

# **Economic Effects of Structural Changes in Manufacturing: Retrospective View**

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**By**

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## EXECUTIVE SUMMARY

The opening years of this century have not been good for Canadian manufacturing. Very slow growth in the US in 2001 that included a collapse in demand for electronic products, and the strong appreciation of the Canadian currency in 2003-2006 have combined to reduce employment in the sector in 2006 to 8.5 per cent below the level of 2000, and real Gross Domestic Product of the sector by more than 2.5 per cent. The job loss in the last two years, which averaged more than 87,000 annually, has been especially acute, spread across almost all provinces, and generalized among industries within manufacturing.

The labour organizations that have sponsored this report are concerned that governments are paying insufficient attention to this downsizing. This report focuses on providing measures of the importance of manufacturing to the economy. It assesses the driving forces behind events to help in developing recommendations to restore growth of the sector's output and employment.

To illustrate the importance of manufacturing to the economy, we have employed our econometric model of the economy to simulate the impact of a \$10 billion (3.3 per cent) increase in manufactured exports in each year of 2003-2006. We estimate that the increase in manufacturing employment in each year of the four years would have averaged 67,000, and that effects on employment of suppliers to manufacturing, and from spending flowing from increased employment and other earnings would have averaged an additional 48,500 spread to other goods-producing industries and throughout services. Real incomes of households would have been increased by about one per cent in each year.

In these estimates, we have assumed that cumulated positive effects on federal, provincial and local government balances of \$16.3 billion over the four years are used solely to reduce debt. If half of this were used to invest in health, education and other public services delivered by provincial and local governments, then annual spending would be increased by \$2 billion. The average impact on total employment would rise from 115,500 annually to 141,750. Of an additional 26,500 total jobs generated annually, 21,500 would be in services and 5,000 in goods-producing industries. Of this, 3,250 would be additional to manufacturing reflecting the role of this industry as a supplier to services, and that additional incomes in services would be spent partly on manufactured goods. Regardless of whether positive effects on government incomes are used for debt reduction or to increase social spending, positive impacts on economic activity are especially pronounced in Central Canada.

We have also reported on the role of manufacturing in foreign trade. There has been a deficit in trade of manufactures that recently has grown (\$28 billion in 2006). Largely because of rapid increases in energy and other resource prices internationally, producers of other goods have recorded sizeable and growing surpluses (\$71 billion in 2006). Notwithstanding this recent record for manufacturing and other goods, it should be noted that manufactured exports remain a critically important source of earnings that finance imports. Services typically record a deficit (\$14 billion in 2006) and the scale of service exports indicates that there is no reasonable prospect that these could become a major source of foreign earnings. Resource products produce a notable surplus as is indicated above, but the scale of these under recent favourable circumstances is equivalent to only about one-fifth of the manufactured imports the economy

requires. Put simply, sustaining healthy manufactured exports (\$344 billion in 2006) remains critical to the country's balance of foreign payments.

We have also reported on R&D spending of manufacturing to indicate that the sector is important to operations of sectors that employ highly skilled scientific and other workers, and that manufacturing, especially high-technology industries, is important to this category of spending. When compared to spending in other industrial economies, Canada's R&D spending by manufacturers is relatively small. And spending in recent years has levelled off, indicating that limits to growth of manufacturing are spilling over into R&D effort.

Looking back to the years since 1970, there is a record of volatility in manufacturing, with earlier sharp episodes of downsizing (typically when the US economy was in recession as at the beginning of the 1980s and 1990s), interrupting periods of growth, including from the mid-1990s until the recent downsizing began. What does appear to distinguish recent events is the extent to which Canadian manufacturing has been negatively affected by foreign trade. Despite annual increases in domestic requirements for manufactures of 3.7 per cent (robust growth by comparison to earlier periods), and annual increases in productivity of 2.7 per cent (close-to historical norms), sector employment fell at an annual pace of 1.9 per cent in 2003-2006. Distinguishing that period was an annual reduction in net foreign trade of 2.8 per cent each year. Also distinguishing that recent record is that trade was a negative influence in each of the 20 manufacturing sectors that we reviewed. We have explored two major influences that are widely agreed to have contributed to this negative influence from trade.

First, we have used our econometric model to assess the extent to which the 28 per cent appreciation of the currency since 2002<sup>1</sup> has played a role in the poor performance of manufacturing. We have compared economic performance of an economy in which the currency remained unchanged at the 2002 level with performance given the appreciation. Since the reason why the currency appreciated (rise in international commodity prices, relatively positive government balances compared to those of the US, etc.) and non-currency influences played a role in the actual economic outcome of 2003-2006, our simulation experiment is only a rough guide to the implications of the appreciation. Still, the magnitude of the simulation results and character of real, inflation and financial impacts are consistent with the widespread impression that the appreciation has played a major role in the recent poor performance of the manufacturing (and other goods-producing) industries.

Second, we have examined the recent role played by China and other emerging countries as replacements for North American-made manufactures. Canadian and US firms are closely related and just-in-time inventory and other practices play a strong integrating influence for plants on both sides of the border. Canadian exports of manufactures to the US are both an important source of demand for almost all manufacturing industries, and the US dominates as an export market. A review of US imports since 2002 indicates that China is now the number one supplier in ten of the 20 manufacturing industries that we have reviewed, and is placed at tenth or more in only two – pharmaceuticals and beverages and tobacco. In the last five years, we estimate that

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<sup>1</sup> Canadian dollar vs. US dollar in 2006 vs. value in 2002 or 38 per cent if expressed as US cents per Canadian dollar.

imports of Chinese manufactures into the US have been equivalent to about 150 per cent of the change in manufactured imports from all sources. Canada's share was reduced, which may be explained partly by our appreciation against the US dollar. (The Chinese currency moved roughly in line with the US dollar.) Interestingly, the share of US manufactured imports from Mexico also fell, as did that of all other countries except China.

Notwithstanding the depreciation of the US dollar versus that of the Canadian, the US share of Canadian imports of manufactures fell sharply in 2003-2006. As a source of the change in imports over that time, China was the single largest winner, with its increase in supplying Canadian imports equivalent to three-fourths of the change in imports from all sources. Still the US remains the largest supplier of manufactures in almost all of the 20 industries we have reviewed. (China is number one in leather goods, clothing and office machines and number two in eleven of the other 20 industries.) The import record in the US and Canada makes it clear that China is an important source of traded manufactures in "high-technology" as well as "low-tech", labour-intensive industries.

The longer (since 1970) record is one in which episodes of employment downsizing in manufacturing have always been followed by periods of growth so that employment reached higher levels than the previous peak. During the first seven years of that long past history, the Canadian currency was at or close-to parity with the US dollar. Yet manufacturing employment grew. During this period, South Korea and others were "emerging". The record suggests that while there may be erosion in the importance of manufacturing in total employment, there is no reason to suppose that reduction in the level of sector employment is inevitable.

We have undertaken to "sound out" experts on possible actions governments should consider to re-invigorate growth of manufacturing. Broadly these are the following.

- Ensure that the "macro" economic environment is growth oriented.
- Encourage value-added production through spending on hard and human infrastructure, research and development, business development, and government procurement.
- Be sensitive to the competitiveness implications for Canadian manufacturing of movements in the exchange rate and trading regimes and consider steps to improve competitiveness and develop new markets.

## Table of Contents

EXECUTIVE SUMMARY .....	i
1 Background .....	1
2 Why Do We Want a Strong Manufacturing Sector? .....	2
2.1 The “Multiplier” Power of Manufacturing .....	2
2.2 Research and Development in Canada .....	10
2.3 Role of Manufacturing in Foreign Trade .....	12
3 Manufacturing Trends.....	14
3.1 Looking Backward .....	14
3.2 A Closer Look .....	22
4 Immediate Actions for Government .....	31
4.1 Ensure that the “macro” environment is growth oriented .....	31
4.2 Centre Structural Policy on Promoting Development of Value-Added Production.....	32
4.3 Adjustment .....	32
4.4 Processes .....	32
References .....	34
Appendix A Manufacturing Job Losses .....	35
Appendix B – Review of Challenges and Potential Solutions .....	36
1 Domestic Policy .....	36
1.1 Macro Policy .....	36
1.2 Exchange Rate .....	36
1.3 Energy & Electricity Policy.....	37
1.4 Public and Private Investment .....	37
1.5 Labour Force .....	38
1.6 Inequality and Income Distribution.....	38

2	International Linkages .....	39
2.1	Trade Policy.....	39
2.2	Globalization – overall level and/or shifts in location .....	40
3	Sectoral Problems for Manufacturing.....	41
3.1	Lack of Industrial Policy.....	41
3.2	Services /Manufacturing .....	42
3.3	Organization of manufacturing.....	42
3.4	Low Innovation.....	42
	Appendix C – Multiplier Impact with Balance Improvement Allocated to Additional Public Services .....	44
	Appendix D – Impact of One (US) Cent Appreciation .....	48
	Appendix E – Change in Manufacturing Employment Detailed for 1988-2006.....	50

# Economic Effects of Structural Changes in Manufacturing: Retrospective View

## 1 Background

Manufacturing employment was 2,292.7 thousand in 2004. The average for 2006 was 2,118.8 thousand, down 173.3 thousand or a 7.6% decline. In August 2007, the seasonally adjusted total was 2,038.3. This is an 11.1% decline from the 2004 average. If measured from the previous peak in November 2002, the decline is 12.5%. Appendix A documents changes by province and sex.

Is a turnaround about to happen? Or do we face continuing declines with plant closings and movement of production abroad? Is this just cyclical weakness or a structural shift?

The Labour Movement is concerned about not only the impact of this job loss on individual manufacturing sector workers and their families and communities, but also the impact on the economy generally. Specifically, there is concern that the jobs replacing these lost manufacturing jobs are lower paid and less secure, and this could well have a negative impact on income distribution, domestic consumption and government revenues. There is also concern about increased reliance on resource extraction as the engine of economic growth, and the impact of a less diversified economy. Will lower government revenues also show up as increased pressure to restrict or reduce public services?

A substantial permanent loss of manufacturing jobs in Canada could translate into a lower standard of living for all Canadians. There could be a loss of real earned income, lower disposable income, difficulties with the current account and some slipping of the exchange rate. (The lower dollar usually entails a loss of real income.)

Informetrica Limited has been asked to consider the effects of a continuation in the slide in manufacturing. What will be the effects on the Canadian economy? Is there a decline in wage income, given the decline in manufacturing jobs? Will employment be replaced with lower paying service sector jobs?

What actions can be taken by governments to reverse the situation? If this is not possible, can they mitigate the adverse effects? What public policy initiatives should be pursued to reverse the job losses in manufacturing? Would accelerated capital cost allowances help? Do we need infrastructure spending both to enhance demand and to improve the competitiveness of Canadian industry? Are there labour market initiatives needed to address the problems facing displaced workers?

## 2 Why Do We Want a Strong Manufacturing Sector?

### 2.1 The “Multiplier” Power of Manufacturing

#### 2.1.1 Positive Effects on Government Balances Used for Debt Reduction

Manufacturing affects all sectors and provinces of the economy so that increases in its level of activity are positive for all. Production of manufactured products requires inputs from other producers of goods, suppliers of services, and from within manufacturing. In addition to these “indirect” impacts of increased manufacturing operations, increased employment across all sectors in the economy with associated increases in wage and other payments for labour services and profits of business will induce further economic production as households increase consumer spending and businesses increase investment. Put simply, increased manufacturing activity is “multiplied” to produce a larger overall economy by more than the increase in manufacturing.

**Table 1 Significance to Sectors of Increased Manufacturing Operations**

Impact on Sectors of Increased Manufacturing Production and Shipments				
Increase Manufacturing Exports by \$10 bn (at 2006 prices)	(per cent impact on GDP \$97)			
	2003	2004	2005	2006
All Industries	1.5	1.4	1.2	1.3
Goods Producing	2.9	2.5	2.2	2.3
Agriculture, Fishing, Hunting & Forestry (11)	2.2	1.8	1.6	1.6
Mining, Utilities & Construction (21-23)	1.5	1.3	1.0	1.0
Manufacturing Total (31-33)	4.0	3.5	3.2	3.3
Service Producing Industries	0.9	0.9	0.8	0.8
Wholesale & Retail Trade	1.6	1.7	1.5	1.6
Transportation & Warehousing	1.6	1.5	1.4	1.4
Information & Culture Industries (51)	1.0	1.2	1.2	1.4
Finance, Insurance & Real Estate (52-53, 55)	0.8	0.6	0.4	0.3
Professional, Scientific & Technical Services (54)	1.6	1.4	1.1	1.0
Administrative & Support, Waste Management & Remediation (56)	1.5	1.4	1.2	1.2
Educational Services (61)	0.0	0.2	0.3	0.4
Health Care & Social Assistance (62)	0.2	0.2	0.1	0.2
Arts, Entertainment & Recreation (71)	0.6	0.5	0.3	0.3
Accommodation & Food Services (72)	1.5	1.5	1.1	1.0
Other Services (excl. Public Administration) (81)	1.1	1.1	1.0	1.2
Public Administration (91)	-0.3	0.2	0.2	0.3

To size the impact of the current Canadian manufacturing industry on overall economic activity and other economic sectors, we have used The Informetrica Model (TIM) of the Canadian economy. To increase manufacturing operations, we have assumed that exports of manufactured goods are increased by \$10 billion (at 2006 prices) in each year of 2003-2006.<sup>23</sup> The \$10 billion increase in each year is equivalent to 3.3 per cent of manufactured exports for 2003-2006.<sup>4</sup>

<sup>2</sup> We have distributed the additional \$10 billion across 36 categories of manufactured exports in proportion to actual exports in 2003-2006. That is, commodities produced by resource sectors are not included in the export impact. In this sense, the impacts within manufacturing are “representative” of a proportionate impact to manufacturing, but as backward linkages and average wage rates of industries within manufacturing vary, this indicates that the effects reported here are specific to our assumptions about which manufacturing industries are directly affected. Thus the overall effects reported here should be regarded as representative of a range of effects on the economy.

During recent years, the manufacturing trade deficit has risen sharply, from an average \$8.3 billion in 2003-04 to \$27.9 billion in 2006. Notwithstanding the relatively slow growth of manufactured exports during the period and rapid growth of exported oil and other resource-based products, exports of manufactures remain critical to trade income, with manufacturing exports close to 2.5 times the value of resource-based merchandise in 2005 and 2006, and 4.5 times larger than exports of services. Put simply, exports of manufactures are important to the financing of the country's imports.

