gain at the expense of Ontario and Quebec. On the other hand, if the tax break is assumed to be passed back to factor owners, it benefits manufactures-producing provinces, and the converse situation occurs. A similar argument applies to the corporate tax itself, since manufacturing (and thus incorporated activity) tends to be regionally concentrated.

### *Federal Transfers to Persons*

In the area of federal transfers, the major program usually cited as having regional impacts is unemployment insurance (UI). If unemployment is viewed as a regionally stochastic phenomenon (i.e., ex ante all provinces having the same chance of experiencing a higher than average unemployment rate), UI operates as a pure insurance program. Ex ante, UI will have no regional impacts, but ex post higher unemployment provinces receiving UI will gain at the expense of other tax-paying provinces. It seems unrealistic to treat regional unemployment rates as purely stochastic since their regional concentration reflects an adjustment process between regions that has been underway for many years. To this extent, regional gains and losses from UI arise, reflecting differences in geographical unemployment rates.

UI further discriminates among provinces to the extent that the number of weeks a person has to work before he can receive benefits varies across provinces, depending on the provincial unemployment rate. In addition, more generous benefit formulas apply to high unemployment provinces through longer benefit periods. Low unemployment provinces are therefore generally perceived to be the ones that lose from UI, both through smaller benefit periods and smaller net fiscal benefits (the difference between premiums paid and UI received). The variability of unemployment across provinces can also be a significant influence on regional impacts under the program.

Other transfer programs are also often perceived as having significant

regional impacts. One is old age security, because of the pattern of distribution of retirees in Canada. Provinces with older populations, on average, are generally thought to gain, while those with younger populations lose.

### *Non-Tariff Trade Policies*

In the trade policy area, a number of policy features beyond the tariff itself are also viewed as having regional impacts. For instance, it is widely agreed that the principal beneficiary from textile quotas is Quebec, since this is the main textile-producing province. Textile-consuming provinces and consumers of textiles throughout Canada are losers. Jenkins (1980) has recently argued that the economic loss from textile quotas is over four times the loss from tariffs on textiles, primarily because of the transfer of quota values to countries exporting to Canada under the Multi-Fibre Arrangement. This suggests that there are potentially more significant regional impacts from quotas than from tariffs.

Another feature of our trade policies for which regional impacts are sometimes claimed is the Auto Pact, which provides for duty-free trade between Canada and the United States in motor vehicles and automotive parts. Quebec has long argued that it derives little benefits from the Auto Pact, since the agreement provides for sectoral free trade in an industry heavily concentrated in Ontario. The argument outside Ontario is that our trade-negotiating leverage has been used to secure an agreement primarily useful to Ontario. It is also widely agreed that Ontario has been the major beneficiary from the production guarantees in the agreement. The situation is more complex than this, however. Ontario benefits from improved access to world markets for its exports, but loses from lower protection on its interregional exports to Canadian markets in other regions.

Protection through federal agricultural marketing boards is a further element of our trade policies with regional impacts. Although there are many different types of marketing boards in Canada, supply management marketing boards are the most stringent, imposing barriers to both interprovincial trade through regulations on output, entry and prices, and international trade, through import quotas. The main effect of such arrangements is to increase incomes of producers at the expense of increased costs to consumers. In addition to the redistribution between producers and consumers within regions, there are also interregional impacts, since some provinces are net importers of particular agricultural products while others are net exporters.

### *Regional Development Programs*

Regional development programs, operated by the Department of Regional Economic Expansion (DREE) up to 1982 and subsequently by

the Department of Regional Industrial Expansion (DRIE), have traditionally been seen as favouring the poorer provinces. A number of existing regional development programs were first introduced in the 1960s and early 1970s. In quantitative terms, the budget cost of the programs has been relatively small, although their regional concentration has had a non-negligible effect on per capita incomes of poorer provinces. Major areas of regional impact have been the Atlantic provinces and Quebec, which are almost universally perceived as the major gainers from these programs.

### ***Agricultural Policies***

In the agricultural policy area, a number of programs provide farm assistance. Among these are direct output subsidies, crop insurance, loan guarantees and/or capital grants, storage and/or freight assistance, and trade promotion. The purpose of such programs has been to raise farmers' incomes and improve their income stability. Prairie provinces are generally perceived as the main gainers from such programs and other tax-paying provinces as losers.

### **Techniques Used to Evaluate Regional Impacts of Policies within Confederation**

To evaluate regional impacts of the more important of these policies in Confederation, this study uses a 1981 microconsistent interregional data set for Canada which records production, demand, and interregional and international trade<sup>5</sup>, along with data on the policy elements. Counterfactual analyses using this data set are performed for various changes in policies, using both partial equilibrium and general equilibrium techniques.

These two techniques are used simultaneously because each has certain advantages and disadvantages over the other. The general equilibrium techniques allow policy impacts to be investigated in a single, consistent, economy-wide framework in which the interacting effects of various policies come into play. However, in several cases the detailed impacts of each of the policies are better captured by partial equilibrium analysis, which allows their features to be investigated without the requirement to repeatedly change a single economy-wide model and make it progressively more complicated.

The general equilibrium model used is parameterized and solved numerically, and is used for counterfactual equilibrium analysis as to the possible regional impacts of alternative policy changes.<sup>6</sup> In simple terms, the approach involves the strong assumption that the economy under investigation, in this case the interregional economy within Canada, is in an equilibrium situation in the presence of existing policies

in some benchmark year. The model is calibrated to data for the benchmark year in order to generate parameter values for the functions which define the model. The model when solved without a policy change should then reproduce the benchmark equilibrium data as a model solution.

Counterfactual equilibrium analysis then proceeds by altering one or more of the policies appearing in the model, and determining the new equilibrium associated with the new policies. As a result of a policy change, resource allocation, relative prices, and the distribution of income both within and across provinces will change. Individuals will move between provinces. Some industries will expand and others will contract. Some commodities will increase in price and others will fall. Relative incomes of individuals in some provinces will increase while those of others will fall. By tracing out this whole set of interactions, the model provides a picture of the changes across regions from the policy changes and quantifies their effects.

It is important, however, to be clear on the interpretation of results obtained from the approach. The spirit of the exercise is to use a consistent theoretical framework incorporating the best available estimates of key parameter values. No exact forecasting is claimed; results merely provide counterfactual simulations as to how things would have been under the model assumptions if this or that policy had operated in a different manner for a long enough time to complete all required long-run equilibrium adjustments in the economy. In practice, many things in the economy besides the policy regime will change as a new equilibrium is being approached, and the time scale for adjustment may or may not be substantial. Any forecasts based on such analysis are therefore not firmly based.

Despite these qualifications, however, the questions which can be addressed by such a model are still relevant to debates on regional impacts of various policy elements within Confederation. Are the regional impacts large or small compared to the impacts on the national economy of other policies, such as the tax system, foreign trade policies, regulatory activity, or anti-combines legislation? What are the most important of the various policy elements, and how do they compound or offset each other? How much uncertainty is there over the impacts of policies because of the lack of adequate data and parameter estimates? Does Confederation emerge as a grand compromise between regional interests, as some have suggested, or do certain regions do better than others and if so, why? How could this set of arrangements be improved? For instance, would it be nationally desirable to change, or even remove, our current system of equalization payments? The general equilibrium approach provides some insight on all of these questions.

Under the partial equilibrium approach, diagrammatic analysis provides the analytic framework used to evaluate the regional impacts of



policies. A series of diagrams, currently not in the literature, are developed and used to implement the quantitative evaluations of regional impact using this approach. Through this approach, more detailed features of each of the policy elements at issue can be investigated than in the single economy-wide general equilibrium model, but the overall consistency of analyzing all policies in a single model is sacrificed.

By way of example, in analyzing the regional impacts of interprovincial trade barriers, the general equilibrium model treats them all in *ad valorem* tariff-equivalent form. In fact, none of them are of this form, and each has its own distinctive features. For instance, provincial procurement policies introduce distortions in favour of own-province production, as would be true under a tariff, but the consumption side-effects of a tariff are missing. Provincial marketing boards involve quota allocations on both interprovincial and international imports, in addition to within-province quotas. Provincial trucking regulation may control both prices and quantities. A partial equilibrium approach can capture these effects by focussing on the details of each policy component in a series of separate analyses. Simultaneously integrating the details of all these policies into a single, consistent, general equilibrium framework is clearly a formidable task, and beyond the scope of the present project. For most of the partial equilibrium analyses, the features of the policies to be investigated are also too detailed to use the level of aggregation in the 1981 data set used in the general equilibrium model. Therefore, these data are supplemented by more detailed information from the 1979 Provincial Input-Output Tables. Estimates of other key parameters are also used.

The plan of the study is as follows. Chapter 2 deals with the partial equilibrium diagrammatics of regional impact. Chapter 3 lays out the structure of the general equilibrium model used. Chapter 4 presents the benchmark data and other key parameters. Chapters 5 and 6 present a sequence of policy analyses which explore the regional impacts of each of these policies. Chapter 6 also synthesizes the main themes of the study and explores their implications for possible approaches to a redesigned federalism. The appendix describes in more detail the various policy elements within Confederation.



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## Some Partial Equilibrium Diagrammatics on Interregional Policy Effects

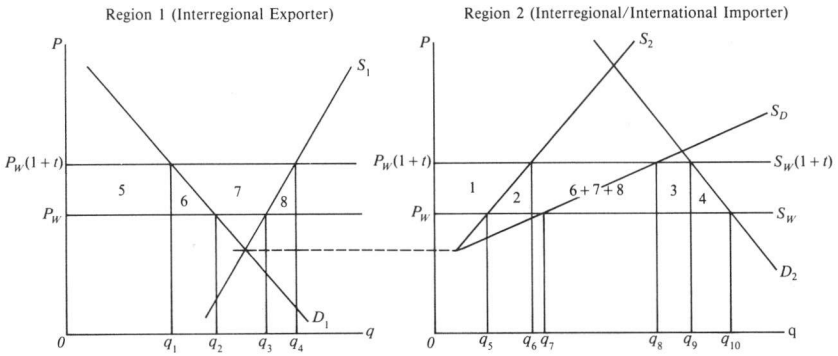
Perhaps the simplest technique through which to explore the interregional effects of policies within Confederation is partial equilibrium demand-supply analysis. Surprisingly, simple as this technique may seem, nowhere in the existing literature are the interregional policy impacts set out in this way, even though partial equilibrium analysis provides strong intuition as to what the interregional policy impacts will be even in more complicated general equilibrium analysis. The analysis here is simplified to the extent that interregional impacts of each of the various policies are considered under the assumption that there are no distorting policies other than the one under examination. But because these diagrams are useful in interpreting the results of the interregional general equilibrium model which follows in later chapters, they are presented in some detail at this point. They are also used subsequently as the basis for partial equilibrium quantification of regional impacts under Confederation.

### **Interregional Effects of the Federal Tariff**

The basic partial equilibrium diagram showing the interregional impacts of policy elements within Confederation is common to many of the analyses presented in this chapter. The case of the federal tariff applying to a single industry or commodity is presented in Figure 2-1.

In this analysis two regions are considered, each of which both produces and consumes a single commodity. Region 1 is a net exporter of the commodity in question in interregional trade both before and after the imposition of the tariff, but in neither case does it trade internationally. Region 2 is assumed to be a net importer in both interregional and

**FIGURE 2-1 Interregional Effects of the Federal Tariff**



international trade before and after the imposition of a national tariff on imports of the commodity. Factors of production are assumed to be both internationally and interregionally immobile, and owners of factors used in a region are also assumed to be located within the same region. Both regions are assumed to be takers of prices internationally; consumers and producers in regions 1 and 2 thus initially face a given world commodity price  $P_w$ .

The demand function for the commodity in region 1 is given by  $D_1$ , and in region 2 by  $D_2$ . The local supply function in region 1 is given by the upward-sloping curve  $S_1$ . Region 2 can purchase the commodity from any of three different sources: local production, interregional imports, and international imports. The curve  $S_2$  represents the upward-sloping local supply function in region 2. The domestic supply function in region 2 (equal to  $S_2$  plus interregional import supply) is represented by the upward sloping curve  $S_D$ . The difference between  $S_1$  and  $D_1$  represents interregional export supply by region 1, also given by the difference between  $S_D$  and  $S_2$  in region 2.

In the absence of a tariff on the commodity, the quantity demanded by consumers in region 1 is  $q_2$ , and the quantity supplied by producers is  $q_3$ . In region 2, the quantity demanded by consumers is  $q_{10}$ . Of this,  $q_5$  is supplied locally,  $q_7 - q_5$  is imported from region 1, and  $q_{10} - q_7$  is supplied internationally.

If the federal government imposes a tariff on the commodity at the rate  $t$ , the price facing both consumers and producers in the two regions increases by the full amount of the tariff to  $P_w(1+t)$ . As a result, the quantity demanded by consumers in region 1 falls to  $q_1$ , and the quantity supplied by producers increases to  $q_4$ . In region 2, the quantity demanded by consumers falls to  $q_9$ , while the quantity supplied by producers in the region increases to  $q_6$ , and interregional imports increase to  $q_8 - q_6$ . International imports by the region decrease to  $q_9 - q_8$ .

The effects of the tariff on each region can be calculated as follows:<sup>1</sup>

<u>Region 1</u> <u>(Interregional Exporter)</u>		<u>Region 2 (Interregional/ International Importer)</u>	
areas of consumer loss	- 5 - 6	areas of consumer loss	- 1 - 2 - 3 - 4 - 6 - 7 - 8
areas of producer gain	+ 5 + 6 + 7	area of producer gain	+ 1
net gain to region 1	+ 7	area of tariff revenue (assumed returned to region 2)	+ 3
		net loss to region 2	- 2 - 4 - 6 - 7 - 8

The national welfare effect of the tariff is as follows:

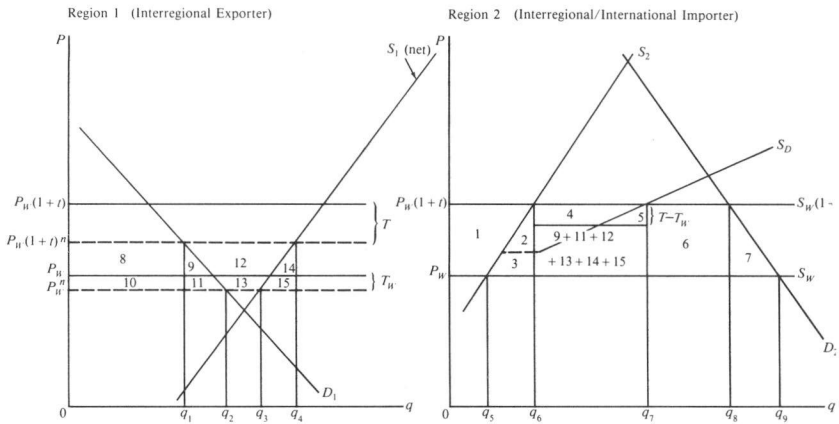
net gain to region 1	+ 7
net loss to region 2	- 2 - 4 - 6 - 7 - 8
national welfare loss	- 2 - 4 - 6 - 8

Figure 2-1 indicates that in this one-commodity partial equilibrium diagram there is an interregional transfer effect associated with the federal tariff. This is given by the value of interregional trade times the tariff rate less the consumer and producer surplus (areas 6 and 8). If the elasticities of the demand and supply schedules in region 1 are small, the interregional transfer effect will be approximated by the value of interregional trade times the tariff rate. Interestingly, the national costs of the tariff are borne exclusively by region 2, which then suffers a further loss from the interregional transfer effect.

While Figure 2-1 represents the traditional view as to the interregional effects of the tariff, more recent literature due to Melvin (1985) has also focussed on its effect in generating socially wasteful transportation costs as part of the increased interregional trade associated with the federal tariff. If interregional and international trade take place both with and without the tariff, then the methodology for evaluating the interregional effects of the tariff is the same as for the case in which transport costs do not exist. The only difference is that a distinction needs to be made between the supply functions for region 1 gross and net of transport cost.

The analysis differs from the traditional approach when interregional

**FIGURE 2-2 Interregional Effects of the Federal Tariff in the Presence of Transportation Costs, but Where Interregional Trade Does Not Exist in the Absence of the Tariff**



*Note:* The  $S_D$  curve in region 2 is discontinuous at the point where the federal tariff is high enough to induce producers in region 1 to switch from international to interregional trade.

transport costs are higher than the costs of transporting internationally, thus discouraging any flow of commodities interregionally in the absence of the tariff, but where interregional trade flows are generated in the presence of the tariff. This case is shown in Figure 2-2. Transport costs of a fixed amount  $T$  per unit shipped interregionally are assumed to apply to exports to region 2, and transport costs of a fixed amount  $T_w$  per unit shipped internationally are assumed for international exports.  $T$  is assumed to be higher than  $T_w$ , so no interregional trade exists in the absence of the tariff.

In the absence of a tariff the net-of-transport-cost price received by producers in region 1 is given by  $P_w^n$ , and they supply  $q_3$ . Consumers in the region also pay this price, and demand  $q_2$ . Excess supply  $q_3 - q_2$  is exported internationally. In region 2, consumers and producers face the world price  $P_w$ . Thus, producers in the region supply  $q_5$ , and consumers demand  $q_9$ . Excess demand  $q_9 - q_5$  by region 2 is satisfied entirely by international imports.

If a tariff is imposed at the rate  $t$ , producers in region 1 receive a higher net price  $P_w(1 + t)^n$  if they switch from international to interregional trade. As a result, producers in region 1 increase their supply to  $q_4$ , and consumers decrease their demand to  $q_1$ . In region 2, the price facing consumers and producers increases to  $P_w(1 + t)$ . Thus, consumers in the

region decrease their demand to  $q_8$  and producers increase their supply to  $q_6$ . Interregional imports by region 2 increase to  $q_7 - q_6$ , while international imports decrease to  $q_8 - q_7$ . If the tariff revenues are returned in lump sum form to the region importing internationally, the effects of the tariff on each region are as follows:

<u>Region 1 (Interregional Exporter)</u>		<u>Region 2 (Interregional/ International Importer)</u>	
areas of consumer loss	- 8 - 9 - 10 - 11	areas of consumer loss	- 1 - 2 - 3 - 4 - 5 - 6 - 7 - 9 - 11 - 12 - 13 - 14 - 15
areas of producer gain	+ 8 + 9 + 10 + 11 + 12 + 13	area of producer gain	+ 1
net gain to region 1	+ 12 + 13	area of tariff revenue (assumed returned to region 1)	+ 6
		net loss to region 2	- 2 - 3 - 4 - 5 - 7 - 9 - 11 - 12 - 13 - 14 - 15

The national welfare effect is:

net gain to region 1	+ 12 + 13
net loss to region 2	- 2 - 3 - 4 - 5 - 7 - 9 - 11 - 12 - 13 - 14 - 15
<u>national welfare loss</u>	<u>- 2 - 3 - 4 - 5 - 7 - 9 - 11 - 14 - 15</u>

Figure 2-2 therefore indicates that when transportation costs enter the analysis and the net effect of the tariff is to produce a switch between international and interregional trade, a further effect occurs which generates additional interregional transport costs (area 4 + 5) whose social benefit is zero. In the extreme case where  $T$  is significantly larger than  $T_w$ , the revenue from the tariff is fully dissipated as additional transport costs. This analysis, however, does not guarantee that there is a larger national cost of a tariff in the presence of transport costs. While the tariff may generate socially wasteful interregional transport costs, it also creates less production and consumption inefficiency in region 1 than in the no transport cost case (i.e., the production loss is areas 14 + 15 instead of area 8, and the consumption loss is areas 9 + 11 instead of

area 6). It is not clear whether the presence of interregional transport costs increases or decreases the national cost of a tariff.<sup>2</sup>

## Interregional Effects of Crow Rate Transportation Subsidies

Prior to the recent changes in transport subsidies following the Gilson report, regulated Crow Rate transportation rates covered only about 20 percent of the costs of transporting grain by rail within Canada. If Canada is assumed to be a taker of the world price for grain, this has the effect of raising farmgate prices in the West above the levels that would prevail in the absence of the subsidy. Under this analysis, the Crow Rate does not affect eastern feed grain prices; only the spread between prices in the Prairies and eastern Canada is changed.

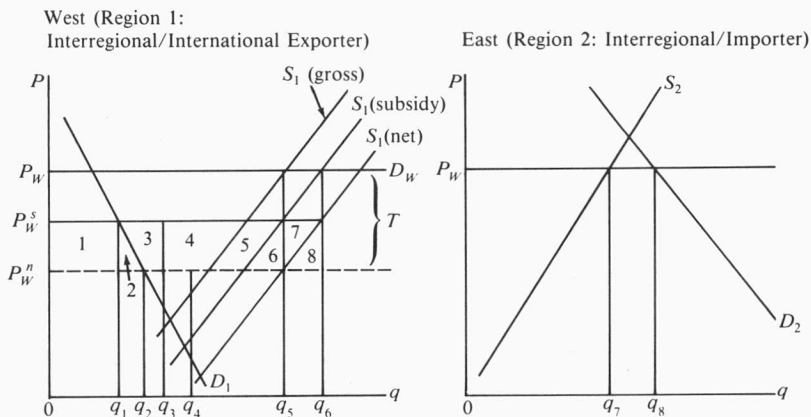
Figure 2-3 illustrates these effects. As before, two regions and a single commodity are assumed. The West is assumed to be a net exporter in both interregional and international trade with or without a Crow subsidy. The East is a net importer in interregional trade with or without a Crow subsidy, but in neither case does it trade internationally. Factors of production are both interregionally and internationally immobile, and both regions are assumed to be price takers on world markets. Consumers and producers in both the East and the West thus face a given world commodity price  $P_w$ .

The demand function in the East is given by  $D_1$  and in the West by  $D_2$ . The upward sloping curves  $S_1$  (gross) and  $S_1$  (net) represent the supply functions in the West net and gross of transport costs, respectively.<sup>3</sup> Excess supply in the West is exported both interregionally to the East and internationally. The local supply function in the East is given by the upward-sloping curve  $S_2$ . The difference between  $D_2$  and  $S_2$  represents interregional import supply to the East.

In the absence of the Crow Rate, the net price received by producers in region 1 is given by  $P_w^n$ , and they supply  $q_5$ . Consumers in the region also pay this price and demand  $q_2$ . Interregional exports to region 2 are equal to the difference between  $q_4$  and  $q_2$ , (the same as  $q_8 - q_7$  in region 2), and international exports are equal to the difference between  $q_5$  and  $q_4$ . Consumers and producers in region 2 face the given world price for grain  $P_w$ . As a result, the quantity demanded by consumers in region 2 is  $q_8$ , and the quantity supplied by producers is  $q_7$ . The difference  $q_8 - q_7$  is imported from region 1.

The effect of the Crow Rate subsidy is to raise grain prices in the West to  $P_w^s$ . The upward-sloping curve  $S_1$  (subsidy) represents the supply function in the West gross of the subsidy and net of transport costs. As a result, the quantity demanded by consumers in the West falls to  $q_1$ , and the quantity supplied by producers increases to  $q_6$ . Interregional exports from region 1 (given by the difference between  $q_3$  and  $q_1$ ) are the same as

**FIGURE 2-3 Interregional Effects of Transportation Subsidies Under the Crow Rate**



without the Crow subsidy, since producers and consumers in the East continue to face the world price  $P_w$ , and supply and demand  $q_8$  and  $q_7$ , respectively. International exports from region 1 increase to  $q_6 - q_3$ .

The impact on the West is as follows:<sup>4</sup>

West (Interregional/International Exporter)

areas of consumer loss                     $-1 - 2$

areas of producer gain                     $+1 + 2 + 3 + 4 + 5 + 6 + 7$

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net gain to the West                         $+3 + 4 + 5 + 6 + 7$

The national welfare effect is:

net gain to the West                         $+3 + 4 + 5 + 6 + 7$

cost of the subsidy                          $-2 - 3 - 4 - 5 - 6 - 7 - 8$

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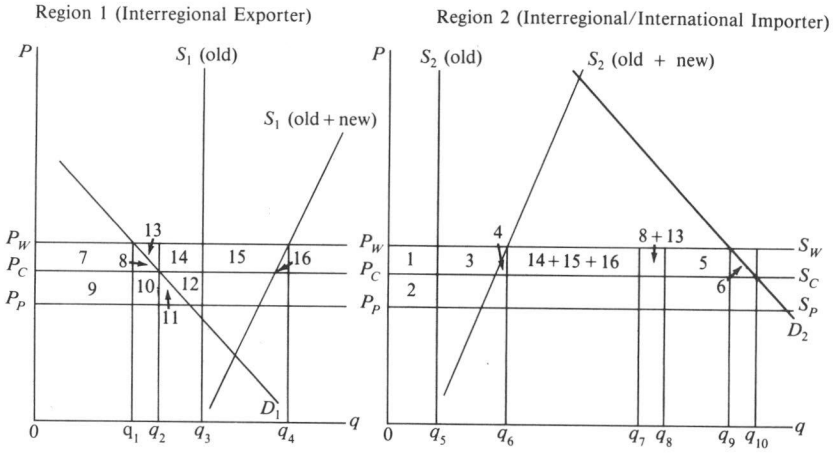
national welfare loss                         $-2 - 8$

**Interregional Effects of Federal Energy Policies**

One of the larger interregional redistributive effects under Confederation in recent years has been the transfers between regions associated with energy policies. Under the National Energy Program (NEP), as modified by the NEP Update and various federal-provincial agreements,



**FIGURE 2-4 Interregional Effects of the Blended Price System for Old and New Oil**



a blended price system for oil was used. This blended the costs of imported oil and various sources of domestic oil into one weighted-average price paid by energy users. Under the closely related revenue flowback system for natural gas, higher revenues from natural gas sales in the United States were pooled with revenues received from sales in the domestic market, and an average price was determined. The revenues were then allocated according to the quantities sold at the average price.

Figure 2-4 illustrates the interregional effects of such a blended price system, assuming there are no other distorting policies in place, such as consumer excise taxes or producer revenue taxes. Two regions are considered and a single commodity — oil. “New” and “old” oil are separately identified on the supply side to correspond to the distinction made under the NEP. “Old” oil is in inelastic supply; “new” oil is characterized by an upward-sloping supply function. New oil receives the world price, while sellers of old oil receive a lower controlled price.

In this analysis, region 1 is assumed to be a net exporter of oil in interregional trade before and after the introduction of the blended price system, but in neither case does it either export or import internationally. Region 2 is assumed to be a net importer of oil in both interregional and international trade before and after the introduction of the blended price system. Factors of production are both internationally and interregionally immobile, and both regions are price takers on world markets. Consumers and producers in regions 1 and 2 thus face a given world commodity price  $P_w$ .

The demand function for oil in region 1 is given by  $D_1$ , and in region 2 by  $D_2$ . The supply functions of old oil in the two regions are represented by the perfectly inelastic curves  $S_1$  (*old*) and  $S_2$  (*old*), indicating a fixed supply of old oil in each region. The upward sloping curve  $S_2$  (*old + new*) represents the supply function of old plus new oil in region 2. The difference between  $S_2$  (*old + new*) and  $S_2$  (*old*) represents the supply of new oil in the region. A similar notation applies for region 1. Supply of oil to region 2 thus comes from three sources: local production, inter-regional imports, and international imports. The export supply function for region 1 is given by the difference between  $S_1$  (*old + new*) and  $D_1$ .

In the absence of any price controls on oil, the quantity demanded by consumers in region 1 is  $q_1$ , and the quantity supplied by producers is  $q_4$ . The difference between  $q_4$  and  $q_1$  is exported to region 1. In region 2, the quantity demanded by consumers is  $q_9$ . Of this,  $q_6$  is supplied locally,  $q_8 - q_6$  is imported from region 1, and  $q_9 - q_8$  is supplied internationally.

If the federal government introduces a blended price system for oil, the price facing consumers in regions 1 and 2 decreases to  $P_c$  and the price facing producers of old oil decreases to  $P_p$ . If, however, a New Oil Reference Price (NORP) applies, as it used to under the NEP, producers of new oil in each region continue to receive the world price for their oil. The quantity of oil supplied by producers in each region stays the same, while the quantity demanded by consumers in region 1 increases to  $q_2$ , and the quantity demanded by consumers in region 2 increases to  $q_{10}$ . In region 2, interregional imports from region 1 decrease to  $q_7 - q_6$ , and international imports increase to  $q_{10} - q_7$ . If other components of the blended price system [such as the Petroleum Compensation Change (PCC) and the Canadian Ownership Special Charge (COSC) introduced under the National Energy Program] are set so as to leave no revenue in excess of the amount required to finance oil import compensation and the NORP subsidy, the effects of the blended price system on each region are as follows:

<u>Region 1 (Interregional Exporter)</u>		<u>Region 2 (Interregional/ International Importer)</u>	
areas of consumer gain	+7+8	areas of consumer gain	+1+3+4+5+6 +8+13+14 +15+16
areas of producer loss	-7-8-9-10 -11-12-13-14	areas of producer loss	-1-2
net loss to region 1	-9-10-11-12 -13-14	net gain to region 2	-2+3+4+5 +6+8+13 +14+15+16

The national welfare effect is:

net loss to region 1	-9 - 10 - 11 - 12 - 13 - 14
net gain to region 2	-2 + 3 + 4 + 5 + 6 + 8 + 13 + 14 + 15 + 16
<hr/>	
national welfare loss	-2 + 3 + 4 + 5 + 6 + 8 - 9 - 10 - 11 - 12 + 15 + 16

The interregional effects of a revenue flowback system on the natural gas industry are similar, except that the revenue flowback occurs for a commodity for which Canada has been an international net exporter rather than a net importer.

A further feature of the NEP was the incentives for oil and gas exploration and development under the Petroleum Incentives Program (PIP). These were originally designed to compensate for the phased elimination of earned depletion allowances, to provide a replacement for the former super-depletion allowance for frontier exploration, and to encourage investment by Canadian companies and individuals in energy industries. The program was paid for and administered by the federal government in all regions except Alberta; the latter agreed under the Ottawa-Alberta Pricing and Taxation Agreement (OAPTA) to pay for and administer incentives under the program for activities within its borders.

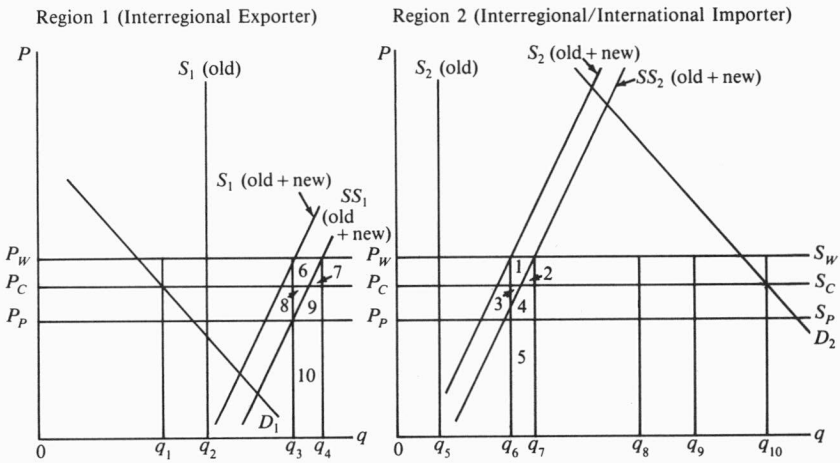
Abstracting from the fact that, for oil, PIP payments differed both by location and ownership characteristics of firms, the interregional effects of PIP grants are illustrated in Figure 2-5. The effect of the subsidy is to increase the supply of new oil in each region. Since the subsidy has no impact on the supply of old oil, the new post-incentive supply functions for old plus new oil are represented by the upward-sloping curves  $SS_1$  (*old + new*) in region 1, and  $SS_2$  (*old + new*) in region 2. As a result, the quantity supplied by producers in region 1 increases from  $q_3$  to  $q_4$ , and the quantity supplied by producers in region 2 increases from  $q_6$  to  $q_7$ . The quantity demanded by consumers in each region is unaffected by the subsidy. In region 2, interregional imports from region 1 increase from  $q_8 - q_6$  to  $q_9 - q_7$ , and international imports decrease from  $q_{10} - q_8$  to  $q_{10} - q_9$ .

The interregional effects of PIP grants for new oil are as follows:<sup>5</sup>

net gain to region 1 (ignoring financing costs)	+6 + 8
net gain to region 2 (ignoring financing costs)	+1 + 3
cost of the program	-1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - 10
<hr/>	
national welfare loss	-2 - 4 - 5 - 7 - 9 - 10

The interregional effects of PIP grants for new natural gas are similar.

**FIGURE 2-5 Interregional Effects of PIP Grants for Oil**



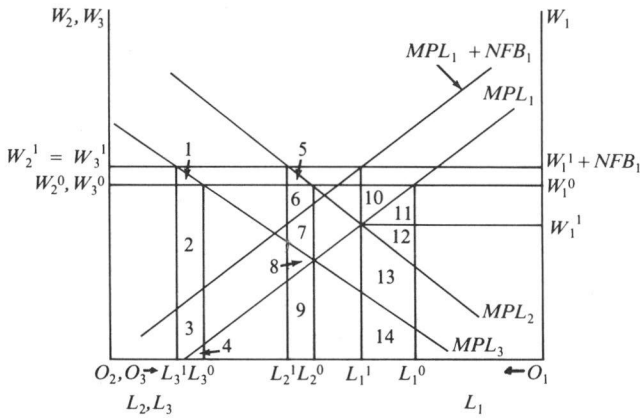
### Effects of Equalization on the Interregional Allocation of Labour

Equalization has both direct interregional transfer effects and indirect effects on the interregional allocation of labour. The direct effects need no diagrammatic analysis. Only the impacts on the interregional allocation of labour are considered here.

With a nationally segmented labour market, labour will flow between regions in response to interregional differences in their marginal productivities until these differences are eliminated. However, as Boadway and Flatters (1982) stress, in the presence of differential net fiscal benefits (NFBs) across regions, arising particularly from the presence of non-capitalized natural resource rents, efficiency conditions for optimal resource use will be violated since differences in wage rates across regions will reflect differences in NFBs received. The efficiency rationale for equalization is therefore to offset the desire by individuals to move between regions in response to differences in NFBs. As has already been pointed out, one reason why the current system of equalization is not able to fully offset fiscally-induced migration is that resource revenues from Alberta generate no equalization transfers to Ontario. Also, the equalization program is not self-financing (i.e., high-income provinces paying in and low-income provinces drawing from an interprovincial revenue-sharing pool). Thus, the current equalization program only partially offsets fiscally-induced migration, and creates an added distortion. By providing transfers to Atlantic Canada it impedes market-driven out-migration to Ontario.

Although the presence of non-capitalized resource rents is not the only source of differing NFBs across regions, (i.e., regional income

**FIGURE 2-6 Effects of Net Fiscal Benefits (NFBs) in One Region on the Interregional Allocation of Labour**



disparities will generate differential NFBs), it is the one being focussed on here. The impact of NFBs on labour flow decisions and the offsetting effects of equalization are illustrated in Figures 2-6 and 2-7. Three regions are considered in this analysis. Region 1 is assumed to be a resource-rich region, with substantial natural resource revenues accounting for positive NFBs. Regions 2 and 3 are assumed to be resource-poor regions, with no natural resource revenues and hence no NFBs. We assume a downward-sloping marginal revenue productivity of labour (MPL) schedule in regions 1, 2 and 3, labelled as  $MPL_1$ ,  $MPL_2$  and  $MPL_3$ . On the horizontal axis  $L_1$ ,  $L_2$  and  $L_3$  are labour located in these regions, and on the vertical axis  $W_1$ ,  $W_2$  and  $W_3$  are the nominal wage rates.

Figure 2-6 illustrates the effects of NFBs in region 1 on labour allocation in regions 2 and 3. With no NFBs, the equilibrium wage rate is  $W_1^0$  (which also equals  $W_2^0$  and  $W_3^0$ ).  $L_1^0$  is employed in region 1,  $L_2^0$  in region 2, and  $L_3^0$  in region 3. If region 1 introduces a tax on resource rents which generates positive NFBs, the factor reward schedule for labour in the region shifts to  $MPL_1 + NFB_1$ , where  $NFB_1$  is the amount of NFBs per capita in region 1. As a result, labour migrates from regions 2 and 3 in response to NFBs in region 1 (i.e., the claim on rents in region 1 they can exact through the provincial tax and expenditure system). The wage rate in region 2 increases to  $W_2^1$ , and in region 3 the wage rate increases to  $W_3^1$  (which also equals  $W_2^1$ ). The wage rate in region 1 decreases to  $W_1^1$ . Wage rates gross of NFBs are equal across the three regions, and the equilibrium levels of employment are given by  $L_1^1$ ,  $L_2^1$  and  $L_3^1$ .

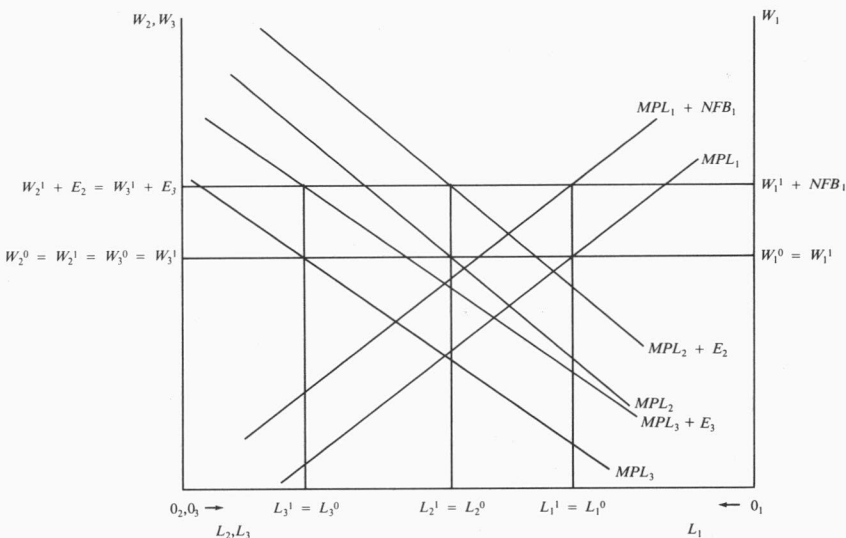
The national welfare costs associated with labour misallocations across regions in the presence of NFBs in region 1 are:

production gain in region 1	+ 11 + 12 + 13 + 14
production loss in region 2	- 5 - 6 - 7 - 8 - 9
production loss in region 3	- 1 - 2 - 3 - 4
<hr/>	
national welfare loss	- 1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 + 11 + 12 + 13 + 4 (= - 1 - 5 - 10).

Because the changes in labour use across the regions must satisfy the full employment condition, areas 2 + 3 + 4 + 6 + 7 + 8 + 9 must equal areas 10 + 11 + 12 + 13 + 14. Therefore, the national welfare cost can be recalculated as areas - 1 - 5 - 10.

The potential gain from implementing an equalization system is that it can offset the distortionary effects of NFBs arising from regional taxation of resource rents. Figure 2-7 illustrates how this can occur. With complete equalization, the factor reward schedules in regions 2 and 3 shift up such that the wage rate plus equalization per capita in each region is equal to the wage rate plus NFBs per capita in region 1. The new factor reward schedule in region 1 is given by  $MPL_1 + E_1$ , and in region 2 the new factor reward schedule is given by  $MPL_2 + E_2$ , where  $E$  is the amount of equalization paid per capita. The market equilibrium is the same as for the case where NFBs and equalization do not exist. Due to the offsetting effects of the equalization program, assumed here to be

**FIGURE 2-7 Effects of an Equalization System Which Exactly Offsets the Distorting Effects of NFBs**



financed by an equal per capita tax paid in all regions (and not shown), there are no distortionary effects from the presence of NFBS in region 1.

The current equalization system in Canada does not fully offset the distortionary effects of fiscally-induced migration flows, and creates added distortionary effects between low-income and high-income regions (see earlier discussion). Indeed, an equalization system which does not fully offset all the distorting elements of NFBS as they affect migration from non-NFB regions need not be superior to no equalization system at all, and is clearly inferior to a complete equalization system.

## Effects of Interregional Barriers to Free Goods Flows

Interregional trade barriers are usually thought to be harmful to small provinces who use them and nationally harmful since they fragment the national economic union. The various interregional barriers affecting the free flow of goods among Canadian provinces are listed in Chapter 1 (and described in more detail in the appendix), and each have quite different interregional effects. It is also important to note that interregional barriers can interact with federal policies in subtle and important ways.

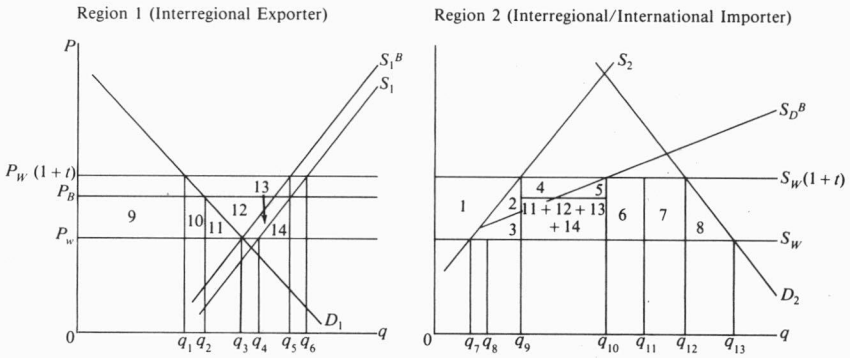
A case in point is the federal tariff which, as previously noted, in traditional analysis creates an interregional redistribution effect against interregional net importers. However, as Figure 2-8 indicates, in the presence of the federal tariff interregional trade barriers may be nationally improving.

In the presence of the federal tariff, the price facing consumers and producers in the two regions is the world price gross of the tariff [i.e.,  $P_w(1 + t)$ ]. In region 1, the quantity demanded by consumers is  $q_1$ , and the quantity supplied by producers is  $q_6$ . In region 2, the quantity demanded by consumers is  $q_{12}$ . Of this,  $q_9$  is supplied locally,  $q_{11} - q_9$  is imported from region 1, and  $q_{12} - q_{11}$  is supplied internationally.

The effect of an interregional trade barrier in region 2, levied at a rate below  $t$ , is to act as a regional tariff reducing interregional imports by the region. The upward-sloping curves  $S_1^B$  and  $S_2^B$  represent the domestic and local supply functions for regions 1 and 2, respectively, gross of the regional tariff. As a result of the barrier, the net of regional tariff price received by producers in the exporting region falls to  $P_B$ , and assuming region 1 does not export on world markets, prices to consumers in the region also fall. Consumers in the region increase their demand to  $q_2$ , and producers decrease their supply to  $q_5$ . The difference between  $q_6 - q_1$  and  $q_5 - q_2$  in region 1 (or  $q_{11} - q_9$  and  $q_{10} - q_9$  in region 2) represents the decrease in interregional trade resulting from the regional trade barrier.

Assuming federal tariff revenues are returned in lump-sum form to the importing region (see the earlier discussion of the interregional effects of

**FIGURE 2-8 Effects of an Interregional Trade Barrier Erected in Region 2 (presence of a federal tariff assumed)**



the federal tariff), the joint effects of the federal tariff and the regional trade barrier in this case can be calculated as follows:

<u>Region 1 (Interregional Exporter)</u>	<u>Region 2 (Interregional/ International Importer)</u>
areas of consumer loss	-9 - 11 - 12
areas of producer gain	+9 + 11 + 12 + 13 + 14
<hr/> net gain to region 1	<hr/> + 13 + 14
	areas of consumer loss
	-1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 12 - 13 - 14 - 15
	areas of producer gain
	+ 1
	areas of federal tariff revenue (assumed returned to region 2)
	+ 6 + 7
	areas of regional tariff revenue
	+ 4 + 5
	<hr/> net loss to region 2
	- 2 - 3 - 8 - 12 - 13 - 14 - 15

The national welfare effect is:

net gain to region 1	+ 13 + 14
net loss to region 2	- 2 - 3 - 8 - 12 - 13 - 14 - 15
<hr/> national welfare loss	<hr/> - 2 - 3 - 8 - 12 - 15



The national welfare costs associated with the federal tariff alone is as reported earlier in Figure 2-1 and shown here as areas  $-2-3-8-10-11-12-15-16-17$ . The comparison of these areas shows that in this case an interregional trade barrier in the presence of the federal tariff will be nationally welfare-improving. This analysis has the joint implications both that interregional trade barriers can undo the interregional redistributive effects of federal policies, and that they may be in the national interest.

While the specifics of each barrier differ quite sharply from the ad valorem interregional tariff case considered here, the analysis in Figure 2-8 illustrates how their interaction with federal policies needs to be carefully considered.

### ***Provincial Government Procurement Policies***

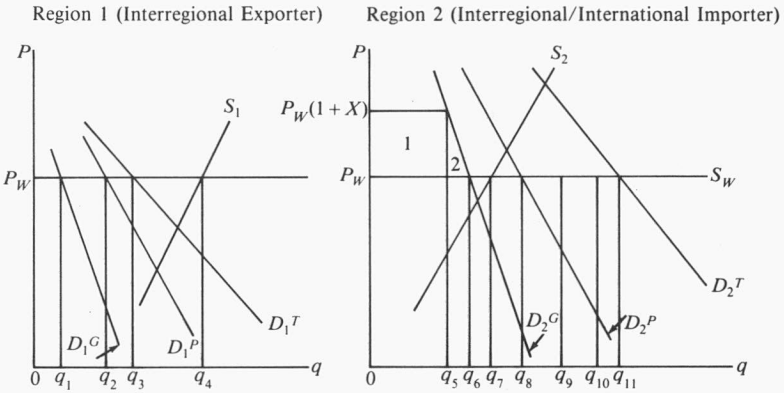
The free interprovincial flow of goods is also restricted by provincial government procurement policies which give preferential treatment to provincially produced goods or to goods with high provincial or Canadian content. Although there are several ways in which the preference may be given (see the appendix), provincial pricing preferences and provincial content preferences are the easiest to analyze, and therefore the ones being focussed on here.

The interregional effects of preferential pricing policies are illustrated in Figure 2-9. This figure uses similar assumptions to those of earlier sections. The main departure is that it is assumed that there are two types of purchasers in each region: the regional government and the private sector. The curves  $D_1^G$  and  $D_1^P$  represent the downward-sloping demand functions for goods in region 1 of the government and the private sector, respectively. A similar notation applies to region 2. The total demand function in region 1 (equal to government demand plus private sector demand) is given by  $D_1^T$ , and the total demand function in region 2 is given by  $D_2^T$ . In the diagram as shown, government demand in each region can be entirely satisfied by local production.

In the absence of preferential pricing policies, the quantity demanded in region 1 is  $q_3$  (equal to  $q_1$  demanded by the government plus  $q_2$  demanded by the private sector), and the quantity supplied by producers is  $q_4$ . In region 2, the quantity demanded is  $q_{11}$  (equal to  $q_6$  demanded by the government plus  $q_8$  demanded by the private sector). Of this,  $q_7$  is supplied locally,  $q_9 - q_7$  is imported from region 1, and  $q_{11} - q_9$  is supplied internationally.

In the presence of an in-province preferential pricing policy in region 2, bids for sale to government are only entertained from outside the region if they are at least  $X$  percent (as a percentage of the world price) less than the lowest bid offered by local suppliers.  $X$  thus represents the degree of preference given to local suppliers. As a result, the

**FIGURE 2-9 Interregional Effects of an In-Province Preferential Pricing Policy in Region 2**



quantity demanded by the government in region 2 decreases from  $q_6$  to  $q_5$ , and the total quantity demanded in region 2 decreases by the same amount from  $q_{11}$  to  $q_{10}$ . The quantity supplied by producers remains unaffected by the policy, since the price paid to domestic suppliers on marginal production is the same in both instances. International imports fall to  $q_{10} - q_9$ . In region 1, the quantity demanded and the quantity supplied remain at  $q_3$  and  $q_4$ , respectively, since both consumers and producers face the same world commodity price  $P_w$ .

The impact on region 2 is as follows:

Region 2 (Interregional/International Importer)	
areas of consumer (government) loss	- 1 - 2
area of producer gain	+ 1
net loss to region 2	- 2

The national welfare loss also equals the net loss to region 2.

The interregional effects of an in-province preferential pricing policy in region 2 which gives an  $X$  percent preference to local suppliers and a  $Y$  percent preference to other regional suppliers over foreign suppliers (assuming  $X$  is greater than  $Y$ ) cannot be simply illustrated using this diagram, due to our assumption that government demand is satisfied by local production. Alternative assumptions (i.e., government demand is satisfied by local production, interregional imports from region 1, and international imports) would only complicate the diagram, and for this reason the analysis focusses only on in-province preferential pricing policies.

Interestingly, if instead of an in-province preferential pricing policy, region 2 introduces a policy of giving a preference to provincial content,

then there are no interregional effects. The reason is that the quantity restrictions on the amount of locally produced goods purchased for government work are non-binding, since government demand is entirely satisfied by local production. Under alternative assumptions (i.e., government demand is satisfied by local production and interregional and international imports), there are still no interregional effects, since the buy-local policy which limits government purchases to within-region sources can be accommodated by changing the local-to-import mix of private sector purchases.<sup>6</sup>

If region 1 introduces an in-province preferential pricing policy or a provincial-content preference policy, the interregional effects are similar to those of procurement policies in region 2.

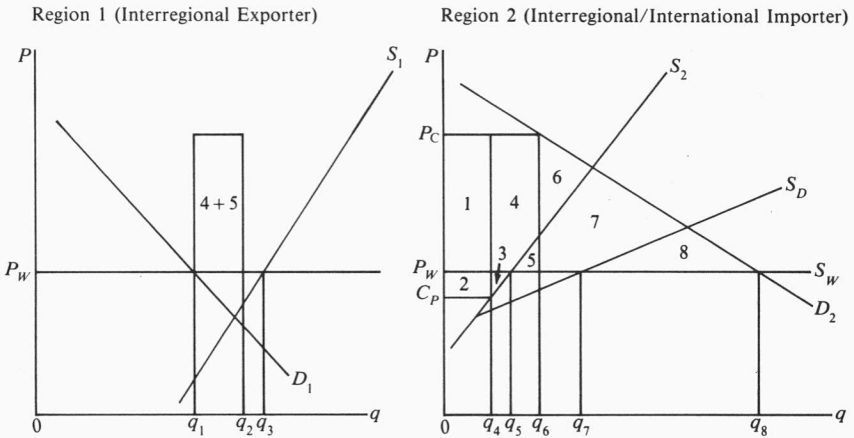
### ***Marketing Boards***

Marketing boards in Canada represent a significant area of government involvement in the agricultural sector, their coverage accounting for 59 percent of farm cash receipts in 1983/84.<sup>7</sup> Although there are five types of marketing boards in Canada, supply management boards are the most important, imposing restrictions on the behaviour of individual suppliers, and therefore are the ones focussed on here. Currently, four national supply management marketing agencies operate: CEMA (eggs), CCMA (chickens), CTMA (turkeys), and the CDC (dairy products). Provincial supply management boards regulate fresh fluid milk in all provinces and tobacco in Ontario. Supply management allows these agencies to impose import controls, determine entry to the industry, and set production quotas and prices. While the main issues with marketing boards concern impacts on consumers and producers within regions, the impacts of these boards on interregional trade, while more minor, have nonetheless been the subject of debate.

The interregional effects of provincial supply management policies are illustrated in Figure 2-10, constructed under similar assumptions as diagrams used in previous sections. Figure 2-10 analyzes a case where provincial supply management restrictions are introduced in region 2 which limit local production to  $q_4$ , limit interregional imports to  $q_6 - q_4$ , and disallow international imports. The approach is similar to that used earlier for two regions and one commodity.

Under these restrictions, the equilibrium price in region 2 becomes  $P_c$ , at which local demand equals local supply augmented by the interregional imports allowed under the quota. In this case, the interregional barrier makes the interregional exporting region better off, since the rents from the quota restrictions are shared between producers in the two regions. Producers in region 2 receive economic rents given by areas 1 + 2 and producers in region 1 exporting to region 2 receive economic rents given by areas 4 + 5. Excess supply in region 1, shown as the difference between  $q_3$  and  $q_2$ , is diverted to the international market.

**FIGURE 2-10 Interregional Effects of a Provincial Marketing Board Which Sets Quotas Within Province and for Interregional Trade**



Note:  $C_p$  is the marginal opportunity cost to producers in region 2 of supplying the restricted output  $q^4$ .

The interregional effects of the provincial supply management plan are:

<u>Region 1 (Interregional Exporter)</u>	<u>Region 2 (Interregional/International Importer)</u>
areas of producer gain	+ 4 + 5
areas of consumer loss	- 1 - 4 - 5
areas of producer loss	- 6 - 7 - 8
quota rent accruing to producers	- 2 - 3
net gain to region 1	+ 4 + 5
net loss to region 2	- 3 - 4 - 5 - 6 - 7 - 8
	- 8

The national welfare loss is:

net gain to region 1	+ 4 + 5
net loss to region 2	- 3 - 4 - 5 - 6 - 7 - 8
<hr/> national welfare loss	<hr/> - 3 - 6 - 7 - 8

If quotas are set in region 2 which limit local production, interregional imports and international imports, a similar analysis applies. In both cases, the region other than one imposing the interregional barrier can gain.

The effects of a national supply management policy which sets quotas on local production in each region are similar to those of provincial supply management policies, except that under the former additional production-side losses are created in region 1 by the quota. Similarly, the effects of a national supply management policy can be considered in cases where both interregional and international trade is allowed.

### *Provincial Liquor Policies*

An example of a specific interprovincial barrier is the presence of provincial liquor commissions with authority over buying and pricing policies for wine, spirits and beer.<sup>8</sup> Most of them exercise their authority so as to create barriers to interprovincial trade by giving preference to within-province producers.

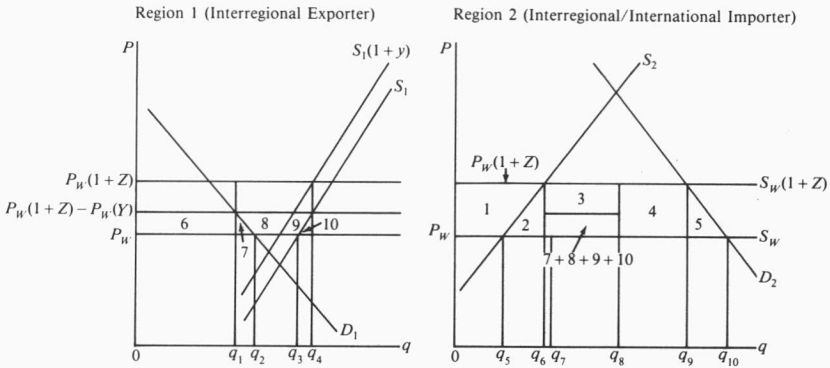
Provinces erect barriers to alcoholic products in three ways: discriminatory marketing in favour of within-province producers, including preferential pricing policies, quotas or taxes on private purchases from other provinces; and unique packaging requirements which make it costly for out-of-province products to enter the market. It is difficult to analyze the effects of all of these practices; here we emphasize the interregional effects of preferential pricing policies.

Figure 2-11 illustrates what can happen in the case of preferential pricing policies for liquor. As before with our analysis of the tariff, we assume two regions. Region 1 is a net exporter interregionally but neither imports nor exports internationally, and region 2 is a net importer both interregionally and internationally. Canada is assumed to be a price taker on world markets, and consumers and producers in regions 1 and 2 thus face a given world price  $P_w$ .

The demand function for liquor in region 1 is given by  $D_1$ , and in region 2 by  $D_2$ . The supply of liquor to region 2 comes from three sources: local supply, interregional imports from region 1, and international imports. The supply function in region 2,  $S_2$ , is upwards sloping, as is the supply function in region 1,  $S_1$ . The difference between  $S_1$  and  $D_1$  represents interregional export supply by region 1. In the absence of preferential pricing policies, the quantity demanded by consumers in region 1 is  $q_2$ , and the quantity supplied by producers is  $q_3$ . In region 2, the quantity demanded by consumers is  $q_{10}$ . Of this,  $q_5$  is supplied locally,  $q_7 - q_5$  is imported from region 1, and  $q_{10} - q_7$  is supplied internationally.

We now assume that region 2 introduces a preferential pricing policy by which it price discriminates on a graduated scale. Locally produced products are subject to a lower mark-up than interregional imports, which in turn are subject to a lower mark-up than international imports.

**FIGURE 2-11 Interregional Effects of a Preferential Pricing Policy for Liquor in Region 2**



Since it is the lower mark-ups on locally produced products that are interregionally contentious, throughout the discussion when we refer to mark-ups we will be referring to the difference in mark-ups between the interregional (and international) imports as compared to those on locally produced products. This is equivalent to the assumption that locally produced products are subject to a mark-up of zero percent, interregional imports subject to a mark-up of  $Y$  percent, and international imports subject to a mark-up of  $Z$  percent (with  $Y$  lower than  $Z$ ). The new supply functions are denoted by  $S_1(1 + Y)$  and  $S_w(1 + Z)$ . The supply function for locally produced products in region 2 remains the same.

As the result of the pricing policy introduced by region 2, the quantity supplied by producers in region 1 increases to  $q_4$ , and the quantity demanded by consumers falls to  $q_1$ . In region 2, the quantity demanded by consumers falls to  $q_9$ , while the quantity supplied by producers increases to  $q_6$ . Interregional imports in region 2 increase to  $q_8 - q_6$ , while international imports fall to  $q_9 - q_8$ .

The interregional effects of the pricing policy pursued by region 2 are as follows:

<u>Region 1 (Interregional Exporter)</u>		<u>Region 2 (Interregional/ International Importer)</u>
areas of consumer loss	- 6 - 7	areas of consumer loss
		- 1 - 2 - 3 - 4 - 5 - 7 - 8 - 9 - 10
areas of producer gain	+ 6 + 7 + 8 + 9	area of producer gain
		+ 1
		tax revenues
		+ 3 + 4
net gain to region 1	+ 8 + 9	net loss to region 2
		- 2 - 5 - 7 - 8 - 9 - 10

The national welfare loss is:

$$\begin{array}{r}
 \text{net gain to region 1} \quad +8+9 \\
 \text{net loss to region 2} \quad -2-5-7-8-9-10 \\
 \hline
 \text{national welfare loss} \quad -2-5-7-10
 \end{array}$$

In this case, even though a national welfare loss results, a gain occurs for the region not imposing the policy (region 1) since its products, even though less preferentially priced than those of the region pursuing the policy, are preferentially priced compared to international imports.

### ***Provincial Regulation of Trucking***

A further set of restrictions often cited as affecting the free interregional flow of goods and services is provincial regulations of for-hire trucking, which consist principally of rate and entry control. The nature and extent of these controls varies considerably from province to province, and to say that the regulatory system in Canada is complex is almost an understatement.

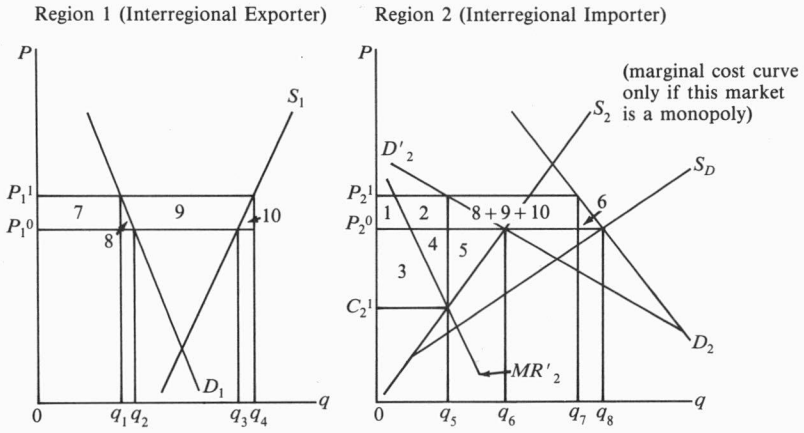
Tariff bureaus (which are discussed in the appendix) are maintained by the trucking industry in all the provinces. These bureaus allow for rate coordination by providing consolidated information on tariffs to carriers and shippers. In conjunction with entry restrictions which limit competition, these bureaus facilitate cartelized activity, allowing carriers to maximize their collective profit by restricting output and increasing price.

The economic rent associated with any trucking licence, however, can easily be dissipated by both the direct costs of participating in the regulatory process and the indirect costs of reduced efficiency.

Figure 2-12 illustrates the interregional effects of trucking regulations with entry control but no effective rate control, assuming that there are no direct or indirect costs associated with the regulatory activity. Two regions are considered. Under the assumption that there is no international trade in trucking, the trucking market is nationally segmented. The demand function for trucking in region 1 is given by  $D_1$ , and in region 2 by  $D_2$ . The local supply function in region 1 is given by the upward-sloping curve  $S_1$ . Supply to region 2 comes from two sources: local production and interregional imports. The curve  $S_2$  represents the upward-sloping local supply function in region 2. The domestic supply function in region 2 (equal to  $S_2$  plus interregional import supply) is represented by the upward-sloping curve  $S_D$ . The demand function for intraregional trucking in region 2 (equal to  $D_2$  minus interregional import supply) is given by  $D'_2$ . The marginal revenue curve calculated from  $D'_2$  is represented by the downward-sloping curve  $MR'_2$ .

In the absence of entry (and rate) restrictions, the equilibrium price clears both regions' markets (i.e.,  $P_1^0 = P_2^0$ ). The quantity demanded by

**FIGURE 2-12 Interregional Effects of Trucking Regulations Which Limit Entry into Intraregional and Interregional Trucking**



consumers (carriers) in region 1 is  $q_2$ , and the quantity supplied by producers (shippers) is  $q_3$ . In region 2, the quantity demanded by consumers is  $q_8$ . Of this,  $q_6$  is supplied locally, and  $q_8 - q_6$  is imported from region 1.

