The Paradox of Market-Oriented Public Policy and Poor Productivity Growth in Canada

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Introduction

In recent decades, governments in Canada have pursued market-oriented policies at both the macro and micro levels. Economists believe that such policies should foster productivity growth. Since 2000, however, productivity growth in Canada has been dismal, much below that in the United States and below Canada's historical trend. The objective of this paper is to attempt to explain the paradox of productivity-enhancing public policies and the continuation of poor productivity performance. In other words, why has there been no apparent productivity payoff from market-oriented policy?

The paper is divided into three sections. The first highlights the market-oriented public policies that have been pursued in Canada in recent decades and examines trends in composite measures of economic orientation or freedom in Canada. The second surveys productivity developments in Canada, particularly since 2000. It presents new findings on the role of within-sector effects and reallocation effects on productivity. The third section reviews evidence related to the effect of market reforms on productivity and attempts to explain why these policies appear to have had a limited effect, at least at the aggregate level, on Canada's productivity performance.

The Market-Orientation Directions of Canadian Economic Policy

In recent decades, Canadian public policy—and economic policy in particular—has become more market oriented, from both a macro- and microeconomic policy perspective. The objective of this section is to briefly document this trend. A number of specific policies, often known as structural or economic reforms, which can be considered market oriented, are first identified. Trends in summary indicators of market freedom in Canada are then examined.

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Specific market-oriented policies

In recent decades, Canada has adopted macroeconomic policies that can be considered market oriented. A number of them are highlighted below.

- The adoption by the Bank of Canada and Finance Canada of inflation targeting in 1991.
- The adoption by the federal government of a zero-deficit philosophy and policy in the mid-1990s.
- The establishment in 2004 by the federal government of a debt-to-GDP ratio target of 25 per cent of GDP, to be achieved within 10 years.
- Ongoing reviews of federal government program spending, with a policy to restrain the growth of program spending, on average, to below the rate of nominal growth of the economy.

Microeconomic policies include the following:

- The implementation of the Canada-U.S. Free Trade Agreement in 1989 and the North American Free Trade Agreement in 1994.
- The abolition of the Foreign Investment Review Agency in the mid-1980s and its replacement by the more investor-friendly Investment Canada (later merged into Industry Canada).
- The privatization in the 1980s and 1990s by the federal government of many Crown corporations, including CN, Petro-Canada, Nav Canada, Air Canada, Telesat, De Havilland, and Canadair. Provincial governments also privatized many Crown corporations.[1]
- The deregulation of a number of sectors, including air transport, electricity, road transport, and telecommunications.
- The adoption in 1991 of the Goods and Services Tax (GST) as a replacement for the Manufacturers' Sales Tax.
- Reductions in the statutory federal corporate tax rate from 37.8 per cent in 1980 to 19.5 per cent in 2008.
- Elimination of many direct business subsidies.
- Significant reductions in the relative importance of R&D performed by government.
- Efforts to eliminate interprovincial barriers to the movement of goods and people.
- A labour-law regime that is not particularly favourable to unionization in emerging sectors, resulting in a significant decline in private sector union density.

1. For a comprehensive list of privatizations by both the federal and provincial governments, see Levac and Wooldridge (1997).

Summary measures of market orientation

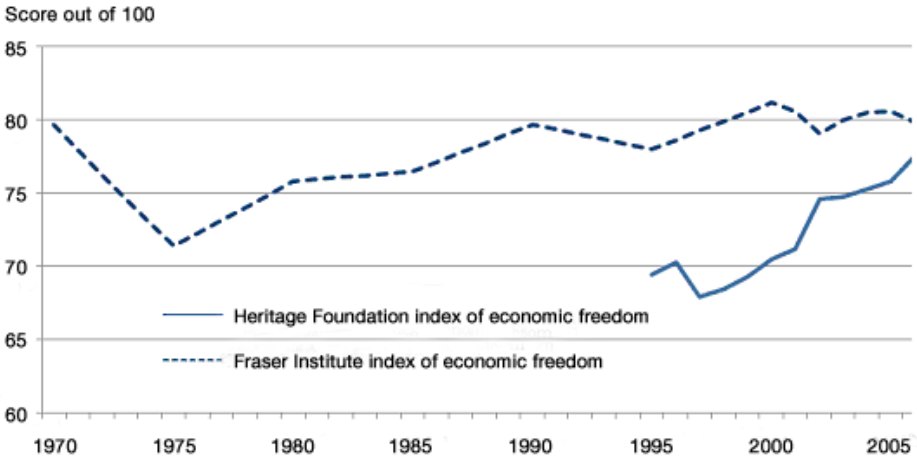
Economic freedom indexes

Trends in the market friendliness of economic policy in Canada and comparisons of the extent of market orientation in Canada with that in other countries can be obtained from reports on indexes of economic freedom. The best known is the report *Economic Freedom of the World*, produced by the Fraser Institute. The most recent edition, authored by James Gwartney and Robert Lawson (2008) and released in October 2008, covers 146 countries for the 1970–2006 period. A second report, titled *Index of Economic Freedom*, authored by Kim Holmes, Edwin Feulner, and Mary O'Grady (2008), is produced by the Heritage Foundation. The most recent edition was published in 2008 and covers 157 countries for the 1995–2008 period.

Both indexes show an increase in the market orientation of Canadian economic policy over time (Chart 1). The index of economic freedom published by the Fraser Institute shows that Canada rose from 7.58 out of 10 in 1980 to 7.98 in 2006 (8.06 in 2005), an increase of 5.3 per cent (Gwartney and Lawson 2008; Table 1b of this paper). The index of economic freedom published by the Heritage Foundation rose in Canada from 69.4 out of 100 in 1995 to 80.2 in 2008, a 15.4 per cent increase (Holmes, Feulner, and O'Grady 2008; Table 2a of this paper).

Chart 1

Ranking of Canada on composite indexes of market orientation and economic outcomes, 30 OECD countries



Notes: Fraser Institute index of economic freedom estimated by CSLS using a constant growth rate in between years for which official estimates were available, 1970, 1975, 1980, 1985, 1990, 1995, and 2000–06. The Fraser Institute index is on a scale of 10. It has been rescaled to 100 for presentation.

Sources: Fraser Institute, *Economic Freedom of the World*, 2008 data set, and *Index of Economic Freedom*, Heritage Foundation and the *Wall Street Journal*

Almost all components of the two indexes manifested a trend towards greater economic freedom, that is, more market orientation. The Fraser Institute index consists of five components or subindexes, of which four exhibited an upward trend over the 1980–2006

period (Gwartney and Lawson 2008; Table 1a of this paper). The index of size of government rose 41.3 per cent from 4.87 to 6.88 between 1980 and 2006;[2] the index for the legal system and property rights rose 0.8 per cent from 8.46 to 8.53; the index for sound money increased 4.3 per cent from 9.20 to 9.60; and the index for regulation of labour, credit, and business increased 1.2 per cent from 7.65 to 7.74. Only the index for freedom to trade internationally fell, dropping 7.2 per cent from 7.69 to 7.14.[3]

The Heritage Foundation index consists of nine components or subindexes available for the 1995-2008 period, and six components exhibited an upward trend over the period (Holmes, Feulner, and O'Grady 2008; Table 2a of this paper). The index of government size increased 262.8 per cent from 14.8 to 53.7; the index of investment freedom rose 40.0 per cent from 50.0 to 70.0; the index of fiscal freedom advanced 17.6 per cent from 64.2 to 75.5; the index for trade freedom rose 15.7 per cent from 75.2 to 87.0; the index of financial freedom increased 14.3 per cent from 70.0 to 80.0; and the index for business freedom increased 13.8 per cent from 85.0 to 96.7. The index of property rights was unchanged at 90.0 throughout the period. Only the indexes of monetary freedom and freedom from corruption fell, the former 5.7 per cent from 85.9 to 81.0 and the latter 5.6 per cent from 90.0 to 85.0.[4]

According to these two indexes, Canada currently has one of the highest levels of economic freedom in the world. The Fraser Institute ranked Canada second out of 13 comparator countries (the G-7 plus Australia, Denmark, Finland, the Netherlands Sweden, and Switzerland) in 2006 for the chain-linked index of economic freedom (Table 1b). Only the United Kingdom ranked higher. On the same index, Canada ranked sixth out of 141 countries. The Heritage Foundation ranked Canada third out of the 13 comparator countries (behind Australia and the United States) and seventh out of 157 countries (Holmes, Feulner, and O'Grady 2008; Tables 2 and 2b of this paper).

OECD regulation indicators

The Organisation for Economic Co-operation and Development (OECD) has developed quantitative measures of the extent of different types of regulation for its member countries. The longest time series is available for the index of energy, transport, and communications regulation (ETCR), which runs from 1975 to 2003 for 21 OECD countries for seven sectors (telecoms, electricity, gas, post, rail, air passenger transport, and road freight) based on five criteria: public ownership, entry barriers, market structures, vertical

2. An increase in this subindex means that the size of government is decreasing, not increasing, as the Fraser Institute believes that an increased size of government, beyond a certain basic level, has a negative impact on economic freedom and the efficient operation of a market economy.

3. The surprising fall in this index, given the overall movement of the world towards freer trade, is due to increases in taxes on international trade, a decline in the size of the international trade sector relative to the expected size, and increasing international capital market controls.

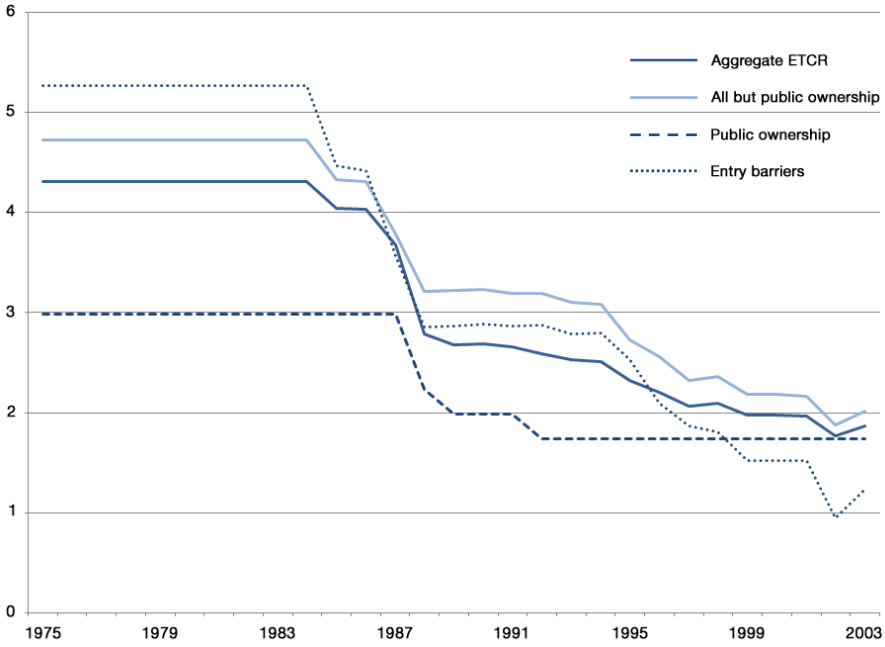
4. Monetary freedom combines a measure of price stability with an assessment of price controls. Both inflation and price controls distort market activity. Price stability without microeconomic intervention is the ideal state for the free market. Each one of the 10 freedoms is graded using a 0 to 100 scale, where 100 represents maximum freedom. The score for the monetary freedom index is based on two components: the weighted average inflation rate for the most recent three years and price controls. The weighted average inflation rate for the most recent three years serves as the primary input into an equation that generates the base score for monetary freedom. The extent of price controls is then assessed as a penalty of up to 20 percentage points subtracted from the base score. The 2008 report (Holmes, Feulner, and O'Grady 2008, 130) notes for Canada that "Inflation is low, averaging 2 percent between 2004 and 2006. Relatively stable prices explain most of the monetary freedom score. The market determines most prices, but the government regulates the prices of some utilities, provides subsidies to industry and agriculture producers, controls prices for some agricultural products, and may also influence prices through state-owned enterprises. An additional 10 percentage points is deducted from Canada's monetary freedom score to adjust for measures that distort domestic prices." Unfortunately, the breakdown of the split between inflation and price controls is not readily available for years prior to 2008.

integration, and pricing. The index is based on a 6-point scale, where 6 represents the most restrictive regulations and 0 represents no regulation.

The aggregate index for Canada fell significantly over time, from 4.4 in 1975 to 1.9 in 2003 (Chart 2 and Table 3a). During this period, barriers to entry fell most (from 5.3 in 1975 to 1.2 in 2003). The 2.5-point decrease in the aggregate index in Canada between 1975 and 2003 was the fifth smallest decline among the 21 countries. This is not particularly surprising, since most other countries had a higher level of the index in 1975 and thus had wider scope for improvement. In 2003, Canada's index was the seventh lowest, with lower values recorded by Germany (1.7), Denmark (1.6), the Netherlands (1.6), Australia (1.5), the United States (1.4), and the United Kingdom (1.0) (Table 3).