As the table above details, increased manufacturing output has a positive impact on production across all sectors. As a rule, impacts are likely to be most significant (as measured by the per cent impact) in industries that supply goods and services to manufacturing operations. A range of impacts on public services (education, health and public administration) is possible and depends on whether governments use positive balance impacts to reduce debt, or otherwise increase spending and/or lower taxes. In these results, we have assumed there is notable debt reduction, averaging \$4.4 billion in each of the four years. We report an average annual increase in corporate profits of \$3.6 billion and of disposable personal income of \$7.1 billion. In real terms, there is an almost one per cent improvement in household incomes.<sup>5</sup>

Given the actual state of labour markets in 2003-2006, our results suggest little impact on price levels. Positive impacts on productivity in the first year more than compensate for increases in labour compensation and unit labour costs. Overall prices are reduced notwithstanding an almost 5 per cent increase in corporate profits. There are positive effects on inflation in the second year, but the magnitude erodes over time and the consumer price level is 0.1 per cent higher by 2006, given the \$20 billion increase in manufacturing shipments.<sup>6</sup>

The table below reports how much each sector in the economy is contributing to the improvement in overall economic activity. Manufacturing constitutes the single largest contributor, but is approximately matched by the increase in services activities. Increased activity in other goods-producing industries accounts for about one-seventh of the total impact.

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<sup>3</sup> Because additional activity in other sectors requires more manufacturing inputs as does additional consumer and investor spending, the total value of manufacturing shipments is increased to \$20 billion annually (at 2006 prices).

<sup>4</sup> See Trade Data Online with retrievals based on an "Industry Search" at: [http://strategis.ic.gc.ca/sc\\_mrkti/tdst/tdo/tdo.php#tag](http://strategis.ic.gc.ca/sc_mrkti/tdst/tdo/tdo.php#tag)

<sup>5</sup> To scale these (and per cent impacts on sector GDP) effects to a \$1 billion increase in manufacturing shipments (at 2006 prices), multiply by 0.0492.

<sup>6</sup> Given the artificial nature of our direct impact – assumed increased exports – we leave the exchange rate unchanged.

**Table 2 Distribution of Overall Effects Among Sectors of Increased Manufacturing**

Impact on Sectors of Increased Manufacturing Production and Shipments				
Increase Manufacturing Exports by \$10 bn (at 2006 prices)	(per cent of All Industry GDP Impact)			
	2003	2004	2005	2006
Goods Producing	58.7	55.7	56.3	54.9
Agriculture, Fishing, Hunting & Forestry (11)	3.0	2.9	3.0	2.7
Mining, Utilities & Construction (21-23)	11.4	11.0	9.6	9.5
Manufacturing Total (31-33)	44.2	41.9	43.7	42.7
Service Producing Industries	41.3	44.3	43.7	45.1
Wholesale & Retail Trade	12.6	14.0	15.5	16.5
Transportation & Warehousing	5.0	5.1	5.3	5.3
Information & Culture Industries (51)	2.6	3.3	4.1	4.5
Finance, Insurance & Real Estate (52-53, 55)	10.4	8.3	6.0	5.2
Professional, Scientific & Technical Services (54)	4.7	4.4	4.0	3.7
Administrative & Support, Waste Management & Remediation (56)	2.2	2.3	2.3	2.3
Educational Services (61)	0.0	0.5	1.0	1.5
Health Care & Social Assistance (62)	0.9	0.8	0.6	0.7
Arts, Entertainment & Recreation (71)	0.3	0.3	0.2	0.2
Accommodation & Food Services (72)	2.1	2.3	1.9	1.7
Other Services (excl. Public Administration) (81)	1.7	1.9	2.0	2.2
Public Administration (91)	-1.1	0.9	0.7	1.3

At \$20 billion of additional manufacturing shipments, total employment is increased by about 125,000 after initial relatively large increases in productivity limit the magnitude of the increase. Again, the largest positive effects are concentrated in manufacturing, but positive effects are widespread across sectors.<sup>7</sup>

**Table 3 Employment Impacts of Increased Manufacturing**

Impact on Employment, Total and by Major Sector				
Increase Manufacturing Exports by \$10 bn (at 2006 prices)	2003	2004	2005	2006
	(per cent change)			
Total Economy	0.5	0.9	0.8	0.7
Goods	1.4	2.4	2.1	2.1
Manufacturing (NAICS 31)	2	3.4	3.3	3.4
Services	0.2	0.4	0.3	0.3
(thousands)				
Total Economy	76	138	126	122
Goods	55	94	85	83
Manufacturing (NAICS 31)	46	79	72	71
Services	21	43	41	39

In recent years, Quebec has accounted for 20 per cent of Canadian GDP with Ontario's share at 42 per cent. Employment proportions are similar – 23 per cent and 40 per cent respectively.

<sup>7</sup> Again, if scaled to a \$1 billion increase in manufacturing shipments, positive overall employment effects after the first year would be in the range of 6,000. This is relatively small, given other types of macroeconomic effects that are typically studied. This follows from the relatively high import leakage of increased manufacturing production, and is a caution about the thesis that promoting production in relatively high-paying sectors (manufacturing wage and supplementary income rates have averaged 13 per cent higher than the economy norm in 2003-2006) is a “relatively” positive approach for the economy as a whole. It is true that induced impacts are larger because of the relatively high wage payment, but weighting the impact for increased employment in manufacturing and other sectors produces only a “small” additional benefit from the relative wage consideration. Note too, that if marginal saving rates were higher for those with relatively high wage and household incomes, then the effects we report would be smaller.

Manufacturing is especially important to the economies of Quebec and Ontario, accounting in each for about one-fifth of Gross Domestic Product (GDP). Given the economic structures, our impact results confirm that provincial authorities have a special interest in promoting increased manufacturing, since at the margin, an increase in manufacturing activity and employment should, through indirect and induced effects, provide a disproportionately large per cent impact for the two provinces' economies as a whole (see Table 4), and in most sectors (see Table 5).

Notwithstanding this "special" interest, it should be recognized that there is manufacturing in every province, and as sector establishments are inter-dependent and demand for manufactures in one province affects manufacturing everywhere, federal authorities have an interest in the sector as well.

**Table 4 Regional Overall Impacts of Increased Manufacturing**

Impact on Provincial Economies of Increased Manufacturing				
(per cent impact on Total GDP \$97)				
	2003	2004	2005	2006
Canada	1.5	1.4	1.2	1.3
Atlantic	1.1	1.1	0.9	0.9
Quebec	1.7	1.5	1.3	1.4
Ontario	1.7	1.5	1.3	1.4
Prairies	1.3	1.2	1.0	1.0
BC & Territories	1.3	1.3	1.1	1.1

**Table 5 Central Canadian Impacts in Canadian Context**

Significance of Central Canada to National Impacts								
	Ontario				Quebec			
	2003	2004	2005	2006	2003	2004	2005	2006
(Provincial % of Canada Impacts)								
GDP \$1997 Mns								
Total	46.7	45.3	45.8	45.8	23.5	23.3	23.4	23.3
Goods	46.2	46.5	47.5	47.6	24.3	23.9	24.0	23.6
Manufacturing	52.6	53.1	53.9	53.5	26.6	25.7	25.4	25.0
Other Goods	26.6	26.5	25.3	27.2	17.3	18.7	18.9	18.4
Services	47.4	43.8	43.5	43.5	22.5	22.4	22.7	22.9
Employment (000s)								
Total	49.8	46.1	46.8	47.1	26.3	24.8	24.8	24.7
Goods	47.3	49.0	50.1	50.1	24.1	23.8	23.7	23.2
Manufacturing	50.8	52.5	53.9	53.5	25.0	24.6	24.4	24.1
Other Goods	30.1	31.2	29.2	31.0	19.5	19.5	20.2	18.4
Services	56.2	39.9	39.9	40.6	32.3	26.8	26.9	27.9

Within the two Central Canadian provinces, the effects are proportionately large for manufacturing industries, with positive implications for effects in other sectors widespread, if smaller.

**Table 6 Sector Effects in Central Canada**

Impact on Central Canadian Provinces of Increased Manufacturing								
	Ontario				Quebec			
	2003	2004	2005	2006	2003	2004	2005	2006
(per cent impact)								
GDP \$1997 Mns								
Total	1.7	1.5	1.3	1.4	1.7	1.5	1.3	1.4
Goods	3.3	2.9	2.6	2.7	3.1	2.7	2.4	2.4
Manufacturing	4.0	3.6	3.4	3.5	3.8	3.4	3.1	3.1
Other Goods	1.5	1.4	1.0	1.1	1.6	1.5	1.2	1.2
Services	1.0	0.9	0.8	0.8	1.0	1.0	0.8	0.9
Employment (000s)								
Total	0.6	1.0	0.9	0.9	0.6	0.9	0.8	0.8
Goods	1.6	2.8	2.6	2.6	1.5	2.5	2.2	2.1
Manufacturing	2.1	3.8	3.7	3.8	1.8	3.1	2.9	2.9
Other Goods	0.5	0.9	0.7	0.7	0.6	1.1	0.8	0.7
Services	0.3	0.4	0.3	0.3	0.3	0.4	0.4	0.4

Although effects seen by those in other sectors will seem proportionately small when compared to impacts in manufacturing, from the perspective of the provincial economy as a whole, impacts in other sectors should be roughly equivalent to or slightly larger than the manufacturing impacts, with this distribution more likely for GDP than employment.

**Table 7 Distribution of Effects by Sector in Central Canada**

Sector Significance of Impacts to Each Central Canadian Province								
	Ontario				Quebec			
	2003	2004	2005	2006	2003	2004	2005	2006
(Sector % of Total Provincial GDP & Employment)								
GDP \$1997 Mns								
Total								
Goods	58.0	57.2	58.5	57.2	60.5	57.4	57.6	55.7
Manufacturing	49.8	49.1	51.5	49.9	49.9	46.2	47.4	46.0
Other Goods	8.2	8.1	7.0	7.2	10.6	11.1	10.2	9.6
Services	42.0	42.8	41.5	42.8	39.5	42.6	42.5	44.3
Employment (000s)								
Total								
Goods	68.7	72.8	72.1	72.7	66.0	65.9	64.5	64.2
Manufacturing	61.3	65.2	65.8	65.9	56.8	57.1	56.2	56.5
Other Goods	7.5	7.6	6.3	6.8	9.1	8.8	8.3	7.7
Services	31.3	27.2	27.9	27.3	34.0	34.1	35.5	35.8

Effects in social service sectors would be contingent on what provincial (and municipal) authorities would do with improved budget balances that may reasonably be expected. We do not formally measure the effects on balances of neither individual provinces nor cities, but we do estimate effects on all-jurisdiction balances for provinces and municipalities. Assuming that Ontario's share of increased economic activity (46 per cent) is applied to the all-jurisdiction balances for provinces and municipalities, then for a \$10 billion increase in manufactured exports, annual balance improvements of Ontario's provincial and municipal governments would have been in the range of \$900 million in 2003-2006. With Quebec's share of additional activity equal to 23 per cent of the total, the annual balance improvement for the province and municipalities would have been in the range of \$450 million.

## 2.1.2 Part of Improved Balances Used for Investment in Public Services

In the analysis above, we have assumed there is no significant change to government spending on delivery of health, education and/or other social services, but, if some or all of the balance improvement had been used to increase such spending in the provinces, then the impacts on total and sector GDP and employment reported in the tables above would be larger. To size this, we have developed a second impact in which we assume that part of the improved balances is allocated to increased spending in health, education and public administration.

Specifically, in addition to the assumptions that were used to produce the results reported in the previous section, we have assumed that slightly more than one-half of the combined federal, provincial and local government balance improvement (\$16.3 billion cumulated over 2003-2006) is used to increase provincial and local government spending. The annual increase in spending is close-to \$2 billion. One-fourth of this additional spending has been allocated to provincial government spending on health care, one-fourth to provincial and local government spending on post-secondary and elementary/secondary education, and one-half has been allocated to other provincial and local government spending on goods and services (i.e., delivery of all other public services). A complete set of tabulations detailing the impact of this case is supplied in Appendix C. In this section, we highlight the impacts on major indicators, and focus on the difference between these amended impacts and those reported earlier.

**Table 8 Comparison of Sector Impacts Based On Use of Government Balance Improvement**

Impact on Sectors of Increased Manufacturing Production and Shipments				
Increase Manufacturing Exports by \$10 bn	(per cent impact on GDP \$97)			
	2003	2004	2005	2006
	with Increased Public Spending			
All Industries	1.8	1.7	1.4	1.4
Goods Producing	3.1	2.7	2.3	2.3
of which:				
Manufacturing Total (31-33)	4.2	3.7	3.3	3.4
Service Producing Industries	1.2	1.2	1.0	1.0
of which:				
Educational Services (61)	0.8	1.0	0.9	1.0
Health Care & Social Assistance (62)	0.9	1.0	0.8	0.8
Public Administration (91)	0.2	0.8	0.6	0.7
	Surplus for Debt Reduction			
All Industries	1.5	1.4	1.2	1.3
Goods Producing	2.9	2.5	2.2	2.3
of which:				
Manufacturing Total (31-33)	4.0	3.5	3.2	3.3
Service Producing Industries	0.9	0.9	0.8	0.8
of which:				
Educational Services (61)	0.0	0.2	0.3	0.4
Health Care & Social Assistance (62)	0.2	0.2	0.1	0.2
Public Administration (91)	-0.3	0.2	0.2	0.3

As the table above indicates, use of the improved balances for delivery of public services increases the overall positive effect on economic activity, with additional positive impacts spread

across all industries, including manufacturing and other goods-producing industries.<sup>8</sup> The largest proportionate effects are in the industries directly affected by the spending – health care, education and public administration. Averaged over the four years, these three sectors account for one-half of the increased GDP. Other services account for 25 per cent of the increase, with goods producing industries accounting for the remaining 15 per cent.

The table below compares employment effects. If the improved balance had been allocated for additional spending in the magnitudes and with the sector distribution we have assumed, this would have added about 0.2 percentage points (or about 25,000 annually) to total employment. We estimate that two-thirds of the additional employment would be concentrated in the three public service areas, with the balance split evenly between employment in other service industries and in the goods-producing sector. Compared to the Base Case, increases in manufacturing and other goods-producing industries remain the main contributors to overall employment increase. In this comparison, the additional jobs generated in the three public sectors account for a little more than one-tenth of all additional jobs.

**Table 9 Comparison of Employment Impacts Based On Use of Government Balance Improvement**

Impact on Employment, Total and by Major Sector				
Increase Manufacturing Exports by \$10 bn	2003	2004	2005	2006
	with Increased Public Spending			
	(per cent change)			
Total Economy	0.6	1.1	1.0	0.9
Goods	1.5	2.5	2.2	2.2
Manufacturing (NAICS 31)	2.1	3.6	3.4	3.5
Services	0.3	0.6	0.5	0.5
	(thousands)			
Total Economy	98	168	154	147
Goods	59	100	90	88
Manufacturing (NAICS 31)	48	83	76	74
Services	39	68	64	59
	Surplus for Debt Reduction			
	(per cent change)			
Total Economy	0.5	0.9	0.8	0.7
Goods	1.4	2.4	2.1	2.1
Manufacturing (NAICS 31)	2.0	3.4	3.3	3.4
Services	0.2	0.4	0.3	0.3
	(thousands)			
Total Economy	76	138	126	122
Goods	55	94	85	83
Manufacturing (NAICS 31)	46	79	72	71
Services	21	43	41	39

<sup>8</sup> These positive effects on the goods-producing industries, and all other sectors not directly affected by the additional government spending, reflects the “indirect” impact on all industries that supply goods and services to those directly affected, and induced spending by households and businesses consequent on their improved real incomes.