If region 2 exercises its control over trucking by restricting entry into intraregional and interregional trucking, this creates monopoly power for carriers in the region. In their collective interest, they maximize their profits at the point where their marginal cost curve cuts  $MR'_2$ . As a result, the equilibrium price increases to  $P_2^1$  (equal to  $P_1^1$  in region 1). In region 1, the quantity demanded by consumers decreases to  $q_1$ , and the quantity supplied by producers increases to  $q_4$ . In region 2, the quantity demanded by consumers decreases to  $q_7$ , and the quantity supplied by producers decreases to  $q_5$ . Interregional imports by region 2 increase to  $q_7 - q_5$  (equal to  $q_4 - q_1$  in region 1).

The interregional effects of these regulations are as follows:

<u>Region 1 (Interregional Exporter)</u>		<u>Region 2 (Interregional Importer)</u>	
areas of consumer loss	-7-8	areas of consumer loss	-1-2-6-8 -9-10
areas of producer gain	+7+8+9	areas of producer loss	-3-4-5
		economic rent accruing to producers	+1+2+3+4
net gain to region 1	+9	net loss to region 2	-5-6-8 -9-10



The national welfare loss is:

$$\begin{array}{r} \text{net gain to region 1} \quad +9 \\ \text{net loss to region 2} \quad -5-6-8-9-10 \\ \hline \text{national welfare loss} \quad -5-6-8-10 \end{array}$$

A similar analysis applies if region 1 restricts entry into intraregional trucking. If both regions exercise control over trucking, the interregional effects cannot be simply illustrated using this diagram. Instead, a general equilibrium analysis would be more appropriate to determine equilibrium quantities and prices, although, as we note subsequently, the general equilibrium regional model presented in this study does not contain sufficient detail to analyze these effects adequately.

While the results in this section suggest that the effect of entry regulation is to create monopoly power for carriers, thereby allowing them to maximize their collective profit, the results will be different if these regulations are in conjunction with effective rate control. The effect of rate regulation is to create an implicit tax on carriers, thereby depressing rates and restraining potential economic rent from cartelized activity.

## Effects of Interregional Barriers to Factor Flows

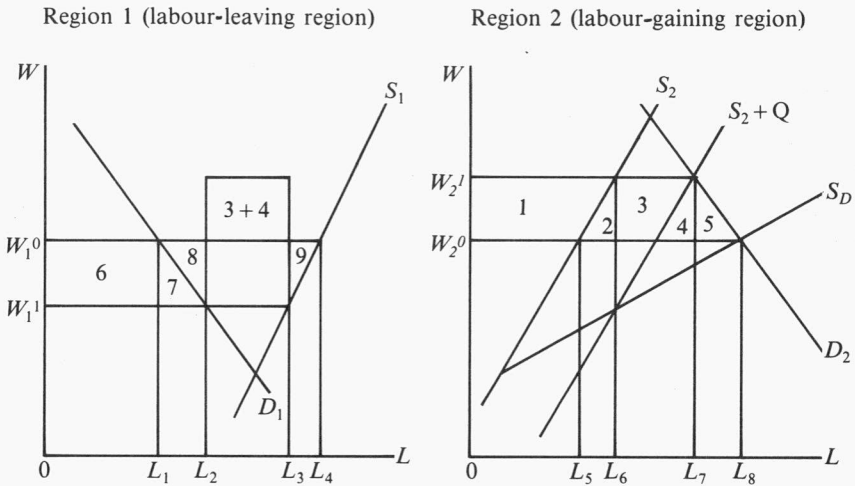
Besides barriers to the free interregional flow of goods and service, a series of barriers also apply to the free flow of factors (capital and labour) between regions. Their interregional effects are explored in this section.

### *Labour Mobility Restrictions*

Occupational licensing and certification requirements are the most widespread restrictions on interprovincial labour mobility. Due to the absence of uniformity and reciprocity in the way regulations are enforced, applicants from other provinces seeking entry into specified occupations may be required to undergo additional training or pass further examinations when they transfer between provinces.

The interregional effects of these restrictions are illustrated in Figure 2-13. Two regions are considered. Under the assumption that the labour market is nationally segmented by labour market restriction, labour is interregionally mobile but internationally immobile. The downward-sloping curves  $D_1$  and  $D_2$  represent the demand functions for labour (or the marginal productivity of labour schedules) in regions 1 and 2, respectively. The local supply functions of labour in the two regions are  $S_1$  and

**FIGURE 2-13 Interregional Effects of Restrictions on Labour Mobility**



$S_2$ . The domestic supply function of labour in region 2 (equal to  $S_2$  plus interregional labour flows) is represented by the upward-sloping curve  $S_D$ . The difference between  $S_1$  and  $D_1$  represents interregional labour flows from region 1, also given by the difference between  $S_D$  and  $S_2$  in region 2.

In the absence of labour mobility restrictions in region 2, the equilibrium nominal wage clears both regions' labour markets (i.e.,  $W_1^0 = W_2^0$ ). In region 1, labour supply is  $L_4$  and labour demand is  $L_1$ . Excess supply of labour  $L_4 - L_1$  in region 1 flows into region 2. In region 2,  $L_8$  of labour is demanded and  $L_5$  of labour is supplied. Excess demand for labour is satisfied by interregional labour flows into region 2, represented as the difference between  $L_8$  and  $L_5$ .

Assuming that occupational training and certification requirements in region 2 erect barriers to the free mobility of labour, the equilibrium wage in region 2 increases to  $W_2^1$ , to equate local demand with local supply augmented by those interregional labour flows restricted by the quota  $Q$ . Labour supply in region 2 increases to  $L_6$  and labour demand decreases to  $L_7$ . In region 1, the equilibrium wage rate decreases to  $W_1^1$ . As a result, labour supply decreases to  $L_3$  and labour demand increases to  $L_2$ . The difference between  $L_3$  and  $L_2$  is the amount of labour permitted to flow from region 1 into region 2.

The effects of these restrictions across regions appear as changes in the returns to interregionally immobile factors and a changed interregional allocation of labour. These effects are:

<u>Region 1 (Labour-Leaving Region)</u>		<u>Region 2 (Labour-Gaining Region)</u>	
areas of loss to labour initially residing in region 1	-6-7-8 -9-10	area of gain to labour initially residing in region 2	+1
areas of gain to inter-regionally immobile factors	+6+7	areas of loss to inter-regionally immobile factors	-1-2-3-4-5
rent to labour in region 2 initially residing in region 1	+3+4+9	net loss to residents initially residing in region 2	-2-3-4-5
net effect on residents initially residing in region 1	+3+4-8-10		

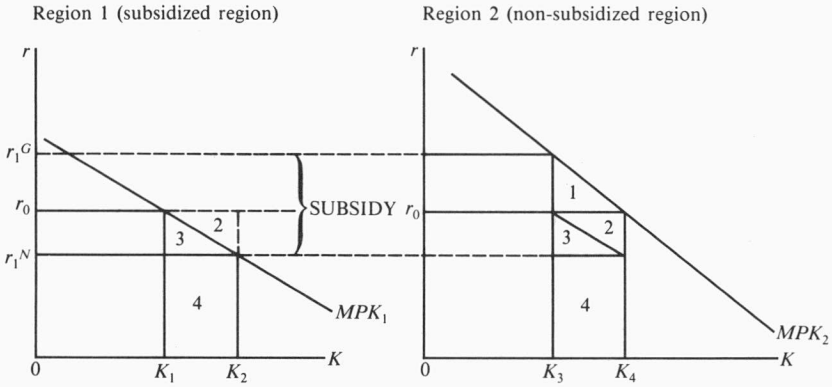
The national welfare effect is:

net gain to residents initially residing in region 1	+3+4-8-10
net loss to residents initially residing in region 2	-2-3-4-5
national welfare loss	-2-5-8-10

### ***Distortions on the Capital Market***

The interregional effects of provincial policies which either attract or retard in-province investment are similar across the various types of policies which have these effects (provincial tax policies, investment loans and subsidies to in-province businesses, and certain of the activi-

**FIGURE 2-14 Interregional Effects of Provincial Capital Subsidies  
(nationally segmented capital market assumed)**



ties of heritage funds). The key issue in determining their interregional effects is whether or not provinces are assumed to operate in an international capital market in which capital is both interprovincially and internationally mobile, or whether nationally segmented capital markets are assumed. If the former assumption is made, actions by one province to attract or retard inward investment have no direct impacts on other provinces, since all participate in the same large international capital market. If the latter assumption is made, actions by one province have an effect on other provinces.

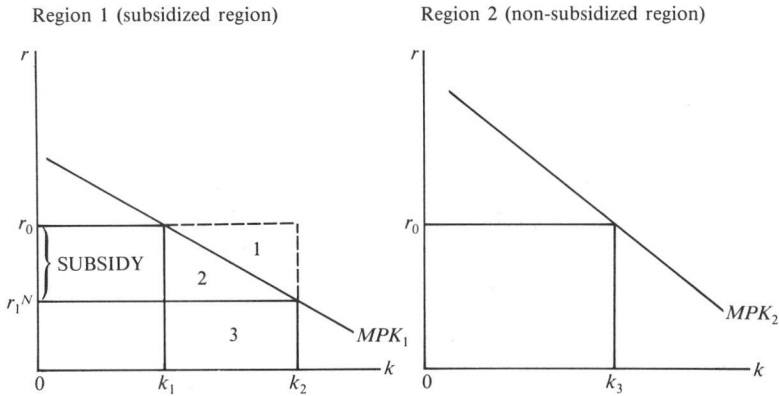
The interregional effects of such policies are presented in Figures 2-14 and 2-15 for these two cases. Two regions are considered; in each, the marginal productivity of capital (MPK) schedule is downward-sloping and capital receives its marginal revenue product.

Figure 2-14 illustrates the effect of a provincial subsidy to capital in region 1 for the case in which the capital market is assumed to be nationally segmented. In the absence of any subsidy, the equilibrium rental rate of capital is given by  $r_0$ .  $K_1$  of capital is employed in region 1, and  $K_4$  in region 2. The effect of a subsidy to capital in region 1 is to misallocate capital until the gross-of-subsidy rate of return to capital is the same in the two regions, but their marginal revenue products are not. The new equilibrium rate of return to capital in region 1 is  $r_1^G$ , and in region 2, the new equilibrium rate of return is  $r_1^N$ .

The distortionary effects of this policy are:

production gain in region 1	+3+4
production loss in region 2	-1-2-3-4
national welfare loss	-1-2

**FIGURE 2-15 Interregional Effects of Provincial Capital Subsidies  
(internationally perfectly mobile capital assumed)**



An issue with heritage funds is that if they are invested in sub-optimal projects there is no necessary distortionary effect. This is because in this case the main effect of heritage funds is to change the pattern of asset ownership in a region by producing a dollar-for-dollar substitution effect between heritage fund savings and private savings. This will guarantee an equivalent rate of return on capital in all regions in Canada, and so no misallocation of capital will occur.

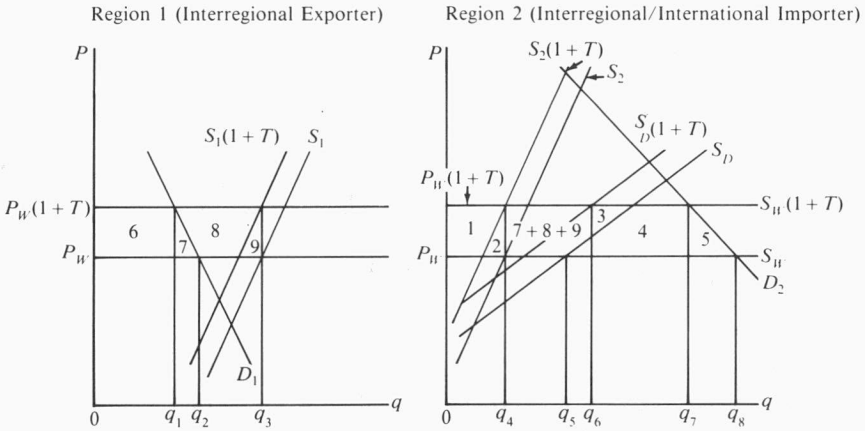
Figure 2-15 also shows the effect of a provincial subsidy, but with the rate of return on capital determined internationally, since capital is internationally and interregionally mobile. The initial equilibrium is the same as for Figure 2-14. In this case, however, the effect of the subsidy is to cause over-employment of capital only in region 1, in the sense that the marginal product of capital is less than the international rate of return (i.e. capital would be better employed out-of-province rather than in-province). The difference between  $K_2$  and  $K_1$  in region 1 represents the capital inflow from the international market. The national welfare cost of the subsidy is given by area 1 and is fully borne by region 1.

### Interregional Effects of the Federal Tax System

The federal tax system has a number of features which have interregional effects. One is the manufacturers' sales tax. Regional impacts of this tax are illustrated in Figure 2-16. The figure employs similar assumptions as earlier analyses.

Since in this analysis Canada is assumed to be a small, open, price-taking economy, the tax will be fully shifted from producers to consumers. In the absence of the tax, the quantity demanded by consumers in region 1 is  $q_2$  and the quantity supplied by producers is  $q_3$ . In region 2, the quantity demanded by consumers is  $q_8$ . Of this,  $q_4$  is supplied locally,  $q_5 - q_4$  is imported from region 1, and  $q_8 - q_5$  is supplied interna-

**FIGURE 2-16 Interregional Effects of the Manufacturers' Sales Tax**



tionally. The effect of the tax is to shift the local supply function in region 1 to  $S_1(1 + T)$ , the local supply function in region 2 to  $S_2(1 + T)$ , and the foreign supply function to  $S_w(1 + T)$ . The new interregional export supply function in region 1 is given by the difference between  $S_1(1 + T)$  and  $D_1$ ; also equal to the difference between  $S_D(1 + T)$  and  $S_2(1 + T)$  in region 2.

The world price gross of the tax increases to  $P_w(1 + T)$ . As a result, the quantity demanded by consumers in region 1 decreases to  $q_1$ . The quantity supplied by producers in region 1 remains at  $q_3$  since the price received at the margin is the same in both cases. In region 2, the quantity demanded by consumers falls to  $q_7$ , while the quantity supplied by producers remains at  $q_4$  for the same reason as above. Interregional imports increase to  $q_6 - q_4$ , while international imports fall to  $q_7 - q_6$ .

The interregional effects of the tax are as follows:<sup>9</sup>

Region 1 (Interregional Exporter)		Region 2 (Interregional/International Importer)	
areas of consumer loss	-6-7	areas of consumer loss	-1-2-3-4-5-7-8-9
federal tax revenues (those paid in region 1 and returned to region 1)	+6	federal tax revenues (those paid in region 2 and returned to region 2)	+1+2+3+4+7+8+9
net loss to region 1	-7	net loss to region 2	-5

The national welfare effect is:

net loss to region 1	-7
net loss to region 2	-5
national welfare	
loss	-5-7

In this case both regions lose from the tax, since under price-taking assumptions the tax is borne by consumers of taxed products. Unlike the case of the federal tariff, no interregional transfer effects occur. Interregional transfer effects will occur if a different treatment of the interregional distribution of revenues is used.

Issues similar to those with the manufacturers' sales tax also arise with other features of the federal tax system which differentially treats industries located in or products produced in different regions. One is the manufacturing and processing incentive in the corporate tax which lowers the corporate tax rate for manufacturing and processing industries. The interregional effects of this policy are illustrated in Figure 2-17.

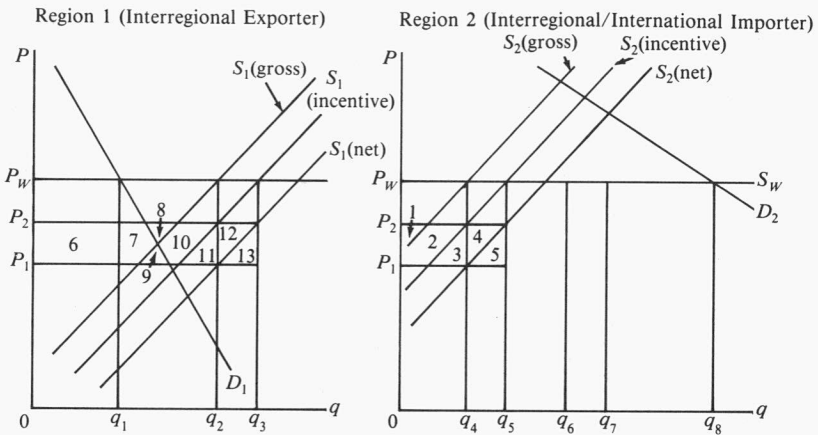
In this case the demand function for manufactured products in region 1 is given by  $D_1$  and in region 2 by  $D_2$ . Supply to region 2 comes from three sources: local supply, interregional imports from region 1, and international imports. The upward-sloping curves  $S_2(gross)$  and  $S_2(net)$  represent the local supply functions in region 2 gross and net of the corporate tax, respectively. A similar notation applies to region 1. The export supply function in region 1 is given by the difference between  $S_1(net)$  and  $D_1$ .

In the absence of the incentive, the net price received by producers in the two regions is given by  $P_1$ . As a result, the quantity supplied by producers in region 1 is  $q_2$ , and the quantity supplied by producers in region 2 is  $q_4$ . Consumers in regions 1 and 2 pay the world price  $P_w$  and demand  $q_1$  and  $q_8$ , respectively. Interregional imports to region 2 are equal to  $q_6 - q_4$  (the same as  $q_2 - q_1$  in region 1), and international imports are equal to  $q_8 - q_6$ .

The effect of the incentive is to raise the price received by producers in the two regions to  $P_2$ . The local supply functions in regions 1 and 2, gross of the incentive and net of the corporate tax, are given by the upward sloping curves  $S_1(incentive)$  and  $S_2(incentive)$ , respectively. The foreign supply function is unaffected, since the corporate tax is only charged on corporations located in Canada.

As a result of the incentive, the quantity supplied by producers in region 1 increases to  $q_3$ . The quantity demanded by consumers in region 1 remains at  $q_1$ , since the price paid at the margin is the same in both cases. In region 2, the quantity supplied by producers increases to  $q_5$ , while the

**FIGURE 2-17 Interregional Effects of the Manufacturing and Processing Incentive**



quantity demanded by consumers in region 1 remains at  $q_8$  for the same reason as above. Interregional imports increase to  $q_7 - q_5$ , while international imports fall to  $q_8 - q_7$ .

The interregional effects of the incentive are:<sup>10</sup>

<u>Region 1 (Interregional Exporter)</u>		<u>Region 2 (Interregional/ International Importer)</u>
areas of producer gain	+ 6 + 7 + 8 + 9 + 10 + 11 + 12	areas of producer gain
net gain to region 1	+ 6 + 7 + 8 + 9 + 10 + 11 + 12	net gain to region 2

The national welfare effect is:

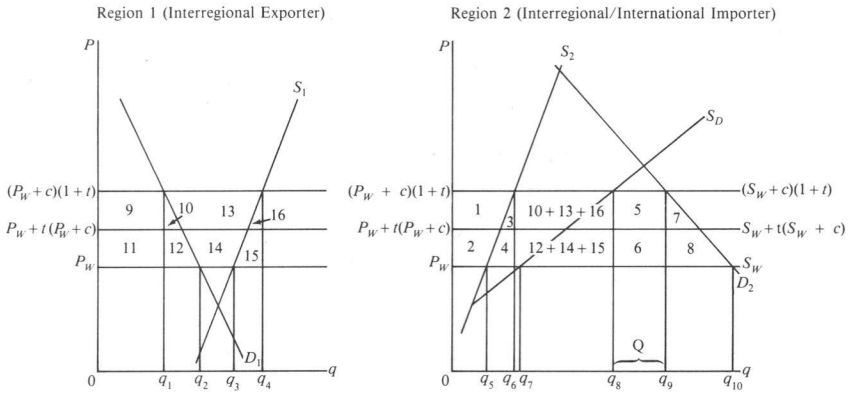
net gain to region 1	+ 6 + 7 + 8 + 9 + 10 + 11 + 12
net gain to region 2	+ 1 + 2 + 3 + 4
cost of the incentive	- 1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - 10 - 11 - 12 - 13
national welfare loss	- 5 - 13

### Interregional Effects of Non-Tariff Trade Policies

In addition to the interregional effects of the federal tariff, interregional effects occur with other non-tariff components of Canadian trade policies. In this section the interregional effects of textile quotas and the Auto Pact are discussed.



**FIGURE 2-18 Interregional Effects of Textile Quotas and the Federal Tariff on Textiles**



Canadian textile quotas are used to protect Canadian textile industries, which are heavily concentrated in Ontario and Quebec. These industries are already protected by the federal tariff. However, because of the importance of these industries to the regions involved, and because of the GATT negotiations which have reduced tariff rates, additional protection through textile quotas has been used in recent years as part of the wider international Multi-Fibre Arrangement (MFA). The effect of this protection for the Canadian industry is clearly to reduce international imports and generate more interprovincial trade. But because quotas are given to foreigners, involving a transfer of quota rents abroad, and because textile tariffs and the quotas interact in important ways, these instruments are worthy of special attention beyond the analysis already given for the tariff.

The interregional effects of both the federal tariff and textile quotas are illustrated in Figure 2-18. In the absence of protection, the quantity demanded by consumers in region 1 is  $q_2$ , and the quantity supplied by producers is  $q_3$ . In region 2, the quantity demanded by consumers is  $q_{10}$ . Of this,  $q_5$  is supplied locally,  $q_7 - q_5$  is imported from region 1, and  $q_{10} - q_7$  is supplied internationally.

If a tariff is imposed at the rate  $t$ , along with a quota of amount  $Q$ , the domestic equilibrium price increases to  $(P_w + c)(1 + t)$ , where  $c$  is the per unit value of the quota. In region 2, local demand equals local production augmented by the international imports allowed under the quota. Because the amount of tariff due is determined using the gross-of-quota price, the tariff per unit of imports is greater than the amount that would be paid had a tariff alone been imposed.

As a result of the tariff and quota, the quantity demanded by consumers in region 1 falls to  $q_1$ , and the quantity supplied by producers increases to  $q_4$ . In region 2, the quantity demanded by consumers falls to

$q_9$  while the quantity supplied by producers increases to  $q_6$ , and inter-regional imports increase to  $q_8 - q_6$ . International imports decrease to  $q_9 - q_8$ , which is the amount of the quota.

Assuming that federal tariff revenues are returned in lump sum form to the region importing internationally (see footnote 1 of this chapter), the interregional effects of protection from both the federal tariff and the textile quota are:

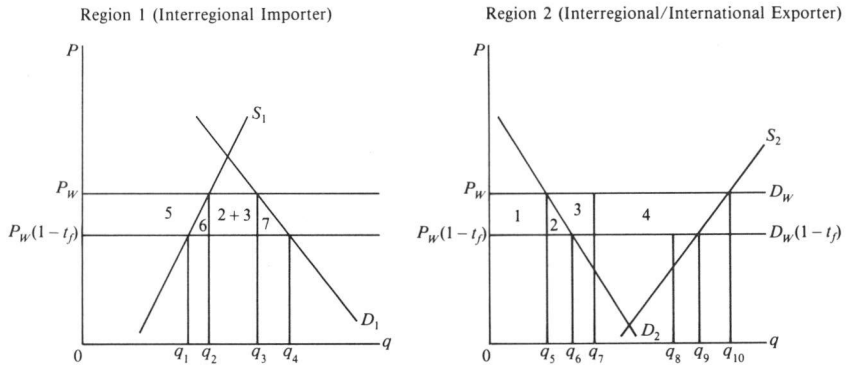
<u>Region 1 (Interregional Exporter)</u>		<u>Region 2 (Interregional/ International Importer)</u>	
areas of con- sumer loss	-9 - 10 - 11 - 12	areas of con- sumer loss	- 1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 10 - 12 - 13 - 14 - 15 - 16
areas of pro- ducer gain	+9 + 10 + 11 + 12 + 13 + 14	areas of pro- ducer gain	+ 1 + 2
net gain to region 1	+ 13 + 14	area of tariff revenue transfer	+ 6
		net loss to region 2	- 3 - 4 - 5 - 7 - 8 - 10 - 12 - 13 - 14 - 15 - 16

The national welfare effect is as follows:

net gain to region 1	+ 13 + 14
net loss to region 2	- 3 - 4 - 5 - 7 - 8 - 10 - 12 - 13 - 14 - 15 - 16
<hr/> national welfare loss	<hr/> - 3 - 4 - 5 - 7 - 8 - 10 - 12 - 15 - 16

An important feature of this analysis of the interregional effects of protection from both the federal tariff and the textile quota, as opposed to protection from the federal tariff alone, is that there are no redistributive effects across regions resulting from a change in the federal tariff as long as a binding quota remains in effect. This is because the domestic price is no longer equal to the international price plus the tariff. Instead, the price in region 2 is determined by the interaction of the local demand function and the domestic supply function augmented by imports of the amount given by the quota. The domestic price will only change if the quota is changed. As a result, if tariff rates fall the market value of the quota rises but the prices which apply to interregional trade are unchanged.

**FIGURE 2-19 Interregional Effects of Auto Pact as It Applies to Motor Vehicles**



The interregional effects of the Auto Pact are a further issue of contention in the non-tariff trade policy area. This set of policies has resulted in improved market access abroad for the Canadian automotive industry, comprised of the Canadian motor vehicle and automotive parts industries, but has also lowered protection in Canada. Traditionally, the Auto Pact has been seen as benefiting Ontario, since the motor vehicle and automotive parts industries are concentrated there. This has been viewed as costly to other provinces only insofar as Canada's international negotiating capability can be considered to have been "used up" in securing improved access for an industry located heavily in Ontario. However, what is frequently not emphasized is that the reduction in protection in Canada, especially given the analysis presented earlier in this chapter, also reduces the previous interregional transfer effect from the Canadian tariff. In this sense, regions outside of Ontario benefit from the Auto Pact if the alternative is higher Canadian protection.

The interregional effects of the Auto Pact on the automotive parts industry in Canada can be evaluated using a similar approach to that used for removal of the federal tariff (see Figure 2-1). A slightly different approach is necessary to evaluate the interregional effects of the Auto Pact on the motor vehicle industry in Canada. This approach is illustrated in Figure 2-19. In this diagram two regions are considered. Region 1 is assumed to be a net importer of motor vehicles in interregional trade, but neither imports nor exports internationally. Region 2 is assumed to be a net exporter of motor vehicles in both interregional and international trade before and after the introduction of the Auto Pact. Factors of production are assumed both interregionally and internationally immobile. Canada is assumed to be a price taker on world markets; consumers and producers in region 1 and 2 thus initially face a given world commodity price  $P_w(1 - t_f)$ , where  $t_f$  is the foreign (U.S.) tariff rate levied on motor vehicle imports.

The demand function in region 1 is given by  $D_1$ , and in region 2 by  $D_2$ . The local supply functions in region 1 and 2 are given by  $S_1$  and  $S_2$ . Excess supply in region 2, given by the difference between  $S_2$  and  $D_2$ , is exported interregionally to region 1 and internationally. The difference between  $D_1$  and  $S_1$  represents interregional import supply to region 1.

In the absence of the Auto Pact, the quantity demanded by consumers in region 1 is  $q_4$ , and the quantity supplied by producers is  $q_1$ . In region 2, the quantity supplied by producers is  $q_9$ . Of this,  $q_6$  is consumed locally,  $q_8 - q_6$  is exported to region 1, and  $q_9 - q_8$  is exported internationally.

The effect of the Auto Pact is to raise the price facing consumers and producers in regions 1 and 2 to  $P_w$ . As a result, the quantity demanded by consumers in region 1 falls to  $q_3$ , and the quantity supplied by producers increases to  $q_2$ . In region 2, the quantity demanded by consumers falls to  $q_5$ , and the quantity supplied by producers increases to  $q_{10}$ . Interregional exports from region 2 fall to  $q_7 - q_5$ , while international exports increase to  $q_{10} - q_7$ .

The interregional effects of the Auto Pact as it affects the motor vehicle industry in Canada are:

<u>Region 1 (Interregional Importer)</u>		<u>Region 2 (Interregional/ International Exporter)</u>	
areas of consumer loss	-2-3-5-6-7	areas of consumer loss	-1-2
area of producer gain	+5	areas of producer gain	+1+2+3+4
net loss to region 1	-2-3-6-7	net gain to region 2	+3+4

The national welfare effect is:

$$\begin{array}{r}
 \text{net loss to region 1} \quad -2-3-6-7 \\
 \text{net gain to region 2} \quad +3+4 \\
 \hline
 \text{national welfare loss} \quad -2+4-6-7
 \end{array}$$

It follows, therefore, that the national welfare effect of the Auto Pact on the automotive industry in Canada is inconclusive; Canada is shown to gain from lowered protection in the automotive parts industry, but the effect from improved access abroad for motor vehicles is indecisive.

The diagrams presented in this chapter have been used only to illustrate the potential interregional effects which accompany many of the policies that currently characterize our federal-provincial arrangements. The weaknesses of the approach are that interregional factor mobility issues and interregional asset ownership effects are ignored, and a partial equilibrium approach is used. Despite these shortcomings, however, the diagrams provide helpful intuition as to what interregional

effects may be expected in more complex analyses. They form the basis for some partial equilibrium quantifications of interregional effects reported later, and for interpreting the interregional policy effects produced by the general equilibrium model discussed in the next chapter, which incorporates interregional factor mobility and other effects.



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## An Applied General Equilibrium Model of Regional Activity

While the partial equilibrium diagrams presented in the preceding chapter provide strong intuitive evidence as to the regional impacts of policy elements within Confederation, they have their deficiencies. They do not capture the impacts of policies on interregional factor mobility. Nor do they adequately capture interconnections between markets, the role of external sector balance conditions in each region, or the effects on results if prices of commodities are endogenously determined across regions. For all these reasons an applied regional general equilibrium model of Canada, closely related to those used in the analysis of taxation and international trade policy issues [see the survey paper by Shoven and Whalley (1984)] has also been used to analyze the regional impacts of policies pursued under Confederation. Unlike the analysis presented in the previous chapter, no qualitative results can be obtained from this model. Instead it provides a framework for numerical analysis using this approach, which is reported on subsequently.

The general equilibrium model specifies particular functional forms to represent demand and production in each region, with parameter values chosen for these functions based on available econometric evidence. Policy parameters also enter the model, and it is used to simulate competitive equilibria under alternative policy regimes. A comparison of equilibria computed for hypothetical policy changes to one implied by a benchmark equilibrium data set constructed from real data provides the basis for an evaluation of the possible regional impacts of any proposed policy change. Such analyses should, however, be treated with caution, since they present counterfactual analyses in which everything except the policy change remains constant. Forecasting what will happen in practice, when many other things also change, is more difficult.

The reason that both partial and general equilibrium approaches are used here is that the two approaches are complementary. One provides a comprehensive and logically consistent overall framework; the other a more targeted approach which does not capture economy-wide interactions but nonetheless incorporates important features of policies missing in the broader general equilibrium approach.

The strength of applied general equilibrium models is their breadth of coverage — their ability to capture interacting effects both across policy elements and between sectors of the economy in a comprehensive and logically consistent framework. Their weakness is that individual policy elements often cannot be treated separately either as fully as one might like or with the same richness of institutional features that can be captured in more narrowly focussed partial equilibrium analyses.

## Overview of Major Model Features

The basic features of the regional general equilibrium model of Canada are summarized in Table 3-1; the technical appendix in Jones and Whalley (1986) describes the model in more detail. A single-period (static) model is used, and six Canadian regions are identified: Atlantic Canada, Quebec, Ontario, Manitoba/Saskatchewan, Alberta, and British Columbia. Interregional trade in commodities occurs between all regions, along with factor flows. A seventh region represents the rest of the world, with which Canadian regions engage in international trade.

**TABLE 3-1 Summary of Main Features of Canadian Regional General Equilibrium Model**

Regional structure	Six Canadian regions are identified (Atlantic Canada, Quebec, Ontario, Manitoba/Saskatchewan, Alberta, and British Columbia) along with the rest of the world.
Production	Each of the six regions in Canada produces a number of commodities, using both primary factors and intermediate products as inputs. A similar number of products are also produced abroad. In some versions of the model, a federally provided pure public good is also incorporated as a produced good. Two levels of aggregation are used, one with six goods produced by each region, and one with thirteen.
Demands	Final demands in each region are derived from maximizing a six-level, nested, constant elasticity of supply (CES)/linear expenditure system (LES) utility function subject to a budget constraint (see description in text). Intermediate demands reflect cost minimization across sources of supply (also see text).

**TABLE 3-1 (cont'd)**

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Policies incorporated which have interregional impacts	Nation-building policies (tariffs, energy policies); intergovernmental transfers (EPF, equalization, CAP); provincial barriers to free flows of goods and factors; other federal and provincial tax and transfer programs.
Treatment of governments	Both regional and federal levels of government are identified. Intergovernmental transfers are also incorporated.
Model treatment of factor mobility	
Capital services	Variant <i>a</i> . Capital is interregionally and intersectorally mobile, but internationally immobile. Variant <i>b</i> . Capital is interregionally, intersectorally, and internationally mobile.
Labour services	Assumed internationally immobile, intersectorally mobile, but interregionally partially mobile; labour is homogeneous across regions but there is locational preference modelled for consumers (see explanation in text), leading to partial mobility between regions.
Resources	Assumed internationally and intersectorally immobile.
Armington assumption	Each of the products produced in each region is assumed to be qualitatively different, both across regions and internationally.
Public goods	Where these are separately identified in the appropriate model variant, pure public goods operate at the federal level.
Transportation costs	Transport margins between regions at both regional and federal levels are incorporated in a "transport cost" model variant, along with transport costs on international imports.
Returns to scale	A further variant of the model incorporates economies of scale in manufacturing industries in all regions.

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Each of these regions produces a number of commodities, using both primary factors (capital services, labour services, and natural resources) and intermediate products (other commodities) as inputs. Two levels of aggregation are used, with six and thirteen products, respectively, considered as being produced in each region. The reason for using the two different aggregation levels is that the smaller level permits use of a model version which is cheaper in terms of execution time on the computer. Several of the policy simulations involve no major changes in



treatment of individual products, and so a six-commodity model variant suffices. In both model variants a similar number of products is also assumed to be produced abroad. A single federally-provided public good is incorporated in some model variants which also uses primary factors as inputs. Regionally-provided public services are included as one of the produced goods in each region.

Each of the produced goods in each region is treated as qualitatively different from similar commodities produced in other regions or abroad. This is the "Armington assumption" [from Armington (1969)], widely used in international trade applied general equilibrium analysis. There are a number of reasons for the use of this assumption in the present regional model.

One is the presence of cross-hauling in interregional trade statistics (the same product being imported and exported by the same region). The phenomenon of the same commodity flowing in both directions between regions is incompatible with an assumption of homogeneous products and perfect competition, and the Armington assumption is a convenient way to accommodate this within the model. While this partly reflects the somewhat crude level of aggregation used, work on cross-hauling in international trade [such as that by Grubel and Lloyd (1975)] suggests that even if a fine level of disaggregation in trade data is used, cross-hauling still remains.

This treatment also makes it easier to incorporate interregional trade elasticities into the model specification. These parameters are crucial in determining the strength of interregional terms-of-trade effects. The extent to which regions can change their terms of trade and shift the burden of such policies as provincial taxes onto other regions depends critically upon the values used for substitution elasticities among the Armington products. These, in turn, reflect the assumptions one makes as to reasonable values for elasticities in interregional trade. Thus, for example, whether or not the model shows that regions have incentives to engage in beggar-my-neighbour policies toward other regions through the erection of barriers to interregional trade will depend in part on these elasticity values.

The treatment of primary factors and their mobility both between regions and internationally is also important in the model. Three different factors of production are considered: capital services, labour services, and natural resources. To simplify things, only two of these appear as inputs in the production function for any industry in any given region. Non-energy industries use only capital and labour services as factor inputs; energy industries use natural resources and labour services as inputs.

Two different factor mobility treatments are available in the model for capital services. In variant *a*, capital is assumed to be mobile inter-regionally and intersectorally within Canada but not internationally.

Variant *b* allows international mobility of capital. The literature<sup>1</sup> is inconclusive as to whether or not perfect international mobility of capital is a reasonable assumption to make for Canada, even though many economists consistently use it — hence the availability of both treatments. As we have already indicated, this issue is important when assessing the impact of regional (provincial) policies designed to encourage investment within regions, since with perfect international capital mobility, provincial preferences to in-province investment have no effect on investment in other regions. With an assumption of either full or partial international immobility, on the other hand, such policies will have effects on the allocation of capital between regions. In the main, the treatment under variant *b* (international perfect mobility) is the one used, but for some of the policy analyses with the model, results using the alternative treatment under variant *a* are also reported.

Labour is assumed to be immobile internationally, mobile intersectorally, but partially mobile interregionally. This partial mobility treatment is adopted for a number of reasons. A model in which labour is perfectly mobile between regions is not particularly useful in analyzing whether and by how much regions gain or lose as a result of specified changes in federal or regional policies, since regions as such are not defined. On the other hand, treating labour as perfectly immobile across regions is equally inappropriate. While it would allow interregional distributional effects of policies to be captured, it precludes analysis of most of the issues associated with fiscally induced migration which have been so heavily stressed in recent literature on Confederation. The treatment used here involves partial interregional mobility, with individuals trading off differences in income across regions against locational preference. This is incorporated through an assumed distribution of individuals within any region by intensity of locational preference. Thus, only a portion of any region's population migrates in response to a change in relative regional incomes.

Finally, on the factor side there is the treatment of resource factor inputs, which account for the resource rents whose treatment is so crucial in Confederation. Resources are treated as internationally and intersectorally immobile. The key resource inputs appear in oil and gas (energy) industries, especially in the West.

On the demand side of the model, both within region and out-of-region products appear in final demand functions in each region, including the rest of the world. Demands are treated as the outcome of a process of utility maximization, with each region maximizing a six-level nested constant elasticity of substitution (CES)/ linear expenditure system (LES) utility function subject to its regional budget constraint. The regional budget constraint includes capital, labour and resource income received by provincial residents, along with intergovernmental transfers and transfers to persons from the federal government. Taxes paid within

a region enter the region's budget constraint and generate revenues which also appear as regional income. The data available to us give no information on interregional asset ownership, and so we make the strong assumption that in the base (pre-policy-change) case, asset incomes originating in a region accrue to residents of that region. The hierarchy within the nesting structure is an important element in model design, which is returned to below. Intermediate demands are determined by cost minimization across within-region and out-of-region sources of supply, involving a five-level nested CES structure (also described below).

Integrated into this treatment of production, demand, and associated interregional and international trade, are the policies which have regional impacts within Confederation. The groups of policies listed in Table 3-1 are all separately identified; nation-building policies, inter-governmental transfers, interprovincial barriers to flows of goods and factors, and other policies. Also included are taxes and expenditures by both provincial and federal levels of government. These all affect the equilibrium produced by the model, and when they are changed they induce modifications in the behaviour of producers and consumers in the various regions.

Three further variants available within the model specification are also worth stressing. In the central variant, real expenditures by federal governments are assumed to reflect maximization of a single public sector utility function subject to a government budget constraint (i.e., public goods do not appear in the utility functions of individual agents). In the model variant where pure public goods appear in the model specification, they enter into individual preferences but only occur at the federal level. The federal government is assumed to follow a Samuelsonian rule in determining their level of provision (i.e., that level for which the sum of marginal rates of substitution across regions between public and private goods equals the corresponding marginal rate of transformation). Public services at the regional level in all model variants include such services as health care and post-secondary education. The level of provision of regional public services reflects the maximization of each region's utility function, subject to its budget constraint.

A further (and important) feature of the public good treatment in the model variant where it enters is the provision of pure public goods abroad, which are assumed to be provided at zero cost to Canada. The key item here is national defence, on which large expenditures are made by the United States, and on which Canada is able to "ride free" without directly contributing to their costs through taxes.

A second additional feature is the treatment of interregional transportation costs in specified model variants which focus on the role of transport costs in affecting the interregional impacts of policies. Where these are incorporated, this is done through transport margins which

apply to all trade between regions. These increase consumer prices above producer prices by the amount of transport margins involved. In the presence of different transportation costs between regions, consumer prices for products produced in a region are not the same across Canada. As noted earlier, this treatment potentially changes the inter-regional impacts of the federal tariff compared to the no-transport-cost case, as indicated by Melvin (1985).

Finally, increasing returns to scale are also incorporated as a model variant. This is done using a simple parametric scale economy specification [see Chipman (1970) and Eaton and Panagariya (1979)], with scale economies assumed to be external to the firm. Scale effects change the industry production function, but each firm treats its own production function as having constant returns to scale. This treatment is somewhat simplistic but captures the main elements of scale economies, while allowing the usual constant returns to scale structure in general equilibrium models to be used in solving the model. However, the interactions between scale economy features and market structure, as developed by Harris (1984) in his modelling analysis of Canadian trade policy, are not captured by this treatment.

## **Levels of Aggregation in the Model**

In the most detailed version of the model, 13 commodities are produced in each region, one of which is not traded across regions. A more aggregated six-commodity classification is also available in the model. These are both listed in Table 3-2. For generating most of the results reported later, the more aggregated, six-commodity form of the model was used, because of the costs of repeated solutions of the model.

The same level of aggregation is used for both commodities and industries in the model. While the classifications in Table 3-2 are closer to producer than consumer classifications (since transportation services and margins are treated as a separate category), this treatment simplifies things considerably. This contrasts with some of the other applied general equilibrium models [see Shoven and Whalley (1984)], in which different producer and consumer good classifications appear.

Within each region there is also an aggregation used over economic agents. The treatment adopted is simple; all households within a region are assumed to have identical commodity preferences and identical incomes, and to differ only in their locational preferences (discussed below).

Regional (provincial level) governments appear in the model as part of the demand side of each region — collecting taxes, receiving inter-governmental transfers, and purchasing regionally supplied local services. In addition, the federal government enters the model through its taxing and expenditure activities. In the public good model variant, the

**TABLE 3-2 Commodity and Industrial Aggregation**

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**6-Good Model Variant**

1. Agricultural products
2. Non-durable manufacturing products
3. Machinery, transport equipment
4. Energy and natural resource products
5. Services (transportation, utilities, housing, wholesale and retail trade)
6. Services provided by the public sector

**13-Good Model Variant**

1. Agriculture (grains and other agricultural products)
  2. Fishing and trapping
  3. Mines and quarries
  4. Food, beverages and tobacco (meat, fish and dairy products; fruits and vegetables; miscellaneous food products; beverages; tobacco and tobacco products)
  5. Light manufacturing (rubber, leather and plastics products; textile and knitted products; clothing; furniture and fixtures)
  6. Lumber, paper and printing (lumber, sawmill and other wood products; paper and paper products; printing and publishing)
  7. Metal and machinery (metal products, machinery and equipment; electrical and communication products; mineral and chemical products; miscellaneous manufactured products)
  8. Vehicles (motor vehicles; motor vehicle parts; other transportation equipment)
  9. Energy (mineral fuels, petroleum and coal products)
  10. Transportation (transportation and storage; transportation margins)
  11. Utilities (electric power and other utilities)
  12. Personal and business services (construction; communication services, wholesale and retail trade; imputed rent on owner-occupied dwellings; finance, insurance and real estate; miscellaneous personal and business services)
  13. Government services (public administration and defence; other services provided by the public sector)
- 

federal government is assumed to take into account the preferences of each of the provinces in deciding on the level of federally provided pure public goods through a Samuelsonian provision rule.<sup>2</sup> The federal government also makes direct transfers to regions (provinces) through intergovernmental transfers.

A foreign sector also enters the model and is treated as a single foreign agent with a utility function defined over own-produced commodities

and imports from all the regions in Canada. Since one commodity in each region is treated as non-traded in the 13-good classification, Canada imports only 12 goods from the rest of the world, while exporting 72 goods ( $12 \times 6$ ).

### **The Structure of Demands in the Model**

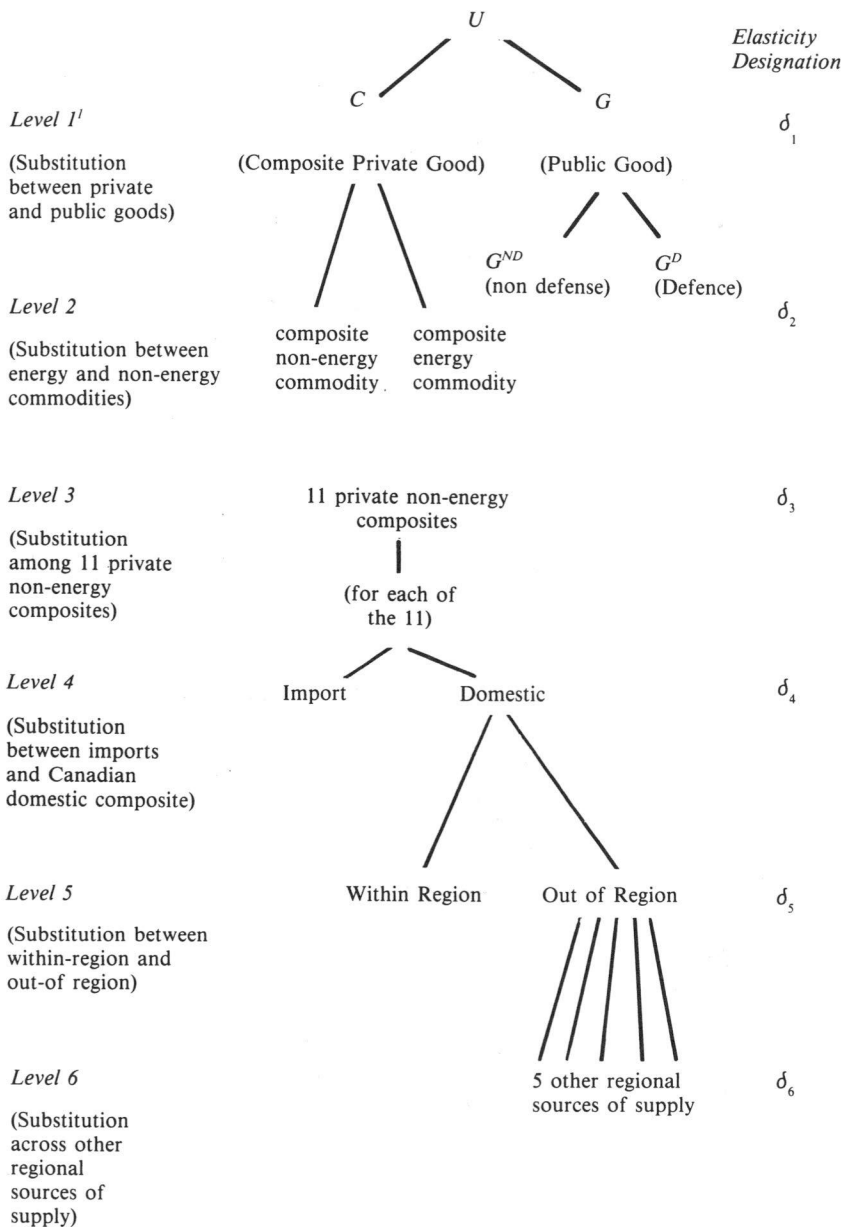
The final demand portion of the model is based on nested constant elasticity of substitution (CES)/linear expenditure system (LES) preference functions. These form part of the family of convenient functional forms widely used by economists.

The Cobb-Douglas function, which involves constant expenditure shares in demands, is perhaps the easiest to use in a model such as this, but has the restriction of producing demand functions which have unitary income and (uncompensated) own-price elasticities, along with zero (uncompensated) cross-price elasticities. The CES function generalizes the Cobb-Douglas function with respect to the value of the elasticity of substitution in preferences, since this is constant but need not be unity as in the Cobb-Douglas case. Demand functions from these preferences still have unitary income elasticities, but have uncompensated own-price and cross-price elasticities different from the Cobb-Douglas case. LES functions allow income elasticities to differ from unity.

Using nested functions enables different elasticities of substitution to be used on the demand side of the model, and recognizes that these values can have important implications for the behaviour of the model.<sup>3</sup> The 13-good variant nesting structure used for the utility function for each Canadian region is outlined in Figure 3-1.

At level six, substitution occurs across other regional sources of supply for each one of the 12 traded goods in the 13-good variant of the model. In the case of food products, for instance, this level allows for substitution between the five other sources of supply of food from other regions within Canada. The outcome of utility maximizing behaviour at this level yields a composite "out-of-region" food commodity. At level five, substitution occurs between composite out-of-region and within-region products. In the case of food, optimizing behaviour at this level produces a composite Canadian food commodity for consumption in the region. Substitution at the fourth level takes place between imports and domestic products (imported food and the composite Canadian food product available for regional consumption), yielding composites of the commodities listed in Table 3-2. At the third level, substitution occurs among non-energy private-good composites, each of these involving a similar aggregation across levels six through four in the nesting hierarchy. Level two allows for substitution between energy and non-energy products in demand, allowing the model to incorporate energy demand elasticity parameters. Finally, at the top level, where the public-good

**FIGURE 3-1 Nesting Structure in Final Demands for Each Region**



*Note:* 1. This level of nesting is only used in the public good variant of the model.

variant of the model is used, substitution occurs between private and public goods. Two different types of public goods enter the model — defence and non-defence — with the former largely provided by the United States. These enter the hierarchy in a way which is independent of substitution among the private-good composites.

It is the bottom three levels of substitution in this hierarchy that contain the elasticity values which are perhaps most important for model results on the interregional impacts of policies. Elasticities of substitution at level four largely determine the import price elasticity of demands for each product in Canada. These elasticities are important in determining the extent to which tariffs or other Canadian trade policies cause changes in the composition of consumption between domestic and foreign sources of supply and, hence, influence Canada's terms of trade. Elasticity values at level five determine the strength of comparable effects across regions. For instance, if a region (province) puts in place policies designed to give preference to in-province contractors or uses other interprovincial barriers to trade, the extent to which the region's terms of trade will improve will depend upon these elasticities.

Level six elasticities determine the ease with which substitution occurs between regional sources of supply within Canada. These elasticities are important in determining the export price elasticities that regions face, since these reflect substitution elasticities across out-of-region sources of supply in all other regions. If regional export price elasticities are high, then regions do not have any significant ability to export taxes and improve their interregional terms of trade through taxes on interregional exports.

If level six substitution elasticities were not separately specified in the model, then the level five substitution possibilities would have to apply to all regional sources of supply, including those from within the region. Having different elasticities of substitution operating at these two levels provides the capability to specify that a region simultaneously faces high export price elasticities and has lower import price elasticities in its own demands.

Above the lower three levels, level three incorporates substitution possibilities between the non-energy private good composites. Included in this are the regionally (provincially) provided public services. Level two allows for substitution between energy and non-energy composites. Level one involves elasticities of substitution between private and public goods in the public good model variant. These determine the marginal rates of substitution between private and public goods, which in turn influence the optimal level of provision of public goods. The second branch of the utility tree for level two specifies an elasticity of substitution between defence and non-defence public goods, with defence public goods given by the level of provision in the United States. In implement-



ing this variant of the model, these two public good types are treated as perfect substitutes.

At first sight the nesting structure of this model may appear overly complex. As with other applied general equilibrium models, however, using a structure such as this enables key elasticity parameters relevant to the policy issues at hand to be incorporated in the model. Furthermore, this can be done in a way which allows the modeller to set the values of these parameters in light of literature values or other estimates. It also allows for sensitivity analysis to determine relatively easily the robustness of model conclusions as to the values selected for these key parameters.

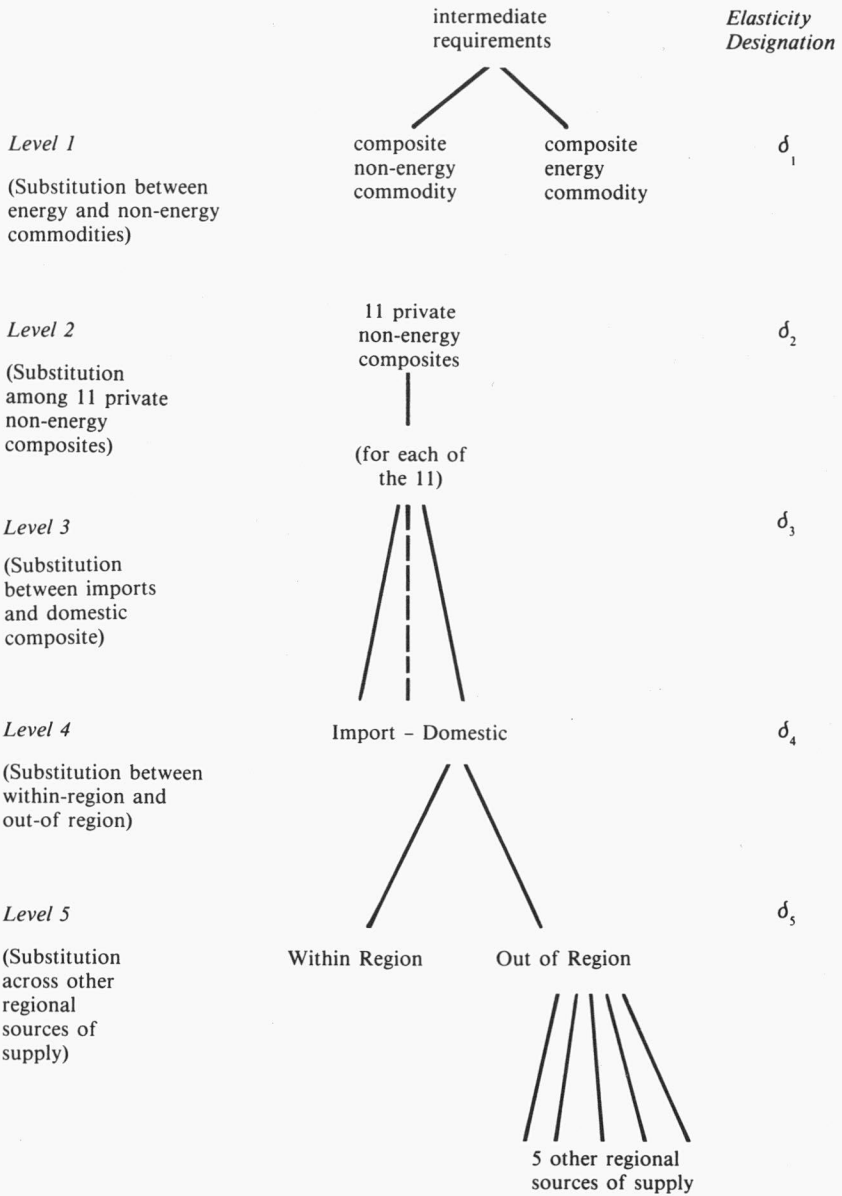
## **The Treatment of Production**

The production side of the model incorporates two separate elements for each industry in each region: intermediate production and use of primary factors. The intermediate production structure is outlined in Figure 3-2. The production of each good in each region allows for substitution between intermediate inputs in ways similar to the substitution appearing on the demand side of the model. Substitution across sources of supply is captured, and the crucial trade elasticities affect both intermediate and final demands.

The intermediate production structure of the model is essentially the same as that assumed for the nesting structure in final demands. For example, in determining intermediate requirements per unit of manufacturing in Ontario, the assumption made is that Ontario manufacturing industries cost minimize in selecting their inputs. This first involves substitution between energy and non-energy inputs; next between non-energy composites; followed by substitution between imported and domestic composites; then substitution between in-region and out-of-region supplies; and finally, substitution across the out-of-region sources of supply.

At the primary factor level, the model uses two input CES value-added functions for each industry in each region. These incorporate labour services and either capital services or resources as inputs. In all industries except energy, capital and labour services are the sole primary factor inputs. The capital factor thus includes land in the case of agriculture and other sectors. For energy industries, resources and labour services appear as the two factor inputs. This treatment is adopted for energy industries to keep the computer code for the model simple by using only two factor inputs, minimizing the complexities of using further nested functions for inputs, at little cost in foregone realism. It also allows the model to focus directly on the treatment of energy rents.

**FIGURE 3-2 Nesting Structure in Intermediate Production for Each Region**



## The Treatment of Interregional Labour Mobility

A prominent feature of the model which differentiates it from other applied general equilibrium models, such as those used to analyze taxation or international trade issues, is the presence of interregional factor mobility and, in particular, a treatment adopted to capture partial labour mobility between regions.

Other modelling attempts which have been used in the past to evaluate the interregional impacts of federal and provincial policies have usually focussed on one of two polar assumptions regarding interregional labour mobility — either perfect labour mobility or complete labour immobility. Neither of these is entirely appropriate in an evaluation of gainers and losers from policies pursued under Confederation. With perfect labour mobility, individuals have no direct association with specific regions, and the issue of which regions gain or lose from Confederation has little meaning. On the other hand, with an assumption of interregional labour immobility, effects of policies within Confederation on fiscally induced migration are not captured.

Because of the desire to analyze the impacts of policies pursued within Confederation on different regional groups of labour income recipients, the present model treatment incorporates location-specific preferences. Figure 3-3 indicates how this works in the case where no transportation costs for shipping commodities between regions enter the model.

The way partial labour mobility is accommodated within the model is to assume that there is a distribution of individuals within each province who differ by their intensity of locational preference. Their utility function parameters reflect this difference in a systematic way across the original (pre-policy-change) population of each region.

The utility function for any agent in any region is specified as the maximum of two separate subfunctions. The  $U_i^H$  function gives the utility from consuming a given bundle of goods if the individual  $i$  originally associated with the region in question remains in that region. The  $U_i^F$  function gives the utility from consuming the same bundle of goods if the individual  $i$  moves outside the region. If it were assumed that all individuals are identical within any region, then in response to a changed income differential between regions every individual in a region would either leave or stay, and no partial labour mobility would occur. The  $U_i^F$  function therefore varies systematically across individuals, who are ranked by the index  $i$  in terms of their intensity of locational preference. The  $U_i^F$  function is downward sloping due to the locational penalty (of increasing severity across individuals) which individuals are assumed to bear should they leave.

For reasons of modelling tractability, the strong assumption is made that an individual leaving region  $i$  for region  $j$  maintains the preference structure which initially characterizes residents of region  $i$ , rather than

assuming the new preference structure of those residents initially in region  $j$ . The locational decision for each individual thus involves comparing two indirect utility functions —  $\hat{U}_i^H$  and  $\hat{U}_i^F$  — one giving the utility level if consumer  $i$  remains in the region, the other the pre-penalty utility if he leaves. Because individuals initially within a region before the policy change are assumed to differ systematically in the intensity of their locational preference, only one individual is on the margin between leaving the region and remaining at any point in time. All others in the region are beyond the margin and have an unambiguous preference for remaining. If relative incomes across regions change, then some individuals will be induced to move because the new income differential more than outweighs locational preference. The allocation of individuals between regions will therefore change.

This approach is illustrated in parts 2, 3 and 4 of Figure 3-3. The parameter  $\delta$  is introduced into the sub-utility function associated with leaving the home region, reflecting a utility penalty from out-migration. This produces a function  $U_i^F$  which varies systematically across the initial population within the region. The product of the parameter  $\delta$  and the index  $i$  defines the locational intensity as one moves through the index of the original population from  $O$  to  $N$ . In an original equilibrium situation in which  $N$  individuals are located in a region, only the first individual is on the margin between staying and leaving. If a decrease in income in the home region occurs, the  $U_i^H$  function shifts down as indicated in part 4, and a number of individuals leave. The number of those leaving and staying depends upon the slope of the  $U_i^F$  function, which in turn depends on the parameter  $\delta$ . A complete implementation of this approach in the model would incorporate migration effects of all regional taxes, along with net fiscal benefits accruing through taxes on resource rents and interregional transfers such as equalization. Including all of these features in interregional migration decisions is complex and the model as implemented captures the effects of regional differences in wage rates, equalization, and regional taxes on resource rents.

A further portion of the model (not presented in Figure 3-3) then specifies how individuals leaving a region locate in other regions. In the simplest treatment, a fixed coefficient distribution function is used, but a CES distribution function can also be used. This, however, is not based on optimizing behavioural assumptions and is used as a simplifying device.

Interprovincial labour mobility is therefore incorporated into the model by treating individuals as making a utility-maximizing decision which involves a trade-off between the income differential from locating in one region rather than another, and the intensity of preference for remaining in the home region, as reflected by the utility penalty associated with leaving. This procedure has the advantage of incorporating location decisions explicitly into preferences, and enables one to evalu-

**FIGURE 3-3 Treatment of Partial Labour Mobility (no transportation cost case)**

1. Location specific preferences

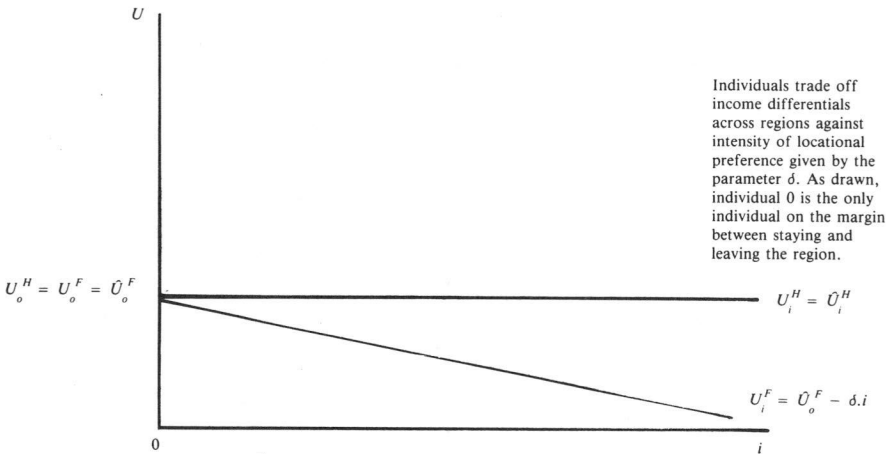
$$U_i = \max [U_i^H(X), U_i^F(X)]$$

$U_i^H$  = utility from consuming bundle of goods  $X$  inside region for individual  $i$

$U_i^F$  = utility from consuming bundle of goods  $X$  outside region for individual  $i$

2. Distribution of individuals within regions by intensity of preference for remaining in the region

$$U_i^F = \hat{U}_o^F - \delta \cdot i \quad i = 0, \dots, N$$



3. Indirect utility functions

$$U^H = I^H \cdot g(P^H)$$

$$U_i^F = I^F \cdot g(P^F) - \delta \cdot i$$

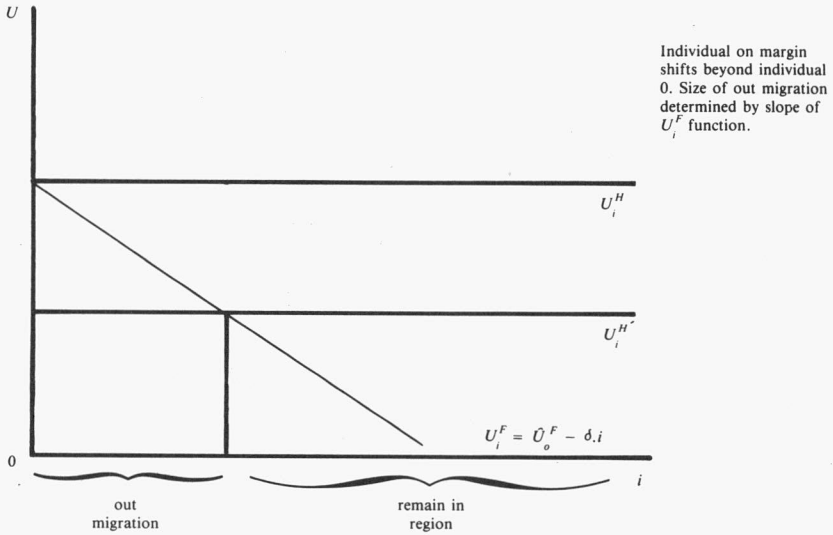
$I^H$  = income if located in own region

$I^F$  = income if located outside region

$g(P^H)$  = true cost of living (price) index for consumption within the region

**FIGURE 3-3 (cont'd)**

4. Implication of Reduction in  $I^H$



ate the welfare costs and benefits of any set of policies which impact on mobility decisions. It also has the strong implication that a set of policies which generates a uniform distribution of income across regions need not be appropriate in terms of providing for a spatially optimal allocation of resources.