Chart 2

Indicators of regulation in energy, transport, and communications, Canada, 1975–2003



Source: Originally from P. Conway and G. Nicoletti (2006; Table 3a of this paper)

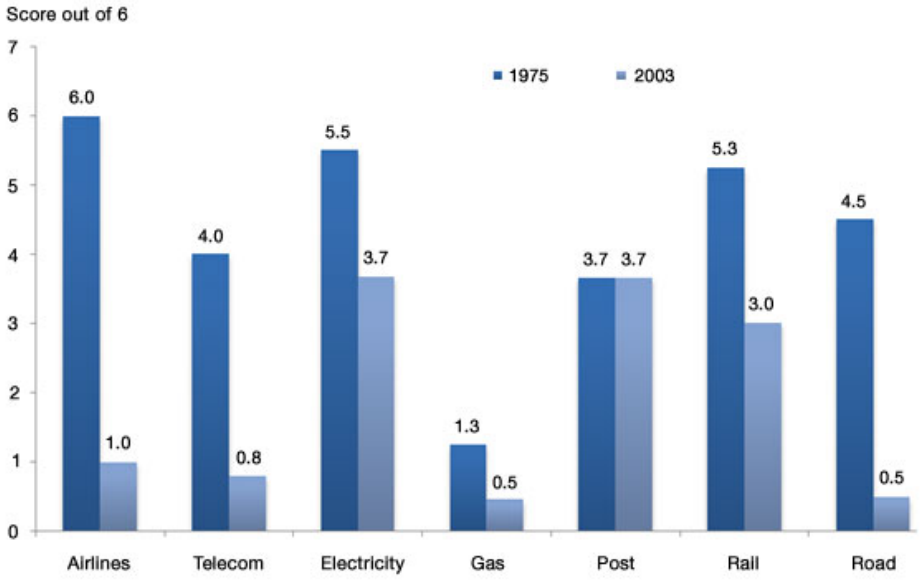
In terms of the seven sectors covered, the movement in Canada to less restrictive regulation was greatest in airlines (Chart 3 and Table 3b), falling 5.0 points from 6.0 in 1975 to 1.0 in 2003, followed by road transport (4.0 points from 4.5 to 0.5), telecom (3.2 points from 4.0 to 0.8), rail (2.3 points from 5.3 to 3.0), electricity (1.8 points from 5.5 to 3.7), and gas (0.8 points from 1.3 to 0.5). There was no change in post, with an index of 3.7 throughout the period.

The OECD also produces an index of product market regulation that covers a larger number of sectors than the ETCR index. Unfortunately, it is only available for two years, 1998 and 2003. Chart 4 shows that all three measures of regulation produced by the OECD have fallen over the 1998–2003 period. Product market regulation fell from 13.9 per cent from 1.37 to 1.18, administrative regulation fell 31.0 per cent from 1.13 to 0.78, and

economic regulation fell 7.2 per cent from 1.53 to 1.42. Since the index is calibrated to a 6-point scale from 0 (least restrictive) to 6 (most restrictive), the absolute extent of the three types of regulation in Canada is low in absolute terms.

Chart 3

Market regulation, Canada, 1975 and 2003



Source: Originally from P. Conway and G. Nicoletti (2006; Table 3b of this paper)

The product market regulation index is composed of three components, all of which fell between 1998 and 2003 (Sharpe and Banerjee 2008, based on Conway, Janod, and Nicoletti 2005). Barriers to entrepreneurship fell 0.2 points from 1.0 to 0.8, barriers to trade and investment fell 0.2 points from 1.3 to 1.1, and state control fell 0.2 points from 1.8 to 1.7.

Recent Productivity Developments in Canada[5]

Productivity is by far the most important driver of living standards for Canadians. This is because real income can only increase in the long run if more real output is produced.[6] While increased productivity growth is generally associated with higher wages, it also brings to life a new world of possibilities for Canadians. Higher productivity means that Canadians will be able to meet the fiscal pressures associated with an aging population. It means the possibility of better health-care funding. It means that workers will have the option of benefiting from increased leisure. In short, productivity growth is vital to the

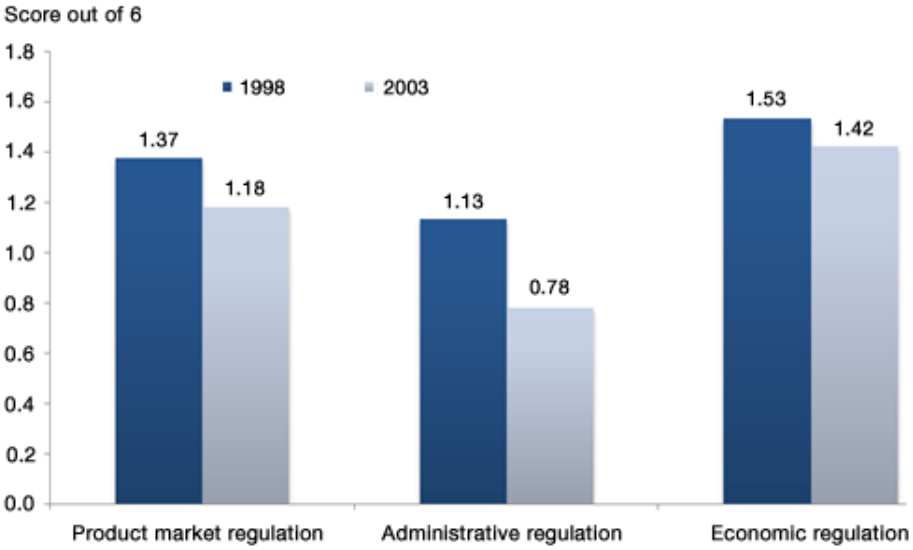
5. This section draws on Arsenault and Sharpe (2008).

6. Terms of trade can also lead to an increase in real incomes, as has been the case in Canada in recent years, owing in large part to the sharp increase in commodity prices (Macdonald 2007). Yet, given the uncertain outlook for commodity prices, the future contribution of terms of trade to income in Canada is not obvious and, unlike productivity gains, terms of trade have the potential to contribute negatively to real income.

economic success of Canadians.[7] From this perspective, therefore, Canada's weak productivity performance since 2000 represents a massive shortfall.[8]

Chart 4

Product market regulation in non-manufacturing sectors in OECD countries, 1998 and 2003



Source: OECD

To assess the importance of market-oriented policies for productivity growth, it is necessary to have an understanding of the trends in productivity growth and the factors behind these trends. Such knowledge provides the context for discussion of the impact on productivity growth of movement towards greater market orientation of economic policy.

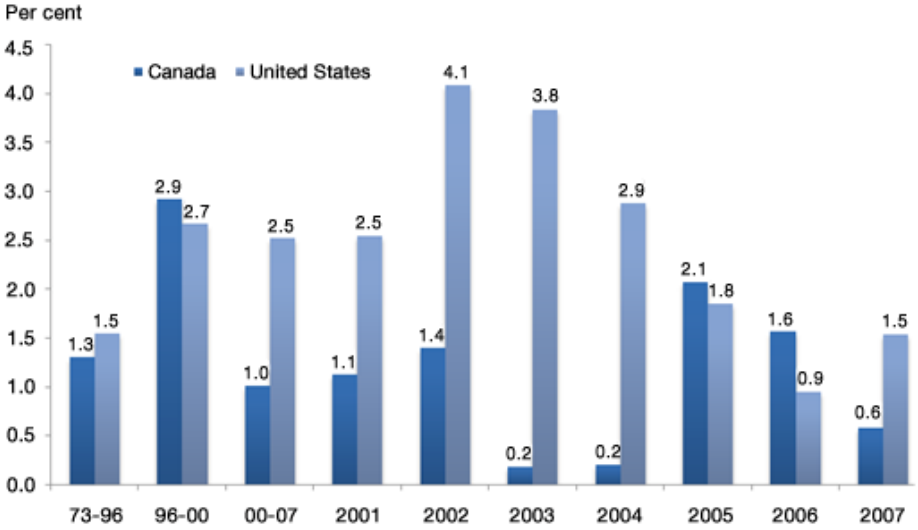
Labour productivity trends

Business sector real output per hour, which is the official measure of labour productivity produced by both Statistics Canada and the U.S. Bureau of Labor Statistics, grew, on average, 1.0 per cent in Canada over the 2000–07 period (Chart 5).[9] Canada's performance stands in stark contrast to that of the United States, which recorded labour productivity growth of 2.5 per cent per year over the period.

7. See Sharpe (2007a) for a discussion of the importance of productivity.
8. See Arsenault and Sharpe (2008, 15–17) for a discussion of what the Canadian economic landscape would have been in 2007 under two alternative scenarios of productivity growth relative to actual developments. In the first scenario, it is assumed that labour productivity since 2000 grows at the same rate as that experienced in the United States over the 2000–07 period. The second scenario assumes that labour productivity grew at the historical trend established over the 1973–2000 period in Canada. The impacts on GDP, annual hours worked, GDP per capita, and GDP per hour are provided.
9. Aggregate labour productivity can be measured at the total economy and business sector levels. Each measure has strengths and weaknesses. Indeed, the business sector measure suffers from less severe measurement issues than the total economy measure, since it excludes industries such as education and health, where output is generally not marketed. On the other hand, total economy measures are consistent with GDP per capita and are advantageous for international comparability since, unlike the business sector measures, the definition of what industries are included in the total economy does not differ across countries. See Smith (2004) for a detailed discussion of issues related to the appropriate measurement of aggregate labour productivity.

Chart 5

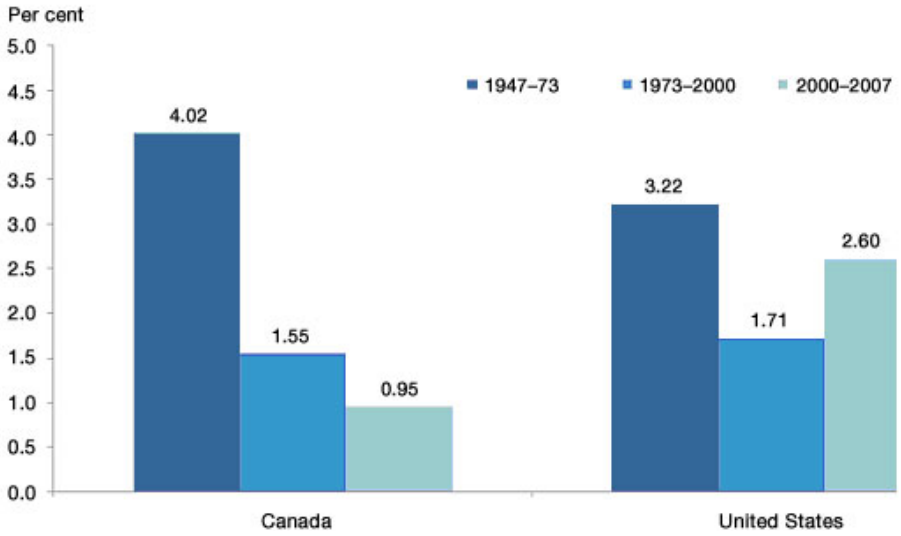
Real output per hour growth, business sector, Canada and the United States, average annual rates, percentage, 1973–2007



Source: CSLS Canada-U.S. productivity database; <www.csls.ca>

Chart 6

Real output per hour growth, business sector, Canada and the United States, average annual rates, percentage, 1947–2007



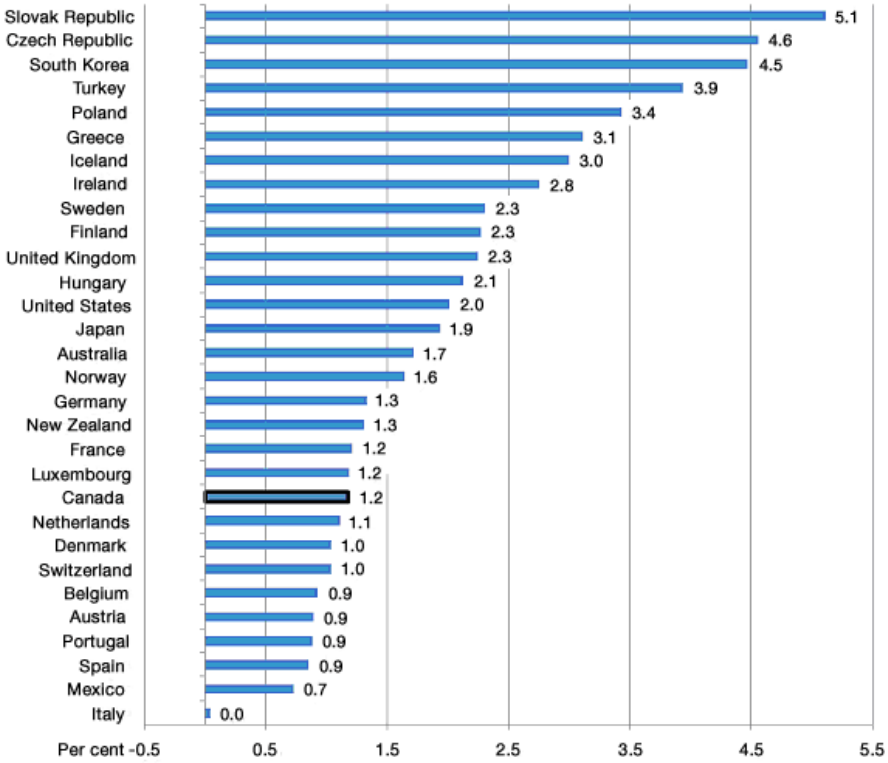
Sources: GDP in chained dollars and total hours worked from the Productivity and Costs program of the Bureau of Labor Statistics for the United States, and annual averages of quarterly estimates from the productivity program database of Statistics Canada for Canada

Canada's post-2000 productivity performance has been weak by historical standards. It was significantly weaker than between 1996 and 2000 (2.9 per cent). Labour produc-

tivity growth was also below the annual average growth of 1.5 per cent recorded between 1973 and 2000 and below the 4.0 per cent per year recorded during the golden era of 1947–73 (Chart 6). Canada's post-2000 productivity performance was weak, not only relative to the United States and to earlier periods, but also relative to other OECD countries. Indeed, the Conference Board/GGDC (Groningen Growth and Development Centre) total economy database places Canada 21 out of 30 OECD countries in terms of labour productivity growth over the 2000–07 period (Chart 7) and 27 in the 1973–2000 period.

