Nordicity Group Ltd.
Le Groupe Nordicité ltée

Interim Report

Effects of Increased Liberalization in the Canadian Telecommunications Industry

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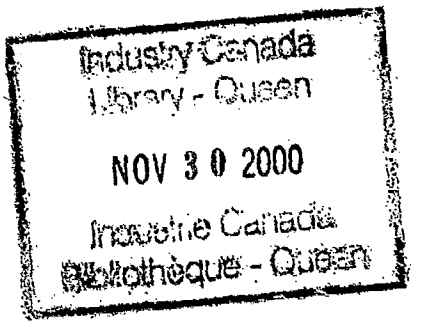

Interim Report

Effects of Increased Liberalization in the Canadian Telecommunications Industry

Prepared for:
Industry Canada

Prepared by:
Nordicity Group Ltd.

September 30, 1996

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AGENDA

September 30, 1996
2:00 pm to 4:00 pm
300 Slater Street
Room 1700
Ottawa, Ontario

1. Review of Deliverable Dates and Milestones

2. Interim Report

Status of Task 2 - Canada and Global Telecommunications Market

- Overview of the World Telecommunications Market
  - Developments and Trends
  - Alliances and Investments
  - Privatization and New Entrant Potential
  - Canada's share of the International Market
  - Canadian Investment in Foreign Markets
- Competitiveness Assessment
- Capital Market Effects of Reduced Foreign Ownership Rules - **TD**

Status of Task 3 - Interviews with Stakeholders

- Preliminary results
- Issues raised and liberalization impact

Status of Task 4 - Sector Models

- Working Paper
- Impact Exercise

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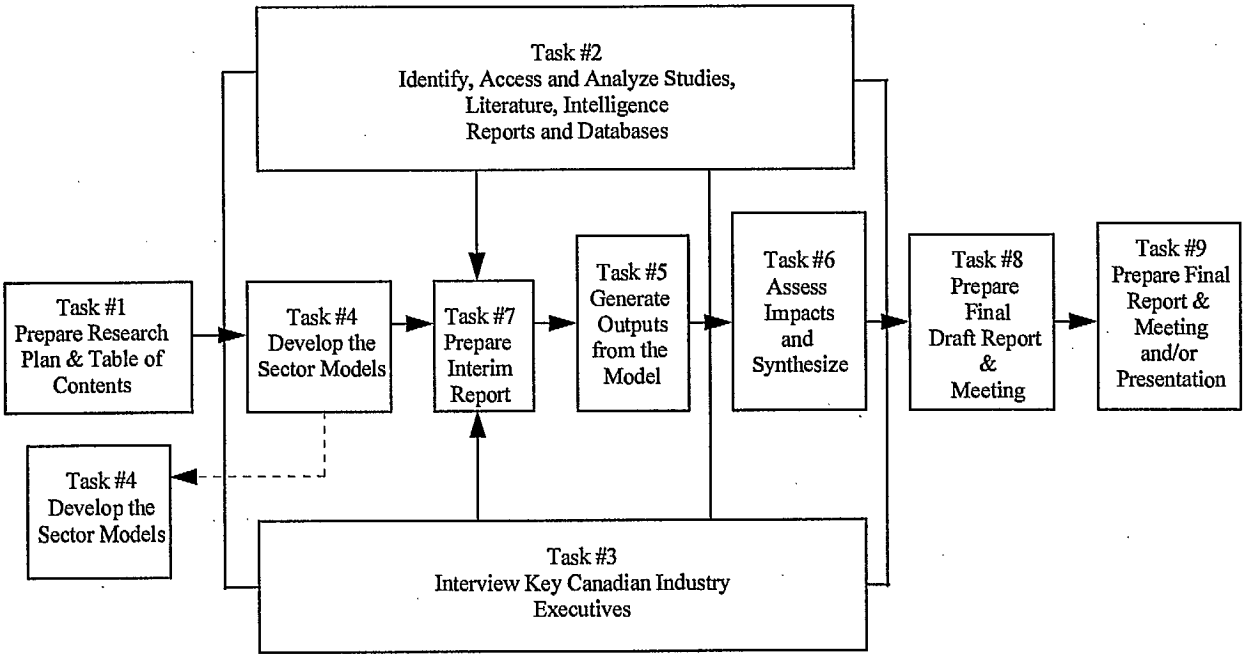
1.2 Status report on Tasks #2, 3, 4

1.1 Analytical Process



As a result of initial discussions, it was determined that a substantial portion of Task # 4, Develop the Sector Models, has to be completed in order to properly accomplish Tasks # 2 and # 3. Specifically, the interface between the econometric modeling on the one side and the results required of the secondary research and interviews needed to be understood in order to obtain results that could be used in the modeling portion of the project. This analysis was completed and incorporated into the Scenario definition, Interview Guides, and the working paper and sample impact assessment prepared under Task 4.

1.2 Status Report on Tasks #2, 3, 4

Task	Status	Completion Date
Task 1: Project Initiation Meeting Interview guide, final report outline	• complete	Sept. 12/19
Task 2: Intelligence Gathering	• on-going • bibliography of sources attached in Appendix I	Oct. 15
Task 3: Interviews	• 3 completed • 8 scheduled	Sept. 30 Oct. 4
Task 4: Sector Models	• trial impact assessment • Analysis of input required from Tasks 2 & 3 • working paper for analysis	Sept. 20 Sept. 24 Sept. 24/30

General Status: On Time

TAB 2
TASK #2 -INTELLIGENCE GATHERING

2.1 Overview of the World Telecommunications Market - NGL

- 2.1.1 Multilateral Negotiations on the Liberalization of Telecommunications Services
- 2.1.2 Key Developments and Trends
  - 2.1.2.1 Global Regulatory Trends
  - 2.1.2.2 Global Alliances and International Investments
  - 2.1.2.3 Privatization and New Entrant Potential
- 2.1.3 Competitiveness of the Canadian Telecommunications Industry
  - 2.1.3.1 Canada's Share of the International Market
  - 2.1.3.2 Competitiveness Assessment
  - 2.1.3.3 Foreign Investment Regulation Assessment

2.2 Capital Market Effects of Reduced Foreign Ownership Rules - TD Securities

2.1 Overview of the World Telecommunications Market

2.1.1 Multilateral Negotiations on the Liberalization of Telecommunications Services

Chronology of International Trade Negotiations

1947	*General Agreement on Tariffs and Trade (GATT) – set the framework for on-going global trade-liberalization negotiations*
1947	*Geneva Round*
1949	*Annecy Round*
1951	*Torquay Road*
1956	*Geneva Round*
1960-61	*Dillon Round*
1964-67	*Kennedy Round*
1973-79	*Tokyo Round – provided a legal basis for trade preferences by developed countries in favour of developing countries*
1986-94	*Uruguay Round – included negotiations about trade in goods, including agricultural productions, trade in services, and trade-related aspects of intellectual property*
1994	*Marrakesh Agreement – resulted in GATS (including Annexes and Schedules on telecommunications), established the WTO, and created the Negotiating Group on Basic Telecommunications (NGBT)*
1994-96	*NGBT – aiming to move beyond the commitments made during the Uruguay Round*
1996	*NGBT agreed to freeze negotiations until a later period*
Jan/Feb '97	*Proposed re-examination period*
Jan 1, '98	*Proposed date for entry into force of liberalization commitments*

Findings

- Increased liberalization of trade in the global telecommunications services industry has been a key item on the world's agenda for the past several years
- Major issues concern barriers to international competition and the administration of domestic telecommunications policy
- Canada has contributed to the creation of a set of criteria on additional commitments related to the regulatory environment and currently accepts the obligations in the so-called 'reference paper'
- Canada is committed to open and transparent regulatory and standards setting processes and will allow access to spectrum, subject to availability
- Canada is still reviewing its ownership and market access position

2.1.2 Key Developments and Trends

Background

- Globalization breaking down borders, creating demand for seamless service
- Policy driving deregulation and privatization; (UK facilities-based international telecom traffic now completely deregulated; FCC rules relaxed to promote competition in international telecom services)
- Infrastructure investment requirements heavy; countries competing for capital
- Industry responses: alliances to gain access to capital, economies of scope and scale
- Consolidation of players and vertical market integration of content and delivery systems

Situating Canada in Relation to Global Developments

Top 25 Info-communications Companies Worldwide, 1994

		Info-communications Sales			Total Profit	
Rank	Company	1994 (US$m)	Change % (1993-94)	As % of Total Sales	1994 (US$m)	Change % (1993-94)
1	NTT (Japan	79070	5.8	100	857	52.9
2	AT&T (USA)	71977	11.3	96	4710	--
3	IBM (USA)	64052	2.1	100	3021	--
4	Sony (Japan)	44758	6.7	100	-3296	--
5	NEC (Japan)	43326	5.3	100	406	434.6
6	Duetsche Telekom	37713	3.7	100	794	--
7	Matsushita (Japan)	37321	1.9	48	1017	269.5
8	Fujitsu (Japan)	36603	3.8	100	506	--
9	Hitachi (Japan)	30213	3.8	35	1280	74.5
10	Toshiba (Japan)	29939	9.3	56	502	268.1
11	HP (USA)	24991	223.0	100	1599	35.9
12	Siemens (Germany)	23540	12.7	45	1228	0.6
13	France Télécom	23288	1.8	100	1657	91.5
14	BT (UK)	22645	1.6	100	2830	-3.8
15	Motorola (USA)	22245	31.1	10	1560	52.6
16	Philips (Netherlands)	21112	2.0	63	1174	8.1
17	STET (Italy)	20932	13.3	100	1179	23.5
18	Alcaltel Alsthom (France)	20407	6.8	68	652	-48.7
19	GTE (USA)	19944	1.0	100	2451	172.3
20	Canon (Japan)	19333	5.3	100	310	47.0
21	BellSouth (USA)	16845	6.1	100	2160	145.4
22	BCE (Canada)	15868	9.3	100	863	--
23	Xerox (USA)	15088	6.0	85	794	--
24	Samsung (Korea)	14617	41.2	42	1226	247.9
25	Bell Atlantic (USA)	13791	4.9	100	-755	--
	Top 25	**469620**	**7.2**	**80**	**28724**	**1759.3**

Source: ITU World Telecom Report, 1995

Multimedia Access

Economy	Telephone Density	TV Density	PC Density	Rank	Economy	Telephone Density	TV Density	PC Density	Rank
United States	59.5	79	29.7	1	Israel	39.4	30	9.4	21=
Denmark	60.4	55	19.3	2	Greece	47.8	22	2.9	23
Canada	57.5	65	17.5	3	Portugal	35.0	25	5.0	24
Sweden	68.3	48	17.2	4	Argentina	14.1	38	1.7	25
Australia	49.6	48	21.7	5=	Poland	13.1	30	2.2	26=
France	54.7	58	14.0	5=	Russia	16.2	38	1.0	26=
Switzerland	59.7	41	28.8	5=	Malaysia	14.7	23	3.3	28
Netherlands	50.9	48	15.6	8	Chile	11.0	23	3.1	29=
Germany	48.3	55	14.4	9	Turkey	20.1	27	1.1	29=
Japan	47.8	64	12.0	10	Mexico	9.2	20	2.2	31
UK	48.9	45	15.1	11	Brazil	7.4	29	0.9	32
Austria	46.5	48	10.7	12=	Venezuela	10.9	18	1.3	33
Belgium	44.9	47	12.9	12=	South Africa	9.5	10	2.2	34
Singapore	47.3	38	15.3	12=	Thailand	4.7	19	1.2	35
Hongkong	54.0	36	11.3	15	China	2.3	23	0.2	36
Italy	42.9	45	7.2	16	Philippines	1.7	12	0.6	37
Spain	37.1	42	7.0	17	Indonesia	1.3	9	0.3	38
Korea (Rep.)	39.7	32	11.2	18	India	1.1	5	0.1	39
Taiwan-China	40.0	32	8.1	19	**Average Developed**	**52.3**	**63**	**18.7**	
Hungary	17.0	42	3.4	20	**Average Developing**	**5.2**	**18**	**0.7**	
Czech Republic	20.9	39	3.6	21=	**Overall Average**	**14.5**	**27**	**4.3**	

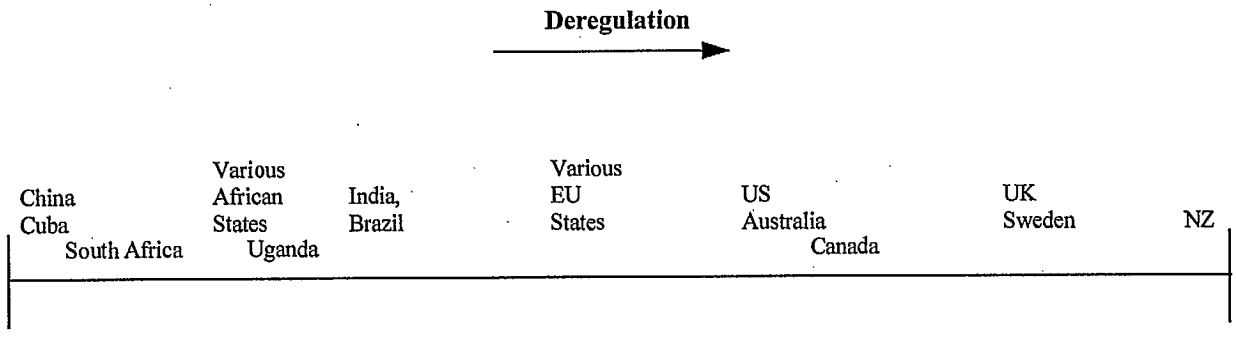
Source: ITU World Telecom Report, 1995

2.1.2.1 Global Regulatory Trends

Momentum toward liberalization:

- Privatization - (e.g. NTT, Deutsche Telecom still forthcoming; now turn of developing countries)
- Competition - (e.g. US Telecom Act(convergence), France Telecom to compete with foreign operators)
- Liberalization - (e.g. EU legislation to require member states to end national restrictions by Jan 1, 1998 including alternative infrastructure)
- Policy direction toward deregulation - (e.g. Free market entry: 50 % of Telecom New Zealand shares now controlled by two U.S. companies)

Canada on a Continuum of Deregulation



Interpreted from: Economist Annual Telecom Survey
Salomon Bros. Quarterly Telecom Survey

Notes:
South Africa: still monopoly PTT arrangement; beginning process of corporatization
Uganda: privatization of PTT underway; continuing monopoly guaranteed
India, Brazil: privatization underway; competitive entry planned
Canada: compared to US, streamlined regulatory process (slightly) greater ease of market entry (i.e. resellers)

Findings

- Countries are using the policy regulatory instruments to gain national competitive advantage, but Canada must stay abreast of international developments in order to maintain its own national competitiveness in the telecommunications sector.