### The Treatment of Foreign Trade

Foreign trade is central to the evaluation of interregional effects of policy elements within Confederation. As has already been indicated, federal policies adopted toward foreign trade can significantly affect the size of any surplus or deficit associated with Confederation. The policies adopted within any region can also have the effect of offsetting the interregional effects of national trade policies.

The main features of the model treatment used are outlined in Table 3-3. The two most important elements are the Armington assumption and the treatment of international factor mobility, both of which have been discussed earlier.

The specification of behaviour by foreigners in the model is especially important, as Whalley and Yeung (1984) have shown for single-economy

**TABLE 3-3 Treatment of Foreign Trade in the Model**

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Armington assumption	Similar products produced in Canada and abroad are treated as qualitatively different (as they also are between regions within Canada).
International mobility assumption	Goods are internationally mobile. Capital is internationally mobile in one model variant and internationally immobile in the other. Labour is internationally immobile.
Behaviour of foreigners	The rest of the world (ROW) is specified as a separate country with a production and demand structure similar to each of the Canadian regions. It also produces a similar number of products to those specified for Canadian regions.
External sector balance	The value of imports plus net capital service inflows equals the value of exports.

---

general equilibrium models. In the present model the behaviour of foreigners involves both their production and demand, including provision for pure public goods in the public good model variant. The rest of the world (ROW) produces the same number of products as each of the Canadian regions and also trades with each of the Canadian regions. In the data used to calibrate the model, each industry's output in the rest of the world is set at ten times that for all Canadian regions combined. No intermediate production enters the model specification for the rest of the world. The two most important parameters in this model treatment are the values chosen for elasticities of substitution between Canadian and foreign products and the size set for the ROW, since these determine the international import and export price elasticities which regions within Canada face.

The model incorporates an external sector balance condition as part of the definition of equilibrium. This requires the value of imports plus the net imbalance on capital account to equal the value of exports. This is equivalent to stating that, as a country, Canada is always on its budget constraint in its international transactions.

### **The Treatment of Policies**

In addition to demand and production, and the various other elements of the model outlined in earlier sections, the key policy elements within Confederation which have been discussed in earlier chapters are also incorporated. These include nation-building policies, intergovernmental transfers, provincial policies relevant to the debate on the economic union, and various other policies including features of the federal tax/

**TABLE 3-4 Treatment of Key Policy Elements within Confederation**

	<b>Model Treatment</b>
<b>Nation-Building Policies</b>	
Tariffs	Ad valorem tax on imports (final and intermediate demands)
Energy policies	Provincial royalties — ad valorem regional tax entering producer costs Price ceilings — ad valorem consumer subsidy, ad valorem producer tax Exploration grants — producer subsidy
<b>Intergovernmental Transfers</b>	
Equalization payments	Federal-provincial transfers
EPPF	Federal-provincial transfers
CAP	Cost-shared federal-provincial transfer program
<b>Economic Union Issues</b>	
Barriers to free goods flows	Ad valorem tariffs on imports from other regions
Capital market preferences	Subsidies to capital use within region
<b>Other Issues</b>	
Trade restrictions (textile quotas)	Ad-valorem-equivalent tariff on textile imports
Features of federal tax system	Manufacturers' sales tax modelled as ad valorem sales tax Manufacturing and processing incentive modelled as lowered corporate tax rates Progressive federal income tax
Regional development programs	Regional subsidies to capital use by industry within region
Agricultural programs	Agricultural output subsidies

transfer system and non-tariff trade restrictions. These policies and a brief description of their model treatment are listed in Table 3-4.

In most cases, the model treatment of these policies is straightforward. The tariff is treated as an ad valorem tax on imports into all regions in Canada, covering both final and intermediate demands, with rates varying across commodities.

In some cases, however, the model treatment of these policies is more complex. This is especially the case with energy policies under the National Energy Program (NEP), since a number of different elements enter the model. Royalties are incorporated as ad valorem regional taxes



on the inputs of resources (oil and gas) used in energy industries. Ideally, energy price ceilings should be incorporated through exogenously specified energy prices for both producers and consumers. However, for reasons of modelling convenience these controls are approximated in the model by an ad valorem consumer subsidy on energy which maintains consumer prices below world prices, and an ad valorem producer tax on energy products which lowers the net of tax price received by producers below world prices. In and of itself, this does not yield a zero revenue pricing scheme because of the presence of net energy imports. The model therefore also incorporates a Petroleum Compensation Charge (PCC) through which taxes on consumers are used to pay for the subsidy on imports. This is incorporated in the model as part of the system of taxes and subsidies on energy products.

A further feature of energy policies as modelled are exploration and development incentive grants under the NEP. In practice, these have effects only on new exploration and development activity. This feature cannot, however, be satisfactorily incorporated in the present model, since exploration and development are not separately identified as investment categories, and also because the model is static in nature, covering only a single period. A major extension of the model, well beyond the resources available to the present study, would be required to satisfactorily incorporate the required intertemporal features. These policies therefore appear in the model as a producer subsidy which transfers back to producers some of the rents transferred to consumers through price ceilings. Marginal effects on new exploration and development activity are not satisfactorily captured by this treatment.

Intergovernmental transfers (including equalization, EPF, and CAP) are also incorporated in the model, each specified in a different way. In the case of equalization, data on equalization payments received by region in 1981 are used in the model. This allows possible changes in equalization to be considered as policy variations in the model. EPF is incorporated in a similar manner, but is calculated as an equal per capita grant to all provinces. CAP enters in the model as part of intergovernmental transfers, in its role as a cost-shared federal-provincial transfer program.

In the economic union area, barriers to free goods flows are incorporated through ad valorem tariffs on imports from other regions. This is not a wholly appropriate treatment of these policies, since in practice they involve quantity and other restrictions on both exports to and imports from other regions which are quite different from tariffs. Examples of this occur with the model treatment of supply management marketing boards and policies such as preferential procurement policies. Neither of these are equivalent to a tariff in their effects. Also, their treatment in the model focusses exclusively on their interregional

effects, which are more adequately captured in the model than their internal effects within regions, although these may well be much more important (as in the case of marketing boards, for instance).

Capital market preferences, which typically involve subsidies on capital use by industry within regions, are incorporated as part of the taxes and subsidies that apply to the capital use of industries within regions. Regional taxes on capital income originating from industries within their own region are lowered as a result of these subsidies, and in some cases a net subsidy may apply.

A final set of policies incorporated are the other tax and subsidy elements and non-tariff trade restrictions which have interregional effects, such as textile quotas and agricultural policies. Those features of the federal tax system which have pronounced interregional impacts appear. The manufacturers' sales tax enters as an ad valorem sales tax on manufactures at the federal level. Similarly, the manufacturing and processing incentive in the corporate tax appears as lowered corporate tax rates for manufacturing industries. The progressive income tax enters as differential average federal income tax rates by region. This is inappropriate insofar as in practice individuals face the same marginal federal tax rate irrespective of the region in which they are located, and no interregional distortion of labour allocation occurs. Regional development programs, such as those administered by the Department of Regional Industrial Expansion (DRIE), appear through regional subsidies to capital use. Agricultural programs are captured through federal subsidies to agricultural industries in each region.

## **Equilibrium Conditions in the Model**

The specifications of production, demand and policy interventions which appear in the model influence its behaviour by changing its equilibrium solution. A general equilibrium for the model is specified in the usual Walrasian sense as a set of prices for which all markets clear. However, because of the structure used in the model, the equilibrium conditions need to be carefully specified.

As indicated in Table 3-5, six separate sets of conditions are required for equilibrium to hold in the basic model variant. These include demand-supply equalities in each goods market (demands include both exports and intermediate demands in any region) and demand-supply equalities in factor markets. In the case of capital markets, if capital is mobile both nationally and internationally, there is only a single capital market equilibrium condition. On the other hand, where capital is internationally immobile there are two separate conditions, one in Canada and one abroad.

In the resource market, resources are sectorally specific, and so a

**TABLE 3-5 Equilibrium Conditions in the Basic Model Variant**

Demands equal supplies in goods markets for each product produced in each region.

Demands equal supplies in factor markets:

For capital	Both nationally and internationally, where capital is assumed internationally mobile
	Nationally where capital is assumed internationally immobile
For resource	In each regional sector-specific market
For labour	In each labour market in each region, including endogenous supply adjustments from interregional migration

Zero profit conditions hold in all industries in all regions and abroad.

Budget balance holds for the federal government (including intergovernmental transfers).

Budget balance holds for each regional government (including intergovernmental transfers).

External sector balance holds (merchandise trade plus capital account transactions).

separate demand-supply equality is required for each of the resources considered. In the basic variant of the model, only one such resource is identified.

Equilibrium conditions in labour markets are more complex, since even though labour is treated as homogenous across regions, the endogenous migration features of the model result in a separate labour market condition in each region, with different wage rates applying across regions. Labour market equilibrium conditions therefore have to be satisfied in each region, plus an additional equilibrium condition in the rest of the world.

In addition to these demand-supply equalities, zero profit conditions must hold for each industry, both abroad and in all regions in Canada. As is usual in general equilibrium models, in equilibrium only normal profits will be earned in any industry. Were this not the case there would be entry into any industry where positive profits were being made, which would in turn change production levels and all quantities and relative prices.

Budget balance conditions hold for both the federal government and each of the regional governments. These can, in fact, be shown to be a property of an equilibrium in such a model [see Shoven and Whalley (1973)], although here they are separately listed as equilibrium conditions. External sector balance conditions must also hold. In equilibrium, external sector balance will be a property of the demand and production

functions used in the model, but it is also shown in Table 3-5 as a separate equilibrium condition. Due to the absence of any data on interregional asset ownership patterns, in the base case equilibrium the value of capital services used in any region is assumed to equal the value of capital services owned by residents of the region.

The characteristics of any particular equilibrium (i.e., relative prices, production by industry by region, interregional trade flows, etc.) will change as policies change in the model. The technique used to analyze possible interregional impacts of policy changes is counterfactual equilibrium analysis, which evaluates the impacts of policy changes relative to a base year (or benchmark) equilibrium. This approach is discussed in more detail below.

## Key Model Variants

Table 3-6 consolidates the description of the model presented thus far in this chapter, by outlining the key model variants available beyond the basic model variant. These include changes in the elasticity configurations used in demand and production functions (discussed in Chapter 4), and variants on factor mobility assumptions (capital can be made either internationally mobile or internationally immobile). There are also parameters which enable increasing returns to scale to be incorporated within industries through parametric scale economy effects. These can be incorporated in any industry production function in any region.

The model can also be used either with or without public goods, or with different transportation cost margins between regions. These treatments are incorporated as variants on the basic model rather than as standard features, because of the higher execution costs involved in repeatedly using a model incorporating these features. Finally, the model can be used in reduced dimensionality format. This variant is used to reduce the execution costs of repeatedly solving the model. In reduced dimensionality format, the model is solved using only six commodities in each region rather than the full thirteen.

Public goods play an important role in the model variant in which they are incorporated. As indicated in Table 3-7, three different types of public goods enter this variant. Federally provided pure public goods enter through regional utility functions, with the federal government assumed to follow a Samuelsonian rule in determining the quantity provided ( $G$ ). In providing these goods it follows the rule that the level of  $G$  is such that the sum of the marginal rates of substitution between private consumption ( $C$ ) and  $G$  across regions equals the marginal rate of transformation between  $C$  and  $G$ . As pointed out by Atkinson and Stern (1974), in the presence of distorting taxes the use of this rule by the federal government will produce a non-optimal supply of  $G$ . Either an under-supply or over-supply of pure public goods will result, depending

**TABLE 3-6 Key Variants of the Basic Model**

---

<b>Changes in Model Specification Possible during Model Use</b>	
Elasticity variations	Elasticities in demands and production can be varied during model use (see Chapter 4).
Factor mobility	Capital may be either mobile or immobile internationally.
Increasing returns to scale	Parametric scale economies can be incorporated in any industry production function in any region.
Public goods	Model may be run with pure public goods appearing in regional utility functions.
Transportation costs	Model may be run either with or without transportation costs, but execution costs are lower without.
Reduced dimensionality	The dimension of the model can be reduced to six commodities within any region.

---

**TABLE 3-7 Treatment Adopted in the Public Goods Model Variant**

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Federally provided pure public goods	These enter each regional utility function. It is assumed that the federal government follows a Samuelsonian rule in providing public goods (i.e., $\sum MRS_C, G = MRT$ ).
Regionally provided local public services	The assumption is that these are “quasi-public” goods (i.e., there is a positive marginal cost involved in providing these goods to additional people), but provision through the public sector ensures uniformity of levels of consumption within any region. This is meant to approximate the situation in post-secondary education and health care. Since agents in each region have identical preferences (save for the parameter controlling intensity of locational preference), these become similar to other private goods except they are bought by regional governments whose demands are aggregated with those of households in the region.
Spillover of public goods from the United States	It is assumed that Canada spends only small amounts on national defence, since Canada is covered by defence expenditures by the United States without bearing significant financial costs. Defence public good provision is thus largely determined by the level selected in the United States.

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**TABLE 3-8 Model Treatment of Interregional Transportation Costs**

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Interregional transport margins	Fixed coefficient transport requirements involved in shipping a unit of any good between any pair of regions.
Margins on international trade	Transport margins in international trade are ignored; world prices of Canadian exports are net of international transport costs; prices paid for imports are gross of international transport margins.
Supplier of transport services	All transport requirements are met by the transportation industry in the exporting region.

---

on the substitutability or complementarity between public and private goods. No modification to the traditional Samuelsonian rule for these effects appears in the present model.

The model also incorporates a simple treatment of regionally provided public services. Because of the model treatment of consumers in each region, who only differ by their intensity of locational preference, these commodities enter the model in a similar way to private goods. Regionally provided public services differ conceptually from federal public goods in that there is a positive marginal cost of additional provision for these commodities. The rationale for their being in the public sector is that an objective of regional (and federal) policies is a uniform level of provision of such services as education and health care.

Finally, defence-related pure public goods provided by the United States appear in the model to capture the spillover effects to Canada from U.S. levels of provision. The role this feature can play in an evaluation of policy impacts within Confederation has already been discussed.

The model also allows for a variant in which there are different transportation costs between regions. This model variant, summarized in Table 3-8, is considerably more expensive to use, and so its use is restricted to selected policy analyses.

These transportation costs are incorporated in the model by specifying transportation cost margins for the shipment of any product between any pair of regions. In this formulation consumer prices for products are no longer the same across regions and do not equal producer prices. Transportation margins on international trade are ignored, and a strong assumption is made that suppliers of transportation margins are always from the region in which the exporting industry is located. This assumption makes the treatment of interregional trade balance conditions in the model somewhat easier to handle in implementing this model variant, although available data indicate that this assumption may perhaps be overly strong.

## Parameter Specification in the Model

To apply the model outlined in preceding sections to the evaluation of interregional impacts of policies pursued under Confederation, parameter values must be specified for the equations appearing in the model, and it must be solved for each competitive equilibrium for the various policy changes considered. In specifying parameter values for the model, the calibration procedures widely used in applied general equilibrium models are followed [see Mansur and Whalley (1984)].

These procedures involve selecting a set of parameter values for the functions in the model such that data which characterize a benchmark (observed) equilibrium can be reproduced as a model equilibrium solution. Elasticity estimates enter this process by serving as identifying restrictions on the model specification such that the benchmark equilibrium data can be replicated in this way. This allows the other parameter values which the calibration procedure generates to be calculated. Different elasticities produce changed values for the other model parameters, and thus selecting appropriate elasticity values is central to this model specification process. A series of adjustments are also necessary to basic data in constructing a microconsistent "benchmark" equilibrium data set to be used in calibration. These are discussed later in Chapter 4.

When faced with the task of selecting parameter values to be used in a numerical general equilibrium model, it is natural to think in terms of stochastic estimation of the whole model (through either system or single equation methods). However, in the present regional model for Canada, calibration of the model to a single equilibrium data observation is used, combined with a literature search for selected key parameters (in the main, elasticities). Estimation is thus only relied on indirectly through a literature search for the extraneously specified key parameters. As a result, no statistical test of the fit of the model to data is used, although sensitivity analysis tests the impact on model results of changing parameters whose values are both uncertain and crucial to the model.

The reasons for adopting this procedure when working with large dimensional equilibrium systems are summarized by Mansur and Whalley. They discuss the difficulties which arise with stochastic estimation of complete general equilibrium models. They note that it is usually not possible to write down a likelihood function for a complete general equilibrium model, and thus Full Information Maximum Likelihood methods for complete model estimation are inapplicable. While a reasonable second-best approach may seem to be to partition the model and separately estimate model sub-systems, other problems arise. In each sub-system, variables endogenous to other sub-systems must be assumed to be exogenous. This inconsistency in the treatment of vari-

ables across the model implies that the estimated parameter values from sub-system estimation are not necessarily compatible with the rest of the model specification. When estimated in this way, even if no changes in policy are considered, the equilibrium solution for the model will typically not be regarded as representative of the economy under consideration, given available data from national accounts and other sources.

If sub-system estimation alone is used, no criterion of reasonableness of the complete specification is used for the whole model relative to its equilibrium solution concept. Equally, some of the restrictions on parameter values that are implied by the equilibrium features of data used in calibration will be neglected in a sub-system approach, such as income and outlay accounts by sector, trade balance and demand-supply equalities by product. Mansur and Whalley note the limited attention that issues of this type have received in econometric literature in recent years, and also emphasize the constraints imposed on estimation when using general equilibrium models of the dimensionality applicable here.

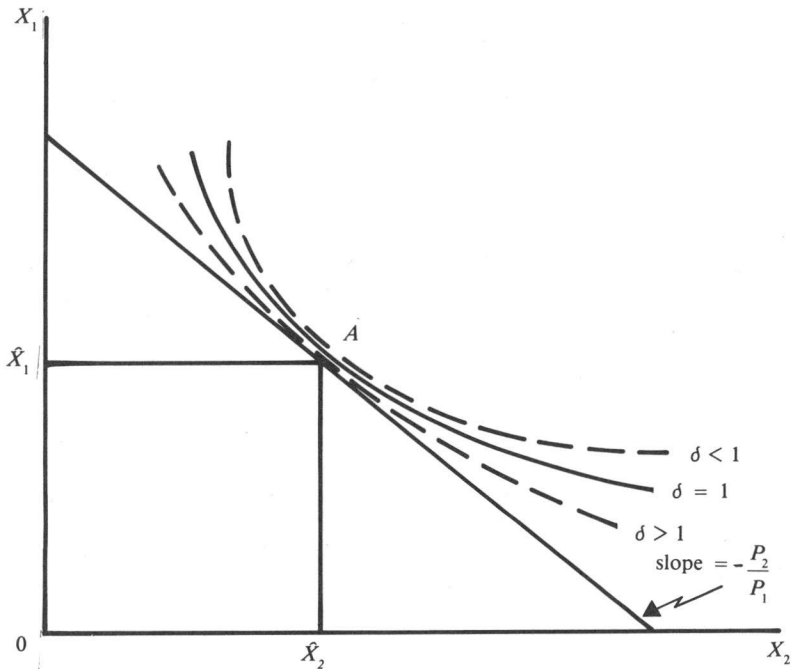
Calibration is most easily understood as the use of model equilibrium conditions and equilibrium data to solve for the parameter values used to represent the model equations. The approach used here applies a non-stochastic procedure to calculate parameter values from a constructed interregional equilibrium data set, augmented by a literature search for key model parameters. With the extensive use of CES functions in the present model, "key" parameters are generally synonymous with elasticities of substitution. Only when the model is fully specified and a policy change incorporated is the model solved for a new equilibrium solution.

Two types of equilibria therefore have to be distinguished in using the model. One is "observed" or "benchmark" equilibria, which are given from data and to which the model is calibrated (and thus do not need to be computed); the second is "new" or "counterfactual" equilibria, which are computed as model solutions under changes in policy.

Two issues which arise with calibration are how the microconsistent equilibrium data sets required for calibration are constructed, and how these data are used to determine parameter values for the model. The starting point in constructing a microconsistent equilibrium data set is provided by basic data available from national and regional accounts and related sources (input-output data, foreign and interregional trade data, balance-of-payments accounts, tax statistics, household income and expenditure survey data, and other sources). But because current national and regional accounting conventions are oriented mainly toward the determination of macro aggregates, the microconsistency conditions required in an equilibrium data set do not appear in available data. Demand-supply equalities, zero-profit conditions,<sup>4</sup> income-outlay identities, and zero external sector balance conditions (both for regions and nationally) must all appear in the microconsistent data set used in calibra-



**FIGURE 3-4 Calibration Method Applied to a Utility Function for a Single Consumer in the Two-Good Case.**



tion. Ensuring that these consistency conditions are satisfied is what motivates the construction of the interregional benchmark equilibrium data set used here, which is described in more detail in Chapter 4.

Typically, such a data set is constructed in value terms, in the present case in \$million for 1981. However, these observations need to be separately decomposed into price and quantity data in order to determine parameter values through calibration. A units convention for quantities is usually the key to this decomposition. Calibration then takes the separate observations on prices and quantities, and determines parameter values for behavioural functions appearing in the model consistent with both maximizing behaviour and these observations.

The calibration procedure as it applies to demand-side parameters for the interregional general equilibrium model is illustrated in Figure 3-4. In this case a single consumer buying two goods  $X_1$  and  $X_2$  is considered. The “decomposed” benchmark equilibrium observation gives the combination of goods consumed at point  $A$ ,  $\hat{X}_1$  and  $\hat{X}_2$ , and the slope of the price line through  $A$ . Calibration imposes the condition that the preferences specified in the model produce a tangency between an indifference curve and the price line at point  $A$ .

The importance of the choice of functional form is apparent from this diagram. If Cobb-Douglas preferences are used, all indifference surfaces are unit elastic and the calibration process determines exactly the parameters of the preference functions from the equilibrium data. However, if CES preferences are used, the elasticity of each indifference surface needs to be pre-specified before calibration can proceed, but because CES preference functions are homothetic, this single elasticity is all that is required. If more complex functional forms are used, further pre-specified parameter values will be needed.

A similar approach also applies in determining production function parameters through calibration. Equilibrium data are sufficient to determine parameters for Cobb-Douglas production functions, while more complex production functions require prespecified elasticity values.

By construction, the parameter values generated through calibration will allow the benchmark data set to be reproduced as an equilibrium solution to the model, since these data have been used along with the model equilibrium conditions to determine the parameter values. An important feature of this procedure is that since one can verify the equilibrium data set as a model solution, it gives an internal check on the correctness of the computer code used. This is usually referred to as the replication test in applied general equilibrium analysis.

In constructing the benchmark equilibrium data set to be used in calibration, the major difficulty is that the required model equilibrium conditions appear explicitly in current national and regional accounts only in the aggregate income-expenditure identity, and do not appear in the sub-aggregate detail. The detailed information present in national accounts and related sources, while clearly of enormous value in constructing microconsistent data sets, is largely a by-product of the process of assembly of macro aggregates. Typically, data such as these do not aim at consistency in the various areas of detail which the present model requires.

The equilibrium conditions listed above are also not all satisfied in the national and regional input-output tables and other available data. In input-output data, for instance, household or government sector income and outlay accounts are not explicitly incorporated, nor is an external sector balance condition explicitly satisfied. Household expenditure data are usually inconsistent with production-side data. Tax data usually reflect administrative classifications rather than classifications directly usable in economic models. Also, classifications differ and totals do not agree between all the various sources.

Thus, in ensuring microconsistencies in the interregional benchmark data set used here, various adjustments are necessary to blocks of data that are available separately but are not currently coordinated on any consistent basis. Classifications and definitions must be made as compatible as possible among the various data sources. Other adjustments

arise from the need to guarantee mutual consistency between inconsistent data sets. The regional benchmark data set used here relies heavily on the "RAS" adjustment method<sup>5</sup> for these. This technique is applied where demands for commodities differ from supplies of firms, where costs of industries are not equal to sales (after modifications to published intermediate transactions accounts), and where agent incomes do not equal expenditures for the economic agents identified in the model. A microconsistent data set in which all the equilibrium conditions listed above hold is the result of these adjustments. Chapter 4 describes in more detail how such a data set for 1981 has been constructed.

The data set actually used in the interregional model involves a number of separate data components which are projected into a microconsistent form for the year 1981. Central are interprovincial trade flow data and input-output accounts for 1979. Also, all the transactions of the federal and provincial governments are fully incorporated through their tax and expenditure activities, along with foreign trade activity of all Canadian regions. On top of this are the interprovincial financial accounts, incorporating the flows of funds between the federal and provincial governments, including equalization and EPF. Energy policies and their interregional impacts under the NEP are also incorporated.

### **Functional Forms and the Determination of Parameter Values Through Calibration<sup>6</sup>**

Once assembled, the interregional benchmark data set is used to determine model parameter values, using the calibration techniques outlined earlier. Calibration, however, first requires that particular functional forms for demand and production functions be selected for the model.

The major consideration in the choice of functional forms in the model is that they must allow for repeated solutions of agent utility maximization problems and industry cost minimization problems in the sequences of calculations involved in equilibrium computations. Tractable functional forms must therefore be used to describe behaviour patterns of both producers and consumers in all regions.

A further consideration is that it must be possible to easily associate key economic parameters such as income and price elasticities with parameter values appearing in the functions chosen. These magnitudes are crucial in determining the response of the model when policy changes occur, and it must be possible to interpret the ways in which the parameter values used in these functions relate to these.

For both of these reasons, the well-known family of convenient functional forms have provided the candidate specifications for the regional model discussed here. These involve demand and cost functions derived from Cobb-Douglas, LES and CES utility and production functions.

Nesting in the CES functions expands the range of parameter choices, since similar products can be grouped at lower levels of nesting and a hierarchical set of substitution possibilities can be specified among composites of products.

The widespread choices of CES functions in this and other applied general equilibrium models reflects the trade-off which modellers face between complexity and tractability. The use of CES functions (either nested or unnested) allows corresponding Cobb-Douglas functions to be considered as special cases. The CES function is, however, a directly additive function, which implies sometimes unattractive restrictions on the corresponding demand functions, including an approximate constant proportionality between income and own-price elasticities.<sup>7</sup> Other restrictions include the absence of inferiority and the unambiguous sign of compensated cross-price elasticities.

CES demand functions also have unitary income elasticities, which may be appropriate for some policy issues. This feature can be relaxed through the use of an LES variant of CES. Displacing the origin of the utility function from zero allows income elasticities of demands to be different from unity, since homothetic preferences are no longer used. The progression from Cobb-Douglas to CES and LES functions on the demand side thus proceeds from a dissatisfaction with the setting of income and uncompensated own-price elasticities equal to unity in the Cobb-Douglas case.

On the production side, fewer issues of choice of functional form arise. Since constant returns to scale are assumed, LES functions cannot be used. Only two factors of production enter the value-added substitution functions in the model, and so the issue of nested or single-stage functions does not arise. CES is a more general form than Cobb-Douglas, explaining its adoption as value-added functions for each industry. Intermediate substitution does require a nested structure to incorporate substitution possibilities between comparable traded products produced in different regions, and nested CES functions are used for this portion of the model.

After selecting functional forms for the model, the next step in calibration is to decompose the benchmark transactions data into separate price and quantity observations. The units convention used here for factors takes as the definition of a physical unit of the factor that amount which can move between alternative uses and, at the margin, can generate the same return to owners of the factor in the benchmark equilibrium. This procedure defines physical units for all factors in all regions as those amounts which can earn a reward of \$1 net of both federal and regional taxes and before receipt of subsidies, in any of its alternative uses in the benchmark equilibrium. Units for commodities are similarly defined as those amounts which sell for \$1 net of all taxes in equilibrium. These correspond to the amounts which producers can sell either within

or outside the region (including abroad) and which generate \$1 of revenues after all taxes have been paid.

While underlying physical units of measurement for both goods and factors are implied by these procedures, their dimensions remain undefined because there are no weight or volume measures one can appeal to. With labour services, for instance, different people will have different productivities and provide different quantities of labour services. Counting the number of workers in an industry or a region does not determine the amount of labour used, because of efficiency differences among workers. However, the assumption that relative marginal revenue products of factors in alternative uses in equilibrium are known permits factor payments data to be used directly to yield observations on physical quantities of factors used by industries in the various regions of the model. Similarly, quantities of goods produced and interregionally or internationally traded are given by the dollar amounts recorded in transactions terms. In these ways observed equilibrium transactions data (products of prices and quantities) are decomposed into separate price and quantity observations.

The final step in calibration is to use the price-quantity data from the benchmark equilibrium observation to calculate demand and production function parameters, given the values of any necessary pre-specified parameters (such as elasticities). This is done by using the equilibrium conditions of the model together with first-order conditions for utility maximization or cost minimization to calculate parameter values, using data on equilibrium prices and quantities.

These procedures can be illustrated for the cases of CES value-added functions for each of the industries in each region and CES utility functions for consumers. For the  $j^{\text{th}}$  industry in any region the CES value-added function is given by

$$Y_j = \gamma_j \left[ \delta_j K_j^{-\rho_j} + (1 - \delta_j) L_j^{-\rho_j} \right]^{\frac{1}{\rho_j}} \quad (3.1)$$

where  $\gamma_j$  is a constant defining units of measurement,  $\delta_j$  is a weighting parameter,  $\sigma_j = 1/(1+\rho_j)$  is the elasticity of substitution between factor inputs,  $K_j$  and  $L_j$  are capital and labour service inputs, and  $Y_j$  is the industry scale of operation. The benchmark equilibrium data set gives values for  $K_j$  and  $L_j$ . If the units convention for factors used were such that  $P_K = P_L = 1$ , and for simplicity we assume that there are no taxes on factor use by industry, they are also the prices paid by factor users that appear in the cost minimization problem facing each industry. Thus, once a value for the elasticity parameter  $\sigma_j$  ( $\rho_j$ ) has been selected for each CES function for each industry, the values of the share parameter  $\delta_j$  are given from the first-order conditions from cost minimization in each industry.

$$\delta_j = \left[ \begin{array}{c} \frac{1}{\sigma_j} \\ \frac{K_j}{\sigma_j} \\ \frac{1}{\sigma_j} \\ L_j \end{array} \right] \left( 1 + \left[ \begin{array}{c} \frac{1}{\sigma_j} \\ \frac{K_j}{\sigma_j} \\ \frac{1}{\sigma_j} \\ L_j \end{array} \right] \right) \quad (3.2)$$

Values for the  $\gamma_j$  term in equation 3.1 can be derived from the zero profit conditions for each industry, given the unit prices for outputs and inputs.

Parameters for household demand functions can similarly be determined from the benchmark equilibrium data on purchases of commodities by regions. The procedure is analogous to that for production functions, except that demand functions rather than first-order conditions from cost minimization are used.

For a single stage CES utility function for a typical demand-side agent,  $c$ ,

$$U^c = \left[ \begin{array}{c} N \\ \sum_{i=1} (b_i^c X_i^c) \\ \frac{\sigma^{c-1}}{\sigma^c} \end{array} \right]^{\frac{\sigma^c}{\sigma^c-1}} \quad (3.3)$$

commodity demand functions

$$X_i^c = \frac{(b_i^c)^{\sigma^c} I^c}{P_i^{\sigma^c} \sum_{j=1} (b_j^c)^{\sigma^c} p_j^{(1-\sigma^c)}}, \dots, N \quad (3.4)$$

are obtained where  $X_i^c$  are the quantities of the  $i^{\text{th}}$  good bought by agent  $c$ ,  $b_i^c$  are distribution parameters,  $\sigma^c$  is the elasticity of substitution,  $I^c$  is agent  $c$ 's income, and  $P_i$  are the commodity prices.

Benchmark data yield observations on  $X_i^c$  and  $I^c$ , and if all  $P_i = 1$  (equation 3.4) can be used to solve for the distribution parameters  $b_i^c$  using an extraneously specified value of the elasticity parameter  $\sigma^c$ , i.e.,

$$\frac{b_i^c}{b_j^c} = \left[ \frac{X_j^c}{X_i^c} \right]^{\sigma^c}; \forall i, j. \quad (3.5)$$

The calculated distribution parameters are normalized so that  $\sum_{i=1}^N b_i^c = 1$ .

A similar procedure can be adopted for nested variants of CES functions. With LES functions the origin displacement for utility func-

tions can be specified to calibrate to desired income elasticities in demand functions.

These calibration methods can be extended to incorporate the various interregional and other features present in the benchmark equilibrium data, such as those associated with interregional labour mobility effects. The major difference is that while sellers' prices remain at unity, buyers' prices differ from unity due to the distortions present and the algebra becomes more complex than that presented above. For the present interregional model, the complete benchmark equilibrium data set can be used in this way to generate the required parameter values for production and demand functions once extraneously specified elasticities are chosen. Elasticities of substitution typically meet these extraneous parameter requirements.

Because of calibration, the equilibrium computed by the model before any changes in policy are considered will exactly replicate the benchmark equilibrium data set. This is assured because the equilibrium conditions have been used directly in a non-stochastic procedure which uniquely determines parameter values. In this procedure the equilibrium solution of the estimated model is known *ex ante*, and its recalculation serves as a check both on the correctness of the computer code and on any error propagation difficulties with equilibrium computation.

## **Computing Counterfactual Equilibria**

In order to use the model for counterfactual policy analysis, it must also be possible to solve the model for a general equilibrium associated with changed policies in one or more regions (including policies changed by the federal government). As already indicated, only counterfactual equilibria are computed when using the model, since data generated in the presence of existing policies provide a direct observation of the benchmark equilibrium.

In solving the model for counterfactual equilibria, a Newton method is used, with the size and direction of Newton steps determined by a Jacobian matrix of excess factor demands and government budget imbalances. This method, while not guaranteed to converge, turns out to be both fast and reliable in its use in the present model.

Much of the recent literature on computation of general equilibrium in economic systems derives from the work of Scarf (1967, 1973), which contained the first description of an algorithm that could be used to find a general equilibrium and was guaranteed to converge. Subsequent contributions have both refined Scarf's original algorithm to increase its speed and flexibility and developed alternative methods which seem to work well in practice, even though the guaranteed convergence of Scarf's algorithm is not present. Typically, these are variants on the well-known Newton method for solving systems of non-linear equations.

A method based on one of the variants of Scarf's algorithm could be used here, but since the main focus of the present modelling effort is on results and policy insights, reliability and speed are the primary considerations in choosing a solution method. These objectives have been adequately met by the Newton method used.

In the present regional model, a Jacobian method is used to calculate the Newton steps required to compute counterfactual equilibria associated with changes in either federal policies or policies in one or more regions. This procedure determines an equilibrium in which all goods and factor markets clear for the whole economy, along with zero government imbalances for both federal and provincial governments, reflecting their expenditures and revenues. This method solves the system of non-linear excess demand functions characterizing an equilibrium by solving successive linear approximations until a true equilibrium solution is obtained. The derivatives of excess demand functions appearing in the Jacobian matrix are determined numerically as point estimates and, when necessary, recomputed as computation proceeds.

The first step in applying this method is to reduce the effective dimensionality of the model to the number of factors in the model, (rather than the number of goods and factors), plus government budget imbalances. From the factor prices it is possible to use the equilibrium zero profit conditions to generate cost-covering goods prices for each region, and to move up to the goods space in order to evaluate the demand functions for goods. Calculating the derived factor demands allows the procedure then to move back down into the factor space again in order to solve for an equilibrium in the model by solving the excess factor demand equations alone.

These dimension reduction techniques have long been used in international trade models and are applied here to the regional model. In a simple model with no intermediate production, goods prices can be calculated as cost-covering prices from the factor prices, and in this way the zero profit conditions of equilibrium are directly imposed on any model solution. It is then possible to evaluate the demands for goods using both factor prices, which determine incomes, and goods prices, which determine the position and slope of budget constraints. Once the demands for goods are known, the cost-minimizing input demands per unit of output for each industry can be used to generate the derived factor demands corresponding to the calculated demands for goods. Input use is thus consistent with goods demands, guaranteeing demand-supply equalities for goods. Thus, models reduced to factor space use factor prices to generate goods prices and directly impose zero profit conditions, and the dimension of the excess demand functions used in solving the interregional model can be sharply reduced using these methods.

The procedure applied in solving these factor excess demands and



government imbalances can be represented as a special case of the more general problem of finding a zero for a system of  $N$  excess demand functions.

$$E_i = E_i(P_1, \dots, P_N), i = 1, \dots, N \quad (3.6)$$

The Jacobian matrix contains the derivatives of the excess demand functions with respect to the prices.

$$J \left[ \frac{\partial E_i}{\partial P_j} \right], i = 1, \dots, N; j = 1, \dots, N \quad (3.7)$$

At any trial set of prices,  $P$ , the excess demand functions  $E_i(P)$  can be evaluated. Using the elements of the Jacobian matrix, the changes in each price,  $P_i^*$ , required to eliminate the excess demand  $E_i(P)$  can be calculated.

$$\Delta P_i^* = \sum_{j=1}^N \left( \frac{\partial P_i}{\partial E_j} \cdot E_j(P) \right), i = 1, \dots, N \quad (3.8)$$

$k \cdot \Delta P_i^*$  is added to the price  $P_i$  to give a further trial price solution  $\hat{P}_i = P_i + k \cdot \Delta P_i^*$  for each commodity, where  $k$  is a constant whose most convenient value must be found by trial and error (typically in the neighbourhood of 0.01). The vector  $\hat{P}$  is usually renormalized to its original sum after each iteration. Applying this procedure results in a new evaluation of the excess demand functions, a further application of derivatives appearing in the Jacobian matrix, and a continuation of the procedure. The procedure terminates when all  $E_i(P)$  are within a desired criterion of closeness to zero.

In practice, the choice of the initial starting value in using this method is important, and in solving the model the benchmark equilibrium is typically used as the starting point. A further issue affecting the speed of solution is the number of times one has to recalculate the Jacobian matrix. In practice, a flexible procedure is followed in solving the model. If convergence is found to be slow or if successive trials are diverging with an initial Jacobian matrix, a further recalculation of the Jacobian matrix is used. Calculating a Jacobian matrix requires repeated function evaluations, and recalculation of this matrix at each step is avoided as far as is possible in solving the model.

Computational experience with this solution procedure for the model has been good, and rapid solutions are typically obtained. If the Jacobian matrix in the neighbourhood of the benchmark equilibrium is already known, and if relatively small policy changes — say those involving a small modification of policies in one region — are being considered, full equilibrium solutions can be obtained in as few as three to four evalua-

tions of the excess demand functions,  $E_i(P)$ . Where larger changes are involved, more function evaluations may be necessary and in addition several new Jacobian matrices may be generated, which increases costs. Execution costs change from equilibrium solution to equilibrium solution, but for the model discussed here, solution costs are well within reasonable bounds with these techniques.



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## **1981 Microconsistent Regional Data, Key Elasticities, and Other Parameter Values**

In this chapter we describe the sources and methods used to assemble a microconsistent regional data set for Canada for 1981 for use in the general equilibrium model described in the preceding chapter. The summary tables present some of the main features of this data set. We also summarize literature on key elasticity and other parameter values used in the model. Much of the methodology used to construct the benchmark data follows that of an earlier paper by St-Hilaire and Whalley (1983) which describes the construction of a national data set for 1972 developed for tax policy analysis. The benchmark data are also used in several of the numerical partial equilibrium evaluations of interregional policy impacts which are presented in Chapter 5.

### **Structure of the Benchmark Data Set and Basic Data Sources**

As emphasized in Chapter 3, the procedure used in specifying the regional general equilibrium model is to calibrate the model to reproduce a base year data observation as an equilibrium solution. This enables the empirically based general equilibrium model to be used to evaluate counterfactual equilibria in a way which corresponds to the comparative static analysis commonly found in theoretical literature.

For this approach to be implemented, the equilibrium conditions which characterize the model must hold in the benchmark data set used in calibration. For each commodity produced in each region, the value of intermediate plus final demands must equal the value of total supply. For each industry in each region, the value of production must equal the total cost of production. Each demand-side agent must satisfy its budget

constraint and for each region an external sector balance condition must hold. The benchmark regional data set assembled for 1981 satisfies all of these conditions, although, as previously emphasized, the absence of data on interregional asset ownership means that interregional flows of capital income are excluded from our data. The strong assumption is made that the value of capital income originating in any region equals the value of capital income accruing to residents of the region.

In this 1981 data set each region is viewed as a separate regional economy whose links with other regions differ somewhat from those recorded between nations in international data sets. Trade between regions is incorporated, but the recording of interregional transactions is more complex than that of international transactions. Tax payments to the federal government, intergovernmental transfer receipts, and federal government purchases of regional products must all be taken into account. As a result, regions can be in either a surplus or deficit position in their transactions with the federal government. A surplus in transactions with the federal government can, in turn, finance a deficit in a region's international and interregional trade.

Developing a regional accounting framework consistent with the general equilibrium model requires that all the transactions taking place in the separate markets and regions which comprise the national economy be recorded. As part of the System of National Accounts, the input-output tables prepared by Statistics Canada (1984b) are the most detailed set of production and expenditure accounts available for Canada and the only data upon which to base such a framework. Statistics Canada has recently produced unpublished provincial input-output (PIO) tables for 1974 and 1979 as an extension to their national input-output tables.

The tables for 1979 are the major building block used in assembling the microconsistent regional data set. The PIO data are updated to 1981 using estimates of regional economy-wide aggregates from the Provincial Economic Accounts (PEA) compiled by Statistics Canada (1984c). The PEA also provide the estimates of federal government transactions with individual provinces, which are integrated into the data set. The PIO tables and the PEA, which are a relatively new Statistics Canada data series, jointly provide much needed information on economic activity at the provincial level that was previously unavailable. Although there are some substantial problems with these data, given the focus of our modelling, they are heavily used in constructing the benchmark data set for use in the general equilibrium model.

The PIO tables are similar in structure to the economy-wide input-output tables. They contain two sets of interrelated accounts: a set of commodity accounts reporting the supply of and the demand for individual commodities, and a set of industry accounts showing the total gross output of each industry and each industry's total input use within the province.

In the first set of accounts, the supply of each commodity is reported as the amount produced by each provincial industry plus the amount imported by the province. The demand for each commodity is reported as the amount used by each provincial industry, plus the amount purchased by the final demand sectors and the amount exported. In the second set of accounts the gross output of each industry in the province is reported by commodity. The total input use of each industry is reported by commodity for intermediate inputs and by type for primary inputs (i.e., indirect taxes, wages and salaries, and capital use costs). For each industry in each province, total production costs (value of intermediate plus primary inputs) equal the value of total production.

The interprovincial and international trade data appear in separate trade flow matrices recording the flows of each commodity among individual provinces, and between individual provinces and the rest of the world.

The major problem with these data is that they are still preliminary, in contrast to the national input-output tables where demand-supply equality conditions for each commodity implicitly hold. Small imbalances are present in currently available provincial tables, due mainly to a lack of data on changes in inventories by commodity by province. Also, while the national input-output tables are consistent with published measures of gross domestic product and expenditure at market prices from the national income and expenditure accounts, PIO tables are only constructed using these estimates as a reference point and strict consistency is not ensured. Furthermore, although data on interprovincial and international flows of goods are available, and are consistent with supply and use constraints of goods by province, data on international and interprovincial trade in service categories are weak. A series of arbitrary assumptions is therefore required in terms of both the kinds of services that are traded and the interprovincial pattern of these flows, even though the numbers involved are quite significant.

The PEA have a longer coverage than PIO data, being currently published for the years 1966 to 1981. In contrast to the national income and expenditure accounts data, which are estimated on a national basis (i.e., with incomes assigned according to the residence of the owners of factors of production), the PEA are estimated on a domestic basis allocating income to the region in which it is earned. This is also the approach used in determining the location of activity in the case of the federal government and multiprovincial corporations. This is a reflection of the point we have emphasized above, namely the absence of data on interprovincial asset ownership patterns.

At present, the PEA report estimates gross provincial product and expenditure, as well as government revenue and expenditure accounts for each of the three levels of government (federal, provincial and municipal). However, the detailed data on the transactions by type and

sector, which are necessary to construct sectoral income and outlay accounts and to redefine value-added, as in the earlier national benchmark equilibrium data set due to St-Hilaire and Whalley, are not yet available. Another problem with these accounts is the weakness of the interprovincial trade data. Net exports by province are reflected in residual estimates in balancing gross provincial product and expenditure. While these estimates do provide a measure of the trade imbalance in goods and services for each province, they also include a significant residual error component.

The structure of the microconsistent regional data set for 1981 produced from these data is similar to that in the numerical example of interlocking regional accounts presented in Table 4-1. Production and demand by commodity in each region are displayed in these accounts, along with the interregional trade flows and flows between the individual regions and the federal government. The activities of the federal government affect the budget constraint of each region through federal taxes paid by the region, governmental transfer payments to the region, and federal government expenditures on goods produced by the region.

**TABLE 4-1 An Example of a 2-Region, 2-Commodity Benchmark Equilibrium Data Set (transactions in currency units)**

Commodities		Production Side				Intermediate Demands
		Input-Output Industries Region 1		Transactions Industries Region 2		
		1	2	1	2	
<b>Region 1</b>	1	30	20	20	10	80
	2	25	45	15	20	105
<b>Region 2</b>	1	20	15	40	25	100
	2	15	20	30	15	80
						365
Capital		15	25	15	20	75
Labour		20	30	25	20	95
Federal Indirect Tax		5	5	5	10	55
Total Value Added		40	60	45	50	195
Total Value of Production		130	160	150	120	560

TABLE 4-1 (cont'd)

		Demand Side						
		Final Demands			Total	Interregional Trade		Total Demands
		Region 1	Region 2	Fed. Gov't.		Region 1	Region 2	
Region 1	1	20	15	15	50	0	45	130
	2	20	30	5	55	0	65	160
Region 2	1	35	7	8	50	70	0	150
	2	12	23	5	40	47	0	120
		87	75	33	195			560

## Income/Outlay Accounts

		Region 1	Region 2	Total
<b>Federal Government</b>				
Income:	Tax collections			
	indirect	10	15	25
	direct	3	6	9
	Investment income	5	6	11
	Total	18	27	45
Outlay:	Current expenditures	20	13	33
	Transfers to regions	5	7	12
	Total	25	20	45
	Regional imbalance	-7	+7	
<b>Regional Economies</b>				
Income:	Capital income	35	29	64
	Labour income	50	45	95
	Transfers	5	7	12
	Total	90	81	171
Outlay:	Final demands	87	75	162
	Direct taxes	3	6	9
	Total	90	81	171

The income-outlay accounts produced for each region satisfy budget balance conditions (incomes equal expenditures). The federal government also satisfies its budget constraint. In its transactions with individual regions, it displays either a surplus or a deficit, depending on the difference between the tax and investment income originating in the region and the amount that is distributed in transfers and spent on goods exported by the region. In each region, the federal government surplus or deficit is exactly offset by the region's trade imbalance (the amount by which a region's imports exceed or fall short of its exports). No inter-regional flows of capital income appear either in this numerical example or in the benchmark data set.

## **Adjustments to Ensure Microconsistency**

The 1979 PIO tables provide the starting point in a series of adjustments which have been made to the basic data to produce a regional microconsistent equilibrium data set for the 1981 base year used in the model. The adjustment process involves extensions, modifications and redefinitions of concepts for portions of the basic data, and the addition of further detail, particularly on government activity. The two major steps are updating to 1981 and restoring mutual consistency between the various component blocks of data.

The data modifications and extensions occur at three levels: (a) transforming the 1979 PIO tables into an aggregated consistent format suitable for model use; (b) updating the aggregated accounts to 1981; and (c) incorporating additional data required for policy analysis.

## ***Modifications to the 1979 Provincial Input-Output Accounts***

The 1979 PIO tables are provided by the Structural Analysis Division of Statistics Canada. For each province an output matrix records the production of commodities by industry; a use matrix records intermediate and primary inputs of industries; and a final demand matrix records final demands for goods and primary inputs for each demand category. Data on both interprovincial and international trade flows appear in a series of separate trade flow matrices displaying the flows of each commodity (imports and exports) among provinces and between provinces and the rest of the world.

The data provided are at a "small" level of aggregation, with 51 commodities and primary inputs, 14 final demand categories, and 43 industries in the most detailed provincial tables (Quebec and Ontario). The industry classification differs slightly across provinces. Certain industrial categories do not appear as producing industries, or are aggregated with others because of their small size in particular provinces.

The first step is to make the industry classification consistent across all provinces by disaggregating aggregated categories, and to enter sets of zeros to represent non-producing industries in various regions' data. The PIO data are then aggregated into 12 industry and 12 corresponding commodity categories consistent across provinces and compatible with model use. A thirteenth industry/commodity is added to represent government-provided services. The final demand categories are aggregated into these 13 commodities for three sectors: consumer, government and business.

The data on individual provinces are also aggregated to reflect the six Canadian regions captured by the model: Atlantic Canada, Quebec, Ontario, Manitoba/Saskatchewan, Alberta, and British Columbia. Because of their relatively small size and the similarity of the policy



issues between them, the Atlantic provinces are aggregated into one region. This same reasoning also applies to Manitoba and Saskatchewan, with Alberta remaining a separate region because of the importance of its energy resources. The interprovincial trade flow matrices are also aggregated according to the model commodity and regional classifications and combined into a single matrix, with 13 commodities produced in each of six Canadian regions and the rest of the world (91 rows), and 8 columns representing the six Canadian regions, the rest of the world, and the federal government (whose purchases of regional goods and services are treated as part of regional exports).

### *Updating to 1981*

The benchmark year chosen for the data set is 1981, in part because this is the latest year for which PEA data are published. The PEA provide both the scaling totals to update the 1979 PIO tables and the detailed data on federal and provincial government transactions incorporated into the data set.

Since the PEA do not report value-added data by industry or sectoral income-outlay accounts, estimates of gross domestic product and expenditure by region for 1981 are used to scale the 1979 input-output estimates of primary input use by industry and by final demand sector on the product side, and estimates of final demand by commodity by sector on the expenditure side.

The treatment of value-added in the final benchmark data set differs significantly from that in both the PIO tables and the PEA. (a) Real depreciation is netted out of both capital income and investment expenditures.<sup>1</sup> (b) Self-employment income is allocated between the return to capital and return to labour by industry, using estimates from St-Hilaire and Whalley (1983). (c) The property tax is netted out of total indirect tax estimates and is treated as a factor tax on capital income. (d) Government royalties on natural resources are not recorded as an input purchase into production activity (as is the procedure in the PIO accounts), but instead are treated as a tax on resource income originating in natural resources industries. (e) Government capital income and expenditure estimates include an imputation made to reflect the implicit return from the government's ownership of capital stock. (f) The value-added shown as originating in the personal and government sectors in the PIO accounts is included as part of production activity in the government services and personal and business services industries in the benchmark data.

The estimates of government final demand are disaggregated in order to differentiate between federal and regional expenditures. The weights used are the ratios of federal to total government expenditures by region, calculated from PEA data. The estimates of federal government expen-

ditures by commodity by region are recorded as part of the data on regional exports.

The PIO estimates of production and intermediate demands are scaled to 1981, using the 1981/1979 ratios of GDP by region calculated from PEA data. These ratios are also used to scale 1979 interregional import data in the separate interregional trade matrix. The estimates of imports from and exports to the rest of the world are separately scaled to sum to National Income and Expenditure Accounts estimates of Canada's international imports and exports for 1981.

Once the input-output estimates are scaled to 1981, a further round of adjustments is required to restore full microconsistency to the whole data set and to ensure that all required equilibrium conditions from the model hold in the benchmark data. The RAS adjustment method is used for this purpose.<sup>2</sup> The technique is first applied to the interregional and international trade matrix, to ensure that regional external sector balance conditions hold. In this case the value of each region's imports from other regions and the rest of the world exceeds or falls short of the value of its exports to other regions and the rest of the world by the amount equal to the federal government's surplus or deficit with that particular region (as in the numerical example in Table 4-1). The intermediate demand matrix is then adjusted in the same fashion, using the trade and value-added data and the production and final demand estimates. This ensures that in the final data set, demand is equal to supply for each commodity, and total costs equal the value of production for each industry.

### *Incorporating Additional Detail*

The PEA report revenues and expenditures for all levels of government by province, including detailed tax and transfer payments estimates. This information is incorporated into the data set and in certain cases is disaggregated further.

**Indirect Taxes** Indirect tax payments by industry and final demand sector for 1981 are disaggregated by commodity, using unpublished data on tax margins and balance sheet estimates provided by the Input-Output Division of Statistics Canada. Property taxes, which make up approximately 75 percent of the other indirect tax category [see St-Hilaire and Whalley (1983)], are netted out proportionally and added to factor taxes on capital.

**Factor Taxes** Corporate income tax payments by industry and by region are calculated using the 1981 industry distribution of federal income tax, as well as the Ontario, Quebec and other provincial income

tax estimates reported in Statistics Canada (1984b), to allocate the corresponding PEA totals. The petroleum and gas revenue tax and government royalties on natural resources are also included as part of taxes on factor inputs (see next section). Labour tax payments by industry are calculated by applying the St-Hilaire-Whalley estimates of national labour tax rates and scaling to the 1981 PEA totals.

**Industry Subsidies** These data consist, for the most part, of the 1979 input-output estimates scaled to the 1981 PEA aggregates. Energy-related subsidies are treated differently (see the chapter section below on data treatment of energy taxes, pricing and rents).

**Personal Income Tax** Estimates of 1981 federal and regional personal income tax payments are incorporated into the data set. Data reported in the PEA are used.

**Transfers** PEA estimates of net payments to persons and inter-governmental transfers aggregated by region are recorded separately in these accounts. These enter the federal and regional income and outlay accounts in the benchmark data.

**Interest on the Public Debt** Given the static nature of the regional general equilibrium model, this item is treated in large part as a government transfer to the private sector. An amount which reflects the purchase of government debt is netted out of the government transfer.

## **Summary Tables from the 1981 Regional Microconsistent Data Set**

An overall picture of the resulting benchmark data set can be obtained from the summary tables presented in Tables 4-2 to 4-8. These display the major characteristics of the regional economies as recorded in our data, the degree and form of interdependence among the various regions, the relative importance of their international and interregional transactions, and the federal government's transactions with each region.

Table 4-2 reports the values of factor income by industry and by region, as well as estimates of domestic product at market prices, displaying the relative importance of each region and product in terms of both national and regional economy-wide aggregates. Estimates of total supply and demand by commodity by region are reported in Table 4-3. The identity used in the data set is that for each commodity in each region, total regional supply is equal to regional demand plus exports minus imports from outside the region.

**TABLE 4-2 Capital, Labour and Domestic Product by Region and by Industry, Canada, 1981**  
(millions of dollars)

	East	Que.	Ont.	Man./Sask.	Alta.	B. C.	Canada <sup>b</sup>
<b>Gross-of-tax Capital and Resource Income</b>							
<b>by Region by Industry<sup>a</sup></b>							
Agriculture	66.6	390.2	756.2	1,115.9	666.9	169.3	3,165.1
Fishing and trapping	78.6	16.2	14.5	13.7	6.0	81.0	210.1
Mines and quarries	187.3	369.6	681.9	549.8	279.6	612.5	2,680.8
Food, beverages and tobacco	221.2	620.0	906.0	253.0	140.3	365.6	2,506.1
Light manufacturing	25.8	514.8	682.8	65.1	72.3	39.1	1,399.9
Lumber, paper and printing	261.0	912.7	986.3	73.4	99.1	1,322.5	3,655.0
Metal and machinery	63.2	1,548.8	2,778.2	219.6	446.2	354.3	5,410.3
Vehicles	45.4	73.3	1,150.3	31.2	3.0	15.8	1,319.0
Energy	178.6	383.2	542.3	975.7	9,053.6	698.0	11,831.4
Transportation	24.7	118.0	340.0	192.6	193.7	181.4	1,050.4
Utilities	138.9	701.6	850.5	293.6	298.7	235.0	2,518.2
Personal and business services	1,805.9	8,766.9	13,179.7	2,915.4	4,725.5	4,735.2	36,128.7
Government services	1,401.6	4,448.4	7,652.2	1,668.6	2,432.0	2,292.5	19,895.4
Total	4,499.0	18,863.8	30,520.9	8,367.6	18,416.9	11,102.2	91,770.4
<b>Gross-of-tax Labour Income</b>							
<b>by Region by Industry</b>							
Agriculture	135.2	540.1	946.6	912.1	592.1	208.0	3,334.1
Fishing and trapping	243.1	20.6	14.6	10.6	0.6	174.6	464.0
Mines and quarries	401.0	630.0	736.5	403.6	766.7	376.4	3,314.3
Food, beverages and tobacco	568.9	1,439.5	2,025.4	359.8	405.3	524.8	5,323.6
Light manufacturing	184.9	2,586.5	2,617.2	186.9	135.7	151.0	5,862.2
Lumber, paper and printing	656.1	2,738.2	3,090.7	338.8	439.6	3,429.7	10,693.1

Metal and machinery	309.7	4,195.6	10,570.8	596.6	931.3	1,122.5	17,726.4
Vehicles	164.7	996.9	3,506.5	153.5	75.8	290.8	5,188.3
Energy	78.6	122.4	348.6	69.0	1,089.1	214.4	1,922.1
Transportation	492.9	2,603.2	4,029.7	1,076.5	1,197.0	1,748.8	11,148.1
Utilities	181.3	653.1	914.2	187.7	207.4	424.6	2,568.3
Personal and business services	5,230.2	19,994.9	32,516.7	6,427.9	10,607.4	10,410.9	85,188.0
Government services	3,793.8	11,856.7	17,257.9	3,512.4	4,313.7	5,261.6	45,996.1
Total	12,440.5	48,377.6	78,575.4	14,235.4	20,761.7	24,338.0	198,728.6

**Domestic Product Originating by Region by Industry<sup>c</sup>**

Agriculture	201.8	930.3	1,702.7	2,027.9	1,259.1	377.3	6,499.1
Fishing and trapping	321.7	36.8	29.1	24.3	6.6	255.6	674.0
Mines and quarries	588.4	999.6	1,418.4	953.4	1,046.3	988.9	5,995.1
Food, beverages and tobacco	790.1	2,059.5	2,931.4	612.8	545.6	890.4	7,829.8
Light manufacturing	210.7	3,101.2	3,300.1	252.0	208.0	190.1	7,262.1
Lumber, paper and printing	917.1	3,651.0	4,077.0	412.1	538.6	4,752.2	14,348.1
Metal and machinery	372.9	5,744.4	13,348.9	816.2	1,377.5	1,476.7	23,136.7
Vehicles	210.2	1,070.3	4,656.8	184.7	78.8	306.7	6,507.3
Energy	257.2	505.6	890.9	1,044.7	10,142.7	912.3	13,753.5
Transportation	517.6	2,721.2	4,369.7	1,269.1	1,390.7	1,930.2	12,198.5
Utilities	320.3	1,354.6	1,764.7	481.3	506.0	659.6	5,086.6
Personal and business services	7,036.0	28,761.9	45,696.4	9,343.3	15,332.9	15,146.1	121,316.7
Government services	5,195.4	16,305.1	24,910.1	5,181.1	6,745.7	7,554.1	65,891.5
Total	16,939.5	67,241.4	109,096.3	22,603.1	39,178.6	35,440.2	290,499.0

a. Return to capital and resources is measured gross of tax (including corporation income taxes, government royalties and the Petroleum and Gas Revenue Tax) and net of real depreciation.

b. Does not include Yukon and Northwest Territories.

c. Domestic product measured at factor cost, net of depreciation.