Chart 7

Growth of GDP per hour worked in OECD countries, 2000–07 (compound annual rate of growth)



Source: Groningen Growth and Development Centre: <www.ggdc.net>

Labour productivity growth is determined as the difference between real output growth and labour input growth. Trends in output growth in the business sector in Canada and the United States have been almost identical since 2000, with annual output growth averaging 2.5 and 2.6 per cent, respectively. In both countries, average annual output growth between 2000 and 2007 was only about half that of the 1996–2000 period and was slightly below that of the 1973–96 period.

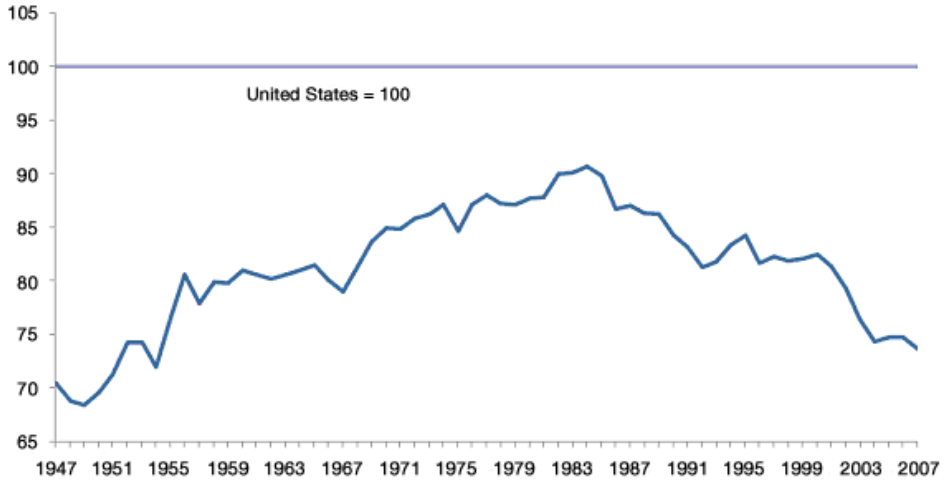
Business sector total hours worked in Canada increased at an average annual rate of 1.5 per cent between 2000 and 2007, identical to the trend observed between 1973 and 2000. In contrast, in the United States, business sector hours worked did not grow, on average, over the 2000–07 period, largely reflecting the sharp recession of the early 2000s south of the border. With output growing at a similar pace in both countries, it was

the large difference in labour input growth since 2000 that led to a divergence in labour productivity growth between Canada and the United States.

While Canada's trend productivity growth rate seems to have declined in recent years, its closest neighbour appears to have shifted to higher trend productivity growth.[10] The strong performance during the 1996–2000 period suggested that Canada might follow the path opened by the United States and experience a revival of its labour productivity growth (Chart 6). This, however, did not materialize, and the dichotomy in the labour productivity performance of Canada and the United States, particularly since 2000, led to a further widening of the Canada-U.S. productivity gap. In 2007, Canada's business sector output per hour stood at only 73.6 per cent of the U.S. level, down from 82.5 per cent in 2000 (Chart 8).

Chart 8

Real output per hour worked, business sector, Canada as a percentage of the U.S. level, 1947–2007



Sources: CSLS Aggregate Income and Productivity Database <http://www.csls.ca/data/ipt1.asp>, Table 7a

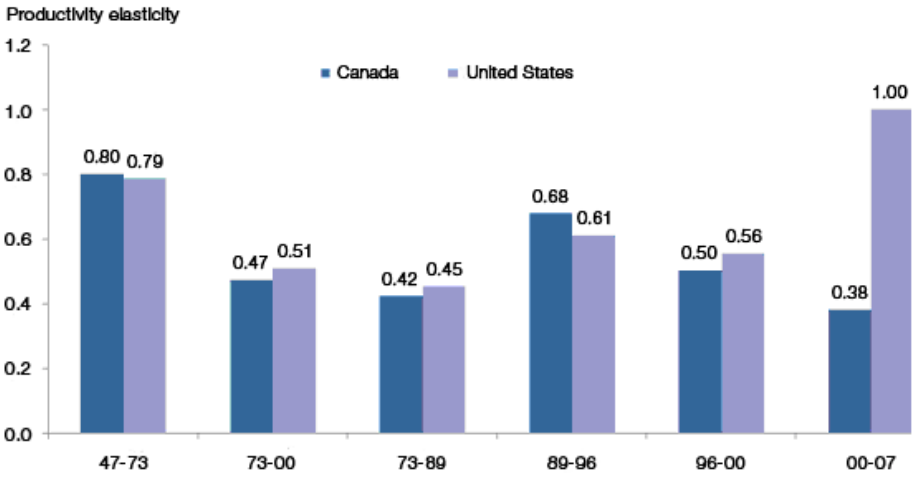
Diverging productivity trends in Canada and the United States are even more puzzling, given the similarity of trends in output growth. This is probably best exemplified by the behaviour of productivity elasticity, that is, the proportion of output growth arising from productivity growth. Productivity elasticities in Canada and the United States have closely tracked each other in the two long-term periods of 1947–73 and 1973–2000, as well as for the three recent subperiods of 1973–89, 1989–96, and 1996–2000 (Chart 9). Since 2000, however, Canada's productivity elasticity has been relatively low, with only 38 per cent of output growth explained by increased labour productivity, slightly below levels of earlier periods. In contrast, the productivity elasticity in the United States was unity, much higher than historical levels. The gap in labour productivity growth rates is thus not only the

10. Skoczylas and Tissot (2005) identify time breaks in productivity growth in OECD countries. Using capacity utilization rates in the manufacturing sector as a proxy to remove cyclicality in business sector productivity, they found that while the United States trend productivity growth increased to 3.00 per cent in the late 1990s (from its 1.25 per cent trend started in the mid-1970s), Canada's trend productivity growth remained at 1.25 per cent, a trend observed since the mid-1970s. Using an HP filter to remove cyclicality gave slightly different results for Canada, with trend productivity growth increasing to 2 per cent in the late 1990s but falling sharply to naught in the early 2000s.

result of unusual developments in Canada, as evidenced by the decline in productivity elasticity and below-average productivity growth since 2000, but also largely a consequence of the atypical behaviour of the U.S. economy, as evidenced by its high productivity elasticity since 2000.

Chart 9

Productivity elasticity, business sector, Canada and the United States, 1947–2007



Sources: GDP in chained dollars and total hours worked from the Productivity and Costs program of the Bureau of Labor Statistics for the United States, and annual averages of quarterly estimates from the productivity program database of Statistics Canada for Canada

Examination of factors explaining weak productivity growth in Canada since 2000

There exists no consensus on the reasons for the weak productivity performance of the Canadian economy since 2000. While many studies have attempted to identify the effect on productivity in Canada of a host of microeconomic and macroeconomic factors, far fewer studies have focused specifically on the recent productivity performance of Canada.[11] In this section, we provide a growth-accounting decomposition of labour productivity growth in Canada in the 1973–2000 and 2000–07 periods.[12] We also provide a detailed analysis of the role of sector shifts on aggregate productivity growth. The following analysis assumes that future statistical revisions will not significantly alter the current productivity estimates. This is an important caveat, since revisions can significantly alter productivity growth, as was the case in the late 1990s.[13]

11. See Dion and Fay (2008) for a review of the recent technical literature on productivity with a focus on Canada. Articles discussing potential reasons for the post-2000 productivity weakness in Canada include Rao, Sharpe, and Smith (2005), Gomez (2005), Dion (2007), Cross (2007), and Arsenault and Sharpe (2008).

12. The 1973–2000 period is used as a historical benchmark, since it is cyclically neutral: initial and end years both were cyclical peaks. It appears that 2007 will be a cyclical output peak so that the 2000–07 period is also cyclically neutral.

13, In Canada, for example, it was estimated that over the 1997–2000 period, the average annual revision was an additional 1.8 points per year between initial and final labour productivity growth estimates (Kaci and Maynard 2005). In the United States, labour productivity growth for the same three years was revised downward by an average of 0.4 percentage points per year between initial and final estimates. In other words, while the initial statistics suggested a large Canada-U.S. labour productivity growth gap in the late 1990s, the final estimates instead showed that labour productivity growth was actually faster in Canada (Chart 5). The magnitude of the Canadian revisions, however, was in large part due to one-time events: the capitalization of software expenditures and the introduction of new surveys.

Proximate sources of weak labour productivity growth

A first step in the identification of the proximate causes of Canada's dismal productivity performance since 2000 is to decompose productivity growth into its main components. Such an exercise provides important insights into the factors affecting labour productivity. Using the neoclassical growth-accounting framework and official estimates from Statistics Canada, we decomposed Canada's business sector labour productivity growth into its main accounting components (Summary Table 1). The key findings are as follows:

- Labour productivity growth between 1973 and 2000 averaged 1.66 per cent per year. The contribution of labour composition, or labour quality, was 0.36 points. The contribution of capital services intensity, which includes both capital stock and capital composition, was 1.15 points. Multifactor productivity (MFP) growth contributed only 0.15 points.

- Over the 2000–07 period, labour productivity growth was 1.06 per cent, down by 0.60 percentage points compared to 1973–2000.

- Growth in labour composition decreased, with its contribution to labour productivity falling slightly by 0.05 percentage points per year (from 0.36 to 0.31 points) between periods. More importantly, both capital services intensity growth and MFP growth decreased, and their contribution to productivity growth fell by 0.14 and 0.41 percentage points, respectively, when compared to the 1973–2000 period.

- The decrease in capital services intensity growth was due almost exclusively to slower capital composition growth. Indeed, the shift towards Information and Communications Technology (ICT) capital has slowed markedly since 2000, driving the slowdown in the contribution of capital composition.

- Weak growth in capital services intensity in Canada since 2000, when compared with the 1973–2000 period, is somewhat puzzling, since the ratio of the price of capital to labour fell, on average, 3.0 per cent per year between 2000 and 2007. In comparison, the ratio of the price of capital goods to labour decreased only 2.0 per cent per year between 1973 and 2000.

- This growth-accounting exercise suggests that the lacklustre productivity performance of Canada since 2000 relative to the 1973–2000 period cannot be attributed to a single factor, but rather is the result of slower growth in both capital services intensity and MFP, with the latter accounting for the lion's share of the decline.

The decomposition of aggregate labour productivity growth in Canada into within-sector and reallocation effects, 1961–2007

Aggregate labour productivity growth is determined by both productivity growth within a sector and the reallocation of the share of hours worked between sectors. An understanding of the dynamics of this growth requires insight into the contributions of these two effects. This section of the paper provides an analysis of the absolute and relative importance of these two effects in Canada for the 1961–2007 period and various subperiods by sector.

Summary Table 1

Sources of labour productivity growth in the Canadian business sector, 1973–2000 and 2000–07

	1973–2000	2000–07	Post-2000 change
	A	B	B – A
Average annual rate of growth			
Output	3.35	2.59	–0.76
Total hours	1.66	1.51	–0.15
Labour composition	0.60	0.54	–0.06
Capital services	4.65	3.90	–0.75
Capital stock	2.86	2.49	–0.36
Capital composition	1.75	1.35	–0.39
ITC capital services	19.56	10.17	–9.38
Non-ICT capital services	3.54	3.24	–0.31
Capital services intensity	2.94	2.35	–0.59
ICT capital services intensity	17.60	8.53	–9.08
Non-ICT capital services intensity	1.85	1.70	–0.16
Average annual percentage point contributions to labour productivity growth			
Labour productivity	1.66	1.06	–0.60
Labour composition	0.36	0.31	–0.05
Capital services intensity	1.15	1.01	–0.14
Capital stock intensity	0.70	0.68	–0.02
Capital composition intensity	0.43	0.32	–0.11
ICT capital services intensity	0.46	0.34	–0.13
Non-ICT capital services intensity	0.67	0.66	–0.01
Multifactor productivity (MFP)	0.15	–0.26	–0.41
Average annual percentage contributions to labour productivity growth			
Labour productivity	100.0	100.0	100.0
Labour composition	21.7	29.6	7.8
Capital services intensity	68.9	95.2	22.8
Capital stock intensity	42.2	64.3	3.5
Capital composition intensity	25.9	30.3	18.2
ICT capital services intensity	27.8	31.7	20.9
Non-ICT capital services intensity	40.5	62.5	1.8
Multifactor productivity (MFP)	8.9	–24.5	67.5

Sources: CSLS calculations based on the Canadian productivity accounts from Statistics Canada, CANSIM table 383-0021

The analytical framework[14]

To begin, we note that at any given point in time,

$$P \equiv \frac{Q}{H} = \frac{\sum Q_i}{H} = \frac{\sum H_i P_i}{H} = \sum P_i\, h_i, \tag{1}$$

where

$P =$ Aggregate labour productivity level

$P_i =$ Labour productivity level in sector i

$H =$ Aggregate hours worked

$H_i =$ Hours worked in sector i

$h_i =$ Share of hours worked in sector i

$Q =$ Aggregate real output

$Q_i =$ Real output of sector i

Equation (1) says that aggregate labour productivity, *P,* is equal to the weighted average of labour productivity in each of the sectors that make up the economy. The weight for each sector is its share of the total number of hours worked in the economy.