Finally, Table 10 provides a summary view of the impacts on regional economies of increased manufacturing exports, with the impacts distinguished by what governments do with their surpluses. Assuming that provincial and local governments enjoy improved balances and roughly increase their spending on public services in about the same proportion, this should produce stronger positive effects across provincial economies than would be the case if balances are used solely for debt reduction, with the additional impact spread across provinces in roughly the same proportions. This is consistent with the view that the backward linkages and induced effects from increased spending on public services are largely concentrated in the services sectors, most of which should be supplied “locally” within the province. The key uncertainty is whether balance improvements would be spread proportionately across the country and, especially, whether provincial and municipal authorities in each province would recycle balance improvements or not, and whether they would use spending or tax cuts as the preferred “recycling” instrument.

**Table 10 Comparison of Regional Overall Impacts of Increased Manufacturing**

	Impact on Provincial Economies of Increased Manufacturing							
	with Increased Public Spending				Surplus for Debt Reduction			
	2003	2004	2005	2006	2003	2004	2005	2006
	(per cent impact on Total GDP \$97)							
Canada	1.8	1.6	1.4	1.4	1.5	1.4	1.2	1.3
Atlantic	1.3	1.3	1.1	1.1	1.1	1.1	0.9	0.9
Quebec	1.9	1.8	1.5	1.5	1.7	1.5	1.3	1.4
Ontario	2.0	1.8	1.5	1.5	1.7	1.5	1.3	1.4
Prairies	1.5	1.4	1.1	1.1	1.3	1.2	1.0	1.0
BC & Territories	1.5	1.5	1.3	1.3	1.3	1.3	1.1	1.1

### **2.1.3 Impact of Investment by Manufacturers**

In the sections above, measures of the significance of manufacturing to the economy overall and other sectors, was derived from an assessment of the sector’s operations. It may be noted that manufacturing also impacts other sectors through spending of the sector on investment. To measure this effect, we have simulated the impact of an additional \$2 billion in business investment spending by the manufacturing industries in each year of 2003-2006. This amount is about 10 per cent of average actual spending in 2003-2006. The split between spending on equipment and structures is about 50/50, or close to the experience of recent years. The allocation for spending by the 19 industries within manufacturing is also close to the experience of recent years.

At this scale of additional spending, we estimate that average total employment increases in 2003-2006 would have been in the range of 23,000. Of this, approximately 6,500 (28 per cent) would have been increased employment in manufacturing, with the balance of employment effects widespread across all goods and services producing sectors. Leaving aside the productivity and potential competitiveness benefits to the economy of capital deepening in manufacturing (and that induced in other sectors), this illustrates that tax and other policies used

to improve the environment for expansion of manufacturing business will have immediate impacts on activity and real incomes in the economy.<sup>9</sup>

## 2.2 Research and Development in Canada

A part of economic progress comes from innovation. Research and development (R&D) is an important aspect of innovation because it not only can provide new ideas and new products but also improve on or replace older methods.

Spending by Canadian manufacturing on R&D has recently been equivalent to about 0.6 per cent of GDP. This is less than the approximate 1.1 per cent for the OECD (and the US) that we estimate from OECD publications. The growth of Canadian total gross domestic expenditures on research and development (GERD) has kept pace with nominal GDP growth from 2002 to 2006, with a stable GERD/GDP ratio of 2.0 per cent. The composition of GERD has changed over that period with higher education taking proportionally more of the total at the expense of federal, provincial and business enterprise expenditure. These fluctuations in compositional shares are common and consistent with the “lumpiness” of investment.

**Table 11: Gross Domestic Expenditure on R&D by Sector, in millions**

	2002	2003	2004	2005	2006
<b>Total</b>	<b>23,539</b>	<b>24,337</b>	<b>26,003</b>	<b>27,174</b>	<b>28,357</b>
<b>Federal</b>	2,190	2,083	2,083	2,162	2,145
<i>Share of total</i>	9.30%	8.60%	8.00%	8.00%	7.60%
<b>Provincial</b>	315	315	326	336	345
<i>Share of total</i>	1.30%	1.30%	1.30%	1.20%	1.20%
<b>Business Enterprise</b>	13,516	13,704	14,441	14,655	14,850
<i>Share of total</i>	57.40%	56.30%	55.50%	53.90%	52.40%
<b>Higher Education</b>	7,455	8,143	9,037	9,900	10,890
<i>Share of total</i>	31.70%	33.50%	34.80%	36.40%	38.40%
<b>Private non-profit org</b>	63	92	116	121	127
<i>Share of total</i>	0.30%	0.40%	0.40%	0.40%	0.50%

<sup>9</sup> It should be noted that similar effects would result from stimulus to other sectors. We have developed simulations that assess the effect of increased investment (and related operations) in the upstream oil and gas sector. These suggest that for an equivalent stimulus to oil and gas and to manufacturing that overall GDP and employment effects would be about the same. Indeed, it should be noted that an annual increase in oil and gas investment of \$1 billion (and related increases in operations) would have increased manufacturing employment by about 2,300 annually in 2003-06. This is less than follows from an equivalent stimulus to manufacturing, but impacts in other sectors (e.g., construction and more generally, services) are larger in the case of an expanded oil and gas sector. Put otherwise, overall effects should be approximately the same for an equivalent stimulus to the oil and gas and manufacturing sectors, but there will be distinguishing effects on sectors, and therefore, provinces.

Business R&D expenditure growth has been slower than GDP over the period shown, but it, followed closely by higher education, has been the major contributor to growth in the gross expenditure on R&D.

Manufacturing is the single largest Business Enterprise R&D expenditure sector. In the five years since 2001, R&D spending of manufacturing has been equivalent to an average 4.1 per cent of sector GDP and in that period, it has accounted for between 55 and 61 per cent of total business expenditure on R&D. There was little growth in sector expenditures over the period, however, reflecting the limiting effects of the appreciation on sector performance. Indeed, manufacturing R&D expenditure as a share of GDP fell (steadily) from 4.2 per cent in 2002 to 3.7 per cent in 2006.<sup>10</sup> Thus, while the conditions that limited sector growth during recent years may suggest an incentive to increase spending on research as a means of improving productivity and otherwise reducing costs, the recent record suggests the possibility that firms will curtail such spending under current financial rules. Through competitiveness effects, this limits future growth of manufacturing and immediately reduces the demand for goods and services delivered by highly qualified industries that supply the R&D.

**Table 12: Industrial Composition of Business Expenditure on R&D, in millions**

	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>
<b>Total</b>	<b>13,516</b>	<b>13,704</b>	<b>14,441</b>	<b>14,655</b>	<b>14,850</b>
<b>Agriculture<sup>1</sup></b>	107	86	88	85	80
<i>Share of total</i>	0.80%	0.60%	0.60%	0.60%	0.50%
<b>Mining<sup>2</sup></b>	254	268	274	245	261
<i>Share of total</i>	1.90%	2.00%	1.90%	1.70%	1.80%
<b>Utilities</b>	131	130	244	195	197
<i>Share of total</i>	1.00%	0.90%	1.70%	1.30%	1.30%
<b>Construction</b>	47	43	46	46	46
<i>Share of total</i>	0.30%	0.30%	0.30%	0.30%	0.30%
<b>Manufacturing</b>	8,257	7,973	7,986	8,092	8,273
<i>Share of total</i>	61.10%	58.20%	55.30%	55.20%	55.70%
<b>Services</b>	4,720	5,205	5,803	5,992	5,993
<i>Share of total</i>	34.90%	38.00%	40.20%	40.90%	40.40%

(1) Agriculture, forestry, fishing, and hunting

(2) Mining and oil and gas extraction

Close to 55 per cent of the R&D spending of manufacturing is concentrated in industries that the OECD qualifies as “high technology”. The recent lack of overall manufacturing R&D growth is attributable mainly to a large reduction in spending by the communication equipment manufacturers – a 21 per cent reduction in spending in 2006 compared to 2002. There were gains

<sup>10</sup> For the opening years of this decade, there appears to be little correlation between spending on R&D and current profitability. Data on financial and taxation statistics for enterprises report an increase in operating profits (operating revenues less operating expenditures) from \$38 billion in 2002 to \$44 billion in 2005 during which period R&D spending was reduced slightly. Data are derived from tabulations available at: <http://www.statcan.ca/english/freepub/61-219-XIE/2005000/tablesectionlist.htm>

in many of the other manufacturing industries with the total excluding communications manufacturing in 2006 about 7 per cent larger than in 2002. Note, however, that this view of spending is in nominal dollars. Allowing for an increase in costs of R&D inputs suggests a reduction in “real” spending since for example, the GDP deflator increased by 12 per cent from 2002 through 2006.

Excluding all of manufacturing, spending on R&D was 25 per cent larger (at nominal prices) in 2006 than in 2002. This reflects equivalently strong growth in spending by services industries. Services expenditure on R&D increased from 35 per cent to 40 per cent as a share of total business expenditure on R&D. Four service sub sectors contribute about 75 per cent of service sector R&D expenditure. These are the information and cultural industries, scientific research and development, computer system design and related services, and wholesale trade. The service sub sector with the fastest growth at 25 per cent per year, from 2002 to 2006, was the information and cultural industries (which includes broadcasting, telecommunication and data processing services). R&D spending by other goods-producing industries is modest (less than \$600 million or 3.9 per cent of the total, in 2006). Overall, spending increased by 8 per cent in 2006 compared to that of 2002 with a large increase in utilities spending offset partially by a reduction in spending by agriculture.

**Table 13: Decomposition of manufacturing expenditure on R&D, in millions of \$**

	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>
<b>Manufacturing</b>	<b>8,257</b>	<b>7,973</b>	<b>7,986</b>	<b>8,092</b>	<b>8,273</b>
<b>Communication equipment</b>	1,995	1,698	1,504	1,553	1,580
<i>Share of total</i>	24.20%	21.30%	18.80%	19.20%	19.10%
<b>Pharmaceutical &amp; medicine</b>	1,163	1,121	1,185	1,251	1,293
<i>Share of total</i>	14.10%	14.10%	14.80%	15.50%	15.60%
<b>Aerospace products &amp; parts</b>	867	889	886	890	912
<i>Share of total</i>	10.50%	11.20%	11.10%	11.00%	11.00%
<b>Semiconductor &amp; electronic components</b>	811	740	802	837	869
<i>Share of total</i>	9.80%	9.30%	10.00%	10.30%	10.50%
<b>Other manufacturing</b>	3,421	3,525	3,609	3,561	3,619
<i>Share of total</i>	41.40%	44.20%	45.20%	44.00%	43.70%

## 2.3 Role of Manufacturing in Foreign Trade

The table below reports foreign trade performance in the last five years. There has been a deficit in the trade of manufactured products, which has grown steadily, increasing from an amount equivalent to 4.5 per cent of sector GDP to more than 12.5 per cent in 2006. Trade in other goods regularly produces a surplus, with this amount having recently grown because of a large increase in the price of traded energy exports, and strong growth in the volume and price of basic metal ores.<sup>11</sup>

<sup>11</sup> In constant dollar terms, trade in energy products regularly produces a surplus, but the size of this was reduced in 2002-2006, indicating that the volume of energy exports (net) has been reduced.

Notwithstanding this recent record for manufacturing and other goods, it should be noted that manufactured exports remain a critically important source of earnings that finance imports. As the table reports, services typically record a deficit and the scale of service exports indicates that there is no reasonable prospect that these could become a major source of foreign earnings. Resource products produce a notable surplus, but the scale of these under recent favourable circumstances is equivalent to only about one-fifth of the manufactured imports the economy requires.

**Table 14 Manufacturing in Foreign Trade**

Recent Canadian Foreign Trade (\$ billions at nominal prices)					
	2002	2003	2004	2005	2006
<b>Exports</b>					
Merchandise	396	381	412	436	440
Manufacturing	305	286	310	315	316
Other Goods	91	95	103	122	124
Services	65	63	66	69	69
<b>Imports</b>					
Merchandise	349	336	356	381	397
Manufacturing	314	299	314	331	344
Other Goods	35	38	42	50	53
Services	72	74	77	80	83
<b>Trade Balance</b>					
Merchandise	47	45	56	55	44
Manufacturing	-8	-12	-4	-16	-28
Other Goods	56	57	61	71	71
Services	-6	-11	-11	-11	-14

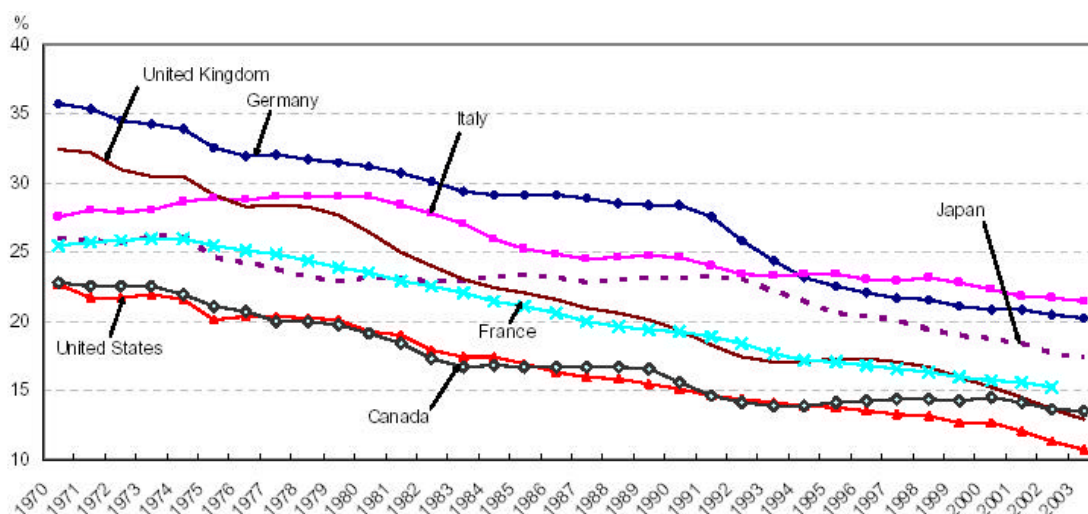
Note: Merchandise on Trade of Canada basis from  
[http://strategis.ic.gc.ca/sc\\_mrkti/tdst/engdoc/tr\\_homep.html](http://strategis.ic.gc.ca/sc_mrkti/tdst/engdoc/tr_homep.html)  
 Services from System of National Accounts

### 3 Manufacturing Trends

#### 3.1 Looking Backward

As in other industrialized economies, the share of manufacturing employment in Canada's economy has been steadily declining since 1970. This noted, among the economies of the Organization of Cooperation and Development countries (OECD), the shrinkage in Canada is among the least severe. This is attributable to the integration of Canadian manufacturing establishments with those of the US, which among the G-7, has reported relatively rapid growth of manufacturing output over most of the last 35 years, and to a long-term depreciation of the Canadian exchange rate versus the US dollar from the mid-1970s through 2002.