**TABLE 4-3 Regional Production and Consumption by Commodity, Canada, 1981 (millions of dollars)**

	East	Que.	Ont.	Man./Sask.	Alta	B.C.	Canada <sup>a</sup>
<b>Production by Commodity and Region</b>							
Agriculture	536.4	2,543.2	5,110.3	5,216.7	3,874.9	913.9	18,195.4
Fishing and trapping	535.6	67.4	56.5	45.4	16.9	435.8	1,157.6
Mines and quarries	1,628.2	2,559.2	3,377.8	1,167.1	2,583.6	2,054.8	13,370.8
Food, beverages and tobacco	2,554.2	8,821.5	13,314.9	2,718.3	3,820.6	3,021.1	34,250.6
Light manufacturing	477.4	8,513.7	7,934.7	626.5	521.1	441.5	18,514.9
Lumber, paper and printing	2,389.8	9,802.1	10,590.1	1,394.0	1,482.9	13,375.7	39,034.6
Metal and machinery	1,270.1	17,691.9	41,095.5	3,600.6	4,048.7	4,177.1	71,884.0
Vehicles	640.2	3,558.7	20,405.6	466.9	295.9	1,009.7	26,377.0
Energy	2,053.8	3,925.9	5,309.8	3,783.7	31,323.4	3,007.5	49,404.1
Transportation	2,111.3	7,587.1	13,543.5	3,832.9	4,829.6	6,147.5	38,051.8
Utilities	1,302.0	3,096.3	3,286.2	999.9	556.8	1,041.7	10,282.9
Personal and business services	15,123.7	59,711.3	99,089.5	19,123.3	34,611.3	31,053.2	258,712.4
Government services	5,647.3	17,330.7	26,309.9	5,585.8	7,165.7	8,022.1	70,061.5
Total	36,270.0	145,209.0	249,424.3	48,561.1	95,131.3	74,701.7	649,297.5

**Consumption by Commodity  
and Region<sup>b</sup>**

Agriculture	783.9	3,897.3	6,237.4	2,214.1	1,985.4	1,213.9	16,332.0
Fishing and trapping	522.5	201.9	62.7	28.0	10.4	320.9	1,146.6
Mines and quarries	642.9	2,896.8	2,582.6	618.6	2,540.1	1,173.2	10,454.2
Food, beverages and tobacco	2,582.2	9,692.7	13,046.7	2,613.6	2,400.7	3,704.1	34,040.0
Light manufacturing	1,256.7	8,065.7	8,821.9	1,390.5	1,661.5	1,765.8	22,962.2
Lumber, paper and printing	1,697.7	6,903.0	9,788.2	1,595.2	1,736.9	5,991.5	27,712.4
Metal and machinery	4,325.7	19,050.6	41,395.6	5,801.0	9,204.5	8,086.7	87,864.1
Vehicles	1,875.0	6,347.9	17,226.0	1,762.3	2,684.8	2,760.7	32,656.7
Energy	3,979.7	8,083.9	14,251.3	4,514.8	10,276.2	3,551.2	44,657.0
Transportation	2,086.7	7,632.5	12,688.3	2,781.1	2,414.5	5,181.1	32,784.2
Utilities	1,133.8	2,918.0	2,891.4	893.6	550.4	920.8	9,308.0
Personal and business services	15,223.9	58,983.3	96,281.5	19,336.0	34,128.3	31,212.3	255,165.4
Government services	3,471.1	14,446.1	19,609.9	4,257.0	6,248.1	6,566.1	54,598.4
<b>Total</b>	<b>39,581.7</b>	<b>149,119.9</b>	<b>244,883.6</b>	<b>47,805.7</b>	<b>75,841.9</b>	<b>72,448.3</b>	<b>629,681.1</b>

*Note:* Detail may not add due to rounding.

a. Does not include Yukon and Northwest Territories.

b. The estimates are the sum of intermediate and final demand for domestic and imported commodities.

The data on exports and imports to and from regions in the rest of the country and the rest of the world are shown in Table 4-4. Table 4-5 reports the pattern and the size of trade flows among regions and between regions and the rest of the world. International and interregional trade are of approximately comparable orders of magnitude for most regions. Ontario and Quebec run surpluses on interregional trade but deficits in international trade. British Columbia and Manitoba/Saskatchewan have deficits in interregional trade but surpluses in international trade. Atlantic Canada has deficits in both types of trade, while Alberta has surpluses in both.

Table 4-6 displays each region's income and outlay accounts as they appear in the benchmark data. Federal government taxes received from and expenditures made in individual regions are reported as receipts and outlays in Table 4-7, along with additional detail on the interregional transfers implicit in certain regional policy elements. The importance of federal government activities in each region is reflected in the size of the surplus or deficit reported and the relative size of government purchases of goods and services in each region. The pattern of regional deficits and surpluses changes substantially, however, when implicit taxes and subsidies in the energy sector are taken into account, as explained in the next section.

The benchmark data set summarized in Tables 4-2 to 4-7 provides the input both for the regional general equilibrium model and some of the partial equilibrium evaluations of interregional policy impacts. Many of the insights on regional impacts of policies under Confederation which are highlighted by these exercises are inherent to the data and are apparent from the tables (such as the key importance of the treatment of energy rents from the tables in the section which follows). Others are less obvious and are brought out in the later discussion of model results.

## **Data Treatment of Energy Taxes, Pricing, and Rents**

Because of the importance of the treatment of natural resources in the model-based evaluations of regional impacts within Confederation, efforts have been made to improve the input-output and other data used, to better reflect 1981 energy production and costs and to incorporate additional detail within the data set to allow model analysis of the regional impacts of energy policies such as the National Energy Program (NEP). An important feature of the resulting benchmark equilibrium data set is the explicit incorporation of subsidies to energy consumers and taxes on energy producers (both actual and implicit) under the price control regime operating in the NEP in 1981.

In extending the treatment of energy in the data set relative to available regional input-output data, additional survey data for 1981 from the Petroleum Monitoring Agency (1983) are used to construct an industry-



wide income and expense statement for both the upstream (production level) and the downstream (mostly refineries) segments of the industry, and to calculate the net return to the energy industry in each region. Estimates of corporate income taxes, royalties, and federal sales and excise taxes paid by the industry are also calculated from the PMA survey data. The energy taxes and subsidies recorded in the benchmark data set are reported in Table 4-8.

Among the energy-related taxes are:

- *Government royalties.* The value of total government royalties paid by the energy industry is calculated from the PMA survey data. The total is allocated by region, using PEA estimates of total government royalties reported as part of government investment income by province as weights. These estimates appear in the data set as part of taxes on resource income of the energy industry by region.
- *Petroleum and gas revenue tax.* This is a tax on the net operating income from production of oil and gas. Estimates by region for 1981 are from unpublished data provided by the Gross National Product Division of Statistics Canada. The petroleum and gas revenue tax (PGRT) is treated as a tax on the resource income of the energy industry in the data set.
- *Oil export charge.* The export charge on oil products is treated as part of production taxes in the data set. Estimates by region for 1981 are those reported in the PEA.
- *Petroleum compensation charge.* This levy is imposed on refiners of domestic crude oil and on all imported oil. Under the NEP, it could be passed on to consumers. PEA estimates<sup>3</sup> by region are reallocated using the regional distribution of the imputed subsidy to consumers of crude oil as weights (see Table 4-8).
- *Natural gas and gas liquids tax.* This tax is imposed on distributors of marketable pipeline gas, and on consumers of marketable pipeline gas obtained from a broker or producer. PEA estimates by region are reallocated using as weights the regional distribution of the imputed subsidy to consumers of natural gas (see Table 4-8).
- *Canadian ownership special charge.* This charge is imposed on natural gas and gas liquids at the processing plant, on crude oil as it enters the refinery, and on all imported petroleum, natural gas and gas liquids. It can be passed on to consumers. PEA estimates by region are reallocated using as weights the regional distribution of the imputed subsidy to consumers of crude oil and natural gas (see Table 4-8).
- *Imputed taxes on energy producers.* These estimates are based on calculations by the Economic Council of Canada (ECC)<sup>4</sup> of energy resource rents for 1980. The estimates of rents not collected through actual energy taxes on producers of crude oil, natural gas and hydro-electricity are treated as an implicit production tax in the benchmark

**TABLE 4-4 Value of 1981 Interregional and International Imports and Exports by Region and by Commodity, Canada, 1981 (millions of dollars)**

	East		Quebec		Ontario		Man./Sask.		Alberta		B.C.	
	IMPC	IMPW	IMPC	IMPW	IMPC	IMPW	IMPC	IMPW	IMPC	IMPW	IMPC	IMPW
<b>Imports</b>	145.9	174.6	809.0	900.0	1,148.8	1,498.4	320.3	122.1	368.1	108.8	275.7	366.6
Agriculture												
Fishing and trapping	0.0	27.3	18.3	152.0	19.5	28.8	18.6	1.8	6.7	0.1	0.0	1.6
Mines and quarries	20.6	63.1	937.5	1,258.6	408.7	1,117.0	24.8	55.4	89.0	194.6	46.8	237.6
Food, beverages and tobacco	913.4	217.8	2,736.3	1,044.1	2,322.2	1,727.2	865.5	145.6	1,066.9	166.3	1,479.3	479.5
Light manufacturing	973.5	112.0	1,421.6	2,401.9	2,184.4	2,387.0	890.1	226.9	1,193.0	270.0	953.6	532.9
Lumber, paper and printing	468.0	82.4	1,157.9	805.8	1,754.3	1,706.6	578.8	116.3	926.5	165.9	368.1	436.3
Metal and machinery	2,458.6	1,267.2	4,827.5	6,972.3	3,728.3	17,946.7	2,601.0	2,014.5	4,237.9	3,657.0	2,740.9	3,322.3
Vehicles	834.5	855.7	1,242.8	4,512.4	465.7	14,944.5	767.7	848.1	1,765.6	798.0	320.3	2,007.8
Energy	190.5	2,421.8	2,379.6	2,842.0	6,750.1	3,105.0	1,489.5	144.9	29.8	20.4	1,489.3	117.7
Transportation	646.8	47.4	3,301.8	181.5	4,735.3	465.8	1,229.6	39.0	1,560.8	39.7	2,021.7	103.4
Utilities	61.9	0.2	78.3	0.1	83.7	0.1	0.0	0.0	0.3	0.0	6.6	0.0
Personal and business services	1,911.4	133.3	5,754.9	974.7	6,775.2	2,666.5	2,740.0	177.6	4,256.1	342.3	2,975.1	435.3
Government services	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	8,624.9	5,402.8	24,665.5	22,045.5	30,376.1	47,593.7	11,525.9	3,892.1	15,500.7	5,763.1	12,677.5	8,041.0

<b>Exports</b>												
Agriculture	35.6	37.4	287.5	67.4	777.7	742.4	1,020.9	2,424.1	734.0	1,632.4	214.2	128.1
Fishing and trapping	1.5	38.9	0.0	35.8	1.2	41.0	0.0	37.8	1.0	12.3	59.3	57.2
Mines and quarries	376.4	692.6	124.5	1,733.8	422.3	1,898.6	260.9	367.9	46.5	280.5	313.8	852.3
Food, beverages and tobacco	366.7	736.7	2,040.2	869.1	3,239.9	1,077.7	888.8	226.8	2,250.5	402.6	597.4	678.6
Light manufacturing	176.0	130.3	3,760.3	511.1	2,955.3	728.8	328.7	24.3	299.8	22.8	134.7	27.7
Lumber, paper and printing	154.2	1,088.5	1,588.3	3,274.6	1,677.7	2,585.2	231.6	262.3	304.6	533.8	1,314.5	6,874.0
Metal and machinery	350.9	319.4	5,467.7	4,973.1	12,084.3	9,290.4	783.4	1,631.6	1,417.6	1,321.4	703.0	1,450.8
Vehicles	315.2	140.2	635.4	2,330.4	4,013.0	14,576.7	197.3	123.1	147.7	26.9	319.6	257.4
Energy	129.0	557.4	788.3	275.3	390.1	523.5	381.7	521.6	10,686.3	10,411.0	49.5	1,013.7
Transportation	588.2	130.4	2,206.6	1,231.4	3,850.6	2,205.8	1,823.7	496.7	3,378.5	636.9	1,798.2	1,293.3
Utilities	108.3	122.1	121.7	135.1	0.3	478.4	25.6	80.9	6.6	0.0	0.1	127.3
Personal and business services	1,654.2	290.2	6,628.8	828.8	10,137.5	2,112.1	2,369.7	335.1	4,588.8	492.6	2,389.9	861.4
Government services	2,176.2	0.0	2,884.6	0.0	6,699.9	0.0	1,328.7	0.0	917.6	0.0	1,456.0	0.0
Total	6,432.4	4,284.2	26,534.1	16,265.9	46,249.9	36,260.4	9,640.9	6,532.3	24,779.6	15,773.3	9,350.1	13,621.8

IMPC = imports from the rest of Canada.

IMPW = imports from the rest of the world.

EXPC = exports to the rest of Canada.

EXPW = exports to the rest of the world.

**TABLE 4-5 Value of Interregional and International Trade by Canadian Regions, 1981<sup>a</sup>**  
(millions of dollars)

	East	Quebec	Ontario	Man./ Sask.	Alberta	B.C.	Rest of World	Federal Gov't	Total Exports
East	0.0	1,391.0	1,469.6	122.6	210.3	88.9	4,284.2	3,150.1	10,716.7
Quebec	3,068.0	0.0	13,901.7	1,729.0	2,457.3	1,731.9	16,265.9	3,646.1	42,800.0
Ontario	4,806.9	16,023.2	0.0	4,939.6	7,806.0	4,570.5	36,260.4	8,103.7	82,510.4
Man./Sask.	298.5	1,590.5	3,318.3	0.0	1,917.9	784.7	6,532.3	1,731.0	16,173.2
Alberta	235.9	4,474.3	9,562.7	3,788.3	0.0	5,501.4	15,773.3	1,217.0	40,552.9
B.C.	215.5	1,186.5	2,123.8	946.4	3,109.3	0.0	13,621.8	1,768.6	22,971.9
Rest Of World	5,402.8	22,045.5	47,593.7	3,892.1	5,763.1	8,041.0	0.0	0.0	92,738.0
Total Imports	14,027.7	46,711.0	77,969.8	15,418.0	21,263.8	20,718.4	92,737.9	19,616.5	

Note: Detail may not add due to rounding.

a. Does not include Yukon and Northwest Territories.

**TABLE 4-6 Regional Income and Outlay Accounts<sup>a</sup>, 1981**

Item	East	Quebec	Ontario	Man./Sask.	Alberta	B.C.	Total
<b>Income</b>							
Labour income net of factor tax	11,526	45,298	73,849	13,401	19,338	22,843	186,255
Capital and resource income <sup>b</sup> (net of factor taxes)	2,464	12,117	16,360	5,481	13,136	7,372	56,930
Total tax collection of regional government (net of subsidies to industries)	2,828	15,454	16,760	3,240	3,975	5,896	48,153
Transfers received from federal government	5,459	10,827	13,601	3,611	2,524	4,023	40,045
Total	22,277	83,696	120,570	25,733	38,973	40,134	331,383
<b>Outlays</b>							
Purchase of goods and services <sup>c</sup>	19,034	65,393	96,052	21,477	32,570	32,534	267,060
Taxes <sup>d</sup>							
Direct	2,225	11,462	14,100	2,486	3,957	4,988	39,218
Indirect	1,018	6,841	10,418	1,770	2,446	2,612	25,105
Total	22,277	83,696	120,570	25,733	38,973	40,134	331,383

Source: Benchmark regional data set, 1981. See text for details on sources and methods.

a. Personal, business and government sectors are consolidated.

b. Capital and resource income is net of depreciation and investment income paid to the federal government.

c. Includes capital expenditures.

d. Consists of the personal income tax and indirect tax on final expenditures.

**TABLE 4-7 Federal Government Expenditure and Tax Transactions with Canadian Regions<sup>a</sup>, 1981 (millions of dollars)**

Item	East	Quebec	Ontario	Man./Sask.	Alberta	B.C.	Total
<b>Receipts</b>							
Direct taxes	2,491	7,394	15,874	2,807	6,301	5,430	40,297
Indirect taxes <sup>b</sup>	1,108	4,632	7,802	1,498	1,750	1,959	18,749
Investment income of the federal government originating in the region <sup>c</sup>	609	1,103	3,543	689	480	552	6,976
Total	4,208	13,129	27,219	4,994	8,531	7,941	66,022
<b>Outlay</b>							
Purchase of goods and services <sup>d</sup>	3,150	3,646	8,104	1,731	1,217	1,769	19,617
Transfers to persons <sup>e</sup> , <sup>f</sup>	2,854	6,441	10,323	2,209	1,391	2,887	26,105
Subsidies to industry <sup>b</sup>	687	1,756	2,048	655	885	607	6,638
Transfers to regional governments under:							
Equalization	1,440	2,157	18	483	50	5	4,153
Established Program Financing	642	1,219	2,298	567	501	656	5,883
Canada Assistance Plan	230	660	604	165	217	337	2,213
Other	289	350	358	180	122	114	1,413
Total	9,292	16,229	23,753	5,990	4,383	6,375	66,022
<b>Surplus or Deficit</b>	-5,084	-3,100	3,466	-996	4,148	1,566	0

Source: Benchmark regional data set, 1981. See text for details on sources and methods.

a. Does not include Yukon and Northwest Territories.

b. The PEA estimates of Oil Import Subsidy, Petroleum Compensation Charge, Canadian Ownership Special Charge and Natural Gas and Gas Liquids Tax by region are reallocated according to energy consumption by region.

c. Estimates are net of real depreciation and interest on public debt received by the federal government, and include the imputed return to government capital stock.

d. Estimates include gross fixed capital formation and are net of indirect taxes.

e. Estimates include net transfers and interest on the public debt paid to persons.

f. PEA estimate of aggregate federal deficit has been reallocated in proportion to interest on public debt received regionally, and has been netted out of these estimates.

**TABLE 4-8 Energy-Related Taxes and Subsidies Appearing in the Benchmark Data Set by Type and by Region,<sup>a</sup> Canada, 1981 (\$ millions)**

Regions	Taxes											
	Petroleum & Gas Revenue Tax		Oil Export Charge		Petroleum Compensation Charge		Natural Gas & Liquids Tax		Canadian Ownership Special Charge		Imputed Tax on Energy Producers	
	Government Royalties	30	16	588	—	59	21	—	10	827	1,531	
Quebec	58	32	1,168	51	130	82	—	—	—	1,475	2,954	
Ontario	65	177	1,363	344	219	180	—	—	—	1,733	3,049	
Man./Sask.	601	566	303	104	54	1,549	—	—	—	472	3,891	
Alberta	3,776	153	402	262	103	11,413	—	—	—	7	22,860	
B.C.	448	31	433	84	64	392	—	—	—	147	2,192	
Total	4,978	1,031	4,257	845	629	13,637	—	—	—	3,661	36,477	

Regions	Subsidies					
	Petroleum Incentive Program		Other Petroleum Compensation Fund Subsidies		Imputed Subsidy to Energy Consumers	
	Oil Import Subsidy	Oil Export Charge	Crude Oil	Natural Gas	Hydro	Total
East	4	522	1,885	—	330	2,741
Quebec	—	1,036	3,742	387	1,843	7,226
Ontario	—	1,209	4,366	2,630	911	9,326
Man./Sask.	7	269	972	797	422	2,520
Alberta	243	356	1,286	2,006	8	4,024
B.C.	24	384	1,387	644	146	2,668
Total	278	3,776	13,637	6,464	3,661	28,505

a. See text for details on sources and methods.

data set. The 1980 estimates are scaled to 1981 using the appropriate National Income and Expenditure Accounts' price index.

Among energy-related subsidies are:

- *Petroleum Incentives Program*. Direct incentive payments are provided to enterprises conducting exploration, development and production activities in Canada. Payments appear as part of estimates of capital assistance to industries in the PEA. Unpublished estimates by region (not including Canada Lands) obtained from the Gross National Product Division of Statistics Canada are recorded as negative production taxes in the benchmark data.
- *Oil Import Subsidy*. PEA estimates by region which are allocated according to consumption of imported oil are reallocated using the regional distribution of the imputed subsidy to consumers of crude oil as weights (see Table 4-8).
- *Other subsidies financed through the Petroleum Compensation Fund*. The compensation fund is used to finance the oil import subsidy, as well as deliveries of Canadian crude oil to Atlantic Canada and certain U.S.–Canada exchanges of crude oil. Estimates by region are those reported in the PEA.
- *Imputed subsidy to energy consumers*. The ECC estimates of imputed taxes on producers from the price controls in the NEP are reallocated across regions as a subsidy to consumers, financed by the imputed tax. The implicit subsidies to energy consumers scaled to 1981 are treated as a negative indirect tax in the benchmark data, along with the energy subsidies financed through the Petroleum Compensation Revolving Fund.

Taking into account these energy-related taxes and subsidies, and in particular the imputed components, substantially changes the regional balance accounts shown in Table 4-7, which report only the federal government expenditure and tax transactions with the various regions. Table 4-9 reports revised estimates of these imbalances after an allowance for these energy transactions. The major impact of including the net regional redistribution of imputed energy rents under the NEP is apparent. Under these calculations, the implicit taxes on producers and implicit subsidies to consumers under the price controls in the NEP are treated as taxes collected and subsidies disbursed by the federal government. When included in this way, for the 1981 benchmark data, they clearly become the major interregional element in these accounts and strongly suggest that for 1981 data, at least, the interregional treatment of energy rents is a dominant issue in assessing interregional impacts of policies within Confederation.



**TABLE 4-9 Federal Government Surplus or Deficit on Transactions with Regions after Adjustments for Implicit Energy Taxes and Subsidies under the NEP**

	East	Que.	Ont.	Man./Sask.	Alta.	B.C.	Total
Previous surplus or deficit (as in Table 4-7)	-5,084	-3,100	3,466	-996	4,148	1,566	0
Implicit subsidy to energy consumers <sup>a</sup>	-2,215	-5,972	-7,907	-2,191	-3,300	-2,177	-23,762
Implicit tax on energy producers <sup>a</sup>	838	1,515	878	2,211	17,224	1,096	23,762
Surplus or deficit after adjustments for energy taxes and subsidies	-4,461	-7,557	-3,563	-976	18,072	485	0

a. These estimates represent the value of energy resource rents net of tax revenues, allocated as a subsidy to consumers and a tax on producers.

**TABLE 4-10 Aggregated Tariff Rates by Product Used  
in the Analysis of the Interregional Impacts  
of Removing the Federal Tariff**

<b>Commodity</b>	<b>Tariff Rates</b>
Grains and agricultural products	0.0323
Fishing and trapping	0.0350
Mines and quarries	0.0061
Food and food products, beverages and tobacco	0.0520
Rubber, leather, plastic textile, clothing, and furniture	0.1849
Forestry, paper products and printing	0.0939
Metal products, machinery and equipment, other manufacturing	0.0806
Autos, trucks and other transportation	0.1000
Energy and energy-related products	0.0534
Transportation services and margins	—

*Source:* Unpublished data used by Hamilton and Whalley (1985) and based on an analysis by the U.S. Special Trade Representative's Office of GATT data for 1976.

## **Data on Policy Elements within Confederation**

Besides the 1981 microconsistent regional data set, further data are required on the distortions associated with several of the policy elements analyzed both by the general equilibrium model and by the application of partial equilibrium techniques to assess regional impacts of policies. These are summarized in this section.

### ***Tariff Data***

Data on tariffs are taken from estimates by commodity for Canada produced by the GATT. A special analysis by the U.S. Special Trade Representative's Office of 1976 GATT data, including that for Canada, used earlier by Hamilton and Whalley (1985) is also used to produce data on the same product classification as in the general equilibrium model. These are presented in Table 4-10.

### ***Transportation Subsidies***

We use an estimate of the transportation subsidy element implicit in the Crow Rate in partial equilibrium calculations of the interregional impact of this program. For the crop year 1982/83, government estimates<sup>5</sup> are that the subsidy covered approximately 80 percent of transportation costs, or \$651.6 million, for shipments of agricultural products from western Canada. It has, however, changed substantially under the new

Crow legislation of 1983. Government estimates<sup>6</sup> of the impact of the new legislation imply that the proportion of transport costs paid by producers will increase from 20 percent in 1982/83 to 30 percent in 1985/86, and that by 1990/91 the rise in rates will eliminate about 75 percent of the distortion caused by subsidized freight rates.

### *Energy Policies*

In analyzing the regional impacts of eliminating federal energy policies, we examine two initial cases. In one we assume the energy program in place is that which was effective during 1981. In the other, we assume that the energy program is that which was effective during 1984. In comparing the interregional impacts of their removal, we are able to evaluate how changes in energy policies since the introduction of the NEP affect both individual regions and the economy as a whole.

Under the 1981 and 1984 energy-pricing regimes, there were two types of oil: conventional old oil and new oil. In our evaluation below of the regional impact of removing 1981 pricing policies, we use the 1982 composition of the two oil types, since no data are available on the 1981 composition. In the 1984 evaluation we use alternative assumptions on oil composition. In a first calculation, the 1984 composition is assumed; in a second, the 1982 composition is assumed. The reason for using alternative assumptions is that Petroleum Incentive Program (PIP) grants are paid only for exploration and development activities and are not applicable to oil from pools discovered before 1981. Since the 1984 composition of new oil includes oil initially discovered after 1973, the estimates of the first calculation in all probability only provide upper-bound estimates of the regional impacts of removing pricing policies. The estimates of the second calculation provide lower-bound estimates. Table 4-11 reports the 1982 and 1984 composition of the two oil types in total oil production for each of the six Canadian regions in our data.

There are also two types of gas: old gas and new gas. We use the 1981 composition of the two gas types for analyzing the regional impacts of removing 1981 pricing policies, and the 1984 composition for analyzing the removal of 1984 policies. Since new gas is that which was discovered, consumed or sold after January 1, 1974, the estimates from the analyses provide upper-bound estimates of the regional impacts of removing federal gas policies under both the 1981 and 1984 pricing arrangements. Table 4-12 reports the 1981 and 1984 composition of the two gas types in total gas production by region.

Pricing schedules for oil and natural gas used in the evaluations of regional impact of removing 1981 and 1984 pricing policies are reported in Tables 4-13 and 4-14.

**TABLE 4-11 Percentage of Conventional Old Oil and New Oil in Total Oil Production, by Region (1982, 1984)**

	B.C.		Alta.		Man./Sask. <sup>a</sup>		Other <sup>b,c</sup> (Ont., N.W.T.)	
	1982	1984	1982	1984	1982	1984	1982	1984
	(percent)							
Conventional old oil	99	65	96	62	90	44	88	63
New oil	1	35	4	38	10	56	12	37

*Source:* Unpublished data provided by the Energy Market Analysis and Statistics Division of Energy, Mines and Resources Canada.

- a. To calculate the percentage of conventional old oil and new oil in total oil production in the combined region (Man./Sask.), a weighted average of the percentages in the two provinces, Manitoba and Saskatchewan, is calculated using the fraction of value of oil production in each province in the total value of oil production in Man./Sask.
- b. Weighted average of Ontario and the Northwest Territories.
- c. For the purpose of analyzing the 1981 and 1984 energy policy regimes using 1979 oil production and consumption data in subsequent partial equilibrium calculations, we use the assumption that the percentage values of conventional old oil and new oil in the "other" region apply to Quebec as well.

**TABLE 4-12 Percentage of Old and New Gas Production, by Region (1981,1984)**

	B.C.		Alta.		Man./Sask. <sup>a</sup>		Other <sup>b</sup> (Ont., Que., Atlantic Canada)	
	1982	1984	1982	1984	1982	1984	1982	1984
	(percent)							
Old gas	50	50	66	60	100	100	100	100
New gas	50	50	34	40	0	0	0	0

*Source:* Unpublished data provided by the Financial and Fiscal Analysis Branch of Energy, Mines and Resources Canada.

- a. For the purpose of analyzing the 1981 and 1984 pricing regimes, we use the assumption that the percentage values of old and new gas in Saskatchewan apply to Man./Sask. as well, since no data are available on the composition of gas types in Manitoba for 1981 and 1984.
- b. No data are available on the composition of gas types in the "other" region for 1981 and 1984. For the purpose of analyzing the 1981 and 1984 pricing policies on 1979 gas production and consumption, we use the assumption that all gas in the "other" region is old gas.

**TABLE 4-13 Crude Mineral Oil Pricing Schedules (\$/barrel)**

	February 1981	August 1984
Wellhead oil price	17.75	29.75
Transport costs to Montreal	1.27	1.80
Petroleum compensation charge and other charges	5.05	4.91
Montreal blended price	24.07	36.46
International price at Montreal	40.60	38.22

*Source:* Canada, Department of Energy, Mines and Resources, *Energy Statistics Handbook* (Ottawa: The Department, 1981 and 1984 editions).

**TABLE 4-14 Natural Gas Pricing Schedules (\$/thousand cubic feet)**

	February 1981	August 1984
Toronto city gate	2.60	3.99
Canadian ownership special charge	0.00	0.15
Natural gas and gas liquids tax	0.30	0.00
Wholesale price	2.90	4.14
Export price	5.23	5.60

Source: Canada, Department of Energy, Mines and Resources, *Energy Statistics Handbook* (Ottawa: The Department, 1981 and 1984 editions).

**TABLE 4-15 Data by Region Used in the Analysis of the Regional Impacts of Eliminating Equalization**

	Equalization Received <sup>a</sup> (\$ millions 1981)	Provincial Royalties <sup>b</sup> (\$ millions 1981)
Atlantic Canada	1,269	30
Quebec	2,021	58
Ontario	0	65
Manitoba/Saskatchewan	388	601
Alberta	0	3,776
British Columbia	0	448
Total	3,678	4,978

Sources: a. Canada, Department of Finance, *Provincial Fiscal Equalization Tables: Seventh Estimate 1980-81* (Ottawa: The Department, 1982).

b. Benchmark equilibrium data set presented in Chapter 3.

## Equalization

Analysis of the regional impacts of eliminating equalization, particularly as it affects interprovincial migration, requires data both on equalization paid to regions and the net fiscal benefits (NFBS) associated with taxation of resource incomes by region. Data for 1981 are reported in Table 4-15. Royalties are used to approximate NFBS created by provincial taxes on resource incomes in the partial equilibrium calculations of regional policy impacts. We note in the table that all regions generate resource rents, but only Atlantic Canada, Quebec and Manitoba/Saskatchewan receive equalization payments.

## Interprovincial Barriers

In the area of interprovincial barriers, there is no information directly incorporated in the benchmark equilibrium data set as to their size. Since the specifics of their removal are analyzed using partial rather than general equilibrium techniques, separate information has been compiled on each.

**Procurement** Due to the complexity of procurement preference pol-

icies, the partial equilibrium evaluations which follow focus on evaluating the regional impacts of eliminating pricing preferences offered by provincial governments for provincially produced goods. A 10 percent preference margin (the difference between the award price and the lowest responsible bid, expressed as a percentage of the lowest responsible bid) is assumed for the degree of pricing preference offered. In the majority of provinces, however, procurement preferences operate through content rather than pricing preferences (see the appendix). For this reason, the partial equilibrium evaluations which follow should be treated with caution.

**Marketing Boards** A range of literature estimates is available on price mark-ups of agricultural products resulting from marketing board regulations. Grubel (1977), for instance, analyzes the B.C. Milk Board, using 1975 data. Using a present-value formula with a discount rate of 12 percent and information on the market value of quotas, he estimates that the annual excess revenue created by the regulation of fluid milk in B.C. amounts to about \$12,000 per average farm. In terms of a premium, this sum represents \$0.07 on the average retail price of \$0.60 per quart, or a little over 10 percent.

Arcus (1981) provides estimates by province of the consumer cost associated with the regulation of broiler and egg markets in Canada for 1980. His highest estimates in the broiler and egg markets are for British Columbia, where the mark-ups in price are \$0.14 per pound and \$0.28 per dozen, respectively. Borchering (1980) has also estimated the mark-up per dozen eggs from monopoly pricing in B.C. under the Egg Marketing Board. He concludes that the mark-up involved is around \$0.11 (in terms of 1975 dollars) in excess of the supply price. In a follow-up paper, Lerner and Stanbury (1983) provide estimates of the mark-up in price in the regulated egg, broiler and turkey markets in Canada. Their highest estimates are for turkeys, where the supply management mark-up is approximately 40 percent of the consumer price.

Brinkman (1981) also provides estimates by province of per-unit quota values for the major agricultural products under supply management in Canada, based on 1978 data. These are reported in Table 4-16. Brinkman's estimates are largely followed in Chapter 5 in the partial equilibrium analyses of the regional impacts of abolishing marketing boards, since his estimates are the most comprehensive and relatively easily used in our calculations.

**Provincial Liquor Policies** Provinces also regulate the sale and distribution of liquor, using interprovincial barriers to protect local industries. Although these barriers have many features, the focus in the partial equilibrium evaluations which follow is on evaluating the effects of

TABLE 4-16 Estimated Per-Unit Quota Values of Supply-Managed Commodities, Canada, by Province, Mid-1978

	Fluid Milk (\$ lbs./day)	Industrial Milk (\$ lbs./year)	Eggs (\$/bird)	Chickens (\$/lb.)	Turkeys (\$/lb.)	Tobacco (\$/lb.)
B.C.	150.00	0.015	21.00	0.63	1.52	—
Alberta	30.00	0.028	5.00	0.25	0.38	—
Saskatchewan	30.00	0.028	5.00	0.06	0.38	—
Manitoba	30.00	0.028	5.00	0.25	0.38	—
Ontario	16.00	0.053	12.00	0.42	0.30	1.08
Quebec	48.06	0.075	10.00	0.25	0.67	—
New Brunswick	22.00	0	8.00	0.05	0.86	—
Nova Scotia	23.00	0	6.25	0.06	0.38	—
P.E.I.	10.00	0	6.00	n.q.	n.q.	—

Source: G.L. Brinkman. *Farm Incomes in Canada*. Study prepared for the Economic Council of Canada and the Institute for Research on Public Policy (Ottawa: Minister of Supply and Services Canada, 1981), Table 3-19.

n.q. = no quota.

eliminating preferential pricing policies which favour local products over those imported from other provinces and countries.

Pricing policies of provincial liquor commissions enter the modelling evaluations of regional impacts of policies through preferential mark-ups on within-province, out-of-province, and imported wine, spirits and beer. A summary of these mark-ups appears in Table 4-17. These estimates of mark-ups are used in evaluations of regional impacts.

**Elasticities** Besides the benchmark data, a further key input into the model-based evaluations of regional impacts of policies are the elasticities of substitution which appear in production and utility functions in the general equilibrium model, and price elasticities in the partial equilibrium calculations.

Four different sets of elasticities are important in determining the behaviour of the model in these evaluations. These are international trade elasticities (on both the import and export side), elasticities affecting interregional trade in commodities, elasticities determining substitution effects between energy and non-energy products in both final demands and intermediate production, and elasticity parameters determining the size of interregional labour mobility effects induced by policy changes.

In the numerical partial equilibrium evaluations of interregional policy impacts, we use elasticity configurations of 1.0 for both supply and demand functions, unless otherwise specified. The reason is that the various levels of commodity aggregation used in the analyses make it difficult to obtain data on elasticity values.

The elasticities which follow are used only in the general equilibrium model. The elasticity values chosen for goods demands are assumed to hold for substitution in both final demands and intermediate use.

### *International Trade Elasticities*

The international trade elasticity values used are based on the compendium of estimates of trade elasticities by Stern et al. (1976). In their study they combine many estimates available from existing studies to provide both ranges and point estimates. "Best-guess" estimates for Canada are based on the median point estimates for both import demand elasticities by Canada and export demand elasticities which Canada faces. Table 4-18 reports the Stern et al. "best-guess" estimates for total imports and total exports by broad commodity group, along with import demand elasticities for Canada due to Houthakker and Magee (1969), which we also cite separately. The total estimates for Canada due to Stern et al., reported in Table 4-18, are adopted in the regional general equilibrium model as providing the elasticities in foreign trade relevant both for Canada and for all regions within Canada.



Although these values are used in the general equilibrium model, the concentration of international trade elasticity estimates in the neighbourhood of 1 for many countries has for many years been questioned as possibly unrealistic. A widespread belief, although not confirmed by many empirical studies, is that trade elasticities in general, and especially those for smaller open economies such as Canada, are larger in absolute value than many current studies suggest. Despite this, import demand elasticity estimates in the range reported by Stern et al. continue to be widely used, even though many researchers continue to feel uncomfortable with these values.

Some trade modellers, such as Balassa and Kreinin (1967), have added corresponding standard errors or multiples of standard errors to all estimated trade elasticities in their modelling work. Both Kreinin (1961) and Krause (1962) have also suggested that upward adjustment can be justified on the basis of "tariff elasticities" (import demand elasticities with respect to a tariff change), since empirically these elasticities are considerably higher than those more conventionally estimated. However, this practice of upward adjustment has not been widely followed, and at the present time values such as those reported in Stern et al. remain in widespread use, partly supporting their use here.

### *Interregional Trade Elasticities*

Interregional trade elasticities are key to evaluating the regional impacts of policies, since if high elasticities are assumed there is no possibility for a region to export the burden of taxes or other policies onto other regions. In this case, ignoring any possible interactions with federal policies such as tariffs, no potential regional advantage can be obtained through the use of trade-restricting interregional trade barriers.

There are currently no available estimates for price elasticities in interregional trade in Canada. This is primarily because there are no time series data on interregional trade flows on which to base such estimation. Only in recent years have data on interregional trade flows for 1974 become available, and the estimates for 1979 used in this study are even more recent. While data on interregional shipments of manufactures are available for a larger number of years, their coverage of interregional trade is incomplete and does not provide enough information for the purpose of complete system estimation.

For these reasons, it is necessary to base the interregional trade elasticity estimates used in the general equilibrium model on values derived from other sources, using various simplifying assumptions. In other modelling exercises that evaluate the impacts of policies within Confederation, such as Hazledine's 1979 study of the effects of Quebec's separation from Canada, the procedure used is to assume that elasticities in interregional trade are the same as those in international trade.

**TABLE 4-17 Summary of Provincial Mark-ups on Alcoholic Products**

	N.B.	N.S.	P.E.I. <sup>a</sup>	Nfld. <sup>b</sup>	Que.	Ont.	Man.	Sask.	Alta. <sup>c</sup>	B.C.
<b>Wine</b>										
In-province (table)	97%	n.a.	—	—	94%	58%	65% + \$.36/l surcharge	84% maximum of \$4.75/bottle (½ bottle/\$2.40)	n.a.	50%
Out-of-province (table)	124%	Same mark-up as in-province wine	100%	103%	n.a.	105%	75% + \$.50/l surcharge	84% maximum of \$4.75/bottle (½ bottle/\$2.40)	Same mark-up as in-province wine	110%
Imported (table)	129%	10% higher than in-province wine	100%	103%	105% <sup>c</sup>	123%	80% + \$.50/l surcharge	89% maximum of \$4.75/bottle (½ bottle/\$2.40)	Slightly higher mark-up than in-province wine	110%
<b>Spirits</b>										
In-province	134%	n.a.	—	—	113%	110%	133%	133%	n.a.	115%
Out-of-province	134%	Same mark-up as in-province spirits	100%	105%	113%	115%	133%	133%	Same mark-up as in-province wine	115%
Imported	139%	10% higher than in-province spirits	100%	105%	113%	120%	138%	138%	Slightly higher mark-up than in-province spirits	120%

**Beer**

In-province	57%	n.a.	—	45%	0%	21%	74% (targeted)	58%	n.a.	50%
Out-of-province	65%	Same mark-up as in-province beer	65%	45%	0%	21%	74% (targeted)	58%	Same mark-up as in-province beer	—
Imported	86%	10% higher than in-province beer	65%	45%	0%	80%	75% + \$.10/ container surcharge	60%	Slightly higher mark-up than in-province beer	83%

*Source:* Correspondence with the provincial ministries responsible for liquor policies.

- P.E.I. does not apply any discriminatory treatment to alcoholic products imported from other provinces and abroad because there are no breweries, wineries or distilleries in the province.
- Newfoundland does not apply any discriminatory treatment to wines and spirits imported from other provinces and abroad because there are no wineries or distilleries in the province. The province also does not apply any discriminatory treatment to beer imported from other provinces and abroad, even though there are three breweries in the province.
- Alberta does not apply any discriminatory treatment to alcoholic products imported from other provinces and abroad. Imported products from abroad, however, are subject to a slightly higher mark-up rate, but this difference covers the higher cost of bringing these products into Alberta from abroad, as well as the extra cost involved in carrying a larger inventory of these products.

n.a. = not available.

— = no products to which a mark-up can be applied.

TABLE 4-18 International Trade Elasticity Estimates for Canada  
 Range and "Best" Point Estimates of Long-Run Elasticities of Demand for Imports and Exports  
 for Canada by SITC Commodity Group<sup>a</sup>

Commodity Group <sup>b</sup>	Imports			Exports		
	Number of Estimates	Range	"Best" (median)	Number of Estimates	Range	"Best" (median)
SITC 0 + 1	7	-0.76 to -1.80	-0.80	n.a.	n.a.	n.a.
SITC 2 + 4	5	-0.20 to -2.55	-0.58	n.a.	n.a.	n.a.
SITC 3	2	-0.23 to -0.81	-0.52	n.a.	n.a.	n.a.
SITC 5 - 9	11	-0.82 to -4.35	-2.06	n.a.	n.a.	n.a.
Total	7	-0.60 to -1.59	-1.30	7	-0.23 to -1.95	-0.79

Import and Export Price Elasticities for Canada (Annual Data, 1951-66)<sup>c</sup>

Commodity Group <sup>b</sup>	Imports		Exports	
	Income	Price	Income	Price
SITC 0 + 1	1.20	-1.46	1.41	-0.59
SITC 2 + 4	(16.31)	(-2.67)	(22.31)	(-2.85)
SITC 3				
SITC 5 - 9				
Total				

a. Reported by R. M. Stern, J. Francis and B. Schumacher, *Price Elasticities in International Trade: An Annotated Bibliography* (London: Macmillan for the Trade Policy Research Centre, 1976), Table 2-1, p. 15.

b. Reported by H.A. Houthakker and S.P. Magee, "Income and Price Elasticities in World Trade," *Review of Economics and Statistics* 51 (May 1969): 111-25.

c. These commodity codes refer to (0+2) Food, Beverages and Tobacco, (2+4) Crude Materials, Oils and Fats, (3) Mineral Fuels, and (5-9) Manufactured Goods.  
 n.a. = not available.

This approach is contentious, however, since a shares approach to elasticity determination, based on a region's share of international trade, would suggest that interregional trade elasticities would be considerably higher than nationally based international trade elasticity estimates. In turn, elasticities faced on the export side by any region which is small would presumably approach minus infinity.

Because of the importance of these values to the modelling effort used here, two different elasticity variants are used for this portion of the model. One follows the Hazledine procedure of using interregional trade elasticities set at the same values as international trade elasticities. The second variant is closer to modelling all regions as small, open, price-taking economies, facing both higher export and import price elasticities. Since the Armington assumption is used in the model, elasticities of substitution between within-region and out-of-region goods in this case become larger.

### *Energy Elasticities*

Elasticities of energy supply and demand are important in the general equilibrium model evaluations of regional impact, since these determine the strength of the regional impacts of price controls and other policies in the NEP, both on interregional trade and on the size of any redistributive effects between energy producing and consuming regions. The national welfare effects of energy pricing policies, for instance, are affected by both the elasticity of energy supply and the elasticity of energy demand. The larger these elasticities the greater the welfare impacts of maintaining domestic oil prices below world levels.

A literature survey of these elasticities reported by Thirsk and Wright (1977) suggests that the elasticity of energy demand in Canada lies in the range of  $-0.4$  to  $-0.6$ , while the long-run price elasticity of supply is of the order of  $1.0$  to  $1.5$ . A more recent survey of energy demand elasticities by Kouris (1982) also reviews existing estimates and comments on possible ranges of energy elasticity values, although not specifically for Canada. The Kouris study produces ranges of energy demand elasticity estimates of  $-0.1$  to  $-0.5$ , only slightly lower than that suggested by Thirsk and Wright. Estimates in this range are therefore used in specifying energy demand elasticity values in the general equilibrium model.

### *Other Commodity Demand and Production Side Elasticities*

Other commodities appear in the demand functions in the general equilibrium model as a composite non-energy product, with substitution between the component products entering the composite. Since these elasticities are less crucial to results other than elasticities in the model,

a Cobb-Douglas specification is used at this level of nesting of preference functions in all regions in the general equilibrium model. This is equivalent to setting all these elasticities to unity.

Elasticities of substitution between capital and labour in value-added functions in each region also appear in the general equilibrium model. A value of 0.8 is used for all non-energy industries in all regions, based in part on the values reported in the survey paper by Caddy (1976) and used in Piggott and Whalley (1985), Whalley (1985), and Ballard et al. (1985). This involves the strong assumption of identical values for similar industries in different regions.

### *Factor Flow Elasticities*

In the factor flow area two separate sets of elasticities need to be specified: those for capital services and those for labour services. In the case of capital services, there are no good estimates of the elasticity of capital flows in response to differences in the rate of return either between regions or between Canada and abroad. As a result, two mobility assumptions are used. In one, capital is assumed to be both inter-regionally and internationally mobile. In the other, capital is treated as only interregionally mobile.

The key issue in choosing between these, so far as Canada is concerned, is the extent of international capital mobility. Relevant to this issue is a recent paper by Feldstein and Horioka (1980) which uses data on 21 OECD countries to measure the degree of collinearity between domestic saving and investment rates. With perfect capital mobility both internationally and interregionally, there should be no relation between the level of domestic investment and the amount of savings generated in any region, or even in Canada as a whole. In contrast, if a region's capital market is wholly or partially insulated from the international capital market, any incremental domestic saving will tend to be reflected in incremental domestic investment. In their analysis of this issue, Feldstein and Horioka find that at an international level, for the 15-year period from 1960 to 1974, the average absolute value of the difference between domestic saving and domestic investment as a fraction of GDP in each country is a little more than 1 percent (1.14 percent for Canada) and the same difference expressed as a percentage of saving is about 5 percent (5.40 percent for Canada). They conclude that their results are inconsistent with the assumption of perfect world capital mobility.

This position, however, has been the subject of substantial debate, and has been queried both by Harberger (1980) and more recently by Tobin (1983). Harberger points out that the evidence produced by Feldstein and Horioka is based on data from the OECD countries only. He argues that one would expect a higher degree of correlation between saving and investment rates of major regions as opposed to individual countries. Tobin criticizes Feldstein and Horioka for regressing the investment-to-

income ratio on the savings-to-income ratio for the same country. If all countries have savings rates which vary systematically, then collinearity of domestic savings and investment rates would not necessarily be inconsistent with perfect international capital mobility. Tobin argues that a better approach would be to regress the investment-to-income ratio on savings rates of all countries.

Due to the absence of both an empirical consensus on this issue and empirical estimates of the elasticity of capital flows both interregionally and internationally, two different model variants are formulated. The choice between these two model variants can, however, have major impacts on model results. If capital services are assumed to be perfectly mobile both internationally and interregionally, then policies used by one region to attract inward capital flows will have no impact on capital used by other regions. If, however, capital services are internationally immobile, this will no longer be true.

In the labour mobility area, the key parameters are those which determine the degree of partial mobility of labour between regions. These relate to the mobility formulation discussed in Chapter 3. The recent study by Winer and Gauthier (1982) on interregional migration in response to fiscal incentives provides information relevant to the model parameter values.

This study reconsiders earlier evidence due to Courchene (1970) on fiscally-induced internal migration. They use "Courchene-type" estimating equations and a revised family allowance migration series, along with several variations on Courchene's original equations, to re-evaluate the extent of fiscally induced migration. While their results tend to confirm Courchene's conclusions concerning the influence of fiscal structure on interprovincial migration, Winer and Gauthier also note a number of problems with this approach. Their equations only inadequately capture the influence of fiscal structure on migration. There are also a number of problems with the use of family allowance data, and they criticize the implicit economic model generating migration behaviour.

Winer and Gauthier construct another model of fiscally-induced migration, taking into account several of these problems. Their model is developed in a multi-nominal logit framework, and then estimated using tax file migration data disaggregated by income class. Their estimates suggest that fiscal structure does have a significant influence on migration decisions, but the degree of influence varies by income class and region. As far as Winer and Gauthier are concerned, their analysis only provides qualitative and not quantitative evidence on the statistical significance of fiscal structure on migration decisions, but in a final section of their paper they present estimates of the quantitative impact of selected changes in fiscal structure on interregional migration flows.

Their procedure is as follows. Using selected estimated equations and 1977 values of all explanatory variables, the probabilities of out-migra-

tion from and in-migration to various regions are estimated. A menu of changes in fiscal structure is then considered. Regional variations in UI benefits, equalization payments, western Canada natural resource revenues, and regional employment income differences are all exogenously returned to their 1971 levels, and the percentage change in migration rates is computed by income class for each origin-destination pair. The parameter estimates determine the labour flows between provinces that their model predicts.

In specifying the interregional mobility component of the model used here, unfortunately it is difficult to relate these Winer-Gauthier estimates directly to the mobility parameters appearing in the general equilibrium model (see Chapter 3). As a result, the Winer-Gauthier study is cited as providing support for the existence of a fiscal inducement effect on interregional labour mobility. Alternative values of the corresponding model parameters are chosen for compatibility, with different assumptions on the elasticity of out-migration from a region with respect to interregional differentials in average household real incomes. These assumptions are discussed later where the general equilibrium model results are reported.

### ***Public Good Elasticities***

The elasticity between public and private goods in preferences is a key parameter in the public goods variant of the model, since it partially determines the size of the surplus from Confederation from the nationally provided non-defence public goods. There is only limited literature on these elasticity values. Atkinson and Stiglitz (1980), for instance, report earlier estimates due to Borcherding and Deacon (1972) and Pommerehne and Schneider (1978). This literature indicates that a reasonable value for this elasticity might be in the region of 0.5. This value is used in the public goods model variant as the substitution elasticity between public and private goods in preference functions in all regions in Canada.

All these elasticity values, both extracted from literature and based on other assumptions, are used to guide parameter choice in the general equilibrium model. Both international and interregional trade elasticities feed into both the final demand and intermediate demand functions. The energy and other demand elasticities enter in a similar way. Labour migration elasticities determine the extent of interregional labour mobility and are used in specifying the model mobility parameter values by region. The public good/private good substitution elasticity also determines preference function parameter values in the public good model variant. Once these elasticities are specified, along with data on the distortions associated with the policies to be analyzed as part of the policy mix under federalism, evaluations of regional policy impacts can commence.





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## Analyses of Regional Impacts of Policies

In this chapter the regional impacts of some of the key policy elements in Confederation are analyzed, using both partial equilibrium and general equilibrium methods.

The regional applied general equilibrium model discussed in previous chapters incorporates factor mobility effects between regions (involving both capital and labour), regional external sector balance conditions, and international terms-of-trade effects. These effects are ignored in the partial equilibrium analyses. On the other hand, partial equilibrium analyses allow for more commodity detail than in a single general equilibrium model used to analyze interregional impacts of all policies, and also have a richer treatment of the institutional features of several of the policies than is possible in the general equilibrium model (particularly in the case of interprovincial barriers). These two approaches thus provide different but complementary perspectives on the interregional impacts of the policies which characterize present-day Confederation. Results are presented from both, and the main themes extracted from each.

### Regional Impacts of Canadian Tariffs

Partial equilibrium calculations of the regional impacts of removing the federal tariff have been made, based on the diagrams presented in Chapter 2, using the same level of commodity detail as in the 1981 microconsistent data set employed in the regional general equilibrium model. To implement this partial equilibrium approach numerically, data are required on production and consumption by region, along with estimates of tariff rates by commodity. The production and consumption data by region from the 1981 microconsistent data set imply imports and

exports by product by region, and the interregional and international trade data used are taken from this source.

However, these data show similar commodities being both imported and exported by the same region (i.e., cross-hauling). In the general equilibrium model, the Armington assumption (heterogeneity of “similar” products across regions) is used to accommodate the presence of cross-hauling in both interregional and international trade. However, the partial equilibrium diagrams used to illustrate the regional effects of the federal tariff in Chapter 2 assume that products are homogeneous across regions. The data on interregional trade flows in the microconsistent data set are incompatible with this assumption and adjustments are needed.

These adjustments involve calculating the value of imports and exports for each commodity in each region, reducing the larger of the two by the difference, and setting the smaller of the two to zero so that a region is either a net importer or net exporter of any given commodity but not both. Thus, if imports to region 1 are greater than exports from region 1, imports by region 1 are reduced by the difference, and the value of exports to each of the other regions from region 1 is set to zero. These adjustments can substantially reduce the size of both interregional and international trade flows. Thus in the partial equilibrium calculations, in contrast to the calculations made with the general equilibrium model, the interregional and international flows on which the policy distortions fall are smaller.

The same six Canadian regions that appear in the general equilibrium model — Atlantic Canada, Quebec, Ontario, Manitoba/Saskatchewan, Alberta, and British Columbia — are considered in these calculations. For each commodity, the regional gains and losses resulting from the removal of the tariff have been calculated.<sup>1</sup> The impact by region has been estimated with tariff revenues initially redistributed among regions on an equal per capita basis. Only those commodities for which Canada is a net importer have their domestic prices affected by the removal of the tariff. If Canada is a net exporter of a particular commodity, no regions bear any cost from the removal of the tariff.

The regional gains and losses due to removal of the tariff have been calculated using alternative elasticity configurations and assumptions on transport costs. The elasticity values used in the general equilibrium model are, in the main, based on international rather than interregional import elasticity estimates. However, the values used in these partial equilibrium calculations are chosen somewhat arbitrarily, both because of the large number of calculations involved and because of the differences in product classifications used in some cases relative to the general equilibrium model.

In a first calculation, elasticity values of 0.5 are assumed for both supply and demand functions for all products in all regions. In a second

**TABLE 5-1 Partial Equilibrium Estimates of the Effects of Removing the Federal Tariff<sup>a</sup>**

	Case 1		Case 2		Case 3	
	\$ millions	\$ per capita	\$ millions	\$ per capita	\$ millions	\$ per capita
Atlantic Canada	38	17	45	20	43	19
Quebec	-35	-5	2	0.3	-5	-0.8
Ontario	-23	-3	51	6	46	5
Man./Sask.	-12	-6	-6	-3	-7	-4
Alberta	87	39	97	43	98	44
British Columbia	90	32	103	37	100	36
Total	145	6	291	12	275	11

Case 1: Demand and supply elasticities equal 0.5 for all products in all regions.

Case 2: Demand and supply elasticities equal 1.0 for all products in all regions.

Case 3: Demand and supply elasticities equal 1.0 for all products in all regions. International transportation cost margin assumed equal to 1 percent and interregional transportation cost margin assumed equal to 2 percent, for all products for all regions.

*Note:* Numbers may not add due to rounding.

a. The estimates are based on trade flow data from the 1981 microconsistent data set and 1976 estimates of tariff rates.

calculation, elasticity values of 1.0 are assumed. In a third calculation, elasticities of 1.0 are used but transportation costs are included and set somewhat arbitrarily at 2 percent of landed cost interregionally and at 1 percent internationally. In this treatment of transport costs, transport margins by commodity are further constrained to be equal to the minimum of the actual commodity tariff and the implied 1 percent interregional transport cost differential, so as to be consistent with the direction of trade in the trade flow data used.

Table 5-1 reports estimates of the regional effects of removing the federal tariff for the first case. Quebec, Ontario and Manitoba/Saskatchewan lose as a result of removing the tariff and all other regions gain. In per capita terms, Alberta gains more than any of the other regions, while Manitoba/Saskatchewan loses the most. The national gain from the removal of the federal tariff from these calculations is around \$6 per capita using 1981 data, a small total effect.

For the case where all demand and supply elasticities are equal to 1.0 rather than 0.5, all regions except Manitoba/Saskatchewan gain from removal of the tariff. The national impacts are approximately double those which occur in the case where elasticities are 0.5. On a per capita basis, Alberta gains more than any of the other regions, just as in the high elasticity case. On the other hand, Quebec and Ontario gain from removal of the tariff, showing a clear reversal in regional impacts from the earlier case.

These two sets of results suggest that the interregional effects of

removing the tariff are small, even though these are conventionally viewed as a major source of grievance by hinterland Canadian regions. Indeed, these results suggest that under some scenarios it is possible that a manufacturing-producing region in Canada gains from removal of the federal tariff. Gains are largest, however, in western provinces, which are net importers of manufactures from central Canada.

Table 5-1 also reports results on the regional impacts of removing the tariff, incorporating interregional transportation effects. Thus, for those commodities for which Canada is a net importer in international trade, one effect of removing the tariff can be to induce exporting regions in Canada to shift from interregional to international trade. The theoretical implications of the effect of the tariff as analyzed by Melvin (1985) are outlined in Chapter 2. Here we quantitatively analyze the effects of removing the tariff.

The results, however, show Canada gaining \$275 million, less than in the no-transportation-cost case. All regions except Alberta are worse off compared to case 2. The reason for this outcome is that although removal of the tariff does eliminate socially wasteful transportation costs, these additional gains are more than offset by larger production and consumption effects. In part, this reflects the estimates of transportation margins used in this calculation.

The general equilibrium model has also been used to analyze the interregional effects of the tariff, but in two different ways. One involves replacement of the federal tariff by a yield-preserving, uniform-rate federal sales tax, which allows the federal government to keep both its expenditures on goods and services and its transfers to regions and persons constant in real terms. The other considers removal of the federal tariff with no yield-preserving replacement tax. For the first case, an additional model simulation is reported where interregional transport costs are also present. Data from interprovincial input-output sources provide estimates of transport margins across all products in each region, and are employed for this purpose. In all cases, capital is treated as both interregionally and internationally mobile.

The resulting estimates of welfare effects from policy changes by region have to be interpreted with care for many reasons, one being the presence of interregional labour mobility in the model. The residents of a region before and after a policy change is instituted typically differ, because the population of each region changes. In the results reported in Table 5-2 and in subsequent tables (unless the text so indicates), the welfare effects by region relate to the initial residents — that is, those who are in a region prior to elimination of the federal tariff.

Two panels of results are reported in Table 5-2 for each simulation: welfare gains and losses by region and associated terms-of-trade effects by region. Welfare effects are reported as Hicksian equivalent variations (EVs) by region in millions of 1981 dollars. This measures the income

**TABLE 5-2 General Equilibrium Analysis of the Effects of Removing the Canadian Tariff**

	Case 1	Case 2	Case 3
<b>Hicksian EV's (\$ millions 1981)</b>			
Atlantic Canada	-151	-149	-320
Quebec	-354	-344	-233
Ontario	-246	-225	137
Manitoba/Saskatchewan	-201	-200	-172
Alberta	-245	-244	42
British Columbia	69	75	238
Total	-1,084	-1,043	-1,110
<b>Terms-of-Trade Change</b> (% change, using new equilibrium trade flows as weights)			
Atlantic Canada	-0.12	-0.11	-0.62
Quebec	-0.71	-0.71	-0.75
Ontario	-0.92	-0.93	-0.96
Manitoba/Saskatchewan	-0.09	-0.10	-0.18
Alberta	0.34	0.34	0.50
British Columbia	-0.39	-0.40	-0.38
Rest of the World	1.14	1.15	1.17

Case 1: Replacement of the federal tariff by a yield-preserving uniform rate sales tax which allows the federal government to keep its expenditures on goods and services and its transfers to persons and regions constant in real terms.

Case 2: As Case 1, but in the presence of interregional transport costs.

Case 3: Removal of the federal tariff; no replacement tax instituted.

equivalent of the change in welfare by region due to the policy change. Terms-of-trade effects are reported as the percentage change in the relative price of imports and exports for each region; a positive entry denoting a terms-of-trade improvement. New equilibrium trade flows (quantities imported and exported by each region) are used as weights in this calculation.

Results indicate that all regions in Canada except British Columbia lose from the replacement of the federal tariff by a yield-preserving federal uniform rate sales tax, and that nationally, tariff removal is a welfare-losing proposition. This outcome is dominated by the international terms-of-trade effects which the general equilibrium model produces when Canadian tariffs are replaced by a uniform rate sales tax, a result similar to that found by Boadway and Treddenick (1978). Unlike the earlier partial equilibrium analysis, the general equilibrium model does not treat Canada as a small, open, price-taking economy. A terms-of-trade deterioration occurs in most regions as a result of removing the Canadian tariff, since Canada moves further away from the degree of protection which would be associated with an optimal tariff. The rest of the world improves their terms of trade.

The domestic rationalization effects stemming from the interaction of market structure features and scale economies when domestic protection is lowered do not appear in the model and are missing from results, despite the stress placed on these effects by Harris (1984) in his work on Canadian trade policy. For this reason, the national effects portrayed by the model may be unreliable. However, the relative terms-of-trade effects by region correspond to what one would expect from a traditional analysis of the interprovincial effects of the tariff. For central Canadian regions, the loss of international protection for their interregional trade results in a deterioration in their interprovincial terms of trade. Since there is also a worsening of their terms of trade internationally, a larger terms-of-trade deterioration occurs for central Canada than for hinterland provinces. In the case of Alberta, a terms-of-trade improvement occurs.

There is little difference between results where interregional transportation costs are also taken into account (case 2). This in part reflects the relatively small transport cost margins which apply interregionally, although in this case, unlike the partial equilibrium calculations, these are based on actual data. Where no equal-yield replacement tax is used, the reduction in taxes paid produces a gain for Ontario, Alberta and British Columbia. In the model the smaller level of taxes implies smaller intergovernmental transfers in this case, accounting for larger losses by poorer regions such as Atlantic Canada, and smaller losses (or gains) by richer regions.

The largest welfare losses from removal of the tariff generally seem to be sustained by Quebec, which also suffers one of the larger terms-of-trade deteriorations. In other regions there are differences in the ranking of losses by region and the behaviour of their terms of trade (such as Alberta and British Columbia in cases 1 and 2). Several model features explain these differences. One that is important is the effect of the tariff in changing the allocation of the corporate income tax base between regions. This feature has been stressed by Jones et al. (1985) in their analysis of the interregional effects of the tariff. Their results suggest that one effect of the tariff is to protect manufacturing activity in central Canada. Other regions share in the producer benefits accruing to central Canada through the tax system, and in particular through the federal corporate tax. As Jones et al. emphasize, effects such as these are reasons why the welfare impacts by region in Table 5-2 do not match the interregional terms-of-trade effects.