Because we are interested in how shifts in hours worked across sectors affect aggregate labour productivity growth, we must move beyond a single point in time. Equation (2) expresses the absolute change in aggregate labour productivity from period 0 to period 1, $\Delta P = P^1 - P^0$, where superscripts denote the period.

$$\Delta P = \sum h_i^0 \Delta P_i + \sum P_i^0 \Delta h_i + \sum \Delta h_i \Delta P_i. \tag{2}$$

In equation (2), h_i^0 and P_i^0, respectively, are the share of total hours worked in sector *i* and the level of labour productivity in sector *i* in period 0, expressed in dollars.

To obtain economically meaningful sectoral contributions to aggregate productivity growth, we adjust the second term of equation (2) by subtracting the average level of labour productivity, $\bar{P}^0$, from the level of labour productivity in each sector in period 0, P_i^0. In the third term, we subtract the average change in labour productivity, $\Delta\bar{P}$, from the change in labour productivity in each sector, ΔP_i. The first adjustment ensures that an increase in the hours share in a sector with a below-average labour productivity level makes a negative contribution to aggregate labour productivity growth. The second adjustment also ensures that an increase in the hours share in a sector with below-average absolute growth in labour productivity makes a negative contribution to aggregate labour productivity growth. The result of these adjustments is equation (3):

$$\Delta P = \sum h_i^0 \Delta P_i + \sum \left(P_i^0 - \bar{P}^0\right) \Delta h_i + \sum \Delta h_i (\Delta P_i - \Delta\bar{P}). \tag{3}$$

We are able to subtract $\bar{P}^0$ and $\Delta\bar{P}$ from equation (2), because the terms $\Delta\bar{P}\Delta h_i$ and $\bar{P}^0 \Delta h_i$ each sum to zero across all sectors, since $\bar{P}^0$ and $\Delta\bar{P}$ are constant and all changes in hours share Δh_i sum to zero across sectors.

14. This section follows Sharpe (1990).

The three terms in equation (3) represent, respectively, the within-sector effect, the reallocation level effect, and the reallocation growth effect. The within-sector effect captures the change in labour productivity within a sector. The reallocation level effect indicates whether changes in hours share have favoured sectors with above- or below-average labour productivity levels. The reallocation growth effect is the sum of the product of the absolute change in the share of hours worked and the absolute change in the labour productivity level for each of the *i* sectors. It measures whether an economy is subject to a phenomenon akin to Baumol's cost disease, i.e., the tendency of labour to move towards sectors with relatively small absolute increases in labour productivity. A negative reallocation growth effect at the aggregate level means that labour is moving to sectors with relatively smaller absolute labour productivity increases.

There are some limitations to this analysis. First, the analysis assumes that differences in technological, institutional, and market structures across sectors lead to differences in average levels of labour productivity, even if marginal products are the same. It also assumes that when a sector loses or gains labour, the changes in output per hour are equal to the sector's average output per hour worked. Second, these results are sensitive to the level of disaggregation. For instance, we use 12 sectors. If, within a sector, resources shift from one subsector to another, and these subsectors have different levels of labour productivity, then the measured impact of the reallocation effect on aggregate labour productivity growth would be different.

The results

The CSLS has calculated the within-sector effect, the reallocation level effect, the reallocation growth effect (also known as the Baumol effect or the interaction effect), the total reallocation effect (the sum of the productivity level and growth effects), and the total sector contribution related to aggregate (business sector) labour productivity growth for 12 sectors for the 1961–2007 period and six cyclically neutral (peak-to-peak) subperiods (1961–73, 1973–2000, 1973–81, 1981–89, 1989–2000, and 2000–07).

Summary Table 2 provides estimates of the total contributions to aggregate labour productivity growth from these effects in both absolute and relative terms for the seven periods. Summary Table 3 provides a sectoral decomposition of these effects for the 2000–07 period. Tables 4 to 4g (from CSLS calculations based on Statistics Canada's Canadian productivity accounts KLEMS database) provide more detailed estimates of the sectoral contributions to aggregate labour productivity growth from the different effects for each of the seven periods. The focus of the discussion in this section will be on Summary Table 2 and Summary Table 3.

For the business sector as a whole, the average annual rate of labour productivity growth in the 2000–07 period was 1.10 per cent per year (Summary Table 2). As noted earlier, this is below the growth rate experienced in all earlier periods under analysis. Of this growth rate, 1.13 percentage points or 102.3 per cent was due to the within-sector effect, that is, productivity growth within the 12 sectors; 0.12 percentage points or 10.6 per cent was due to the reallocation level effect; and –0.14 percentage points or 12.8 per cent was due to the reallocation growth effect. The total reallocation effect is the sum of the reallocation level and growth effects and was –0.03 percentage points or –2.3 per cent.

Summary Table 2

Decomposition of aggregate labour productivity growth into within-sector and reallocation effects, 1961–2007

	Average annual growth rate	Contribution to labour productivity growth								Churn measure			
		Within-sector effect[1]		Reallocation level effect[2]		Reallocation growth effect[3]		Total reallocation effect		Share of hours worked		Reallocation level effect	
	Per cent	Points	Per cent	Points	Per cent	Points	Per cent	Points	Per cent	Total	Average annual	Total	Average annual
1961–2007	2.01	2.13	105.9	0.28	13.9	-0.40	-19.8	-0.12	-5.9	51.7	1.1	0.31	0.01
1961–73	3.44	3.08	89.7	0.48	14.1	-0.13	-3.8	0.35	10.3	17.6	1.5	0.66	0.05
1973–2000	1.62	1.83	113.0	0.06	3.8	-0.27	-16.7	-0.21	-13.0	32.0	1.2	0.21	0.01
1973–81	1.71	1.37	80.3	0.56	32.5	-0.22	-12.8	0.34	19.7	14.4	1.8	0.74	0.09
1981–89	1.31	1.53	117.1	-0.13	-10.0	-0.09	-7.1	-0.22	-17.2	7.8	1.0	0.25	0.03
1989–2000	1.79	2.03	113.3	-0.10	-5.6	-0.14	-7.7	-0.24	-13.3	13.2	1.2	0.31	0.03
2000–07	1.10	1.13	102.3	0.12	10.6	-0.14	-12.8	-0.03	-2.3	9.6	1.4	0.71	0.10

Notes: The aggregate is the business sector. The business sector covers the whole economy less public administration, non-profit institutions, and the rental value of owner-occupied dwellings. GDP for the business sector is calculated as the sum of the GDP of the constituent sectors.
Labour productivity is real GDP per hour worked. Real GDP is calculated from Statistics Canada, Canadian productivity accounts KLEMS Database, CANSIM Table 383-0021. Current-dollar GDP estimates for 2002 were extended forward to 2007 and backward to 1961, using the growth rates of the corresponding real GDP series from the same table.
The churn measure is the sum of the absolute values changes in share of total hours worked or the sum of the absolute values of the reallocation effect. The average annual churn is the total churn measure divided by the number of years in the period.

1. The contribution of labour productivity growth within the sector to aggregate labour productivity growth.
2. The contribution of changes in the share of hours worked between sectors to aggregate labour productivity growth.
3. The reallocation growth effect is the sum of the product of the absolute change in the share of hours worked and the absolute change in the labour productivity level for each of the *i* sectors. It measures whether an economy is subject to Baumol's cost disease, i.e., the tendency of factors of production to move into sectors with relatively small absolute increases in productivity.

Source: Tables 4 to 4f, from CSLS calculations based on Statistics Canada's Canadian productivity accounts KLEMS database

The total reallocation effect can be positive, that is, a boost or fillip to aggregate productivity growth (1961–73 and 1973–81) or negative, that is, a drag on productivity growth (1961–73, 1973–2000, 1981–89, 1989–2000, and 2000–07). Its importance relative to the aggregate labour productivity growth depends on the absolute size of the effect (in percentage points), as well as the absolute level of aggregate labour productivity growth (the greater the productivity growth, the smaller the relative importance and vice versa, *ceteris paribus*). The positive contribution of the total reallocation effect, in both absolute and relative terms, was greatest in positive terms in 1961–73 and 1973–81, and the negative contribution was largest in 1981–89 and 1989–2000.

Summary Table 3 provides the sectoral decomposition of the contributions of the reallocation effects to aggregate labour productivity growth in the 2000–07 period. There were offsetting developments within this period. In terms of the productivity level reallocation effect, there were significant positive effects experienced by the mining and oil and gas extraction sector (0.26 percentage points per year) and finance, insurance, real estate, and renting and leasing (0.08 points) because of the above-average labour productivity level and increasing hours share of these sectors. Significant negative-level reallocation effects occurred in manufacturing (–0.15 points) because of the sector's above-average productivity level and falling hours share and in other services (except public administration) (–0.09 points) because of this sector's below-average productivity level and increasing hours share.

In terms of the productivity growth reallocation effect, all sectors had minimal effects except mining and oil and gas extraction (–0.09 points), owing to the very large fall in labour productivity in this sector and the increase in the hours share.

Because of the small size of the sectoral productivity growth reallocation effects, the total reallocation effect was close to the productivity level reallocation effect for all sectors, except for mining and oil and gas extraction.

It is interesting to note that gross reallocation effects (sum of the absolute values of the sectoral productivity level effect), which we also call the churn measure, have been greater on an average annual basis in the most recent period (0.10) than in the six earlier periods (Summary Table 2).

Summary Table 3 provides estimates of the absolute and relative importance by sector of the within-sector effect and the total effect for the 2000–07 period. Given the 4.17 per cent average annual fall in output per hour in the mining and oil and gas extraction sector between 2000 and 2007 (see Table 4f), this sector's within-sector effect contributed –0.24 percentage points per year to aggregate labour productivity growth. The above-average productivity level of the sector, combined with the increased hours share, resulted in a 0.26 point productivity level effect. The below-average productivity growth of the sector, again combined with the rising hours share, resulted in a –0.09 point productivity growth reallocation effect for a total reallocation effect of 0.17 points. This offset much of the sector's large negative within-sector effect to result in a –0.06 point net contribution to aggregate productivity growth.

Summary Table 3

Decomposition of aggregate labour productivity growth by sector and within-sector and reallocation effects, 2000–07

	Within-sector effect	Reallocation effect			Total effect	Within-sector effect	Reallocation effect			Total effect
		Level	Growth	Total			Level	Growth	Total	
	(Percentage points)					(Per cent)				
Business sector	1.10	–	–	–	1.10	100.0	–	–	–	100.0
Agriculture, forestry, fisheries, and hunting	0.12	0.04	-0.02	0.02	0.14	10.5	3.66	-1.52	2.14	12.6
Mining and oil and gas extraction	-0.24	0.26	-0.09	0.17	-0.06	-21.4	24.03	-8.50	15.53	-5.9
Utilities	-0.01	0.02	0.00	0.02	0.01	-1.2	2.24	-0.14	2.10	0.9
Construction	0.11	-0.03	0.00	-0.03	0.08	9.8	-2.83	0.40	-2.44	7.4
Manufacturing	0.27	-0.15	-0.01	-0.16	0.11	24.4	-13.37	-1.12	-14.49	9.9
Wholesale trade	0.26	0.00	0.00	0.00	0.26	23.4	0.21	-0.37	-0.16	23.3
Retail trade	0.23	-0.01	0.00	-0.01	0.23	21.2	-0.73	0.08	-0.65	20.6
Transportation and warehousing	0.03	0.00	0.00	0.00	0.03	2.8	0.02	0.01	0.03	2.8
Information and cultural industry	0.14	-0.01	-0.01	-0.02	0.13	12.9	-0.89	-0.57	-1.46	11.4
FIRE (finance, insurance, and real estate)	0.11	0.08	0.00	0.08	0.19	9.6	7.36	0.19	7.54	17.1
Professional, scientific, and tech. services	0.03	-0.01	0.00	-0.02	0.01	2.3	-1.27	-0.38	-1.65	0.6
Other services (except public administration)	0.09	-0.09	-0.01	-0.10	-0.01	8.1	-7.87	-0.90	-8.77	-0.7

Source: CSLS calculation based on data from Statistics Canada. See Table 4f for more details.