2.1.2.2 Alliances and Investments

- **Alliance Formations Growing Rapidly**
  - Increased participation among major international carriers in global alliances
  - Large number of alliances are based in Europe and North America
  - large number of operational locations are in Central/Eastern Europe and Central/South America

- **Reasons for Increase in Alliance Formations**
  - Globalization of telecom industry at large, i.e. customers want global service
  - Capital constraints involved in huge network builds
  - Communications convergence, cross industry formations
  - Economies of scope and scale, i.e. companies want to be cross-industry involved

- **Four Basic Types of Telecom Alliances**
  - The Supercarrier Alliances: large alliances from industrialized nations (see point below)
  - Alliances through Privatizations (RBOCs and European monopoly telecom companies)
  - Alliances Formed to Exploit Opportunities in Developing Countries
  - Cross Industry Alliances

- **Major Alliances in the Telecom Industry**
  - MCI/BT (Concert)
  - Sprint/France Telecom/Deutsche Telekom (Global One)
  - WorldPartners
  - Uniworld
  - Cable and Wireless Federation
  - BT/Mannesmann AG/SBC/ Generale des Eaux (Cegetel)

Findings

- Shrinking market share while overall market is growing; supercarrier alliances all targeting the same markets
- Competition is forcing prices to drop
- Growing trend to invest abroad to expand to broaden their reach and seek greater financial return

2.1.2.3 Privatization and New Entrant Potential

Upcoming Telecom Privatizations

	Country	Type	Sale %	Size (est) $ millions	Manager/ Advisor	Date
Portugal Telecom	Portugal	Secondary	22	885	Meerill/Warburg/UBS	June 1996
Manitoba Telephone	Canada	IPO	100	511	Wood Gundy/RBC/ Richardson	July 1996
Telefonica del Peru	Peru	IPO	29	1400	JP Morgan/Merrill	July 1996
Deutsche Telekom	Germany	IPO	30	10000	Deutsche/Dresdner/ Goldman	Nov. 1996
Korea Telecom	Korea	Secondary	14	n/a	n/a	1996
Singapore Telecom	Singapore	IPO	n/a	n/a	n/a	1996
Bezeq	Israel	Secondary	25	650	Merrill/Morgan Stanley	1996
Shanghai Guomai	China	IPO	n/a	n/a	n/a	1996
Matav	Hungary	IPO	n/a	n/a	CSFB	1996
Turk Telekom	Turkey	IPO	n/a	n/a	n/a	1996
Stet	Italy	Secondary	(52)	(4100)	Morgan Stanley/ Mediobanca/BZW	1996
Telstra	Australia	IPO	33	6200	CSFB	1997
Deutsche Telekom	Germany	Secondary	n/a	n/a	n/a	1998
Deutsche Telekom	Germany	Secondary	n/a	n/a	n/a	2000
Kuwait Telecoms	Kuwait	IPO	51	n/a	n/a	n/a
CANTV	Venezuela	Secondary	(49)	n/a	n/a	n/a
NTT	Japan	Secondary	n/a	n/a	n/a	n/a
Sonatel	Senegal	IPO	n/a	n/a	n/a	n/a
CI-Telecom	Cote d'Ivoire	IPO	10	n/a	n/a	n/a

Recent Telecom Privatizations

Date	Company	Country	% Sold	Amount Raised $ millions
4/96	OTE	Greece	8	555.3
12/95	Belgacom	Belgium	49.9	2506
12/95	Matav	Hungary	37	852
11/95	PT Telkom	Indonesia	19	1590
10/95	KPN	Netherlands	20	3452.6
10/95	Telefonica	Spain	12	1331.7
10/95	Entel	Bolivia	50	610
6/95	SPT Telecom	Czechaslavakia	27	1450
6/95	Portugal Telecom	Portugal	28.3	986.6
6/94	KPN	Netherlands	30	3656.5
5/94	TeleDanmark	Denmark	48.3	3100.7
12/93	Matav	Hungary	30.3	875

2.1.3 Competitiveness of the Canadian Telecommunications Industry

- The process of telecom privatization now shifts to the rapidly emerging markets of countries in Asia, Latin America and Africa (notable exception of Germany, Italy and Japan, where privatization has been slowed by political developments)
    - some 16 African countries have declared their intention to phase in private participation in basic voice services by April 1997 (as part of their offer to the WTO)
    - these regions are sought by global players seeking higher returns on investments. The World Bank estimates that East Africa alone will consume $1.5 trillion for infrastructure development - with telecommunication taking up a substantial amount - over the next decade. China will likely attract $750 million.
    - countries from outside the OECD are encouraging investment from cross-border alliances, following recent economic, regulatory and political liberalization, and are seeking telecom coalitions as a means of developing infrastructure (i.e. Telecom New Zealand and Thailand's TelecomAsia).
- Developed countries also continue to seek new investment and to adapt new policies governing entry by foreign carriers into their market:
    - the FCC has recently significantly relaxed the foreign ownership constraints governing foreign carrier entry into the U.S. marketplace, the ECO rule (to be applied only to foreign telecom entities with "market power"; non-dominant foreign carriers need not pass the test)
- France Telecom/Deutsche Telekom allowed to invest in Sprint (up to 35 % as of Sept. 1996)

Findings:

- Number of countries seeking telecom investment increasing
- Countries are privatizing and liberalizing telecom sector to secure investment

2.1.3.1 Canada's Share of the International Market

- World services market was $448.5B (US) in 1995
- Although Canadian exports in telecommunications equipment have risen during the past few years, Canadian production of telecommunications equipment is estimated to represent only 3% of the world market
- Canadian participation in global telecom markets - not limited to export activities:
    - Canadian firms are establishing offshore operations to serve foreign markets
- Canada has worldwide reputation as leader in telecommunications innovation - heavy R&D investments
    - global telecom equipment industry as a whole devotes 11% of revenues to R&D

  - Canadian telecommunications R&D expenditures accounted for approximately 23% of the R&D performed by Canadian industry (and Nortel accounts for about 80% of that)
- Canada's ranking in global telecompetitiveness
  - Canada's telecompetitiveness scores are impressive by international standards
  - Canada ranks a close second behind Singapore and ahead of the US, which is in third place
  - Canada's infostructure trails only Singapore and France
  - Reasons for Canada's high ranking: extensive digitalization; deployment of SS7 and fibre optic cable; high levels of penetration - in both telephone access lines and cellular phones
- Canada's capital investment in public network facilities is lagging behind other countries
  - Canada ranked 4th of seven countries in annual new network investment per access line, as of 1991, with annual investments by telcos averaging US$233.60 per access line
- Canada's capital recovery rates also lag behind - 6th out of seven nations
- Equivalent to 36 per cent of the world's information industry
- Growing at twice the rate of the world economy
- Telecommunications represents area of high growth employment in Canada -
  - Canadian telecom industry created 5,000 new Canadian jobs at wage rates 30% higher than the Canadian average
- Investments in telecommunications infostructure drive economic development
  - telecom equipment manufacturers produced 3.6% of GDP (1992)
- Telecommunications equipment exports are increasing - equipment exports increased 85% between 1989-92
- Canada's communications services exports grew 92% from 1989 to 1992

2.1.3.2 Competitiveness Assessment - Benchmarking

Telecompetitiveness Index Component Scores

	Canada	France	Germany	Japan	Singapore	UK	US
Digitalizaton	8.5	8.9	4.0	5.5	7.1	5.5	6.9
SS7	8.5	7.3	2.1	4.8	9.5	4.6	8.1
Fiber Deployment	5.0	7.0	3.5	7.0	8.0	4.0	6.5
Infostructure	**7.1**	**7.8**	**3.4**	6.0	**7.9**	**4.7**	**7.0**
Capital Investment	4.8	4.7	9.6	8.3	7.4	2.2	2.9
Capital Recovery	2.4	5.5	2.5	8.4	5.7	4.0	1.2
Digital Switches	6.2	4.0	2.0	7.9	5.9	4.0	1.1
Analog Switches	1.8	5.4	3.8	8.8	7.1	5.4	0.7
Fiber Optic Cable	0.7	5.1	2.7	9.5	5.1	5.1	1.2
Copper Cable	1.0	7.6	1.4	7.6	4.5	1.4	1.9
Capital Invest & Recovery	**3.6**	**5.1**	**6.0**	**8.3**	**6.5**	**3.1**	**2.1**
Regualtory Delays	4.0	9.0	5.0	7.0	10.0	8.0	1.0
Policy Focus	6.0	10.0	7.0	9.0	9.0	9.0	5.0
Infostructure Initiatives	6.0	9.0	6.0	9.0	10.0	5.0	6.0
Modernization of Regulation	4.8	5.8	33	5.5	5.5	8.5	7.0
Rate Rebalancing	4.0	6.0	2.0	5.0	8.0	8.0	7.0
Competition Policies	5.0	4.0	2.0	6.0	3.0	10.0	8.0
Forbearance	6.0	6.0	4.0	5.0	6.0	7.0	5.0
Role of Regulator	4.0	7.0	5.0	6.0	5.0	9.0	8.0
Policy and Regulation	**5.2**	**7.8**	**4.8**	**7.2**	**7.9**	**7.5**	**5.6**
Access Lines Per Employee	6.8	8.8	7.1	9.5	6.6	5.8	7.5
Operating Expenses per Access Line	4.6	1.0	0.5	2.1	4.8	3.3	5.0
Call per Employee	7.0	2.8	2.6	4.2	9.5	2.9	8.2
Productivitiy	**6.3**	**3.0**	**4.3**	**6.3**	**6.9**	**4.5**	**7.1**
Access Lines	9.5	8.5	8.6	7.8	8.8	7.6	9.2
wireless	9.5	2.1	2.1	2.8	6.9	6.7	9.3
Cable TV	9.5	0.7	6.2	2.1	0.1	0.3	7.9
Penetration	**9.5**	**3.7**	**5.6**	**4.2**	**5.3**	**4.8**	**8.8**
Fault Reports	7.7	4.4	n/a	8.7	8.7	1.0	7.2
Installation Time	8.2	1.0	n/a	6.4	4.5	3.6	7.0
Fault Clearance	8.7	8.6	n/a	5.0	9.8	8.7	9.4
Blockage at Peak							
Quality	**8.2**	**4.7**	**n/a**	6.7	**8.0**	**4.4**	**7.9**
Market Openness	8.1	4.0	5.6	2.2	9.6	8.7	5.5
New Services	6.0	9.5	4.3	7.0	7.7	6.7	8.5
	6.0	9.5	4.0	6.0	8.0	6.0	8.0
New Service Offerings	5.0	9.5	4.0	7.0	7.0	7.0	9.5
Usage	7.0	9.5	5.0	8.0	8.0	7.0	8.0
International Traffic	7.4	3.7	4.0	2.3	9.3	4.2	7.1
Total Traffic	8.0	5.7	7.3	0.9	9.0	6.9	4.9
Calls per Access Line	7.8	2.6	2.6	2.8	9.5	2.6	9.1
	6.3	2.6	2.3	3.3	9.5	3.1	7.2
Market Development	**7.2**	**5.7**	**4.7**	**3.8**	**8.9**	**6.5**	**7.0**
Residential Rates	7.8	6.5	2.2	1.5	8.3	3.8	4.1
Business Rates	6.4	4.0	3.0	1.5	6.9	6.7	2.1
International Rates	5.6	2.9	1.5	3.4	8.4	5.0	5.8
Rate Rationalization	5.0	4.0	2.0	6.0	9.0	9.0	8.0
Rates	**6.2**	**3.6**	**2.2**	**3.1**	**8.2**	**6.1**	**5.0**
Telecom R&D	8.8	2.8	6.2	4.9	6.4	1.2	1.6
Patents	1.4	3.3	4.0	3.4	0.1	3.2	9.0
Telecom R&D Expenditures	1.2	1.4	5.3	9.0	0.0	0.5	4.9
Research & Development	**3.8**	**2.5**	**5.2**	**5.8**	**2.2**	**1.6**	**5.1**
Investment	6.4	4.5	9.5	6.5	8.9	7.2	4.2
Revenue	7.7	5.1	5.9	5.2	9.5	6.8	7.7
Employment	8.9	7.6	8.3	5.0	3.5	8.4	9.5
Equipment Exports/Mfg Exports	7.9	4.4	3.2	9.5	0.5	3.3	6.5
Exports	1.9	2.4	3.8	9.5	0.3	1.6	6.9
Sector Strength	**6.5**	**4.8**	**6.1**	**7.1**	**4.6**	**5.5**	**7.0**

Source: Adapted from Nortel Study "A Telecompetitiveness Infosatructure: Enabling a new Future for Canada", May 1994

Australia, Best and Worst Observed

Indicator	Year	Best Observed	Worst Observed	Australia's Rank
Prices				
Simple Rate Comparisons				
Business Fixed Charges	1993	United States	Canada	18th of 28
Long Distance Call Charges	1993	Luxembourg	Portugal	16th of 26
International Call Charges	1994	Norway	Japan	14th of 24
Mobile Fixed Charges	1992	Malaysia	Luxembourg	9th of 29
Mobile Call Charges	1992	Singapore	Germany	7th of 29
Basket Comparisons				
National basket	1994	Iceland	Austria	14th of 23
International Call basket	1994	Australia	Turkey	1st of 24
Mobile basket	1994	Iceland	Japan	4th of 24
PSDN basket	1994	Finland	Japan	18th of 24
Leased line basket, 9.6Kbit	1994	Belgium	Austria	9th of 24
Leased line basket, 64Kbit	1994	Australia	Spain	1st of 24
Leased line basket, 1.5/2 Mbit	1994	United Kingdom	Luxembourg	5th of 22
Composite basket	1994	Finland	Japan	11th of 22
Quality Service				
IDD Completion Rates	1992	United States	Greece	15th of 24
Fault Clearance	1992	Netherlands	Taiwan	15th of 19
Innovation				
R&D Investment				
Wireless	1994	Sweden	Turkey	8th of 30
Digitalization	1993	Hongkong	Austria	23rd of 30
Optical Fibre Deployment	1990-92	Sweden	Canada	6th of 12
Itemized Billing	1992	Canada/France	Denmark	5th of 13
Proportion Cardphones	1992	Japan	Norway	2nd of 25
Productivity				
Revenue per employee	1993	Switzerland	Turkey	19th of 27
Lines per employee	1993	South Korea	Thailand	26th of 30
Revenue per line	1993	Switzerland	Turkey	7th of 28
Partial labour productivity	1992	United States	Australia	11th of 11
Partial capital productivity	1992	United States	Switzerland	7th of 11
Multifactor productivity	1992	United States	Switzerland	8th of 11

Note: Caveats apply and care should be taken in the interpretation of these indicators.
Source: BIE

Findings

Investment

- Telecompetitiveness study suggested Canada weak in capital investment in the infrastructure, a point which is reinforced in the Australian benchmarking study which noted Canada as the "Worst Observed" for innovation in the deployment of optical fibre;
- Alternatively, the Australia benchmarking study identified Canada as "Worst Observed" regarding prices on business fixed charges; Canada listed as 3rd out of seven, after Singapore and the UK according to Nortel study;
- policy and regulation identifed as a barrier to competitiveness by Nortel study
- Canada's regulatory and investment climates have improved since 1993-94; however so have the climates of several of our competitor economies

2.1.3.3 Foreign Investment Regulation Assessment

A quick survey:

Asia: Hong Kong: no foreign ownership limitations on telecom operators
Japan: no restrictions on Type II carriers; Type I carriers (infrastructure providers): foreign capital not more than 1/3
South Korea: no restrictions in case of VAS operators; foreign participation prohibited in case of general service providers (i.e. Korea Telecom and DACOM)

Europe: a 20% foreign ownership restrictions exist on non-EU companies using the radio spectrum, subject to reciprocal bilateral agreements. Foreign investment in France Telecom, SPT Telecom (Czech Rep.) etc., have been political issues. Netherlands and Sweden have no specific restrictions. In Eastern Europe, foreign participation limited to 49% in MATAV, 75% for local telephone companies in Hungary.

U.S. : (to come)

Finding

- International investment rules demonstrate variety of approaches to seeking inward investment

2.2 Capital Market Effects of Reduced Foreign Ownership Rules

Agenda

Our Understanding of Industry Canada's Objectives: Capital Markets Effects

TD Securities Understands that Industry Canada requires information on the likely impacts that a significant additional loosening of the foreign ownership requirements for Canada telecommunications companies would have on:

- Cost of capital
  - Debt
  - Equity
- Amount of additional future capital raising
- Source(s) of additional future capital raised
- Future investment/ capital expenditures

These impacts will become a part of a larger analysis on the likely impacts of an eased ownership stance on items such as jobs, quality of service, etc.

Initial Theories

Based on previous experience, market history as well as preliminary analysis, the following theories are posited as the basis for further data gathering and analysis:

CURRENT FOREIGN INVESTMENT

There is already significant foreign involvement in by foreign companies in the Canadian telecommunications market.

- Large U.S. telecoms have taken permitted equity positions, have supplied Board Members, technology transfer and management expertise to Canadian partners
- Economic investments (versus more limited voting interests) have been increasing, occasionally to more than 50% ownership by foreign entities

Capital markets are international; investments are made on global sector, country and risk/ return analyses.

- U.S. equity investors, particularly large institutional investors, do and will continue to invest in Canadian telecommunications enterprises when they represent a good risk/ return opportunity on a globally comparative basis.
- Foreign capital, both strategic and financial, has already been one of the few good sources of capital for some young telecommunications companies

FUTURE FOREIGN INVESTMENT

Foreign investment in Canadian telcos will likely increase in the near to medium term if foreign ownership restrictions are significantly liberalized or completely lifted.