However, the main feature of these results is that the interregional effects of the federal tariff appear to be small. In the partial equilibrium analysis, where the national terms-of-trade effects associated with the federal tariff are excluded and only net trade flows enter the analysis, impacts by region are even smaller. In the general equilibrium model, where the international terms-of-trade effects come into play, the analy-

**TABLE 5-3 Effects of Varying Elasticity Values from Those Used in Base Case Analysis of Removing the Federal Tariff**

	Case 1	Case 2	Case 3	Case 4
<b>Hicksian EV's (\$ millions 1981)</b>				
Atlantic Canada	-151	-123	-168	-175
Quebec	-354	-224	-509	-507
Ontario	-246	33	-508	-518
Manitoba/Saskatchewan	-201	-172	-220	-228
Alberta	-245	-228	-258	-273
British Columbia	69	133	22	20
Total	-1,084	-572	-1,561	-1,599
<b>Terms-of-Trade Change</b> (% change, using new equilibrium trade flows as weights)				
Atlantic Canada	-0.12	0.04	-0.19	-0.24
Quebec	-0.71	-0.48	-1.03	-1.01
Ontario	-0.92	-0.61	-1.24	-1.24
Manitoba/Saskatchewan	-0.09	0.001	-0.12	-0.15
Alberta	0.34	0.31	0.42	0.41
British Columbia	-0.39	-0.15	-0.64	-0.64
Rest of the World	1.14	0.74	1.55	1.55

Case 1: Removal of the tariff (as in Table 5-2); central case elasticity specification.

Case 2: International trade elasticities in the rest of the world set equal to 6.0 for all commodities.

Case 3: International trade elasticities in all regions in Canada set equal to 3.0.

Case 4: Both international and interregional trade elasticities in all regions in Canada set equal to 3.0.

sis suggests that most regions gain from the tariff. The relative terms-of-trade effects by region are roughly consistent with the pattern one would expect, given the protection of central Canadian interregional exports behind the tariff barrier. On the other hand, the welfare effects by region do not match the terms-of-trade effects, because of revenue and other effects of the tariff.

A bottom line from these results would appear to be that the widespread perception of regional grievance in hinterland provinces associated with the tariff may be misplaced. This appears to be a relatively unimportant issue because of its limited quantitative significance relative to other policy issues within Confederation. The interregional effects which are generated by the model also are complicated by other factors, such as the revenue effects of the tariff.

The cases reported on in Table 5-2 have been further investigated through a series of sensitivity analyses reported in Tables 5-3, 5-4 and 5-5. Table 5-3 reports the impacts of changes in international and interregional trade elasticities in the model on results in Table 5-2. Table 5-4 considers the potential importance of economies of scale. Table 5-5

**TABLE 5-4 Effects of Removing Canadian Tariff for Various Levels of Increasing Returns to Scale in Canadian Manufacturing**

	Case 1	Case 2	Case 3	Case 4
<b>Hicksian EV's (\$ millions 1981)</b>				
Atlantic Canada	-151	-149	-143	-130
Quebec	-354	-350	-332	-294
Ontario	-246	-240	-206	-129
Manitoba/Saskatchewan	-201	-200	-196	-186
Alberta	-245	-243	-235	-215
British Columbia	69	71	78	91
Total	-1,084	-1,068	-990	-820
<b>Terms-of-Trade Change</b> (% change, using new equilibrium trade flows as weights)				
Atlantic Canada	-0.12	-0.11	-0.07	-0.02
Quebec	-0.71	-0.71	-0.70	-0.68
Ontario	-0.92	-0.94	-1.04	-1.27
Manitoba/Saskatchewan	-0.09	-0.09	-0.06	0.02
Alberta	0.34	0.35	0.42	0.56
British Columbia	-0.39	-0.39	-0.38	-0.36
Rest of the World	1.14	1.15	1.21	1.35

Case 1: Removal of the tariff with base case elasticities, and no increasing returns to scale (as in Table 5-2).

Case 2: As Case 1, but with increasing returns to scale in manufacturing industries in all regions in Canada. Elasticity of each average cost function is 0.01.

Case 3: As Case 2, but with a 0.05 elasticity.

Case 4: As Case 2, but with a 0.10 elasticity.

analyzes the importance of commodity aggregation and the treatment of international capital mobility for results.

Results in Table 5-3, as might be expected, indicate sensitivity of results to elasticity parameters. Where the import price elasticity abroad increases (in absolute value), there is a smaller terms-of-trade gain to be achieved through a restrictive tariff. As a result, the loss to Canada from removing the tariff falls. The converse effect occurs where higher values are used for international trade elasticities in all Canadian regions.

Case 4 of Table 5-3 indicates that it is the values for international rather than interregional elasticities which are important for these results. Interestingly, results for some of the regions are highly sensitive to the changes in elasticities (i.e., Ontario), while others are much less so (i.e., Alberta). The degree of sensitivity seems to be collinear with the importance of foreign trade to the region.

Results in Table 5-4 indicate limited sensitivity with respect to scale economy parameters used in the parametric scale economy version of the model (the same values are assumed for all manufactured products in all regions). This is true even when large values are used for the elasticity



**TABLE 5-5 Effects of Commodity Disaggregation and International Capital Mobility Treatment on Interregional Impacts of Removal of Federal Tariffs**

	Case 1	Case 2
<b>Hicksian EV's (\$ millions 1981)</b>		
Atlantic Canada	-146	-156
Quebec	-357	-384
Ontario	-246	-284
Manitoba/Saskatchewan	-190	-210
Alberta	-210	-242
British Columbia	94	74
Total	-1,009	-1,208
<b>Terms-of-Trade Change</b> (% change, using new equilibrium trade flows as weights)		
Atlantic Canada	-0.10	-0.28
Quebec	-0.72	-0.90
Ontario	-0.94	-1.12
Manitoba/Saskatchewan	-0.04	-0.26
Alberta	0.29	0.47
British Columbia	-0.31	-0.52
Rest of the World	1.17	1.39

Case 1: As for Case 1 of Table 5-2, but with 13 rather than 6 commodities in each region.

Case 2: As Case 1 of Table 5-2, except that capital is assumed to be internationally immobile.

of the average cost functions for manufacturing products in all regions. This lack of sensitivity to scale economies contrasts with the recent work by Harris (1984) on Canadian trade policies, in which scale economies play such a large role. The difference is that here foreign trade barriers, whose removal allows for economies of scale in Canada to be exploited, remain unchanged, and also the collusive behaviour of domestic producers assumed in the key model variants in Harris does not appear. As a result, in contrast to Harris, no rationalization gains accrue from removing the Canadian tariff.

Table 5-5 reports results from two further cases in which the model specification is varied. In case 1, more commodity detail than in earlier cases is considered, with the full 13-good model variant used. Case 2 considers the effects of changing the assumptions on international capital mobility. In this case, capital is interregionally mobile but internationally immobile. In neither case are results much different from case 1 of Table 5-2; slightly larger differences occur under case 2 than case 1.

Because of the major focus on the regional impacts of bilateral rather than unilateral reductions in protection in recent policy debate, some further model simulations have been performed, for which results are

**TABLE 5-6 Effects of a Tariff Abolition Involving Canada and the Rest of the World in Presence of an Assumed Foreign Tariff of 5% on All Products**

	Case 1	Case 2	Case 3
<b>Hicksian EV's (\$ millions 1981)</b>			
Atlantic Provinces	98	124	172
Quebec	613	694	833
Ontario	1,615	1,767	2,054
Manitoba/Saskatchewan	29	49	86
Alberta	85	120	187
British Columbia	572	601	647
Total	2,829	3,169	3,789
Rest of the World	-2,237	-2,010	-1,557
<b>Terms-of-Trade Change</b> (% change, using new equilibrium trade flows as weights)			
Atlantic Canada	1.23	1.39	1.70
Quebec	0.65	0.64	0.70
Ontario	0.76	0.36	-0.47
Manitoba/Saskatchewan	0.67	0.79	1.05
Alberta	1.98	2.22	2.72
British Columbia	1.13	1.15	1.24
Rest of the World	-1.91	-1.67	-1.19

Case 1: Specification (except for the foreign tariff) as in Case 1, Table 5-2; no increasing returns to scale.

Case 2: As Case 1, but elasticity of each cost function for manufactured products in each region is 0.05.

Case 3: As Case 1, but elasticity of each cost function for manufactured products in each region is 0.10.

reported in Table 5-6. In these, a tariff of 5 percent which has been assumed to operate in the rest of the world is removed, along with tariffs in Canada. As described in Chapter 3, the rest of the world is specified somewhat schematically to be ten times the size of Canada in these simulations (approximately the U.S.-to-Canada population ratio). Not surprisingly, the increased access to foreign markets in these cases benefits both Canada and all regions. In case 1, where there are no increasing returns to scale, all regions benefit and all regions have a terms-of-trade improvement. It is larger for western and Atlantic regions than for central Canada, reflecting the deterioration in central Canada's interregional terms of trade from the removal of the Canadian tariff. With increasing returns to scale, measured benefits to all regions rise, but Ontario's terms of trade (being the largest region) worsen both internationally and interregionally. These results therefore highlight the clear difference between the regional effects of a unilateral reduction in pro-

**TABLE 5-7 Effects of Eliminating the 1982/83 Crow Rate Subsidy<sup>a</sup>**

<b>Region</b>	<b>Regional Gain or Loss (\$ millions)</b>
Atlantic Canada	46
Quebec	133
Ontario	178
Manitoba/Saskatchewan	-149
Alberta	-52
British Columbia	57
Total	215

*Note:* Numbers may not add due to rounding.

a. The estimates are based on 1979 trade flow information and 1982/83 estimates of subsidy rates.

tection in Canada, and a bilateral or multilateral reduction involving lowered barriers abroad. They also suggest that in a bilateral or multilateral reduction, all regions in Canada will benefit and smaller regions will share in the benefits of scale economies achieved by larger regions in being able to sell more to larger markets.

### **Regional Impacts of Transport Subsidies**

Due to the treatment of regional transport subsidies in the general equilibrium model as cash transfers to regions, rather than as payments which subsidize interregional freight costs on agricultural shipments, the interregional effects which would accompany an elimination of transport subsidies have only been calculated using partial equilibrium techniques based on the diagrams in Chapter 2. We again use data on net interregional trade flows, reflecting a similar set of adjustments in the 1981 data to those made for calculations for the tariff in the preceding section. The value of the subsidy to rail grain transportation under the old Crow Rate legislation for the 1982/83 crop year is estimated to be 22 percent of total delivered costs of grain being transported (80 percent of transportation costs).

The results reported in Table 5-7 have been calculated under the assumption that the Crow subsidy is initially financed by an equal per capita tax paid in all regions. The interregional effects show Manitoba/Saskatchewan and Alberta, the two net exporting regions, losing from elimination of the subsidy. The other regions are net importers of grain and hence gain from elimination of the subsidy, since they are no longer required to pay taxes to help finance a subsidy from which they received no benefits. These results imply a national gain of \$215 million from the elimination of these subsidies.

## Regional Impacts of Energy Policies

Interregional effects from energy policies have been evaluated using both partial equilibrium methods and the general equilibrium regional model. The data used in the partial equilibrium analyses are taken from various sources. Interregional trade data covering natural gas and crude mineral oils are taken from 1979 PIO data, adjusted to be consistent with an assumption of homogenous products, as in the regional analysis of tariffs. These data are used for separate analyses of the removal of both the 1981 and 1984 policy regimes, to reflect the subsequent move closer to world prices, and further changes in the National Energy Program (NEP). To calculate regional production and consumption of crude mineral oils and natural gas valued at gross-of-producer revenue taxes, data on the value of petroleum and gas revenue taxes (PGRT) collected in each region are used. These data are taken from unpublished 1981 data provided by the Gross National Product Division of Statistics Canada and are allocated to oil and natural gas, using the fraction of oil production and natural gas production, respectively, in total value of oil and natural gas production in each region. Further adjustments are also made to these calculated values of production and consumption to calculate regional production and consumption of crude mineral oils and natural gas valued, respectively, at the blended price and the average price.<sup>2</sup>

Petroleum Incentive Program (PIP) grants also enter the analysis. These are direct payments to qualifying enterprises carrying out oil and natural gas exploration and development activities, anywhere in Canada and on the Canada Lands. The Government of Alberta pays for and administers PIP within the province, and the federal government pays for and administers PIP elsewhere in Canada.

Data on the value of PIP grants paid to each region under the 1981 and 1984 policy regimes are taken from Petroleum Monitoring Agency Survey data for 1981 and 1984, respectively.<sup>3</sup> The Canada Lands are included in the regions in this analysis, and the value of PIP grants to the Canada Lands are allocated as follows: PIP grants to Labrador East and the Atlantic Shelf South are assumed to be given to the Atlantic region, and PIP grants to the Beaufort Sea and other Canada Lands are allocated to an extra region (the North) which we introduce only into our partial equilibrium analyses of regional energy policy impacts. For simplicity, we assume that only exploration and development activities are carried out on the Canada Lands.

For the 1981 policy regime, the value of PIP grants in each region are allocated to oil and natural gas using, respectively, the fraction of oil metres drilled and natural gas metres drilled in each region in 1981.<sup>4</sup> For the 1984 policy regime, PIP grants are allocated using 1984 data on oil and natural gas drilling.<sup>5</sup>

In practice, exploration, development and production activities occur

**TABLE 5-8 Partial Equilibrium Calculations of the Effects of Removing Energy Price Controls<sup>a</sup> (\$ millions)**

	Atlantic	Quebec	Ontario	Man./Sask.	Alberta	B.C.	North	Total
<b>Oil</b>								
1981 policy regime <sup>b</sup>	-185	-1,679	-2,704	158	6,362	-716	-52	1,185
1984 policy regime <sup>c</sup>	-85	-89	-127	34	1,190	-12	-177	735
<b>Natural Gas</b>								
1981 policy regime <sup>b</sup>	-71	-369	-929	-214	2,078	4	-8	492
1984 policy regime <sup>c</sup>	-116	-68	-276	-63	1,091	48	-42	575

Note: Numbers may not add due to rounding.

- a. The estimates are based on 1979 trade flow data and 1981 estimates of the value of PGRT.
- b. The estimates are also based on other data for 1981. See text for details.
- c. The estimates are also based on other data for 1984. See text for details.

in different periods. However, to be consistent with implications of our partial equilibrium analysis that PIP grants have an immediate effect which increases the supply of both new oil and new natural gas in each region, we use the strong assumption that the observations given by data for the year in question represent a constant annual flow of oil and natural gas production in each region. We then calculate the change in these flows from the introduction of PIP grants. To analyze the effect of PIP grants on new oil production on the Canada Lands, we use the assumption that oil exploration and development expenditures on the lands equal the value of the eventual constant annual flow of new oil production from the region. This assumption applies to natural gas exploration and development expenditures on the lands as well.

For the 1981 pricing arrangements, data on exploration and development expenditures on the Canada Lands are from Petroleum Monitoring Agency Survey data for 1981.<sup>6</sup> These are allocated to oil and natural gas in the same way as PIP grants. A similar allocation procedure is used for exploration and development expenditures under the 1984 pricing arrangements. Data on these expenditures are from PMA survey data for 1984.<sup>7</sup>

Table 5-8 reports the regional and national welfare effects of removing federal energy policies under both the 1981 and 1984 pricing arrangements, both under these assumptions and under the assumption that net federal revenues<sup>8</sup> are initially allocated to the six Canadian regions on an equal per capita basis. The welfare effects of eliminating the Petroleum Gas Revenue Tax (PGRT) are also included in these results. The results

ignore excise taxes on oil and gas consumption and the complicating factor of foreign ownership and control of energy resources.

In the first panel of Table 5-8, estimates of the welfare effects of removing 1981 federal oil policies are presented. Manitoba/Saskatchewan and Alberta are the two interregionally net exporting regions. Even though these regions no longer receive any redistribution of positive federal revenues, they are still major gainers.

The welfare gain in Manitoba/Saskatchewan from the removal of controlled pricing under this regime is partially offset by the regional loss from the removal of PIP grants. Alberta on the other hand, pays for and administers PIP within its own region, so a welfare gain from the removal of PIP grants in the region is added to the welfare gain in the region from the removal of controlled pricing.

The North is shown to lose from the removal of 1981 federal oil policies. Since the region does not initially receive any federal redistribution of revenues in this calculation, the welfare loss in the region can be attributed solely to the removal of PIP grants paid to the region. Other regions are net importers of oil and hence lose on the consumption side from the removal of controlled pricing. The national effect shows Canada gaining almost \$1.2 billion.

Estimates of the welfare effects of removing 1981 federal natural gas policies are given in the second panel of Table 5-8. The two net exporting regions are Alberta and British Columbia. Both regions gain from the removal of federal natural gas policies even though there is no longer any redistribution of positive federal revenues. The North and all other regions lose from the removal of 1981 federal natural gas policies, with Ontario losing the most. The national effect shows Canada gaining by \$492 million from the removal of federal natural gas policies. In combination, these estimates suggest that the removal of energy policies in 1981 would have resulted in a combined gain from oil and gas regulation to Alberta of over \$8.4 billion, with losses to Ontario of over \$3.6 billion. These effects are clearly much larger than the interregional effects due to removal of the tariff, although it has to be borne in mind that these also reflect the somewhat unusual circumstances of 1981, when these effects were more pronounced than later.

The third panel of Table 5-8 reports estimates of the regional and national welfare effects of removing federal oil policies under the 1984 pricing arrangements. The two interregionally net exporting regions are Manitoba/Saskatchewan and Alberta. Both regions gain from the removal of 1984 federal oil policies but not by the same degree as for the removal of 1981 policies, since by 1984 domestic prices in Canada had moved much closer to world levels.

The North is shown to lose by \$177 million from the removal of 1984 federal oil policies. This larger 1984 loss can be attributed to the removal of PIP grants paid to the region, which were significantly greater in 1984 than in 1981.

The national effect of removing 1984 federal oil policies shows Canada gaining \$735 million. This is just over half the national welfare gain from the removal of 1981 federal oil policies. One reason is the increase in the proportion of oil qualifying to receive the New Oil Reference Price (NORP). This significantly reduces the producer-side gain in oil-producing regions. The different pricing schedules of oil between the two years also has an effect on the results. In 1981 consumer prices in Canada were at around 60 percent of world levels; but in 1984 the ratio was 95 percent. This has the effect of reducing the consumer losses from the removal of controlled pricing. The percentage difference between the wellhead oil price and the international price at Montreal also changed between these years. In 1981 the difference was 56 percent of the international price, and in 1984 it was only 22 percent. These differences have the effect of reducing the gains in income for owners of conventional old oil. Finally, the value of PIP grants paid under 1984 federal oil policies are more than double those paid under 1981 policies. This has the effect of increasing producer losses to qualifying enterprises carrying out oil exploration and development activities in Canada and on the Canada Lands. The overall effect is that gaining regions gain less and losing regions lose less from the removal of federal oil policies under the 1984 policy regime as compared to the 1981 policy regime.

In the fourth panel of Table 5-8, estimates of the welfare effects of removing 1984 federal natural gas policies are presented. One feature which differs from the 1981 analysis is the treatment of federal revenues. In 1984, federal revenues were in deficit by \$60 million, while in 1981 a surplus of \$643 million was recorded. The difference in revenues is mainly because of the increased financing requirements for PIP grants in 1984.

Alberta and British Columbia gain from the removal of federal natural gas policies, both because they are net exporting regions and because they are no longer required to help finance the federal deficit. Other Canadian regions are interregional net importers of natural gas and lose from the removal of federal natural gas policies. The North loses solely from the producer surplus loss from the removal of PIP grants. Except for Atlantic Canada and the North, the overall effect is the same as for oil: gaining regions gain less and losing regions lose less from the removal of federal natural gas policies under the 1984 policy regime as compared to the 1981 policy regime.

The national effect of removing 1984 federal natural gas policies shows Canada gaining \$575 million, which is \$83 million greater than the 1981 value. This larger 1984 national welfare gain can be attributed mainly to the removal of PIP grants, since the value of PIP grants paid under 1984 federal natural gas policies is significantly greater than the value of those paid under 1981 policies.

The general equilibrium model has also been used to evaluate the regional impacts of both energy policies applying to oil and those apply-

ing to natural gas, even though energy in this model is treated as a single composite commodity. These analyses evaluate both the large inter-regional redistribution effects implicit in the price control features of the NEP, and changes in both federal and provincial energy taxes and subsidies as they apply to energy production and consumption.

A series of cases has been considered, with results reported in Tables 5-9, 5-10 and 5-11. As with the analysis of the regional impacts of the tariff, the focus is on welfare effects by region in terms of Hicksian equivalent variations measured in millions of 1981 dollars. Labour flows in and out of regions induced by the policy change are also reported. As with the tariff analyses above, welfare effects refer to residents who were initially located in a region before the policy change under consideration.

The first set of results reported in Table 5-9 is for the abolition of the federal tax/transfer components of the NEP. As has been emphasized earlier when discussing the benchmark equilibrium data, this transfer component is large, and the general equilibrium effects by region in Table 5-9 confirm this.

The gain to Alberta from the elimination of these price controls, using 1981 data, is in the region of \$12 billion, larger by many orders of magnitude than the interregional effects of any other policy changes considered in this study, and larger by about one-third than the partial equilibrium estimates reported above. Ontario and Quebec each lose, Quebec slightly more than Ontario. These results clearly suggest that because of the large difference between internal Canadian energy prices and world prices in 1981, the interregional redistribution effects induced by the NEP were so large that they dominated the interregional effects from the other policy elements considered in this study.

Results from Case 2 report the effects of only a 50 percent reduction in the tax/transfer component of the NEP. In this case the regional effects change substantially. The losses to Atlantic Canada are much smaller than in Case 1, and Ontario and Quebec both gain. The reason is that under the NEP, two separate effects come into play: an interregional transfer effect from the price controls, and a national welfare loss from the distortion of energy consumption. The partial equilibrium diagram in Chapter 2 suggests that the first of these is proportional to the difference between world and domestic prices for energy; the second is approximately proportional to the square of this difference. As a result, for a 50 percent reduction in this difference, the effect causing a national welfare gain is more important than the interregional transfer effect. This is also evident from the fact that more than half of the national gain which accrues from removing the NEP price controls and taxes occurs under this change.

Case 3 in Table 5-9 considers the same change in energy policies as in Case 1, but with foreign ownership of energy resources in Alberta explicitly recognized. In this case, gains to gaining regions are smaller,



**TABLE 5-9 General Equilibrium Estimates of the Effects of Changes in Energy Policies<sup>a</sup>**

	Case 1	Case 2	Case 3
<b>Hicksian EV's (\$ millions 1981)</b>			
Atlantic Canada	-1,017	-242	-1,050
Quebec	-2,356	53	-2,472
Ontario	-2,129	784	-2,363
Manitoba/Saskatchewan	1,484	727	1,449
Alberta	11,722	4,294	10,233
British Columbia	-383	317	-427
Total	7,304	5,881	5,376
<b>Net Labour Inflow or Outflow<sup>b</sup></b>			
<b>(+ indicates inflow;</b>			
<b>units are \$ millions of labour</b>			
<b>measured in benchmark equilibrium units)</b>			
Atlantic Canada	-91	-42	-88
Quebec	-155	-64	-149
Ontario	-671	-229	-648
Manitoba/Saskatchewan	39	16	43
Alberta	961	347	918
British Columbia	-84	-28	-77

Case 1: All federal tax/transfer components of the NEP removed (i.e., price controls, all federal energy taxes and subsidies) and replaced by an equal-yield uniform-rate sales tax.

Case 2: As Case 1 above, but only 50% reduction.

Case 3: As Case 1 above, but with 62% of Alberta's energy resources treated as foreign owned.

- Central case elasticities; elasticity of interregional labour mobility parameter set at 0.05 in all regions (see Chapter 3 for description).
- In the benchmark data, labour is measured in terms of the value of the wage bill for labour employed in a region, in \$ millions using 1981 data. Units of labour in each region are then taken to be that amount which generates a total return to each unit of labour (including any net fiscal benefits) of \$1 in the benchmark equilibrium model solution.

and losses to losing regions are larger. In contrast to the results reported by Lenjosek and Whalley (1984), where national effects from foreign ownership of energy rents are incorporated, there is still a national welfare gain from eliminating the NEP. The changes in interregional effects from recognizing foreign asset ownership appear relatively minor compared to the dominating effect from the abolition of energy price controls in Cases 1 and 2.

Some sense of how the interregional effects of more recent energy policies compare to the results reported in Table 5-9 can be gained from results in Table 5-10, where the effects of moving closer to world energy prices are reported. Case 3 of Table 5-10 provides some indication of the interregional effects which would come into play were prices to be changed to 90 percent of world levels from their 1981 levels. Comparing Case 1 of Table 5-9 with the results in Case 3 for Table 5-10 suggests that

**TABLE 5-10 Effects of Moving Closer to World Energy Prices under the NEP (using 1981 data)<sup>a</sup>**

	Case 1	Case 2	Case 3
<b>Hicksian EV's (\$ millions 1981)</b>			
Atlantic Canada	-239	-444	-573
Quebec	139	-373	-758
Ontario	834	244	-230
Manitoba/Saskatchewan	786	1,034	1,175
Alberta	4,265	6,278	7,484
British Columbia	350	223	110
Total	6,079	6,905	7,157
<b>Net Labour Inflow or Outflow<sup>b</sup></b> (+ indicates inflow; units are \$ millions of labour measured in benchmark equilibrium units)			
Atlantic Canada	-43	-58	-67
Quebec	-62	-88	-103
Ontario	-236	-362	-438
Manitoba/Saskatchewan	18	26	31
Alberta	350	525	629
British Columbia	-27	-43	-52

Case 1: Movement to 75% of world prices.

Case 2: Movement to 85% of world prices.

Case 3: Movement to 90% of world prices.

a. In all cases, an equal-yield tax change for the federal government accompanies the change.

b. See footnote b, Table 5-9.

the interregional effect against Alberta from the NEP might have been around \$4 billion per year (approximately the difference between the two sets of results) if controlled prices for energy products were 90 percent of world levels rather than as they were in 1981. However, this calculation suggests that even under this scenario, the interregional effects of the NEP are still significant and larger than any of the other policy elements examined in this study, although clearly much reduced relative to 1981. Similar conclusions apply to moves to 75 percent and 85 percent of world prices (Cases 1 and 2 of Table 5-10).

Table 5-11 reports interregional effects of other energy policy changes. Removing provincial royalties, not surprisingly, is undesirable for Alberta but benefits energy-consuming regions. Removing PIP grants has small impacts with the 1981 data used, since they were quantitatively small at that time. Removing windfall profits taxes benefits energy producers and hurts energy consumers, due to the yield-preserving alternative federal sales tax used in the calculation.

Overall, these results emphasize how central the interregional effects associated with the treatment of energy are to contemporary Con-

**TABLE 5-11 Effects of Other Energy Policy Changes**

	Case 1	Case 2	Case 3
<b>Hicksian EV's (\$ millions 1981)</b>			
Atlantic Canada	463	2	-93
Quebec	1,039	16	-331
Ontario	1,512	13	-186
Manitoba/Saskatchewan	194	5	17
Alberta	-1,513	-98	996
British Columbia	231	-9	-59
Total	2,704	-70	341
<b>Net Labour Inflow or Outflow<sup>a</sup></b>			
<b>(+ indicates inflow;</b>			
<b>units are \$ millions of labour</b>			
<b>measured in benchmark equilibrium units)</b>			
Atlantic Canada	18	-1	-10
Quebec	12	-2	-23
Ontario	58	5	-64
Manitoba/Saskatchewan	20	1	8
Alberta	-162	-4	106
British Columbia	54	2	-17

Case 1: Remove regional royalties (with yield-preserving regional taxes).

Case 2: Remove PIP grants (with yield-preserving federal subsidy).

Case 3: Remove windfall profits tax elements of the NEP (PGRT + NGGLT) (with yield-preserving federal tax).

a. See footnote b, Table 5-9.

federation. While it has to be emphasized that the model results reported in Table 5-9 are based on 1981 data, a period for which these effects were more pronounced than subsequently, the interregional effects involved dominate those of the other policy elements evaluated in this chapter by several orders of magnitude.

## **Regional Impacts of Equalization and Intergovernmental Transfers**

Interregional impacts of eliminating equalization have also been evaluated, using both the partial and general equilibrium approaches. In the general equilibrium evaluations, both the direct interregional transfer effects and the indirect effects on the interregional allocation of labour of removing equalization are assessed. In the partial equilibrium evaluations, only the latter effects are considered.

In order to calculate gains and losses by region and the national efficiency effects using partial equilibrium methods, a number of simplifying assumptions have been made. In the presence of both net fiscal benefits (NFBs) by region and equalization payments, units of labour are defined such that the comprehensive income per unit of labour (the sum

**TABLE 5-12 Partial Equilibrium Estimates of the Effects of Eliminating Equalization**

Region	Regional Gain or Loss (\$ million 1981)
Atlantic Canada	- 986
Quebec	- 1,096
Ontario	1,410
Manitoba/Saskatchewan	- 113
Alberta	439
British Columbia	444
Total	100

*Note:* Numbers may not add due to rounding.

of labour income, NFBs and equalization received per labour unit) is equal to \$1.00 in all regions. This somewhat arbitrary choice of units enables us to measure the quantity of labour employed in all regions as the sum of the wage bill, provincial taxes on resource rents (assumed to equal regional NFBs), and the amount of equalization paid to each region. The wage rate in any region (in dollars) is calculated by dividing the labour income component of comprehensive income by the quantity of labour employed in each region.

We then use partial equilibrium methods to find the allocation of labour between the regions after the removal of equalization, using an iterative search procedure. We use the approximation that the value of NFBs received per unit of labour in each region will remain constant as individuals move between regions. We begin with the initial value of comprehensive income per labour unit in each region, which is parametrically varied until a value is found in the absence of equalization such that a national full employment condition for labour is satisfied across all regions. This procedure is implemented through a relatively simple computer program which generates the new interregional allocation of labour and estimates of wage rates by region in the absence of equalization.

Since we use 1981 data in analyzing the interregional effects of eliminating equalization, the equalization formula is assumed to be based on the national average standard. The regional and national welfare effects of equalization are reported in Table 5-12 under the assumption that capital is interregionally immobile.

Not surprisingly, the results suggest that the effect of removing equalization is to benefit those regions not entitled to receive equalization, because they gain productivity at the expense of recipient regions. However, the national effect shows Canada to be better off as a result of abolishing equalization, a result consistent with some of the later general equilibrium results. The deviations in equalization from a more ideal form of offset to the migration incentives caused by NFBs make equal-

**TABLE 5-13 Effects of Removing Equalization, with Yield-Preserving Uniform-Rate Federal Subsidy on All Final Sales**

	Case 1	Case 2	Case 3	Case 4
<b>Hicksian EV's</b>				
<b>(\$ millions 1981)</b>				
Atlantic Canada	-1,302	-1,278	-1,183	-1,067
Quebec	-1,342	-1,300	-1,150	-995
Ontario	1,743	1,704	1,558	1,396
Manitoba/Saskatchewan	-175	-167	-138	-107
Alberta	477	468	432	393
British Columbia	556	552	529	500
Total	-22	-5	56	117
<b>Net Labour Mobility<sup>a</sup></b>				
<b>(+ indicates inflow;</b>				
<b>units are \$ millions</b>				
<b>of labour measured in</b>				
<b>benchmark equilibrium units)</b>				
Atlantic Canada	-37	-88	-301	-581
Quebec	-55	-130	-405	-702
Ontario	61	144	454	807
Manitoba/Saskatchewan	-8	-18	-56	-97
Alberta	21	50	158	283
British Columbia	17	42	150	290

Case 1: All interprovincial labour mobility elasticities set equal to 0.02.

Case 2: All interprovincial labour mobility elasticities set equal to 0.05.

Case 3: All interprovincial labour mobility elasticities set equal to 0.2.

Case 4: All interprovincial labour mobility elasticities set equal to 0.5.

a. See footnote b, Table 5-9.

ization a nationally welfare-losing program, although the aggregate effects are small. Migration incentives between low-income and resource-rich regions (Atlantic Canada and Alberta) are partially offset, but migration incentives between non-resource low-income and high-income regions (Atlantic Canada and Ontario) are worsened.

A series of experiments have also been performed with the regional general equilibrium model to assess the impacts of equalization. Table 5-13 reports on four experiments in which 1981 equalization payments based on the national average standard formula have been replaced by an equal-yield federal subsidy on all final sales of products in all regions. This subsidy approximately maintains federal expenditures constant in real terms.

In the four cases, different values, varying between 0.02 and 0.5, are assumed for interprovincial labour mobility elasticities in each region. These parameters determine the extent of outward mobility from a region induced by differences in comprehensive labour incomes (including any net fiscal benefits) between regions in the general equilibrium

model, whether due to wage rate differences or changes in equalization arrangements. In each case, welfare impacts by region in terms of Hicksian equivalent variations are reported, along with the net labour inflow or outflow by region.

In all cases net labour outflows occur from Atlantic Canada, Quebec and Manitoba/Saskatchewan when equalization is removed, with inflows into Ontario, Alberta and British Columbia. The impacts of equalization on the spatial allocation of labour by region are therefore clear. Equalization provides a fiscal incentive for labour to remain in the relatively lower income provinces, as is conventionally thought to be the case.

Equally striking in Table 5-13 are the national effects. The welfare effects by region partly reflect the changes in the interregional allocation of labour, as well as the removal of equalization. A region which receives labour tends to lose to the extent that the marginal product of labour in the region is lowered, since this determines the regional wage rate. The opposite occurs when a region loses labour. However, these effects are small compared to the direct effects from changes in the interregional transfer mechanism, since Atlantic Canada, Quebec and Manitoba/Saskatchewan all lose.

However, in two of the four cases considered in Table 5-13, a national gain occurs when equalization is removed. Thus, like the partial equilibrium results in Table 5-12, these results also emphasize how far equalization is from an ideal offset to the incentives for fiscally-induced migration created by resource rents. Firstly, equalization does not provide a mechanism for directly transferring revenues from resource-rich regions to low-income regions. Instead, payments to recipient regions are financed through federal tax revenues. Secondly, equalization as it applies to energy is extremely limited in its impacts. A large portion of natural resource rents — i.e., hydro-electricity rents and non-capitalized energy rents beyond royalty revenues — are not part of provincial revenues and therefore do not find their way into the equalization formula.

While equalization to some extent offsets the distortion of the interregional allocation of labour between Atlantic Canada and Alberta arising from provincial taxes on resource rents, it creates an added distortion between Ontario and Atlantic Canada. Results in Table 5-13 suggest that on efficiency grounds equalization can easily be a nationally welfare-losing program. While there is a gain from the offset to migration incentives between low-income and resource-rich provinces (such as between Atlantic Canada and Alberta), there is a migration disincentive operating between Atlantic Canada and Ontario. Table 5-13 suggests that whether the net effect is positive or negative depends on the labour mobility elasticities assumed.

Table 5-14 reports welfare effects for the same cases as Table 5-13, but separately for the groups that remain in and leave from regions. Because

**TABLE 5-14 Effects of Removing Equalization on Those Remaining in and Those Leaving Regions**

Hicksian EV's (\$ millions 1981)	Case 1 <sup>a</sup>		Case 2 <sup>a</sup>		Case 3 <sup>a</sup>		Case 4 <sup>a</sup>	
	Remaining	Leaving	Remaining	Leaving	Remaining	Leaving	Remaining	Leaving
Atlantic Canada	-1,303.1	-1.4	-1,280.2	-3.4	-1,186.0	-12.6	-1,062.7	-26.9
Quebec	-1,343.3	-0.1	-1,303.3	-0.3	-1,156.7	-2.2	-999.3	-6.0
Ontario	1,743.4	0.0	1,703.5	0.1	1,557.0	0.6	1,394.9	1.3
Manitoba/Saskatchewan	-175.3	0.1	-167.7	0.2	-139.8	0.4	-109.1	0.3
Alberta	477.0	0.0	467.5	0.1	432.0	0.3	392.6	0.6
British Columbia	556.4	0.0	551.6	0.0	529.4	0.0	500	0.0
Total	-45.0	-1.3	-28.7	-3.3	35.9	-13.4	116.4	-30.6
All Individuals	-46.3		-32.0		22.4		85.5	

a. Cases 1 to 4 are the same as in Table 5-13.

**TABLE 5-15 Effects of Removing Fiscally-Induced Migration  
Component of Equalization (intergovernmental transfers  
unchanged)**

	Case 1	Case 2	Case 3	Case 4
<b>Hicksian EV's</b> (\$ millions 1981)				
Atlantic Canada	11	26	87	162
Quebec	20	47	145	249
Ontario	-20	-48	-148	-258
Manitoba/Saskatchewan	4	10	30	52
Alberta	-5	-11	-34	-59
British Columbia	-2	-4	-18	-37
Total	7	15	47	79
<b>Net Labour Mobility<sup>a</sup></b> (+ indicates inflow; units are \$ billions of labour measured in benchmark equilibrium units)				
Atlantic Canada	-27	-65	-220	-424
Quebec	-38	-90	-281	-488
Ontario	44	104	327	582
Manitoba/Saskatchewan	-6	-14	-43	-74
Alberta	15	36	113	203
British Columbia	11	28	103	201

Case 1: All interprovincial labour mobility elasticities set equal to 0.02.

Case 2: All interprovincial labour mobility elasticities set equal to 0.05.

Case 3: All interprovincial labour mobility elasticities set equal to 0.2.

Case 4: All interprovincial labour mobility elasticities set equal to 0.5.

a. See footnote b, Table 5-9.

the number of labour units which are induced to relocate between regions is relatively small, the welfare effects borne by those who leave are small and get progressively smaller as interregional labour elasticities fall. Results from this table show similar welfare impacts for the population of original residents and the residents who remain following the policy change.

Table 5-15 investigates these national efficiency effects further by evaluating the impacts of removing the fiscally-induced migration effects of equalization without removing the transfers under the program itself. In this case, intergovernmental transfers are unchanged, but the inter-regional migration incentive effects from equalization are removed from the model. The welfare impacts across regions are small, accounted for only by the labour reallocations involved. In Atlantic Canada, Quebec and Manitoba/Saskatchewan, there is a net labour outflow. The wage rate in the labour-losing regions tends to rise and these regions experience a gain. On the other hand, labour-gaining regions, such as Ontario,



**TABLE 5-16 Effects of Removing Equalization, Using the Public Goods General Equilibrium Model Variant<sup>a</sup>**

	Case 1	Case 2
<b>Hicksian EV's (\$ millions 1981)</b>		
Atlantic Canada	-1,278	-880
Quebec	-1,300	-841
Ontario	1,704	1,240
Manitoba/Saskatchewan	-167	-99
Alberta	468	350
British Columbia	552	393
Total	-3	188
<b>Net Labour Mobility<sup>b</sup></b>		
<b>(+ indicates inflow;</b>		
<b>units are \$ billions of labour</b>		
<b>measured in benchmark equilibrium units)</b>		
Atlantic Canada	-88	-93
Quebec	-130	-133
Ontario	144	151
Manitoba/Saskatchewan	-18	-18
Alberta	50	51
British Columbia	42	43

Case 1: Case 2 of Table 5-13.

Case 2: Public good model variant using an assumption that "defence" public good benefits to Canada from U.S. public good provision are 10% of the benefits from Canadian public good provision.

a. Elasticities and equal yield as for case 2, Table 5-13.

b. See footnote b, Table 5-9.

Alberta and British Columbia, suffer an income loss since the marginal product of labour in the region falls, implying a lower regional wage rate.

In Table 5-15 the national welfare effect is also consistently positive, indicating a welfare gain from removing the labour migration effects of equalization. These results therefore add further weight to the implication of both the partial equilibrium calculations and the last two columns of Table 5-12, namely that the net national welfare effect of the equalization program may be negative. Equalization can be an efficiency-losing program, because the current equalization system differs significantly from a scheme which directly offsets the incentives for fiscally-induced migration.

In Table 5-16 we present results for the removal of equalization based on the public good variant of the model. The welfare results by region differ from those in Table 5-13, in part due to the utility evaluation in the presence of public goods, but the pattern across regions is similar. Labour flows in and out of regions induced by the policy change are similar.

Partial equilibrium methods have not been used to analyze the inter-

**TABLE 5-17 Effects of Removing Federal Intergovernmental Transfers and Transfers to Persons (federal real expenditures held constant)<sup>a</sup>**

	Case 1	Case 2
<b>Hicksian EV's (\$ millions 1981)</b>		
Atlantic Canada	-1,952	-3,693
Quebec	-1,265	-1,605
Ontario	2,074	1,468
Manitoba/Saskatchewan	-361	-590
Alberta	808	3,007
British Columbia	631	1,073
Total	-35	-267
<b>Net Labour Mobility<sup>b</sup></b> <b>(measured in benchmark labour units);</b> <b>(+ indicates net inflow)</b>		
Atlantic Canada	-100	-131
Quebec	-133	-147
Ontario	153	97
Manitoba/Saskatchewan	-23	-36
Alberta	62	157
British Columbia	40	60

Case 1: Remove intergovernmental transfers by federal government.

Case 2: Remove intergovernmental and interpersonal transfers paid by the federal government.

- a. Interprovincial labour mobility elasticities assumed equal to 0.05 in all regions.  
 b. See footnote b, Table 5-9.

regional impact of intergovernmental transfers (other than equalization) and transfers to persons, and only simplified calculations are made using the general equilibrium model. In Table 5-17, general equilibrium results on the interregional impacts of larger changes in these transfers are reported. Two cases are considered, one in which all intergovernmental transfers between federal and provincial governments (including EPF) are removed; another in which all intergovernmental transfers and transfers to persons are removed. The latter includes old age security, unemployment insurance, family allowances and welfare.

In the first of these cases the interregional effects are not dissimilar to those reported in Table 5-13, suggesting that out of all intergovernmental transfers, equalization has the largest interregional effects. Equalization is a relatively smaller program in terms of total dollar amounts involved than some of the other programs (around one-quarter the size of EPF). But its regional concentration in Atlantic Canada and Quebec compared to other federal programs means that the main interregional impact of federal expenditures occurs through this program.

When the impacts of removing intergovernmental transfers and transfers to persons are considered, the interregional effects change some-

**TABLE 5-18 Effects on Interregional Labour Mobility  
of Removing the Interregional Transfer Component  
of the National Energy Program<sup>a</sup>**

<b>Hicksian EV's (\$ millions 1981)</b>	
Atlantic Canada	-1,432
Quebec	-5,099
Ontario	-6,672
Manitoba/Saskatchewan	367
Alberta	12,475
British Columbia	-725
Total	-1,037
<b>Net Labour Mobility<sup>b</sup> (measured in benchmark labour units); (+ indicates net labour inflow)</b>	
Atlantic Canada	-148
Quebec	-307
Ontario	-1,275
Manitoba/Saskatchewan	-34
Alberta	1,874
British Columbia	-111

a. Interprovincial labour mobility elasticities set equal to 0.05 in all regions.

b. See footnote b, Table 5-9.

what, most notably in the cases of Atlantic Canada and Alberta, but once again the dominant effects result from equalization. These results, therefore, suggest that equalization is the federal government transfer program that has the greatest effect on both the interregional allocation and the interregional distribution of labour.

Table 5-18 continues the same line of investigation by examining the relative importance of equalization for the interregional allocation of labour, compared to other policy elements. In this case the impacts of removing the interregional transfer component of the NEP are considered. Federal real expenditures are held constant and the incentive effects of the NEP (taxes and subsidies) on energy production and consumption remain intact. The data on interprovincial transfers used here are those estimated by the Economic Council of Canada (1982) for 1980 (and updated here to 1981). These have been entered into the model as an offsetting series of lump sum transfers paid to the regions by the federal government.

In this case, removing these interregional transfers results in large interregional welfare effects and, as might be expected, these are larger than those which result when equalization is abolished. The negative national effects reflect the impacts on interregional labour mobility. This is because the lower consumer prices for energy products under the NEP alter the interregional allocation of labour. More individuals remain in

Ontario, and out-migration to Alberta is discouraged. The effect of removing the transfer component of the NEP in the price controls is that significant numbers of people leave Ontario and migrate to Alberta. These results suggest that the NEP therefore has an impact on labour mobility much like that suggested by the Boadway-Flatters conception of an “ideal” equalization program — direct transfer of rents from resource-rich to resource-poor regions. In the case of the NEP, this is accomplished through a regional sharing of rents through energy price controls. In terms of labour mobility effects, the major effect occurs between central Canada and Alberta, rather than between Atlantic and central Canada as is true under equalization.

Table 5-18 thus suggests that the energy price control policies used since 1973 may have been a more important influence on interregional labour mobility than equalization. Their impact on the interregional allocation of labour appears positive, while those of the equalization program may have been negative. This point has been little noted in recent literature on fiscally-induced migration.

## **Regional Impacts of Interregional Barriers**

In evaluating the effects of removing interregional barriers to the free flow of goods and factors, partial equilibrium methods have been heavily relied on, with only simplified calculations made using the general equilibrium model. As the partial equilibrium diagrams used to represent the effects of interprovincial barriers in Chapter 2 make clear, the interregional effects of these barriers are complex and it is a gross simplification to represent them as ad-valorem-equivalent tariffs as is done in the general equilibrium model.

## ***Procurement Policies***

There are a variety of methods by which provincial governments give preferential treatment to within-province suppliers. The most visible forms of barriers to free interprovincial goods flow are preferential pricing and provincial content preferences. However, due to limited data, it is difficult to determine if provincial content preferences which limit government purchases to within-province sources are binding or non-binding. For these reasons, our partial equilibrium analysis of the effects of removing preferential practices by provincial governments is limited to the regional impacts of removing in-province pricing preferences, under the assumption that government purchases are from local production. Since these preferences are only a few of the ways in which preferential practices by the provinces create barriers to interregional trade, these estimates in all probability only provide lower-bound estimates of the interregional effects of these practices.

**TABLE 5-19 Partial Equilibrium Estimates of the Effects  
of Eliminating Provincial Procurement Policies**

	Regional Gain or Loss (\$ millions 1981)
Atlantic Canada	9
Quebec	31
Ontario	28
Manitoba/Saskatchewan	8
Alberta	11
British Columbia	10
Total	97

*Note:* Numbers may not add due to rounding.

Trade data on goods and services are from the 1981 microconsistent data set and, as before, are adjusted to be consistent with our assumption of homogeneous products. The data imply that Canada is an international net exporter of the goods and services involved.

Data on gross government expenditures by region on goods and services are from Statistics Canada data for 1981,<sup>9</sup> and data on value added in government service provision are from the 1981 microconsistent data set in Chapter 4. Net government expenditures on goods and services by region, used in analyzing the interregional effects of removing procurement policies, are equal to the difference.

Table 5-19 reports our estimates of the interregional effects of removing these policies, under the assumption that procurement policies operate in all regions. Of all the regions affected, Quebec is shown to gain the most, with a regional gain of over \$31 million. Like the general equilibrium analysis of interprovincial barriers which follows, these results suggest that the interregional effects of these barriers are small. These results neglect the interaction of such barriers as procurement with the federal tariff and other trade policies, which, as we suggested earlier, can produce beneficial effects for regions using barriers.

## ***Marketing Boards***

### *Chicken and Turkey Boards*

Responsibility for regulating interprovincial and international trade in chickens resides with the Canadian Chicken Marketing Agency, and for trade in turkeys with the Canadian Turkey Marketing Agency. Due to limited interprovincial trade data covering these products, we assume in our partial equilibrium analysis that one national agency regulates both industries.

The interregional impacts of eliminating these boards have been estimated using data obtained from various sources. Regional estimates of per-unit quota values for chickens and turkeys taken from Brinkman

**TABLE 5-20 Partial Equilibrium Estimates of the Effects of Eliminating Regulation of Interregional Trade in Chickens and Turkeys<sup>a</sup>**

	Regional Gain or Loss (\$ millions)
Atlantic Canada	0.01
Quebec	0.06
Ontario	0.55
Manitoba/Saskatchewan	-0.23
Alberta	0.02
British Columbia	0.41
Total	0.83

a. The estimates are based on 1979 trade flow information and 1981 estimates of per-unit quota values and prices.

(1981) have been averaged to provide estimates of the per-unit quota values for poultry by region (see Chapter 4). Annual excess revenues created by the quota system are calculated by annualizing the average per-unit quota values, using an assumed real interest rate of 7 percent. These have been expressed as a proportion of the per-unit price of poultry. Prices received by producers by region, calculated from prices set by provincial marketing boards, are taken from Agriculture Canada data for 1981.<sup>10</sup> For each region, the price received by producers of chicken is assumed to be the price received per pound for chickens weighing between 5 and 6 pounds, while the price received by producers of turkeys is assumed to be the price received per pound for turkeys weighing between 12 and 20 pounds. Taking an average of the two prices provides an estimate of the price received per pound of poultry. Interregional trade estimates for poultry are taken from 1979 PIO data, adjusted, as earlier, to be consistent with our assumption of homogeneous products across regions.

Estimates of the interregional effects of eliminating these poultry regulations are given in Table 5-20. The results imply only small interregional effects of eliminating marketing board activities in the poultry sector, although the impacts within regions (not estimated here) are clearly more substantial. The major gainers from eliminating these marketing quotas are Ontario and British Columbia, while Manitoba/Saskatchewan lose. That the interregional effects of these boards are small seems to confirm the intuition that the main effects of regulation through marketing boards occur within rather than across regions.

### *Egg Boards*

The Canadian Egg Marketing Agency has the authority to regulate interprovincial marketing and movement of eggs, as well as quantities and prices of eggs produced in Canada. The agency also has the author-

**TABLE 5-21 Partial Equilibrium Estimates of the Effects of Eliminating Regulation of Interregional Trade in Eggs<sup>a</sup>**

	Regional Gain or Loss (\$ millions)
Atlantic Canada	0.00
Quebec	0.01
Ontario	0.11
Manitoba/Saskatchewan	0.00
Alberta	0.06
British Columbia	-0.08
Total	0.10

a. The estimates are based on 1979 trade flow information and 1981 estimates of per-unit quota values and prices.

ity to impose import quotas to reduce competition in Canada from international trade. Estimates of the interregional effects of eliminating these policies are given in Table 5-21.

The data used are again taken from various sources. Interprovincial trade estimates for eggs are taken from 1979 PIO data, adjusted to be consistent with our assumption of homogeneous products across provinces. Annual excess revenues created by the quota system are calculated by annualizing the regional estimates of per-unit quota values for eggs (taken from Brinkman, 1981) using the same assumed real interest rate of 7 percent. These have been expressed as a proportion of the per-unit price of large grade "A" eggs. Data on the price per dozen of large grade "A" eggs to producers by province are taken from Agriculture Canada data for 1981.<sup>11</sup>

The results in Table 5-21 show that the interregional effects of eliminating marketing quotas in the egg industry are also small. Regions which consume more eggs than they produce gain relatively more.

### *Milk Marketing Boards*

Although the production of milk and milk products in Canada is managed by two separate supply management programs, due to limited interprovincial trade estimates in this area we assume that one supply management system operating at the national and provincial levels controls the production and processing of all raw milk in Canada.

Unlike other products regulated through marketing boards, raw milk produced in a region is currently consumed there,<sup>12</sup> and there is no interregional transfer of rents from quota restrictions.

The data used in making calculations of the resulting interregional impacts are also taken from a variety of sources. Regional estimates of per-unit (lbs./year) quota values for fluid and industrial milk (taken from Brinkman) are averaged to provide regional estimates of per-unit quota

**TABLE 5-22 Partial Equilibrium Estimates of the Effects of Eliminating Regulation of Interregional Trade in Milk<sup>a</sup>**

	Regional Gain or Loss (\$ millions)
Atlantic Canada	0.02
Quebec	0.62
Ontario	0.09
Manitoba/Saskatchewan	0.02
Alberta	0.03
British Columbia	0.78
Total	1.56

a. The estimates are based on 1979 trade flow information and 1981 estimates of per-unit quota values and prices.

values for unprocessed milk. Annual excess revenues created by the quota system are calculated by annualizing the regional estimates of the per-unit quota values, with the same assumed real interest rate of 7 percent as above. These have been expressed as a proportion of the per-unit price of unprocessed milk.

Producer prices for fluid and industrial milk by region are taken from Agriculture Canada data for 1981.<sup>13</sup> Producers of industrial milk receive the target price (or target returns) for industrial milk, calculated as the sum of the producer price for industrial milk and a federal subsidy paid at a rate of \$0.0273 per pound.<sup>14</sup> Taking the average of the target price for industrial milk and the producer price for fluid milk gives an estimate of the average price per pound of whole fluid unprocessed milk received by producers. Interprovincial trade estimates for unprocessed whole fluid milk are taken from 1979 PIO data, adjusted to be consistent with our assumption of homogeneous products across regions.

Estimates of the regional effects are reported in Table 5-22. These show that all regions gain from eliminating regulation of interregional trade in milk. This is due to the fact that no interregional transfer of rents exists to offset the gains created by the removal of the quotas.

### *Tobacco Marketing Boards*

Tobacco production and marketing is currently regulated in four provinces: Quebec, Ontario, Nova Scotia and Prince Edward Island. Our analysis concentrates only on the interregional effects created by removing controls on the production and marketing of tobacco in Ontario, since over 90 percent of tobacco production in Canada is located there.

Tobacco in Ontario is controlled by two separate tobacco growers' marketing boards: the Ontario Flue-Cured Tobacco Growers' Marketing Board and the Ontario Burley Tobacco Growers' Marketing Board. Due to limited interprovincial trade data for each type of tobacco, we assume



**TABLE 5-23 Partial Equilibrium Estimates of the Effects of Eliminating Regulation of Interregional Trade in Tobacco<sup>a</sup>**

	Regional Gain or Loss (\$ millions)
Atlantic Canada	0.0
Quebec	0.0
Ontario	0.20
Manitoba/Saskatchewan	0.0
Alberta	0.0
British Columbia	0.0
Total	0.20

a. The estimates are based on 1979 trade flow information and 1981 estimates of per unit quota values and prices.

that there is only one type of tobacco, raw tobacco, and that production and marketing in Ontario is controlled by one provincial board.

The data used in analyzing the regional effects of eliminating tobacco marketing include interprovincial trade data from 1979 PIO data (adjusted as above) and data on the price of tobacco in Ontario. This is assumed to be the average price per pound to producers for all types of tobacco grown in Ontario, as in Statistics Canada data for 1981.<sup>15</sup> Annual excess revenues created by the quota system are calculated by annualizing the per-unit quota values as above. This has been expressed as a proportion of the per unit price of tobacco.

The regional effects of eliminating tobacco marketing regulations in Ontario are reported in Table 5-23. Since Canada is an international net exporter in tobacco, there are no impacts on other regions in this analysis of eliminating interprovincial restrictions in Ontario. Ontario gains from the removal of regulations, but the effect is small.

### ***Provincial Liquor Policies***

Our analysis of interregional impacts of eliminating provincial preferences for alcoholic products uses the strong simplifying assumption that provincial mark-up rates on wine apply to all alcoholic beverages. This assumption is made because there is limited interregional data separately covering production and consumption and interregional trade in each of wine, spirits, and beer. We assume that provincial mark-ups apply to the aggregated product for which data are available: alcoholic beverages.

Because of this, it is necessary to decide which provincial mark-ups apply to this aggregated product. Due to the fact that virtually all beer sold is brewed in the province of sale, provincial mark-ups on beer are excluded from our analysis of interregional effects. Rather than taking

**TABLE 5-24 Assumed Provincial Mark-ups on Alcoholic Products<sup>a</sup>**

	Within-Province Mark-Up Assumed	Out-of-Province Mark-up Assumed
	(percent)	
Atlantic Canada	97 <sup>b</sup>	124 <sup>b</sup>
Quebec	94	105
Ontario	58	105
Manitoba/Saskatchewan	80 <sup>c</sup>	87 <sup>c</sup>
Alberta	84 <sup>d</sup>	89
British Columbia	50	110

*Source:* Correspondence with the provincial ministries responsible for liquor policies.

a. See text for details.

b. Assumed to be the same as the mark-up in New Brunswick.

c. Estimated as the arithmetic average of the mark-ups in Manitoba and Saskatchewan.

d. Assumed to be the same as the mark-up in Saskatchewan.

an arithmetic average of the provincial mark-ups on wine and spirits, provincial mark-ups on wine are assumed to be applied to the aggregated product. For simplicity, it is also assumed that provincial mark-ups on interregionally imported products apply to internationally imported products as well. Based on these strong simplifying assumptions, the resulting provincial mark-ups are reported in Table 5-24. These are adjusted to ensure that the estimated values for profits of liquor commissions are the same as those reported in the 1981 Provincial Economic Accounts (Table 5).<sup>16</sup> As noted in Chapter 2, the mark-ups by region used in making calculations of the resulting interregional impacts are the difference in mark-ups on interregional (and international) imports compared to those on locally produced products.

Trade data on alcoholic beverages are taken from 1979 PIO data and, as before, are adjusted to be consistent with our assumption of homogeneous products across regions. However, Canada is a net exporter in alcoholic products, thereby potentially eliminating any interprovincial effects of provincial liquor policies. We therefore use the data under the assumption that all international trade (exports) is in spirits, while all interprovincial trade is in wine. Assuming that Canada is a taker of prices on world markets, the diagrammatics of the effects of provincial liquor policies on regions as illustrated in Chapter 2 still apply. All international trade in spirits is ignored for the purpose of this calculation.

Estimates of the regional effects of eliminating these policies are given in Table 5-25. These results suggest that the effects created by eliminating preferential liquor pricing policies are more substantial than for most other interprovincial barriers. This is perhaps not surprising, since most regions, especially British Columbia, have large preferential mark-ups. Quebec and Ontario, the two interregionally net exporting regions, are not affected by the elimination of provincial liquor policies of other

**TABLE 5-25 Partial Equilibrium Estimates of the Effects of Eliminating Provincial Liquor Policies<sup>a</sup>**

	Regional Gain or Loss (\$ millions)
Atlantic Canada	10
Quebec	0
Ontario	0
Manitoba/Saskatchewan	2
Alberta	2
British Columbia	660
Total	675

*Note:* Numbers may not add due to rounding.

a. The estimates are based on 1979 trade flow data and 1984 estimates of provincial mark-ups.

provinces. The reason is that they export interregionally, and liquor policies within the region have no protective effect. These results also reflect the assumption that regional mark-ups on out-of-province products apply to international imports as well. Any gains from increases over world prices as a result of exporting interregionally to a region which has mark-ups on international imports are completely offset by losses incurred by the exporting region as a result of the transfer of rents to the importing region. The large gainer is clearly British Columbia.

### ***Provincial Regulation of Trucking***

Due to the data difficulties in identifying the monopolistic pricing component for carriers in the for-hire trucking industry, it is difficult to calculate the interregional effects of provincial regulation using partial equilibrium methods. Also, the general equilibrium model does not contain sufficient detail to yield results on the regional effects of provincial regulation of trucking. For these reasons, no results are reported in this study.

The general equilibrium model has also been used to analyze the impacts of interregional trade barriers, even though it is not wholly appropriate for analyzing their impacts due to its ability to consider trade barriers only in ad-valorem-equivalent form. As has been emphasized previously, many of these barriers do not operate in this way, and there are also data problems with estimating aggregate ad-valorem equivalents for these barriers.

The cases analyzed are largely stylized representations of how interregional trade barriers actually operate. Table 5-26 reports results from two cases where interprovincial trade barriers of 2 percent on all products are assumed to be present in all regions in the benchmark equilibrium data set. The difference between the two cases is that in Case 1

**TABLE 5-26 General Equilibrium Analysis of Effects of Removing  
2% Interregional Trade Barriers on All Products**

	Case 1	Case 2
<b>Hicksian EV's (\$ millions 1981)</b>		
Atlantic Canada	-0.3	-9.4
Quebec	-7.7	8.9
Ontario	-16.3	-3.6
Manitoba/Saskatchewan	-0.9	1.9
Alberta	53.5	0.6
British Columbia	-9.7	0.3
Total	-17.3	-2.7
<b>Terms-of-Trade Change (% change calculated using new equilibrium quantities as weights)</b>		
Atlantic Canada	-0.08	-0.10
Quebec	-0.05	0.02
Ontario	0.01	-0.01
Manitoba/Saskatchewan	-0.06	0.01
Alberta	0.07	0.01
British Columbia	-0.06	0.00

Case 1: Removal of 2% Interregional Trade Barriers in all regions.

Case 2: Removal of 2% Interregional Trade Barriers in Ontario.

interregional trade barriers are removed in all regions, whereas in Case 2 they are only removed in Ontario.

In case 1, the impacts by region are relatively small but the largest gain occurs for Alberta. This is largely because in this simulation Alberta also faces barriers on its interregional exports of resource products and this slightly unrealistic scenario produces a net gain for the region when barriers are removed. The more important feature, however, is the relatively small size of effects, both in the interregional terms-of-trade impacts, and also the welfare effects by region.

Case 2 considers the removal of a 2 percent interregional trade barrier in Ontario. The interesting feature here is that the major gain accrues to Quebec, Ontario's largest trading partner, with a significant loss to Atlantic Canada. Atlantic Canada loses because of its large trade with Quebec, whose terms of trade have been improved by increased access to Ontario markets.

While largely illustrative because of the data and modelling problems involved, these general equilibrium results nonetheless suggest that the quantitative importance of interregional trade barriers may be relatively small in terms of the larger picture of Confederation. This analysis also includes the influence of federal trade policies on the evaluation of the regional impacts of interregional trade barriers, which does not seem to be a significant factor. Effects by region seem to be largely determined by the relative importance of trade links between the various regions.

## ***Labour Mobility Restrictions***

Interprovincial labour market restrictions occur in the trades and, most prominently, in the professions. A rough approximation of the effects of interprovincial restrictions on labour mobility is given by estimates of wage differentials across regions associated with implicit quotas on labour entering from outside. Data on total employment and average employment income of male workers by province for a limited number of occupations have been used to analyze the interregional effects of removing these restrictions, using the approach outlined in Chapter 2. These data are reported in Tables 5-27 and 5-28.

Since there are no available estimates by occupation of migration between provinces, a somewhat heroic assumption is made that 10 percent of all people employed in a province with in-migrants are from provinces other than the one where they currently reside, and 10 percent of all people initially resident in a province with out-migrants become employed in provinces other than the one where they originally resided.

To find the wage rate in any of these occupations in the absence of interregional labour restrictions, an iterative search similar to the one used in the analysis of the interregional effects of equalization is used. The initial wage rate chosen in the search procedure is the highest wage paid to individuals in the occupation in any region in Canada, in the presence of interregional labour restrictions. The rents received by individuals migrating to provinces which impose these restrictions are assumed attributed to the regions where the individuals were initially resident.