Three sectors made large within-sector contributions to aggregate labour productivity growth in the 2000–07 period: manufacturing (0.27 points), wholesale trade (0.26 points), and retail trade (0.23 points). The absolute increases in constant dollar output per hour were the same for the three sectors, but those of the retail and wholesale trade sectors were due to the rapid productivity growth of these two sectors (3.30 per cent and 3.64 per cent per year, respectively), while that of manufacturing reflected mainly its high productivity level (productivity growth in this sector was only 1.11 per cent). The overall contribution of the two trade sectors to aggregate productivity growth, in both absolute and relative terms, was close to the within-sector contribution because of small reallocation effects. In contrast, the overall contribution of manufacturing to aggregate productivity growth was only 0.09 points because of this sector's negative reallocation effect (–0.16), due primarily to a large negative productivity level effect arising from the very large fall in the sector's hours share (3.32 points). It is interesting to note that the two trade sectors accounted for 0.49 points or 44 per cent of aggregate labour productivity growth in 2000–07, but accounted for only 19.9 per cent of total hours worked.

It is also very helpful to examine the changes in the contributions by sector to aggregate productivity growth between 1973–2000 and 2000–07 (Table 4g). Between these two periods, labour productivity growth decreased 0.52 percentage points, from 1.62 per cent per year in 1973–2000 to 1.10 per cent in 2000–07 (Summary Table 2). All of the post-2000 slowdown can be accounted for by the manufacturing sector, which made a –0.65 percentage points contribution to the –0.52 points falloff in aggregate productivity growth between periods. This situation arose from the 1.8 percentage points fall in labour productivity growth in manufacturing between 1973–2000 and 2000–07 (from 2.9 per cent to 1.1 per cent).

The slowdown for within-sector productivity growth between 1973–2000 and 2000–07 was greater than the total slowdown, which includes both within-sector and reallocation effects: (–0.71 points versus –0.52 points). In other words, sectoral shifts were not directly responsible for the falloff in labour productivity growth. Indeed, these sectoral reallocations boosted productivity between periods. This is because the negative impact of the sector reallocations (both productivity level and growth effects) was less in 2000–07 (–0.03 points) than in 1973–2000 (–0.21 points), making a 0.19 point positive contribution to the difference in productivity growth between the two periods (Table 4g).

The reason for this can largely be found in the mining and oil and gas extraction sector. In 1973–2000, the magnitude of the reallocation effect in this sector was very small (–0.02 points). In 2000–07, the size of this effect rose to 0.17 points because of the movement of workers to this high productivity level sector, resulting in a 0.19 point change between period.

The Relationship Between Market-Oriented Public Policies and Productivity Growth

General relationship

As a rule, economists believe that market-oriented policies and institutions foster productivity growth. Such policies may, but not necessarily, be bad for equity, but they do promote efficiency and better economic outcomes, since they provide the appropriate incentives to maximize private sector actions that increase productivity, such as

incentives for investment. There is considerable evidence that a movement towards market-oriented public policies can result in improved productivity growth.

Product market reforms are structural reforms of the microeconomic type that aim at improving the functioning of product markets by increasing competition among producers of goods and services. Theoretical models suggest that regulation and reforms that liberalize or improve the functioning of markets can positively affect productivity through three different channels, namely, a reallocation of scarce resources (allocative efficiency), an improvement in the utilization of production factors by firms (productive efficiency), and an incentive for firms to innovate and to move to the modern technology frontier (dynamic efficiency).

Probably the most authoritative work on the positive impact of market-oriented policies on productivity is work by the OECD on product market regulation and productivity growth (Conway and Nicoletti 2006, 2007). This research has found that countries with low levels of product market regulation tend to have higher levels of productivity than countries with high levels of product market regulation. This research also finds that countries that reduce regulation experience faster productivity growth, although this growth effect is generally not permanent.

A number of country studies have documented the positive effect of the movement to more market-oriented policies on productivity. Card and Freeman (2002) estimate that, in the United Kingdom, changes in labour laws, privatization of state enterprises, and the introduction of profit and share ownership schemes increased labour productivity 0.35 percentage points per year over the 1979–99 period, accounting for about one quarter of the pickup in labour productivity growth. Up to half of this increase in productivity was associated with laws that weakened the coverage and power of trade unions. The United Kingdom had one of the largest falls in product market regulation over the 1974–2003 period (only the Netherlands and Denmark experienced larger declines), with a decrease of 3.8 points on the OECD's ETCR index from 4.8 in 1975 to 1.0 in 2003 (Summary Table 3). This suggests that the scope for increasing productivity growth through liberalization in countries with less potential for lowering their ETCR index than the United Kingdom would likely be less than the 0.35 percentage points per year gains experienced by the United Kingdom.

Parham (2002) argues that microeconomic reform had a salutary impact on productivity growth in Australia since 1990. He presents evidence that such policy reforms, which lead to sharper competition, greater openness to trade, investment, and technology, and greater flexibility for businesses to adjust production and distribution processes, have fostered a transition to a more competitive, open, flexible, innovative, and resilient economy.

New Zealand also experienced a series of market reforms in the 1980s that had some positive impacts on productivity. Darwall (2003) reports that for the first nine years of reforms, total factor productivity growth (labour and capital) in the agriculture sector averaged 6.3 per cent a year, well ahead of that in the pre-reforms period.

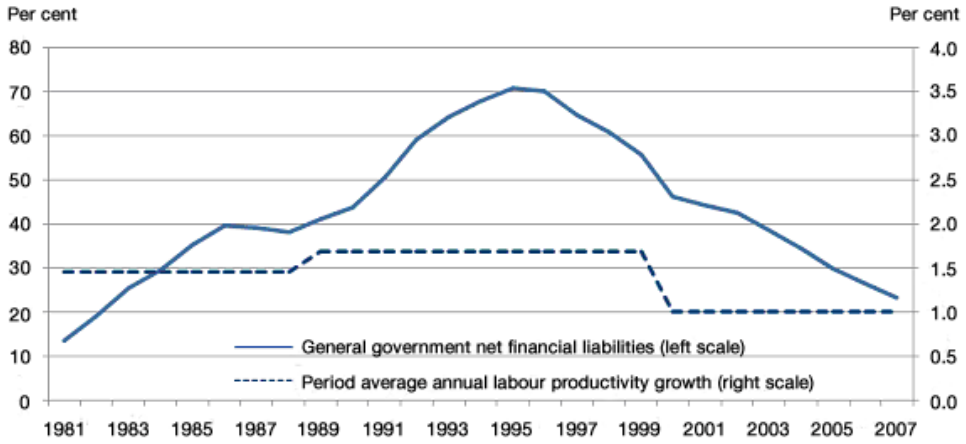
The Canadian experience

Despite the many market reforms highlighted in the first section of the paper that have been implemented in Canada in the past three decades, there is limited evidence that many of these reforms have had a significant impact on productivity. For example, it is

interesting to look at the relationship between certain macroeconomic variables and productivity growth. The bivariate relationship one might have expected between market-oriented policy and productivity growth often goes in the other direction. Chart 10 shows that the fall in the debt to GDP ratio since 2000 has coincided with a period of very weak productivity growth. A sound fiscal position appears to be no guarantee of increased productivity. Getting the fiscal house in order in the 1990s, while needed, does not appear to have boosted productivity growth in the 2000s.

Chart 10

Government debt and labour productivity, Canada, 1981–2007



Note: General government net financial liabilities as a share of nominal GDP, per cent, and real output per hour worked, business sector, per cent

Source: *OECD Economic Outlook*, No. 83 (June 2008)

It has also been argued that a low, stable, and fully anticipated rate of inflation might, in theory, boost productivity growth through reduced menu cost and less noise in price signals (Jarrett and Selody 1982). But Chart 11 shows that the decline in inflation in Canada since the 1970s and 1980s has not corresponded with an improvement in productivity growth. Equally, inflation has been lower in Canada than in the United States since 1989, but productivity growth has also been lower, particularly since 2000 (Chart 12).

Of course, the deterioration of productivity growth in Canada after 1973 and the further deterioration after 2000 does not definitely prove that macroeconomic reforms did not have a positive impact on productivity. Offsetting factors may have been at play and multivariate analysis is needed.

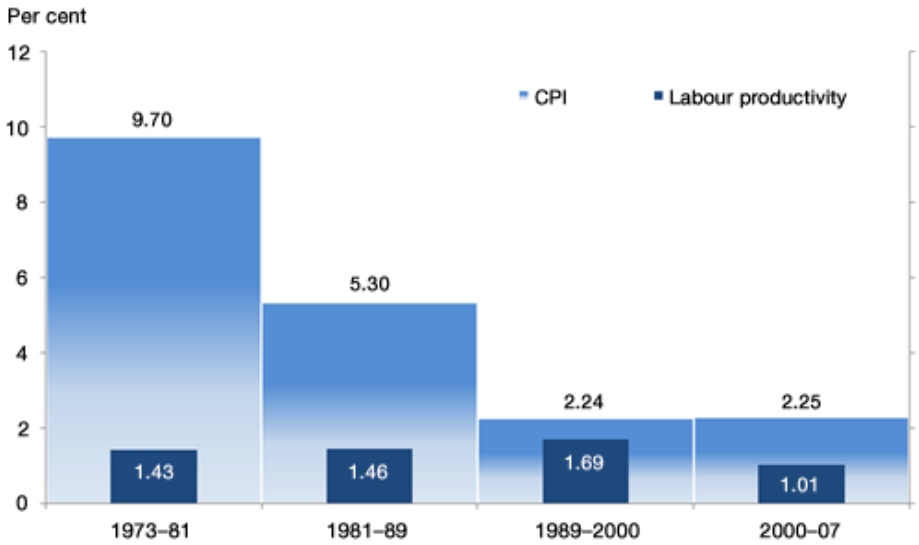
Canadian studies

Conway and Nicoletti (2007) have applied their findings on the impact of deregulation on productivity for OECD countries to Canada. Their results suggest that if Canada had implemented the regulatory policies of the most liberal OECD countries in network industries and other services in 1995, aggregate labour productivity growth would have been just under 1.0 percentage point faster per year over the period to 2003. Looking forward, their model simulations suggest that labour productivity growth could be between 0.5 and 1.0 percentage points higher if Canada reformed the remaining areas of anti-

competitive regulation in product markets to match those of the most liberal OECD countries in each sector. These are very large numbers. Unfortunately, Conway and Nicoletti do not identify the specific reforms that would generate such large productivity gains. Indeed, given that aggregate labour productivity growth has been only around 1 per cent per year since 2000, the suggestion that this growth rate could be boosted by 50 to 100 per cent through further product market regulation, while certainly appealing, seems exaggerated.

Chart 11

Consumer price index and labour productivity, Canada, compound annual growth rates, per cent, 1973–2007

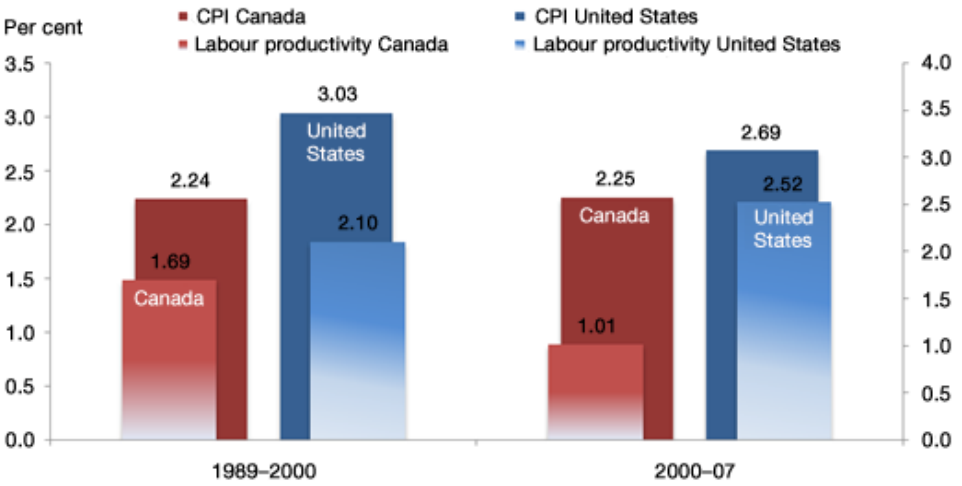


Sources: CPI from Statistics Canada, and labour productivity from CSLS Aggregate Income and Productivity Trends Database

To be sure, certain studies have found that liberalization has produced productivity gains in Canada in certain sectors. Trefler (2004) found some positive productivity impacts on Canadian manufacturing from the North American Free Trade Agreement. In industries that experienced the deepest Canadian tariff cuts, the contraction of low-productivity plants reduced employment by 12 per cent while raising industry-level labour productivity by 15 per cent. For industries that experienced the largest U.S. tariff cuts, plant-level productivity rose 14 per cent. Smart (2007) examined the economic impacts of harmonizing the provincial retail sales taxes with the GST. Retail sales tax reform can be considered a means of reducing the distortionary effects of taxation, and therefore can be considered a market-oriented policy. Smart concluded that, in his "preferred estimate, annual machinery and equipment investment in harmonizing provinces rose 12.2 per cent above trend levels in the years following the 1997 sales tax reform." In principle, increased investment should translate into additional productivity gains. The privatization of CN rail in 1995 appears to have had a positive effect on productivity and efficiency. The railway, according to many observers, has enjoyed strong productivity gains and became a North American leader in efficiency. One does not know what would have happened under continued government ownership, but it is likely that private ownership has played some role in the firm's excellent productivity performance.