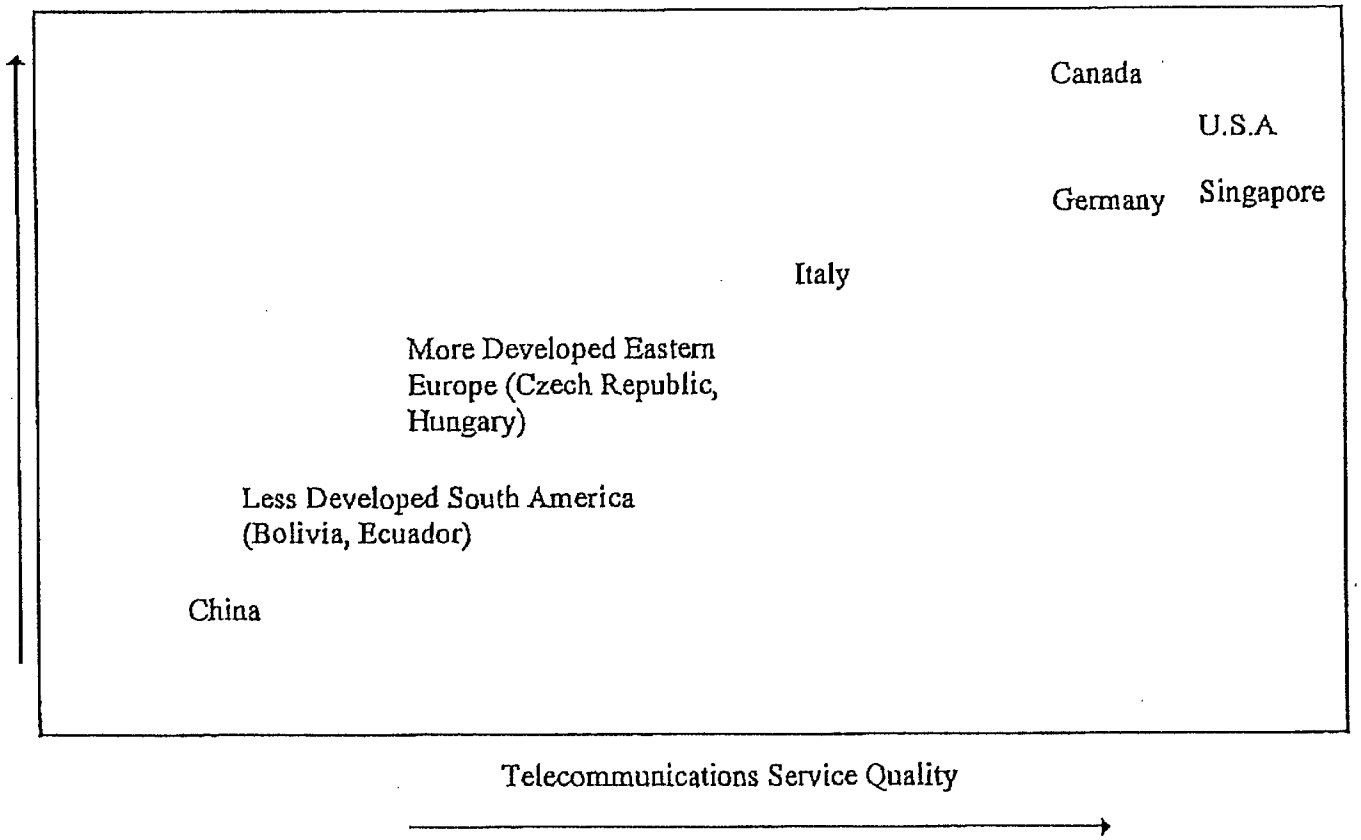
Consolidation of some smaller Canadian telcos may occur if there were no regulatory barrier.

Initial Theories

CURRENT SERVICE QUALITY

The quality and price of Canadian telecommunications is, generally, comparable to that of U.S. telecommunications when compared to the remainder of the world.

Additional investment/ ownership by foreign telecommunications Companies may accelerate the introduction of certain service offerings, and may improve the quality and price of some services, but generally will not have a tremendous impact on service offerings



Initial Theories

CAPITAL MARKETS SUPPORT AND COST OF CAPITAL

Canadian capital markets support older, more mature telecommunications companies very adequately

- Cost of equity and access to equity generally similar to peer U.S. companies
- Cost of both public and private senior debt and access to senior debt generally similar to peer U.S. companies

Younger, higher risk, higher growth Canadian telecommunications companies are not well-supported by Canadian capital markets

- The lack of broad-based competition in Canada has made it historically likely that U.S. companies would be sought as good strategic equity investors in new Canadian telecommunications venture
- The U.S. high yield debt market is a very significant source of capital for growing Canadian telecommunications companies
- The NASDAQ is a deeper market with more analyst coverage for certain Canadian technology and communications firms

Cross-investment between more mature U.S. companies (e.g., AT&T) and younger, riskier Canadian companies (e.g., Clearnet) would likely reduce the Canadian company's cost of capital.

- The effect, however, is to the size, nature and perceived stability of the investor company, not to any difference in the underlying cost of capital for peer companies
- The same general effect would be produced by a large, stable Canadian company investing in a younger, riskier Canadian company.

Any future changes in RRSP rules may have a significant impact on where future equity capital is raised

Proposed Methodology and Data Requirements

In order to find empirical support for or against the above theories, TD Securities will:

1. Gather the following data for various Canadian telecommunications companies and U.S. peers

- Historical capital structure,
- Cost of capital
- Source of capital (market in which raised)
- Significant capital raising exercises in the last three years
- Involvement/ ownership by foreign partners, etc. for

Where peer companies will be categorized as:

- Former "Monopoly Telcos"
- Competitive Telcos
- Independent Wireless Telcos
- Major Equipment Manufacturer

2. Gather data on the total amount of capital raised by Canadian telecommunications companies:

- In Canada, by type of capital
- In U.S., by type of capital
- In other markets, by type of capital

Proposed Methodology and Data Requirements

3. Research which developed countries, if any, significantly liberalized their telecommunications industry in terms of foreign ownership at least 2 years ago, but not more than 10 years ago. Compare data regarding the following pre- versus post- liberalization:

- Total investment in the industry
- General level and cost of service to the public
- Cost of capital and amount of capital raised

Progress to Date and Preliminary Conclusions

PROGRESS TO DATE

To date, we have gathered significant data on (1), above, and have analyzed a portion of that data.

Data gathering for (2) is underway and should be completed by the end of this week.

Work on identifying a suitable comparative situation for (3) will begin immediately, although no good comparable situations are immediately apparent.

PRELIMINARY CONCLUSIONS

Preliminary analysis of data in (1) indicate that there is very little difference in the cost of capital between peer companies in Canada and the U.S., and that growth has not been differentially restricted by inadequate access to capital, at least for public companies

Type of Company	U.S. WACC	Canadian WACC	Differential WACC
Former Monopoly Telco	10.86%	8.48%	2.38%
Competitive Telco	10.82%	11.50%	(0.68%)
Equipment Supplier	13.98%	14.72%	(0.74%)
Wireless Telco	9.67%	11.70%	(2.03%)
Weighted Average	**11.57%**	**11.02%**	**0.54%***

*(*Note: Subject to change due to changes in market, additional capital raising exercises and/ or additional data points)*

TAB 3
TASK #3 - INTERVIEWS

3.1 Early Findings
3.2 List of Sources
3.3 Interview Guide

3.1 Early Findings

General

It is difficult to maintain a distinction among the four scenarios during interviews. Respondents tend to focus on a liberalization scenario with different aspects or components instead of following through with a complete scenario. This will require analysis of the responses to define the changes required in the modeling exercises for each scenario.

Telesat

- US market access is key determinant of future plans
- Investment plans would triple or quadruple
- Foreign Ownership reductions not seen as a driver
- Impact on allocation of orbital slots and spectrum resources is a major limitation on reduction of Foreign Ownership limitations

SR Telecom (manufacturer)

- since 97% of business is aimed at foreign markets, no direct impact is anticipated as a result of a change in foreign ownership rules, except, in a minor way, as a consumer of telecom services.
- world trend toward liberalization both increases access to and competition for markets; SR has not quantified the anticipated net effect on its business, although generally feel liberalization is positive.
- foreign content in its products is less than 20%, and is made up of components that it purchases. Canadian value added is 100%. Liberalization should not change this. Right now they have a plant in Montreal and one in Kanata, which was opened recently to tap into the knowledge base in the area. There are always pressures from large customers for local content. If the business is large enough in a given market, then SR Telecom might make the decision to build another plant in the market. The changes in market size due to liberalization are likely to be the determining factor in such a decision.
- growth in the telecom service sector should present more opportunities for design and manufacture by small and medium-sized companies in Canada. A lot of these companies do not sell directly to carriers but to systems suppliers to carriers. Since the industry is largely globalized, the impact on them has to do more with trends in global telecom equipment markets than with trends in the Canadian market.
- An important factor is the international competitive position of these small companies. Many of them are leaders in their particular niche.

Canadian Cable Television Association (CCTA)

- The cable industry is in favour of reduced restrictions on foreign ownership as soon as possible
- Foreign ownership restrictions are seen as a barrier to access to capital by cable companies
- The cable industry is looking for parity with telcos, i.e. 51% foreign ownership as in the case of BCTel/QuebecTel

3.2 List of Potential Sources

Salute	FName	LName	Position	Company	Meeting Scheduled	Completed
Mr.	William	Catucci	President	AT&T Canada Inc.		
Mr.	Brian	Canfield	Chairman & CEO	BC Tel		
Mr.	Ron	Osborne	President	BCE Inc.		
Mr.	John	MacDonald	VP Tech Development	Bell Canada		
Mr.	Derek	Burney	Chairman, President and CE	Bell Canada International (BCI)		
Mr.	Larry	O'Brien	Chairman and CEO	Calian Technology Ltd.		
Mr.	Juri	Koor	Chairman	Call-Net/Sprint Canada	x 4922 Oct 3, 12:30 p.m., phone call	
Mr.	Bill	Dunbar	President & CEO	CellularVision		
Mr.	John	Reid	President	~~CATA~~		
Ms.	Ariane	Slegal	Special Assistant to Executiv	CBTA	Oct 2 10:00 a.m. in person	
Mr.	Richard	Stursberg	President	~~CCTA~~	Sept 30, 10 a.m., in person, confirmed	
Ms.	Catherine	Swift	President	CFIB		
Mr.	Bob	Simmonds	Chair & VP Regulatory/Tech	Clearnet Communications Inc.		
Mr.	Lionel	Hurtubise	President	Ericsson Research Canada		
Mr	Jan	Peeters	CEO	fONOROLA	Oct 3, 11:00 a.m.	
Mr.	C. William	Stanley	President & CEO	Fundy Cable Ltd.		
Mr.	Khalil	Barsoum	President	IBM Canada Ltd.		
Mr.	Gerry	Pond	President	NB Tel		
Mr.	Terry	Matthews	CEO and Chairman	Newbridge Networks Corp.		
Mr.	Jean	Monty	President & CEO	Nortel		
Mr	Michael	Janigan	General Counsel	Public Interest Advocaty Centre (PIAC)		
Mr.	Andy	Redick		Public Interest Advocaty Centre (PIAC)	Oct 2, 2 p.m., in person, confirmed	
Mr.	Ted	Rogers	President & CEO	Rogers Communications Inc.		
Mr.	Colin	Watson	President	Spar Aerospace		
Mr.	Ron	Couchman	President & CEO	SR Telecom	Out of town all next week, 27/9	Sept 27th
Mr.	Mike	Morris	VP Corp Affairs	SR Telecom	Sept 27th	Sept 27th
Mr.	Mike	Murphy	Acting President & CEO	Stentor Telecom Policy Inc.		
Mr.	Al	Bahnman	President & CEO	Tee-Comm Electronics Inc.		
Mr.	Mike	Kedar	Chairman and CEO	TeleBurmuda International Ltd.		
Mr.	Guthrie	Stewart	President & CEO	Teleglobe Canada Inc.		
Mr.	Larry	Boisvert	President	Telesat Canada	will call back, likely Sept 27	Sept 27th
Mr.	Charles	Sirois	President	Telesystem Enterprises T.E.L.		
Ms.	Janet	Yale	Vice President, Regulatory A	AT&T Canada Inc.		
Mr.	Peter J.	Nicholson	Senior Vice President, Corp	BCE Inc.		
Mr.	Michael	Allen	Vice-President, Regulatory A	Rogers Communications Inc.		
Mr.	John	Quigley	Special Advisor	WIC		
Ms.	Suzanne	Scheunaman	Special Advisor, CellularVisi	WIC - CellularVision Technology		

I suggested more users e.g.
- Pharma
- Automobile
- Banks
- Wallmart
- ISP

3.3 Interview Guide

CARRIERS

The impact of liberalization of foreign ownership restrictions could occur through a number of mechanisms. These mechanisms are:

- Cost of Capital
- Access to Capital
- Access to New Processes and Services (Foreign Owners and Alliances)
- International access to Canadian markets
- Canadian access to international markets

Potential Impact

Domestic Market

- increased competition;
  - ° entry of foreign service providers; bringing new service offerings or making available existing services via foreign infrastructure (e.g. LD bypass)
  - ° increased domestic competition - leading to price reduction, lower margins, but possibly increased demand (depending on elasticity),and faster introduction of new services
- potential corporate financing and structure in reaction to liberalization of foreign ownership restrictions could bring lower costs of capital and improved access.
  - ° future capitalization in foreign markets and costs savings gained therein
  - ° foreign equity possibilities: minority stake; sale of assets; sale of company
- potential consequences that each method of financing would bring to the company:
  - ° cost of capital savings applied to:
    - – proportion to wages and salaries, lower prices, dividends, greater investments
  - ° if greater investments
    - – to what purpose (meet competition in product improvements, expand services, marketing of existing services, etc.)
    - – what kinds of new services (video-consumer; Internet-business; other)
    - – what market segments targeted (consumer/business; industry sector large/small customer)
    - – would the profile of the equipment supplier change, particularly the potential substitution of foreign for Canadian

- potential rationalization with greater foreign ownership
  - loss headquarters functions
  - impact on R&D, procurement
  - centralization of operational functions, e.g. call centres, billing systems
- impact on market share, on overall domestic revenues (recognizing the substitution of one product for another, so that the new business growth is to some extent at the expense of another product line)
- impact on productivity of Canadian carriers
- impact on the productivity and competitiveness of the domestic business of specific industry segments, e.g. financial, wholesale, trade, government, etc.

Foreign Markets

- improvements in access to foreign markets if liberalized, competition allowed, and new telecoms technologies introduced
- alliances gained as a result of foreign ownership and their impact on access to foreign markets (positive and negative)
- increases in exports, expected revenue flows
- changes in capital investment
- main geographic areas where trade and ownership liberalization would have the most impact
- current, planned forays abroad; linkages and alliances with other carriers
- barriers to entry, including capital, local partners, regulatory, trade

MANUFACTURERS, CONSULTING AND OTHER SERVICE SUPPLIERS TO THE TELECOMMUNICATIONS INDUSTRY (EXCLUDING CONTENT PROVIDERS)

Domestic Market

- profile of current and future domestic customer base among domestic carriers;
- estimated % of Canadian value added of the company's products currently sold in the Canadian market
- potential impacts of liberalization on domestic demand, e.g.
  - from incremental investments by carriers, triggered by liberalization
  - from increased foreign competition of the domestic customer base of carriers
  - from increased foreign ownership among the domestic customer base
  - from new infrastructure entrants, e.g. LMCS and MMDS
- potential impact expressed as a percentage change in revenues and profitability levels
- impact on relative market share of domestic and foreign suppliers
- impact expressed in terms of new products or services, or R&D to meet new demands brought forward by new entrants

Foreign Markets

- profile of current and future foreign customer base in foreign markets; market restrictions imposed by international head office
- profile of major alliances with distributors, manufacturers, and R&D establishments
- trade and regulatory barriers faced by Canadian based suppliers in this sector - by broad geographic region
- potential impacts of liberalization on demand in foreign markets - by broad geographic market, e.g.
    - ability to enter markets formerly closed
    - increased investment and capital spending in foreign markets, leading to increased sales in those markets
    - new alliances formed and their business advantages
    - potential new investments in or acquisitions of foreign based firms
    - changes in marketing and channels of distribution
- increases or decreases in level of foreign sales, profitability as a result of liberalization
- impact on location of major corporate functions - sales/marketing, head office, R&D, manufacturing

CANADIAN BUSINESS USERS

- use of and degree of dependence on telecommunications services
    - which parts of the industry sector; how much of it relative to other industry sectors
- degree of satisfaction with current telecommunications services:
    - pricing structure and levels (especially if compared to the US)
    - range and types of services offered
    - quality of service
- impact of liberalization (assuming more competitively priced services, greater access to global services, and to a broader range of services): e.g.
    - on company domestic sales, market share, and margins (or productivity;)
    - on the development of new products or processes, possibly through increased collaboration with other organizations
    - on the development of international alliances and access to foreign markets
    - on international sales/exports of the user company

CONSUMER/CITIZEN GROUPS

- impact of liberalization
    - competitive impact
        - impact of price reductions
        - service expansion
        - quality
        - choice
- impact on universal service at affordable prices
    - impact of rate rebalancing and price increases
    - impact on penetration rates
    - quality of service for remote subscribers
    - impact on regional disparities
    - who is denied access to the information highway?
- Will foreign owners export jobs?
    - R&D participation
    - head office functions
    - high value added jobs

TAB 4
TASK 4: SECTOR MODELS

4.1 Working Paper
4.2 Impact Exercise

4.1 Working Paper (Infometrica)

September 27, 1996
Working Paper No. 1

Effects of Increased Liberalization in the Canadian Telecommunications Industry:

Task 4: Develop Sector Models
Inputs to Macroeconomic Assessment

Institutional Overview

Following from the agreements reached in the Uruguay Round of the General Agreement on Tariffs and Trade, and under the auspices of the World Trade Organization, a Negotiating Group on Basic Telecommunications (NGBT) was established to further liberalize basic telecommunications, with a deadline for agreement at April 30, 1996. Failure to conclude agreement in that multi-lateral forum has resulted in an extension of the deadline for agreement, to February 15, 1997.

In the interim, the NGBT parties have agreed that each country's current offer will be "frozen" until January 15, 1997, after which date any party (for one month) may modify or withdraw its offer. The parties also have agreed not to enact legislation or implement new rules between now and next January 15 that would be inconsistent with the frozen offers. If negotiations are successfully concluded next February, implementation of the agreement is intended for January 1, 1998.