Assuming that capital is interregionally immobile, the results of the analysis of the interregional effects of removing these restrictions are reported in Table 5-29. These interregional effects show British Columbia, Alberta, Manitoba/Saskatchewan, and Quebec to be the regions which lose from these restrictions, but the effects are small. All other regions gain, with Atlantic Canada gaining the most.

## **Interregional Effects of the Federal Tax System**

Several elements of the federal tax system have interregional effects and have also been analyzed using both partial and general equilibrium techniques.

### ***Partial Equilibrium Estimates***

**Manufacturers' Sales Tax** The manufacturers' sales tax is a tax imposed on the manufacturer's selling price of domestic products and duty-paid value of imported goods. The interregional effects of removing the tax depend crucially upon the assumption of who bears the burden of

**TABLE 5-27 Total Employment<sup>a</sup> of Male Workers by Region for Selected Occupations, 1980**

Occupation <sup>b</sup>	Atlantic	Quebec	Ontario	Man./Sask.	Alberta	B.C.	Total
Architects <sup>c</sup>	492	1,935	2,345	246	805	1,135	6,960
Lawyers and Notaries	1,775	7,125	11,670	1,875	2,835	3,710	28,990
Mechanical Engineers	755	3,135	10,140	830	1,950	1,845	18,675
Pharmacists	645	2,215	2,940	760	600	975	8,135
Physicians and Surgeons	2,690	9,650	11,925	2,410	2,740	4,455	33,870
Welders	6,860	22,170	35,990	6,685	12,235	9,830	93,770

Source: Statistics Canada, *Worked in 1980 — Employment Income by Occupation*, Cat. No. 92-930, (Ottawa: Minister of Supply and Services Canada, 1984).

a. For persons with employment income.

b. Occupations with less than 250 males are not separately shown by region, but the data are included in the relevant totals. For purpose of analysis, the suppressed data are calculated as the difference between the relevant totals and the data available for all other regions.

c. The suppressed data are allocated equally between the provinces comprising the Atlantic region and Manitoba/Saskatchewan.

**TABLE 5-28 Average Employment Income<sup>a</sup> of Male Workers by Region for Selected Occupations, 1980**

Occupation <sup>b</sup>	Atlantic	Quebec	Ontario	Man./Sask.	Alberta	B.C.	Canada
Architects	\$ 25,917	\$ 26,331	\$ 25,998	\$ 25,917	\$ 27,293	\$ 26,681	\$ 25,917
Lawyers and Notaries	34,647	35,252	39,379	36,926	41,043	40,940	38,096
Mechanical Engineers	25,068	25,923	26,468	23,120	27,400	27,662	26,302
Pharmacists	22,329	27,228	23,315	18,357	20,547	22,146	23,506
Physicians and Surgeons	56,956	59,270	58,193	51,596	53,644	58,227	57,495
Welders	15,607	14,944	16,454	15,305	19,112	20,432	16,651

Source: Statistics Canada, *Worked in 1980 — Employment Income by Occupation*, Cat. No. 92-930 (Ottawa: Minister of Supply and Services Canada, 1984).

a. For persons with employment income.

b. Occupations with less than 250 males are not separately shown by region, but the data are included in the relevant Canadian average. For purpose of analysis, the suppressed data is assumed to be the reanalysis, the suppressed data is assumed to be the relevant Canadian average.

**TABLE 5-29 Estimated Effects of Eliminating Labour Restrictions by Region for Selected Occupations**  
 (\$ millions)<sup>a</sup>

Occupation	Atlantic	Quebec	Ontario	Man./Sask.	Alberta	B.C.
Architects	0.007	0.044	0.043	0.003	-0.102	-0.043
Lawyers and Notaries	-0.108	0.426	1.885	0.498	-1.378	-1.716
Mechanical Engineers	0.038	0.351	-0.122	-0.294	-0.278	-0.350
Pharmacists	0.180	-2.163	-0.042	-0.771	-0.023	0.257
Physicians and Surgeons	0.986	-2.225	-0.951	-0.801	0.229	-0.374
Welders	0.262	-1.825	3.479	-0.052	-7.159	-10.738
Impact by region across all the occupations listed	1.366	-5.392	0.521	-1.417	-8.713	-12.966

a. The estimates are based on employment and average employment income data for 1980.

**TABLE 5-30 Partial Equilibrium Calculations of the Effects of Removing the Manufacturers' Sales Tax<sup>a</sup>**

	Regional Gain or Loss (\$ millions)	Per Capita Effect (\$ millions)
Atlantic Canada	- 322	- 144
Quebec	51	8
Ontario	889	103
Manitoba/Saskatchewan	- 239	- 120
Alberta	- 239	- 107
British Columbia	219	80
Total	360	15

*Note:* Numbers may not add due to rounding.

a. The estimates are based on trade flow data from the 1981 microconsistent data set and 1984 estimates of the manufacturers' sales tax rate.

the tax. Although it is the producers of manufactures who pay the manufacturers' sales tax, if Canada is assumed to be a small, open, price-taking economy in manufacturing products, consumers of manufacturing products will bear the burden of the tax, including any dead-weight loss which results.

The interregional effects of removing the tax have been calculated using partial equilibrium techniques under this latter assumption. Inter-provincial trade estimates for manufacturing products are taken from the 1981 regional microconsistent equilibrium data set (see Chapter 4) and adjusted to be consistent with an assumption of homogeneous products across regions in Canada, as earlier. The manufacturers' sales tax is treated as levied at a rate of 10 percent on sales of goods manufactured in or imported into Canada, with the exception of construction materials and equipment for buildings (on which a rate of 6 percent is assumed) and alcoholic beverages and tobacco products (on which a rate of 13 percent is assumed).<sup>17</sup> Due to the commodity classification used in the analysis, a rate of 10 percent is assumed to apply to all manufactured goods.

Table 5-30 shows the interregional effects of removing the manufacturers' sales tax, under the assumption that tax revenues are initially redistributed to the regions on an equal per capita basis. Ontario, Quebec and British Columbia (the largest consumers of manufacturing products) are shown to gain, while Atlantic Canada, Manitoba/Saskatchewan and Alberta are shown to lose. In per capita terms, Ontario gains more than any of the other regions, while Atlantic Canada is the worst off. As our analysis in Chapter 2 makes clear, there should be no direct interregional effects of removing a uniform rate sales tax on all domestic products and imports. The interregional effects in the present results are attributable to the restricted base of the sales tax and the revenue redistribution scheme being on an equal per capita basis.



**TABLE 5-31 Partial Equilibrium Calculations of the Effects of Removing the Manufacturing and Processing Incentive in the Corporate Tax<sup>a</sup>**

	Regional Gain or Loss (\$ millions)	Regional Impacts Per Capita (\$ millions)
Atlantic Canada	15.74	7.05
Quebec	-2.30	-0.36
Ontario	-28.22	-3.27
Manitoba/Saskatchewan	8.75	4.39
Alberta	2.07	0.93
British Columbia	4.19	1.53
Total	0.23	0.01

*Note:* Numbers may not add due to rounding.

a. The estimates are based on trade flow data from the 1981 microconsistent data set and 1984 estimates of the manufacturing and processing incentive.

**Manufacturing and Processing Incentive** The manufacturing and processing incentive in the corporate income tax reduces the corporate tax rate by 6 percent on profits of manufacturing and processing industries. If Canada is assumed to be a small, open, price-taking economy in manufacturing products, the tax break will benefit producers of manufacturing products, assuming that the complications of foreign tax credits abroad for foreign-controlled corporations located in Canada can be ignored.

The interregional trade data used in evaluating the interregional effects of removing this incentive for manufactured goods are taken from the 1981 regional microconsistent equilibrium data set (see Chapter 4). Data on corporate income tax payable by industry and region are taken from Statistics Canada data for 1981.<sup>18</sup>

The results of the calculations are reported in Table 5-31. These estimates of regional effects suggest that if all regions are required to pay an equal per capita tax to finance the incentive, British Columbia, Ontario and Quebec (the manufacturing-producing regions) lose, while Atlantic Canada, Manitoba/Saskatchewan and Alberta gain. Effects are small, and in per capita terms, similar conclusions apply.

### *General Equilibrium Estimates*

The general equilibrium model has also been used to evaluate the interregional effects of both federal and provincial taxes. In Table 5-32, results on the manufacturers' sales tax and the manufacturing and processing incentive in the corporate tax for three cases are reported.

In these three cases, the manufacturers' sales tax and the manufacturing processing incentive in the corporate tax are changed, either singly or in combination. In Case 1 the manufacturers' sales tax and the

**TABLE 5-32 General Equilibrium Calculations of the Effects of the Manufacturers' Sales Tax (MST) and the Manufacturing and Processing Incentive (MPI) in the Corporate Tax**

	Case 1	Case 2	Case 3
<b>Hicksian EV's (\$ millions 1981)</b>			
Atlantic Canada	-113	-122	9
Quebec	75	3	69
Ontario	649	488	154
Manitoba/Saskatchewan	-166	-175	8
Alberta	-129	-191	59
British Columbia	-80	-76	-6
Total	245	-52	282
<b>Terms-of-Trade Change</b> (% change measured using new equilibrium quantities as weights)			
Atlantic Canada	-0.22	-0.24	0.02
Quebec	0.32	-0.11	0.43
Ontario	0.37	-0.09	0.46
Manitoba/Saskatchewan	-0.10	-0.17	0.08
Alberta	-0.40	-0.02	-0.39
British Columbia	0.15	-0.15	0.30

Case 1: Remove the MST and MPI; replace by yield-preserving federal sales tax.

Case 2: Remove the MST; replace by yield-preserving federal sales tax.

Case 3: Remove the MPI; replace by yield-preserving federal subsidy on all sales.

manufacturing processing incentive are both abolished. Gains accrue to both Quebec and Ontario, the manufacturing-producing regions, and are reflected in the interprovincial terms-of-trade effects.

Case 2 separately considers removal of the manufacturers' sales tax, and case 3 considers removal of the manufacturing and processing incentive in the corporate tax. The change in the manufacturers' sales tax involves a terms-of-trade deterioration for Ontario and Quebec as well as for the manufacturing-consuming regions. In this case the tax is on imports and, much as with the tariff, the model shows terms-of-trade losses for all regions in Canada by removing it. A gain results for Ontario and Quebec because of demand-side effects, since they are larger consumers of manufactured items. In case 3 the manufacturing and processing incentive is removed. Results are quantitatively small, although a terms-of-trade gain results for most regions because of the increase in origin-based taxes from the removal of the subsidy.

### Interregional Effects from Other Policies

The interregional effects of other policy elements beyond those analyzed in earlier subsections have also been evaluated using partial equilibrium techniques. One is textile and clothing quotas.

**TABLE 5-33 Partial Equilibrium Calculations of Effects of Removing the Tariff-Equivalent of Textile Quotas<sup>a</sup>**

	Regional Gain or Loss (\$ millions)
Atlantic Canada	15.8
Quebec	0.9
Ontario	182.2
Manitoba/Saskatchewan	4.1
Alberta	15.4
British Columbia	52.9
Total	271

*Note:* Numbers may not add due to rounding.

a. The estimates are based on 1979 trade flow data and 1970 estimates of tariff equivalents of voluntary export restraints.

As emphasized earlier, the textile and clothing industries in Canada are heavily concentrated in Quebec. Historically, Canadian tariffs and quotas on imports have been a key factor in helping to keep these industries financially viable. However, since GATT negotiating rounds were initiated in 1947, there has been a continuing trend of decreasing tariffs on a wide range of manufactured products, including textiles and clothing. Supplementary protection through quotas has been used to provide further protection for Canadian textile industries from imports from low-wage countries. Generally, these have developed in the direction of greater restrictiveness, reflecting a protectionist policy for these industries.

The data used in evaluating the interregional effects of removing tariff and quota protection in textiles are again taken from various sources. Interprovincial trade data for textiles and clothing are taken from 1979 PIO data, adjusted to be consistent with our assumption of homogeneous products across regions. The total protection, or the tariff-equivalent of the quota (expressed in terms of the Canadian price) is assumed to be the arithmetic average of the tariff equivalents of voluntary export restraints on manufacturers of cotton textiles, synthetic textiles, hosiery, knitted goods and clothing reported by Dauphin (1978).

Table 5-33 shows the regional effects of removing the tariff-equivalent of the quota, under the assumption that federal tariff revenues are initially allocated to the six Canadian regions on an equal per capita basis. All regions are shown to gain from the removal of protection. This is perhaps not surprising for the importing regions of Atlantic Canada, Ontario, Manitoba/Saskatchewan, Alberta and British Columbia. However, for the exporting region of Quebec, the effect of removing the protection is to induce the region to switch from interregional export trade to interregional import trade. Losses on the production side are offset by gains on the consumption side.

## Conclusions

In this chapter, estimates of the regional impacts of the various policy elements within Confederation have been reported, based on partial and general equilibrium techniques. These are perhaps a little hard to synthesize, and so their interpretation as a set of estimates is left for the next chapter. Nonetheless, some major themes are clearly revealed by these estimates. One is the dominant interregional effect of the policy treatment of resources, compared to other policy elements. This, in turn, suggests that in the late 1970s and early 1980s Confederation may have become substantially regionally unbalanced, a theme which is explored in the next chapter. Another is the complex interplay between assumptions, parameter values and results, emphasizing that a definitive treatment of regional impacts of policies under Confederation is unlikely ever to be achieved.



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## Toward a Balance Sheet of Confederation

Although the main focus of this study is the evaluation of regional impacts of key policy elements that characterize contemporary Confederation, it seems fitting in this final chapter to synthesize the results presented thus far in the context of a time-honoured tradition for Canadian scholars — namely, construction of balance sheets of Confederation. All regional balance sheets are widely agreed to be approximate and exclude many key factors, and here we do not explicitly report a single balance sheet. Instead we use the framework of the balance sheet approach as a vehicle for integrating the main themes coming out of our analyses in Chapter 5, since we feel that its potential usefulness outweighs its many unresolved problems.

### **Balance Sheets, the Surplus from Confederation, and Other Conceptual Issues**

Debates on regional impacts of the policy elements within Confederation often focus on balance sheets of Confederation. These balance sheets are largely accounting exercises examining differences in taxes collected from each region and direct federal expenditures undertaken in the same region. In these exercises, gainers and losers from various policies are identified and estimates reported as to how large the net effects are. Protagonists in policy debates centering on the various arrangements entered into by the federal government and the provinces under Confederation, whether they be individual provinces, groups of provinces, or the federal government, typically produce conflicting sets of calculations showing that particular regions gain or lose from policy elements within Confederation.

The calculations that have been made in the past have proved extremely confusing for all those involved. For instance, at the time of the debate on Quebec separation, estimates simultaneously surfaced from Ottawa, Ontario, and Quebec,<sup>1</sup> showing that Quebec was both a major beneficiary from Confederation and a major loser. The federal position paper, for instance, argued that federal expenditures made in Quebec and other financial operations of the federal government are a significant economic benefit to Quebec. Ontario produced a paper emphasizing the considerable financial gain to Quebec from the fiscal equalization program operating through the Canadian federal system. On the other hand, the Quebec paper emphasized that taxes collected in Quebec are larger than federal expenditures in the province, in part because it did not recognize some federal expenditures, such as defence, as benefiting the province.

### *Conceptual Issues with the Balance Sheet Approach*

As previous exchanges on these balance sheets have made clear, even if the federal taxes collected in various regions and the federal expenditures from which regions have benefitted (either as intergovernmental transfers or direct federal expenditures in the region) could be accurately measured and appropriately recorded, they would represent only a small part of the policy interplay within Confederation and its impact on regions. With many policies, no direct interregional flow of cash occurs between levels of government and yet significant interregional impacts result. If the federal tariff protects producers of manufactures in central Canada who sell to consumers in western Canada at gross-of-tariff prices, an implicit transfer between interregional exporters and importers occurs. Many other policies, such as energy price controls, also generate interregional effects because producers and consumers are located in different regions. Any attempt to analyze the regional impacts of Confederation has to take these and other effects into account.

This, however, is not the only difficulty with the balance sheet approach as it is usually conceived; many others arise. One of the more problematic is how to deal with interregional labour mobility. If one assumes, for instance, that all labour is perfectly mobile interregionally, it is not really possible to associate a particular group of individuals with a region. Because of particular federal or regional policies, people will have moved between regions. Thus when one talks of, say, Ontario gaining or losing from a policy element within Confederation, the question arises as to whether one means all the residents of Ontario before the policy change (including outward migrants), only the people remaining in Ontario, or all those in Ontario after the change (including inward migrants). However, an assumption of perfect labour mobility across regions is extreme since it neglects relocation costs and individual preferences for particular locations.

Another problem is interregional asset ownership. Even if one argues that interregional impacts of policies affect only interregionally immobile factors of production, cross-province ownership of assets further clouds any assessment of interregional impact. For instance, while energy price controls may well be borne by owners of resources, it does not follow that just because resources are located in western Canada the resource owners are also located there. Through financial intermediation, residents of central Canada can be affected by changes in energy policies in their role as resource owners as well as resource customers. No data exist on interregional asset ownership patterns, further clouding any balance sheet type of assessment of interregional policy impacts.

A further difficulty is the implicit assumption in balance sheet exercises that what one region gains from any policy element some other region loses. Assuming that Confederation is a zero sum game, with the gains and losses by region balancing out to zero, is not appropriate. If a surplus results from Confederation, a positive rather than a zero sum game is involved. If the surplus is dissipated, or if Confederation involves national costs through trade distorting nation-building policies, it may be more appropriate to treat Confederation as a negative sum game. Confederation may also result in a larger combined public sector than would be true under an alternative set of arrangements (such as a unitary state). The additional deadweight losses associated with the extra tax revenues raised may also need to be factored into any balance sheet exercise.

Finally, balance sheet exercises do not spell out the alternatives which are being considered to the current arrangements. Unitary states have regional policies in much the same way that federal states do, and to say that one region gains or loses from a particular policy element within Confederation does not necessarily imply that the alternative is to have no such policies. The alternative against which current policies are to be evaluated needs to be carefully specified.

### *The Surplus from Confederation*

Also integral to any overall assessment of regional impacts within Confederation is the issue of whether the free flow of goods and factors between regions yields a national surplus which provides a joint gain to all. For example, the federal government document on the economic union prepared at the time of the Constitutional debate<sup>2</sup> talked in terms of the potential surplus from Confederation being dissipated by regions competing against one another through retaliatory trade and factor-flow restricting policies. The implication drawn was that an economic charter of rights is needed to protect consumers from regions pursuing retaliatory beggar-my-neighbour policies.

Questions of both the sign and size of any surplus from Confederation have received little attention in the literature but are central to any

evaluation of gainers and losers from Confederation in a balance sheet exercise. The most recent discussion of how a surplus can arise from Confederation is that by Maxwell and Pestieau (1980), who identify four different elements which both make up the surplus from Confederation and provide a rationale for our current federal-provincial arrangements.

The first they see as traditional gains from trade arising from free trade between regions. Under this view, Confederation is treated as a customs union in which participating regions agree to eliminate their trade barriers one against another and erect a common protective barrier against other nation states outside Confederation. The gains from trade arise from the increased specialization by regions which the lowering of interregional trade barriers produces.

However, this issue is not as straightforward as it might appear at first sight, because such an economic union has both trade-creating and trade-diverting effects. Trade is created between regions, but may also be diverted from cheaper sources of supply abroad. If trade-diverting losses outweigh the trade-creating gains, this element of the surplus from Confederation can be negative (i.e., the source of a deficit rather than a surplus).

A second element in any surplus, as identified by Maxwell and Pestieau, is the pooling of risk due to differing degrees of variability in economic activity across regions. For example, a depression in the auto industry adversely affects Ontario, but other regions may be affected less; a slump in lumber affects British Columbia, but Ontario may hardly be affected. This component of the surplus arises from the counter-cyclical contribution to economic activity in each region, operating through the budget of the federal government. Federal programs, such as unemployment insurance and equalization, are funded from federal rather than regional sources, and in this way risks are pooled by regions. Similar effects occur through the federal tax system. A boom in one region generates higher personal and corporate tax revenues, which are shared with other regions both through federal transfers and expenditures on goods and services. However, the size of any gain from risk-pooling depends on the degree to which the risks faced by the regional economies are uncorrelated. If all regions experience depressions of equal severity at the same time, risk-pooling does not help since all regional economies are equally affected (i.e., federal revenues and expenditures would be affected in the same way across all regions).

A third element listed by Maxwell and Pestieau is the sharing of overheads — the joint regional benefits from federally provided public goods and services. The original characterization of pure public goods due to Samuelson (1954), Lindahl (1958), and others involved two features: jointness of consumption and an inability to appropriate sufficient revenues as user fees to cover production costs. These features imply that these goods must be provided by the public sector if they are to be



provided at all. Public goods such as national defence and transportation infrastructure are thus more efficiently provided by a single federal government than separately by each regional government.

A fourth element Maxwell and Pestieau identify is increased international bargaining power. The argument is that a larger nation state is able to exercise more influence at the international bargaining table relative to that which each of a number of smaller states can exercise. Confederation can therefore be justified as providing increased leverage in international negotiations, such as those under the GATT.

Despite the elements they list as entering the potential surplus from Confederation, Maxwell and Pestieau are pessimistic about the extent to which a surplus from Confederation has actually been realized. They point out that in spite of potential gains from trade, regional governments are now using regional trade barriers to insulate their economies, producing less regional specialization and foregoing potential gains from trade.

As regards the risk-pooling argument, it seems that interregional transfers, such as equalization, dominate any risk-pooling elements. "Have" provinces, such as Ontario, Alberta and British Columbia, may pay into the federal system for a long time before receiving net benefits when their economies are depressed. In addition, risk-pooling schemes have disincentive effects on regions. UI benefits weaken the market pressures which may help to reduce unemployment; job creation expenditures may oversubsidize employment. Also the poorer regions, particularly Quebec, have criticized federal stabilization policies for not taking into account the variability in business cycles between poorer and wealthier regions, claiming that they are the first to suffer when Ottawa applies restrictive national fiscal policies. These considerations also raise questions about whether or not national benefits should be sacrificed for regional gains from reduced variance in regional incomes.

On the sharing of overheads, it seems clear that any reduction in duplication of supply in public services jointly consumed by all Canadian residents should provide a significant surplus from Confederation. For instance, it would clearly be inefficient for national defence to be provided separately by all provinces. As regards increased international bargaining power, there seem to be grounds for arguing that any contribution to the surplus is small, since most of the important international negotiations are not those in which Canada has had a significant voice in the past, such as trade negotiations under the GATT.

Even though the literature on the surplus from Confederation is quite limited, most of it has assumed that there is a surplus achievable from Confederation, particularly through the gains from trade in an internally undistorted economic union. The debate subsequently focusses on whether the surplus is being dissipated by provinces competing with one another. To the extent that Confederation involves foregoing gains from

trade with other countries (such as the United States) and is accompanied by provinces pursuing beggar-my-neighbour policies, the surplus can be negative. Also, as noted above, if Confederation results in larger combined federal-provincial expenditures than would occur under an alternative governmental structure, additional deadweight losses from the extra taxes may result, also causing a deficit.

The trade policy aspects of Confederation are well known but have been given added prominence in recent literature. Harris (1984), for instance, estimates the gains to Canada from a multilateral free trade arrangement with our major trading partners (principally the United States) to be in the range of 8 to 10 percent of Canadian GNP. To the extent that nation-building as part of Confederation promotes protection and makes it difficult to negotiate improved access to major markets for Canadian exports (such as the United States), federalism can be tagged with a deficit rather than a surplus.

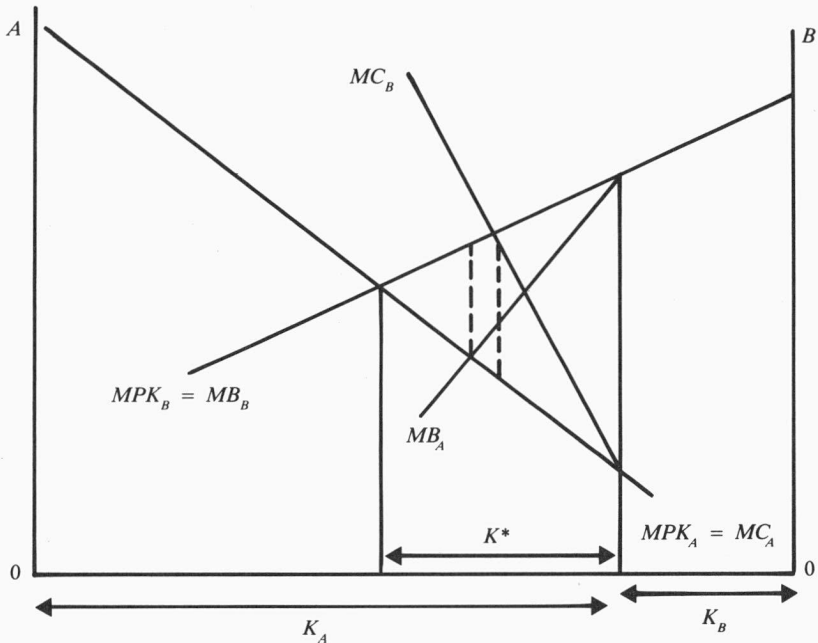
Also, by promoting interprovincial east-west trade through national trade policies at the expense of international north-south trade, Confederation can produce trade diversion effects as Canadians no longer purchase from the least-cost source of supply. These effects further increase any deficit. Melvin (1985) has argued this point by illustrating how, in addition to artificially stimulating domestic production of manufactures, Canadian protection can generate additional transportation costs associated with the trade diversion toward interprovincial trade from sources of supply abroad.

### *Provincial Versus National Interests*

Whether or not a surplus is in fact achievable under Confederation, one also has to evaluate the threat to Confederation from provinces pursuing beggar-my-neighbour policies which may be in the provincial interest but against the national interest. If such policies are pursued, the contention is that any surplus will be reduced or even dissipated and any deficit will be increased. The point is that the potential and the actual surplus or deficit under Confederation are two different things.

The mechanics of how provincial and national interests can differ have been well illustrated in theoretical work in the international trade literature on the optimal tariff. In this literature, countries engaging in international trade can improve their terms of trade through a restrictive tariff. But countries also retaliate against each other, which can leave everyone worse off. Countries facing such incentives may retaliate against one other in a retaliatory trade war, as happened internationally in the 1930s. The incentives for countries to adopt tariffs on the grounds of improving their terms of trade are more pronounced if the risk of retaliation is ignored.

**FIGURE 6-1 Provincial Interest and Policies Restricting Interprovincial Capital Flows**



A convenient way of displaying how these incentives work is to consider the case of regions using restrictive policies on interregional capital flows to raise regional incomes at the expense of the national interest. This is illustrated in Figure 6-1, based on a diagram from Hamada (1966). In this case, there is a nationally fixed amount of capital, initially owned by the two regions A and B.  $K_A$  and  $K_B$  represent the initial endowments of capital owned by the two regions. In each region there is a marginal product of capital schedule, which is downward sloping. In the absence of any restrictions on interregional capital flows, a capital flow  $K^*$  would occur between the two regions such that the marginal value product of capital would be the same in the two regions.

However, each region has an incentive to interfere with free capital flows to produce a smaller flow. From the point of view of region B (the capital-importing region), the marginal benefit from importing capital ( $MB_B$ ) is given by the marginal product of capital in that region (using the initial capital allocation as the zero coordinate). However, the marginal cost of importing additional units of capital ( $MC_B$ ) is larger than the foregone marginal product of capital in region A. This reflects the feature that as additional units of capital are transferred from region A to B, the

price of all units imported is increased. A restrictive tax policy taking part of the income return to investment in the region would produce a smaller capital flow but would give region *B* a larger gain from capital inflows than in the case where no restrictions apply.

Equally, from the point of view of region *A* (the capital-exporting region), the marginal cost of exporting capital ( $MC_A$ ) is given by the marginal product of capital foregone,  $MPK_A$ . However, the marginal benefit to region *A* ( $MB_A$ ) is lower than the marginal product of capital in region *B*. This is because each unit of capital exported will drive down the price received on all units of capital exported by the region. Thus, this region also has an incentive to interfere with free capital flows by restricting the size of the interregional capital outflow. In both cases regional and national interests diverge, and if regions discount the possibility of retaliation by other regions they have an incentive to restrict interregional capital flows through tax or other policies.

Were both regions to adopt restrictive policies simultaneously, a further round of revisions in provincially optimizing policies would take place, with retaliation back and forth between the regions that would further reduce the size of interregional capital flows. This would ultimately result in a situation (often referred to as a Nash equilibrium) in which the policies used by each region are optimal given the policies adopted by the other. In such a case, the likely outcome would be for both regions to become worse off compared to the case where no restrictions apply.

In the case displayed in Figure 6-1, both marginal product of capital schedules are linear and both regions must be worse off in a post-retaliation outcome. However, if these schedules are non-linear, then it is possible for one of the regions (but not both) to make itself better off in a post-retaliation situation compared to the no-restriction case, depending largely upon the elasticities of the schedules in the two regions. Whether this will in fact occur is discussed more fully in Johnson (1958) and Gorman (1958).

The applicability of this analysis to Confederation in Canada is that if incentives for regions to engage in restrictive policies affecting goods and factor flows are significant, then the problems represented in Figure 6-1 can easily occur. A national code of conduct or a set of rules governing interregional flows of goods and factors will protect any potential surplus if it focusses on the national welfare gain that can be achieved by limiting regional policies to avoid such an outcome.

### *Alternatives to Confederation*

A final issue with analyses of interregional impacts of policies is that they often do not fully spell out what alternatives to current arrangements are being considered. Indeed, one can argue that it does not really make

sense to discuss interregional impacts of policies unless the alternative one has in mind is clearly specified. Just as in tax incidence analysis, where public finance economists repeatedly stress how when performing differential incidence experiments (i.e., replacing one tax by another but raising the same revenue) the alternative tax chosen affects results, when analyzing regional impacts of policies within Confederation one also needs to define carefully the alternative arrangements being considered.

In the literature on Confederation, several alternatives have been suggested as a replacement for present arrangements. One is a unitary state, which would transfer the current powers of both federal and provincial governments to a single national government. Under such an arrangement, the national government would play a role comparable to that of the Westminster government in the United Kingdom. However, as Courchene (1983a) points out, unitary states often have as complex regional policies and regional incentives as occur in federal systems.

An alternative is more regional (provincial) autonomy. In the limiting case, this would produce ten separate nation states. It could well be, however, that some of the smaller provinces would not be viable as separate nation states. A number of regional groupings might therefore be formed, perhaps involving, for instance, an Atlantic region, Quebec, Ontario, Manitoba and Saskatchewan, Alberta, and British Columbia as six independent regions — the same regions identified in the general equilibrium model reported on here. On the dissolution of the federal government under such an option, such questions as apportionment of the federal debt between the regional governments would need to be settled. This alternative could well prove less efficient than present arrangements, both because of incentives for the regions to create higher regional barriers than currently exist to the free movement of goods and factors between each other, and because of foregone gains from sharing of overheads.

A third alternative would be for one or more of the existing provinces to seek an arrangement comparable to the “sovereignty-association” proposed for Quebec. Sovereignty-association would involve an autonomous region, Quebec, linked to the rest of Canada through a free trade area but not participating in the federal budgetary process (i.e., paying no federal taxes and receiving no intergovernmental transfers). Again, such questions as how the federal debt would be apportioned and other financial issues would remain to be decided.

A fourth alternative could be for Canada to integrate into a North American economic zone which, in the limit, might involve provinces becoming states within the Union south of the border. The key difference relative to the other alternatives listed above would be the integration of Canadian provinces into the federal budget process in the United States, paying federal taxes and receiving the benefits of federal expenditures. One can, however, make the argument that this does not provide an

attractive option for most provinces in Canada, since around 30 percent of federal taxes in the United States are used to finance defence expenditures and any province joining the United States would therefore, in effect, face a 7 to 8 percent defence-related tax on accession. However, Harris (1984) has argued that greater economic integration with the United States could significantly increase the real incomes of Canadians, due to improved access for Canadian exports to larger U.S. markets.

A final alternative is piecemeal change, involving changes to various portions of existing federal arrangements without fundamentally changing the powers of the levels of government. The basic institutions underlying current federal arrangements would not be fundamentally affected, but several of the elements in the current policy mix would be modified or removed. Examples would be to leave all existing federal arrangements in place but remove, say, the federal tariff; to modify the National Energy Program (NEP); to remove or change existing equalization arrangements; or to introduce a constitutional limit on the powers of provinces to use barriers in interregional trade. The interdependencies among policy elements would, of course, have to be taken into account in evaluating any proposals for piecemeal change.

This list of alternatives includes some radical alternatives to current federal arrangements. Most of the analysis in this study examines piecemeal rather than wholesale change, and moving from the analysis of piecemeal change to a balance sheet of Confederation is not easy because of all the issues raised above.

### ***Evaluating Regional Gains and Losses Relative to the Next Best Alternative***

Despite both previous literature and the form of analysis undertaken in this study, the fact remains that Confederation is a cooperative regional arrangement. What each region gains or loses under Confederation should be evaluated relative to the next best alternative for that region — typically, leaving Confederation. The federal government may redistribute any surplus from Confederation so that the strong regions help the weak to the benefit of the whole, but gains and losses by region from Confederation should not be evaluated relative to a no-policy environment, but instead relative to each region's next best alternative arrangement.

Typically, any individual region can point to specific features of present policies by which it both gains and loses from Confederation. But even if the net effect for a region is negative, it does not necessarily follow that the region would be better off outside of Confederation. A balance sheet approach to Confederation which attempts to measure gains and losses by region from individual policy elements and sums the

effects will typically not provide an appropriate benchmark for assessing how the various regions fare in Confederation unless their next best alternative is also evaluated.

For instance, if the smaller provinces in the West and Atlantic Canada find the possibility of joining the United States unattractive (perhaps for the reasons mentioned above), and if they are not wholly viable as independent nation states, the costs they would bear in leaving Confederation may be much larger than those of the larger provinces in central Canada. It is therefore possible that a province may be perceived as a loser from Confederation from a balance sheet exercise, but as a gainer when its situation is evaluated relative to not participating in Confederation. The alternative being considered is therefore crucial to an evaluation of the regional impacts of Confederation.

This game-theory view of Confederation is also crucial to an evaluation of how any surplus from Confederation is distributed between regions. The threat which any region has to leave Confederation if it finds a particular policy mix unacceptable can be countered by the power of a coalition of the other regions to exact a penalty in the form of prohibitive trade policies against the departing region. Division of any surplus thus depends on the relative strengths both of regions themselves and of the complementary coalition of other regions.

The possibilities for mutual gain relative to the next best alternative for each region define the bargaining set within Confederation. Evaluating the particular outcome obtained within this bargaining set requires analysis of the complex negotiations which characterize Confederation. Thus, if individual provinces are not viable as independent nation states due to the threat of a coalition of all other provinces using prohibitive trade policies against them, and if the option of joining the United States is unattractive because this would force the province to pay for a share of U.S. federal expenditures, this bargaining set may be quite large. Provincial bargaining and negotiating skills will be crucial to individual regions in determining their actual net gain.

## **Main Themes of Results and Their Implications for Balance Sheet Exercises**

Despite all the issues raised above, the fact remains that balance sheet exercises will still be attempted, and in the policy arena the search will continue for a bottom-line evaluation of how particular regions fare under Confederation. The interregional effects of the policy components examined in this study are clearly central to any such regional balance sheet exercise, and as part of this process, it may be helpful to synthesize the main results from Chapter 5 and assess their relevance for a wider evaluation of Confederation. These results are considered under subheadings which refer to the main policy elements evaluated earlier.

## *Tariffs and Trade Policies*

In the earlier partial equilibrium analyses of the interregional impacts of tariff policies, a number of themes emerge. One is that the interregional effects of the tariff appear to be fairly small. Another is that interregional effects appear to cut across the traditional heartland-hinterland distinction often associated with the tariff. For example, Ontario is the province most affected by the tariff on textiles because it is the major interprovincial importer of textiles from Quebec. These effects appear to be, perhaps, more prevalent than those which follow from a more traditional analysis of interregional effects of the tariff.

The general equilibrium analyses of interregional impacts incorporate international and interregional terms-of-trade effects. Because of the trade elasticities used in the model, all regions in Canada are shown as benefiting from the tariff, because of the improvement in the international terms of trade. The interregional terms-of-trade effects from the tariff occur as portrayed in traditional analysis, but are relatively weak. In addition, the uses-side effects of the tariff appear to be important in these analyses. Because Ontario is a larger international importer than the West, Ontario loses from the tariff relative to the West on the demand side. In addition, the uses-side effects of tariff revenues (the way tariff revenues are redistributed by region) are also important in determining the interregional effects of the tariff.

In summary, the results presented here seem to indicate that whatever the interregional effects of the tariff in Canada are, they are quantitatively small. This reflects the fact that there have been large reductions in tariffs in the postwar years under the GATT. Also, because of the provincial rather than regional concentration in certain protected product lines (such as textiles), the within-region effects of tariffs appear to be potentially as important as the across-region effects. This suggests that the traditional heartland-hinterland analysis, under which central Canada benefits from the tariff due to its ability to sell to hinterland provinces at gross-of-tariff prices behind a tariff wall, may be overstated. In addition, interregional and international terms-of-trade effects and effects from the revenue side compound this picture.

## *Energy and Resources*

From the results reported in this study, policies in the energy and resource area appear to have been a dominant source of interregional policy impact within Confederation in recent years. In the general equilibrium analyses, interregional effects of energy policies (primarily the price controls under the NEP) by far dominate the interregional effects produced by all other policies. The gain to Alberta from eliminating the NEP in 1981 is estimated at around 30 percent of gross provincial



product for Alberta. Equally, the losses to other regions, particularly those in central Canada, are large. As already stated, to a large extent the size of these results reflects the use of data for 1981. But even if modifications are made to approximate the situation in 1984, the effects of resource policies, while quantitatively much smaller, still dominate those of other policies.

One qualification to these results arises with both foreign and inter-regional ownership of resources, since one can argue that the major effects of the NEP are the transfers of rents to Canadian consumers from both foreign and Canadian owners of energy resources. In the past, the argument that rents are transferred from foreigners has been used by some in favour of maintenance of energy price controls, such as those under the NEP. However, results from the present study suggest that while foreign ownership of resources reduces the interregional transfer effects from energy policies, it does not remove them. Also, treating rents as being transferred from foreign resource owners to Canadian consumers through price controls is based on the assumption that foreign resource owners would receive higher incomes in their absence. The counter-argument is that these rents should be attributed to resource-producing regions, because of their increased ability to tax rents originating in their jurisdiction if such energy policies were removed.

A further result produced by the present analyses is that the effects of energy price controls on interregional labour mobility seem to be more significant than those of any of the other policy elements analyzed here for the early 1980s. Interestingly, these effects are nationally beneficial and larger by many orders of magnitude than the interregional labour mobility effects associated with equalization. Over the years, it has often been argued that an equalization program is necessary to offset incentives for fiscally induced migration associated with the ability of provincial governments to tax energy rents. The equalization scheme suggested by these considerations is some distance from the actual equalization scheme in present use. The analyses presented in this study suggest that, from an interregional labour migration point of view, a more appropriate equalization process has implicitly been underway for many years through the interregional redistribution resulting from energy price controls.

However, the bottom line from the results reported here remains that for the early 1980s the interregional effects of energy policies appear to substantially dominate the interregional impacts of other policies. In many ways the central theme revealed in all the results is the elevation of energy issues as the key issue within Confederation in the post-1973 period. The conflicts between the provinces and the federal government in the early 1980s reflect their importance to both the energy-producing and energy-consuming regions. The data and modelling evaluations all

suggest that by 1981 this had become the single most important issue in modern-day Confederation. Rather than a balanced Confederation spanning offsetting policy elements such as the tariff and transportation subsidies, as suggested by Mackintosh (1939) at the time of the Rowell-Sirois Commission, by 1981 we appeared to have unbalanced Confederation in which conflicts over energy rents had become predominant.

The importance of this issue has clearly been reduced in more recent years as we first moved closer to world oil prices and increased the share of resources to which world prices apply, and subsequently as these controls were removed with the signing of the Western Accord in 1985. One can argue that this indicates a healthy, adaptive Confederation which can accommodate to and deal with such issues, or in turn that regional conflicts inevitably come sharply into play when such matters arise and their severity jeopardizes Confederation itself.

### *Equalization and Established Programs Financing*

In the area of intergovernmental transfers, the general equilibrium results suggest that the interregional effects of equalization are larger than those of EPF. This occurs despite the fact that EPF is four times larger than equalization in budget terms. Interestingly, in results not reported in Chapter 5, the interregional effects of equalization appear smaller than those due to the wider federal tax system, particularly those resulting from the personal income tax. Although equalization is often portrayed as our major interregional redistributive program, interregional redistribution effects under other policies, especially from the interregional transfer of rents under energy policies and to a lesser extent from the personal income tax system, seem in recent years to have been larger than that due to equalization.

Both the partial and general equilibrium approaches have been used to assess the impacts of equalization on interregional labour mobility. Interestingly, the impacts of the present equalization program on interregional labour mobility are portrayed by both analyses as quite possibly perverse. This reflects the imperfections in the equalization program that we currently have in place, relative to a more desirable scheme which would offset the effects of fiscally induced migration associated with provincial taxes on resource rents. The current equalization system is not a direct transfer scheme (i.e., one which transfers money directly from resource-rich to resource-poor regions). Instead, it is a scheme financed through federal tax revenues collected from all provinces and paid to have-not provinces. The interregional labour migration incentive between Atlantic Canada and Alberta may be partially offset through such a scheme, but with no equalization paid to Ontario the migration incentive between Atlantic Canada and Ontario is worsened. In addition, the incomplete treatment given to energy resources in current

equalization arrangements through the five-province rule substantially reduces the effectiveness of equalization as an offset to interregional labour mobility. From a national efficiency point of view, results reported here suggest that Canada could well be better off without the current equalization system. The interregional redistributive impacts of the current program may, however, still justify its use.

### *Interregional Barriers*

In evaluating the impacts of interregional barriers, the present analyses emphasize the limited information available. Current catalogues of barriers are incomplete, and their interregional impacts are subtle and complex. In this study, most attention has been given to partial equilibrium evaluations of their impact rather than to results generated by the general equilibrium model. This is because of the difficulties of adequately capturing the impacts of the barriers involved. In the general equilibrium modelling the approach involves a broad sweep of the brush method, not suited to the analysis of a wide range of barriers.

Despite these limitations, in the analysis presented here the effects of interregional barriers appear in aggregate to be small and outweighed by the interregional effects of energy policies, equalization and federal taxes. In the partial equilibrium analyses, the impacts of the various barriers emerge as quite different from one another. For instance, provincial marketing boards, which use quotas against both international and interregional trade, can have the perverse effect of transferring rents to regions other than the one imposing the barrier, because the protected market created behind the interregional quota generates higher prices on interregional exports. Numerical results suggest, however, that the effects are small. The complexities of interregional barriers clearly suggest that more work needs to be done in this area, even though data problems will always remain.

A further implication emerging from the partial equilibrium analyses is that, given the federal tariff, interregional barriers may be desirable for importing regions in order to offset the interregional effects of federal policies such as tariffs. Interregional transfers associated with the federal tariff reflect the higher prices paid to producers in domestic interregional exporting regions due to the national tariff. These effects can be offset by interregional importing regions through matching interregional trade barriers. In such cases, interregional barriers are nationally welfare-improving, providing a rationale for the maintenance of these barriers. This line of argument suggests that any attempt to regulate interregional barriers through a national code of conduct may be fraught with difficulties not only from the data side, in identifying and quantifying barriers, but also conceptually, since these barriers could be both nationally and regionally desirable. This, however, is a theoretical pos-

sibility rather than a proven outcome; firmer statements await further analysis of these issues.

## **Regional Balance and Confederation**

Despite the summary of results on interregional impacts of policies given above, the deeper issue is whether or not Confederation is regionally balanced. In the 1930s, at the time of the Rowell-Sirois Commission, a major study by Mackintosh (1939) examined the regional dimensions of Confederation at the time and suggested that Confederation had evolved as a balanced arrangement. The interregional effects of the federal tariff were seen as offset by transportation subsidies under the Crow Rate and subsidies to westward settlement.

Today the situation is quite different. Tariffs have been significantly reduced, transport subsidies under the Crow Rule are relatively small, and subsidies to westward settlement are no longer an issue. Instead, the taxing powers of all levels of government have grown, intergovernmental transfers are a significant item, and interregional effects of federal regulatory activity are potentially large. The Confederation evaluated by Mackintosh is not the Confederation of today.

All the reservations stated above concerning attempts to construct balance sheets of Confederation need always to be kept in mind, but we have felt it reasonable to ask what broader perspectives on Confederation can be provided by the regional general equilibrium model compared to those given by our analyses of particular policy elements in Chapter 5. This we do through a series of further model runs involving either combinations of policy changes taken together, or analyses of scenarios involving even more major changes within Confederation.

Table 6-1 considers a case where all the existing federal programs analyzed earlier are replaced by a single-rate federal sales tax. This includes the NEP, the federal tariff, intergovernmental transfers (including equalization and EPF), transfers to persons, and federal corporate, personal, and sales taxes. In effect, the federal government is left making the same level of real expenditures on goods and services, which it finances through a single-rate national sales tax.

These results show large gains to Alberta (largely due to the removal of energy policies) and large losses to Atlantic Canada and Quebec. In this analysis, the latter two regions appear to be significant gainers from Confederation, although one has to qualify this by noting, as above, that these effects should be evaluated relative to the next best alternative for each of these regions. British Columbia and Manitoba/Saskatchewan are small gainers in the change and Ontario loses slightly. Both Ontario's loss and the national gain from the change reflect the importance of energy policies and the use of 1981 data. The national gain occurring in Table 6-1 suggests that Confederation may be the source of a deficit rather than a surplus.

**TABLE 6-1 General Equilibrium Impacts of Replacement of Major Existing Federal Programs<sup>a</sup> by a Federal Sales Tax Used to Finance Real Expenditures of the Federal Government**

<b>Hicksian EV's in \$ millions, 1981 data</b>	
Atlantic Canada	-5,316
Quebec	-6,411
Ontario	-199
Manitoba/Saskatchewan	491
Alberta	15,866
British Columbia	1,093
Total	5,710

a. This includes the National Energy Program, the federal tariff, intergovernmental transfers, transfers to persons, federal personal, corporate, and existing sales taxes.

**TABLE 6-2 General Equilibrium Impacts of Replacement of Components of Existing Federal Programs by a Yield-Preserving Sales Tax**

	<b>Replacement of Equalization and the NEP</b>	<b>Replacement of Tariffs and Equalization</b>
<b>Hicksian EV's in \$ millions, 1981 data</b>		
Atlantic Canada	-2,292	-1,419
Quebec	-3,722	-1,650
Ontario	-566	1,448
Manitoba/Saskatchewan	1,370	-369
Alberta	12,320	217
British Columbia	128	619
Total	7,253	-1,091

In Table 6-2 results are reported for cases in which pairs of policy elements are replaced in a similar way to those in Table 6-1. The two pairs for which results appear illustrate how the model can be used for combination-type policy changes. Where equalization and the NEP are jointly replaced, regional impacts are much like those in Table 6-1, reflecting the dominance of energy policy impacts in these evaluations. The gains to Alberta and losses to Atlantic Canada and Quebec are smaller, since the progressive federal income tax is not removed in this experiment. For a similar reason, losses to Ontario are larger than in Table 6-1. Results of replacing the tariff and equalization are dominated by the effects of equalization on the interregional redistribution side, but the national effect largely reflects the removal of the tariff.

In Table 6-3, we consider cases where each of the regions identified in the model in turn is considered to withdraw from Confederation. In implementing these experiments, on withdrawal federal taxes are not collected in the region, federal expenditures are not made, and intergovernmental transfers and transfers to persons are no longer made to

**TABLE 6-3 General Equilibrium Impacts of Withdrawal from Confederation<sup>a</sup>  
by Individual Regions, Using 1981 Data (Hicksian EV's in \$ millions)**

Impacts on	Withdrawal by					
	Atlantic	Quebec	Ontario	Man./Sask.	Alberta	B. C.
Atlantic Canada	-5,150	358	-512	-189	-1,417	-329
Quebec	607	-6,394	-1,937	-663	-5,674	-1,197
Ontario	792	1,801	713	-1,204	-7,901	-1,943
Manitoba/Saskatchewan	168	331	-630	1,310	-2,209	-429
Alberta	124	308	-1,154	-751	20,534	-667
British Columbia	208	419	-1,163	-385	-2,875	2,389
Total for six original regions	-3,251	-3,177	-4,683	-1,882	459	-2,176
Total for five remaining regions	1,899	3,217	-5,396	-3,192	-20,076	-4,565

a. Each of these model experiments is specified by removing intergovernmental transfers and federal transfers to persons in the region, federal taxes paid, and expenditures by the federal government on goods produced by the region. Any gain or loss to the federal government produced by the model has been reallocated to the remaining regions on a proportional basis.

Ont 129,349 (1.4%)  
Que 80,814 (8%)

the region. Labour is treated as immobile between the withdrawing region and those remaining; capital remains fully mobile. Any gain or loss to the federal government is reallocated proportionally to the five regions that remain, using population in each region as weights.

The theme emerging from these results appears to be that in 1981, at least, Confederation was not the grand compromise depicted by Mackintosh in the 1930s. The major change over this period was the growth in importance of resource rents and the interregional effects produced by federal policies toward them. Using data for 1981, these model results suggest that Ontario, British Columbia, Manitoba/Saskatchewan and Alberta would all gain by leaving Confederation. Thus, Confederation appears to be substantially unbalanced both against resource-rich and higher-income provinces. In addition, these results suggest that, if anything, rather than accounting for a surplus to be distributed between regions, Confederation seems to account for a deficit, and this seems to be due in large part to the distorting policies pursued by the federal government.

The picture portrayed by these results has, of course, changed since 1981. The severity of the regional impacts of the NEP has been reduced, first due to an increase in controlled prices in Canada to bring them closer to world prices and a relaxation in the rules as to which resources come under these price controls, and subsequently due to the Western Accord. Nonetheless, the political tensions that these policies created in the early 1980s were apparent to all, with the protracted negotiations between Ottawa and Alberta in 1981 on energy pricing and the disagreements on sharing of energy revenues, which still persist.

The dominance of resource rents in federal-provincial relations is clearly an important factor which must be kept in mind by all of those working in the years ahead on issues facing Confederation. The risk is that a long list of regional issues in debates on Confederation can mask the importance of a few major issues. Excessive concern over such matters as transportation subsidies can easily deflect discussion from the much larger regional dimensions of resource issues, even though these may generate significant political attention. The danger is that those working on balancing Confederation can become distracted by yesterday's problems rather than focussing on the problems of today.

Beyond the treatment of resource rents, the next most important issue seems to be the interregional effects of equalization. Threats to the economic union appear to be relatively unimportant in the broader sweep of things.

## **Concluding Remarks**

In this study we have tried to analyze the possible regional impacts of policies jointly pursued by federal and provincial governments under

Confederation. This effort builds on several earlier attempts to evaluate these regional impacts, and we stress the difficulties involved. The calculations we present are best guesses, provided because of the importance of the issues rather than any definitive claims to have resolved these issues.

The future of Confederation in Canada may appear for the moment to be secure. The immediate threat of Quebec separation has passed, and the conflict of the early 1980s on the resource issue seems to have subsided with both the signing of the Western Accord and the falls in world oil prices. The results of this study suggest, however, that by 1981 Confederation in Canada had become dominated by the conflict between owners and consumers of resources, and that this issue dwarfed other regional issues within Confederation, such as intergovernmental transfers and the fragmentation of the economic union through interregional barriers. These issues may surface again in the years ahead, and how they are dealt with would seem to be crucial to the future of the institutional arrangements which affect us all.



# Appendix

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## Federal-Provincial Policy Components within Confederation

In this appendix more details on the policies listed in Table 1-1 are presented. This includes both background information on the historical development of these policies and a description of their present-day characteristics. They are grouped under the same headings as Table 1-1.

### Nation-Building Policies

#### *The Federal Tariff*<sup>1</sup>

The federal tariff was the key element in Sir John A. Macdonald's National Policy, adopted in 1879. This was introduced with several objectives in mind. Among them were: to provide for growth of Canadian manufacturing; to provide revenue to finance transportation development needed to encourage western settlement; to retard emigration to the United States by maintaining higher wages in Canada; to prevent dumping of foreign goods in Canadian markets; to encourage interprovincial trade; and to provide a bargaining chip for tariff negotiations with the United States. In short, the tariff was thought by its promoters at the time to be a panacea for several ills of the day.

Since 1879, however, the federal tariff has been a source of regional tension. The tariff, designed to protect Canadian manufacturers from foreign competition, is widely seen today as benefiting mainly producers in Ontario and Quebec, since manufacturing activity is heavily concentrated in these regions. Consumers, on the other hand, pay higher prices for manufactured goods, since prices of foreign goods are raised above those that would otherwise prevail. The fundamental issue in determining the regional impacts of the federal tariff is therefore whether the net result of producer benefits and consumer costs for each region is positive or negative. Repeated attempts to modify the high protectionist policies of the National Policy have proved unsuccessful, due to political opposition in central Canada. Typically these attempts have involved some form of negotiable free trade arrangements with the United States, as proposed in 1911 and 1948.

Over time, the federal tariff has changed substantially in structure. In 1907 Canada adopted a three-tier tariff, with the highest rates applying to the United States and the lowest rates to Britain and the Commonwealth. This system of Commonwealth preferences was taken further through more widespread Commonwealth preferences agreed to in 1932. Also in the 1930s, however, modifications were made to the high tariff policy toward the United States, as a result of bilateral trade negotia-

tions aimed at ameliorating the effects of the sharp rise in protection which had occurred during the Great Depression. By 1938 Canada had agreed to extend intermediate tariff status to the United States (rates lower than the highest rate) in return for increased access to U.S. markets for Canadian manufacturing and other concessions affecting exports of primary products. Subsequently, through the series of GATT negotiating rounds initiated in 1947, the level of protection in the Canadian tariff has been further reduced, particularly in the Kennedy and Tokyo Rounds.

Currently, the Canadian tariff offers a degree of protection for manufactures, but little or no tariff protection on non-manufactured items. Average nominal tariffs on manufactured products range around 8 to 10 percent and are scheduled to decrease by approximately one-third by 1987, as the Tokyo Round tariff cuts come into effect. High tariffs remain for certain items, such as textiles, but lower tariffs prevail for others. Levels of effective protection are somewhat different, but there has been no recent study of effective protection in Canada and certainly no study as to how these have changed as a result of the Tokyo Round arrangements. Special duty-free arrangements apply for trade in motor vehicles and automotive parts with the United States under the Auto Pact (which covers around 25 percent of U.S.–Canada trade).

### *Transportation Subsidies<sup>2</sup>*

Regional transportation subsidies have their origins in an 1897 statute, the Crow's Nest Pass Act, which recognized an agreement between the federal government and the Canadian Pacific Railway to set transportation rates at half a cent per ton-mile on a number of commodities in return for a subsidy to Canadian Pacific by the federal government to help finance construction of a 300-mile line through the Crow's Nest Pass in the Rocky Mountains. Later amendments to the Railway Act have modified the initial agreement, but until the latest round of changes, the statutory rates had been unchanged in nominal terms since 1925. The evolution of the Crow Rate is documented in Table A-1.

As the table indicates, over time the coverage of the subsidy has slowly increased. The original Crow's Nest Pass Act and Agreement of 1897 provided for lower transportation rates on grain and flour moving eastward to the Lakehead, as well as on 13 westbound commodities including farm equipment and settlers' goods. In 1925, Parliament amended the Railway Act, ending the special rates for westbound settlers' effects but continuing the special rates for eastbound grain and flour on all present and future railways, and expanding the number of shipping points from which the rates apply. In 1927, the Board of Railway Commissioners made the Crow Rate applicable to grain and flour shipped to the West Coast, and in 1931 the Crow Rate was applied to grain shipped to

**TABLE A-1 A Historical Summary of Transportation Subsidies under the Crow Rate**

1897	Crow's Nest Pass Act and Agreement provides for lower rates on grain and flour moving eastward to the head of navigation (the Lakehead), as well as on 13 westbound commodities (mostly farm equipment and other settlers' goods).
1898-99	Reductions made in rates as required by the Crow Agreement.
1901	In return for financial and other assistance from the Manitoba government, the Canadian Northern Railway builds a line to Thunder Bay and reduces the grain transportation rate below the Crow Rate (15 cents per bushel) to about 10 cents per bushel.
1903	Canadian Pacific Railway lowers its rates to conform with those of the Canadian Northern. Lower rates remain in force for 15 years.
1918	Terms of the Agreement are suspended under the War Measures Act and rates are allowed to rise above the Crow level.
1922	With world grain prices falling, grain and flour rates once again come under the Crow regime. Other rates remain suspended for a further two years.
1925	Parliament amends Railway Act, ending the special rates for westbound settlers' effects but incorporating the principal elements of the Crow's Nest Pass Act, including a continuation of the special rates for eastbound grain and flour on all present and future railways (2,915 miles in 1897; 16,500 miles in 1982) and expanding the number of shipping points from which the rates apply (289 in 1897; 1,245 in 1982).
1927	Board of Railway Commissioners makes the Crow Rate applicable to grain and flour shipped to the West Coast.
1931	Crow Rate applied to grain shipped to Churchill, Manitoba.
1927-45	Various actions extend the Crow Rate to cover specified by-products of milling, distilling and brewing industries, as well as to certain feed grain products.
1949-50	Turgeon Royal Commission on Transportation tackles the issue of whether rates should remain under control of Parliament or be determined in the same manner as rates for other commodities. The conclusion of the Commission is that the rates should remain under the control of Parliament and any change should be a decision of Parliament.
1961	Crow Rate applied to rapeseed.
1961	The MacPherson Royal Commission on Transportation, which had examined the proposition that the benefits of government land and financial grants to the railways should be used to operate the railway, reported: "We find no evidence that either the donor or the receiver contemplated such action. Grants were made to get the railway built," and went on to add ". . . we do not recommend that assets and earnings of railway companies in businesses and investments other than railways be taken into account in setting freight rates."

**TABLE A-1 (cont'd)**

1967	The National Transportation Act and associated Railway Act amendments incorporate the recommendations of the MacPherson Royal Commission that branch-line abandonment be allowed and that subsidies be paid to the railways to cover losses on branch lines retained "in the public interest." The Canadian Transport Commission is provided with detailed procedures for the assessment of branch line abandonment applications and payments of subsidies (Sections 252 to 258 of the Railway Act), which from 1971-82 exceeded \$1.2 billion.
1970s	Traffic grows and the railways face capacity problems. Government of Canada begins its acquisition of 11,280 hopper cars at a total cost of \$353 million and commits \$700 million (1977-87) for the rehabilitation of Prairie branch lines.
1976	Consultant Carl Snavely heads a one-man commission to look into the cost of moving grain by rail. His report, released in 1976, shows the railways lost \$105.5 million moving grain in 1974.
1977	The Hall Commission, appointed primarily to look into the rail needs of Prairie communities, recommends that the Government of Canada should pay a grain subsidy to the railways and that the Crow Rate should remain and be extended to other agricultural commodities.
1977-79	Citing transportation difficulties, the Canadian Wheat Board announces it has had to forego or defer grain sales of approximately \$1 billion over two crop years.
1982	Update by Carl Snavely sets railway losses from moving grain in 1980 at \$244.4 million, representing an average annual increase in such losses of 15.5 percent since 1974. If the railways' net revenue shortfall from moving grain continues to grow at this rate, Snavely estimates it will exceed \$1 billion per year by 1990.
1982	On February 8, Transport Minister Jean-Luc Pepin releases a government policy statement outlining a comprehensive approach to meet western Canada's future rail needs, including a commitment of \$3.2 billion over four years for grain transportation.  Dr. Clay Gilson of the University of Manitoba is appointed to lead a consultative process among the major western agricultural organizations and the two national railways.
1982	On June 28, the Report on Western Grain Transportation prepared by Dr. Gilson is released, recommending a new framework for sharing of future grain transportation costs.
1982	On August 4, Transport Minister Jean-Luc Pepin tables a Government Policy Response to the Gilson Report, accepting the Report in principle, subject to later decisions on the financial aspects and work of the task forces on rate structure for grain, a grain transportation agency, and legislative requirements, and a working group on method of payment.

**TABLE A-1 (cont'd)**

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1982	On October 27, the Minister of Finance in an Economic Statement in the House of Commons announces “. . . an additional amount of up to \$400 million to speed up the expansion and modernization of rail capacity in the West, and to facilitate an early, fair and balanced resolution of the Crow rate issue.”
1983	The Western Grain Transportation Act replaces the Crow's Nest Pass Freight Rate with a new grain transportation regime.

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*Sources:* Information for the years 1897 to 1982 is reproduced from Canada, Department of Transport, “Western Transportation Initiative,” background notes, February 1, 1983.

Churchill, Manitoba. In the period from 1927 to 1945, the Crow Rate coverage was expanded to cover specified by-products of the milling, distilling and brewing industries, as well as certain feed grain products. In 1961, the Crow Rate was applied to rapeseed.

The fixed statutory rate served the West well for many years. However, in the early 1960s the railways were faced with net revenue shortfalls due to rising costs and largely unchanged revenues. As a result, they were unable to acquire new rail cars, branch-line networks were not maintained, and there was no incentive for railways to expand the volume of shipments. In response, the federal government provided funds in the 1970s for branch-line subsidies, hopper car acquisitions, branch-line rehabilitation, and other programs. These, however, were only short-run solutions to the basic problem that costs were outstripping revenues by ever increasing amounts. Prior to the recent changes which replace the 86-year-old Crow Rate, the cost to farmers of transporting grain had fallen to approximately 20 percent of the actual cost to railways.

Over the years, the Crow Rate arrangements have been the subject of a succession of government enquiries, first by the MacPherson Royal Commission on Transportation in 1961, and then by the Snavely Report in 1976, the Hall Commission in 1977, and the Snavely Update in 1982. The 1982 Gilson Report, the most recent of these, was perhaps the most important, leading to the 1983 Western Grain Transportation Act.