Figure 1 Share of Manufacturing in Total Employment, G-7 Countries, 1970-2003<sup>12</sup>

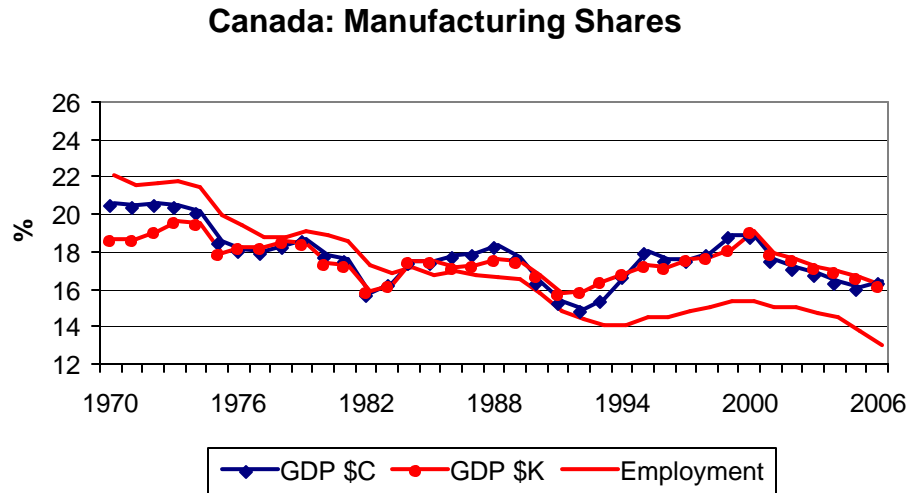


The share of manufacturing in Canadian output (Gross Domestic Product) has also eroded since 1970s, but by a smaller margin. This is the case whether measured in nominal (\$C) or constant (\$K)dollars.<sup>13</sup> In 2006, manufacturing's share of employment was 9.1 percentage points smaller than in 1970. Manufacturing's share of GDP in nominal terms was 4.1 percentage points smaller; at 1997 prices, the reduction was 2.4 per cent.

<sup>12</sup> Dirk Pilat, Agnès Cimper, Karsten Olsen and Colin Webb, THE CHANGING NATURE OF MANUFACTURING IN OECD ECONOMIES, STI WORKING PAPER 2006/9, Organisation for Economic Co-operation and Development, October 27, 2006.

<sup>13</sup> The deflator for manufacturing GDP has grown less rapidly than that of the total economy, but by only a small margin – 4.5 per cent versus 4.8 per cent over 1971-2006.

**Figure 2 Share of Manufacturing in Output and Employment, Canada, 1970-2006**



This reduction in importance noted, Canada is one of the few industrialized countries to experience long-term growth in the level of manufacturing employment. Sector employment has been particularly vulnerable to cyclical downturns in the North American economy (e.g., at the beginning of the 1980s and 1990s), and recently to the effects of a sharp acceleration in the value of the Canadian dollar. However, there have been extended periods of growth, and typically, sector employment has recovered to more than previous peak levels following the downturns. Employment in 1989 had recovered to 2,130,000 from the previous peak of 2,040,000 in 1981, and in 2002 was higher again at 2,286,000. Notwithstanding recent reductions, employment in 2006 was almost 390,000 (23 per cent) larger than in 1972.

**Figure 3 Growth of Employment, Canada**



Arguably, the Canada-US Free Trade Agreement (CUSFA) of 1988 consolidated the North American market for Canadian manufacturers. Here we examine several key factors for the years since CUSFA was concluded.

**Table 15 Decomposing Sources of Employment Change**

Changes in Manufacturing Employment and Sources				
(average per cent change)				
	ET	+DD	-PROD	+FOR
1988-2006	0.2	3.1	2.4	-0.5
1988-1995	-0.9	1.5	2.8	0.4
1996-2002	2.7	4.7	1.7	-0.3
2003-2006	-1.9	3.7	2.7	-2.8

ET Employment  
 DD Domestic +Intermediate Industry Demand  
 PROD Gross Output (GO) per Employee  
 FOR Foreign Trade & Residual

As the table indicates over the 19 years, sector employment has grown, but very slowly (including large reductions in the last four years). During the 19-year period, growth of real demand in Canada for commodities produced by manufacturers has generally been robust, with foreign trade a modest negative influence (i.e., growth of imports has been more rapid than exports). Growth of production (measured by real GDP) has effectively matched the growth of demand for manufactures, but growth of productivity (in labour terms) has essentially matched GDP growth to limit employment gains to the very slow pace.

This is roughly consistent with the finding for OECD countries. “The relative and absolute decline in manufacturing employment is primarily due to strong productivity growth, but is also affected by the growth of manufacturing capacity in non-OECD countries. At the same time, the loss of manufacturing employment in OECD countries cannot simply be characterised as a transfer of manufacturing production to non-OECD countries, as manufacturing employment in non-OECD countries has not grown significantly.”<sup>14</sup> What does distinguish Canada from the rest of the OECD is the long-run picture for demand growth. Where the OECD finds that reduction in the community at large reflects *relatively* slow growth of demand for manufactured goods, in Canada this has not been true over the period in question.

Admittedly growth of demand initially was slow through to the mid-1990s, when first a cyclical downturn and then an exceedingly tight fiscal policy stalled the growth of household real incomes, investment and overall, the demand for manufactured goods. This is the period when adjustments to the CUSFA were strongest, and when the value of the Canadian dollar (US cents per \$Canadian) first rose from 75 cents to peak at 87 cents in 1991 and then fell back to the 73-cent range by the mid-1990s. There was a small positive influence from foreign trade on manufacturing during that time.

<sup>14</sup> Op cit, p. 32.



The period of strongest growth is in 1996-2002. The value of the currency falls from the 73-cent range to 64 cents in 2002. There was also strong growth in the US economy during the period (averaging 3.3 per cent per year for overall GDP and 6.5 per cent per year for non-energy merchandise imports). Notwithstanding these two positive influences, there was a small drag on Canadian manufacturing from foreign trade in the sector's commodities during the period. The dominating positive influence was growth of domestic demand. Among other things, this is a period when the federal government relaxes fiscal restraint and thereby contributes to growth of real disposable income that matches or exceeds 2 per cent in each year. Business investment in machinery and equipment is increasing by almost 7 per cent each year spurred partly by a reduction of almost 200 basis points in the industrial bond rate over the seven years. Productivity growth was slowed below the longer-term norm of about 3 per cent, in part because the period ends with the 9/11 influenced years of slow growth in 2001 and 2002. This noted, performance during this period suggests that for notable manufacturing employment growth to occur, *all* main drivers need to be favourably positioned – strong growth in our major foreign market, a weakening currency, rapid growth of Canadian real incomes, and falling or low interest rates.

In the last four years, most of the drivers have been favourably positioned but one – the currency value – has contributed to a major drag on sector employment growth through its influence on foreign trade in manufactures. Expert opinion suggests that the impact of competition from emerging economies – notably China – is now stronger than in earlier years.<sup>15</sup>

Here we assess the impact of the appreciation as a sole influence on manufacturing. In abbreviated form, the standard “model” for the impact of an appreciation would be:

- real net exports are reduced,
- reduced import prices for capital goods promote business investment and the capital deepening yields a positive effect on sector productivity,
- there are induced, dynamic reductions in aggregate prices that follow from the lowering of prices for imports; real disposable income gains promote consumption,
- Net of lost foreign trade demand that affects manufacturing, and positive effects that follow from increased capital formation, one should expect at least transitory negative effects on manufacturing GDP and employment.

Other changes to driving forces of manufacturing performance have occurred since 2002, but the following changes to manufacturing are consistent with this general model. Compared to 2002, in 2006,

- real manufacturing GDP was only 1.7 per cent higher, with this derived from three years of stagnation or small reductions and one year (2004) when a 2 per cent gain was recorded,

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<sup>15</sup> Note that the Chinese Yuan has changed little in its rate of exchange with the US dollar, so Canada's currency has also sharply appreciated against the Yuan.

- growth of sector productivity accelerated (to an average 4 per cent in 2005/06 following sub-par growth in 2003/04), and
- sector employment was reduced by approximately 170,000 (measured annually), with almost all of this reduction concentrated in the last two years – 2005/06.

To distinguish the impact of the appreciation, we report a simulation experiment in which we use The Informetrica Model (TIM) to isolate the effects of the change to the exchange rate since 2002. The purposes of this experiment is to determine whether the standard model at least roughly describes what we model formally, and to force consideration of other influences that may be relevant to any discussion about the effect of exchange rate changes on manufacturing.

In the simulations, to develop a Base Case, we assume that the exchange rate in 2003-2006 is unchanged from the value of 2002 and simulate economic performance. We then simulate the economy using the actual appreciation of the currency (and all other exogenous variables that record what actually happened) to develop an Impact Case. As the following table reports, the amount of Canadian currency required to purchase a US dollar is reduced by increasing amounts over the four years, reaching an amount of a little less than 30 per cent last year.<sup>16</sup>

**Table 16 Exchange Rate Appreciation: Macro Impacts**

Macro Impacts of Exchange Rate Appreciation				
	2003	2004	2005	2006
		% Impact		
Exchange Rate (\$Can per \$U.S.)	-10.8	-17.1	-22.9	-28.3
Exchange Rate (cents U.S. per \$Can)	7.7	13.2	18.9	25.2
GDP at Basic Prices (\$97 Mns)	-1.5	-3.3	-5.2	-7.6
Memo: Domestic Final Demand	1.2	1.5	1.5	1.0
Exports	-3.4	-5.8	-8.2	-10.5
Imports	3.1	5.3	7.1	8.5
Disposable Personal Income (\$1997 Mns)	1.6	1.4	1.0	-0.2
Investment Effort (% of GDP \$C) (a)	0.2	0.3	0.5	0.6
GDP Deflator (Chained, 1997=1)	-1.7	-3.1	-5.2	-6.8
Consumer Price Index (1992=100)	-2.9	-5.1	-7.8	-10.4
Import Price Deflator (Chained, 1997=1)	-9.5	-15.3	-20.7	-26.2
Wage & Salary Rate (\$000 nominal per employee)	-1.2	-3.1	-5.7	-8.8
Pre-tax Corporate Profits (\$Mns Nominal)	-14.4	-18.0	-23.0	-24.0
All-Government Balance/Net Lending (a)	-5137	-12620	-22124	-34652
Unemployment Rate (%) (a)	0.2	0.5	0.8	1.2
Government of Canada Bonds (10+ years) (a)	0.0	0.0	0.0	0.0
10+ Years Canada Bonds (real) (a)	0.4	0.7	1.1	1.5

(a) Level Impact

<sup>16</sup> To provide “rules of thumb” for exchange rate impacts, Appendix D reports, in tabular form, the impact of a one US cent appreciation in each year of 2003-2006.

The macroeconomic impacts are consistent with normally expected effects. There are sharp reductions in real exports and increased real imports to lower net exports. There are positive effects on consumption, business capital formation<sup>17</sup> and other components of domestic demand, but the scale of these positive effects is much smaller than the losses in foreign trade. In 2003, the trade losses are one-fourth the scale of final domestic demand gains; by 2006, the trade losses are 1.4 times the scale of the domestic demand gains.

Implications for manufacturing are somewhat different from this picture of overall economic impacts. Here we decompose the sector effects with the tautology used above in Table 1 – impacts on manufacturing employment are necessarily equal to the impacts on domestic demand for manufactures times the ratio of production to domestic demand divided by productivity (output per worker), or equivalently:

$\%E = \%FD - \%Prod + (\%GDP - \%FD)$ , where FD is final domestic demand and the last term indicates a shift in demand structure between trade and domestic demand. Our results for the difference in growth rates for 2003-06 are:

$$\%E = \%FD - \%Prod + (\%GDP - \%FD),$$

$$-3.9 = -2.5 - 1.2 - 2.6$$

These effects suggest the possibility that for manufacturers, the appreciation failed to provide a positive impact on domestic demand. Within manufacturing, our results suggest that the candidate industries most likely to face this effect are textile mills, paper, printing, chemicals, plastic and rubber products, primary metals and fabricated metals, computer and electronic products, and transportation equipment.<sup>18</sup> Notwithstanding sharp positive effects on capital formation, our results suggest the possibility that reduced growth would be accompanied by productivity losses that are larger than is derived from capital deepening, with this applying to manufacturing as well as to the economy as a whole. Our results are consistent with the view that the appreciation would have significant negative consequences for manufacturing through trade impacts.

Reduced import prices produce lowered aggregate domestic prices. There is a small positive effect on *real* labour compensation rates that contributes to the improvement in real disposable income. Note that a positive effect on real disposable income is modest and erodes over time as

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<sup>17</sup> Real spending on machinery and equipment is positively affected by increasing amounts over the four years. There is an increase of 5 per cent in 2003 rising to a 12 per cent increase by 2006.

<sup>18</sup> These results do not detail the “source” of the appreciation and implications that follow from that. Thus, part of the reason for the appreciation lay in rapid growth of world prices for energy and other commodities that Canada exports in large quantities (e.g., basic metals). As this generated strong investment spending by the oil and gas and other mining industries to produce a sharp increase in demand for primary metals and metal fabrications, the simulation results overstate negative effects on these industries. Other considerations – the Canadian appreciation mirrors in large degree the worldwide depreciation of the US dollar – would have implications for detail. At the margin, this should have had a positive effect on US industrial production with at least partial favourable consequences for Canadian establishments that are closely tied to activity of those in the US.

employment losses mount and reduce overall wage incomes of households. There is a sharp reduction in corporate profits, which is interesting in light of the fact that actual performance records a 46 per cent increase in profits when comparing 2006 to 2002, with increases recorded in each of the four years.<sup>19</sup> Our results include a reduction in real spending by governments but balances are hurt nevertheless.

For this simulation, we have *assumed* that the Bank of Canada would not have altered interest rates, notwithstanding that in the absence of an appreciation, the unemployment rate would now be well below 6 per cent, and that annual changes in the CPI would have exceeded 2 per cent by a wide margin in each of the four years. Given this consideration, there is a notable risk that the real results reported here understate negative effects.

Our simulated impacts on key sectors are presented in the table below. The results suggest a relatively sharp impact on manufacturing GDP and employment, which is consistent with its special sensitivity to net export impacts. The magnitude of the simulated “impact” on the sector’s GDP and employment is larger than may be suggested by “actual” performance over the last four years – GDP in 2006 was 1.7 per cent higher than in 2002 and employment, while lowered, was reduced by less (170,000) than the 355,000 impact reported below.

**Table 17 Exchange Rate Appreciation: Sector Impacts**

Sector Impacts of Exchange Rate Appreciation				
	2003	2004	2005	2006
		% Impact		
GDP at Basic Prices (\$97 Mns)	-1.5	-3.3	-5.2	-7.6
Goods	-2.4	-5.0	-7.7	-10.8
Manufacturing Total (31-33)	-4.0	-7.9	-12.0	-16.9
Services	-1.1	-2.5	-4.1	-6.1
Employment Total	-0.4	-1.3	-2.3	-3.4
Goods	-1.1	-3.4	-5.8	-8.5
Manufacturing Total (31-33)	-2.1	-5.7	-9.7	-14.4
Services	-0.2	-0.6	-1.0	-1.7
		(000s)		
Employment Total	-62	-212	-375	-582
Goods	-44	-141	-246	-372
Manufacturing Total (31-33)	-48	-139	-237	-355
Services	-18	-72	-129	-210

<sup>19</sup> Again, this may reflect the particular nature of the recent appreciation with for example, sharp increases in net incomes of the energy sector producing increased royalty and corporate income tax receipts for the federal and several provincial governments.