Chart 12

Inflation and labour productivity, Canada and the United States compound annual growth rate, per cent, 1989–2007



Sources: CPI from *OECD Economic Outlook*, No. 83 (June 2008), and labour productivity from CSLS Aggregate Income and Productivity Trends Database

It is often asserted that Canada's lagging productivity growth is due to barriers to the free flow of factors of production and that removal of such barriers would contribute in a significant manner to the revival of productivity growth in this country. This assertion can be questioned from two angles. First, are there still significant barriers to the free flow of goods and services, capital, and labour in Canada? Second, would the removal of the existing barriers have a major impact on aggregate productivity growth?

There is no doubt that certain market impediments exist in Canada. The most egregious are the marketing boards for certain agricultural products, such as milk, which control supply (OECD 2008b). Restrictions on foreign ownership in certain sectors are also put forward as an impediment to productivity growth, as are interprovincial barriers to trade and labour mobility.

But, as noted earlier in the paper, there have been large declines in product market regulation in Canada in recent decades, and the current level is relatively low by both historical and international standards, as illustrated, for example, by the OECD index of regulation for energy, transport, and communications. A recent study done for Industry Canada on interprovincial barriers to labour mobility in Canada by Grady and Macmillan (2007) concluded that "credible estimates of the economic costs to labour mobility are likely to be minuscule." A second study by Macmillan and Grady (2007), also done for Industry Canada, reached a similar conclusion regarding barriers to the movement of goods. It was found that "trade in goods, services and capital within Canada is relatively unencumbered."

Explanations of the paradox

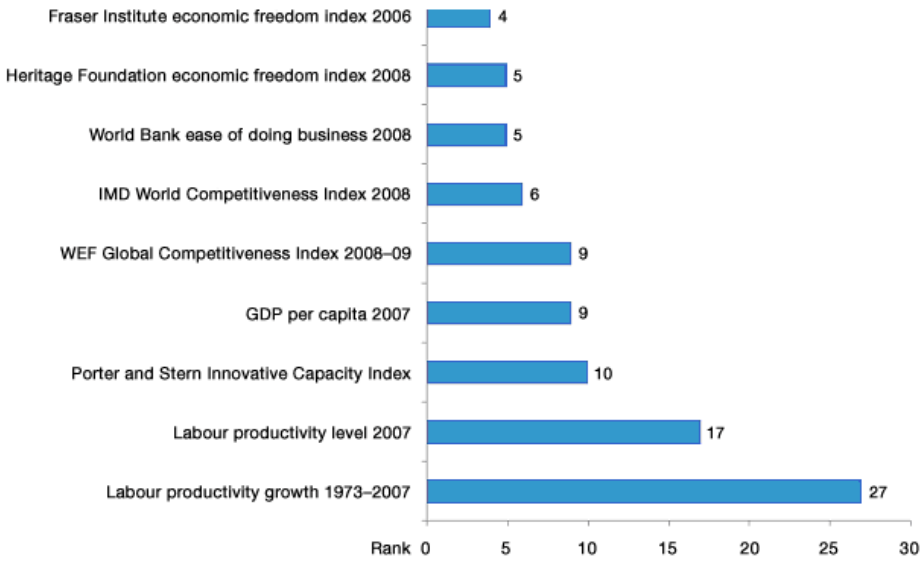
What explains the paradox of increased market-oriented policies and poor productivity growth in Canada? This paper argues that the high degree of market orientation that

already existed in Canada meant that there have been few opportunities for productivity gains through further liberalization, and particularly since 2000. This does not mean that such reforms are not desirable, nor does it mean that specific reforms, such as those related to marketing boards, could not have a significant positive impact on productivity in the sector affected. What it does mean is that, in a global sense, the low-hanging fruit of market reform has been harvested in the decades well before 2000, so the marginal impact of further reforms on productivity have and will continue to be limited. This, of course, has implications for future productivity growth.

Chart 13 and Summary Table 4, based on the most recent data available, show how Canada ranks among OECD countries on a number of key economic indicators and in terms of market orientation. The results are surprising. It is well known that Canada ranks poorly, or at least below the top, on many economic indicators and this is indeed shown in the chart and table. In 2007, Canada ranked seventeenth in terms of output per hour levels among OECD countries and ninth in GDP per capita. Even worse, Canada ranked twenty-seventh in terms of labour productivity growth over the 1973–2007 period.

Chart 13

Ranking of Canada on composite indexes of market orientation and economic outcomes, 30 OECD countries



Source: Summary Table 4

In contrast to the less than stellar ranking in the indicators outlined above, Canada ranks extremely high among OECD countries in indexes of economic freedom. In principle, these indexes are indicative of the extent of market orientation. Canada ranked fourth among OECD countries in 2006 in the Fraser Institute Index of Economic Freedom, and fifth in the Heritage Foundation's Index of Economic Freedom in 2008. Canada also ranked fifth in the OECD in the World Bank's composite measure of the ease of doing business, with a particularly high ranking for the ease of starting a business (second) and the ease of closing a business (third).

Competitiveness and innovation composite indexes reflect both economic outcomes and the market orientation of economic policy. Not surprisingly, Canada's ranking on these indexes falls between the economic freedom and the productivity indicators. Canada ranked sixth on the most recent IMD (Institute of Management Development) World Competitiveness Index, ninth on the World Economic Forum's Global Competitiveness Index, and tenth on the Porter-Stern Innovative Capacity Index.

Canada is not the only country that ranks highly on economic freedom indicators and poorly on long-term productivity growth. Switzerland ranked high in economic freedom (first on the Fraser Institute index and sixth on the Heritage Foundation index), but twenty-ninth out of thirty countries in terms of productivity growth. New Zealand also ranked high on the economic freedom indexes (second on the Fraser Institute index and fourth on the Heritage Foundation index) and twenty-eighth in productivity growth.

These findings suggest that countries that already have a high degree of economic freedom, or market orientation, may have less scope for productivity gains through further liberalization, even if their productivity level is below average, as is the case of Canada (and Switzerland and New Zealand). Of course, this does not necessarily mean that these countries are destined to have poor productivity growth. There are many determinants of productivity growth in addition to a market-oriented environment, including increased human capital, adoption of best-practice technologies, and greater capital deepening. For countries with high degrees of economic liberalization, the key to productivity advance likely does not lie in greater liberalization, but rather in these other, more fundamental, drivers of productivity growth.

Market-oriented policies are by no means detrimental to productivity growth, although their impact on equity may be more problematic. Indeed, such policies may, in many instances, boost productivity somewhat. But the evidence suggests that increased market orientation of public policy in this country in the past three decades has not significantly increased aggregate productivity growth. Indeed, aggregate labour productivity has fallen off considerably. This situation seems related to the already high level of market orientation in Canada, which means that the marginal impact of further moves towards greater market orientation has been and will likely continue to be small.

In other words, labour productivity growth is largely determined by the underlying rate of technological advance, including that embodied in new capital goods and in the human capital needed to operate the new and capital goods. This, of course, does not mean that market-oriented public policies are not important or appropriate, only that their impact on aggregate productivity may often be exaggerated.

Consequently, it seems unlikely that the solution to Canada's productivity stagnation will be found in further market reforms, although this does necessarily mean that such reforms should not be implemented. Canada's macro and micro environment for productivity advance is favourable. It is the responsibility of the business sector to build on this market-friendly environment by developing human capital, investing in new machinery, and keeping abreast of and adopting frontier technologies. Market-friendly public policy cannot force business to behave in a manner that increases productivity, although market-*unfriendly* policy can certainly have the opposite effect.

Summary Table 4

Ranking across composite indexes of market-orientation and economic outcomes, OECD countries

Rank	Fraser Institute economic freedom	Heritage Foundation economic freedom	Ease of doing business	Global Competitive-ness Index	World Competitive-ness Index	GDP per capita	Innovative capacity index	Labour productivity level	Labour productivity growth
1	Switzerland	Ireland	New Zealand	United States	United States	Luxembourg	United States	Luxembourg	South Korea
2	New Zealand	Australia	United States	Switzerland	Switzerland	Norway	Finland	Norway	Slovakia
3	United Kingdom	United States	Denmark	Luxembourg	Denmark	Ireland	Germany	Belgium	Poland
4	Canada	New Zealand	United Kingdom	Denmark	Sweden	United States	United Kingdom	United States	Ireland
5	Australia	Canada	Ireland	Australia	Finland	Iceland	Switzerland	Netherlands	Turkey
6	Ireland	Switzerland	Canada	Canada	Germany	Switzerland	Netherlands	Austria	Finland
7	United States	United Kingdom	Australia	Sweden	Netherlands	Netherlands	Australia	France	Norway
8	Denmark	Denmark	Norway	Netherlands	Japan	Austria	Sweden	Germany	Spain
9	Iceland	Netherlands	Iceland	Norway	Canada	Canada	France	Ireland	Austria
10	Austria	Iceland	Japan	Ireland	United Kingdom	Australia	Canada	United Kingdom	Japan
11	Finland	Luxembourg	Finland	Austria	South Korea	Denmark	Japan	Sweden	United Kingdom
12	Germany	Finland	Sweden	Finland	Austria	Sweden	Belgium	Denmark	France
13	Netherlands	Japan	Belgium	Germany	Norway	Belgium	Ireland	Italy	Germany*
14	Slovak Republic	Belgium	Switzerland	New Zealand	France	Finland	Austria	Finland	Czech Republic
15	Luxembourg	Germany	South Korea	United Kingdom	Australia	United Kingdom	Norway	Australia	Iceland
16	Norway	Sweden	Germany	Japan	Belgium	Germany	Denmark	Switzerland	Hungary
17	Hungary	Austria	Netherlands	Belgium	Iceland	Japan	Iceland	Canada	Belgium
18	Japan	Spain	Austria	France	Ireland	France	Spain	Spain	Luxembourg
19	South Korea	Norway	France	Czech Republic	New Zealand	Italy	Italy	Iceland	Denmark

Summary Table 4 (cont'd)

Ranking across composite indexes of market-orientation and economic outcomes, OECD countries

Rank	Fraser Institute economic freedom	Heritage Foundation economic freedom	Ease of doing business	Global Competitive-ness Index	World Competitive-ness Index	GDP per capita	Innovative capacity index	Labour productivity level	Labour productivity growth
20	Sweden	Slovakia	Slovakia	Slovakia	Luxembourg	Greece	South Korea	Japan	Greece
21	Spain	Czech Republic	Hungary	South Korea	Spain	Spain	New Zealand	Greece	Italy
22	Portugal	South Korea	Portugal	Spain	Czech Republic	New Zealand	Portugal	New Zealand	Portugal
23	Belgium	Hungary	Spain	Portugal	Portugal	South Korea	Czech Republic	Slovakia	Sweden
24	France	Mexico	Luxembourg	Hungary	Slovakia	Czech Republic	Hungary	Portugal	Australia
25	Italy	France	Mexico	Greece	Italy	Portugal	Slovakia	Hungary	Netherlands
26	Greece	Portugal	Turkey	Poland	Poland	Slovakia	Poland	Czech Republic	United States
27	Mexico	Italy	Italy	Italy	Mexico	Hungary	Greece	South Korea	Canada
28	Czech Republic	Turkey	Czech Republic	Turkey	Hungary	Poland	Turkey	Poland	New Zealand
29	Poland	Greece	Poland	Mexico	Turkey	Mexico	Mexico	Turkey	Switzerland
30	Turkey	Poland	Greece		Greece	Turkey		Mexico	Mexico

Sources: Fraser Institute economic freedom index 2006: <http://www.freetheworld.com/>. Heritage Foundation economic freedom index 2008: <http://www.heritage.org/Index/>. World Bank ease of doing business index 2008: <http://www.doingbusiness.org/EconomyRankings/.> IMD World Competitiveness Index 2008: <http://www.imd.ch/research/publications/wcy/upload/scoreboard.pdf>. Iceland is not available. WEF Global Competitiveness Index 2008–2009: <http://www.weforum.org/en/initiatives/gcp/Global%20Competitiveness%20Report/index.htm>. GDP per capita in 2007 $US: <http://www.ggdc.net/>. Porter and Stern Innovative Capacity Index 2000: <http://www.isc.hbs.edu/Innov_9211.pdf>. Luxembourg is not available. GDP per hour worked level (2007) and growth (1973–2007), in 2007 $US: <http://www.ggdc.net/>.

In addition to fostering the three proximate productivity drivers noted above, a more equitable sharing of productivity gains would give a higher proportion of the working population a greater stake in productivity advance. This would help mobilize public support for a productivity-focused economic agenda. Between 1980 and 2005, labour productivity growth in Canada rose 37 per cent, but real median earnings grew a miniscule 1 per cent. While certain measurement issues account for some of the gap, nearly one half is due to increased earnings inequality and the falling labour share (Sharpe, Arsenault, and Harrison 2008).