The Western Grain Transportation Act replaced the Crow's Nest Pass Freight Rate, which allowed farmers to transport grains at around one-fifth the actual cost. The new Act includes an annual payment of a “Crow benefit” of \$651.6 million, which represents the difference between the total railway cost of transporting grains and the revenue derived from the statutory rate paid by producers in the 1981/82 crop year. The Crow benefit was to be paid totally to the railways in 1982/83. For each year thereafter, an increasing proportion of that payment is to be paid to producers, either directly or by a freight credit option up to the

beginning of the 1986/87 crop year, when payments will be approximately 50 percent to producers and 50 percent to railways. Parliamentary approval will be required to continue the progression beyond this point.

The Crow benefit is supplemented by temporary agricultural adjustment payments to all grain producers (to be phased out between 1983/84 and 1985/86) to compensate for the spreading of the Crow benefit among a larger number of recipients.

The federal government paid for cost increases due to inflation and volume increases during the 1982/83 crop year. From 1983/84 to 1985/86, producers pay the first three percentage points of increased costs due to inflation. After 1985/86, producers will pay the first six percentage points of inflationary increases. For railway cost increases due to added grain volumes after 1982/83, producers pay the full cost of transporting volume increases beyond the base year (1981/82) volume of 31.1 million tonnes, but through a "blended" freight rate. This rate will be established by combining the cost of shipping the base-year volume at the low subsidized rate and the full cost of shipping any additional volumes.

Other elements of the Act include continued expenditures for hopper car purchases and branch-line rehabilitation, specific railway performance and investment guarantees, the establishment of a Grain Transportation Agency (GTA) as a central coordinating agent, and a comprehensive review of key features of the Act in 1985/86.

The Crow Rate will not be as important a policy element within Confederation in the years ahead as in previous decades, since it will be slowly phased out as inflation reduces the real value of the benefit. However, the sense of regional grievance in the West over the recent action on the Crow is real. Following its removal these feelings will no doubt remain, especially as the benefits to the West from the Crow Rate have traditionally been seen as a counterweight to benefits accruing to central Canada from the tariff.

### *Energy Policies<sup>3</sup>*

Energy policies are a more recent addition to the set of nation-building policies, having their origins largely in the oil price increases of 1973 by the Organization of Petroleum Exporting Countries (OPEC). For the purpose of insulating Canada from the full impact of oil price increases, the federal government, during the winter of 1973/74, froze the Canadian oil price substantially below the world price. The difference between the two prices was maintained by an Oil Import Compensation Program (OICP) and an oil export charge. Refiners processing imported oil were paid federal subsidies, financed by the oil export tax, to reduce their costs to the same level as refiners using Canadian oil. During the rest of

the 1970s, the federal government gradually allowed increases in the domestic price in line with international price increases.

Originally, the revenues received from the export tax exceeded the costs of the import subsidy. In 1976, however, costs exceeded revenues and the federal government was forced to finance the remainder of the subsidy out of its general revenues. This situation worsened to the extent that in 1980 the annual import subsidy was approximately 53 percent of the cost of imported oil, against which only a portion was covered by export tax revenues.

Also in 1973, the National Energy Board (NEB)<sup>4</sup> issued licences for all oil exports, imposing volume and price restrictions on the terms of negotiated export contracts. These restrictions reflected the requirements of the controlled pricing regime.

Administered natural gas prices had their origins in a 1975 agreement between the federal government and the government of Alberta, which set a reference price for natural gas at approximately 85 percent of the price of crude oil. Two new institutions, the Alberta Petroleum Marketing Commission and the British Columbia Petroleum Corporation, were set up for the purpose of allocating the higher receipts from export sales to gas producers in Alberta and British Columbia. Export controls on natural gas imposed by the NEB were aimed at ensuring that no gas would be exported if it was needed in Canada.

Under Alberta regulations, a distinction is made between old and new gas for royalty calculation purposes. Old gas is from pools which began production prior to January 2, 1974, and new gas is from pools which began production after January 1, 1974. Similar regulations exist in British Columbia under which old gas is from pools which began production prior to November 15, 1973 and new gas is from pools which began production after November 14, 1974.

Incentives to invest in oil and gas exploration and development activities came in the form of a depletion allowance provision in the income tax (effective May 6, 1974). This provision allowed taxpayers to claim a deduction, called the depletion allowance, generally equal to one-third of oil and gas exploration and development expenditures. A super-depletion allowance for frontier exploration was introduced, at an additional two-thirds rate, for the period April 1, 1977 to March 31, 1980. A supplementary depletion allowance on eligible expenditures on oil sands assets and assets used in enhanced oil recovery projects was introduced at the rate of one-third and one-half, respectively, on April 10, 1978.

The National Energy Program (NEP) followed in October of 1980. Through a system of pricing, taxation and incentives, the goals of energy security, opportunity and fairness were to be achieved. Specifically, these goals were to achieve a zero oil supply-demand balance by 1990; establish a system of equitable sharing of energy benefits and burdens

among Canadians; obtain a larger Canadian presence in the energy sector through increased ownership and control; increase government ownership of the oil and gas sector; and ensure greater economic and industrial benefits from energy development for Canadians.

Under the NEP, the federal government established new pricing schedules for domestic oil production. The wellhead price per barrel of conventional oil was scheduled to increase gradually toward the international price until it reached its appropriate quality-determined level relative to the oil sands "reference price" (discussed below).

Production of oil from high-cost new sources of supply — oil sands, enhanced oil recovery and frontier oil — was not economically feasible at conventional oil prices at this time. For this reason the NEP provided a "reference price" for synthetic oil from oil sands and a "tertiary supplement" for oil produced using approved enhanced recovery methods, both of which allowed prices for these specific sources of oil supply to be greater than conventional oil prices but less than international prices. No reference price for specified frontier oil was established, since not enough was known about its cost conditions.

The federal government also subsidized refiners purchasing synthetic oil, to reduce their costs to the same level paid by refiners purchasing conventional oil. The subsidy was financed by the "Syncrude Levy" imposed on all oil refined in Canada. Consumers bore the burden of the levy costs in the form of higher prices for petroleum products. The tertiary supplement to qualifying producers was paid for by the government out of its general revenues.

Another feature of the NEP was the attempt to blend the costs of imported oil and various streams of domestic oil into one weighted-average price to consumers — the blended price. This was to be accomplished through the Petroleum Compensation Charge (PCC), which also incorporated the Syncrude Levy, paid by all domestic refineries, to cover the costs of compensating refiners using imported oil and high-cost synthetic oil. In the process, the burden of imported oil prices and higher prices on synthetic oil was passed on to consumers.

The shift to the blended pricing system was to occur gradually, and until it was in full operation the federal government was to continue to provide funds out of its general revenues to help finance the system. The blended price was to be the lesser of 85 percent of the international price and the average price of oil in the United States.

All oil exports continued to be subject to licence under the NEP. The federal government also maintained its oil export charge, but unlike the previous arrangements, the revenues were to be shared equally between the federal government and the Alberta and Saskatchewan governments.

The natural gas pricing policy of the NEP was designed to provide incentives for new gas production and encourage consumers to shift



away from oil to natural gas. There was already ample price incentive to production, as returns enjoyed by gas producers rose almost three-fold over the five years preceding the program. To encourage consumers to switch their energy consumption from oil to natural gas, natural gas prices to consumers were scheduled to rise less quickly than oil prices.

In lieu of a gas export tax, a natural gas and gas liquids tax (NGGLT) was also to be imposed on all gas produced in Canada.<sup>5</sup> This tax was to be used to generate additional revenue needed by the federal government. As in the case of oil, the burden of the tax was shifted from the taxpayer to the gas consumer.

Under the NEP, higher prices for natural gas were earned on foreign sales as opposed to domestic markets. To ensure that no bias existed in favour of the export market, a system of revenue "flowback" resulting from the sales of natural gas in the United States was introduced. Under this system, revenues from the sale of natural gas in the United States were pooled with the revenues received in the domestic market and an average price determined. The revenues were then split among producers according to the quantity sold at the average price.

Under the NEP, natural gas exports continued to receive approval of the National Energy Board. Exports were allowed only to the extent that they were surplus to foreseeable Canadian requirements, and then only if full and fair returns were received from this energy source. In effect, the export restrictions acted as a lump sum tax on the industry, requiring it to carry large inventories in order to export.

To increase the federal government's revenues from oil and gas, a petroleum and gas revenue tax (PGRT) was imposed on net oil and gas production revenues, including revenues from oil and gas royalty interests. The tax was initially set at 8 percent.

The Canadian Ownership Special Charge (COSC) was added to the PCC on May 1, 1981<sup>6</sup> to assist with financing the Petro-Canada takeover of Petrofina Ltd. and the marketing and refining operations of BP (Canada) Ltd. This charge was levied on all domestic crude oil entering refineries, all imported oil, all marketable gas and gas liquids at the point at which the NGGLT is levied, and all imported gas and gas liquids. In the process, the charge was passed on to consumers in the form of higher prices.

The NEP reinforced the earlier commitment to new supply development through improved oil and gas investment incentives. The supplementary depletion allowance and the depletion allowance for expenditures on conventional oil and gas development were withdrawn, effective January 1, 1982. The earned depletion allowance for domestic exploration expenditures on the provincial lands was to be phased out by 1984, commencing January 1, 1981. For integrated oil sands projects, enhanced recovery projects, and heavy crude oil upgraders, the deple-

tion allowance was earned at one-third of qualifying expenditures incurred in 1981 and thereafter was deductible up to a ceiling of 25 percent of resource income.

To compensate for the reduction in earned depletion incentives in the NEP, the federal government introduced the Petroleum Incentives Program (PIP). Under this program, direct incentives were paid in the form of PIP grants to qualifying enterprises carrying out specified oil and gas exploration and development activities in Canada. The level of these incentives varied according to the area in which exploration and development occurred and were higher for those enterprises which were Canadian-controlled and had specified levels of Canadian ownership.

A Natural Gas Bank was to be established to provide firms with a source of cash flow to finance exploration in Canada in periods when markets are not readily assessable. The Gas Bank would purchase gas which could not find markets from Canadian-owned and -controlled firms, enter into joint venture operations, and provide production loans.

The NEP included new Canada Lands legislation to regulate further the use of these lands. The new regime included stiffer work requirements to ensure active development of oil and gas rights; a requirement of at least 50 percent Canadian participation; strict requirements for the use of Canadian goods and services in exploration, development and production programs; and reservation to the Crown of a 25 percent interest in every right on the lands. In addition to the basic royalty, a progressive incremental royalty was established.

A federal government acquisition program was also included, designed to increase Canadian participation in the oil and gas sector. The objective of the program was to have the federal government acquire several large foreign-owned oil and gas firms, financing the acquisitions by special charges on all oil and gas consumption in Canada (see the discussion on the COSC).

Finally, direct action programs were to be targetted to further reduce oil imports. This was to be achieved through exploration, development and production of domestic oil supplies; reduced oil consumption; and substitution from oil to more plentiful Canadian sources of energy supply.

After the introduction of the NEP, the next developments occurred in the second half of 1981, when the federal government signed five-year energy pricing and taxation agreements with the three major producing provinces — Alberta, British Columbia, and Saskatchewan. While the new agreements modified some of the provisions of the NEP, especially with respect to increases in the schedule of prices for oil and gas, the basic features of the original program remained unaltered.

The Canada-Alberta Energy Pricing and Taxation Agreement (OAPTA) began September 1, 1981. The agreement made a distinction between conventional old oil and conventional new oil, and established new

pricing schedules for each, effective October 1, 1981. Conventional old oil in Alberta was defined as oil recovered from a pool initially discovered prior to January 1, 1981, but excluded incremental oil recovered from pools or portions of pools subject to enhanced recovery schemes (other than waterflood schemes) commencing operation after December 31, 1980. Conventional new oil in Alberta was defined as oil from pools initially discovered after December 31, 1980, incremental oil, and crude bitumen obtained from experimental and non-integrated oil sands projects commencing operation after December 31, 1980.

Under the agreement, the price of conventional old oil was not to exceed 75 percent of the international price of oil. Effective January 1, 1982, a New Oil Reference Price (NORP) was to apply to new oil — conventional new oil in Alberta, synthetic oil, and oil from Canada Lands. The NORP was not to exceed 100 percent of the price of imported oil. It was also the stated intention of the federal government to set the level of the PCC so as to leave no revenue in excess of the amount required to finance oil import compensation and the NORP subsidy.

Furthermore, natural gas prices were favourably priced in relation to oil, set to rise steadily, with Alberta discounting new sales by 30 percent to fund a new federal program to facilitate the expansion of gas markets.

The federal government also agreed to set the level of the NGGLT on domestic sales to maintain the price of natural gas at 65 percent of the price of crude oil. The government also agreed to a zero-rated NGGLT on exports in agreeing provinces; the Alberta government was the first to enter into such an agreement.

The PGRT was raised to 16 percent, effective January 1, 1981, but with a 25 percent resource allowance the effective rate was 12 percent. The earned depletion on Canada Lands was to be phased out but the benefit was to be retained for synthetics projects and for enhanced recovery projects in exceptional circumstances.

The PIP was modified to permit agreements under which a province could undertake to administer and pay the portion of the program that related to activities occurring within its borders; Alberta was the only province that entered into such an agreement.

The OAPTA was followed, on September 24, 1981, by the Canada-British Columbia Agreement. In this agreement the federal government agreed to pay for and administer the PIP in British Columbia and provide the NORP for new conventional oil produced in British Columbia. The federal government also agreed to a zero-rated NGGLT on exports of natural gas originating in British Columbia. The B.C. government agreed to pay certain taxes or equivalent revenues owing to the federal government.

On October 26, 1981, the federal government and the government of Saskatchewan also entered into an agreement similar to the Canada-British Columbia Agreement. The federal government agreed to pay and

administer the PIP in Saskatchewan and to provide the NORP for new conventional oil produced in the province. The Saskatchewan government undertook to pay grants to the federal government in lieu of the NGGLT, the COSC, and the PGRT, and to reduce its royalty and tax burden on the oil industry in order to stimulate confidence and activity.

The Canada-Alberta Natural Gas Agreement of November 25, 1981 was a sub-agreement to the OAPTA. The new agreement reconfirmed the natural gas pricing schedule in the earlier agreement and set out the terms under which the government of Alberta was to make Market Development Incentive Payments (MDIP) to the federal government to fund programs aimed at developing and expanding markets for Alberta gas.

All of this was followed by the NEP Update, released on May 31, 1982, which made certain adjustments within the overall framework of the NEP. These adjustments involved measures to alleviate the problem of shut-in oil, as well as supplementary action in support of "off-oil" objectives. In addition, measures to improve industry cash flow and bolster the industry's capacity to invest in new oil and gas exploration in Canada were introduced.

The main features of the latter two measures involved a reduction to 11 percent in the basic effective rate of the PGRT, and a reduction to 8 percent in the rate on production revenue arising from synthetic oil production; an annual Small Producers' Credit of up to \$250,000 to corporations to offset their PGRT liability; a Special Old Oil Price (SOOP) of 75 percent of the world price for conventional oil discovered after 1973, which qualified for provincial royalties at new oil rates but did not receive the NORP; an extension of the NORP to certain existing tertiary recovery projects, experimental projects, and suspended oil wells; and finally, earned depletion for tertiary recovery projects.

On June 30, 1983 the federal government and Alberta agreed to amend the Memorandum of Agreement they had entered into on September 1, 1981 relating to energy pricing and taxation. The effect of the new agreement was to freeze conventional oil prices at their current levels if the world price remained stable; to ensure that natural gas prices would remain at 65 percent of the price of crude oil (at least until early in 1985) through adjustments in the price of gas at the Alberta border; and to extent the NORP for oil qualifying for the SOOP program and for in-fill drilling.

This agreement was further followed by the Canada-Saskatchewan Amending Agreement of August 23, 1983 and the Canada-British Columbia Amending Agreement of April 13, 1984, both of which allowed oil from in-fill wells and oil qualifying for the SOOP program to receive the NORP.

Price and tax changes on February 1, 1984 had reflected the commitment of the governments of Canada and Alberta to the maintenance of the price of natural gas at 65 percent of the price of crude oil. The

changes involved an adjustment in the price of gas at the Alberta border; setting of the NGGLT to zero; and a federal subsidy on transportation costs through direct payments to gas distributors under the Gas Transportation Assistance Program.

These changes were followed by an agreement between the governments of Canada and Alberta on an incentive plan — the Natural Gas Marketing Incentive Program — designed to maintain and expand sales of Canadian natural gas by providing a price discount to natural gas consumers east of Alberta.

On March 28, 1985 the federal government and the governments of British Columbia, Alberta and Saskatchewan reached an agreement — the Western Accord — to modify the existing pricing and taxation regime for oil and natural gas in order to produce jobs and economic growth. The agreement calls for complete deregulation of crude oil pricing effective June 1, 1985, and the implementation of a market-sensitive pricing system whereby the price of oil will be determined by negotiations between crude oil buyers and sellers.

With deregulation, volume and price restrictions on oil exports imposed by the NEB will no longer be required (except for export contracts exceeding one year for light crude oil and petroleum products, and two years for heavy crude oil). However, the NEB will issue non-restrictive export licences for short-term contracts to monitor these exports in order to ensure its awareness of particular problems in the free market.

The agreement also calls for the implementation of a market-responsive pricing system for natural gas on or before November 1, 1985. For the interim period, beginning April 1, 1985, the federal government and the government of Alberta have agreed to maintain the Alberta Border Price of natural gas at its current level.

Under the terms of the agreement, various programs implemented under previous agreements between the governments of Alberta and Canada will be removed. One is the Natural Gas Marketing Incentive Program, implemented early in 1984, which will terminate on April 30, 1986. Another is the subsidy under the Transportation Assistance Program, which will continue until the COSC is removed (see the discussion below). Still another is the MDIP system, which will continue to April 30, 1986 or until \$160 million has been paid to the federal government, whichever comes first.

While there are new energy pricing provisions under the Western Accord, there are also important tax measures. The federal government has agreed to eliminate a number of taxes or charges, including the NGGLT, the IORT, the COSC, crude oil export charges, and the PCC.

The PIP will terminate on March 31, 1986, except for existing exploration agreements on the Canada Lands, for which the program will be extended to no later than December 31, 1987.

The PGRT will be phased out on existing production by Janu-

ary 1, 1989, and will not apply to new energy production and projects. In addition to the existing Small Producers' Credit, which was increased to \$500,000 per year in the November 8, 1985 Economic Statement, the agreement exempts the first \$10,000 of an individual small producer's income from the tax. The agreement also allows unused write-offs on new exploration and development expenses to be used as a credit against their PGRT otherwise payable. The reduction will be calculated as 30 percent of the unused write-offs in the year.

Although there were energy price controls prior to the 1980 NEP, the policies since then and prior to the Western Accord have been the source of major debate, even though the arrangements are so complex that few people can fully understand them. The level at which price controls should be set has been a source of dispute between Ottawa and the western provinces, especially Alberta, since these price controls cause substantial transfers to take place from western Canada to oil-consuming provinces in central and Atlantic Canada. As a result, energy policies have figured prominently in recent debates on Confederation.

## **Intergovernmental Transfers**

### ***Equalization***<sup>7</sup>

The recommendations of the Rowell-Sirois Commission, appointed in 1937, indirectly led to the introduction of the equalization system in 1957. The objectives of a desirable equalization system as outlined by Rowell-Sirois were that it should allow minimum national standards for specified publicly provided goods and services to be available for all Canadians, particularly as concerns education and health care. This was to be accomplished by National Adjustment Grants paid whenever a provincial government could not offer average standards for these services without resorting to unduly high levels of taxation appreciably exceeding the national average. Equalization, therefore, was seen by Rowell-Sirois as a vehicle to achieve common minimum standards in levels of provision of public services through the equalization of tax collections. The objective was to share revenues raised through the federal tax system among provinces, through special payments to provinces with relatively small provincial tax revenues per capita.

This objective still holds true for the current equalization program, which has undergone many changes since its introduction in 1957, as indicated in Table A-2. The basis for "full equalization" is a population share formula. Under this approach, a calculation is made of the proportion of the national tax base in any province, along with the proportion of the national population. If the proportion of the population exceeds the proportion of the tax base, the province is said to have a "fiscal deficiency" or to be a "have-not" province. Conversely, if the proportion of

**TABLE A-2. Development of the Equalization Payments Program**

1937	Equalization-type payments first advocated by the Rowell-Sirois Royal Commission to assure the provision of a national minimum standard of public services in Canada.
1957	Equalization first introduced by the St. Laurent government and determined on the basis of the two provinces with the highest per capita yield for three "standard" taxes — the personal income tax, the corporate income tax, and succession duties.
1962	As a result of the Fiscal Arrangements Act, 50 percent of a three-year moving average of the per capita yield from natural resource revenues enters the formula, and standard taxes are evaluated at the national average per capita yield.
1967	Representative tax system introduced into an existing Fiscal Equalization Program with full equalization of 16 revenue categories.
1968–73	Revenue categories increased to 23.
1974	One-third energy formula introduced, resulting in the abandonment of the "full equalization" concept.
1977	As a result of the Fiscal Arrangements Act: <ul style="list-style-type: none"><li>• revenue categories are increased to 29;</li><li>• tax bases become more representative;</li><li>• one-half formula for non-renewable resources is introduced;</li><li>• equalization associated with renewable and non-renewable resources cannot exceed one-third of total equalization.</li></ul>
1981	Bill C-24 introduces the "income override" and excludes revenues from oil and gas land sales from equalization.
1982	Bill C-97, as passed April 5, amends the 1977 Fiscal Arrangements Act: <ul style="list-style-type: none"><li>• representative average standard is determined by five provinces — Ontario, Quebec, British Columbia, Saskatchewan, Manitoba;</li><li>• revenue coverage is increased to include municipal-local revenues and 100 percent of resource revenues;</li><li>• the income override is eliminated;</li><li>• a payment floor and a transitional guarantee are introduced, along with a ceiling on payments which is linked to the rate of growth of GNP;</li><li>• population adjustment recovery payments are introduced.</li></ul>
1982	The Constitution Act recognizes equalization payments as a permanent feature of Canadian federalism.

Sources: T.J. Courchene and G.H. Copplestone, "Alternative Equalization Programs: Two-Tier Systems," in *Fiscal Dimensions of Canadian Federalism*, ed. by R.M. Bird (Toronto: Canadian Tax Foundation, 1980), pp. 11–16; Canada, Department of Finance, *Fiscal Arrangements in the Eighties — Proposals of the Government of Canada* (Ottawa: The Department, 1981), pp. 11–18; D. B. Perry, "The Federal-Provincial Fiscal Arrangements for 1982-87," *Canadian Tax Journal* 31 (January-February, 1983), 30–34, 36; Canada, Office of Deputy Prime Minister and Minister of Finance, *News Release 82-33* (March 19, 1982); and Canada, Parliament, House of Commons, *Debates*, vol. 14, 1982, pp. 15677–15680.

the population is less than the proportion of the tax base, the province is said to have a “fiscal surplus” or to be a “have” province.

An alternative but equivalent way of determining “fiscal deficiency” or “fiscal surplus” is by the use of the per-capita-base formula. Under this approach, a province has a positive equalization entitlement if the “all-province” per capita base exceeds the average per capita base in that province and a negative entitlement if the opposite holds.

For each province, equalization entitlements are summed over all the revenues eligible for equalization. If the total is positive, it represents the equalization payment due to that province. If the total is negative the equalization payment is set equal to zero.

Because of a series of modifications beginning in 1974 with the abandonment of the “full equalization” concept, the population share and per-capita-base equalization formulas no longer strictly apply. Currently, the representative average standard is determined by five provinces — Ontario, Quebec, British Columbia, Saskatchewan and Manitoba.

When equalization was introduced in 1957, only three tax sources (the personal income tax, the corporate income tax, and succession duties) entered the equalization formula, with equalization determined on the basis of the two provinces with the highest per capita yield for these taxes. The 1962 Fiscal Arrangements Act modified equalization by adding to the formula 50 percent of a three-year moving average of the per capita yield from natural resource revenues and evaluating the three standard taxes at the national average per capita yield. Although this system was based upon the concept of the “representative tax” system (RTS), the true origin of the RTS lies in the 1967 arrangements, which extended equalization to 16 provincial revenue categories. The 1967–72 formula included most of the provincial revenues, and because these revenues were fully equalized the system was more representative than the previous ones. Seven additional revenue categories were added in the period up to 1973, bringing the total to 23.

However, prompted by rising energy royalties in the early 1970s and the resulting growth in equalization (since oil and gas revenues primarily accrue to western provinces), the full equalization concept was abandoned in 1974, when the amount of energy revenues entering the equalization formula was restricted to the 1973/74 revenue level plus one-third of any revenues beyond this level. Without such an adjustment, large increases in equalization to have-not provinces would have occurred and would have been financed by federal tax revenues raised from all provinces rather than directly from those provinces receiving increased oil and gas tax revenues. This problem emphasizes the inadequacies of the equalization program in not providing a mechanism for direct transfers from richer to poorer provinces, but instead using the indirect mechanism of taxes raised by the federal government.



The 1977 Fiscal Arrangements Act further modified the equalization system of earlier years in four ways. First, the number of revenue sources was increased to 29, including the division of taxes on alcoholic beverages into three categories for wine, spirits, and beer. Second, tax bases became more representative. The corporate income tax, for example, was broadened to include the profits of provincially owned profit-making enterprises. Third, one-half of all revenues from non-renewable resources became eligible for equalization, replacing the 1974 restrictions on non-renewable resource revenues. Finally, the proportion of total equalization payments arising from renewable as well as non-renewable resources was limited to one-third.

As a result of continued oil and gas revenue increases, it became obvious in late 1978 that Ontario was steadily heading toward becoming a have-not province under the equalization formula. At a time of expenditure restraint, the federal response was in the form of Bill C-26, aimed at preventing Ontario from receiving equalization payments on the argument that its personal income per capita exceeded the average of all provinces in 1979 and the preceding two years. This income-override provision was made retroactive on the grounds that Ontario had sufficient revenue sources to finance a reasonable level of public services without resorting to equalization. The bill was also directed squarely at reducing the total amount of equalization paid by Ottawa out of general revenues by the phasing out of oil and gas royalties and sales taxes from the formula. Because of the defeat of the Liberal Government in 1979, Bill C-26 did not become law. However, Bill C-24, which implemented the revisions in the equalization formula originally proposed in Bill C-26, was passed in February 1981, after the federal government announced its intention to set up a Parliamentary Task Force on Federal-Provincial Fiscal Arrangements.

This parliamentary task force made several recommendations concerning the income override and the treatment of municipal and natural resource revenues in the equalization formula. As regards the income override, the task force noted Ontario's deterioration in fiscal capacity since 1973/74 and the inequity in an equalization system which prevented Ontario from receiving equalization. The task force recommended that the income override provision be ended and that no further discriminatory provisions against individual provinces be included in the formula. In discussing municipal revenues, the task force recommended that property taxes be included in full in the equalization formula so that the system would become more "representative" as a measure of provincial fiscal capacity.

As regards natural resource revenues, the task force recommended that only that portion of resource revenues used for budgetary purposes and to finance normal provincial services be included in the formula, and that all resources should be treated in the same manner.

Following the task force recommendations, Bill C-97 was introduced to amend the Federal-Provincial Fiscal Arrangements and Established Programs Financing Act, 1977. The bill, proclaimed into law April 4, 1982, introduced a new equalization formula based on a representative average standard determined by five provinces — Ontario, Quebec, British Columbia, Saskatchewan, and Manitoba — with a much broader revenue coverage than the previous formula (for example, the revenue coverage is extended from 29 to 33 categories). In addition, the new formula contains a provision which guarantees a minimum payment floor<sup>8</sup> for a three-year period beginning in 1982/83, to protect equalization-receiving provinces from an abrupt drop in equalization payments due to the new legislation. The formula also has a provision which limits the annual growth of equalization payments to the rate of growth in the gross national product. Finally, the bill authorizes the federal government to make special payments to five provinces — Newfoundland, P.E.I., Nova Scotia, New Brunswick, and Manitoba — to offset their liabilities to the federal government for overpayments of equalization for the 1980/81 and 1981/82 fiscal years due to census over-enumeration.

The view that the federal government should provide equalization transfers to provinces with relatively low fiscal capacity is now enshrined in the Constitution Act 1982.

Two issues remain central to equalization and to any proposals for change. One is the treatment of energy revenues, since these are so important quantitatively. Debate hinges both on whether to include them and if so, how. An argument heard in the West is that these revenues should not appear in the equalization formula since they represent the use of depreciable assets rather than income from renewable resources. Since these revenues will be exhausted in time, the argument from the West is that they do not represent a permanent addition to the taxable capacity of provinces. The argument in the East, however, is that when these revenues disappear they will no longer appear in the equalization formula, and therefore their inclusion is appropriate.

The second issue in debates on equalization is that the payments to have-not provinces are financed out of general federal revenues rather than directly through transfers from have provinces. This has produced a number of anomalies. The key one is that the large increase in energy prices has resulted in increases in provincial energy royalties of which only the portion that is collected in corporate income tax and petroleum and gas revenue tax directly accrues to the federal government. Since energy royalties are geographically so concentrated they have created substantial equalization flows and as a result the federal government has had to raise additional revenues through the federal tax system. Hence the rationale for modifying the equalization program as it relates to oil and natural gas. The increase in equalization has been financed primarily

by transfers from Ontario and Quebec (through the federal tax system) to have-not provinces, rather than by a transfer from Alberta.

This interaction between energy royalties and equalization is crucial. Many authors have suggested converting the system from a gross to a net scheme. Typically, this would involve provinces with negative equalization entitlements paying into the scheme by this amount so that, on net, payments to have-not provinces would be balanced by receipts from the have provinces. Courchene (1979) and Courchene and Copplestone (1980) suggest moving partway to a net scheme by a two-tier equalization system, the first tier being a full equalization system of all non-resource revenue categories and the second tier an interprovincial revenue-sharing pool of all resource categories.

### *Established Programs Financing<sup>9</sup>*

EPF, which had been in place since 1977 and was recently renamed on a more categorical basis, was the major vehicle for federal transfers to the provinces to help finance expenditures on health insurance programs and post-secondary education. Its evolution is documented in Table A-3. This program operated as a block-funding arrangement through which entitlements were paid partly in cash and partly in the value of a tax point transfer. Terms of these arrangements were renegotiated every five years and adjusted for inflation.

The origins of this system lie in the earlier system of conditional (cost-sharing) grants made by the federal government to provincial governments, which EPF replaced. These cost-sharing arrangements were entered into by the federal and provincial governments in order to provide for the financing of certain specified services.

These, in turn, go back to conditional grants, paid by the federal government as early as 1912. These grants were typically conditional on specific provincial expenditures, were matching and frequently closed-ended. In the 1970s the federal government's concern was that cost-sharing programs with no cap on total expenditures result in an open-ended obligation for the federal government. These transfers also varied widely across provinces because of differences in tax yields and expenditures across Canada, and were cumbersome to administer. In addition, the rigidities of the cost-sharing formulas resulted in an inefficient allocation of resources, since the effect of cost-sharing arrangements was to compel provinces to implement programs they might not otherwise have introduced or might have introduced in a different form and at lower cost. EPF was introduced to remove these effects.

The system introduced in 1977 had the agreement of the provinces, since the amount they were to receive was to be no less than that which they had been receiving under the earlier conditional grant system. More recent statements by provincial governments, such as that con-

**TABLE A-3 A Summary of the Evolution of Established Programs Financing (EPF)**

1957	Hospital Insurance and Diagnostic Services Act provides open-ended and matching federal grants to ensure that all Canadians receive prepaid hospital care and diagnostic services. Each province receives 25 percent of the national average per capita cost of insured services plus 25 percent of the provinces per capita cost of insured services, multiplied by the population of the province.
1965	As a result of the Established Programs (Interim Arrangements) Act, Quebec contracts out of the hospital insurance arrangements, and in return receives an abatement of 16 personal income tax points and a cash adjustment payment.
1966	Medical Care Act extends publicly financed health care to services rendered to insured persons by practitioners. The entitlement is 50 percent of the national average per capita cost of insured services, multiplied by the population of the province. Financing is through an open-ended and matching grant.
1967	Prompted by the baby boom, post-secondary arrangements are introduced to ensure that provinces have sufficient financial resources to meet their growing requirements. The entitlement is the greater of (a) 50 percent of post-secondary education operating costs, or (b) \$15 per capita escalated annually thereafter at the rate of growth of total post-secondary operating costs in all provinces. This is to be paid partly in cash and partly in the form of a tax transfer, consisting of 4 equalized percentage points of personal income tax and 1 equalized percentage point of corporate income tax.
1972	As a result of the income tax reform, the four equalized percentage tax points provided under the post-secondary arrangements are adjusted to 4.357 points to give each province the same tax room. A revenue guarantee program is introduced to compensate all provinces for unforeseen revenue reductions resulting from this change. Also, a 15 percent ceiling is placed on the growth of total federal contributions to post-secondary education.
1975	The federal budget of June 23 serves notice of the federal intention to terminate the hospital insurance agreements and to place a ceiling on contributions to medicare to the provinces for 1976/77 and subsequent years.
1976	EPF arrangements are proposed to the provinces at the First Ministers' Conference held June 14.
1977	As a result of the Fiscal Arrangements Act, hospital insurance, medicare and post-secondary education are consolidated into one single unconditional grant known as EPF. Payments serve to fund the programs under EPF as well as compensate for the termination of the 1972 revenue guarantee, and include a cash grant and an equalized tax transfer of 13.5 personal income tax points and 1 corporate income tax point. Quebec receives a special abatement of 8.5 personal income tax points, which is subtracted from the EPF cash transfer and added to the EPF tax transfer. The 1977 Act also introduces the Extended Health Care program with payments equal to

**TABLE A-3 (cont'd)**

	\$20 per capita in 1977–78 escalated at the rate of growth of GNP per capita.
1982	Bill C-97 amends the Federal-Provincial Fiscal Arrangements and Established Programs Financing Act, 1977 in two ways: (a) federal contributions to all provinces for established programs financing are made equal per capita; and (b) compensation under the 1972 revenue guarantee program is ended.
1983	The Federal-Provincial Fiscal Arrangements and Post-Secondary and Health Contributions Act, 1977, as amended by Bill C-12, sections 1 to 8, separates the post-secondary portion of EPF from the two health components and increases the contributions to post-secondary education costs for the next two years by 6 percent and 5 percent.
1984	As a result of the Federal-Provincial Fiscal Arrangements and Federal Post-Secondary Education and Health Contributions Act, 1977, as amended by Bill C-12, sections 9-12, on the day the Canada Health Act was passed, federal contributions to the provinces for the three “established” programs are split into two payments — one for insured health services and one for post-secondary education financing. The authority for making payments under the Act in respect of insured health services is in the Canada Health Act.

*Sources:* Canada, Department of Finance, *Federal-Provincial Fiscal Arrangements in the Eighties*, Submission to the Parliamentary Task Force on the Federal-Provincial Fiscal Arrangements (Ottawa: Minister of Supply and Services Canada, 1981), Annex VI; and *Fiscal Arrangements in the 1980s — Proposals of the Government of Canada* (Ottawa: the Department, 1981), pp. 20–22, 37–39. R.W. Boadway, *Intergovernmental Transfers in Canada* (Toronto: Canadian Tax Foundation, 1980), pp. 19–27. Canada, Parliament, House of Commons, *Debates*, vol. 14, 1982, p. 15680. Canada, Secretary of State, *Support to Education by the Government of Canada* (Ottawa: Minister of Supply and Services Canada, 1983) p. 32; and correspondence with Health and Welfare Canada.

tained in a communiqué issued following the Premiers’ Conference in Victoria in August 1981, have indicated their satisfaction with the EPF arrangements, saying that “established programs financing (EPF) has been an important factor in the high standard of health care and post-secondary education enjoyed by Canadians.”

Under the 1977 EPF arrangements, federal contributions were in the form of cash payments and tax transfers. These payments served to fund the programs under EPF as well as to compensate for the termination of the 1972 tax reform revenue guarantee.<sup>10</sup>

The tax transfer under the arrangement consisted of a federal reduction of 13.5 personal income tax points (1 point of which represented one-half of the 1972 revenue guarantee) plus 1 corporate income tax point. These were equalized under the fiscal equalization program.

Cash payments consisted of a “basic cash” contribution and “transitional adjustments.” The basic cash contribution, equal to half the total, was calculated according to an agreed-upon formula which included an

amount of \$7.63 per capita representing the other half of the compensation for the 1972 revenue guarantee. The transitional adjustment was calculated as the difference between the basic cash contribution and the value of the equalized tax transfer for each province.

The program was designed to ensure that no province was made worse off as a result of accepting part of the contribution in the form of a tax transfer; this was accomplished through the transitional adjustment. In the event that the tax transfer exceeded the basic cash paid to a province, the province kept the excess.

Further elements of the 1977 arrangements included levelling adjustments, tax transfer recovery payments, and a special abatement to Quebec. Levelling adjustments were necessary to ensure a smooth transition of the per capita contributions between the old cost-sharing arrangements and EPF. Provinces below the national average were to be "levelled up" to it by the third year of the program, and those above were to be "levelled down" to the national average by the fifth year of the program.

Tax recovery payments from the provinces to the federal government operated for the first two years of the program, over which time the provinces were required to pay back the excess of tax transfers given to them as a result of the introduction of the tax transfer program three months before EPF began.

A special tax abatement of 16 personal income tax points had been given to Quebec under the previous cost-sharing arrangements for hospital insurance. Under EPF this special abatement became 8.5 personal income tax points. This value was subtracted from the EPF cash transfer and added to the EPF tax transfer in Quebec.

The Extended Health Care Program was also introduced as part of the 1977 arrangements. Certain health-related services which were being cost-shared under the Canada Assistance Plan were among the many services the program was designed to cover. Payments under the program were equal to \$20 per capita in 1977/78 and escalated thereafter by a three-year, compound moving average of gross provincial product per capita.

As with equalization, EPF arrangements were reviewed in 1981 by the Parliamentary Task Force on Federal-Provincial Fiscal Arrangements. The task force voiced its concern over the variability of federal contributions per capita by province and the allocative aspects of the revenue guarantee as it related to program financing.

In regard to the latter point, the federal government has often stated that the compensation element was never intended to be part of the long-run federal contribution to health care and post-secondary education. Hence, its removal would not result in lower levels of provision under these programs.

With regard to the former, EPF had considerably improved the vari-

ability in federal contributions per capita across the provinces, since transitional payments ensured that no province was made worse off by accepting part of the federal transfer in the form of a tax transfer. However, a small degree of variability still existed, due to the revenues some provinces were able to capture from the tax transfer.

These concerns led to Bill C-97, which included two proposals to modify EPF. The first sought to change the computation of EPF cash transfers so that the federal contribution would be an equal per capita amount for all provinces. The second sought to end that element of EPF which compensated for the termination of the 1972 revenue guarantee. Bill C-97 was passed in April 1982.

The task force also voiced concern for national standards in the area of health care and the lack of federal influence in the area of post-secondary education development. In response to their recommendations, the federal government, in its November 1982 budget, proposed that national standards for health care be clarified and mechanisms for their maintenance be developed.

Following the federal government's proposals, the Federal-Provincial Fiscal Arrangements and Federal Post-Secondary Education and Health Contributions Act, 1977, as amended by Bill C-12, sections 1 to 8, April 1, 1983, separated the post-secondary education component of EPF from the two health components, and provided for a 6 percent increase in the growth of the per capita federal contributions to post-secondary education costs for the 1983/84 fiscal year and a 5 percent increase for the 1984/85 fiscal year, in line with the government's policy to control inflation.

The amendments to the 1977 Act contained in Bill C-12, sections 9 to 12, April 1, 1984 (the day the Canada Health Act came into force) split the federal contributions to the provinces in respect of the three "established" programs into two separate payments, one for insured health services and one for post-secondary education financing. The authority for making payments under the Federal-Provincial Fiscal Arrangements and Post-Secondary Education and Health Contributions Act, 1977 in respect of insured health services is contained in the Canada Health Act. The Act establishes criteria and conditions that must be satisfied before full cash contributions may be made. Discretionary penalties are levied if these criteria and conditions are not met, and the level of discretion is linked to the gravity of the offence. Mandatory deductions are made if user fees are charged or if there is extra-billing in the province.

### *The Canada Assistance Plan<sup>11</sup>*

The CAP, introduced in 1966, consolidated various welfare and assistance plans as well as four federal-provincial cost-shared programs — old age assistance, blind persons' allowances, disabled per-

sons' allowances, and unemployment assistance — into a single comprehensive system of income maintenance. The cost-shared arrangements had been matching and open-ended, with the extent of federal government financing varying across the programs from 75 percent for blind persons' allowances to 50 percent for others.

Under the CAP, the federal government pays 50 percent of the costs of provincially delivered welfare services and social assistance to persons in need (or likely to become in need). In order for the provinces to receive CAP funds from the federal government, their own programs must satisfy a number of conditions including no residency requirements; the provision of financial and statistical information; assistance to the needy; and the establishment of appeal procedures for social assistance.

It is the application of the needs test for social assistance which has caused most problems. The needs test was designed to pay assistance to those who were not expected to find employment and would hence remain on assistance for most of their lives. Moreover, the low level of assets under the needs test was designed to preclude any employed person from receiving assistance. In the 1970s, however, it became apparent that social assistance programs discouraged recipients from leaving welfare; in response the provinces introduced work incentives for those on assistance and income supplementation programs for the working poor. The CAP Part III (Work Activity Projects) was designed to complement these financial incentives through improvements in training and employment opportunities. This portion of the CAP has, however, been underutilized.

There has also been considerable debate on whether the cost-sharing arrangements provide the most appropriate financing scheme for social services. Although cost-sharing of social services is favoured by most provincial governments and is thought to be the first-best financing scheme for maintaining standards and encouraging the necessary growth of services, the scheme has its problems. It increases disparities between provinces, since those provinces which can afford more spend more, and in return get a greater share of federal dollars. Also, rigidities in the cost-sharing formula lead to an inefficient allocation of both provincial and federal resources, since services for which funding is available are sometimes substituted for those which are more needed.

A number of alternative financing schemes have been put forward. The Social Services Act (Bill C-57, 1977) proposed to continue cost-sharing of expanded services, but the Social Services Financing Act (Bill C-55, 1978) proposed block-funding as more appropriate. Neither bill was passed. A further proposal was for social services to be provided by provincial governments through a transfer of tax points from the federal government. This proposal was also withdrawn.

A further important issue is the variance in costs of providing welfare



services and social assistance across provinces, an issue highlighted in Canada, Department of Finance (1981b).

## **Provincial Policies Which Fragment the Economic Union**

### ***Barriers and Distortions Which Affect the Free Flow of Goods***

The range of policies used by provinces which affect the free flow of goods interprovincially is summarized in Table A-4. These are complex and subtle policies, many of which are not fully understood, in part because documentation is poor and the severity of their implementation depends in part on administrative discretion.

The table begins with government procurement policies. All provincial governments have purchasing commissions, most of whom give either implicit or explicit preferences to in-province contractors, although these arrangements differ from province to province. In some cases price preferences are given to in-province contractors, while in others in-province contractors must be used where they are available. These policies have the effect of giving preferences to goods produced within a province rather than from outside, and lowering the volume of goods and services moving between provinces.

The activities of both provincial and federal marketing boards are another example of policies with similar effects. These marketing boards control and typically limit interprovincial trade in the items under their control. An example is the flow of eggs and chickens between Ontario and Quebec, which is prohibited by the federal marketing board involved, except in extreme circumstances. For a more detailed discussion of the boards, see the section below on other policies with significant regional impacts.

A further complex and difficult issue is that of standards. Provinces have regulatory powers over a number of products, and adopt their own interpretation as to appropriate standards. An example often quoted is butter, which must be wrapped in foil in Quebec but can be sold in parchment wrap in Ontario. The severity of the standards issue is difficult to document, since it is not known how many products are affected and how severe the differences in standards are.

The policies of liquor commissions also generate interprovincial trade barriers. Pricing policies adopted by liquor commissions typically favour in-province wines. Liquor commissions also typically require that beer sold by the commission be brewed within the province. They also control advertising, display, and other matters which affect the relative market positions of in-province and out-of-province suppliers. For a more detailed summary of provincial (non-pricing) preferences applying to alcoholic products, see Table A-5.

**TABLE A-4 Provincial Policies Affecting the Free Interprovincial Flow of Goods<sup>a</sup>**

**Procurement Policies<sup>b</sup>**

There are several ways in which provincial governments give preferential treatment to in-province suppliers when awarding contracts. One is to tailor performance requirements in the contract to match the capabilities of local producers. Another is the use of source lists, since out-of-province firms find it difficult to get on these lists. Still another method, and one which is the most visible form of barrier to free interprovincial goods flow, is to provide a pricing advantage to in-province bids relative to bids from outside the province. A final method is to give preferential treatment to goods having a high provincial content.

Some provinces give preferential treatment to goods having a high Canadian content, giving no explicit preference as such for in-province suppliers.

By province, provincial pricing preferences and provincial or Canadian content preferences operate as follows:

*Newfoundland:* The policy as of May 1, 1983, uses a "value added" approach to provide for maximum employment of local labour and materials. A provincial overload allowance, which measures the degree of the firms' presence in the province, can increase the provincial content of a bid by as much as 10 percent of the amount of the bid.

*New Brunswick:* Since September 1977, bids have been valued on the basis of both cost and impact on employment and the New Brunswick economy. Sourcing has been limited to New Brunswick suppliers if at least three suppliers are available.

*Nova Scotia:* The 1964 Government Purchasing Act provides for maximum employment of local labour and materials. If there are at least three Nova Scotia suppliers available, tenders are restricted to the province. A 10 percent premium can be given to Nova Scotia suppliers on an ad hoc basis.

*Prince Edward Island:* Public tenders are taken only for larger contracts. An unspecified in-province preference is given to local suppliers in all construction contracts.

*Maritime Provinces in General:* The three provinces also subscribe to the 1981 Maritime Premiers Purchasing Policy, which provides for province first, Maritimes second, and Canada third. This policy is aimed at preventing a flow of Maritime dollars to central Canada and generating increased Maritime manufacturing activity.

*Quebec:* Since 1977, government policy has been to award bids on the basis of both cost and Quebec and Canadian content. Bidding is limited to Quebec firms when sufficient competition exists among them or when it promotes industrial development objectives. All tenders must state the percentage of Quebec, Canadian and foreign content. For contracts exceeding \$50,000, a preference of up to 10 percent is applied to Quebec content.

*Ontario:* In 1977, the government initiated its 10 percent Canadian content preference policy. Preferential treatment is given to Ontario companies when their bids are competitive. An exception occurred in 1977, when a contract was awarded for streetcar construction to Hawker-Siddeley of Thunder Bay even though a Montreal firm offered a lower bid.

**TABLE A-4 (cont'd)**

Ontario also maintains an Office of Procurement Policy, designed to reduce the discriminatory treatment of suppliers from other provinces and to ensure that Canadian content is maximized in all contracts awarded.

*Manitoba:* The 1983 "buy Manitoba" policy is designed to optimize the inclusion of Manitoba content. Price preferences are not fixed, but preferences are awarded on some tender announcements. Contracts are now being split to give smaller firms an opportunity to tender.

*Saskatchewan:* Preference is given to local suppliers only when bids are approximately the same. Under the August 1983 Major Projects Procurement Policy a variety of new mechanisms were introduced to encourage increased Saskatchewan content and provide greater opportunities for Saskatchewan industry and workers to supply goods and services for major projects.

*Alberta:* Projects which require special permits must make maximum use of Alberta professional services and supplies. Preference is given to local suppliers only when the price and quality of goods are equal. However, in 1975-76, over 90 percent of all goods and services bought by the province were purchased from Alberta suppliers.

*British Columbia:* As of July 1977, a premium of up to 10 percent may be given to local suppliers, and up to 5 percent to non-B.C. Canadian suppliers. In awarding contracts, decisions are based on cost as well as regional or sectoral unemployment and the general health of an industry.

#### **Marketing Boards and Other Agricultural Policies**

Three main instruments are used by the provinces to create barriers to the free interprovincial flow of goods: agricultural marketing boards, agricultural support programs, and restrictive product standards or regulations.

*Agricultural marketing boards.* Supply management boards are the most stringent of marketing boards as regards imposing restrictions on entry into provincial markets. These boards may be provincial or national. Provincial supply management boards govern fresh fluid milk and tobacco, while national supply management boards govern chickens, eggs, turkeys and industrial milk. A more detailed discussion of these boards occurs in the appendix section below on other policies with significant regional impacts.

*Agricultural support programs.* If differences exist between provinces in expenditures on various agricultural programs, distortions will be created in the interprovincial flow of agricultural goods, provided the traded products are in competition with each other. The two main forms of support programs are: (a) direct aid, i.e. cash subsidies, stabilization schemes, and assistance programs, and (b) promotional support.

*Product standards.* Non-uniformity in product standards may discriminate against out-of-province producers, reducing the size of interprovincial trade. These standards usually apply on either packaging or grading. For example, Quebec requires that butter be foil wrapped, whereas Ontario permits butter to be wrapped in transparent parchment. Also, Quebec's language law, Bill 101, requires French to be as prominently displayed on labels as English.

The Canadian grading system is used in the potato industry in Quebec and the Maritimes, while Ontario implements its own grading system. The result is that

**TABLE A-4 (cont'd)**

Ontario No. 1 potatoes are smaller and less expensive, and consumers usually purchase the less expensive product.

Enforcement practices can also impede the free flow of trade even where standards are the same. This might involve rigorous border inspections, reducing the amount of competition from outside the province.

**Provincial Liquor Policies**

Provinces typically discriminate against out-of-province producers by:

- giving favourable support to products produced locally through preferential advertising, shelf-space, listing, and pricing policies;
- limiting private purchases of out-of-province products, either by imposing quotas or by levying taxes on such purchases; and
- having unique packaging requirements.

More details on non-pricing preferences applying to alcoholic products are given in Table A-5.

**Transportation Regulations**

Transportation regulation by the provinces has been in operation since 1954. Six separate features of regulation create barriers to free trucking movement between provinces: regulation of rates and entry; registration requirements; weights and dimensions regulations; safety restrictions; enforcement practices; and fuel taxes.

*Regulation of Rates and Entry.*<sup>c</sup> This involves entry control and rate approval and filing, which is different for each province. Some provinces regulate intra-provincial trucking differently than extraprovincial trucking. Also licence terms are not uniform across provinces. Tariff bureaus have been established in all the provinces to assist carriers in rate-filing and to provide consolidated rate information to carriers and shippers. In conjunction with entry restrictions, such bureaus have facilitated a potentially cartelized role structure. More details on these regulations are given in Table A-6.

*Registration requirements.* Trucks moving across provincial boundaries are required to pay registration fees and obtain licence plates from all provinces. However, the Canadian Agreement on Vehicle Registration (CAVR) (a reciprocity agreement between all provinces except Quebec, Nova Scotia, and Prince Edward Island) allows registration fees to be paid only to the home province of the carrier. These are redistributed to the other provinces according to miles travelled within the provinces.

*Weight and dimension regulations.* Due to lower road quality, Prairie provinces have lower weight restrictions than Ontario and Quebec. The Prairies allow longer vehicle lengths than central Canada. This non-uniformity in regulation creates problems for truckers as they try to meet the requirements of all the provinces they pass through.

*Safety restrictions.* These vary between provinces. A province can restrict entry of out-of-province trucks by adopting safety requirements that are costly for out-of-province carriers to meet.

*Enforcement.* It is often alleged that regulations are more strictly enforced on out-of-province than in-province truckers.

*Fuel and sales taxes.* Most provinces assess fuel taxes on the basis of fuel actually used within the province. Any excess is either refunded or given as a credit. In Quebec, the credit must be used up within 12 months, creating an

**TABLE A-4 (cont'd)**

incentive to travel more to Quebec. However, a reciprocity agreement exists in the Maritime provinces whereby truckers can purchase fuel anywhere within the region, and the taxes are later allocated among them based on mileage travelled in each province.

In addition, each province assesses a sales tax on every truck that enters the province. This has been the subject of the Interprovincial Sales Tax Agreement (ISTA). A trucker now only pays a sales tax in his home jurisdiction and the amount is then distributed to other provinces according to the mileage travelled in each province. However, carriers who travel to the United States are in breach of the ISTA, and hence are forced to pay the full sales tax in all provinces they travel through. This produces an incentive to truckers to specialize in either interprovincial or international trade.

*The Canadian Conference of Motor Transport Administrators (CCMTA)* is an association devoted to promoting greater uniformity in the trucking industry, so as to reduce existing interprovincial barriers to free movement. Some of the products of this group's activities include the CAVR (discussed above), concurrent hearings on entry requirements, common documentation, and common commodity descriptions.

#### **Natural Resource Policies**

There are several ways in which these policies distort interprovincial trade flows:

- Taxes or royalties on resource income produce an incentive to concentrate activities in lower-taxed provinces. However, it is important when comparing tax rates to take into account differences in the income that is exempted from taxes.
- Policies which increase the amount of processing done in a province, such as processing allowances, incentives for exploration and related costs, and imposition of additional duties or requirements on the product if it is shipped out of the province in unprocessed form.
- Terms and conditions in provincial government leases may restrict entry to local residents or impose obligations requiring resources to be processed within the province.

#### **Retail Sales Tax**

Substantial differences exist in provincial sales tax rates and exemptions. However, consumers typically will not travel great distances to take advantage of these differences. The interprovincial resource misallocation only occurs in areas close to provincial borders.

- a. This summary draws heavily on information presented in M.J. Trebilcock, J.R.S. Prichard, T.J. Courchene and J. Whalley, eds., *Federalism and the Canadian Union* (Toronto: University of Toronto Press for the Ontario Economic Council, 1983), pp. 243-70.
- b. Other sources for this section include the following: P.J.E. Kovacs, "In Praise of Teamwork," Draft of a Canadian Manufacturers' Association Discussion Paper, November 1983, pp. 10-11; Jean Chrétien, *Securing the Canadian Economic Union in the Constitution* (Ottawa: Minister of Supply and Services Canada, 1980), pp. 34-36; R.E. Haack, D.R. Hughes, and R.G. Shapiro, *The Splintered Market: Barriers to Interprovincial Trade in Canadian Agriculture* (Ottawa: Canadian Institute for Economic Policy, 1981), pp. 39-41; correspondence with the provincial ministries responsible for procurement policies.
- c. Sources for this section also include R. Hirshhorn, *Trucking Regulation in Canada: A Review of the Issues*, Working Paper 26 (Ottawa: Economic Council of Canada, 1982), pp. 57-61.

**TABLE A-5 Summary of Provincial (Non-Pricing) Preferences Applying to Alcoholic Products**

New Brunswick	Special in-store merchandising displays used to promote locally produced products.
Nova Scotia	Local products receive automatic listing and are specially marked as "Nova Scotia products". Local products also receive preferential shelf space.
P.E.I.	Non-discriminatory treatment because there are no breweries, wineries, or distilleries in the province to be protected.
Newfoundland	No distilleries or wineries. However, the Newfoundland Liquor Corporation does do some of its own bottling. Goods bottled locally receive promotional support through in-store displays and eye-level shelf positioning.
Quebec	The Société des Alcools du Québec promotes only the imported wine it bottles itself — a major competition for local wineries who provide marketing support for local products. SAQ-bottled wine and local products are distributed in grocery stores, giving them an advantage over imported wines which must be sold through the liquor board
Ontario	Ontario wines can be distributed either through the Liquor Board or through an Ontario winery retail outlet, whereas out-of-province wines can be sold only through the Liquor Board. All wines must be listed with the Liquor Board. However, imported wines are listed subject to rigorous quality testing, whereas Ontario wines are listed if they are of adequate quality and in the proper price range. Ontario wines can be distributed in a wider range of bottle sizes than wines imported interprovincially or internationally. Ontario wines are automatically distributed in high-volume stores, while other wines must be accepted by the store manager.
Manitoba	Manitoba products get automatic listing, while products imported interprovincially and internationally must be approved by the Manitoba Liquor Control Commission.
Saskatchewan	Merchandising displays are used to promote locally produced products. An annual tax of \$5,000 paid by any party wishing to export liquor out of Saskatchewan serves to deter interprovincial trade in liquor products.
Alberta	Automatic listing of Alberta wines, up to 45 listings per winery.

**TABLE A-5** (cont'd)

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British Columbia	Automatic listing of B.C. wines, up to 66 listings per winery. Locally produced products enjoy promotional support through pamphlets displayed in stores, and distributional support through merchandising displays. Local products also have access to 25 percent of retail shelf space. Non-B.C. wines must reach a fixed quota of sales in a "test" market before being eligible for full distribution, whereas B.C. wines are immediately eligible for full distribution. B.C. wines are listed and featured in B.C. restaurants as house wines.
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*Sources:* R.E. Haack, D.R. Hughes and R.G. Shapiro, *The Splintered Market: Barriers to Interprovincial Trade in Canadian Agriculture* (Ottawa: Canadian Institute for Economic Policy, 1981), pp. 43–46; M.J. Trebilcock, J.R.S. Prichard, T.J. Courchene, and J. Whalley, eds., *Federalism and the Canadian Economic Union* (Toronto: University of Toronto Press for the Ontario Economic Council, 1983), pp. 263–66; and correspondence with the provincial ministries responsible for liquor policies.

Other provincial policies which potentially affect the free interprovincial flow of goods and services include transportation regulation, natural resource policies, agricultural support programs, and differences in provincial taxes. Because of the complexity of provincial trucking regulations as they affect rates and entry, they are annexed in greater detail in Table A-6.

### ***Distortions Affecting Interprovincial Flows of Capital***

Most provinces also use a range of policies which affect interprovincial flows of capital. Most of these are designed to encourage investment within the province, although a few policies are also designed to restrict the movement of foreign capital into the province (most notably for land purchases). They range from tax incentives for provincial residents who invest within the province, to restrictive investment policies designed to ensure that capital remains within the province. Table A-7 describes these policies.

In the area of tax preferences to in-province investment, for some years Quebec has had a stock savings plan under which a fraction of stock purchased in Quebec-based companies is deductible in calculating Quebec tax. More recently, British Columbia has introduced provincial bond issues on which part of the interest income is effectively free from B.C. tax through either a tax credit or cash refund system. Provincial corporate tax systems also contain preferences toward in-province investments. Ontario's Small Business Development Corporations and Quebec's Corporations for the Development of Quebec Business Firms

**TABLE A-6 Provincial Regulation of Trucking in Canada**

	<b>Regulatory Agency</b>	<b>Entry Regulation</b>	<b>Rate Regulation</b>
Newfoundland	Board of Commissioners	Intra- and interprovincial for-hire motor transport requires a certificate of "public convenience and necessity"	A few rates are prescribed; most others — both intra- and interprovincial — must be filed and approved.
P.E.I.	Public Utilities	Same	All tariffs must be filed with Commission.
Nova Scotia	Board of Commissioners of Public Utilities	Same	Tariffs must be filed (new rates must be on file within 15 days of change).
New Brunswick	N.B. Motor Carrier Board	Same	Same
Quebec	Quebec Transport Commission	Same	Rates for both intra- and interprovincial carriage must be approved by the Commission.
Ontario	Ontario Highway Transport Board, Minister of Transportation and Communications	Same	Tariffs must be filed (tariff changes do not become effective until 30 days after filing).
Manitoba	Manitoba Motor Transport Board	Same	Intraprovincial rates are prescribed by the Board; there is no regulation of extraprovincial rates.



TABLE A-6 (cont'd)

	Regulatory Agency	Entry Regulation	Rate Regulation
Saskatchewan	Saskatchewan Highway Traffic Board	Same	Minimum and maximum rates are prescribed for intraprovincial general freight; a large number of commodities shipped intraprovincially are exempt from rate control; there is no regulation of extraprovincial rates.
Alberta	Alberta Motor Transport Board, Minister of Transport	Intraprovincial trucking is not subject to effective entry control Extraprovincial trucking is regulated as in other provinces	There are no requirements with respect to rates.
British Columbia	B.C. Motor Carrier Commission	Usual licensing requirements apply to intra and interprovincial for-hire	Most intraprovincial rates must be filed and approved by the commission; rates on extraprovincial carriage are not regulated.

Source: Reproduced from R. Hirschhorn, *Trucking Regulation in Canada: A Review of the Issues*, Working Paper No. 26 (Ottawa: Economic Council of Canada, 1982), Ch. 2, Table 8.

**TABLE A-7 Provincial Policies Which Affect the Free Interprovincial Mobility of Capital<sup>a</sup>**

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**Controls on Land Ownership**

Various restrictions such as residency requirements in several provinces impede capital flowing into a province to improve land quality and use, although their use seems not yet sufficiently widespread to present major impediments to free mobility.

**Policies Affecting the Location of Investment**

*Government investment policies.* The Alberta Heritage Savings Trust Fund, the heritage funds in Saskatchewan and Nova Scotia, and Quebec's earmarked portion of the natural resource royalties it receives from Hydro-Quebec are all used to promote local industrial development. This is done through explicit or implicit subsidies at below-market rates.

*Regulation of pension plan funds.* Geographical restrictions placed upon pension investments can also act as barriers to interprovincial capital mobility. Under the Canada Pension Plan (CPP), the excess of contributions over benefits is loaned to provinces in proportion to the province's payments into the plan, with interest paid by borrowers at below market rates. The funds of the Quebec Pension Plan (QPP) are held and invested by the Caisse de Dépôt et de Placement (a Crown corporation), with priority given to using these funds in both private and public sectors for economic development within Quebec. Quebec's Government and Public Employees Retirement Plan and the Construction Industry Pension Fund are also invested in the Caisse de Dépôt et de Placement.

*Insurance funds.* Under Section 92(11) and Section 92(13) of the BNA Act, provinces have the power to impose investment restrictions on funds held by insurance companies. Most provinces exercise this power, although to varying degrees. Some provisions require that insurance companies invest a certain percentage of their assets within the province, while others restrict investments to property located in the province or other places where business is done.