The last table in this section reports our estimate of effects on provinces.

**Table 18 Exchange Rate Appreciation: Provincial Impacts**

Provincial Impacts of Exchange Rate Appreciation				
	2003	2004	2005	2006
	% Impact			
Canada	-1.5	-3.3	-5.2	-7.5
Newfoundland	-0.8	-1.7	-3.0	-3.9
Prince Edward Island	-1.2	-2.3	-4.2	-6.1
Nova Scotia	-0.9	-2.0	-3.5	-5.2
New Brunswick	-1.2	-2.5	-4.2	-6.1
Quebec	-1.6	-3.6	-5.8	-8.6
Ontario	-1.9	-3.9	-6.0	-8.7
Manitoba	-1.2	-2.4	-4.0	-5.8
Saskatchewan	-1.0	-2.0	-3.2	-4.4
Alberta	-1.0	-2.4	-3.8	-5.3
British Columbia	-1.1	-2.5	-4.0	-6.2
Territories	-2.4	-3.9	-5.6	-7.2

It suggests that effects of an appreciation would be particularly severe in Ontario and Quebec, with this typically expected given the relatively high proportion of manufacturing in the structure of the two provinces.<sup>20</sup>

Also notable, however, is the (roughly similar) negative effects in all other provinces.<sup>21</sup> In part, this reflects a simulation result in which services GDP is reduced, a feature that would be roughly shared in each province. Considering actual history, however, it also reflects a result in which impacts in the energy sector (and related construction) are either negative or less robust than is indicated by actual experience. Accordingly, impacts in Alberta are negative while actual performance suggests implications noted above that are not captured in the simulation.

This experiment suggests that assessing the effect of an exchange rate change is a more complicated analytical challenge than simply assuming there is a change to the value of the exchange rate. Beyond “general” considerations, comparison of these results with actual history suggests that circumstances that are particular to the period examined should play an important role in the analysis. It is accordingly likely that policy suggestions that are aimed at maintaining a “low” currency value, or equivalently, resisting a sharp appreciation, would have to consider the “special” circumstances of the day and possibly require a “complicated” action plan to produce an effective positive impact on manufacturing.

<sup>20</sup> . Our results suggest especially severe impacts for the Territories as well. Although manufacturing is an insignificant share of activity in the region, other goods production accounts for two-fifths of all production (compared to 14 per cent for the economy as a whole). Foreign trade effects accordingly are especially important to the Territories.

<sup>21</sup> The relatively small impact in Newfoundland reflects the especially large role of social services (health, education and public administration) in the province’s structure, and a simulation result that reports a relatively small negative impact in these sectors.

## 3.2 A Closer Look

Manufacturing is heterogeneous, with markets for products of industries distinguished from one to the next, and the nature of production and costs also distinguished from one industry to the next. Thus, while some framework policies may be appropriate as a “general” approach to promoting employment growth in manufacturing, effectiveness can be expected to vary widely from industry to industry. This also suggests that industry-specific initiatives should be considered.

The table below follows the decomposition of employment growth applied to manufacturing as a whole in the section above, and applies this to 2-digit industries within manufacturing for selected years. To assist in understanding which industries are more or less trade sensitive, industries where the share of exports in production and imports in domestic requirements averages 75 per cent or more (our estimate for 2006) are reported with a **bold** font. Industries where the share ranges between 40 per cent and 75 per cent are reported with an *italics* font. Industries with shares of less than 40 per cent use a regular font. The average for manufacturing as a whole was 59 per cent. Generally, industries that are highly dependent on exports for markets also face imports that constitute a notable proportion of the domestic market. Exceptions include wood and paper, which depend on export markets predominantly but face modest domestic competition.

**Table 19 Manufacturing Industries: Employment and Sources of Change**

	Decomposition of Employment Change (average % change)											
	1988 through 1995				1996 through 2002				2003 through 2006			
	ET	+DD	-PROD	+FOR	ET	+DD	-PROD	+FOR	ET	+DD	-PROD	+FOR
Food (311)	-0.5	1.5	2.1	0.1	2.2	2.6	0.6	0.2	0.3	2.2	1.7	-0.2
Beverage & Tobacco Products (312)	-3.7	-0.2	3.6	0.1	0.6	1.6	-0.1	-1.1	-3.8	2.0	4.0	-1.9
<i>Textile Mills and Products (313-314)</i>	-2.0	0.7	2.8	0.2	-2.0	4.3	9.2	2.9	-8.0	0.6	7.8	-0.8
<b>Clothing &amp; leather (315-316)</b>	-2.2	-0.1	1.8	-0.3	-1.8	3.0	4.4	-0.3	-9.2	5.2	4.9	-9.4
Wood (321)	1.1	-0.5	0.3	1.9	4.2	5.1	-0.9	-1.9	-1.3	3.2	3.1	-1.3
Paper (322)	-0.2	1.3	1.4	0.0	-1.9	3.5	3.8	-1.6	-3.0	1.8	2.9	-1.9
Printing & Related Support Activities (323)	-0.2	1.7	1.7	-0.2	2.3	3.6	2.3	1.0	-3.0	2.8	5.1	-0.8
Petroleum & Coal Products (324)	-3.7	1.2	5.9	1.0	-1.1	3.0	5.0	0.9	-0.2	2.1	-0.9	-3.1
<i>Chemical (325)</i>	-0.6	1.6	1.3	-0.9	3.4	4.2	1.4	0.5	-4.5	2.3	5.1	-1.8
<i>Plastics &amp; Rubber Products (326)</i>	1.1	2.1	0.7	-0.3	3.5	4.1	2.0	1.3	0.1	2.3	0.0	-2.2
Non-metallic Mineral Products (327)	-1.7	0.0	1.5	-0.2	-0.1	4.3	5.2	0.9	5.0	3.0	-2.9	-0.9
<i>Primary Metal (331)</i>	-1.3	1.8	3.4	0.3	-1.2	4.5	5.4	-0.4	-2.8	0.5	1.1	-2.2
<i>Fabricated Metal Product (332)</i>	-2.1	1.3	2.6	-0.9	3.8	4.1	1.0	0.7	1.0	3.0	-1.2	-3.2
<b>Machinery (333)</b>	-0.6	1.4	1.5	-0.5	5.0	3.4	0.6	2.1	-1.0	6.1	1.0	-6.1
<b>Computer &amp; Electronic Product (334)</b>	-2.1	2.8	2.0	-2.9	5.5	11.2	5.9	0.2	-4.0	10.3	11.0	-3.3
<b>Electrical Equipment, Appliances &amp; Components (335)</b>	-4.3	1.1	3.9	-1.4	1.6	4.9	4.0	0.7	-5.2	3.6	1.5	-7.4
<b>Transportation Equipment (336)</b>	0.2	2.4	5.6	3.4	4.6	5.4	-0.6	-1.5	-2.0	2.1	3.0	-1.2
Furniture & Related Product (337)	-2.5	0.5	4.5	1.5	7.1	6.3	1.0	1.8	-1.9	5.7	4.1	-3.5
<b>Miscellaneous (339)</b>	2.4	1.6	-2.3	-1.4	3.6	4.3	-0.7	-1.4	-1.0	5.7	-1.8	-8.5
<b>Manufacturing (31-33)</b>	-0.9	1.5	2.8	0.4	2.7	4.7	1.7	-0.3	-1.9	3.7	2.7	-2.8

% changes to:

ET Employment

DD Domestic +Intermediate Industry Demand

PROD Gross Output (GO) per Employee

FOR Foreign Trade & Residual

Since 1988, when the first of the two continental trade agreements were concluded, manufacturing employment has undergone two major contractions (1990-1993 and 2005-2006), but there has been intervening growth. For the period 1988-2006<sup>22</sup>, manufacturing employment increased by 4 per cent or at an annual pace of 0.2 per cent. Excluding the contraction of the last two years, employment had increased by 12.3 per cent, equivalent to annual growth of 0.7 per cent.

Over the full 19 years, employment has shrunk in establishments producing beverage and tobacco products, textiles, clothing and leather goods, paper, refined petroleum and coal products, primary metals, and electrical equipment, appliances and related components.<sup>23</sup> Among these industries, growth of domestic demand for their products has typically been relatively weak and increases in productivity (GDP per employee) has been relatively strong when compared to other manufacturing. As with all manufacturing industries, opening to foreign trade has increased, but the effect on production and employment prospects has been mixed. Among this group, foreign trade has been a notable negative influence for two industries – clothing and leather goods and electrical equipment and appliances.

Six industries have recorded modest (one per cent or less) employment growth over the nineteen years. These are producers of food, printing, chemicals, non-metallic mineral products, fabricated metal, and computers and electronic products. Common among these industries, as for the list above, is relatively weak growth of domestic demand for the products of these manufacturers. The major exception to this is in demand for computers and electronic products, for which growth has been more robust than for any other set of manufactures. In this industry, however, this robust demand growth is partially offset by a notable drag on domestic production from foreign trade. Productivity growth among these industries has generally been sub-par when compared to manufacturing as a whole, with again, computers a positive exception. Again, there is no strong correlation between technological intensity and employment (or output) growth. Food and printing are classified to low technology industries, non-metallic minerals and metal fabrications to low-medium technology, chemicals to high-medium, and computers to high technology. Note that while one may otherwise presume that Canada has some comparative advantage in this industry, it is one of the manufacturing industries most adversely impacted by opening to foreign trade.

The remaining six industries may be classified as employment “winners” – wood, plastics and rubber, machinery, transportation equipment, furniture, and miscellaneous manufactures – with the pace of employment growth exceeding one per cent per year over the past 19 years. As a rule, the domestic demand for products of these industries has tended to be robust when compared to

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<sup>22</sup> See Appendix D for a table reporting changes over 1988-2006.

<sup>23</sup> There appears to be no strong correlation between growth of employment (or GDP) and the technology intensity of industry. The first four of the industries listed as “poor” performers are in low-technology industries, with refineries and primary metals classified to low-medium technology, and electrical appliances classified as high-medium technology intensity. See OECD, *op cit*, p. 9. Similarly, there appears to be no strong correlation to labour intensity. Note, for example, that under circumstances of recent foreign trade changes that significant reductions have occurred in what would normally be regarded as capital intensive industries – primary metals, paper and chemicals.

other manufactures, with foreign trade influences a mixed record of small positive and negative influences. The outstanding exception to this has been a strong negative influence for miscellaneous manufactures.<sup>24</sup> Growth of productivity has been relatively slow among this group of industries, excepting for rapid growth in furniture manufacturing and growth in transportation equipment that matches the overall manufacturing norm. Again there is no strong correlation to technology intensity. Wood, furniture and miscellaneous manufacturing are typically classified as low technology with plastics and rubber classified to low- medium technology. Machinery and transportation equipment are classed as high medium technology.

In addition to trade and other sector-specific structural considerations, growth of employment in manufacturing is clearly sensitive to a number of “macro” influences. Included in the years since the late 1980s are

- cyclical growth periods in our major export market, with US growth of output (and imports) falling or stagnating at the opening of the 1990s and in 2001, but otherwise growing at a strong pace,
- following a sharp appreciation of the Canadian dollar (vs. that of the US) through 1991, there was a 27 per cent depreciation through 2002<sup>25</sup>; the subsequent appreciation over four years was about 40 per cent,
- the continental cyclical downturn at the opening of the 1990s, strengthened in Canada by monetary policy and the currency appreciation, and subsequent decisions in 1993-1995 to make debt reduction a fiscal priority produced a period (1991-1996) of stagnant real disposable income. Subsequent major federal tax cuts and a strong external economic environment have produced several years of growth averaging almost 3 per cent (one per cent in per capita terms).

As the foregoing table indicates, arraying weak “macro” conditions in 1988-95 commonly produced a period of weak growth of domestic demand for the products of most manufacturing industries. Overall foreign trade provided a small positive contribution to production and employment growth during the years<sup>26</sup>. But note that there were generally modest, negative implications for a large number of manufacturing industries, most notably among the producers of chemicals, metals, and non-electrical and electrical/electronic machinery industries.

If this was a “perfect storm” for manufacturers, it was followed by an extended period of perfect weather (and a Canadian sense of being a “Northern Tiger”). From the middle of the 1990s through to 2002, growth of our dominant export market was robust (in an extend cyclical

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<sup>24</sup> Included in this category is the manufacture of dolls, toys and games, and sporting equipment.

<sup>25</sup> 30 per cent in real terms

<sup>26</sup> Note that this was occurring in the years during which the implementation of the Canada-US Free Trade agreement was most pronounced, and occurs during a period when through at least 1991, the currency has appreciated sharply.

“recovery” except for 9/11 related events that affected 2001 and 2002), the value of the currency was dropping steadily, and real household (and business) incomes were rising sharply. The distinguishing characteristic of this period for manufacturers is the rapid growth of domestic requirements for products, with growth of less than 3 per cent limited only to food and products produced by textile mills. Rapid growth of demand was accompanied by moderate (by comparison to long-run trends and other periods) growth of productivity for manufacturing as a whole, but with a wide range among the industries of the sector. Notwithstanding the sharp increase in domestic demand for manufactures, and in spite of competition from China and other “emerging” economies, foreign trade played only a minor negative role in growth of production and employment. Notable in this period within manufacturing are strong positive and negative impacts.

Since 2002, Canadian real disposable income growth has continued to be robust and economic activity (until late quarters of 2006) has also been robust. The former condition has sustained rapid growth of domestic demand for manufactures, spread widely among its many industries, but the appreciation of the currency in the last four years has produced a sharp negative impact from foreign trade, which we estimate, has occurred for each of the industries that we separately identify. This is not a second “perfect storm”, but dangers of this exist. The consensus anticipates recovered and sustained growth of the US economy from the second quarter of 2007, still strong Canadian growth of disposable incomes, and no major initiatives on the part of the Bank of Canada that would strengthen an appreciation of the currency. But a (US) mortgage related credit crunch could well lead to a prolonged period of slow US growth and concerns about “wage” inflation in Canada are being weighed by the central bank as a reason to raise rates (and appreciate the currency). Put simply, most of the weight of risks for the near term future are negative for manufacturing prospects.

Unaccounted for as a separate influence is the presumed trade competition for China and other “emerging” economies. We cannot distinguish the impact of this as compared to impacts in earlier years or as compared to other influences. Here we can provide trade information that is relevant to Canada’s trade in manufactures in recent years.

Imports from the US, China and Mexico account for about three-fourths of Canada’s manufactured imports with these three ranked as the primary suppliers for most major categories of goods. As the table below reports, China has increased its share of Canadian imports (as has Mexico).<sup>27</sup> The gains in Chinese and Mexican shares are equivalent to most, but not all, of the loss of US market share in our imports, so the US is losing to others as well. (Increases in imports from China accounted for about three-fourths of the all-source change in manufactured imports. The US reduction in imports of manufactures over the five years was equivalent to almost 50 per cent of the global change. Mexico accounted for less than 10 per cent of the change in Canadian imports of manufactures, while increases from “other” countries were also large - equivalent to almost two-thirds of the global change.<sup>28</sup> The United States and “other”

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<sup>27</sup> During 2003-2006, Canadian imports were growing by a little more than 6 per cent annually.