For purposes of this study, it is important to understand that the NGBT is **negotiating only** liberalization of **basic** telecommunications services: facilities-based voice telephony, data transmission, telex, telegraph, facsimile, private-leased circuits, satellite services, mobile services, and video-transport services. Resale of these included. **Not included** in the negotiations are **enhanced** services, or those that employ computer processing applications or value-added services. Illustratively, these include electronic mail, voice mail, on-line information and database retrieval, data processing and electronic data interchange.

This occurs against a background of general liberalization of internal telecommunications markets for domestic reasons within individual countries or economic "regions" (e.g., the EU), but with liberalization staged differently among the parties. A principal concern here is that highly monopolized (dominant basic suppliers in a local market) incumbent firms (including several where the monopoly is "secured" by state ownership) should not be able to use their "rents" to develop "special" market positions to influence market access (protecting themselves in their internal market from foreign competition, or subsidizing their own exports of services to foreign markets). Also of concern, but

not directly involved in a negotiation on basic services is the power this may afford such entities in subsidizing development of enhanced services, or even, "content" services. Deutsche Telecom of Germany is a prime example of this potential.

Apart from a generalized faith that market liberalization across the world will produce a more efficient and productive set of economies (few country-specific losers in that scenario), there are two other pressures for liberalization. First, the experience of the US (MCI and Sprint as galvanizing competitive forces in long-distance telephone service) and development of a pan-European basic telecommunications infrastructure with internal-to-the-region competitive implications are powerful, telecommunications-specific considerations. Second, development of Low-Earth Orbit satellite services is a fundamental technological influence that points towards more efficient production of basic services, with few barriers to delivering services across national boundaries. The development of a Global Information Infrastructure (GII) draws other-country interests directly into both of these considerations.

The to-date negotiations, are centred on industry- and firm-specific "competitiveness" considerations. Included in the negotiations are the extent to which the following "competitiveness" principles relevant to regulatory considerations can be applied.

Licensing should be transparently arrived at, and be made "general" not specific to a particular application (a foreign-firm concern).

Regulatory independence from the executive and legislative branches of governments is widely agreed to be important, particularly where state-ownership of incumbent monopolies is involved. Application of this will be difficult as a "transition" issue since some countries start from a position of extreme monopoly position of a single supplier, while others are domestically operating with highly competitive (presumed little need for regulation) internal markets. A "test" of independence will be the extent to which common procedures and criteria are applied, and the extent to which regulatory decisions are enforceable - competition safeguards.

Interconnection between basic suppliers and between basic suppliers and producers of enhanced services is central to ensuring a multi-firm presence in markets. The language here concentrates on "fair" prices, and accounting practices, and falls under the general rubric of tariffs and accounting rates.

Standards and type approval should ensure that neither the substance of standards nor procedures relating to their determination and adoption should act as entry barriers.

Rights of way should have few barriers for new suppliers who wish to construct their own new infrastructure as compared to interconnecting.

Universal or public service delivery appears to be a common policy objective (the public at large has affordable access), regardless of commercial viability. This, of course, will be a tough nut for domestic market reasons, but the concern here is that "subsidy" of non-viable delivery to remote regions should not become an impediment to competition.

Set against the negotiations is a "base case" of market facts and international agreements. Canada asserts (and the United States Trade Representative agrees) that there are few restrictions to competitive forces in our delivery of enhanced telecommunications services. But Canada does limit foreign ownership of basic services in the domestic market, and did not give this up in the NAFTA - "as under the Canada-U.S. Free Trade Agreement (FTA), protection of basic telecommunications" was agreed (Source: Canada and the North American Free Trade Agreement on Strategis) so that Canadian "control" was assured through Canada's 20% limit on foreign ownership of basic services.

Although a leading implementer of competition in internal markets, the US does employ some restrictions. Implemented through Section 310(b) of its Act, the Federal Communications Commission (FCC), acting in the "public interest", restricts foreign entry to the US market for cellular and wireless communications by denying common-carrier licenses to use the radio spectrum to any company (1) which is an alien, (2) in which foreign entities or individuals hold or mote more than 20 per cent of the equity, or (3) that is controlled by another entity in which more than 25 per cent of the equity or voting control is held by a foreign entity. This effectively limits Canadian ownership of US-based basic service companies, and importantly, effectively blocks Canadian exports of wireless services to the US market.

Barring a change to the US legislation (an Act of 1934), the public interest provision of 310(b) would allow variations from the basic equity rules. This allows the FCC to develop an international investment and trade "bargaining chip" through rules put into effect on January 29, 1996 which allows foreign companies to enter the US market as long as the market in that company's home county offers US firms "effective competitive opportunities" (ECO's). Effectively the US is bargaining for reciprocity, not simply national treatment. And within Mobile Satellite Systems (MSS), the FCC has indicated two other

important items. First, the "footprint" of satellites will typically require multi-country agreement, since individual country markets will typically make this uninteresting. Second, the FCC intends to apply the ECO test within MSS on different types of satellite services, rather than as a blanket license. Motorola's interests appear to be playing a key role in US policy, which is indicated by the US government's announcement that it was not wiling to include services by low-earth-orbit satellites, but would be wiling to negotiate this separately at a later date.

From the US view of the bilateral relationship with Canada, there are two sticking points. First, Canada's offer (what was it?) is judged by the USTR to leave in place too-substantial restrictions on foreign investment in Canadian telecommunications. Second, Canada offered to grant full access to our satellite services market only after 2001. Although not directly related to the current NGBT events, it should be remembered that the US is unhappy about Canadian restrictions affecting their producers of content (or "culture" in Canadian terms).

Analytical Overview

It should be recalled and emphasized that the RFP for this project is asking what the implications for Canada are of a successful conclusion (and January 1998 implementation) of the current negotiations on basic services under three change scenarios which are paired differences of Canada/World willingness to liberalize. That this is about basic services, makes it sound like the impacts on Canada could occur mainly because of two related changes:

(1) increased foreign ownership of Canada's basic telecommunications service companies (a change from NAFTA), but also, potential for increased Canadian ownership of US and other-country basic service companies, and

(2) Canada's access to the US and other foreign markets for satellite services (with potential for increased US and other-country sales of such services in our market). My "gut" sense at this time is this is the "big" change event that could occur. Direct effects would focus on implications for the telecommunications service and equipment industries.

This starts with the NGBT-specific sense that altered international trade, including ownership, rules will directly affect telecommunications service producers, with related consequence for suppliers of their equipment. Indeed, there may be direct effects of equipment suppliers as, for example, supplies of equipment to a US satellite service that covers Canada. Negotiations might directly affect producers of enhanced services, and even content, but this would be a "stretch" in that

the only mechanism for this is for increased foreign equity have directly associated "cheaper" access to new products and processes that would effectively be enhanced services.

For basic services, negotiations may directly affect Canadian access to foreign financial capital, thereby altering the cost of investment (capital), and therefore, the volume of investment flows and growth of the industry's real capital stock. Ties of firms involved in such transactions may alter the extent of, or timing, for development of new products and processes that can be adopted in the domestic, Canadian market, but if we are focused on basic services, the effects here might be fairly small. It may (more likely will) also alter domestic market concentration, thereby altering the price of services to users, and returns to producers, their labour force, and suppliers.

Through relations to trade flows, it may alter Canadian access to foreign markets for telecommunications services (the satellite effect), and foreign access to the Canadian market. Starting with service producers, this may take several (technical, in economic impact terms) forms.

> Other things equal, changes to ownership rules may alter (likely reduce) the effective borrowing costs of Canadian domestic producers of telecommunications services. This should induce increased domestic Canadian investment in the service-producing industry, thereby increasing the supply of service capacity, and for individual producers, alter the production function of service delivery (impact on productivity), requirement for returns, and ultimately producer prices. Reduced service prices implies increased real demand for household, government, and other-industry real demands for such services, and alters prospects for net exports (exports minus imports). If additional firms enter the Canadian market, or improved access to the Canadian market occurs, then it is possible that returns to property and labour will also be affected, with consequence for industry selling prices.
>
> In addition to the chain of influences that follow from altered relative prices of telecommunications services, firm-specific ties to new technologies may occur. This implies an exogenous introduction of new products and processes available to service users that would not be "explained" by altered relative prices. This would need to be introduced in any formal study of the direct effects as exogenous increases in demand for telecommunications service by households, government and other industries. As an exogenous change to the volume of demand from these sources effects are not explained by price or income changes. Note that "payment" for access to these rights through returns to shareholders may simply substitute for licensed royalties,

in which case, the issue is whether net payments to foreigners are affected, with little direct consequence on the real ability to generate new products and processes.

Related to changed ownership rules may be direct changes to foreign market access. These may be construed as exogenous changes to exports (and imports) of the products and services produced by the telecommunications service industry (satellite services, wired interconnection in the US market, and with Europe when Trans-Atlantic cable systems are sorted out. In addition, changed domestic unit costs of production (with consequent effects on industry selling prices) may affect trade flows. In effect, if such changes to international rules, or firm-specific ties between telecommunications service producers and firms in the equipment manufacturing and/or software industry can be identified, this would exogenously alter exports and imports of their products and services. Canadian investment in a satellite system operated by the Russians (observers but not yet participants at the NGBT) could well be a boost for Canadian telecommunications equipment manufacturers.

Adoption of new products and processes by using industries (including governments as "producers" of health care, education, deliverer of public services) may occur for several reasons. This includes reduction in their unit costs of production (through time savings, substitution of the new process for other inputs including labour and capital or purchased services from other industries), or development of an ability to produce a new marketable product (or improve the quality of existing products and services) on the part of the telecommunications-using industry.

Technical Translation of Analytical Overview

The macroeconomic model of Canada being used in this project distinguishes more than 120 separate industries. For each, a relatively complete description of the industry's economics is available in the sense that demand, supply, and price and cost formation are distinguished for each. On the demand side, service or "commodity" details are available for foreign trade (exports and imports), and for the domestic market, where this is distinguished for demands from consumers, investment spending of businesses, government current and capital spending, and operational (or current) requirements of industries. On the supply side, the industry's "internal" production function (link between output and labour and real capital inputs) and "external" production requirements (material and service inputs to operations) are distinguished.

For purposes of this project, three central analytical questions can be addressed.

(1) For an industry that is directly affected by an altered trade agreement (on "basic" services), does this (and by how much) change its costs of capital, investment, and therefore capacity to produce? For purposes of decomposing the analysis, we should think of part of the additional capacity as potentially changing the industry's own production function or ability to deliver existing products and services more or less efficiently than would be the case in a Base Case scenario. And, if the added investment yields a higher productivity result, do the income gains from this go to labour, capital, or into lower prices for purchasers of the industry's output?

This may also be influenced by the extent to which altered trade-related (ownership) rules lead to more supply or firms, and the extent to which market organization (changes to the regulatory environment) is affected. More investment implies more internal competition, and therefore, reduced returns (possibly to both labour and capital) and relatively large, negative industry price impacts.

Notice that all of the demands and industries in the model we are using are assessed interdependently, so that a reduction to, for example, the telecommunications' carrier industry prices, will endogenously ("automatically") lead to an increase in real domestic and foreign demands (and consequently, output of the industry. The extent of that influence is determined by the price elasticity of the affected demand (e.g., telecommunications service demand of consumers, exports and imports of telecommunications services).

Reflection in a Questionnaire: Of the new investment that you expect will occur because of the trade-agreement change, how much of that will change the way you produce your existing products and services? If some, then there are detailed follow-on questions related to timing, how much more, and how, this makes them more productive, and how the productivity gain will be "distributed" between labour, capital, and service users. Also important is to get some sense of what the import/domestic shares will be for the suppliers of the investment goods. A breakdown between investment in structures and equipment would be helpful, in which case the shares issue would concentrate on the import share of the equipment.

(2) Where the first item is concentrated on the analysis of the directly affected industry (i.e., telecommunications carrier industry, and possibly others), the second item is concentrated on "exogenous" (new product and process) influences. Some part of the new capacity that results from the trade arrangement may be said to reflect these "new" products and processes of potential value to purchasing industries, households, etc., and are influences that lie

beyond those that occur because the price of existing products is reduced by (1) above. Note, however, that limiting the discussion to basic services as in the NGTB negotiations, probably implies that new product and process implications are likely to be modest.

For this, we should concentrate on identifying what, and how much, the new products and processes are, who will be buying these (consumers, specific buying industries, ...) and how this will be staged in over time. It is important to specifically recognize that there should be internal consistency between the affected industry's investment and growth of capacity and these flows (sales) of new services. It is also important to recognize that these new products and processes may "compete with" (or substitute for) products and services (a) that the industry already produces (wireless substitutes for wired), or for products that are produced by other industries (voice and data transmission substitutes for postal service).

Reflection in a Questionnaire: Of the additional investment you expect, what kinds of new products (or processes) will you be able to develop, to whom will you sell these (foreign and domestic), and how is this staged in over time? For what existing services that you supply, or that are otherwise supplied by someone else, what does this new product/process replace?

(3) New products and processes will be adopted by purchasing industries because adoption reduces the purchasing industry's unit costs of production, or because it enables that industry to produce a marketable product/service not otherwise possible. This can be reflected as an exogenous "productivity" benefit among purchasing industries. Note, of course, that there should be reasonable internal consistency between this view (from the "customer") and from the producer of new products/processes - from (2) above.

I do not know the candidate list for interviews, but for current services offered by telecommunications carriers it would include financial institutions, wholesale and retail trade, private and public health providers, and trucking as prime candidates. (The problem, of course, is that the "new" products and processes may be targeted at other industries!) In any event, if one has identified from (2) above, a list of new products and processes, then the question to pose to the potential customer industry is the extent to which that would directly improve the buying industry's net income. (That could come from either reduced costs or sales of the buying industry's own "new" products and services). Given this information, we could introduce an "exogenous" productivity gain into that buying industry in the model to produce a

"competitiveness" effect (i.e., reduced unit costs of production and lower industry selling prices).

Reflection in a Questionnaire (for potential users of new products and processes): For new carrier product "x", how much (per cent form) will this reduce your costs of production, or what new products and services could you generate and what would be your additional sales (in dollars and to whom foreign versus domestic)?

I am not particularly optimistic that a survey can yield much for this third impact, but to the degree that alternative impacts are founded on a "project" view of the new products and processes, then going at matters this way will be important. Nor is an "analytical" approach likely to lead to much information about the extent to which new (agreement-caused) productivity gains among using industries can be measured. Does the client have a view about this?

Scenario Implications

Keep in mind that we are measuring impacts, or the change from a Base Case to an Impact case, where the impact case is defined by some change to an international agreement. My strong suggestion is that the RFP definition of scenario IV (no institutional change in Canada or the rest of the world) is the only sensible description of a Base Case. This has an implication for the way questions are asked, as for example, "as compared to a future in which there are no changes to existing or committed international agreements directly affecting market access or investment in basic telecommunications industries, how much would a change in the international agreement (specify this) cause you to change (1) investment, (2) new product/process or (3) if a purchasing industry, your adoption of new product/process?

The answers to these questions will vary depending on Canada/Rest-of-World assumptions that define each of the three "impact" scenarios. Thus, for each question being asked, there are presumably three answers (scenario contingency). If they provide the same response for each of the three scenarios, then I would suspect that their intentions are already in the Base Case, and there is no direct impact on their plans.

A Tableaux for Inputs to the Macroeconomic Analysis

I have appended a Tableaux (Appendix A) of potential direct impacts that are to be provided to the macroeconomic model from other-team members. This tableaux is relevant particularly to item (2) above (new products and processes), and especially to the view that exports and imports of satellite services are

likely to be the "big" change because of market access rule changes. It raises two questions.

(1) Of the several information industries listed across the top, which ones are directly affected by changes to international agreements? We are presuming, for now, that only the carriers are affected, but telecommunications equipment and software industries could be affected because increased investment in foreign telecommunications capacity could well mean a significant increase in their export potential. Domestically, they will be affected indirectly (and automatically) in that they will be providing goods and services to supply the investments and operations of the Canadian carrier industry. But are there "direct" linkages, so that changes (for example, to ownership rules) affect the investment decisions of any of the other industries? In particular, will international agreements "tie" liberalization changes of carriers to market access (into Canada or any other country) of "content" products and services?

(2) Items, down the rows, provide, for each industry, an indication of where new products and processes, or other exogenous influences on an industry's demands, would be introduced as assumptions into the model. Items under "INDICATIONS OF DEMAND" ("Final" and "Intermediate") in Appendix C will provide you a "richer" set of detail for each of the industries identified in the Tableaux. Concentrate especially on the Telecommunications Service Industry table. Note in particular, that this will provide you with an idea of which industries normally buy (as an operational input) from the industry being reviewed.

For reduced borrowing costs and consequent incremental effects on Canadian industry investment (carriers only?), I have appended the "sample" shock of additional investment in the carrier industry. Remember that we should determine, of total investment being added, how much is for improving the productivity of the carrier industry to deliver current services, and how much will produce new products and processes. My starting point after reviewing the NGTB literature is that new product and process effects are likely to be modest, at most. Also, keep in mind that liberalized foreign ownership rules will affect every one, including notably the US and Europe. Thus, one can conceive of there being an increase in sectoral borrowing costs, as firms "compete" for savings.