**Provincial Control over Financial Institutions**

The view from the West is that traditional financial institutions are not responsive to the needs of western economic development. The Ontario Savings Offices lend their funds exclusively to the Ontario government and the Alberta Treasury Branches tend to give priority to provincial investments. As a result, Manitoba and British Columbia have set up provincially owned financial institutions to support provincial economic development. Quebec's major institutions are the Caisses Populaires Desjardins and the Caisse de Dépôt et de Placement. All of the above partially inhibit the free interprovincial movement of capital through their borrowing and lending policies.

**Provincial Crown Corporations**

Provincial Crown corporations are frequently given special concessions in the form of grants, loans on better-than-market terms, guarantees, and federal tax exemptions which give them an advantage in financial markets over their private sector counterparts.

**Restrictive Business Policies**

Subsidies given to in-province businesses or barriers erected to discourage activity of out-of-province businesses within the province can distort capital mobility. The policies involved include:

**TABLE A-7 (cont'd)**

*Financial assistance and industrial incentives.* Grants, loans, loan guarantees and government provision of support services and infrastructure are frequently given to in-province firms as subsidies to encourage activity within the province.

*Regulation of companies.* Several provinces have residence restrictions for directors of provincially incorporated companies. All provinces except New Brunswick require registration of out-of-province corporations as a condition of doing business in-province, and most impose additional requirements on these companies, such as attorney residence restrictions and giving notice of corporate structural and activity changes.

*Regulation of combined businesses.* Business amalgamations can be affected by restrictions on the sale of shares (or a takeover bid), the sale of assets or statutory amalgamation. Examples of restrictions on takeover bids have occurred when British Columbia blocked the Canadian Pacific bid for Mac-Millan-Bloedel, and Quebec blocked the takeover of Cr dit Foncier by a Nova Scotia firm. Statutory amalgamations are made difficult by the necessity for each of the corporations to transfer into the jurisdiction of the other prior to amalgamation.

*Securities regulation.* Differences in prospectus requirements by each of the ten regulating provincial authorities may create barriers to the free flow of capital across provincial boundaries. The difficulties, however, have been alleviated somewhat by an agreement among the provinces upon a standard procedure for filing a prospectus which an issuer may use to clear a prospectus in more than one province. In Quebec the prospectuses are required to be filed in French, creating additional costs for the issuer wishing to raise capital in the province.

### **Provincial Taxes and Capital Mobility**

*Corporate income tax.* Differences in provincial tax rates which reflect efforts to attract industry into provinces have distorting effects on the free flow of capital. The Alberta decision to withdraw from the corporate income tax agreements was made in order to give them greater flexibility in setting rates.

*Special investment incentive tax measures.*<sup>b</sup> Various special incentive programs have been introduced by provinces. While some involve the corporate tax, others also involve the personal income tax. By province, these operate as follows:

*Ontario:* Small Business Development Corporations (SBDC) are established for the purpose of stimulating private sector investment in small business. Individuals receive a grant and corporations a tax credit equal to 30 percent of the amount they pay for new issues of equity shares.

*Quebec:* There are currently two programs in operation. One is Corporations for the Development of Quebec Business Firms (SODEQ), which is similar to Ontario's SBDC. Taxpayers are entitled to deduct from otherwise-payable provincial tax 25 percent of the amount of their investment in a SODEQ. The other is the Stock Savings Plan which allows Quebec residents to deduct up to 20 percent (or \$15,000) of earned income for purchases of new shares of Quebec companies.

Two Quebec programs were discontinued as of 1981. One was the Industrial Incentive Fund which provided assistance to small- and medium-sized firms. Participating firms deposited amounts equal to one-half their income tax payable to the Quebec government and were able to withdraw from the fund the sums

**TABLE A-7 (cont'd)**

required for the financing of 50 percent of allowable investments or expenditures. The other was the Tax Abatement Regional Industrial Development Program, which applied to all manufacturing firms in Quebec located outside metropolitan Montreal. Eligible corporations were able to deduct 25 percent of allowable investments, up to a maximum of 50 percent of tax payable.

*British Columbia:* Incentive measures provide tax credits or cash refunds in respect of interest income received by taxpayers on housing and employment development bonds. The interest income is deductible only in part in computing income under the Provincial Income Tax Act. The proceeds of these bonds are used to create employment through the financing of housing and other projects in British Columbia.

*Saskatchewan:* An industry investment incentive exists in the form of a 30 percent provincial income tax credit to investors in venture capital corporations.

*Capital taxes.* Quebec, Ontario, Manitoba, and British Columbia impose a capital tax on the paid-up capital of corporations. Corporations refining oil in Quebec are required to pay an additional 2 percent "education tax" on top of their profits and capital tax.

*Retail sales tax.* Exemptions for manufacturers create distortions insofar as provincial variations create price differentials for production machinery, production consumables, and processing materials.

*Gasoline and fuel tax.* Motor fuel is subject to various exemptions, refunds or reduced rates in respect of specific uses at the point of sale in all ten provinces, but with substantial provincial variation.

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- a. The material in this table is based on M.J. Trebilcock, J.R.S. Prichard, T.J. Courchene and J. Whalley, eds., *Federalism and the Canadian Economic Union* (Toronto: University of Toronto Press for the Ontario Economic Council, 1983), pp. 291-321.
  - b. Other sources for this section include: M. Kostuch, ed., *Sources of Funds Index* (Toronto: SB Capital Corporation, various years); M. Goodman, "Checklist," *Canadian Tax Journal* 27 (May-June 1979), pp. 386-87; and vol. 30 (July-August 1981), p. 243; and "Saskatchewan unveils tax credit as industry investment incentive," *London Free Press*, March 22, 1984, p. C5

are examples of programs in place which provide tax incentives through the provincial corporate tax system. Saskatchewan has recently unveiled a tax credit program along similar lines.

However, these policies extend substantially beyond provincial tax systems. Business subsidies offer cash assistance to businesses locating in-province. Provincial Crown corporations are preferentially treated through subsidized loans, the writing off of accumulated debts, and also the absence of federal taxes on provincial operations. The Alberta Heritage Savings Trust Fund is a vehicle through which there is a substantial accumulation of funds within-province, which can potentially affect the capital allocations across provinces if the capital market is nationally segmented.

### ***Barriers to Interprovincial Labour Mobility***

A number of provincial barriers also operate that affect the ease with

which individuals in a range of professions and trades can move between provinces. These are listed in Table A-8.

In varying degrees, out-of-province transfer applicants in certain professions are often required to take further retraining or examinations, and are subject to citizenship, residency and work requirements which often impede their movement interprovincially. It is difficult to describe all this licensing as necessary to protect consumers, and the discriminatory requirements beyond this protection impose additional costs on the economy through restrictions on interprovincial mobility.

In the trade area, licensing and apprenticeship procedures are provincially based. For instance, construction workers from Ontario have been denied access to jobs in Quebec. On the other hand, the federal Red Seal Program, although not a complete solution to the problem of barriers, has come a long way in facilitating interprovincial mobility in trades through a national certification scheme.

Those who downplay the interprovincial barrier issue stress instead that despite the length of lists such as those displayed in Tables A-4 to A-8, the case that interprovincial barriers cause significant fragmentation of the internal economic union remains unproven. In turn, others have argued that interprovincial barriers are usually an unintended and relatively minor effect of policies which have primarily in-province objectives (such as marketing boards). Alternatively, others have argued that interprovincial barriers are needed by provinces to offset the interprovincial effects of federal policies such as tariffs. These issues are discussed in the text.

## **Other Policies with Significant Regional Impacts**

### ***Regional Aspects of Federal Taxes and Transfers to Persons***

Within the federal tax system there are a number of features which have significant interprovincial impacts. Many of these reflect the way in which the tax system either favours or discriminates against industries concentrated in particular regions. In addition, taxes which redistribute between individuals also redistribute between regions, because of differences in regional incomes.

The most important industry features are those which affect the relative balance of taxation between manufacturing and non-manufacturing, since manufacturing is so heavily concentrated in Ontario and Quebec. The manufacturers' sales tax, for instance, with its 10 percent tax on manufactured products (including imports but excluding exports) has an interprovincial impact between central and western Canada, since it affects the interprovincial terms of trade. The manufacturing and processing incentive in the corporate tax, which reduces the corporate

**TABLE A-8 Provincial Policies Which Restrict Labour Mobility<sup>a</sup>**

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**Preferential Hiring Practices**

Several provinces impose local hiring restrictions upon both the private and public sectors.

- Newfoundland has established a registry of workers giving Newfoundlanders first preference on jobs associated with petroleum and gas exploration and exploitation.
- In Quebec, employment preference is given to Quebec labourers and mining engineers when issuing mineral exploration permits.
- In Saskatchewan, a northern preference hiring clause contained in all lease agreements requires that 50 percent of the staff be residents of Northern Saskatchewan.
- In Alberta, all projects needing Industrial Development Permits, Forest Management Agreements, or Coal Development Permits must give preference to Alberta personnel, materials and supplies.
- Quebec has barred an estimated 3,000 eastern Ontario construction workers from working on Quebec construction projects through its permit system.
- Quebec and Nova Scotia public service legislation gives preference in recruitment to their own residents.

**Restrictive Standards For Entrance Into The Professions**

Academic standards, apprenticeship periods, licensing examinations, and residency and citizenship requirements are affected by the lack of uniformity and reciprocity in provincial licensing requirements. Among the professions affected are:

*Lawyers.* Since legal systems are provincially based, lawyers must qualify on a provincial basis. However, it is difficult to see how familiarity with provincial law is enhanced by the condition that out-of-province transferees require three years of active practice after the call to the bar.

*Architects.* Many provinces have essentially automatic admission while some provinces (Saskatchewan and Quebec) have reciprocity agreements with other associations. However, there are still interprovincial barriers. British Columbia and Ontario require minimum periods of post-registration practice, and British Columbia, Saskatchewan, and Quebec require professional practice exams to be written before acceptance is granted. Other provinces such as Saskatchewan, Ontario and Quebec have citizenship requirements. For foreign transfers, the provinces rely on a minimum standards syllabus developed by the Royal Architectural Institute of Canada (RAIC). However, not all provinces (for example, Ontario) are fully integrated into the system and some impose more stringent standards, so discriminatory barriers still exist.

*Engineering.* Few barriers exist due to nationally standardized academic and work experience requirements. However, British Columbia does a case-by-case review of credentials of out-of-province transferees, and Quebec has strict language, residency and citizenship requirements. For foreign transfers, most provinces evaluate academic credentials and work experience, and some require part of the work experience to be obtained in Canada or in the United States. Very few provinces grant automatic admission.

**TABLE A-8 (cont'd)**

*Accounting.* National curriculum and examinations have achieved a high degree of mobility across Canada between the three nationally-based accounting associations. However, this does not extend to public accountancy where some provincial licensing systems (Ontario and Quebec) require out-of-province transferees to take additional education and also pass an exam. National standards are relied upon in admitting foreign applicants, so there is little variation in acceptance between the provinces.

*Surveyors.* Most provinces require additional training or examinations for transfers of surveyors from other provinces. Newfoundland also requires a one-year residency in the province, while Nova Scotia, New Brunswick, Quebec, Saskatchewan, and British Columbia require Canadian citizenship or British subject.

*Pharmacists.* Several provinces (Newfoundland, Nova Scotia, Prince Edward Island and New Brunswick) require transfer applicants to take additional courses and examinations in addition to holding the certificate of the National Pharmacy Examining Board. Other provinces (Ontario, Manitoba, and British Columbia) require a minimum of 12 months of previous experience. Residency requirements are also different across provinces.

### **Provincial Licensing of Trades**

Substantial provincial variation exists as to which occupations are subject to licensing, and what the licensing or certification requirements are. The barriers created are not as great as in the professions, because certification is often voluntary (any province can opt out), provisional certificates are frequently available, and the Interprovincial Red Seal Program is making progress in reducing interprovincial differences in apprenticeship periods, trade standards and examinations. The Red Seal, however, is not a complete solution to the problem of barriers, because it is voluntary and not universally applied.

### **Municipal Licensing**

Municipalities are also empowered to license trades. This does not directly affect interprovincial mobility, but may affect internal mobility since barriers are created due to differences in municipal regulations. These problems are reduced by the existence of reciprocity agreements between municipalities. Ontario, for example, has a reciprocity agreement with five municipalities. Bossons and Makuch<sup>b</sup> (1984) found that entry or mobility was little affected by municipal licensing except for taxicabs.

### **Portability of Employment-Related Benefits**

One of the more important barriers to the free flow of labour is the lack of portability in private pension plans between jobs or provinces. Three aspects of the portability issue include vesting, locking-in and transferability. The Department of National Revenue imposes the minimum requirement that private pension plans must provide for vesting after age 50 and 20 years of service. Existing provisions which generally allow for long-vesting periods and locking-in of benefits can create barriers to labour, since employees who move before the vesting conditions are fulfilled are forced to forfeit their employers' contributions. Vesting does not, however, guarantee perfect portability of pension rights, since payments do not reflect general wage increases after employment termination.

**TABLE A-8 (cont'd)**

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**Language and Culture**

Although language differences are best treated as a "natural barrier" to labour mobility, they inhibit the movement of anglophones into primarily francophone areas (and vice versa), but they are not the result of provincial government policies.

**Labour Standards**

There is significant provincial variation with regard to minimum wages, hours of work, overtime rates, annual vacation and vacation pay, and notice of termination. However, a study by the Employment and Immigration Commission concluded that there is little evidence to suggest that their impact represents a major impediment to the interprovincial flow of labour.<sup>c</sup>

**Personal Taxes**

Variations exist between the provinces in personal tax rates. They may, and often do, reflect differences in the level of provision of local public services, but can affect interprovincial labour mobility.

**Education**

Interprovincial differences in curriculum and grade requirements may affect labour mobility, depending upon the influence their children's education has on the parents' decision to move to another province. A study by the Employment and Immigration Commission reveals that school system incompatibilities are usually not enough to deter parents from relocating.<sup>c</sup> Barriers also exist with respect to the free movement of students seeking post-secondary education. Current restrictions take the form of quotas on non-resident students, and exist in pharmacy, dentistry, medicine, veterinary medicine, occupational therapy, and physiotherapy. Also, these students have limited access to financial assistance, and may only be eligible for a loan and not a grant.

**Restrictions on Access to Welfare (income support) and Social Services**

Restrictions on access to welfare assistance and social services impose burdens on persons who wish to relocate in another province. As a condition to receive Canada Assistance Plan (CAP) funds provinces must not impose a residence requirement. However, provinces can make residence itself a condition.

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- a. This summary is based on M.J. Trebilcock, J.R.S. Prichard, T.J. Courchene and J. Whalley, eds., *Federalism and the Canadian Economic Union* (Toronto: University of Toronto Press for the Ontario Economic Council, 1983), pp. 271-91.
- b. J. Bossons and S.M. Makuch, "Municipal Licensing: Regulation in Search of a Rationale," in *Regulation by Municipal Licensing*, edited by J. Bossons, S.M. Makuch and J. Palmer (Toronto: Ontario Economic Council, 1984), pp. 23-76.
- c. Canada, Employment and Immigration Commission, Policy and Program Analysis Division, "Legislative/Regulatory Barriers to Interprovincial Labour Mobility" (1979, mimeographed).

tax by 6 percent for qualifying industries, has interprovincial effects in the opposite direction.

Manufacturing and processing industries also have more liberal depreciation allowances, generating regional impacts. The special treatment of oil, gas, and mining industries also produces regional effects because of the geographical concentration of these industries. A further



feature is provincial Crown corporations. Since these in most cases are free of federal taxes, provinces using Crown corporations more intensively than other provinces are more lightly taxed.

Regional features also come into play through the expenditure side of federal government activity. In the transfer area, unemployment insurance is regionally concentrated on the benefits side, especially since the minimum number of weeks of eligible benefits is tied to the provincial unemployment rate. Special provisions also apply for particular industries such as fishing, generating enhanced benefits for Atlantic Canada. Also, unemployment insurance produces regional impacts, since it acts as a subsidy to search and tends to increase unemployment rates, which are already regionally divergent. Regional impacts of other transfers are less significant, but the size of transfers to the elderly differs across regions because of differences in the average population age.

### *Trade Policies Beyond the Tariff*

Another policy area with regional impacts is foreign trade policies beyond the federal tariff. Three important elements in Canadian trade policies beyond the tariff are the system of textile quotas which operate under the Multi-Fibre Arrangement, the Automotive Products Trade Agreement, and marketing boards and agricultural protection.

#### *The Multi-Fibre Arrangement*<sup>12</sup>

Operating under the MFA<sup>13</sup> is a system of textile quotas limiting exports of textiles and textile products from the low-cost exporting countries. Beneficiaries of these quotas are widely agreed to be domestic textile firms, many of which are located in Quebec. The arrangements set up by the MFA of 1974 proved favourable to developing countries. In return for allowing restrictions on imports of textiles and textile products made of man-made fibres and wool from low-wage countries, the Arrangement contained clauses guaranteeing the reduction of barriers and the progressive liberalization of trade. This proved to be difficult for the Canadian textile industry to deal with during the second half of the 1970s because the improvement in quality and style of clothing from low-wage countries — and the wage increases in the Canadian clothing industries — made low-wage countries more competitive than in earlier years. In response, in November 1976 the federal government imposed a global quota system on the imports of a wide range of clothing items. Licences to import were given to Canadian importers, who were then free to seek out the lowest-cost source of supply from the exporting countries.

In June 1978, the federal government announced that this system of global quotas would be lifted in favour of a system of bilateral agreements (MFA II) between Canada and seven developing countries — the

Philippines, Romania, Hong Kong, Taiwan, Poland, the Republic of Korea, and the People's Republic of China — under which they would voluntarily limit clothing exports to Canada to slightly above the 1975 level. These agreements came into effect in January 1979 and applied to 80 percent of total clothing imports into Canada. By early 1980 the percentage of clothing imports under voluntary restraint had increased, due to the expansion of the number of agreements to 14. Under this system of quotas the exporting country has administrative control over who obtains the licence to sell to Canadian importers.

In December 1981, a new MFA (MFA III) was agreed in Geneva. The bilateral agreements under the new arrangement remain highly restrictive, but the increase in restrictions is more modest than was the case when MFA II was introduced.

### *The Automotive Products Trade Agreement*<sup>14</sup>

The Automotive Products Trade Agreement (usually known as the Auto Pact), was negotiated in 1965 to provide for conditional duty-free trade in motor vehicles and automotive parts between the United States and Canada. It is frequently claimed that Ontario is the main beneficiary of the Auto Pact, since it guarantees duty-free access for export by an industry heavily concentrated in Ontario. This has been viewed as costly to other provinces insofar as the Auto Pact was negotiated at the expense of alternative policies that would necessarily benefit other regions. However, what is often overlooked is that all regions in Canada benefit from the resulting lower prices on international imports.

The Agreement allows for duty-free entry of motor vehicles and automotive parts into the United States, provided they come from Canada and contain at least 50 percent North American content. Special restrictions apply in Canada in the form of certain production-to-sales ratios (the greater of 75 percent and the level achieved in the base year beginning August 1, 1963) and Canadian value-added commitments.<sup>15</sup> Designated companies making cars or trucks in Canada must meet these conditions before duty-free entry of vehicles and parts to Canada is granted. The agreement was made possible through a waiver from the GATT that allowed the United States to implement the Automotive Agreement on a preferential basis for Canada. Canada implemented the agreement on a multilateral basis.

As a result of the Agreement, employment in the automotive industry in Canada rose from 70,500 in 1964 to 98,700 in 1982. Canada's share of North American automotive production rose from 7.1 percent in 1965 to 15.0 percent in 1982. Canadian value-added in automotive production by the four largest North American auto companies increased from 3.7 percent of the value of output in 1964 to 7.4 percent in 1982. Output per worker has improved to the point where the productivity gap that existed between Canadian and U.S. automotive industries prior to the Auto Pact

has been eliminated. The price gap between cars sold in Canada and the United States in 1965 has also been eliminated. In fact, in 1982 the factory cost to Canadian buyers was 8.8 percent lower for a sub-compact sedan and 6.9 percent lower for a full-size sedan than the factory cost for buyers in the United States. Most of the benefits have allegedly accrued to Ontario, although all Canadians have benefitted to the extent that auto prices in Canada are lower under the Auto Pact than they would otherwise have been.

### *Marketing Boards and Agricultural Protection*<sup>16</sup>

Agricultural protection operating through marketing boards is another element of the system of trade-related policies with regional impacts. A number of these boards operate at the provincial level. However, some provincial boards with supply management powers operate under a federal-provincial agreement administered by a federal marketing board. There are major differences in the ways boards operate. Some are largely promotional, while others control quantities through quota systems and regulate output, entry and prices. Import controls are a standard additional set of controls.

It is widely agreed that the main effect of agricultural protection is to increase incomes of producers in Canada and to increase costs of agricultural products to consumers. However, in addition to the redistribution between producers and consumers, there are interprovincial effects, since some provinces are net agricultural importers and others are net exporters.

Marketing boards are part of an extensive federal and provincial government involvement in the agricultural sector, covering 59 percent of farm cash receipts in 1983/84.<sup>17</sup>

Jurisdiction over marketing may be either federal, provincial, or both. Under the British North America Act of 1867, provincial governments were granted jurisdiction over intraprovincial trade and the federal government was granted jurisdiction over interprovincial and international trade. After the passage of the Agricultural Products Marketing Act in 1949, provincial boards were allowed to exercise their authority over interprovincial and export trade, in addition to their regulation of intraprovincial trade. However, the gradual adoption of marketing practices led to intense competition in interprovincial trade, such as occurred in the "chicken and egg war" in the early 1970s. The result was the passage in 1972 of the Farm Products Marketing Agencies Act, which allowed national commodity marketing agencies to be established.

These agencies are formed by agreement between the provinces and the federal government, in which each contributes its powers of regulation to a marketing plan, which in turn is administered by a national board. The national board specifies the level of output allowed by each province and these allocations are then divided among individual pro-

ducers by each provincial board. The presence of a national supply management scheme also allows these agencies to impose import controls, determine entry, and in some instances set prices. Currently there are three marketing boards operating under the Farm Products Marketing Agencies Act: the Canadian Egg Marketing Agency (CEMA), the Canadian Chicken Marketing Agency (CCMA), and the Canadian Turkey Marketing Agency (CTMA). The Canadian Dairy Commission (CDC) also operates a national supply management scheme with regard to the regulation of industrial milk which is similar to those operated by the national agencies.

Supply management boards can also be provincial. Currently, provincial supply management boards govern tobacco in Ontario and fresh fluid milk in all provinces.

Receipts of farmers selling their products under supply management authority as a percentage of farm cash receipts vary considerably across provinces. The most recent data available on these percentages are for 1978 and are as follows: British Columbia, 41.7 percent; Alberta, 8.4 percent; Saskatchewan, 2.9 percent; Manitoba, 13.1 percent; Ontario, 37.7 percent; Quebec, 58.1 percent; New Brunswick, 38.1 percent; Nova Scotia, 53.8 percent; and Prince Edward Island, 20.8 percent. Data for Newfoundland is not available. In Canada, producers' receipts through supply management boards accounted for 24 percent of all farm cash receipts in 1978.<sup>18</sup>

Although there are many different types of marketing boards in Canada, supply management boards are frequently associated with the most serious restrictions on interprovincial trade, and therefore are the ones being focussed on here.

**The Canadian Chicken Marketing Agency** The CCMA was created in 1978. All provinces except Prince Edward Island and Newfoundland are members of this agency. National production quotas are allocated annually to provincial boards according to predetermined shares, and are adjusted a number of times during the year in response to changes in demand. In turn, the provincial boards establish production quotas for individual producers. Criteria for market share reallocation tend to emphasize provincial self-sufficiency in production. Maximum and minimum limits on the volume of broiler production per cycle are regulated at the provincial level in all member provinces. Generally, broiler growers with less than the minimum number of regulated birds can enter and leave the industry freely.

Most provincial boards also place minimum restrictions on the square footage required in a broiler barn to grow any given number of birds, and the amount of production is further limited through the control of production cycle lengths. Imports of chicken are controlled at the national level. The global import quota was set at 55.1 million pounds eviscerated

weight in 1983.<sup>19</sup> The national agency also has the power to license those involved in interprovincial trade, through the Canadian Chicken Licensing Regulations passed in 1980. The licences are restricted to those who have regularly engaged in the marketing of chicken in interprovincial trade over the five years preceding the introduction of the regulations. Prices paid to producers for chickens in each province are set by the provincial marketing board.

**The Canadian Turkey Marketing Agency** The CTMA was established in 1973. Prince Edward Island and Newfoundland are not members, due to insignificant turkey production in those provinces. The establishment of national production quotas and allocation of quotas to the provincial boards involves the operation of a scheme similar to that operated by the CCMA. Again, market share changes are slanted toward provincial self-sufficiency.

Turkey pricing is the responsibility of the provincial turkey marketing boards. These boards negotiate or set producer prices, using a formula based on a cost of production survey. The CTMA has the authority to license persons marketing turkey in interprovincial or export trade. The national agency also has the authority to impose turkey import controls. The global import quota was set at 2 percent of the Canadian annual turkey production in mid-1975, and has not been changed since.<sup>20</sup>

**The Canadian Egg Marketing Agency** The CEMA was created in 1972, and all provinces are members. The agency operates a national supply management scheme similar to those operated by the CCMA and the CTMA, and control over egg production is exercised by restricting the number of birds laying eggs. A self-sufficiency bias exists with regard to market share renegotiation.

Prices for large grade "A" eggs in each province are developed from a national formula administered by the CEMA that takes account of production and marketing costs and historic market differentials in price. These prices are determined weekly, with quarterly capital cost updates. Individual provincial boards have responsibility for the pricing of other grades and sizes of eggs.

Imports of eggs and egg products are controlled at the national level. In 1983 the global import quotas were set at 924,982 pounds of egg powder, 2.5 million pounds of liquid and frozen egg products, and in the case of shell eggs, 0.675 percent of Canadian production in the previous year.<sup>21</sup> The national agency also has the power to license those involved in interprovincial or export trade.

**The Canadian Dairy Commission** The CDC is a federal Crown corporation established in 1966. The production of industrial milk is controlled under supply management at the national level. The Canadian Milk

Supply Management Committee (CMSMC), which is chaired by a member of the CDC, is authorized to administer the federal-provincial agreements under the Comprehensive Milk Marketing Plan.

A national target returns level or target price for industrial milk is established using a returns adjustment formula based on milk production costs in Canada. The target returns level is set so as to ensure that milk producers receive a fair return on investment in the production of industrial milk. The level is changed several times during the course of the dairy year in response to changes in the cost of production from the base cost set in 1975. Industrial milk producers receive the target returns level through the market returns for processed dairy products (negotiated within each province) and a federal subsidy which is paid at a uniform rate of \$6.03 per hectolitre of milk across Canada. The federal subsidy is regarded as a consumer subsidy because it keeps consumer prices lower than they would be in its absence.

The CDC imposes import restrictions on all dairy products, to protect the Canadian dairy industry against heavily subsidized foreign imports and to protect the national supply management of industrial milk. The commission's international marketing activities include the export of skim milk powder purchased under the offer-to-purchase program and the planned exports of whole milk products under the Special Export Program. Levies are collected from dairy farmers by provincial marketing boards and forwarded to the commission to be applied against the costs of these dairy products sold for export.

**Provincial Fluid Milk Marketing Boards** The provincial fluid milk marketing boards administer the fluid milk supply, determine fluid milk quota allocations, and carry out many of the administrative aspects of the industrial milk policy. Although each province has its own fluid milk program, the general frameworks of these programs are similar. Prices are determined by formula, based on costs. Quotas are set to exceed demand by one-quarter or one-fifth, and consequently fluid milk producers provide fluid milk to meet demand plus industrial milk to meet the quota. The price they receive is usually a blended average of the prices for fluid milk and industrial milk. There is very little movement of fluid milk across provincial borders, due to provincial regulations designed primarily to protect local industries.

**Tobacco Marketing Boards** Over 90 percent of the Canadian tobacco crop is accounted for by tobacco grown in Ontario. Currently, there are two tobacco grower's marketing boards in Ontario: the Ontario Flue-Cured Tobacco Growers' Marketing Board, established in 1957, and the Ontario Burley Tobacco Growers' Marketing Board, established in 1974. These boards are provincial boards operating under the authority delegated to them by the provincial government. Rules for the control and

regulation of the production and marketing of the two tobaccos are the same.

The policy objectives of the boards are to regulate the production and marketing of flue-cured and burley tobacco within Ontario. This is done by establishing and allotting quotas and requiring that production and marketing be done on a quota basis. Only those persons holding a licence issued by a local board are entitled to engage in the production or marketing of tobacco. The activities of each board are financed by a producer licence fee which is deducted by each board from the proceeds of the sale of each producer's tobacco. For flue-cured tobacco the licence fee is set at 1 cent per pound for each pound marketed, and has remained unchanged for the last 25 years. For burley tobacco the licence fee under current regulations is set so as not to exceed 3 cents per pound.

Minimum prices for any class, variety or grade of flue-cured or burley tobacco are set by the local board. The actual sale prices for each grade are determined by auction.

Each board also regulates the sale of tobacco in interprovincial and export trade. In order to promote the sale of its product, the Canadian Tobacco Manufacturers' Council for flue-cured tobacco has established an export development fund, which provides an agreed-upon rebate per pound to export buyers for any eligible flue-cured tobacco exported from Canada up to a maximum specified weight.

### ***Regional Development Programs<sup>22</sup>***

Regional development grants are also an important part of any list of policies with regional impact. In the past these have operated under the Department of Regional Economic Expansion (DREE), but since 1982 these activities have been combined with those of the Department of Industry, Trade and Commerce. While subsidies under these programs have been relatively small in aggregate, their regional concentration in Atlantic Canada, as indicated in Table A-9, has produced a significant transfer of resources into this region.

DREE was formed in 1969, with the objective of assisting and encouraging Canadian regions to realize their full economic and social potential. Existing regional programs (such as those carried out under the Agricultural and Rural Development Act, the Prairie Farm Rehabilitation Act, and the Fund for Rural Economic Development Act) were drawn together and continued under the auspices of DREE. In addition, new approaches were developed to promote economic development and create employment opportunities in less well developed regions. The Regional Development Incentives Program was DREE's first initiative.

However, in a policy review conducted in 1972, concern was voiced about existing programs and the way they focussed on isolated problems in slow-growth areas rather than on more general development oppor-

**TABLE A-9 Department of Regional Economic Expansion Expenditures by Province, 1969/70 to 1982/83**

	1969/70 to 1981/82	1982/83
	(thousands of dollars)	
Newfoundland	701,372	29,960
Nova Scotia	602,421	38,173
Prince Edward Island	325,277	19,734
New Brunswick	715,510	40,451
Quebec	1,707,014	127,198
Ontario	326,124	28,992
Manitoba	389,587	37,925
Saskatchewan	477,184	58,347
Alberta	207,419	16,362
British Columbia	180,387	14,692
Other <sup>a</sup>	338,763	38,333
Total	5,971,058	450,167

*Source:* Data for the period 1969/70 to 1981/82 are from Canada, Department of Industry, Trade and Commerce/Regional Economic Expansion, *Annual Report 1981-82*, (Ottawa: Minister of Supply and Services Canada, 1983), Appendix A; data for 1982/83 are from Canada, Department of Industry, Trade and Commerce and Department of Regional Economic Expansion, *Annual Report 1982/83* (Ottawa: Minister of Supply and Services Canada, 1984), p. 55.

- a. Includes expenditures for head office, Atlantic Development Council, Atlantic and Western regional offices, Northwest Territories and Yukon.

tunities. In addition, it was recognized that each of the regions in Canada required specially tailored measures to satisfy its needs and priorities, because of interregional differences in developmental opportunities and problems.

This policy review made recommendations which led to the decentralization of the department in 1973/74, and the signing of 10-year General Development Agreements (GDAs) with nine provincial governments in 1974. (In 1969, Prince Edward Island had signed a 15-year Comprehensive Development Plan similar to the GDAs). Five-year GDAs were later signed with the Yukon in 1977 and the Northwest Territories in 1979.

In 1980/81, a second review of DREE's policy concluded that greater emphasis should be placed on direct federal program delivery systems, either by DREE alone or in cooperation with other departments. Emphasis on industrial support aimed at job creation was also suggested, together with increased regional development activities in Canada's needier areas. As a result, in 1982, an amalgamation of elements of DREE and the Department of Industry, Trade and Commerce was undertaken, and a new Department of Regional Industrial Expansion (DRIE) was created. This department is now responsible for delivering the industrial and regional development programs of the federal government. DRIE



expenditures under regional development programs previously carried out by DREE were just over \$450 million in 1982/83.

### *General Development Agreements*

As a result of the signing of the GDAs with the provinces in 1974, and later with the territories, the federal government, through DREE and subsequently DRIE and along with provincial governments, aimed at formulating a basic strategy for regional development. Each GDA sets out areas of opportunity and concern in a particular province, and provides for subsidiary agreements for joint action on specific development programs. Other federal departments are often involved in the planning, funding and management of these agreements, in cooperation with DRIE and the provincial governments concerned.

DRIE shares in the cost of subsidiary agreements, subject to an upper limit of 90 percent in Newfoundland; 80 percent in Nova Scotia and New Brunswick; 60 percent in Quebec, Manitoba, Saskatchewan, the Northwest Territories and Yukon; and 50 percent in Ontario, Alberta and British Columbia. Prince Edward Island is the only province that does not have a GDA, because in 1969 it had signed a 15-year Comprehensive Development Plan similar to the GDA. Between 1974 and March 31, 1982, 126 subsidiary agreements were signed. Of the 77 agreements active during 1981/82, 16 had expired by the end of the fiscal year. In 1982/83, DRIE expenditures under subsidiary agreements amounted to \$172 million.

### *The Regional Development Incentives Program*

**The Regional Development Incentives Act (RDIA) and Special Areas Program** The purpose of the RDIA is to create jobs in regions of slow growth by encouraging capital investment in these designated regions.

The aim of the Special Areas Program is to create employment opportunities in designated industrial areas. Projects are directed at establishing and modernizing existing manufacturing and processing industries, as well as establishing new facilities. They are also directed at implementing measures to assist residents in adjusting to new jobs, innovations and other social changes. As of 1982/83, Montreal had the only special areas program.

Financial assistance under the Regional Development Incentives Program is in the form of capital grants and loan guarantees to business and industry. The amount of assistance varies depending upon the type of projects, the capital costs and the employment opportunities it will create. In 1982/83, DRIE expenditures under the Regional Development Incentives Program amounted to \$142.8 million.

### *The Prince Edward Island Comprehensive Development Plan*

This development project, signed in 1969 by the federal government and

Prince Edward Island, covered a 15-year period. The aim of the plan was to assist in industrial development aimed at creating opportunities for employment and raising per capita income in the province. The plan was financed by a cost-sharing arrangement between the province and the federal government.

A new three-year (April 1, 1981 to March 31, 1984) package of economic development programs was announced by the federal government on October 7, 1981. The \$92-million package includes a \$53-million cost-sharing agreement for phase three of the Comprehensive Development Plan and a \$39-million Federal Development Strategy which has provided the structure for further federal contributions to economic development on Prince Edward Island since termination of the Comprehensive Development Plan in 1984.

### *The Prairie Farm Rehabilitation Administration*

The PFRA began in 1935 and was incorporated into DREE when the department was first established in 1969. The purpose of the program is to provide the three Prairie provinces with the necessary funds to finance projects directed at reducing soil-drifting, rehabilitating land in drought-stricken areas, and upgrading water supply and sewage disposal under the control of the Agricultural Service Centres program. During 1982/83, the PFRA was transferred to the Department of Agriculture.

### *Special ARDA Rural Development Programs*

These programs reflect agreements entered into under the Agricultural and Rural Development Act (ARDA), and work to provide financial assistance to rural residents, particularly people of Native ancestry, to start commercial ventures for job creation and income improvement. Assistance is also provided for social adjustment measures to enable Native people to take advantage of employment and earnings opportunities. During 1981/82, special ARDA agreements were active in Manitoba, Saskatchewan, British Columbia, the Northwest Territories and the Yukon. All special ARDA agreements were to expire on March 31, 1982. However, the agreements in Manitoba, Alberta, British Columbia and the Northwest Territories were extended to March 21, 1984. New agreements were signed in Saskatchewan and the Yukon for a period ending on March 31, 1984.

### *Agricultural Policies*<sup>23</sup>

A final set of policies are agricultural policies which provide cash payments and cheap loans to farmers, again affecting the regional balance of policies because of the regional concentration of the agricultural industry.

Federal government involvement in the agricultural sector has been extensive and dates back to pre-Confederation, when funds were made

available to assist the development of the agricultural industry to provide a secure food supply. In the nineteenth century, agricultural development became interwoven with immigration, Western settlement and transportation subsidies. Beginning in this period also, federal government assistance programs were directed to facilitating the production and marketing of farm products, and included programs concerned with resource development, production efficiency, farm credit, market promotion, improvement in the grading and inspection of farm products, and prevention and control of livestock and crop diseases. Today these programs are a large component of a great many federal government programs assisting the agriculture industry.

Price and income maintenance became important themes of agricultural policy during the Depression and drought of the 1920s and 1930s. These objectives were pursued through producer marketing operations which included voluntary cooperatives, compulsory marketing boards, and the various relief and rehabilitation programs that were designed to cope with regional conditions in the Prairies.

During World War II, extensive price and production controls and direct expenditures on income support were a main feature of federal government policy. However, following the war these programs became more modest as emphasis was again placed on facilitating the production and marketing of farm products.

During the 1950s and 1960s, price and income instability and persistent excess capacity, caused in part by agricultural expansion during the war, forced the federal government to become more involved in the agriculture sector through greater commitments to food prices and incomes. This increased federal government intervention and regulation in Canadian agriculture began with the 1958 Agricultural Stabilization Act, escalated rapidly during the 1970s due to soaring input prices and increased market instability, and has remained quite extensive to this day.

Table A-10, based on Canada, Department of Agriculture (1985b), summarizes net federal government expenditures on some of the more important agricultural programs which currently operate. These expenditures are made by various federal departments, including Agriculture Canada (AG), Industry, Trade and Commerce (IT&C), Department of Regional Economic Expansion (DREE), External Affairs (EXT AFF), Employment and Immigration (E&I), Transport Canada (T), and others. Federal expenditures on agriculture increased substantially from \$0.53 billion in 1970/71 to \$2.28 billion in 1982/83. Direct payments through commodity programs and storage and/or freight assistance are the largest expenditure categories, accounting for 48 percent of total federal expenditures on agriculture in 1982/83. The single largest expenditure is for payments to the Canadian Dairy Commission (CDC) for direct subsidies to producers of milk, amounting to \$2.95 billion in 1982/83.

**TABLE A-10 Federal Government Expenditures on Agriculture by Commodity and Department, Canada, 1970/71 to 1982/83**

Programs (Department)	1970/71	1971/72	1972/73	1973/74	1974/75	1975/76	1976/77
	(thousands of dollars)						
Direct payments through commodity programs:	128,172	122,505	182,758	270,644	469,806	505,406	403,998
Direct subsidies on milk (AG)	125,000	109,000	107,400	143,400	251,100	275,000	233,118
Two-price wheat (IT&C)	n/a	n/a	63,173	69,386	81,230	188,698	65,303
Western grain stabilization program (IT&C)	n/a	n/a	n/a	n/a	n/a	n/a	61,801
Direct payments through social and labour programs:	1,715	1,739	1,860	1,887	3,675	5,180	5,773
Farm labour pool (E&I)	151	153	250	240	1,984	3,462	3,438
General industrial training programs (E&I)	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Institutional training program (E&I)	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Crop insurance:	3,818	4,035	5,214	16,655	31,236	48,276	56,457
Contributions to provinces under the Crop Insurance Act (AG)	2,898	3,158	4,144	15,182	31,140	48,276	56,457
Financial assistance:	38,575	23,629	25,612	10,482	8,698	4,529	4,992
Prairie grain advance payments (IT&C)	11,614	3,513	1,036	1,645	3,058	1,011	2,550
Storage and/or freight assistance:	77,939	152,280	130,071	84,969	124,969	181,097	302,615
Contribution to railways under section 258 of Railway Act (T)	23,364	35,414	22,931	37,537	71,713	82,379	82,410
Contribution to railways under section 272 of Railway Act (T)	3,423	1,543	6,031	6,070	8,307	13,343	13,774
Rehabilitation of Prairie Branch Railway Lines (T)	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Programs (Department)	1977/78	1978/79	1979/80	1980/81	1981/82	1982/83
Direct payments through commodity programs:	622,656	418,707	(thousands of dollars) 407,264	466,975	617,009	436,195
Direct subsidies on milk (AG)	293,580	271,524	279,695	287,918	301,500	295,000
Two-price wheat (IT&C)	21,860	43,826	16	n/a	n/a	n/a
Western grain stabilization program (IT&C)	57,980	53,157	95,559	119,416	94,320	114,906
Direct payments through social and labour programs:	20,058	23,133	34,013	43,074	41,082	46,431
Farm labour pool (E&I)	3,804	3,811	4,063	4,259	4,332	5,610
General industrial training programs (E&I)	6,266	7,683	???	9,521	8,372	5,641
Institutional training program (E&I)	n/a	n/a	11,837	15,367	16,056	18,944
Crop insurance:	72,812	74,965	78,097	100,132	115,850	142,191
Contributions to provinces under the Crop Insurance Act (AG)	72,812	74,965	78,097	100,132	115,850	142,191
Financial assistance:	5,430	6,414	8,814	60,758	???	23,322
Prairie grain advance payments (IT&C)	3,478	5,193	6,394	2,710	12,735	11,621
Storage and/or freight assistance:	228,790	288,660	323,954	381,149	404,412	648,799
Contribution to railways under section 258 of Railway Act (T)	109,498	130,261	149,332	203,577	221,233	258,941
Contribution to railways under section 272 of Railway Act (T)	27,751	25,520	34,729	36,071	34,582	31,016
Rehabilitation of Prairie Branch Railway Lines (T)	30,000	70,000	70,000	70,000	77,000	84,700

TABLE A-10 (cont'd)

Programs (Department)	1970/71	1971/72	1972/73	1973/74	1974/75	1975/76	1976/77
Research programs:				(thousands of dollars)			
+ Research activities (AG)	33,474	36,243	39,889	44,680	50,424	58,765	64,859
Information and statistical services:	28,967	31,128	33,730	37,178	41,714	47,878	52,044
+ Information (AG)	4,430	6,307	5,978	5,984	6,832	12,918	16,482
+ Statistics Canada: Agriculture Statistics Division (DSS)	1,472	1,952	2,299	2,202	2,679	2,765	3,263
Inspection and control services:	2,200	3,400	2,600	2,600	2,800	3,400	6,000
	40,527	47,549	54,861	63,594	77,710	97,002	110,169
Food production and inspection programs (AG)	32,522	37,893	43,096	48,526	59,292	74,575	84,824
Technical and food aid programs:	107,127	82,792	101,298	77,276	117,711	236,253	253,587
- International food aid program (EXT)	99,551	76,529	93,964	66,164	103,479	211,397	235,212
Marketing and trade promotion programs:	13,565	18,147	21,447	28,710	37,862	34,990	39,428
+ Marketing and economics (AG)	11,509	15,421	17,042	19,145	22,308	19,604	22,415
- Grains export credit (IT&C)	1,599	2,291	2,106	5,946	11,904	10,070	7,743
Regional and Industrial Economic Development:	51,801	53,255	66,954	76,707	95,492	102,026	102,498
- Prairie Farm Rehabilitation Administration — PFRA (DREE)	14,545	14,817	23,940	22,551	27,727	26,672	26,177
- Regional Development Incentives (DREE)	8,393	12,308	8,792	9,749	10,705	11,725	9,858
Administration:	29,126	29,366	32,824	46,356	60,632	77,239	76,827
+ Administration (AG)	29,126	29,366	32,824	46,356	60,632	77,239	76,827

Programs (Department)	1977/78	1978/79	1979/80	1980/81	1981/82	1982/83
Research programs:	74,227	81,380	(thousands of dollars) 89,773	106,698	136,757	171,314
+ Research activities (AG)	58,918	64,172	68,761	82,838	108,982	138,810
Information and statistical services:	16,016	11,605	11,828	18,272	14,877	14,203
+ Information (AG)	3,422	4,105	3,685	4,382	3,307	3,929
+ Statistics Canada: Agriculture Statistics Division (DSS)	4,800	5,600	5,000	5,600	8,800	7,900
Inspection and control services:	118,841	150,783	150,658	170,156	171,031	212,746
Food production and inspection programs (AG)	92,971	122,354	119,156	126,497	129,443	161,339
Technical and food aid programs:	261,609	224,164	223,283	210,414	256,801	306,729
- International food aid program (EXT)	219,822	174,087	170,072	166,276	205,087	244,213
Marketing and trade promotion programs:	43,323	33,922	38,822	41,701	38,366	30,618
+ Marketing and economics (AG)	26,090	11,381	11,460	13,109	9,136	11,870
- Grains export credit (IT&C)	7,218	12,399	16,476	16,589	21,788	11,054
Regional and Industrial Economic Development:	114,783	118,663	106,376	116,584	114,022	118,257
- Prairie Farm Rehabilitation Administration — PFRA (DREE)	35,327	32,588	27,783	37,056	41,607	44,225
- Regional Development Incentives (DREE)	17,733	20,918	16,763	19,566	16,341	22,625
Administration:	89,839	100,423	113,065	118,057	154,267	131,995
+ Administration (AG)	89,839	100,423	113,065	118,057	154,267	131,995

TABLE A-10 (cont'd)

Programs (Department)	1970/71	1971/72	1972/73	1973/74	1974/75	1975/76	1976/77
Grand total	530,269	577,847	668,766	727,944	1,085,047	1,363,681	1,437,686
	(thousands of dollars)						
Programs (Department)	1977/78	1978/79	1979/80	1980/81	1981/82	1982/83	
Grand total	1,668,384	1,532,819	1,586,500	1,833,970	2,087,704	2,283,000	
	(thousands of dollars)						

Source: Canada, Department of Agriculture, *Canadian Farm Economics* (Ottawa: The Department, 1985), Section 2.

- Grants or contributions only.

+ Grants and contributions including operating and capital expenditures.

n/a Not applicable or not available.



TABLE A-11 Impact of Government Expenditures on Farm Net Income, Canada, 1970 to 1982

	Farm Net Income	Direct Payments Through Commodity Programs <sup>a</sup>	Federal Subsidies <sup>b</sup>	Proportion of Farm Net Income			
				Direct Payments Plus Subsidies	Direct Payments	Subsidies	
1970	1,275,635	128,172	133,897	262,069	10.0	10.5	20.5
1971	1,442,589	122,505	198,091	320,596	8.5	13.7	22.2
1972	1,630,302	182,758	182,344	365,102	11.2	11.2	22.4
1973	3,199,274	272,732	140,816	413,548	8.5	4.4	12.9
1974	3,496,351	483,857	202,765	686,622	13.8	5.8	19.6
1975	4,048,649	554,343	268,892	823,235	13.7	6.6	20.3
1976	3,231,454	530,757	403,492	934,249	16.4	12.5	28.9
1977	2,631,310	703,554	350,355	1,053,909	26.7	13.3	40.1
1978	3,284,287	439,124	403,961	843,085	13.4	12.3	25.7
1979	3,535,906	422,360	449,687	872,047	11.9	12.7	24.7
1980	3,097,319	496,932	583,740	1,080,672	16.0	18.8	34.9
1981	4,613,717	693,009	581,858	1,274,867	15.0	12.6	27.6
1982	3,430,607	534,492	844,930	1,379,422	15.6	24.6	40.2

Source: Farm net income and provincial payments through commodity programs are from Statistics Canada, "Farm Net Income Reference Handbook," Ottawa, May 1985; federal government expenditures are from Table A-10.

a. Includes both federal government expenditures and expenditures by the provincial governments through income stabilization programs.

b. Includes crop insurance, financial assistance, storage and/or freight assistance, and marketing and trade promotion.

Provincial governments also make expenditures on agriculture through provincial income stabilization programs. Table A-11 provides an indication of the impact of both federal and provincial government programs on farm net income in Canada. Together, direct federal and provincial government payments through commodity programs and federal subsidies averaged 26.2 percent of farm net income during 1970 to 1982. Aside from 1978/1979, these expenditures increased steadily from \$0.26 billion in 1970 to \$1.38 billion in 1982. However, as a proportion of farm net income, government expenditures over 1970 to 1982 have been relatively unstable, primarily because of the substantial changes in farm net income during the period. Direct payments through commodity programs represented from 8.5 to 26.7 percent in the same period, and federal subsidies represented from 4.4 to 24.6 percent.

## Notes

### CHAPTER 1

1. Long/short-haul discriminatory pricing by the railways, which is seen as subsidizing long-haul transportation at the expense of short-haul service, is also seen as imposing a significant burden on the Prairie provinces. The argument runs as follows. Railways act as discriminating monopolists, setting freight rates on the basis of value of service rather than cost of service. The demand for imported manufactured products in the Prairies is assumed to be relatively price inelastic, and the general lack of intermodal competition in the region means that railways are able to price discriminate and charge more than cost for transporting processed products into the region. Because of this perception, Prairie provinces have been lobbying for a freight rate structure based more directly on cost rather than the value of service provided.
2. See Petroleum Monitoring Agency Canada (1985), p. 6–2.
3. The federal government has consistently supported national standards for health care. However, national standards for post-secondary education are more controversial. The federal government's view is that the issue is its ability to influence post-secondary education development, not simply growth and program expansion. This reflects the view that with the institutional infrastructure in place and with slower growth in student numbers, Canada's economic development depends on better coordination of higher education rather than simply the level of provision. The federal government's new financing arrangement for post-secondary education reflects this approach.
4. For a discussion of optimal tariffs see Johnson (1958).
5. This is closely related to a microconsistent national data set for tax policy analysis constructed by St-Hilaire and Whalley (1982), using 1972 data.
6. This approach reflects the attempt to use a framework widely adopted in theoretical work in economics but as yet only partially incorporated in empirically based policy analysis. Many of these developments are summarized in a recent survey paper on applied general equilibrium analysis by Shoven and Whalley (1984), where this approach is described in more detail.

### CHAPTER 2

1. In this analysis federal tariff revenues are assumed to be returned in lump sum form to the importing region. In Chapter 5, where the results of numerical partial equilibrium calculations are reported, federal tariff revenues are instead assumed to be redistributed among the regions on an equal per capita basis. This difference in treatment is necessary because of the difficulties of representing transfers of revenues diagrammatically.
2. This point is also emphasized in Wonnacott (1984).
3. Transport costs are assumed to be a fixed amount  $T$  per unit shipped interregionally and internationally.
4. In this analysis the interregional effects do not include taxes paid to finance the subsidy, but subsidy costs are included in the national welfare effects. In Chapter 5, where the results of numerical partial equilibrium calculations are reported, the cost of the subsidy is instead assumed to be financed by an equal per capita tax paid by all regions. This difference in treatment is necessary because of the difficulties in representing these taxes diagrammatically.
5. The treatment is similar to that described in footnote 4. The interregional effects are calculated ignoring taxes needed to finance this subsidy, while the national welfare effects include subsidy financing costs.
6. We make the assumption that value added within a region is greater for goods and services produced locally than for these imported from other regions and the rest of the world.
7. See Canada, Department of Agriculture (1985b), p. 12.
8. An exception is the Quebec Liquor Commission (Société des Alcools du Québec), which has no authority over buying and pricing policies of beer brewed in the province.
9. The treatment is similar to that described in footnote 1, except that in this analysis

federal tax revenues are assumed to be returned in lump sum form to the regions that paid the taxes.

10. The treatment is similar to that described in footnote 4.

#### CHAPTER 3

1. Also see the discussion in Chapter 4.
2. For example, public goods are provided up to the point where the sum of the marginal rates of substitution between public and private goods equals the corresponding marginal rate of transformation.
3. Also see the discussion in Whalley (1985).
4. The profit-type return to capital by industry is treated as a contractual cost and enters these zero profit conditions.
5. The term "RAS" refers to the row and column sum adjustment methods for updating input-output tables. See the discussion in Bacharach (1971).
6. This section is based in part on the discussion in Mansur and Whalley (1984).
7. This is true for any demand functions derived from directly additive preferences (of which a single state CES function is an example), a property which Deaton (1974) refers to as "Pigou's Law."

#### CHAPTER 4

1. The calculations use 1980 National Capital Consumption Allowance data reported in Statistics Canada (1983a).
2. In the "RAS" procedure, a non-negative matrix which does not initially meet prescribed non-negative row and column sum constraints is restored to a situation of consistency through a sequence of alternating operations on rows and columns of the matrix. First row constraints are satisfied, then column constraints, then row constraints, and so on until a consistent matrix is achieved. The sums of pre-specified row and column constraints must be the same since they both provide the matrix sum. If the matrix is everywhere dense, convergence is assured; see Bacharach (1971).
3. The estimates of energy taxes and subsidies appear in the PEA in a footnote to Table 1.
4. See Economic Council of Canada (1982), Chapter 4 and Appendix B. An average of the high and low estimates has been used here.
5. See Canada, Department of Transport (1983).
6. Ibid.

#### CHAPTER 5

1. The interregional effects of the federal tariff on commodity 5 have been calculated in a later section dealing with the interregional effects of textile and clothing quotas. Commodity 8 is not included in the analysis, since the Auto Pact provides for duty-free trade in motor vehicles and automotive parts between the United States and Canada. Commodity 9 is not included because of the price controls under the National Energy Program (NEP).
2. Under a system of revenue flowback, the average price of natural gas is determined by pooling revenues from the sale of natural gas in the United States with revenues received in the domestic market. More details on the revenue flowback system are given in the appendix.
3. See Petroleum Monitoring Agency Canada (1983), Appendix B-5; and Petroleum Monitoring Agency Canada (1985), Appendix A-7.
4. Data on metres drilled in 1981 are from Canadian Petroleum Association (1982), Section 1, Table 5.
5. Data on metres drilled in 1984 are from Canadian Petroleum Association (1985), Section 1, Table 5.

6. See Petroleum Monitoring Agency Canada (1983), Appendix B-6. Due to confidentiality, data on development expenditures by area on the Canada Lands for 1981 are not available. For this reason, we make the assumption that in 1981, development expenditures on the Canada Lands were zero. This discrepancy in data does not significantly affect the results of our analysis, since total development expenditures on the Canada Lands in 1981 were very small (see Petroleum Monitoring Agency Canada (1983), Appendix C-5).
7. See Petroleum Monitoring Agency Canada (1985), Appendix A-9. The treatment of development expenditures on the Canada Lands is similar to that described in footnote 6; development expenditures on the Canada Lands in 1984 are assumed to be zero.
8. Federal tax revenues minus federal expenditures.
9. See Statistics Canada (1983c), Table 3.
10. See Canada, Department of Agriculture (1981a), Table 35.
11. *Ibid.*, Table 21.
12. The exception is Ontario, where an insignificant amount of total demand is satisfied by foreign imports.
13. See Canada, Department of Agriculture (1981b), pp. 4–5.
14. Data for the federal subsidy from Canada, Canadian Dairy Commission (1981), Table 2.
15. See Statistics Canada (1982), Table 9.
16. Given the values of production and interregional imports for each region, and average mark-ups calculated as

$$\frac{\pi_R}{P_R + I_R \left( \frac{M_R^O}{M_R^R} \right)} = X_R, \quad R = 1, \dots, 6$$

where  $R$  denotes the region,  $\pi_R$  the profits,  $P_R$  the value of production,  $I_R$  the value of interregional imports,  $M_R^O$  the markup on out-of-province wine,  $M_R^R$  the mark-up on within-province wine, and  $X_R$  the average percentage mark-up, the adjusted mark-ups on within-province and out-of-province wine are  $X_R$  and

$$X_R \frac{M_R^O}{M_R^R},$$

respectively.

17. Data for the manufacturers' sales tax are from Canada, Department of National Revenue (1984).
18. See Statistics Canada (1984a), Table 4.

## CHAPTER 6

1. See, for example, Ontario, Treasury Department (1977); Canada, Federal-Provincial Relations Office (1977); and Quebec Ministry of Industry and Commerce (1977).
2. Chrétien (1980).

## APPENDIX

1. This discussion is based on Whalley et al. (1985b).
2. The material in this section is largely based on Canada, Department of Transport (1983).
3. Sources for this section include: Trebilcock et al. (1983), pp. 222–38; Lenjosek (1984); Canada, Department of Energy, Mines and Resources (1980), (1981), (1982), (1983), (1984b), (1984c), (1984d), (1985); Memorandum of Agreement Between the Govern-

ment of Canada and the Government of Alberta Relating to Energy Pricing and Taxation, September 1, 1981; Letter of Understanding Between the Government of Canada and the Government of British Columbia Relating to Energy Pricing and Taxation, September 24, 1981; Letter of Understanding Between the Government of Canada and the Government of Saskatchewan Relating to Energy Pricing and Taxation, October 26, 1981; Memorandum of Agreement Between the Government of Canada and the Government of Alberta Respecting Gas Pricing and Market Development Incentive Payments, November 25, 1981; Canada-Alberta Natural Gas Agreement, December 10, 1981; Agreement to Amend the Memorandum of Agreement of September 1, 1981 Between the Government of Canada and the Government of Alberta Relating to Energy Pricing and Taxation, June 30, 1983; Agreement to Amend the Letter of Understanding of October 26, 1981 Between the Government of Canada and the Government of Saskatchewan Relating to Energy Pricing and Taxation, August 23, 1983; Letter of Agreement Between the Government of Canada and the Government of British Columbia to Amend the Letter of Agreement of September 24, 1981 Relating to Energy Pricing and Taxation, August 13, 1984.

4. The NEB is a federal agency established for the purpose of regulating the energy sector. In addition to its role in regulating Canadian exports of crude oil (and natural gas), the NEB played an important role during the 1960s and 1970s in overseeing the construction of oil and gas pipelines between eastern and western Canada.
5. That portion of gas sold in the export market was exempt from the tax until February 1, 1981.
6. A Special Compensation Charge (SCC) was added to the Petroleum Compensation Charge on March 1, 1981 but abolished on September 22, 1981.
7. Sources for this section include: Courchene and Coppelstone (1980) pp. 8–15; Perry (1983) pp. 30–34, 36; Canada, Department of Finance (1981b), pp. 11–18; Canada, Parliament (1981), pp. 169–83, (1982); Canada, Office of Deputy Prime Minister and Minister of Finance and Sewell and Slater (1982), pp. 17–19.
8. The minimum payment to a recipient province is: 95 percent of the entitlement for the preceding year (1981/82) if the provinces's per capita revenue is 70 percent or less of the national average; 90 percent if the per capita revenue is 75 percent or less of the national average; and 85 percent if the per capita revenue is over 75 percent of the national average (Perry, 1983, p. 84).
9. Information in this section was taken from: Canada, Department of Finance (1981a), Annex VI, (1981b), pp. 20–29, 37–39; Canada, Parliament (1981), pp. 78–95, (1982); Boadway (1980), pp. 19–27; Canada, Department of the Secretary of State (1983); and correspondence with Health and Welfare Canada.
10. As a result of the 1972 tax reform, 4.0 personal income tax points were transferred from the federal government to the provincial governments, thus lowering the basic federal tax. Since provinces levy their personal income taxes on the federal tax base, it was necessary for them to adjust their provincial tax rates in order to obtain the same total revenues. The revenue guarantee was given to the provinces following the reform to ensure that the revenues collected were no less than they were prior to the reform.
11. Sources for this section include: Boadway (1980), pp. 27–28; Canada, Parliament (1981), pp. 64, 156–62, 166.
12. The information in this section was taken from: Canada (1979), pp. 1–12, 42–43; Jenkins (1980), pp. 1–7; Keesing and Wolfe (1980), pp. 6–22; and Wolf (1983).
13. The MFA is an arrangement controlling international trade in textiles. This arrangement evolved over a period of 20 years, during which time agreements were made by developed countries to operate quantitative controls on imports of cotton textiles (defined as textile products in which cotton represented over 50 percent of the fibre content) from low-cost sources of supply. Strong pressures built up to widen the scope of the restrictions, as exports from developing countries of textiles and textile products made of man-made fibres and wool were not included in the agreements expanded. These pressures were satisfied by the introduction of the MFA in January 1974.
14. This summary draws on information presented in Canada Federal Task Force on the Canadian Motor Vehicle and Automotive Parts Industries (1983c).

15. Under the agreement, Canadian value-added for all classes of vehicles — cars, trucks, and buses — made in Canada must be at least as great as the value added in the base year. Canadian value added over and above the base year requirements should amount to at least 60 percent of the increase in value of cars sold in Canada over the value of cars sold in the base year; for commercial vehicles, the value added should amount to at least 50 percent of the increase in value of commercial vehicles sold in the base year.
16. Sources of this section include: Economic Council of Canada (1981), pp. 55–64; Canada, Department of Agriculture (1985a); Haack et al. (1981), pp. 16–30; Canadian Federation of Agriculture (1980); Canada, Canadian Dairy Commission (1981); Arcus (1981); and correspondence with the Canadian Turkey Marketing Agency, the Canadian Chicken Marketing Agency, the Ontario Burley Tobacco Growers Marketing Agency, and the Ontario Flue-Cured Tobacco Growers Marketing Board.
17. See Canada, Department of Agriculture (1985a), p. 12.
18. See Economic Council of Canada (1981), p. 57.
19. The information for the global import quota for chickens was obtained from contact with the Canadian Chicken Marketing Agency.
20. The information for the global import quota for turkeys was obtained from contact with the Canadian Turkey Marketing Agency.
21. The information for the global import quotas for eggs and egg products was obtained from contact with the Department of External Affairs.
22. Discussion in this section draws heavily on information from: Canada Department of Regional Economic Expansion (1980), (1983); and Canada, Department of Industry, Trade and Commerce/Regional Industrial Expansion (1984).
23. The information in this section was taken from: Garland and Hudson (1969), pp. 1–2; Brinkman (1981), pp. 51–56; Economic Council of Canada (1981), p. 51; Forbes et al. (1982), p. 15; Statistics Canada (1985); and Canada, Department of Agriculture (1985b), pp. 5–14.

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