<sup>28</sup> There is no simple characterization of these “other” countries. Included as relatively large sources of import change were such emerging countries as Brazil, Malaysia, Chile and India, but also ranked as large source of the change in Canadian imports are many “industrialized” countries – Germany, Ireland and Switzerland.

countries accounted for almost all of Canada's increased imports of other, largely resource, imports.) Note that the currencies of China, the US and Mexico have all been depreciating against ours since 2002.

**Table 20 Who are the Major Suppliers of Canadian Imports?**

Source of Canadian Imports, by Selected Product and by Major Suppliers

	%								Top 10 Rank, 2006		
	China		United States		Mexico		Others		China	US	Mexico
	2002	2006	2002	2006	2002	2006	2002	2006			
Manufactured Food	1.6	2.6	69.4	67.0	0.6	0.8	28.4	29.6	4	1	
Beverages & Tobacco	7.2	9.2	28.9	23.2	5.1	8.7	58.9	58.9		1	5
Textiles & Products	7.6	14.4	61.5	55.1	2.5	2.9	28.4	27.7	2	1	4
Clothing	28.5	49.2	11.2	6.5	5.4	4.8	54.9	39.5	1	3	5
Leather Goods	56.7	65.9	6.6	4.8	0.6	1.3	36.1	28.1	1	4	7
Wood	4.8	14.2	73.6	64.8	0.2	0.3	21.4	20.7	2	1	
Paper	1.9	4.3	84.4	82.1	0.7	0.4	13.0	13.2	2	1	
Chemical (excl Pharm)	1.6	2.4	70.1	63.8	0.8	1.0	27.5	32.8	8	1	
Pharmaceuticals	0.5	0.5	48.9	35.5	0.4	0.2	50.2	63.8		1	
Plastics & Rubber	3.8	6.5	80.7	75.2	0.9	1.2	14.5	17.0	2	1	6
Non-metallic Minerals	7.9	13.3	64.7	58.7	3.5	3.0	23.8	25.0	2	1	4
Primary Metals	3.7	8.7	68.5	47.1	1.2	1.0	26.5	43.3	2	1	
Fabric. Metals & Hardware	8.9	15.8	67.2	55.8	2.8	3.8	21.0	24.6	2	1	4
Machinery	2.1	5.0	68.2	60.6	1.4	2.0	28.3	32.3	2	1	5
Office Machines	9.6	34.5	43.6	30.0	8.6	6.7	38.1	28.7	1	2	3
Electrical	7.6	17.4	52.4	39.5	9.3	12.4	30.7	30.6	2	1	3
Transport Eqpt	0.3	1.3	75.1	72.9	4.6	4.9	20.1	20.9	8	1	2
Furniture	18.7	30.2	52.5	42.6	12.6	10.0	16.2	17.1	2	1	3
Miscellaneous	15.2	21.5	53.9	47.0	3.1	4.1	27.8	27.4	2	1	5
Subtotal of Selected Products	5.0	10.1	65.1	56.9	3.9	4.3	26.0	28.7			
Unaccounted	1.3	1.3	43.8	44.3	1.8	2.7	53.1	51.6			
Total Imports	4.6	8.7	62.6	54.9	3.7	4.0	29.1	32.4	2	1	3

For Canada, it is equally important to understand how the “emerging” economies are affecting US imports. If these displace Canada as a supplier or if increased imports are displacing US “local” suppliers, then these changes are negatives for Canadian producers. Given the strong just-in-time inventory and other supply chain ties between Canadian and US manufacturing establishments, reduced output in an American plant will likely be reflected in reduced supplies from its “partner” Canadian plant. The table below provides a picture of how the US sourcing of imports has been changing in recent years.<sup>29</sup>

<sup>29</sup> We use the Strategis Trade Online database of US imports detailed by Harmonized System trade categories and have used judgment to assign them to categories that should roughly correspond to manufacturing industries.

**Table 21 Who are the Major Suppliers of US Imports?**

	Source of US Imports, by Selected Product and by Major Suppliers								
	%						Top 10 Rank, 2006		
	China		Canada		Mexicc		China	Canada	Mexico
	2002	2006	2002	2006	2002	2006			
Manufactured Food	4.0	7.1	29.9	27.6	7.4	10.1	3	1	2
Beverages & Tobacco	0.6	0.7	8.1	5.2	14.9	14.2	>10	7	2
Textiles & Products	15.1	28.6	11.6	8.4	10.3	7.3	1	3	5
Clothing	12.1	27.1	2.7	1.6	13.0	7.4	1	>10	2
Leather Goods	65.4	72.3	0.7	0.6	1.9	1.3	1	>10	8
Wood	8.2	14.2	61.0	53.6	1.8	1.6	2	1	8
Paper	6.7	12.2	59.6	52.5	3.6	4.4	2	1	3
Chemical (excl Pharm)	3.9	6.0	11.8	13.9	2.4	2.6	7	2	1
Pharmaceuticals	0.4	0.8	5.6	8.2	0.8	0.8	>10	5	1
Plastics & Rubber	14.6	19.1	30.6	27.2	6.4	7.0	2	1	4
Non-metallic Minerals	20.0	22.8	11.9	10.1	13.2	13.1	1	4	2
Primary Metals	8.3	13.6	29.1	25.0	8.8	7.1	2	1	3
Fabric, Metals & Hardware	25.6	33.9	12.5	10.1	11.7	11.0	1	3	2
Machinery	7.0	11.5	15.7	12.2	9.1	10.6	1	4	3
Office Machines	19.9	45.6	2.4	1.7	11.5	6.5	1	9	4
Electrical	16.1	28.3	5.9	4.7	21.5	20.7	1	7	2
Transport Eqpt	1.1	2.4	30.1	27.8	14.2	15.8	8	1	3
Furniture	37.1	48.7	18.5	14.5	17.0	13.8	1	2	3
Miscellaneous	30.1	33.3	4.0	3.6	11.0	9.3	1	5	2
Subtotal of Selected Products	12.8	20.2	16.7	14.8	12.1	11.2			
Unaccounted	2.8	2.8	23.3	20.6	9.6	9.4			
Total Imports	10.8	15.5	18.0	16.4	11.6	10.7	2	1	3

Highlights include the following:

In value terms, the commodities detailed accounted for almost three-fourths of US imports in 2006 (we expect that crude petroleum and other non-manufactured merchandise would dominate the trade that is not specifically covered). In 2006, Canada ranked first as a supplier of US merchandise imports but we were only slightly ahead of China. Note, however, that if our detailing of codes is a reasonable proxy for manufactures, the Chinese share of US imports is much higher than ours. Mexico ranks third among US suppliers, but the gap between theirs and our share for our proxy of manufactures is not as large as in the unaccounted for (“raw”) categories. That is, we appear to be more important to the US as a supplier of “raw” materials than Mexico; China is not a significant supplier of “raw” materials.

- China appears to rank number one as a US supplier of manufactures, a status that has been achieved within the last four years. Our share of manufactures (the “subtotal of selected products”) has slipped during that time. So has that of Mexico! Ours may be partially explained by our appreciation against, for example, the Yuan, but the Peso has not changed much in relation to the Yuan.<sup>30</sup>
- China is not simply a supplier of commodities produced in labour-intensive, low-wage establishments. It is a high-ranking supplier of the US in almost all industrial sectors. Further, it dominates in only one of the low-cost, labour-intensive sectors (leather goods).

<sup>30</sup> The picture for changes in US imports is distinct from that of Canada. In the Canadian case, China and “other” countries accounted for very large increases in manufactured imports in 2002-2006, largely at the expense of the US as a supplier. In the US case, China’s increase in manufactured imports was equivalent to about 150 per cent of the change in imports from all sources. This increase came at the expense of Canada, Mexico, and “other” suppliers. Canada and other countries accounted for almost all of the increase in US imports of resource commodities.

In clothing and textiles, it has strong competitors (India, Pakistan, Mexico for textiles, and Mexico and several South Asian economies for clothing). Possibly the most surprising will be the extent to which China now plays a role in delivering commodities typically described as produced in high and medium-high technology industries. The US imported \$145 billion (\$Can) of commodities we have classified to machinery, office machines (and computing), and electrical equipment in 2006. In that same year, US imports from China of commodities we have classified to textiles, clothing, and leather goods amounted to less than \$55 billion. China does not appear to be a major player in transportation equipment – so far.

**Table 22 Cost Allocation for Manufacturing Establishments**

Component Costs of Gross Output in 2003, % share					
	Labour Income	Unincorp. Income	Corporate Surplus	Net Indirect Tax	Purchased Inputs
Food (311)	13.2	0.1	12.4	0.5	73.9
Beverage & Tobacco Products (312)	14.8	0.1	31.2	0.8	53.1
Textile Mills and Products (313-314)	24.1	0.2	12.4	0.9	62.4
Clothing & leather (315-316)	29.6	0.3	12.4	0.9	56.8
Wood (321)	19.9	0.1	14.7	0.7	64.7
Paper (322)	19.8	0.0	10.0	1.1	69.0
Printing & Related Support Activities (323)	29.3	0.3	15.2	0.8	54.4
Petroleum & Coal Products (324)	3.8	0.0	6.2	0.2	89.8
Chemical (325)	12.6	0.0	17.7	0.6	69.1
of which:					
Basic Chemicals	8.4	0.0	15.6	0.6	75.3
Resin, Synthetic Rubber & Fibre	10.1	0.0	15.7	0.5	73.7
Pesticide, Fertilizer & Other Agriculture Chemicals	8.2	0.0	18.6	0.5	72.6
Pharmaceuticals & Medicine	16.5	0.1	23.1	0.7	59.7
Miscellaneous Chemicals	16.4	0.0	16.0	0.7	66.8
Plastics & Rubber Products (326)	22.7	0.0	14.4	0.7	62.2
Non-metallic Mineral Products (327)	23.3	0.1	17.8	1.2	57.6
Primary Metal (331)	16.0	0.0	10.2	0.9	72.9
Fabricated Metal Product (332)	28.6	0.2	12.4	0.9	57.9
Machinery (333)	27.4	0.2	12.8	0.8	58.8
Computer & Electronic Product (334)	22.7	0.1	6.3	0.7	70.3
Electrical Equipment, Appliances & Components (335)	25.0	0.0	7.7	0.7	66.6
Transportation Equipment (336)	12.3	0.0	11.7	0.3	75.7
of which:					
Automobile & Light- & Heavy-Duty Motor Vehicle	6.2	0.0	10.9	0.2	82.7
Other Motor Vehicle Parts Manufacturing	18.5	0.0	10.0	0.5	71.0
Aerospace Product & Parts Manufacturing	24.3	0.0	18.8	0.6	56.4
Furniture & Related Product (337)	28.2	0.3	13.1	1.0	57.4
Miscellaneous (339)	25.4	0.6	16.6	1.1	56.3

As the foregoing has illustrated, markets into which Canadian manufacturers sell vary from industry to industry within manufacturing, and have changed differently over time. The structure of production and costs are also heterogeneous. It will not always be immediately clear about whether to identify an industry as labour or capital-intensive. The table above provides the 2003

allocation among major sources of costs for each of the manufacturing industries on which we focus.<sup>31</sup>

The following are some notable features.

- As direct expenses of establishments, payments for wages and supplementary labour income are relatively modest proportions in most manufacturing industries. At the major group level, there are no industries in which the share reaches one-third.<sup>32</sup> In 2003, they accounted for less than 10 per cent of total costs in the Petroleum Refining Industries, Automobile and Light and Heavy-Duty Motor Vehicle Assembly, Animal Food Manufacturing, Pesticide, Fertilizer and Other Agriculture Chemicals, Basic Chemicals and Dairy Product Manufacturing. As a quick reference, the following table provides a listing of major manufacturing industries sorted by labour intensity in 2003 with estimates also provided for an earlier years.<sup>33</sup> Notice that when comparing this listing to growth of employment in 1988-2006, there is no strong correlation between slow or rapid employment growth and the apparent extent of labour intensity in the industry.

**Table 23 Sorted Labour-Intensity Indicator Within Manufacturing**

	Wages & Suppl. Labour Income % share of Gross Output		
	1989	1997	2003
Clothing & leather (315-316)	30.4	28.3	29.6
Printing & Related Support Activities (323)	36.2	33.9	29.3
Fabricated Metal Product (332)	27.6	28.6	28.6
Furniture & Related Product (337)	31.2	28.2	28.2
Machinery (333)	29.7	27.4	27.4
Miscellaneous (339)	28.4	25.9	25.4
Electrical Equipment, Appliances & Components (335)	24.8	23.0	25.0
Textile Mills and Products (313-314)	24.9	23.9	24.1
Non-metallic Mineral Products (327)	25.0	24.4	23.3
Computer & Electronic Product (334)	25.6	18.2	22.7
Plastics & Rubber Products (326)	26.3	24.2	22.7
Wood (321)	25.4	19.6	19.9
Paper (322)	20.3	19.8	19.8
Primary Metal (331)	18.1	16.2	16.0
Beverage & Tobacco Products (312)	17.9	15.3	14.8
Food (311)	15.7	14.0	13.2
Chemical (325)	16.1	14.1	12.6
Transportation Equipment (336)	17.2	13.5	12.3
Petroleum & Coal Products (324)	5.9	4.5	3.8

<sup>31</sup> This is the latest year for which we can produce “actual” results using official data sources. Allocation of among costs may change from year-to-year depending on world commodity prices and other factors, but the basic structure reflected in this table changes slowly over time.

<sup>32</sup> At the detailed level, only one – ship and boat building - meets this test. Note that we are allocating costs of the goods shipped including costs of purchased goods and services. Estimating labour intensity based on shared of Gross Domestic Product produces a similar ranking.

<sup>33</sup> The year 2003 is the last full year for which detail can be provided. Nominal GDP detailing by industry, from which cost components can be derived, will be updated for later years and revised in the Fall of 2007.

- Manufacturing establishments are operated almost entirely under corporate forms of ownership so that unincorporated income is a very small component of costs for all industries – the largest is in miscellaneous manufacturing at less than one per cent. Net of subsidies, indirect taxes<sup>34</sup> are also small, amounting to less than one per cent of costs in all but seven of the 160 manufacturing industries that we can separately identify.
- Corporate surplus to cover capital consumption, net interest paid, inventory valuation adjustment and profits typically accounts for about one-sixth of costs, but varies widely from one manufacturing industry to the next with proportions ranging from two-fifths to negligible or even negative proportions. Further, relatively high proportions are not necessarily strong indicators of capital intensity. In 2003, the highest cost proportions were recorded in tobacco, breweries, wineries, pharmaceuticals and distilleries, suggesting that high proportions may be attributable as much to market power as to “fundamental” requirements for real fixed capital. In this respect, global business cycles may also play a strong role in costs allocated to surplus. Sharply reduced proportions (in 1991 as compared to those of 2003) in wood, paper, primary metals and most transportation equipment industries likely reflect sharp reductions in relative international prices for commodities produced by these industries at the time of that global downturn in economic growth.