The question here is, what added investment in the carrier industry will occur, how does it affect that industry's productivity, and how is the productivity gain (including possible associated market-supply effects) distributed to labour compensation, returns, and therefore, industry selling prices?

To introduce new carrier product and process effects into the model as productivity impacts on the using industries, we would exogenously reduce their (using industry) requirements for labour and/or capital, with perhaps some mix of reduced material requirements from non-carrier industries for which the new carrier service is a replacement. This can be done in a generalized fashion for all of the 120+ industries in the model, but I recommend against this. Rather, we should concentrate such "productivity enhancing" effects in a few industries that are clearly tied back to new products and processes that are identified from the survey of carrier suppliers. In any event, we should have a separate discussion on this before I proceed further.

Telecommunications Service Base Case Indicators

Appendix C provides some historical and prospect growth views of the industries with which we should be concerned. My sense is that direct effects will be concentrated on changing prospects mainly for telecommunications carriers, and possibly telecommunications equipment (and even possibly) software in business services. Still, most of the "big" events should be concentrated on telecommunications carriers.

The table below provides some reference (Base Case) level information that may be of use to other members of the research team. Some salient points are as follows.

Compared to most industries, for their operations telecommunications carriers require relatively few material and service inputs from other industries (i.e., they directly manage most of their costs).

The industry is very capital-intensive, with a large proportion of its GDP allocated to returns to capital, to cover depreciation and shareholder income.

Employees are relatively well-compensated by general-economy standards, but the number of employees has changed little over the last two decades, despite very rapid growth in real sales and GDP.

Corporate returns as a per cent of the capital stock are close-to-business-economy averages, with signs of notable improvement in the industry over the past five years.

We do not measure average industry borrowing costs, but it is important to note that general-economy borrowing costs, in real terms, should remain at the historically high levels that have prevailed since the early 1980s, for an indefinite period into the future. With falling selling prices in the industry a

"constant", real borrowing costs of the industry are higher than the economy average.

Telecommunications Carriers (SIC 4820, 4830)
Basic Indicators
Base Case

	80-81	89-90	95-96	99-00	04-05
			Average		
Gross Output (Industry Revenues)					
$Billion, Nominal	7.3	14.6	16.1	19.2	24.1
$Billion, 1995 Prices	7.2	12.8	16.2	20.0	26.5
Gross Domestic Product					
$Billion, Nominal	5.9	11.0	14.4	16.6	19.6
$Billion, 1995 Prices	5.8	10.5	14.5	17.7	23.1
Labour Income					
$Billion, Nominal	2.7	4.7	4.8	5.4	6.5
$Billion, 1995 Prices	4.8	4.8	4.8	4.8	5.0
Employment (000s)	105.6	105.4	104.5	106.2	110.0
Returns to Capital					
$Billion, Nominal	3.2	6.4	9.7	11.1	13.1
$Billion, 1995 Prices	2.7	4.8	9.6	10.8	11.7
Investment					
$Billion, Nominal	2.7	4.9	4.4	4.8	7.0
$Billion, 1995 Prices	2.6	4.1	4.4	4.6	6.2
Capital Stock					
$Billion, Nominal	34.7	57.4	64.2	76.5	95.7
$Billion, 1995 Prices	34.8	49.5	63.9	72.9	84.4
Borrowing Costs (%)					
Moody's Industrial Bonds	14.8	11.4	8.5	7.3	7.3
"Real"					
General-Economy Price Change	6.3	7.5	7.2	5.9	5.5
Industry Price Change	10.3	13.5	11.2	8.5	8.4

Carl Sonnen

Base Case $5B/year
Facilities Investment

Appendix A
Tableaux

Tableaux of Direct Impact Requirements

"Changes to Demand"

——Using Perspective——	——Producer Perspective——				
	Carriers	Software Genl Svc	Telecomm Eqpt.	Computing Eqpt.	Content/ Broadcasters
A. Exports					
Telecommunications Equipment					
Computing Equipment					
Carrier Services					
Software Services					
Content (Cultural) Services					
B. Imports					
Telecommunications Equipment					
Computing Equipment					
Carrier Services					
Software Services					
Content (Cultural) Services					
C. Consumer					
Carrier Svcs					
Durables (Computing Eqpt)					
Broadcast/Content Services					
D. Government					
Health					
Education					
Public Administration					
G. Other Industries					
Deposit-Taking					
Other Financial Institutions					
Wholesale Trade					
Retail Trade					
Content Users (Advert)					

Impact Statements (Three Trade-Change Scenarios less No Canada/Foreign Change [Base] Case)
x (times) High and Low estimates of direct impacts
= 6 impact Cases = six sets of direct impact changes

Data Requirements for Exogenous Demand Changes
We will have to discuss whether, at industry level, these are ex ante or ex post estimates.

For each scenario and high/low (relative to no international trade relation change case), *need dollar value (at 1995 ? price impacts on each item above, staged in over 1997(?), by-year, to 2005(?)*: note, start with row (user industry) name, and ask i the scenario, a dollar-denominated, direct value change to the producing (column) industry? In some cases, change to a using industry may affect only one or a few of the producers. The "content" column is to reflect negative international trade-offs access. This can be introduced best in "row" entries (i.e., improved Canadian access to capital with carrier linkages to new products and processes could come at expense of US and other improved access for sales of content materials (films, TV product into Canada, in which event, imports of cultural materials would be increased exogenously).

Cost of Capital

Changes to the Cost of Capital (borrowing, equity) should be reflected in the rental costs of capital. Of the four industries above, which ones are to be affected.

Can be introduced as (1) reduced rental costs of capital (per cent reduction), and/or (2) as exogenous increases to industry investment ($ flows). My sense is that only industry being afected is carriers, but is this true? Step one is to "trial" thi impact to see what happens to affected industry details as e.g., productivity change, returns, industry selling prices. If we model's answer to this is incorrect, we should override, but would then have to supply information. Can get this "trial" done Wednesday, c-o-b.

Telecommunication Carriers and Other Industries
[redacted]C 4[redacted]4830[redacted]
Major Indicators

CIB Rental Cost- Price Benefit		1996	1997	1998	1999	2000	2001	2002	2003
					% Impact				
SUMMARY MEASURES OF SUPPLY AND DEMAND (Mn$86)									
Gross output		0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0
Final demand		0.0	0.0	0.2	0.1	0.1	0.0	0.0	0.0
Final domestic demand		0.0	0.0	0.3	0.2	0.1	0.0	0.0	0.0
Gross exports		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gross imports		0.0	0.0	0.7	0.5	0.3	0.1	0.0	0.0
Inventory change		0.0	0.0	0.3	0.1	-0.2	-0.2	0.0	0.0
Intermediate industry req'ts		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net exports	(a)	0.0	0.0	-10.7	-7.9	-5.3	-1.4	-0.6	-0.1
Export share in output (%)	(a)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Import share in domestic sales (%)	(a)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONTRIBUTION TO OUTPUT GROWTH (%)									
Domestic sales	(a)	0.0	0.0	0.2	-0.1	-0.1	0.0	0.0	0.0
Inventory change	(a)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Exports	(a)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Imports	(a)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
INDICATIONS OF DEMAND (Mn$86)									
Final Demand									
M&E, comm.-carriers&oth (1.6)		0.0	0.0	6.6	4.6	2.6	0.6	0.4	0.2
Consump, telecommunications (36.6)		0.0	0.0	-0.1	-0.1	0.0	0.0	0.0	0.0
Govt exp, defence other G&S (0.7)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Govt exp, federal other G&S (2.5)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Govt exp, local other G&S (0.8)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Govt exp, prov. oth. G&S (3.0)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Imports, misc. svc (2.6)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Imports, telecommunications (0.8)		0.0	0.0	1.9	1.3	0.8	0.2	0.1	0.0
Exports, misc. services (2.2)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Exports, telecom.&electronics (1.3)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Intermediate Industry Req'ts									
Finance-other (8.0)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trade-wholesale (5.8)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trade-retail (3.8)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Services-health-phys&oth (3.1)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Finance-deposit taking (2.6)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Communication-carriers&oth (1.8)		0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0
Transport-motor-truck (1.6)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Services-accommodation&food (1.5)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
advertising&promotion(fictive)(1.5)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Transport-railway (1.4)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

(a) Level Impact

Telecommunication Carriers and Other Industries

[redacted]IC 4[redacted]4830[redacted]

Major Indicators

CIB Rental Cost- Price Benefit		1996	1997	1998	1999	2000	2001	2002	2003
					% Impact				
INDICATIONS OF INDUSTRY ACTIVITY									
Gross domestic product (Mn$86)		0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0
Gross domestic product (Mn$C)		0.0	0.0	0.2	0.1	0.1	0.0	0.0	0.0
GDP deflator (1986=1)		0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Investment (Mn$86)		0.0	0.0	6.4	4.6	2.6	0.5	0.2	0.2
Machinery and equipment		0.0	0.0	6.6	4.6	2.6	0.6	0.4	0.2
Structures		0.0	0.0	2.3	2.9	1.0	-0.3	-1.1	-0.6
Investment effort (Inv/GDP in %)	(a)	0.0	0.0	1.9	1.3	0.7	0.1	0.1	0.0
Gross capital stock (Mn$86)		0.0	0.0	0.5	0.8	0.9	0.9	0.9	0.9
Machinery and equipment		0.0	0.0	0.7	1.1	1.3	1.3	1.3	1.2
Structures		0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Scrappage (% of stock)	(a)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Machinery and equipment	(a)	0.0	0.0	0.0	0.0	-0.1	-0.1	-0.1	-0.1
Structures	(a)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Avg. age of M&E (Years)	(a)	0.0	0.0	0.0	-0.1	-0.1	0.0	0.0	0.0
Capital/output ratio	(a)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Employment (000s, estab. basis)		0.0	0.0	0.3	0.2	0.1	0.0	0.0	0.0
Labour productivity(Th$86/person)		0.0	0.0	-0.2	-0.1	-0.1	0.0	0.0	0.0
Capital/labour ratio(Th$86/person)	(a)	0.0	0.0	1.2	4.5	6.8	7.8	8.0	8.1
Total factor productivity(1986=1)		-0.1	-0.1	-0.5	-0.6	-0.7	-0.7	-0.7	-0.7
INDICATIONS OF COSTS									
Gross output (Mn$C)		0.0	0.0	0.2	0.1	0.1	0.0	0.0	0.0
Gross output price (1986=1)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Share of gross output (%)									
Purchased inputs	(a)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Wages & suppl.labour	(a)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Unincorporated income	(a)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Surplus	(a)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net indirect taxes	(a)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prices of purchased inputs (1986=1)									
Construction-repair (3.2)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Elec. eqpt.-electronics (2.2)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Communication-carriers&oth (1.8)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Finance-other (1.3)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Elec. eqpt.-wire, etc. (1.2)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

(a) Level Impact

Telecommunication Carriers and Other Industries
[redacted]C 4[redacted]4830[redacted]
Major Indicators

CIB Rental Cost- Price Benefit		1996	1997	1998	1999	2000	2001	2002	2003
					% Impact				
Labour Inputs									
Wages per person-year (Th$C)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Supp.lab.inc.per person-year(Th$C)		0.0	0.0	0.0	-0.1	0.0	0.0	0.0	0.0
Wage bill/GDP (%)	(a)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Unit labour costs (1986=1)		0.0	0.0	0.2	0.1	0.1	0.0	0.0	0.0
Capital Costs									
Investment deflator (1986=1)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Surplus/GDP (%)	(a)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Unincorporated income/GDP (%)	(a)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Real return to capital (%)	(a)	0.0	0.0	0.0	-0.1	-0.1	-0.1	-0.1	-0.1
Unit capital cost (1986=1)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Taxes									
Net indirect taxes (Mn$C)		0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0
Indirect taxes		0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0
Subsidies		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net indirect taxes/GDP (%)	(a)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FINAL DEMAND PRICES (1986=1)									
Total M&E Deflator		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
M&E, comm.-carriers&oth (1.6)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Consumption Deflator		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Consump, telecommunications (36.6)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Government G&S Deflator		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Govt exp, defence other G&S (0.7)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Govt exp, federal other G&S (2.5)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Govt exp, local other G&S (0.8)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Govt exp, prov. oth. G&S (3.0)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Imports Deflator		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Imports, misc. svc (2.6)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Imports, telecommunications (0.8)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Exports Deflator		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Exports, misc. services (2.2)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Exports, telecom.&electronics (1.3)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

(a) Level Impact
Sources: Statistics Canada and Informetrica Limited
Note: Figures in brackets represent share of industry gross output.

Information Carrier & Content Industries
Output (Gross Domestic Produce) in Real Terms
($Millions at 1986 Prices)
CIB Rental Cost- Price Benefit

		1996	1997	1998	1999	2000	2001	2002	2003
					% Impact				
Total Economy		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Business Economy	(82.4)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
of which:									
Telecommunications Equipment		0.0	0.0	0.3	0.1	0.0	0.0	0.0	0.1
Office Machines and Computing		0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Recreation & Amusement		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Business-Related Services	(20.8)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Information Industries	(4.2)	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0
Content Providers	(2.0)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Radio & TV	(0.4)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Printing & Publishing	(1.2)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advertising	(0.3)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Communication, nonbusiness	(0.0)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Carriers	(2.3)	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0
Telecom. Carriers & Other	(1.8)	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0
Post Office & Courier	(0.5)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Business-Related Services									
Transportation/Storage	(3.7)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
of Goods	(2.3)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
of People	(1.5)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Finance & Insurance	(8.6)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
General Services	(4.2)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Professions	(2.2)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Software, Empl. Agencies, etc	(1.9)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nonbusiness Services	(0.0)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Data in () are % of Nominal GDP in 1988-89

Information Carrier & Content Industries, Demand Indicators
(Millions at 1986 Prices unless Otherwise Specified)
CIB Rental Cost- Price Benefit

	1996	1997	1998	1999	2000	2001	2002	2003
				% Impact				
Industrial Demand								
for Content Industries (79.9)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
for Carrier Industries (57.7)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Growth of Key Buying Industries								
All Consumer-Oriented Producers	Error	Error	Error	Error	Error	Error	Error	Error
Retail Trade	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Wholesale Trade	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Restaurants & Accommodation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recreation Industries	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deposit-Taking Financial	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Financial Institutions	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Airline Services	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final Domestic Demand								
for Content Industries (33.2)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Key Indicators								
Consumption per Capita								
Total, of three:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cable TV	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Movies & Theatres	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Reading Materials	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advertising Sensitive Other								
Tobacco & Alcohol	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cosmetics	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recreation, Meals, Hotels, etc.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
for Carrier Industries (42.8)	0.0	0.0	0.3	0.2	0.1	0.0	0.0	0.0
Key Indicators								
Consumption per Capita								
Telecommunications	0.0	0.0	-0.1	-0.1	0.0	0.0	0.0	0.0
Postal & Courier Services	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Govt Goods & Services Purchases	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Exports (% of Sales)								
Content Industries (-11.9)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Carrier Industries (-0.6)	0.0	0.0	25.4	13.2	10.5	2.2	0.7	0.1

Data in () are % of Total Sales in 1995

Information Carrier & Content Industries

[redacted] Dem[redacted]

CIB Rental Cost- Price Benefit

	1996	1997	1998	1999	2000	2001	2002	2003
				% Impact				
Demography (000s)								
Population	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Households	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Population Aged 15-30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Enrolment in Education (000s)								
Elementary/Secondary	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
University	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Post-Secondary, Non-University	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Income								
Real Spendable Income/Household	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Personal Savings Rate (%)	0.0	0.0	-0.1	0.0	0.0	0.0	0.0	0.0
Foreign Travel Receipts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Spending on Travel Abroad	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All-Gov't Balances (% of GDP)	0.0	0.0	-0.4	0.2	0.2	0.2	0.4	0.5
Consumer Prices (Detail Item Relative to Total)								
Cable TV	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Movies & Theatres	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Reading Materials	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Telecommunications	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Postal & Courier Services	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Appendix C
Base Case Information–Industry Tabulations