Market reform and labour supply

It is important to recognize that market-oriented policies may have other benefits than those associated with faster productivity growth. This is the case for market-oriented labour market policies that have been found to have a positive effect on labour utilization, especially in a less than fully employed economy. Lower employment legislation, fewer minimum wage controls, and lower unemployment benefits, for example, have a clear, positive effect on employment. Yet, as noted in Bassanini and Venn (2008), each of these factors has, at best, an ambiguous effect on measured labour productivity growth. For example, the authors find that decreases in the ratio of the minimum wage to the median wage, which tend to increase employment levels, have a negative impact on aggregate productivity.

Among OECD countries, Canada ranks much higher in terms of GDP per capita than productivity levels (see Summary Table 4), which means that it has above-average employment rates. Indeed, Canada's growth in recent years has relied overwhelmingly on employment growth, particularly when compared with the United States, as noted in the second section of the paper. Another explanation for the paradox may be that market-oriented reforms had a more positive impact on employment growth than on productivity growth. While these reforms may still be desirable because of their impact on employment, they should not be sold on their purported potential to solve Canada's productivity problem.

Conclusion

Six key conclusions can be drawn from the preceding analysis:

(i) The overall magnitude of the effect of economic liberalization on aggregate labour productivity growth in developed market economies, while certainly not inconsequential, appears to be not particularly large (less than 0.4 percentage points per year).

(ii) The high degree of market orientation of public policy that already exists in Canada suggests that the productivity-enhancing effects of further liberalization may be quite small.

(iii) Market reforms have positive effects on labour supply, as well as on productivity, and the latter should be included in any overall assessment of economic liberalization.

(iv) Given the potentially limited payoff of economic liberalization on productivity, overselling the productivity gains from economic reforms can be counter-productive.

(v) The solution to Canada's productivity problem lies with the business sector's commitment to human resource development, adoption of best-practice technologies, and investment in machinery and equipment.

(vi) A more equitable sharing of productivity gains could mobilize broader public support for a productivity-focused economic agenda.

LIST OF DATA TABLES

Table 1

Fraser Institute Economic Freedom, 2006

Countries	SUMMARY INDEX	Summary Index Rank	1. Size of Government: Expenditures, Taxes, and Enterprises	2. Legal Structure and Security of Property Rights	3. Access to Sound Money	4. Freedom to Trade Internationally	Regulation			
							5. Overall Regulation of Credit, Labor, and Business	5A. Credit Market Regulations	5B. Labor Market Regulations	5C. Business Regulations
Australia	8.04	4	6.77	8.68	9.46	7.17	8.12	9.50	7.06	7.79
Canada	**8.05**	**3**	**6.88**	**8.39**	**9.60**	**7.14**	**8.22**	**9.32**	**7.22**	**8.12**
Denmark	7.78	6	4.39	8.96	9.36	7.77	8.44	9.39	7.71	8.23
Finland	7.69	7	5.03	9.01	9.52	7.43	7.47	9.62	4.34	8.45
France	7.19	12	4.11	7.53	9.51	7.38	7.40	9.13	5.65	7.42
Germany	7.64	9	5.82	8.59	9.47	7.88	6.47	7.75	3.99	7.68
Italy	7.15	13	5.99	6.26	9.42	7.24	6.84	8.65	5.95	5.91
Japan	7.48	10	6.23	7.90	9.72	5.87	7.69	8.31	7.50	7.27
Netherlands	7.65	8	4.06	8.49	9.69	8.33	7.69	9.21	6.37	7.48
Sweden	7.35	11	3.73	8.41	9.61	7.72	7.26	9.31	4.51	7.97
Switzerland	8.20	1	7.89	8.66	9.56	6.79	8.12	8.84	7.50	8.01
United Kingdom	8.07	2	6.64	8.33	9.40	7.76	8.25	9.76	7.42	7.57
United States	8.04	4	7.13	7.58	9.66	7.53	8.31	9.37	8.29	7.27
Canada's Rank										
Of countries 13 listed	**3**	**-**	**3**	**8**	**5**	**11**	**4**	**6**	**6**	**3**
World Rank (out of 141 countries)	7	-	53	14	6	52	11	28	23	7

Source: Fraser Institute, *Economic Freedom of the World*, 2008 dataset, http://www.freetheworld.com/datasets_efw.html

Table 1a

Fraser Institute Chain-Linked Index of Economic Freedom Ratings, Canada 1970-2006

	Summary	Size of Government	Legal System & Property Rights	Sound Money	Freedom to Trade Internationally	Regulation of Labour, Credit, and Business
1970	7.97	-	-	-	-	-
1975	7.14	-	-	-	-	-
1980	7.58	4.87	8.46	9.20	7.69	7.65
1985	7.65	4.74	9.29	8.96	7.68	7.63
1990	7.97	5.31	9.84	9.56	7.59	7.63
1995	7.80	5.30	8.95	9.58	7.50	7.64
2000	8.12	5.97	9.27	9.47	8.29	7.61
2001	8.06	-	-	-	-	-
2002	7.91	-	-	-	-	-
2003	8.00	-	-	-	-	-
2004	8.05	6.62	8.40	9.60	7.82	7.78
2005	8.06	6.76	8.70	9.69	7.51	7.64
2006	7.98	6.88	8.53	9.60	7.14	7.74
Total Percentage Change 1980-2006	5.3	41.3	0.8	4.3	-7.2	1.2

Source: Fraser Institute, Economic Freedom of the World, 2008 dataset.

Table 1b

Fraser Institute Chain-Linked Index of Summary Economic Freedom, 1970-2006

	1970	1975	1980	1985	1990	1995	2000	2001	2002	2003	2004	2005	2006	Rank			Total % Change
														1970	1980	2006	1980-2006
Australia	7.31	6.40	7.12	7.45	7.64	7.80	8.02	7.91	7.87	7.80	7.83	7.86	7.96	6	6	4	11.8
Canada	**7.97**	**7.14**	**7.58**	**7.65**	**7.97**	**7.80**	**8.12**	**8.06**	**7.91**	**8.00**	**8.05**	**8.06**	**7.98**	**2**	**3**	**3**	**5.3**
Denmark	7.08	6.31	6.52	6.66	7.34	7.46	7.78	7.58	7.54	7.61	7.63	7.77	7.85	8	10	6	20.4
Finland	7.12	6.25	6.90	7.06	7.37	7.56	7.80	7.67	7.66	7.61	7.58	7.75	7.71	7	8	7	11.7
France	6.58	5.79	6.06	6.06	7.06	6.80	7.04	6.72	6.81	7.04	7.17	6.98	7.07	10	11	12	16.7
Germany	7.70	7.17	7.42	7.43	7.66	7.50	7.49	7.29	7.29	7.61	7.58	7.69	7.70	3	4	8	3.8
Italy	6.06	5.29	5.38	5.66	6.57	6.50	7.08	6.95	6.94	6.71	6.94	6.90	7.01	12	13	13	30.3
Japan	6.85	6.48	7.01	7.06	7.47	7.07	7.42	7.08	6.97	7.34	7.28	7.38	7.33	9	7	10	4.6
Netherlands	7.54	6.85	7.31	7.47	7.80	7.82	8.03	7.75	7.65	7.57	7.58	7.67	7.64	5	5	9	4.5
Sweden	5.75	5.62	6.05	6.63	6.93	7.18	7.43	7.05	7.26	7.41	7.19	7.30	7.28	13	12	11	20.3
Switzerland	8.02	7.79	8.19	8.32	8.30	8.04	8.43	8.18	8.22	8.30	8.31	8.33	8.18	1	1	1	-0.1
United Kingdom	6.48	6.21	6.53	7.45	7.83	8.08	8.35	8.11	8.11	8.12	8.08	8.10	8.06	11	9	2	23.4
United States	7.61	7.74	7.99	8.14	8.41	8.33	8.55	8.32	8.09	8.03	8.07	7.90	7.86	4	2	5	-1.6
Canada's Rank																	
Of countries 13 listed	1	3	2	2	2	4	3	3	3	3	3	2	2				
World Rank (out of 141 countries)	3	7	6	6	5	10	8	7	7	7	7	6	6				

Source: Fraser Institute, Economic Freedom of the World, 2008 dataset, http://www.freetheworld.com/datasets_efw.html

Table 2

Heritage Foundation Economic Freedom Index, 2008

Country	Overall Score	Business Freedom	Trade Freedom	Fiscal Freedom	Gov't Size	Monetary Freedom	Investment Freedom	Financial Freedom	Property Rights	Freedom from Corruption	Labor Freedom
Australia	82.0	89.3	83.8	59.2	62.8	83.7	80	90	90	87	94.2
Canada	**80.2**	**96.7**	**87.0**	**75.5**	**53.7**	**81.0**	**70**	**80**	**90**	**85**	**82.9**
Denmark	79.2	99.9	86.0	35.0	19.8	86.5	90	90	90	95	99.9
Finland	74.8	95.2	86.0	64.3	29.1	88.5	70	80	90	96	48.8
France	65.4	87.1	81.0	53.2	13.2	81.2	60	70	70	74	63.8
Germany	71.2	88.9	86.0	58.4	34.0	81.4	80	60	90	80	52.8
Italy	62.5	76.8	81.0	54.3	29.4	80.6	70	60	50	49	73.5
Japan	72.5	88.1	80.0	70.3	56.2	94.3	60	50	70	76	79.8
Netherlands, The	76.8	88.0	86.0	51.6	38.2	86.9	90	90	90	87	60.5
Sweden	70.4	94.8	86.0	32.7	3.9	82.8	80	80	90	92	62.0
Switzerland	79.7	83.9	87.2	68.0	61.6	83.6	70	80	90	91	82.0
United Kingdom	79.5	90.8	86.0	61.2	40.1	80.7	90	90	90	86	80.7
United States	80.6	91.7	86.8	68.3	59.8	83.7	80	80	90	73	92.3
Canada's Rank											
Of countries 13 listed	**3**	**2**	**2**	**1**	**6**	**11**	**8**	**5**	**1**	**8**	**4**
World Rank (out of 157 countries)	7	4	6	84	126	27	18	8	1	14	13

Source: Index of Economic Freedom, Heritage Foundation and the Wall Street Journal, http://www.heritage.org/research/features/index/downloads.cfm

Table 2a

Heritage Foundation Index of Economic Freedom, Canada, 1995-2008

	Score	Business Freedom	Trade Freedom	Fiscal Freedom	Gov't Size	Monetary Freedom	Investment Freedom	Financial Freedom	Property Rights	Freedom from Corruption	Labor Freedom
1995	69.4	85.0	75.2	64.2	14.8	85.9	50.0	70.0	90.0	90.0	-
1996	70.3	85.0	75.2	64.6	18.3	89.7	50.0	70.0	90.0	90.0	-
1997	67.9	85.0	77.0	38.1	25.9	86.8	50.0	70.0	90.0	88.7	-
1998	68.5	85.0	77.0	38.1	29.4	86.9	50.0	70.0	90.0	89.6	-
1999	69.3	85.0	77.0	39.2	34.9	86.9	50.0	70.0	90.0	91.0	-
2000	70.5	85.0	77.4	40.0	41.9	88.1	50.0	70.0	90.0	92.0	-
2001	71.2	85.0	77.8	41.5	47.1	87.2	50.0	70.0	90.0	92.0	-
2002	74.6	85.0	78.6	71.1	49.6	85.4	50.0	70.0	90.0	92.0	-
2003	74.8	85.0	83.4	72.7	47.8	85.0	50.0	70.0	90.0	89.0	-
2004	75.3	85.0	83.2	73.6	50.5	85.4	50.0	70.0	90.0	90.0	-
2005	75.8	85.0	82.8	75.1	50.8	84.7	50.0	70.0	90.0	87.0	82.6
2006	77.5	96.9	83.2	75.3	53.4	85.9	50.0	70.0	90.0	85.0	85.5
2007	78.1	96.8	88.2	75.9	52.2	80.7	60.0	70.0	90.0	84.0	83.1
2008	80.2	96.7	87.0	75.5	53.7	81.0	70.0	80.0	90.0	85.0	82.9
Total Change, Per Cent											
1995-2008	15.4	13.8	15.7	17.6	263.3	-5.7	40.0	14.3	0.0	-5.6	-

Source: Index of Economic Freedom, Heritage Foundation and the Wall Street Journal, http://www.heritage.org/research/features/index/downloads.cfm