The dominant source of costs is purchased materials and services. In 2003, only two industries – breweries and tobacco manufacture – limited costs of purchased inputs to less than one-half. Among the 120 manufacturing industries we separately identify, the average proportion was two-thirds. In some cases, the proportion is much higher; purchased materials – mainly crude oil – account for 90 per cent of the costs of shipments made by refineries. Put otherwise, any policy recommendations that focus on reducing unit costs as a device for improving the fortunes of Canadian manufacturing will have to extend the focus to cover costs of inputs.

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<sup>34</sup> Taxes on property and labour and subsidies for labour costs are components of GDP at Basic Prices. Industries are also impacted by taxes and subsidies on commodities – GST/HST and excise taxes and duties. Such taxes are reflected in GDP at market prices, occurring after the factory gate.

## 4 Immediate Actions for Government

Recognition that manufacturing is important to the future of the economy, that the current downsizing of the sector is “major”, and that actions to reverse current trends are needed is not new, nor limited to the views of the Labour Movement. A comprehensive list of candidate actions recommended by labour may be found in “The real story and plan we need” published on the internet by the Canadian Labour Congress in May, 2007 at:

[http://canadianlabour.ca/index.php/our\\_economy\\_the\\_rea](http://canadianlabour.ca/index.php/our_economy_the_rea).

We have met with a Steering Committee composed of staff from several labour organizations, and a Sounding Board of experts to review the challenges facing manufacturing and to develop solutions to those challenges. Views provided in two meetings held in June and August are detailed in Appendix B. Here we provide a summary of policy recommendations and actions that governments should consider.

### 4.1 Ensure that the “macro” environment is growth oriented

Our decomposition of the explanations for past growth of manufacturing employment makes it clear that government policies centered on growth of incomes and overall employment are important to the growth of manufacturing. In recent years, the return of unemployment rates to lower levels and relatively robust growth of real disposable incomes are benchmarks of a strong “macro” environment. But there are no guarantees that this will be sustained, as currently, the US economy and others around the world struggle with the implications of overextended credit in US mortgage markets. And this is occurring at the end of an extended cycle of growth, suggesting the possibility that the North American and other industrial economies would be vulnerable to a cyclical downturn from any number of unfavourable events. Will governments move contra-cyclically to sustain growth of real incomes and employment, or will they, as in the mid-1990s, make protection of government balances the priority?<sup>35</sup> A commitment to full(er) employment than is marked by current unemployment rates could characterize this.

The ongoing current appreciation of our currency versus that of our dominant trading partner is sourced partly in a number of things that are beyond Canadian governments to control – “twin deficits” in the US and sustained strong global demand for energy and other commodities that Canada exports in abundance. But the currency value is at least partly sensitive to the view of monetary authorities. Their singular focus meeting inflation targets provides a bias that favours interest rate increases that reduce the capital deepening needed to produce future productivity gains and sustains the current high value of the Canadian currency.

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<sup>35</sup> Most attention will focus on federal policies. But provinces also have a general fiscal influence on macro conditions. Further, during “challenging” fiscal times, the tendency of governments to cut capital spending impacts commitments to developing infrastructure.

## 4.2 Centre Structural Policy on Promoting Development of Value-Added Production

There are many instruments available to the federal and provincial governments. They include:

- a tax environment that promotes business expansion, including consideration of lower retail sales tax inputs for manufacturing investment goods and/or operating inputs,
- developing transportation, communications, and other infrastructure with governments, especially at the provincial and municipal level,
- strengthening the training and education systems, including re-strengthening social financing for post-secondary education, sustainable funding for skills training of new entrants, life-time skills upgrading (and literacy improvement) of those at work, and re-training as a central action of “adjustment” programs,<sup>36</sup>
- commitment to a “made in Canada” procurement strategy in government operations, infrastructure spending, and by business for development of major capital projects and when policies on environmental action are developed,<sup>37</sup>
- pursuit of relatively low energy, especially electricity, prices for industrial users,
- sensitivity to the overriding objective of increased value added when negotiating trade and investment agreements.

## 4.3 Adjustment

This is a complicated issue. In part, this focuses on reviewing the EI system including benefits and in its relationship with training. Processes that recognize that adjustment includes actions taken by provincial and municipal governments and by business are also needed. A central issue is focussing on sustaining viable businesses. A growing complication for adjustment through mobility follows from the increasing number of two-earner families. Adjustment processes are typically *ad hoc*. We should recognize that adjustment is a continuing significant feature of the economy, and that across-sector and government approaches are warranted.

## 4.4 Processes

The Informetrica review of past performance highlights the extent to which manufacturing sectors are heterogeneous in both their markets and costs. Development of industry-specific Sector Councils with labour, business and governments as stakeholders is a recommendation of the Labour Movement that we believe warrants serious consideration. Their mandates,

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<sup>36</sup> The growing significance of international immigrants to growth of the labour supply, and the importance of integrating these into the workplace and society may usefully be included as an “adjustment” challenge.

<sup>37</sup> Informetrica maintains an inventory of approximately 1000 major capital projects that could be used as a starting point for identifying projects where procurement actions might be undertaken.

coordination among Councils, links to governance and overriding policy objectives of sector promotion are matters to be further explored.

## References

Canadian Labour Congress, “Made In Canada Jobs”, May 30, 2007 at [http://canadianlabour.ca/index.php/made\\_in\\_canada\\_jobs](http://canadianlabour.ca/index.php/made_in_canada_jobs), and especially links to:

- Our Economy - The real story and the plan we need
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## Appendix A Manufacturing Job Losses

Roughly coincident with the beginning of what has turned out to be a sharp appreciation of the Canadian currency, manufacturing employment has contracted. From a peak last reached in November 2002, the reduction through August of this year has amounted to 291,500 or 12.5 per cent. As the table below indicates this is an “across-Canada” phenomenon. From that late month of 2002, employment levels have been reduced in all but three provinces – Newfoundland, Prince Edward Island and Alberta. The most severe reductions have been concentrated in Central Canada, with the reduction in Quebec from November 2002 through August of this year amounting to 18.5 per cent, and that in Ontario, 14.6 per cent. Note too that even in provinces that have been “winners” since late 2002, some reductions have occurred. There has been a loss of 1,600 in Newfoundland since November 2005, and a loss of 14,100 in Alberta since January of this year.

**Table 24 Manufacturing Job Losses, by Province**

<b>Manufacturing-Job Losses by Province (Monthly)</b>							
	<b>Manufacturing Employment</b>				<b>Decline in Manufacturing Employment [1]</b>		
	Nov. 2002	Peak Month	Peak	Aug. 2007	Since Nov. 2002	Since Peak	
NL	13.9	Nov. 2005	18.7	17.1	-3.2	1.6	
PEI	6.1	April 2005	7.2	6.6	-0.5	0.6	
NS	44.4	June 2003	45.8	40	4.4	5.8	
NB	36.1	Jan. 2004	43.8	36	0.1	7.8	
QC	670.7	Nov. 2002	670.7	546.6	124.1	124.1	
ON	1115.3	Nov. 2002	1115.3	952.5	162.8	162.8	
MB	68.5	April 2004	74.2	67.1	1.4	7.1	
SK	27.5	Aug. 2007	31.8	31.8	-4.3	0	
AB	149.2	Jan. 2007	155.8	141.7	7.5	14.1	
BC	202	March 2007	215.3	201.4	0.6	13.9	
Canada	2329.8	Nov. 2002	2329.8	2038.3	291.5	291.5	

[1] Negative numbers denote employment increases.

Provincial figures do not sum to national figures because they are subject to separate seasonal adjustments.

**Table 25 Manufacturing Job Losses by Sex**

<b>Manufacturing-Job Losses by Sex (Annual)</b>							
	<b>Manufacturing Employment</b>				<b>Decline in Manufacturing Employment</b>		
	2002	Peak Year	Peak	2006	Since 2002	Since Peak	
Men	1627.6	2002	1627.6	1517.8	109.8	109.8	
Women	658.3	2003	660.6	599.9	58.4	60.7	
Total	2285.9	2002	2285.9	2117.7	168.2	168.2	

Notes: These figures are not available on a seasonally-adjusted monthly basis.

Lost jobs has affected both sexes, with the impact on women slightly more severe. Through 2006, the reduction for females was 8.9 per cent. For males, the reduction was 6.7 per cent.

## **Appendix B – Review of Challenges and Potential Solutions**

Summary of Views at Meetings of Steering Committee (June 18, 2007) and Sounding Board (August 7, 2007)

### **1 Domestic Policy**

#### **1.1 Macro Policy**

##### **1.1.1 Problems**

Interest rate policy too narrowly focused on inflation targeting.

#### **1.2 Exchange Rate**

##### **1.2.1 Problems**

High Canadian dollar

\$ appreciation

\$ exchange rate versus US dollar, versus Asian currencies

Exchange rate too high – Bank of Canada could relax monetary policy (might help some). More controversial would be a cap on oil and gas exports

Exchange rate appreciation in context of currency management by Asian exporters

Exchange rate appreciation is due to US dollar depreciation

##### **1.2.2 Solutions**

Bank of Canada should reduce interest rates. This would help them to achieve a lower exchange rate and improved economic growth. The Bank and Finance should provide a target range for the exchange rate that would be in the national interest.

A move to full employment should be part of macro policy. Today this means 4%. Even lower rates are possible and desirable.

Monetary and fiscal policy should undertake the achievement of a broader set of goals – stable and low inflation, full employment, stable exchange rate, and an improved distribution of rising incomes.

Aggressive application of environmental regulations, particularly on imports that are produced with high GHG emissions should help remove any disadvantage to domestic producers facing tighter regulations.

Work with other countries to encourage upward revaluation of Chinese Yuan.

## **1.3 Energy & Electricity Policy**

### **1.3.1 Problems**

Energy prices can impact on macro picture

Rising costs of energy, particularly electricity

High energy prices

Electrical power rates are too high

In Ontario, there could be a lower industrial rate

Electricity market deregulation

Oil sands developments overheating Alberta economy, dissipating rents through higher costs and locking-in export commitments.

### **1.3.2 Solutions**

Deliberately move to slow down developments in oil sands with an objective of maximizing the long-term economic rents from the resource. Raise royalty rates substantially.

Use energy potential as a support for industrial development. Ensure stable , low-cost energy supply to manufacturing.

Subsidize rates for energy inputs to manufacturing processes.

Enforcement of environmental regulations should slow both the Mackenzie Valley Gas Pipeline and the oil sands developments.

Introduce carbon tax, reducing demand in the short-run and encouraging more economic replacements in the longer-term.

Expansion of nuclear power using the CANDU technology or other Canadian-based approaches should be pursued actively.

Launch national strategy by federal and provincial governments to build and use alternative energy equipment (e.g., solar, wind, small hydro, etc.)

## **1.4 Public and Private Investment**

### **1.4.1 Problems**

Low capital investment

Capital investment too low – more incentives and/or subsidies to modernize or build new plants

Lack of investment

Weak capital investment in period of low Canadian dollar

Insufficient infrastructure – need for better transportation grid and electrical grid

### **1.4.2 Solutions**

Invest in infrastructure to support manufacturing. Examples would include gateways to US for exports through better highways and bridges, improved port facilities, increased rail capacity, and other steps to enhance overall transportation grids.

Expansion of commuter rail networks and high-speed intercity rail should be undertaken with an emphasis on Canadian technologies and procurement.

## **1.5 Labour Force**

### **1.5.1 Problems**

Illiteracy rates are high in the workforce and showing little improvement over time.

Financing of post-secondary education remains a challenge for the middle class and low-income Canadian families.

Workplace training is not a major part of the human capital system.

Pensions earned are vulnerable to plant closures and layoffs.

### **1.5.2 Solutions**

Tax breaks and subsidies should be applied to assist in adult training through companies, community colleges, and other institutions.

There should be a major push on improving adult literacy of Canadians, particularly those in the labour force.

The federal government should increase its efforts in post-secondary education through reducing financial barriers for students.

Workplace training should be emphasized. Retraining into new skills for other industries may also be important. Some parts of this training could be delivered through EI programs to enhance the security of workers.

Governments should review the vesting provisions for private sector pensions to ensure their adequacy in the face of layoffs and plant closures.

## **1.6 Inequality and Income Distribution**

### **1.6.1 Problems**

Rising inequality – is it affecting the demand for manufactured goods??

### **1.6.2 Solutions**

Tax system can be used to increase progressivity of tax system by raising tax rates on higher incomes and lowering them for low-income individuals.

## **2 International Linkages**

### **2.1 Trade Policy**

#### **2.1.1 Problems**

Trade policy: unbalanced trade flows

“Unfair” competitive advantages from:

- Currency manipulation
- Lack of internalization of “cost” of doing business

No requirements for any domestic production

No Penalty for undervalued currency (China)

Trade imbalances (China, etc.) and impacts on economy

Emerging economies have the capacity to organize and market consumer-approved manufactured products internationally

Asian imports

No penalty for failure to meet ILO standards

International differences in labour standards: working conditions and environmental standards

#### **2.1.2 Solutions**

Export taxes and restrictions on raw material exports should be imposed to force more value-added production in Canada.

Tighten trade laws. For example:

Strengthen anti-dumping countervail to take into account:

- Raw material inputs below world price
- Broader definition of subsidy
- Labour standards

Create equivalent of US 301 (Unfair Trade Practices) that would allow Canada to define unfair trade and to take measures beyond those currently permitted by existing trade agreements

Recognize that current arrangements are actually managed trade agreements, not “Free Trade” agreements.

Extension of agreements for “deep integration” with Mexico and the US should provide for “opting in” or “out” of various parts of the agreement.

## **2.2 Globalization – overall level and/or shifts in location**

### **2.2.1 Problems**

Global financial instability and recession in the US could damage Canadian economy substantially.

Worldwide decline of manufacturing employment

Continent-wide reduction in manufacturing & inter-establishment/firm dimensions of this for Canada

Shift of labour-intensive manufacturing operations to China/developing Asia as part of transnational corporation’s value chains

Off-shoring

Substantive off-shoring of production

Shift of Auto industry away from North American companies

Competitive pressures

Contracting-out of jobs by manufacturing firms

Stated problem: Loss of skilled, relatively high-paying, jobs in manufacturing. Why is this happening and how to fix it?

Theory says that growth of emergent countries puts our unskilled (low-paying) workers at risk primarily, not our skilled workers so much. So is our problem due to:

- Structural – Canada’s growth is inevitably switching to services?
- Relocation of firms inevitably takes skilled as well as low-skilled workers
- Lack of domestic & international investment is not creating manufacturing jobs
- Governments are not training skilled workers

### **3 Sectoral Problems for Manufacturing**

As a long-run objective, Canada should pursue the development of a “New Industrial Strategy” based on Tri-partite Sectoral Councils with effective governance mechanisms. As a long-run policy this offers a forum for the development of a meaningful industrial strategy.