Telecommunication Carriers and Other Industries
SIC 4820, 4830
Major Indicators

Base Case		80-89	90-92	93-95	96-00	01-05
		Average Annual Rates of Growth				
SUMMARY MEASURES OF SUPPLY AND DEMAND (Mn$86)						
Gross output		7.1	4.1	4.4	5.6	5.7
Final demand		6.5	9.6	3.1	6.1	7.0
Final domestic demand		6.6	9.8	2.4	6.1	7.0
Gross exports		7.6	14.9	12.2	5.0	4.4
Gross imports		9.0	15.5	4.4	4.9	4.9
Inventory change		0.8	-	-	-8.5	-5.9
Intermediate industry req'ts		7.6	-0.9	5.7	5.0	4.2
Net exports	(a)	-27.2	-318.8	-199.5	-156.6	-236.9
Export share in output (%)	(a)	3.6	4.3	5.4	5.7	5.4
Import share in domestic sales (%)	(a)	3.8	6.1	6.3	6.4	6.1
CONTRIBUTION TO OUTPUT GROWTH (%)						
Domestic sales	(a)	7.2	4.4	4.0	5.6	5.8
Inventory change	(a)	0.0	0.0	0.0	0.0	0.0
Exports	(a)	0.3	0.6	0.6	0.3	0.2
Imports	(a)	-0.4	-0.8	-0.3	-0.3	-0.3
INDICATIONS OF DEMAND (Mn$86)						
Final Demand						
M&E, comm.-carriers&oth (1.6)		8.2	14.9	3.8	3.1	5.3
Consump, telecommunications (36.6)		7.0	4.9	1.2	5.2	6.1
Govt exp, defence other G&S (0.7)		7.4	0.6	-0.9	-4.0	0.0
Govt exp, federal other G&S (2.5)		2.3	7.8	3.9	0.3	0.4
Govt exp, local other G&S (0.8)		5.8	4.9	-1.2	0.7	2.2
Govt exp, prov. oth. G&S (3.0)		6.9	1.6	-2.7	-1.3	0.9
Imports, misc. svc (2.6)		4.0	2.6	-0.9	2.5	2.6
Imports, telecommunications (0.8)		10.5	8.7	11.2	4.1	4.6
Exports, misc. services (2.2)		5.4	2.7	5.5	2.0	2.6
Exports, telecom.&electronics (1.3)		12.4	13.3	16.9	4.2	3.1
Intermediate Industry Req'ts						
Finance-other (8.0)		4.5	-0.1	2.6	2.5	2.3
Trade-wholesale (5.8)		5.4	2.2	5.1	2.5	2.4
Trade-retail (3.8)		3.0	-0.6	3.5	1.5	1.5
Services-health-phys&oth (3.1)		3.9	2.7	0.0	2.0	2.9
Finance-deposit taking (2.6)		3.1	2.4	4.1	2.1	2.0
Communication-carriers&oth (1.8)		7.1	4.1	4.4	5.6	5.7
Transport-motor-truck (1.6)		3.6	0.5	5.0	3.9	3.3
Services-accommodation&food (1.5)		2.6	-3.8	6.9	1.0	1.3
advertising&promotion(fictive)(1.5)		3.5	8.4	4.6	2.4	2.2
Transport-railway (1.4)		0.7	-2.3	4.6	0.3	0.2

(a) Average

Telecommunication Carriers and Other Industries
SIC 4820, 4830
Major Indicators

Base Case		80-89	90-92	93-95	96-00	01-05
		Average Annual Rates of Growth				
INDICATIONS OF INDUSTRY ACTIVITY						
Gross domestic product (Mn$86)		7.2	5.1	6.8	5.2	5.4
Gross domestic product (Mn$C)		8.1	5.6	4.2	3.5	3.5
GDP deflator (1986=1)		0.9	0.5	-2.4	-1.6	-1.8
Investment (Mn$86)		7.2	6.4	-0.8	2.6	6.0
Machinery and equipment		8.2	14.9	3.8	3.1	5.3
Structures		5.6	-13.3	-26.9	-5.0	15.7
Investment effort (Inv/GDP in %)	(a)	35.5	37.0	32.4	30.1	28.7
Gross capital stock (Mn$86)		4.2	5.5	4.4	4.0	3.4
Machinery and equipment		4.7	7.4	7.5	7.2	5.2
Structures		3.8	3.4	0.6	-1.2	-0.8
Scrappage (% of stock)	(a)	2.7	3.2	3.3	3.4	4.4
Machinery and equipment	(a)	4.3	4.9	4.5	4.1	4.9
Structures	(a)	1.0	1.4	1.7	2.2	3.1
Avg. age of M&E (Years)	(a)	8.3	7.6	7.1	6.9	7.1
Capital/output ratio	(a)	5.3	4.4	4.3	4.1	3.8
Employment (000s, estab. basis)		0.1	-0.1	-0.6	0.6	0.7
Labour productivity(Th$86/person)		7.1	5.2	7.4	4.5	4.7
Capital/labour ratio(Th$86/person)	(a)	456.3	589.4	723.0	798.1	922.6
Total factor productivity(1986=1)		4.7	2.0	4.5	2.6	3.1
INDICATIONS OF COSTS						
Gross output (Mn$C)		9.0	4.4	-0.6	4.4	4.7
Gross output price (1986=1)		1.9	0.3	-4.8	-1.1	-0.9
Share of gross output (%)						
Purchased inputs	(a)	16.2	16.6	5.7	7.1	12.8
Wages & suppl.labour	(a)	34.1	32.5	30.4	28.7	27.4
Unincorporated income	(a)	0.0	0.0	0.0	0.0	0.0
Surplus	(a)	43.9	44.9	58.0	58.9	55.3
Net indirect taxes	(a)	5.8	6.0	5.9	5.3	4.5
Prices of purchased inputs (1986=1)						
Construction-repair (3.2)		5.5	0.2	1.7	1.4	1.8
Elec. eqpt.-electronics (2.2)		2.5	-0.2	3.9	0.8	1.5
Communication-carriers&oth (1.8)		2.0	-0.1	-4.2	-0.9	-0.8
Finance-other (1.3)		6.9	3.1	1.0	1.2	1.6
Elec. eqpt.-wire, etc. (1.2)		4.9	-6.2	7.0	1.2	2.1

(a) Average

Telecommunication Carriers and Other Industries
SIC 4820, 4830
Major Indicators

Base Case		80-89	90-92	93-95	96-00	01-05
		Average Annual Rates of Growth				
Labour Inputs						
Wages per person-year (Th$C)		7.8	4.5	-3.9	2.8	2.9
Supp.lab.inc.per person-year(Th$C)		7.4	12.0	0.0	2.0	3.4
Wage bill/GDP (%)	(a)	43.6	42.0	34.4	32.7	33.1
Unit labour costs (1986=1)		0.5	-0.1	-10.0	-1.8	-1.6
Capital Costs						
Investment deflator (1986=1)		1.0	-4.3	-4.6	0.7	1.8
Surplus/GDP (%)	(a)	56.3	58.0	65.6	67.2	66.9
Unincorporated income/GDP (%)	(a)	0.0	0.0	0.0	0.0	0.0
Real return to capital (%)	(a)	4.4	9.4	13.5	13.5	12.0
Unit capital cost (1986=1)		1.2	0.9	2.5	-1.6	-1.9
Taxes						
Net indirect taxes (Mn$C)		11.5	1.9	-0.8	0.9	2.1
Indirect taxes		11.5	1.9	-0.8	0.9	2.1
Subsidies		7.1	6.1	-10.6	-0.9	4.2
Net indirect taxes/GDP (%)	(a)	7.4	7.8	6.7	6.0	5.4
FINAL DEMAND PRICES (1986=1)						
Total M&E Deflator		-0.6	-4.6	-1.2	0.0	0.9
M&E, comm.-carriers&oth (1.6)		-0.4	-4.5	-4.0	0.8	1.5
Total Consumption Deflator		6.1	3.4	1.4	1.9	2.1
Consump, telecommunications (36.6)		2.4	-0.5	0.3	-0.5	-0.7
Total Government G&S Deflator		6.4	4.0	1.0	1.9	2.6
Govt exp, defence other G&S (0.7)		4.3	-1.2	5.2	1.9	2.3
Govt exp, federal other G&S (2.5)		5.1	1.7	3.0	1.8	2.1
Govt exp, local other G&S (0.8)		6.0	2.0	3.6	1.9	2.1
Govt exp, prov. oth. G&S (3.0)		4.9	2.3	3.3	1.6	1.9
Total Imports Deflator		1.3	-0.3	3.4	1.1	1.4
Imports, misc. svc (2.6)		6.6	1.2	5.2	2.3	2.4
Imports, telecommunications (0.8)		5.0	1.3	5.5	1.2	1.5
Total Exports Deflator		2.2	-1.4	4.6	0.4	1.5
Exports, misc. services (2.2)		6.2	1.6	1.8	2.6	3.0
Exports, telecom.&electronics (1.3)		4.1	3.3	-0.3	0.4	1.4

(a) Average
Sources: Statistics Canada and Informetrica Limited
Note: Figures in brackets represent share of industry gross output.

Electronic Equipment Industries
SIC 3350
Major Indicators

Base Case		80-89	90-92	93-95	96-00	01-05
		Average Annual Rates of Growth				
SUMMARY MEASURES OF SUPPLY AND DEMAND (Mn$86)						
Gross output		11.2	9.6	11.7	5.6	2.7
Final demand		4.7	26.3	13.6	4.8	1.4
Final domestic demand		11.5	23.5	5.1	4.1	4.7
Gross exports		16.2	26.6	18.4	4.4	3.2
Gross imports		16.4	22.1	12.6	4.2	4.5
Inventory change		0.4	-	-5.7	1.4	0.6
Intermediate industry req'ts		13.9	4.4	10.8	6.0	3.2
Net exports	(a)	-1178.7	-4102.9	-4439.7	-4837.8	-6837.6
Export share in output (%)	(a)	48.9	87.0	94.0	93.1	95.7
Import share in domestic sales (%)	(a)	58.4	88.6	93.1	92.6	95.1
CONTRIBUTION TO OUTPUT GROWTH (%)						
Domestic sales	(a)	16.0	18.5	11.3	6.7	5.3
Inventory change	(a)	-0.1	-2.6	0.3	0.0	0.0
Exports	(a)	7.6	17.9	16.6	4.2	3.1
Imports	(a)	-12.0	-24.0	-16.3	-5.1	-5.7
INDICATIONS OF DEMAND (Mn$86)						
Final Demand						
M&E, comm.-carriers&oth (23.4)		8.2	14.9	3.8	3.1	5.3
M&E, comm.-radio tv cable (1.2)		10.5	13.7	15.7	7.3	6.3
Govt exp, defence other G&S (7.4)		7.4	0.6	-0.9	-4.0	0.0
Govt exp, federal m&e (3.3)		12.9	14.1	7.5	8.7	7.8
Imports, other equipment&tools (1.4)		7.5	1.1	7.7	4.4	3.6
Imports, telecommunications (61.5)		10.5	8.7	11.2	4.1	4.6
Imports, consumer electronics (1.8)		9.1	-1.7	-1.9	3.9	1.7
Exports, misc.industrial eqpt(4.1)		8.8	3.1	15.6	4.6	4.2
Exports, telecom.&electronics (45.8)		12.4	13.3	16.9	4.2	3.1
Intermediate Industry Req'ts						
Elec. eqpt.-electronics (23.1)		11.2	9.6	11.7	5.6	2.7
Laboratory supplies (fictive) (10.1)		3.8	2.5	2.9	2.0	2.3
Elec. eqpt.-other misc. (6.1)		8.4	-5.5	15.8	4.0	1.6
Communication-carriers&oth (5.0)		7.1	4.1	4.4	5.6	5.7
Operating supplies (fictive) (3.3)		4.2	3.7	3.7	1.9	2.1
Trans. eqpt.-shipbuilding (3.1)		0.7	-4.0	1.5	-1.8	3.4
Other misc. mfg.-total (2.0)		1.3	-2.3	6.8	4.6	3.7
Elec. eqpt.-computers, etc. (1.8)		26.2	12.8	32.2	17.8	5.3
Construction-nonres bldg. (1.5)		4.4	-9.1	0.7	3.8	1.5
Construction-residential (1.1)		4.3	-6.2	-4.4	4.4	2.7

(a) Average

Electronic Equipment Industries
SIC 3350
Major Indicators

Base Case		80-89	90-92	93-95	96-00	01-05
		Average Annual Rates of Growth				
INDICATIONS OF INDUSTRY ACTIVITY						
Gross domestic product (Mn$86)		7.0	3.4	10.1	5.8	2.7
Gross domestic product (Mn$C)		12.0	3.7	9.5	5.5	4.0
GDP deflator (1986=1)		4.7	0.2	-0.5	-0.3	1.2
Investment (Mn$86) (1)		12.1	-1.5	14.1	8.4	12.0
Machinery and equipment (1)		13.3	0.1	14.9	8.1	12.5
Structures (1)		5.0	-19.5	-0.8	16.1	-0.5
Investment effort (Inv/GDP in %) ((a)		9.2	8.2	8.2	6.5	7.3
Gross capital stock (Mn$86) (1)		6.5	3.4	2.9	4.9	5.4
Machinery and equipment (1)		9.5	5.4	4.9	6.8	6.6
Structures (1)		2.7	-0.6	-1.9	-0.9	-0.1
Scrappage (% of stock) (1)	(a)	5.5	6.9	9.6	10.9	12.4
Machinery and equipment (1)	(a)	8.1	8.9	12.3	13.2	14.2
Structures (1)	(a)	2.2	2.7	3.1	3.5	3.8
Avg. age of M&E (Years) (1)	(a)	4.5	4.3	4.4	4.1	4.0
Capital/output ratio (1)	(a)	0.8	0.8	0.7	0.4	0.4
Employment (000s, estab. basis)		4.7	-2.0	12.3	1.1	-0.3
Labour productivity(Th$86/person)		2.2	5.5	-2.0	4.7	3.0
Capital/labour ratio(Th$86/person)	(a)	33.0	49.8	53.9	51.7	67.7
Total factor productivity(1986=1)	(1)	5.1	3.2	12.4	8.1	2.2
INDICATIONS OF COSTS						
Gross output (Mn$C)		14.7	8.6	13.3	6.0	4.1
Gross output price (1986=1)		3.2	-0.9	1.4	0.4	1.4
Share of gross output (%)						
Purchased inputs	(a)	46.7	59.0	63.0	63.6	64.4
Wages & suppl.labour	(a)	34.8	26.1	27.8	27.7	26.4
Unincorporated income	(a)	0.0	0.0	0.0	0.0	0.0
Surplus	(a)	18.1	14.4	8.6	8.3	8.8
Net indirect taxes	(a)	0.4	0.5	0.5	0.4	0.4
Prices of purchased inputs (1986=1)						
Elec. equip.-electronics (23.6)		2.5	-0.2	3.9	0.8	1.5
Metal fabrication-total (2.3)		4.6	0.2	4.2	1.5	1.8
Elec. equip.-other (2.0)		4.0	1.5	4.3	1.8	2.1
Finance-other (1.8)		6.9	3.1	1.0	1.2	1.6
Elec. equip.-computers, etc. (1.7)		-14.1	-13.8	-8.1	-3.6	-2.0
Trade-wholesale (1.6)		4.4	-0.6	0.7	0.8	1.6
Communication-carriers&oth (1.3)		2.0	-0.1	-4.2	-0.9	-0.8
Elec. equip.-other misc. (1.2)		-0.1	1.6	7.1	1.3	1.8

(a) Average

Electronic Equipment Industries
SIC 3350
Major Indicators

Base Case		80-89	90-92	93-95	96-00	01-05
		Average Annual Rates of Growth				
Labour Inputs						
Wages per person-year (Th$C)		6.6	6.1	2.7	3.9	4.0
Supp.lab.inc.per person-year(Th$C)		8.7	14.1	4.2	3.1	4.8
Wage bill/GDP (%)	(a)	65.8	64.4	76.4	76.9	75.0
Unit labour costs (1986=1)		4.5	1.5	4.9	-0.8	1.0
Capital Costs						
Investment deflator (1986=1) (1)		0.9	-5.7	-4.0	-0.5	-0.6
Surplus/GDP (%)	(a)	34.1	35.6	23.6	23.1	25.0
Unincorporated income/GDP (%)	(a)	0.0	0.0	0.0	0.0	0.0
Real return to capital (%) (1)	(a)	38.0	33.5	30.1	43.9	45.8
Unit capital cost (1986=1)		5.0	-2.0	-13.5	1.7	1.8
Taxes						
Net indirect taxes (Mn$C)		15.1	-8.7	13.1	4.1	3.5
Indirect taxes		15.3	2.0	4.3	2.6	3.2
Subsidies		15.8	22.0	-6.7	-0.5	2.4
Net indirect taxes/GDP (%)	(a)	0.8	1.2	1.3	1.2	1.2
FINAL DEMAND PRICES (1986=1)						
Total M&E Deflator		-0.6	-4.6	-1.2	0.0	0.9
M&E, comm.-carriers&oth (23.4)		-0.4	-4.5	-4.0	0.8	1.5
M&E, comm.-radio tv cable (1.2)		0.0	-8.0	-6.0	1.0	1.7
Total Government G&S Deflator		6.4	4.0	1.0	1.9	2.6
Govt exp, defence other G&S (7.4)		4.3	-1.2	5.2	1.9	2.3
Govt exp, federal m&e (3.3)		-0.7	-8.3	-6.3	-0.8	0.3
Total Imports Deflator		1.3	-0.3	3.4	1.1	1.4
Imports, other equipment&tools (1.4)		4.3	3.0	5.4	2.4	2.2
Imports, telecommunications (61.5)		5.0	1.3	5.5	1.2	1.5
Imports, consumer electronics (1.8)		-0.1	4.0	10.7	1.9	2.1
Total Exports Deflator		2.2	-1.4	4.6	0.4	1.5
Exports, misc.industrial eqpt(4.1)		5.8	2.3	2.3	0.9	1.8
Exports, telecom.&electronics (45.8)		4.1	3.3	-0.3	0.4	1.4

(a) Average
Sources: Statistics Canada and Informetrica Limited
Note: Figures in brackets represent share of industry gross output.
(1) Data available only for Electrical products-total

Office, Store and Business Machines
SIC 3360
Major Indicators

Base Case		80-89	90-92	93-95	96-00	01-05
		Average Annual Rates of Growth				
SUMMARY MEASURES OF SUPPLY AND DEMAND (Mn$86)						
Gross output		26.2	12.8	32.2	17.8	5.3
Final demand		27.0	11.5	43.1	20.3	5.6
Final domestic demand		37.9	28.3	25.2	4.5	4.1
Gross exports		31.0	40.4	33.3	11.9	4.6
Gross imports		38.1	33.6	26.9	5.7	4.0
Inventory change		88.2	-	-6.9	1.6	0.7
Intermediate industry req'ts		25.7	13.7	24.2	15.1	5.0
Net exports	(a)	-2630.1	*******	*******	*******	*******
Export share in output (%)	(a)	87.3	137.6	165.2	141.3	127.1
Import share in domestic sales (%)	(a)	94.7	111.2	122.0	121.9	117.1
CONTRIBUTION TO OUTPUT GROWTH (%)						
Domestic sales	(a)	70.9	63.4	82.2	15.1	7.0
Inventory change	(a)	3.2	-4.2	0.1	0.0	0.0
Exports	(a)	27.2	44.2	55.6	18.7	5.9
Imports	(a)	-73.6	-90.4	-102.1	-15.6	-7.5
INDICATIONS OF DEMAND (Mn$86)						
Final Demand						
Consump, recr.&sporting eqpt. (19.1)		8.3	-0.6	6.7	2.1	0.8
Govt exp, federal m&e (4.4)		12.9	14.1	7.5	8.7	7.8
Imports, other equipment&tools (3.3)		7.5	1.1	7.7	4.4	3.6
Imports, office machines&eqpt.(192.1)		40.1	25.8	26.6	5.8	4.0
M&E, commercial services (34.4)		13.0	3.2	17.8	3.3	4.9
M&E, trade-total (6.3)		7.4	2.0	7.5	3.0	6.3
M&E, electric utilities (17.7)		9.4	12.6	-5.7	8.0	5.1
M&E, comm.-carriers&oth (5.8)		8.2	14.9	3.8	3.1	5.3
M&E, fin, insur&real est. (18.0)		29.5	4.4	27.7	9.0	4.7
Exports, office equipment (83.8)		31.6	35.0	32.8	12.0	4.6
Intermediate Industry Req'ts						
Elec. eqpt.-computers, etc. (28.0)		26.2	12.8	32.2	17.8	5.3
Operating supplies (fictive) (14.8)		4.2	3.7	3.7	1.9	2.1
Elec. eqpt.-electronics (3.4)		11.2	9.6	11.7	5.6	2.7
Trans. eqpt.-cars&trucks (1.6)		4.0	-1.5	14.7	7.1	3.9
Finance-deposit taking (1.2)		3.1	2.4	4.1	2.1	2.0
Finance-other (1.1)		4.5	-0.1	2.6	2.5	2.3
Other misc. mfg.-total (1.1)		1.3	-2.3	6.8	4.6	3.7
Printing&publishing (1.1)		3.6	-5.4	1.5	2.1	2.2
Construction-nonres bldg. (0.9)		4.4	-9.1	0.7	3.8	1.5
Construction-residential (0.9)		4.3	-6.2	-4.4	4.4	2.7

(a) Average

Office, Store and Business Machines
SIC 3360
Major Indicators

Base Case		80-89	90-92	93-95	96-00	01-05
		Average Annual Rates of Growth				
INDICATIONS OF INDUSTRY ACTIVITY						
Gross domestic product (Mn$86)		31.0	9.0	38.0	17.3	5.4
Gross domestic product (Mn$C)		13.1	-24.1	-1.1	12.7	3.1
GDP deflator (1986=1)		-13.7	-30.4	-28.3	-3.9	-2.1
Investment (Mn$86) (1)		12.1	-1.5	14.1	8.4	12.0
Machinery and equipment (1)		13.3	0.1	14.9	8.1	12.5
Structures (1)		5.0	-19.5	-0.8	16.1	-0.5
Investment effort (Inv/GDP in %) ((a)		9.2	8.2	8.2	6.5	7.3
Gross capital stock (Mn$86) (1)		6.5	3.4	2.9	4.9	5.4
Machinery and equipment (1)		9.5	5.4	4.9	6.8	6.6
Structures (1)		2.7	-0.6	-1.9	-0.9	-0.1
Scrappage (% of stock) (1)	(a)	5.5	6.9	9.6	10.9	12.4
Machinery and equipment (1)	(a)	8.1	8.9	12.3	13.2	14.2
Structures (1)	(a)	2.2	2.7	3.1	3.5	3.8
Avg. age of M&E (Years) (1)	(a)	4.5	4.3	4.4	4.1	4.0
Capital/output ratio (1)	(a)	0.8	0.8	0.7	0.4	0.4
Employment (000s, estab. basis)		4.3	0.7	-0.5	2.0	0.5
Labour productivity(Th$86/person)		25.5	8.2	38.6	15.0	4.9
Capital/labour ratio(Th$86/person)	(a)	33.0	49.8	53.9	51.7	67.7
Total factor productivity(1986=1) (1)		5.1	3.2	12.4	8.1	2.2
INDICATIONS OF COSTS						
Gross output (Mn$C)		14.0	-0.4	21.0	13.5	4.0
Gross output price (1986=1)		-9.7	-11.7	-8.5	-3.7	-1.3
Share of gross output (%)						
Purchased inputs	(a)	60.9	77.4	92.7	91.8	92.0
Wages & suppl.labour	(a)	25.5	20.7	15.2	10.1	9.4
Unincorporated income	(a)	0.3	0.7	0.9	1.4	1.7
Surplus	(a)	12.5	0.0	-9.8	-4.2	-3.9
Net indirect taxes	(a)	0.8	1.1	0.9	0.9	0.8
Prices of purchased inputs (1986=1)						
Elec. equip.-computers, etc. (32.2)		-14.1	-13.8	-8.1	-3.6	-2.0
Elec. equip.-electronics (4.1)		2.5	-0.2	3.9	0.8	1.5
Other misc. mfg.-total (3.1)		5.0	1.2	4.5	1.9	2.0
Finance-other (2.7)		6.9	3.1	1.0	1.2	1.6
Services-business-professional (2.6)		9.2	5.9	2.3	2.4	2.3
Trade-wholesale (1.4)		4.4	-0.6	0.7	0.8	1.6
Communication-carriers&oth (1.2)		2.0	-0.1	-4.2	-0.9	-0.8
Metal fabrication-total (1.1)		4.6	0.2	4.2	1.5	1.8

(a) Average

Office, Store and Business Machines
SIC 3360
Major Indicators

Base Case		80-89	90-92	93-95	96-00	01-05
		Average Annual Rates of Growth				
Labour Inputs						
Wages per person-year (Th$C)		6.5	6.9	0.5	2.8	3.1
Supp.lab.inc.per person-year(Th$C)		8.7	14.9	1.8	2.0	3.9
Wage bill/GDP (%)	(a)	66.4	110.5	244.5	137.2	131.6
Unit labour costs (1986=1)		-15.0	-0.4	-27.4	-10.7	-1.6
Capital Costs						
Investment deflator (1986=1) (1)		0.9	-5.7	-4.0	-0.5	-0.6
Surplus/GDP (%)	(a)	32.7	-14.0	-159.1	-56.7	-54.8
Unincorporated income/GDP (%)	(a)	0.9	3.5	14.6	19.5	23.2
Real return to capital (%) (1)	(a)	38.0	33.5	30.1	43.9	45.8
Unit capital cost (1986=1)		-11.0	-	-26.3	-22.4	0.1
Taxes						
Net indirect taxes (Mn$C)		18.4	-0.6	14.0	11.0	3.6
Indirect taxes		14.2	-1.6	8.4	11.1	4.2
Subsidies		3.8	-7.3	-	6.2	-
Net indirect taxes/GDP (%)	(a)	2.2	5.9	15.1	11.9	11.9
FINAL DEMAND PRICES (1986=1)						
Total Consumption Deflator		6.1	3.4	1.4	1.9	2.1
Consump, recr.&sporting eqpt. (19.1)		2.3	-1.4	0.2	1.7	2.2
Total Government G&S Deflator		6.4	4.0	1.0	1.9	2.6
Govt exp, federal m&e (4.4)		-0.7	-8.3	-6.3	-0.8	0.3
Total Imports Deflator		1.3	-0.3	3.4	1.1	1.4
Imports, other equipment&tools (3.3)		4.3	3.0	5.4	2.4	2.2
Imports, office machines&eqpt.(192.1)		-16.6	-13.8	-8.0	-4.1	-2.3
Total M&E Deflator		-0.6	-4.6	-1.2	0.0	0.9
M&E, commercial services (34.4)		-0.2	-6.2	-7.6	0.8	1.2
M&E, trade-total (6.3)		0.5	-7.1	-6.1	0.3	0.8
M&E, electric utilities (17.7)		-3.7	-5.7	-2.1	1.1	1.5
M&E, comm.-carriers&oth (5.8)		-0.4	-4.5	-4.0	0.8	1.5
M&E, fin, insur&real est. (18.0)		-8.7	-14.4	-11.1	-3.4	-1.9
Total Exports Deflator		2.2	-1.4	4.6	0.4	1.5
Exports, office equipment (83.8)		-13.3	-13.6	-10.9	-3.3	-1.0

(a) Average
Sources: Statistics Canada and Informetrica Limited
Note: Figures in brackets represent share of industry gross output.
(1) Data available only for Electrical products-total

Other Business Service Industries
SIC 7710, 7720, 7770, 7790
Major Indicators

Base Case		80-89	90-92	93-95	96-00	01-05
		Average Annual Rates of Growth				
SUMMARY MEASURES OF SUPPLY AND DEMAND (Mn$86)						
Gross output		12.5	4.3	4.7	5.6	5.1
Final demand		13.0	17.7	4.3	4.9	5.8
Final domestic demand		10.4	16.0	0.7	5.2	5.6
Gross exports		16.9	15.5	5.7	4.7	4.9
Gross imports		10.6	14.0	-0.7	5.2	4.9
Inventory change		0.0	0.0	0.0	0.0	0.0
Intermediate industry req'ts		12.4	0.4	4.8	5.8	4.8
Net exports	(a)	-888.4	-2050.9	-1656.0	-1825.0	-2410.2
Export share in output (%)	(a)	7.2	13.1	14.3	13.7	13.3
Import share in domestic sales (%)	(a)	15.8	23.1	21.6	20.3	20.0
CONTRIBUTION TO OUTPUT GROWTH (%)						
Domestic sales	(a)	13.6	5.7	3.7	6.1	5.5
Inventory change	(a)	0.0	0.0	0.0	0.0	0.0
Exports	(a)	1.3	1.8	0.8	0.7	0.6
Imports	(a)	-1.9	-3.2	0.2	-1.2	-1.1
INDICATIONS OF DEMAND (Mn$86)						
Final Demand						
Govt exp, defence other G&S (2.6)		7.4	0.6	-0.9	-4.0	0.0
Govt exp, education other G&S (2.7)		3.4	3.6	-1.8	0.3	2.4
Govt exp, federal other G&S (9.1)		2.3	7.8	3.9	0.3	0.4
Govt rev, oth.fed. from G&S(1.8)		4.3	5.0	10.1	0.3	0.4
Govt exp, hospitals other G&S (1.2)		5.0	5.7	-1.5	-0.4	3.0
Govt exp, local other G&S (3.2)		5.8	4.9	-1.2	0.7	2.2
Govt exp, prov. oth. G&S (9.5)		6.9	1.6	-2.7	-1.3	0.9
Imports, misc. svc (14.1)		4.0	2.6	-0.9	2.5	2.6
Exports, misc. services (7.7)		5.4	2.7	5.5	2.0	2.6
Intermediate Industry Req'ts						
Finance-other (13.7)		4.5	-0.1	2.6	2.5	2.3
Trade-wholesale (6.2)		5.4	2.2	5.1	2.5	2.4
Trade-retail (5.8)		3.0	-0.6	3.5	1.5	1.5
Finance-deposit taking (5.2)		3.1	2.4	4.1	2.1	2.0
Finance-insurance (3.9)		4.9	2.6	5.0	1.6	1.8
Trans. eqpt.-cars&trucks (3.5)		4.0	-1.5	14.7	7.1	3.9
Services-business-other (3.3)		12.5	4.3	4.7	5.6	5.1
Services-business-professional (3.1)		5.2	-5.2	4.3	3.7	2.6
Mining-oil&gas (2.1)		2.0	3.5	7.8	0.6	1.0
Communication-radio tv cable (1.5)		3.6	3.4	3.2	1.4	1.7

(a) Average

Other Business Service Industries
SIC 7710, 7720, 7770, 7790
Major Indicators

Base Case		80-89	90-92	93-95	96-00	01-05
		Average Annual Rates of Growth				
INDICATIONS OF INDUSTRY ACTIVITY						
Gross domestic product (Mn$86)		13.7	3.4	6.7	5.6	5.1
Gross domestic product ($C)		15.8	7.6	7.5	8.2	7.6
GDP deflator (1986=1)		1.8	4.0	0.7	2.5	2.3
Investment (Mn$86) (1)		12.0	0.1	16.9	3.4	4.8
Machinery and equipment (1)		13.0	3.2	17.8	3.3	4.9
Structures (1)		7.1	-28.6	-5.9	6.8	-0.1
Investment effort (Inv/GDP in %) ((a)		15.6	22.0	31.1	38.3	43.3
Gross capital stock (Mn$86) (1)		9.8	6.8	7.8	8.0	2.2
Machinery and equipment (1)		13.0	8.6	10.5	9.9	2.6
Structures (1)		5.5	3.1	1.3	1.1	0.8
Scrappage (% of stock) (1)	(a)	6.3	7.6	9.7	9.2	16.0
Machinery and equipment (1)	(a)	10.8	10.8	13.1	11.3	19.1
Structures (1)	(a)	0.6	0.6	0.7	0.9	1.3
Avg. age of M&E (Years) (1)	(a)	3.2	3.4	3.4	3.4	3.2
Capital/output ratio (1)	(a)	1.0	1.6	1.8	2.3	2.4
Employment (000s, estab. basis)		7.6	3.5	7.5	5.6	4.2
Labour productivity(Th$86/person)		5.6	-0.1	-0.7	0.0	0.9
Capital/labour ratio(Th$86/person)	(a)	1.0	1.6	1.8	2.3	2.4
Total factor productivity(1986=1) (1)		-1.5	-2.7	-1.4	-1.6	0.1
INDICATIONS OF COSTS						
Gross output (Mn$C)		15.3	7.5	5.9	8.0	7.4
Gross output price (1986=1)		2.5	3.0	1.1	2.3	2.2
Share of gross output (%)						
Purchased inputs	(a)	26.7	27.2	24.7	21.5	21.0
Wages & suppl.labour	(a)	52.2	56.7	57.6	62.1	64.7
Unincorporated income	(a)	3.0	4.6	4.2	3.8	3.6
Surplus	(a)	16.8	10.9	12.4	11.1	9.2
Net indirect taxes	(a)	1.3	0.7	1.1	1.5	1.5
Prices of purchased inputs (1986=1)						
Finance-other (7.1)		6.9	3.1	1.0	1.2	1.6
Services-business-other (3.3)		2.8	3.2	1.8	2.3	2.2
Finance-deposit taking (2.0)		9.7	2.5	0.3	1.7	1.9
Travel&entertainment (2.1)		5.1	-1.2	2.8	2.0	2.7
Communication-carriers&oth (1.7)		2.0	-0.1	-4.2	-0.9	-0.8
Services-business-professional (1.6)		9.2	5.9	2.3	2.4	2.3