#### **3.1 Lack of Industrial Policy**

##### **3.1.1 Problems**

Over-reliance on resource extraction compared to value-added processing and manufacturing

Lack of industrial policy to add value to resources before export (e.g., logs, bitumen)

Lack of industrial policy to link our manufacturing industry to capital equipment needs of resource sector

No domestic procurement policy

Municipal and provincial procurement might help as well

##### **3.1.2 Solutions**

Governments and corporate buyers should pursue “Buy Canadian” procurement strategies as an economic development instrument. Emphasis should be placed on innovative products and services, including green technologies and processes.

Identify “green” products and services produced by Canadian firms. Create incentives to close any gaps in Canada’s supply capabilities.

Stimulate “green jobs” through encouragement, financing, and procurement policies.

Strategies in other areas with substantial government procurement should be undertaken (e.g., healthcare equipment, Coast Guard and Fisheries ships, etc.)

Tighten environmental regulations and impose costs on imports through unfair trade practices in situations in which the production of the goods violates good environmental practices.

##### **3.1.2.1 Tax Policy**

Reduce corporate tax rates for:

- Exporting firms
- Firms increasing R&D
- Firms increasing employment and output
- Further upgrading of materials

Concentrate special capital gains tax reductions for investment in new small firms and increase capital losses write-offs as well.

### **3.1.2.2 Financing**

Promote financial investments (equity and debt) in start-ups and SMEs in manufacturing sector. Provide government agency insurance for part of debt.

Create a public sector investment pool for new manufacturing ventures.

Establish sector development banks to provide long-term equity investment and/or low interest rate loans to Canadian manufacturers. Government role should be indirect – providing implicit subsidies to private investors in the banks.

Provide federal and provincial support for municipal efforts to create manufacturing clusters.

## **3.2 Services /Manufacturing**

### **3.2.1 Problems**

Continental consumer, income elasticity at margin is shifting spending to services (non-manufacturing). A good example is foreign travel.

## **3.3 Organization of manufacturing**

### **3.3.1 Problems**

Change is occurring within manufacturing – see occupational shifts

Business is pursuing a strategy of more concentration and reductions in capacity in the manufacturing sector

Training is insufficient. Need more incentives and/or subsidies to train employees. Taxes applied if there is no training.

### **3.3.2 Solutions**

## **3.4 Low Innovation**

### **3.4.1 Problems**

Lack of innovative capacity on part of most manufacturing companies

Insufficient R&D – need for centres of excellence, subsidies and incentives

Low quality of production equipment. Most producers are SMEs. This creates problems regarding technical know how and its dissemination

### **3.4.2 Solutions**

Provincial funding of university technology transfer departments or units should be undertaken.

Increase funding of R&D with particular emphasis on “green technologies”.

Fund additional centers of excellence in key sectors; provide subsidies for the development of new technologies.

**Appendix C – Multiplier Impact with Balance Improvement Allocated to Additional Public Services**

**Table 26 Significance to Sectors of Increased Manufacturing Operations**

Impact on Sectors of Increased Manufacturing Production and Shipments				
Increase Manufacturing Exports by \$10 bn (at 2006 prices)	(per cent impact on GDP \$97)			
	2003	2004	2005	2006
All Industries	1.8	1.7	1.4	1.4
Goods Producing	3.1	2.7	2.3	2.3
Agriculture, Fishing, Hunting & Forestry (11)	2.3	1.9	1.7	1.7
Mining, Utilities & Construction (21-23)	1.6	1.4	1.0	1.0
Manufacturing Total (31-33)	4.2	3.7	3.3	3.4
Service Producing Industries	1.2	1.2	1.0	1.0
Wholesale & Retail Trade	1.8	1.9	1.7	1.8
Transportation & Warehousing	1.9	1.7	1.5	1.5
Information & Culture Industries (51)	1.1	1.4	1.4	1.6
Finance, Insurance & Real Estate (52-53, 55)	0.9	0.7	0.4	0.3
Professional, Scientific & Technical Services (54)	1.8	1.5	1.2	1.1
Administrative & Support, Waste Management & Remediation (56)	1.7	1.6	1.4	1.3
Educational Services (61)	0.8	1.0	0.9	1.0
Health Care & Social Assistance (62)	0.9	1.0	0.8	0.8
Arts, Entertainment & Recreation (71)	0.9	0.8	0.5	0.4
Accommodation & Food Services (72)	1.7	1.7	1.2	1.0
Other Services (excl. Public Administration) (81)	1.4	1.5	1.3	1.4
Public Administration (91)	0.2	0.8	0.6	0.7

**Table 27 Distribution of Overall Effects Among Sectors of Increased Manufacturing**

Impact on Sectors of Increased Manufacturing Production and Shipments				
Increase Manufacturing Exports by \$10 bn (at 2006 prices)	(per cent of All Industry GDP Impact)			
	2003	2004	2005	2006
Goods Producing	53.4	50.2	50.8	50.1
Agriculture, Fishing, Hunting & Forestry (11)	2.7	2.5	2.7	2.4
Mining, Utilities & Construction (21-23)	11.0	10.4	9.0	9.0
Manufacturing Total (31-33)	39.7	37.3	39.1	38.7
Service Producing Industries	46.6	49.8	49.2	49.9
Wholesale & Retail Trade	12.1	13.4	15.0	16.2
Transportation & Warehousing	4.8	4.9	5.2	5.2
Information & Culture Industries (51)	2.6	3.4	4.3	4.8
Finance, Insurance & Real Estate (52-53, 55)	10.3	8.1	5.7	4.8
Professional, Scientific & Technical Services (54)	4.5	4.2	3.7	3.4
Administrative & Support, Waste Management & Remediation (56)	2.2	2.2	2.2	2.2
Educational Services (61)	1.9	2.6	3.0	3.2
Health Care & Social Assistance (62)	3.0	3.4	3.3	3.3
Arts, Entertainment & Recreation (71)	0.4	0.4	0.3	0.2
Accommodation & Food Services (72)	2.2	2.3	1.9	1.5
Other Services (excl. Public Administration) (81)	2.0	2.2	2.3	2.4
Public Administration (91)	0.5	2.6	2.4	2.8

**Table 28 Central Canadian Impacts in Canadian Context**

Significance of Central Canada to National Impacts								
	Ontario				Quebec			
	2003	2004	2005	2006	2003	2004	2005	2006
(Provincial % of Canada Impacts)								
GDP \$1997 Mns								
Total	45.9	44.6	45.0	45.1	23.6	23.4	23.6	23.4
Goods	46.0	46.3	47.5	47.6	24.4	24.1	24.2	23.8
Manufacturing	52.4	53.0	53.9	53.5	26.7	25.8	25.5	25.1
Other Goods	27.4	27.2	26.1	28.0	17.6	19.1	19.7	19.2
Services	45.8	42.8	42.4	42.6	22.7	22.7	22.9	23.0
Employment (000s)								
Total	46.9	44.6	45.2	45.5	26.4	24.9	24.9	24.9
Goods	47.0	48.8	50.0	50.0	24.1	23.8	23.9	23.4
Manufacturing	50.5	52.3	53.7	53.4	25.2	24.7	24.5	24.2
Other Goods	31.5	31.9	29.9	31.8	19.3	19.6	20.6	19.0
Services	46.8	38.4	38.4	38.7	29.7	26.5	26.4	27.1

**Table 29 Sector Effects in Central Canada**

Impact on Central Canadian Provinces of Increased Manufacturing								
	Ontario				Quebec			
	2003	2004	2005	2006	2003	2004	2005	2006
(per cent impact)								
GDP \$1997 Mns								
Total	2.0	1.8	1.5	1.5	1.9	1.8	1.5	1.5
Goods	3.5	3.1	2.7	2.8	3.3	2.8	2.5	2.5
Manufacturing	4.2	3.7	3.4	3.5	4.0	3.5	3.2	3.2
Other Goods	1.7	1.5	1.1	1.2	1.8	1.6	1.3	1.3
Services	1.3	1.2	1.0	1.0	1.3	1.3	1.1	1.1
Employment (000s)								
Total	0.7	1.2	1.1	1.0	0.7	1.1	1.0	1.0
Goods	1.7	3.0	2.7	2.8	1.6	2.6	2.3	2.3
Manufacturing	2.2	4.0	3.8	3.9	1.9	3.3	3.0	3.1
Other Goods	0.6	1.0	0.7	0.7	0.7	1.2	0.9	0.8
Services	0.4	0.6	0.5	0.5	0.4	0.6	0.6	0.6

**Table 30**

Sector Significance of Impacts to Each Central Canadian Province

	Ontario				Quebec			
	2003	2004	2005	2006	2003	2004	2005	2006
	(Sector % of Total Provincial GDP & Employment)							
GDP \$1997 Mns								
Total								
Goods	53.5	52.2	53.6	52.9	55.2	51.8	52.1	50.9
Manufacturing	45.3	44.3	46.8	45.8	44.9	41.2	42.4	41.5
Other Goods	8.2	7.9	6.8	7.1	10.3	10.6	9.7	9.4
Services	46.5	47.8	46.4	47.1	44.8	48.2	47.9	49.1
Employment (000s)								
Total								
Goods	60.0	65.3	64.6	65.7	54.8	57.1	55.9	56.1
Manufacturing	52.6	58.0	58.6	59.2	46.7	49.1	48.3	49.0
Other Goods	7.4	7.3	6.0	6.5	8.1	8.0	7.5	7.1
Services	40.0	34.7	35.4	34.4	45.1	42.9	44.1	43.9

## Appendix D – Impact of One (US) Cent Appreciation

Table 31 Exchange Rate Appreciation: Macro Impacts

Macro Impacts of Exchange Rate Appreciation (1 US cent)				
	2003	2004	2005	2006
		% Impact		
Exchange Rate (\$Can per \$U.S.)	-1.40	-1.30	-1.21	-1.13
Exchange Rate (cents U.S. per \$Can)	1.42	1.32	1.23	1.14
GDP at Basic Prices (\$97 Mns)	-0.2	-0.3	-0.3	-0.4
Memo: Domestic Final Demand	0.2	0.1	0.0	0.0
Exports	-0.4	-0.5	-0.5	-0.5
Imports	0.4	0.4	0.4	0.3
Disposable Personal Income (\$1997 Mns)	0.2	0.0	-0.1	-0.2
Investment Effort (% of GDP \$C) (a)	0.0	0.0	0.0	0.0
GDP Deflator (Chained, 1997=1)	-0.2	-0.2	-0.3	-0.3
Consumer Price Index (1992=100)	-0.4	-0.4	-0.4	-0.4
Import Price Deflator (Chained, 1997=1)	-1.2	-1.1	-1.1	-1.0
Wage & Salary Rate (\$000 nominal per employee)	-0.1	-0.3	-0.4	-0.5
Pre-tax Corporate Profits (\$Mns Nominal)	-2.1	-1.1	-1.0	-0.5
All-Government Balance/Net Lending (a)	-594	-1028	-1279	-1543
Unemployment Rate (%) (a)	0.0	0.0	0.1	0.1
Government of Canada Bonds (10+ years) (a)	0.0	0.0	0.0	0.0
10+ Years Canada Bonds (real) (a)	0.1	0.1	0.1	0.1

(a) Level Impact

**Table 32 Exchange Rate Appreciation: Sector Impacts**

Sector Impacts of Exchange Rate Appreciation (1 US cent)				
	2003	2004	2005	2006
		% Impact		
GDP at Basic Prices (\$97 Mns)	-0.2	-0.3	-0.3	-0.4
Goods	-0.3	-0.5	-0.5	-0.6
Manufacturing Total (31-33)	-0.5	-0.7	-0.8	-0.9
Services	-0.1	-0.2	-0.2	-0.3
Employment Total	0.0	-0.1	-0.2	-0.2
Goods	-0.1	-0.3	-0.4	-0.5
Manufacturing Total (31-33)	-0.3	-0.6	-0.7	-0.8
Services	0.0	-0.1	-0.1	-0.1
		(000s)		
Employment Total	-8	-21	-26	-30
Goods	-5	-14	-17	-19
Manufacturing Total (31-33)	-6	-13	-16	-18
Services	-2	-7	-9	-11

**Table 33 Exchange Rate Appreciation: Provincial Impacts**

Provincial Impacts of Exchange Rate Appreciation (1 US cent)				
	2003	2004	2005	2006
		% Impact		
Canada	-0.2	-0.3	-0.3	-0.4
Newfoundland	-0.1	-0.2	-0.2	-0.2
Prince Edward Island	-0.2	-0.2	-0.3	-0.3
Nova Scotia	-0.1	-0.2	-0.2	-0.2
New Brunswick	-0.1	-0.2	-0.3	-0.3
Quebec	-0.2	-0.3	-0.4	-0.4
Ontario	-0.2	-0.3	-0.4	-0.4
Manitoba	-0.1	-0.2	-0.2	-0.3
Saskatchewan	-0.1	-0.2	-0.2	-0.2
Alberta	-0.1	-0.2	-0.2	-0.3
British Columbia	-0.1	-0.2	-0.3	-0.3
Territories	-0.3	-0.3	-0.3	-0.3

## Appendix E – Change in Manufacturing Employment Detailed for 1988-2006

**Table 34 Manufacturing Industries: Employment and Sources of Change, 1988-2006**

Decomposition of Employment Change  
(average % change)

	1988 thorough 2006			
	ET	+DD	-PROD	+FOR
Food (311)	0.7	2.1	1.5	0.1
Beverage & Tobacco Products (312)	-2.2	0.9	2.3	-0.8
<i>Textile Mills and Products (313-314)</i>	-3.3	2.0	6.2	0.9
<b>Clothing &amp; leather (315-316)</b>	-3.6	2.1	3.4	-2.3
Wood (321)	1.7	2.3	0.4	-0.2
Paper (322)	-1.4	2.2	2.6	-1.0
Printing & Related Support Activities (323)	0.1	2.6	2.6	0.1
Petroleum & Coal Products (324)	-2.0	2.1	4.1	0.1
<i>Chemical (325)</i>	0.0	2.7	2.1	-0.6
<i>Plastics &amp; Rubber Products (326)</i>	1.8	2.9	1.0	-0.1
Non-metallic Mineral Products (327)	0.3	2.2	1.9	0.0
<i>Primary Metal (331)</i>	-1.6	2.5	3.6	-0.5
<i>Fabricated Metal Product (332)</i>	0.7	2.7	1.2	-0.8
<b>Machinery (333)</b>	1.3	3.1	1.1	-0.7
<b>Computer &amp; Electronic Product (334)</b>	0.2	7.4	5.3	-1.9
<b>Electrical Equipment, Appliances &amp; Components (335)</b>	-2.3	3.0	3.4	-1.9
<b>Transportation Equipment (336)</b>	1.3	3.4	2.7	0.6
Furniture & Related Product (337)	1.1	3.7	3.1	0.5
<b>Miscellaneous (339)</b>	2.1	3.4	-1.6	-2.9
<i>Manufacturing (31-33)</i>	0.2	3.1	2.4	-0.5

% changes to:

ET Employment

DD Domestic +Intermediate Industry Demand

PROD Gross Output (GO) per Employee

FOR Foreign Trade & Residual