(a) Average

Other Business Service Industries
SIC 7710, 7720, 7770, 7790
Major Indicators

Base Case		80-89	90-92	93-95	96-00	01-05
		Average Annual Rates of Growth				
Labour Inputs						
Wages per person-year (Th$C)		9.0	4.3	0.9	3.1	3.6
Supp.lab.inc.per person-year(Th$C)		12.0	17.2	2.4	0.5	4.9
Wage bill/GDP (%)	(a)	72.6	78.6	77.7	80.6	83.5
Unit labour costs (1986=1)		3.1	3.6	1.3	3.4	3.0
Capital Costs						
Investment deflator (1986=1) (1)		0.7	-6.5	-7.4	1.0	1.1
Surplus/GDP (%)	(a)	23.3	15.0	16.7	14.5	11.8
Unincorporated income/GDP (%)	(a)	4.1	6.4	5.6	4.9	4.7
Real return to capital (%) (1)	(a)	23.1	23.7	25.4	20.4	17.7
Unit capital cost (1986=1)		-1.6	5.4	-1.3	-1.1	-0.9
Taxes						
Net indirect taxes (Mn$C)		5.7	3.9	31.2	11.2	7.9
Indirect taxes		15.0	11.3	8.8	6.6	6.1
Subsidies		38.1	15.5	-5.5	-0.4	1.8
Net indirect taxes/GDP (%)	(a)	1.9	0.9	1.5	1.9	2.0
FINAL DEMAND PRICES (1986=1)						
Total Government G&S Deflator		6.4	4.0	1.0	1.9	2.6
Govt exp, defence other G&S (2.6)		4.3	-1.2	5.2	1.9	2.3
Govt exp, education other G&S (2.7)		5.6	2.5	4.0	2.0	2.3
Govt exp, federal other G&S (9.1)		5.1	1.7	3.0	1.8	2.1
Govt rev, oth.fed. from G&S(1.8)		6.4	3.5	-0.6	2.4	2.6
Govt exp, hospitals other G&S (1.2)		5.5	0.9	4.3	1.6	1.9
Govt exp, local other G&S (3.2)		6.0	2.0	3.6	1.9	2.1
Govt exp, prov. oth. G&S (9.5)		4.9	2.3	3.3	1.6	1.9
Total Imports Deflator		1.3	-0.3	3.4	1.1	1.4
Imports, misc. svc (14.1)		6.6	1.2	5.2	2.3	2.4
Total Exports Deflator		2.2	-1.4	4.6	0.4	1.5
Exports, misc. services (7.7)		6.2	1.6	1.8	2.6	3.0

(a) Average
Sources: Statistics Canada and Informetrica Limited
Note: Figures in brackets represent share of industry gross output.
(1) Data available only for Commercial services

Telecommunication Broadcasting Industry
SIC 4810
Major Indicators

Base Case		80-89	90-92	93-95	96-00	01-05
		Average Annual Rates of Growth				
SUMMARY MEASURES OF SUPPLY AND DEMAND (Mn$86)						
Gross output		3.6	3.4	3.2	1.4	1.7
Final demand		8.2	0.2	2.9	-0.4	0.8
Final domestic demand		8.0	0.7	2.5	-0.3	0.9
Gross exports		6.5	-9.1	8.7	2.9	2.8
Gross imports		4.3	2.6	-0.5	2.7	2.9
Inventory change		-	-	-1.0	0.0	0.0
Intermediate industry req'ts		1.5	5.3	3.3	2.3	2.2
Net exports	(a)	-28.1	-49.3	-40.4	-38.9	-45.6
Export share in output (%)	(a)	1.2	1.2	1.2	1.3	1.4
Import share in domestic sales (%)	(a)	2.2	2.6	2.2	2.2	2.3
CONTRIBUTION TO OUTPUT GROWTH (%)						
Domestic sales	(a)	3.6	3.6	3.1	1.4	1.8
Inventory change	(a)	0.0	0.0	0.0	0.0	0.0
Exports	(a)	0.1	-0.1	0.1	0.0	0.0
Imports	(a)	-0.1	-0.1	0.0	-0.1	-0.1
INDICATIONS OF DEMAND (Mn$86)						
Final Demand						
Consump, recr.&sporting eqpt. (0.2)		8.3	-0.6	6.7	2.1	0.8
Consump, cable&pay television (32.4)		9.4	7.3	3.6	-0.5	0.8
Consump, lotteries (0.5)		7.4	5.5	14.3	1.1	1.0
Consump, other recreational svc(0.7)		2.4	-0.9	0.3	0.3	1.3
Consump, financial&legal svc (0.2)		4.1	2.7	6.0	1.0	1.4
Consump, movie theatre&drive-ins(0.2)		-2.4	-7.3	5.7	0.6	1.1
M&E, comm.-carriers&oth (0.3)		8.2	14.9	3.8	3.1	5.3
Imports, misc. svc (1.9)		4.0	2.6	-0.9	2.5	2.6
Exports, misc. services (0.6)		5.4	2.7	5.5	2.0	2.6
Exports, telecom.&electronics (0.3)		12.4	13.3	16.9	4.2	3.1
Intermediate Industry Req'ts						
Advertising&promotion(fictive)(59.3)		3.5	8.4	4.6	2.4	2.2
Communication-radio tv cable (3.1)		3.6	3.4	3.2	1.4	1.7
Services-accommodation&food (0.7)		2.6	-3.8	6.9	1.0	1.3
Services-recreation&amusement (0.5)		4.7	2.4	8.2	0.8	1.1
Finance-other (0.3)		4.5	-0.1	2.6	2.5	2.3
Transport-railway (0.2)		0.7	-2.3	4.6	0.3	0.2
Trade-retail (0.1)		3.0	-0.6	3.5	1.5	1.5
Construction-gas&oil facilities(0.1)		0.0	-0.1	3.0	4.0	3.8
Trade-wholesale (0.1)		5.4	2.2	5.1	2.5	2.4
Construction-nonres bldg. (0.1)		4.4	-9.1	0.7	3.8	1.5

(a) Average

Telecommunication Broadcasting Industry
SIC 4810
Major Indicators

Base Case		80-89	90-92	93-95	96-00	01-05
		Average Annual Rates of Growth				
INDICATIONS OF INDUSTRY ACTIVITY						
Gross domestic product (Mn$86)		1.1	2.1	2.0	1.0	1.3
Gross domestic product (Mn$C)		9.6	5.4	4.7	2.1	4.9
GDP deflator (1986=1)		8.4	3.3	2.7	1.1	3.5
Investment (Mn$86)		12.9	5.5	11.8	5.4	6.6
Machinery and equipment		10.5	13.7	15.7	7.3	6.3
Structures		15.3	-2.0	6.5	2.0	7.3
Investment effort (Inv/GDP in %)	(a)	15.9	29.3	39.0	53.8	60.9
Gross capital stock (Mn$86)		6.3	8.9	10.0	9.1	4.3
Machinery and equipment		3.9	8.8	15.1	12.6	6.2
Structures		8.0	9.0	6.8	6.1	2.4
Scrappage (% of stock)	(a)	4.3	4.2	4.2	4.9	7.9
Machinery and equipment	(a)	8.8	7.6	6.5	6.3	9.7
Structures	(a)	1.3	2.2	2.6	3.6	6.0
Avg. age of M&E (Years)	(a)	5.3	4.5	4.1	4.1	4.3
Capital/output ratio	(a)	1.5	2.4	2.9	4.1	5.0
Employment (000s, estab. basis)		2.4	-0.5	3.8	1.0	1.3
Labour productivity(Th$86/person)		-1.3	2.6	-1.8	0.0	0.0
Capital/labour ratio(Th$86/person)	(a)	87.0	134.8	159.7	224.4	273.6
Total factor productivity(1986=1)		-2.5	-0.4	-3.7	-2.6	-1.0
INDICATIONS OF COSTS						
Gross output (Mn$C)		12.1	6.0	7.8	3.6	4.5
Gross output price (1986=1)		8.3	2.5	4.5	2.2	2.7
Share of gross output (%)						
Purchased inputs	(a)	55.9	54.5	53.1	54.3	53.9
Wages & suppl.labour	(a)	48.9	42.1	43.7	42.3	43.5
Unincorporated income	(a)	0.0	0.0	0.0	0.0	0.0
Surplus	(a)	23.2	21.1	14.3	11.6	10.0
Net indirect taxes	(a)	-28.0	-17.7	-11.1	-8.2	-7.3
Prices of purchased inputs (1986=1)						
Services-recreation&amusement (16.2)		7.4	2.0	5.0	2.2	1.9
Services-business-other (4.9)		2.8	3.2	1.8	2.3	2.2
Communication-carriers&oth (4.3)		2.0	-0.1	-4.2	-0.9	-0.8
Finance-other (3.6)		6.9	3.1	1.0	1.2	1.6
Services-business-professional (3.2)		9.2	5.9	2.3	2.4	2.3
Communication-radio tv cable (3.1)		8.3	2.6	4.5	2.2	2.7
Advertising&promotion(fictive)(2.8)		7.7	-5.0	4.1	2.0	2.4
Travel&entertainment(fictive)(2.5)		5.1	-1.2	2.8	2.0	2.7
Operating supplies (fictive) (2.3)		3.4	-1.9	3.4	1.2	1.6

(a) Average

Telecommunication Broadcasting Industry
SIC 4810
Major Indicators

Base Case		80-89	90-92	93-95	96-00	01-05
		Average Annual Rates of Growth				
Labour Inputs						
Wages per person-year (Th$C)		7.5	5.0	3.4	2.6	3.7
Supp.lab.inc.per person-year(Th$C)		5.8	12.7	7.8	2.2	4.8
Wage bill/GDP (%)	(a)	67.8	66.7	75.3	78.5	81.3
Unit labour costs (1986=1)		8.2	3.8	5.6	2.6	3.8
Capital Costs						
Investment deflator (1986=1)		1.8	-4.9	-3.8	0.5	2.0
Surplus/GDP (%)	(a)	32.1	33.3	24.7	21.5	18.7
Unincorporated income/GDP (%)	(a)	0.0	0.0	0.0	0.0	0.0
Real return to capital (%)	(a)	13.7	18.5	13.3	8.3	5.4
Unit capital cost (1986=1)		8.9	2.2	-4.4	-4.0	2.6
Taxes						
Net indirect taxes (Mn$C)		4.5	1.7	-5.9	-5.1	6.6
Indirect taxes		16.9	-6.6	4.3	3.9	4.1
Subsidies		5.6	0.6	-4.6	-3.5	6.1
Net indirect taxes/GDP (%)	(a)	-38.4	-27.9	-19.1	-15.2	-13.7
FINAL DEMAND PRICES (1986=1)						
Total Consumption Deflator		6.1	3.4	1.4	1.9	2.1
Consump, recr.&sporting eqpt. (0.2)		2.3	-1.4	0.2	1.7	2.2
Consump, cable&pay television (32.4)		7.7	2.5	5.3	2.2	2.7
Consump, lotteries (0.5)		7.3	2.1	0.5	2.6	2.2
Consump, other recreational svc(0.7)		8.3	8.5	3.3	2.7	2.3
Consump, financial&legal svc (0.2)		7.2	4.4	1.1	1.6	1.9
Consump, movie theatre&drive-ins(0.2)		7.2	4.0	2.0	2.7	2.3
Total M&E Deflator		-0.6	-4.6	-1.2	0.0	0.9
M&E, comm.-carriers&oth (0.3)		-0.4	-4.5	-4.0	0.8	1.5
Total Imports Deflator		1.3	-0.3	3.4	1.1	1.4
Imports, misc. svc (1.9)		6.6	1.2	5.2	2.3	2.4
Total Exports Deflator		2.2	-1.4	4.6	0.4	1.5
Exports, misc. services (0.6)		6.2	1.6	1.8	2.6	3.0
Exports, telecom.&electronics (0.3)		4.1	3.3	-0.3	0.4	1.4

(a) Average
Sources: Statistics Canada and Informetrica Limited
Note: Figures in brackets represent share of industry gross output.

4.2 Impact Exercise

TAB 5
APPENDICES

BIBLIOGRAPHY

BOOKS AND REPORTS

Australian Bureau of Industry Economics (BIE), *International Performance Indicators: Telecommunications 1995*, March 1995.

----- *International Benchmarking - Overview 1995*, November 1995.

INDUSTRY CANADA, *The Canadian Telecommunications Service Industries: An Overview Part 1: The Domestic Situation*, 1994/1995 Edition.

----- *The Telecommunications Service Industry, "Trend Analysis Canada - United States 1980-1995*, January 1996, Spectrum, Information Technologies and Telecommunications Sector.

ITU, *The Changing Role of Government in an Era of Telecom Deregulation, Regulatory Colloquium No. 1 – Options for Regulatory Processes and Procedures in Telecommunications*, May 1993.

----- *World Telecommunications Development Report: Information Infrastructures, World Telecommunications Indicators*, 1995.

----- *The Changing Role of Government in an Era of Telecom Deregulation, Regulatory Colloquium No. 2 – Universal Service and Innovation: Fostering Linked Goals through Regulatory Policy*, February 1994.

----- *The Changing Role of Government in an Era of Telecom Deregulation, Regulatory Colloquium No. 3 – Global Mobile Personal Communications Systems (GMPCS)*, March 1995.

----- *The Changing Role of Government in an Era of Telecom Deregulation, Regulatory Colloquium No. – Interconnection*, June 1995.

----- *The Changing Role of Government in an Era of Telecom Deregulation, ITU Regulatory Colloquium No. 5 – Trade Agreements on Telecommunications: Regulatory Implications*, (date).

NORTHERN TELECOM, *A Telecompetitiveness Infostructure: Enabling a New Future for Canada*, May 1994.

OBSERVATOIRE MONDIAL DES SYSTÈMES DE COMMUNICATION, *Key Figures and Indicators for the World Telecommunications Market*, 1995.

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD), Directorate for Science, Technology and Industry, Committee for Information, Computer and Communications Policy, "Seventeenth Session of the Working Party on Telecommunication and Information Services Policies", September 17, 1996

----- *Competition in Telecommunications*, 1996.

STAPLE, Gregory C., ed., in cooperation with the International Institute of Communications (IIC), *TeleGeography 1995: Global Telecommunications Traffic Statistics & Commentary.*

World Trade Organization, *List of Exemptions from Article II, Final Report of the Negotiating Group on Basic Telecommunications*, April 30, 1996

ARTICLES

GRANT, Land, "To survive in an era of better service at lower cost, large – and small – telecom companies are furiously spinning out a web of global alliances", *Infrastructure Finance* (July/August 1996).

SANDLER, Neal, "Upstart, Israel's Bezeq Telecom is a model of efficiency with giant ambitions", *Infrastructure Finance* (July/August 1996).

FEDERAL COMMUNICATIONS COMMISSION, International Bureau Telecommunications Division, Policy and Facilities Branch, "Sprint Alliance with France Telecom and Deutsche Telekom", Press Release – September 23, 1996.

----- "New Rules on Foreign Carrier Entry into US Markets", Press Release – August 1996

----- "The United Kingdom's Decision to end its Duo Policy for the Provision of Facilities based International Services", June 6, 1996.

Government of the United States of America, "Green Paper on Liberalization of Telecommunications Infrastructure and Cable Television Networks", March 14, 1995.

"Industry Recommendations to The Negotiating Group on Basic Telecommunications", EUROBIT, ITAC, ITI and JEDIA, April 16, 1996

"Background Note on the WTO Negotiations on Basic Telecommunications", February 1996

TeleGeography, Inc, 1995

"Volume VII, Issues 1 to 9", January 1996 to September 1996, *Telefacts*

Jerry L. Salvaggio, "How Competition will Alter the Landscape of Japanese Telecommunications", *Intermedia*, December/January 1995-6

"The Global Telecomms Industry Alliances, 1996" (chart), *Communications International*, May 1996

Guy Daniels, "Acquisition Frenzy", *Communications International*, March 1996

"1995: The Year of the Acquisition", *Communications International*, March 1996

Federal Communications Commission, International Bureau, Douglas Galbi and Chris Keating, "Global Communications Alliances, Forms and Characteristics of Emerging Organizations", February 1996

"G. T. Global Telecommunications Glass", 1994, *G.T. Global Fund Inc.*

"The Class of '95", *Communications International*, October 1995

Courtney Munroe, "The Long and The Short", *Communications International*, October 1995

Thomas J. Ramsey, "A Regulatory Perspective on the Commercialization, Privatization, and Financing of Telecommunications", *Datapro Communications Equipment and Services*, February 1994

"Prevailing Trends in International Telecommunications", *Datapro Communications Equipment and Services*, June 1996

Adrian May, "Responding to the New Market", *Communications International*, December 1995

"Asia-Pacific Cellular Operators", *Telefacts*, September 1996

Karel Van Miert, "Competition in EU Telecoms: A 'Tough Stance' for 1998 and Beyond", *Intermedia*, August/September 1996

Dr. Ron Sommer, "Competition and Regulation in a Liberalised Telecoms Market", *Intermedia*, August/September 1996

Rex Winsbury, "Competition in Telecoms: It's Basically Down to the Regulator", *Intermedia*, August/September 1996

"Deutsche Telecom Prepares Markets for its Massive IPO", *Financial Post*, September 18, 1996

Vineeta Shetty, "Achtung Telekom", *Communications International*, March 1996

Bhawani Shankar, "Deregulation and a Segmented European Market", *Telecommunications*, 1996

Richard Woolham, "Call in the Referee", *Communications International*, March 1996

Art Brothers, "Russian Telephone Tales Leaves you Breathless", *America's Network*, May 1996

Malcolm Taylor, "Eastern Promise", *Communications International*, March 1996

"The Road to 1998", *Communications International*, July 1996

Judith Hellerstein, "FCC Moves to Establish New Rules for Foreign Ownership", *Telecom's (America's Edition)*, May 1996

Robert Aamoth, "ECO Sounding", *Communications International*, January 1996

Patty Wetl and Deborah Eby, "Telecom Reform: Now What?!", *America's Network*, March 1996

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North American Free Trade Agreement (NAFTA)

General Agreement on Trade in Services (GATS) and Annex on Telecommunications

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