Table 2b

Heritage Foundation Index of Economic Freedom, 1995-2008

											Rank			Total % Change	
	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	1995	2000	2008	1995-2008	2000-2008
Australia	74.1	77.1	77.4	77.3	77.4	77.9	78.5	79.4	81.0	82.0	4	2	3	10.6	6.3
Canada	**69.4**	**70.5**	**71.2**	**74.6**	**74.8**	**75.3**	**75.8**	**77.5**	**78.1**	**80.2**	**6**	**6**	**6**	**15.4**	**13.8**
Denmark	-	68.3	68.3	71.1	73.2	72.4	75.3	75.4	77.0	79.2	-	8	10	-	16.1
Finland	-	64.3	69.7	73.6	73.7	73.4	71.5	73.3	74.2	74.8	-	11	8	-	16.2
France	64.4	57.4	58.0	58.0	59.2	60.9	61.2	61.9	62.8	65.4	7	13	13	1.4	13.9
Germany	69.8	65.7	69.5	70.4	69.7	69.5	69.0	71.4	71.5	71.2	5	9	9	1.9	8.3
Italy	61.2	61.9	63.0	63.6	64.3	64.2	64.9	61.9	62.7	62.5	9	12	12	2.0	0.9
Japan	75.0	70.7	70.9	66.7	67.6	64.3	66.7	72.8	72.2	72.5	3	5	7	-3.4	2.5
Netherlands, The	-	70.4	73.0	75.1	74.6	74.5	72.3	74.8	74.9	76.8	-	7	5	-	9.1
Sweden	61.4	65.1	66.6	70.8	70.0	70.1	69.5	70.6	69.0	70.4	8	10	11	14.7	8.1
Switzerland	-	76.8	76.0	79.3	79.0	79.5	79.3	79.0	78.1	79.7	-	3	4	-	3.9
United Kingdom	77.9	77.3	77.6	78.5	77.5	77.7	79.3	80.6	80.0	79.5	1	1	2	2.1	2.9
United States	76.7	76.4	79.1	78.4	78.2	78.7	79.7	81.1	80.9	80.6	2	4	1	5.1	5.4
Canada's Rank out of 13 countries listed	6	6	6	6	5	5	5	5	5	3				1	4

Source: Index of Economic Freedom, Heritage Foundation and the Wall Street Journal, http://www.heritage.org/research/features/index/downloads.cfm

Table 3

Indicators of Regulation in Energy, Transport and Communications, OECD Countries, 1975-2003

										Rank		Absolute Change 1975-2003	
	1975	1980	1985	1990	1995	2000	2001	2002	2003	1975	2003	Change	Rank
Australia	4.0	4.0	4.0	3.9	3.0	1.6	1.5	1.5	1.5	2	3	-2.5	17
Austria	5.2	5.1	4.9	4.5	4.0	3.0	2.7	2.5	2.4	10	15	-2.8	14
Belgium	5.5	5.5	5.5	5.3	3.9	2.8	2.5	2.3	2.1	13	11	-3.3	5
Canada	**4.3**	**4.3**	**4.0**	**2.7**	**2.3**	**2.0**	**2.0**	**1.8**	**1.9**	**4**	**7**	**-2.4**	**18**
Denmark	5.5	5.5	5.5	4.7	3.5	2.4	2.0	1.7	1.6	15	5	-3.9	2
Finland	5.5	5.4	5.1	4.6	3.0	2.5	2.5	2.5	2.4	14	14	-3.1	9
France	6.0	6.0	6.0	5.2	4.8	3.8	3.7	3.3	3.0	21	19	-3.0	12
Germany	5.2	5.2	5.1	4.6	3.7	2.2	2.0	1.8	1.7	11	6	-3.5	4
Greece	5.7	5.7	5.7	5.7	5.4	5.0	4.7	4.2	4.1	17	21	-1.5	20
Ireland	5.7	5.7	5.7	5.0	4.6	3.8	3.5	3.3	3.2	18	20	-2.5	16
Italy	5.8	5.8	5.8	5.8	4.9	3.6	3.2	2.7	2.6	19	16	-3.3	7
Japan	5.1	5.1	5.1	3.5	3.2	2.6	2.4	2.3	2.2	8	12	-2.9	13
Netherlands	5.6	5.6	5.6	5.6	3.7	1.9	1.8	1.7	1.6	16	4	-4.0	1
New Zealand	5.2	5.2	4.5	3.7	2.8	1.8	1.7	2.1	2.1	9	10	-3.1	8
Norway	5.5	5.5	5.0	4.5	3.4	2.8	2.7	2.5	2.3	12	13	-3.1	10
Portugal	5.9	5.9	5.9	5.3	4.8	3.3	3.1	2.9	2.6	20	17	-3.3	6
Spain	5.1	5.0	5.0	4.7	4.2	2.8	2.4	2.2	2.0	7	9	-3.0	11
Sweden	4.5	4.5	4.5	4.4	2.9	2.1	2.1	2.0	1.9	5	8	-2.7	15
Switzerland	4.1	4.2	4.2	4.2	3.9	3.0	2.9	2.9	2.8	3	18	-1.3	21
United Kingdom	4.8	4.8	4.3	3.0	1.7	1.2	1.1	1.1	1.0	6	1	-3.7	3
United States	3.4	3.0	2.5	2.3	1.8	1.5	1.5	1.4	1.4	1	2	-2.0	19

Source: Conway, P. and G. Nicoletti (2006), "Product market regulation in non-manufacturing sectors in OECD countries: measurement and highlights", OECD Economics Department Working Paper.

Table 3a

Indicators of Regulation in Energy, Transport and Communications (ETCR), Canada, 1975-2003

	Aggregate ETCR	All but public ownership	Entry barriers	Public ownership
1975	4.3	4.7	5.3	3.0
1976	4.3	4.7	5.3	3.0
1977	4.3	4.7	5.3	3.0
1978	4.3	4.7	5.3	3.0
1979	4.3	4.7	5.3	3.0
1980	4.3	4.7	5.3	3.0
1981	4.3	4.7	5.3	3.0
1982	4.3	4.7	5.3	3.0
1983	4.3	4.7	5.3	3.0
1984	4.3	4.7	5.3	3.0
1985	4.0	4.3	4.5	3.0
1986	4.0	4.3	4.4	3.0
1987	3.7	3.8	3.6	3.0
1988	2.8	3.2	2.9	2.2
1989	2.7	3.2	2.9	2.0
1990	2.7	3.2	2.9	2.0
1991	2.7	3.2	2.9	2.0
1992	2.6	3.2	2.9	1.7
1993	2.5	3.1	2.8	1.7
1994	2.5	3.1	2.8	1.7
1995	2.3	2.7	2.5	1.7
1996	2.2	2.6	2.1	1.7
1997	2.1	2.3	1.9	1.7
1998	2.1	2.4	1.8	1.7
1999	2.0	2.2	1.5	1.7
2000	2.0	2.2	1.5	1.7
2001	2.0	2.2	1.5	1.7
2002	1.8	1.9	0.9	1.7
2003	1.9	2.0	1.2	1.7

Source: Conway, P. and G. Nicoletti (2006), "Product market regulation in non-manufacturing sectors in OECD countries: measurement and highlights", OECD Economics Department Working Paper.

Table 3b

Indicators of Regulation in Energy, Transport and Communications, Canada, by Sector, 1975-2003

	Airlines	Telecom	Elecricity	Gas	Post	Rail	Road
1975	6.0	4.0	5.5	1.3	3.7	5.3	4.5
1976	6.0	4.0	5.5	1.3	3.7	5.3	4.5
1977	6.0	4.0	5.5	1.3	3.7	5.3	4.5
1978	6.0	4.0	5.5	1.3	3.7	5.3	4.5
1979	6.0	4.0	5.5	1.3	3.7	5.3	4.5
1980	6.0	4.0	5.5	1.3	3.7	5.3	4.5
1981	6.0	4.0	5.5	1.3	3.7	5.3	4.5
1982	6.0	4.0	5.5	1.3	3.7	5.3	4.5
1983	6.0	4.0	5.5	1.3	3.7	5.3	4.5
1984	6.0	4.0	5.5	1.3	3.7	5.3	4.5
1985	6.0	2.1	5.5	1.3	3.7	5.3	4.5
1986	6.0	2.2	5.5	1.2	3.7	5.3	4.5
1987	5.5	2.2	5.5	0.7	3.7	3.8	4.5
1988	3.2	2.2	5.5	0.7	3.7	3.8	0.5
1989	2.5	2.2	5.5	0.7	3.7	3.8	0.5
1990	2.5	2.2	5.5	0.7	3.7	3.8	0.5
1991	2.5	2.1	5.5	0.6	3.7	3.8	0.5
1992	2.5	2.1	5.0	0.6	3.7	3.8	0.5
1993	2.5	1.7	5.0	0.6	3.7	3.8	0.5
1994	2.5	1.6	5.0	0.6	3.7	3.8	0.5
1995	1.5	1.3	5.0	0.6	3.7	3.8	0.5
1996	1.5	1.2	5.0	0.6	3.7	3.0	0.5
1997	1.0	0.8	5.0	0.6	3.7	3.0	0.5
1998	1.0	1.0	5.0	0.5	3.7	3.0	0.5
1999	1.0	0.9	4.3	0.5	3.7	3.0	0.5
2000	1.0	0.9	4.3	0.5	3.7	3.0	0.5
2001	1.0	0.8	4.3	0.5	3.7	3.0	0.5
2002	1.0	0.8	3.0	0.5	3.7	3.0	0.5
2003	1.0	0.8	3.7	0.5	3.7	3.0	0.5

Source: Conway, P. and G. Nicoletti (2006), "Product market regulation in non-manufacturing sectors in OECD countries: measurement and highlights", OECD Economics Department Working Paper.

Table 4

Decomposition of Aggregate Labour Productivity Growth by Sector into Within-Sector and Reallocation Effects, 1961-2007

	Labour Productivity				Sector Minus Business Sector Productivity		Share of Total Hours Worked		
	1961 Level	2007 Level	Compound Annual Growth Rate	Absolute Change	1961 Level	1961-2007 Absolute Change	1961	2007	Absolute Change
	(Constant 2002 Dollars per Hour Worked)		(Per Cent)	(Constant 2002 Dollars per Hour Worked)			(Per Cent)		(Percentage Points)
	A	B	C	D = B-A	E = A - 15.32	F = D - 23.01	G	H	I = H-G
Business Sector[1]	15.32	38.33	2.01	23.01	N/A	N/A	100.0	100.0	N/A
Agriculture, Forestry, Fishing and Hunting	6.73	32.95	3.51	26.22	-8.59	3.20	16.86	3.31	-13.55
Mining and Oil and Gas Extraction	95.76	119.20	0.48	23.44	80.44	0.42	1.58	2.01	0.42
Utilities	56.90	145.96	2.07	89.06	41.58	66.04	0.69	0.83	0.14
Construction	19.29	33.77	1.22	14.48	3.97	-8.54	9.49	9.28	-0.21
Manufacturing	13.42	50.69	2.93	37.27	-1.90	14.25	26.28	14.96	-11.33
Wholesale Trade	11.43	41.05	2.82	29.62	-3.89	6.61	4.82	7.12	2.31
Retail Trade	6.89	23.28	2.68	16.38	-8.43	-6.63	11.88	12.80	0.92
Transportation and Warehousing	12.14	34.57	2.30	22.44	-3.18	-0.58	7.12	6.34	-0.78
Information and Cultural Industries	11.92	63.24	3.70	51.32	-3.41	28.31	1.94	2.73	0.79
Finance, Insurance, Real Estate and Renting and Leasing[1]	44.78	71.82	1.03	27.04	29.46	4.03	4.28	8.03	3.74
Professional, Scientific and Technical Services	21.69	30.00	0.71	8.31	6.37	-14.71	1.72	7.76	6.04
Other Services (except Public Administration)[2]	16.22	20.19	0.48	3.97	0.90	-19.04	13.33	24.83	11.50
Sum Total							100.0	100.0	0.00
								Total Churn Measure:	51.7
								Average Annual Churn:	1.12

Source: Calculated by CSLS from Statistics Canada, Canadian Productivity Accounts KLEMS Database, CANSIM Table 383-0021.

Notes:
The churn measure is the sum of the absolute values changes in share of total hours worked or the sum of the absolute values of the reallocation effect. The average annual churn is the total churn measure divided by the number of years in the period.

In column [E] the business sector average labour productivity over the period is subtracted from the sector's period average labour productivity in order to obtain reallocation effects that can be interpreted inuititvely. In the absence of this adjustment, a sector that experiences an increase in labour share always experiences a positive reallocation effect. This is misleading, because the reallocation effect should be negative if, for example, a below-average productivity sector experiences an increase in labour share.

Table 4

Decomposition of Aggregate Labour Productivity Growth by Sector into Within-Sector and Reallocation Effects, 1961-2007 (continued)

	Contribution to Aggregate Labour Productivity Growth															Sector Relative Productivity Performance	
	Within-Sector Effect	Reallocation Effect			Total Effect	Within-Sector Effect	Reallocation Effect			Total Effect	Within-Sector Effect	Reallocation Effect			Total Effect	Expected Effect	Difference From Expected
		Level	Growth	Total			Level	Growth	Total			Level	Growth	Total			
	(Constant 2002 Dollars per Hour Worked)					(Per Cent)					(Percentage Points)						
	J=G/100*D	K=E*I/100	L=F*I/100	M=K+L	N=J+M	O=J/23.01*100	P=K/23.01*100	Q=L/23.01*100	R=P+Q	S=O+R	T=O/2.01*100	U=P/2.01*100	V=Q/2.01*100	W=U+V	X=T+W	Y=X*G/100	Z=X-Y
Business Sector[1]	23.01	N/A	N/A	N/A	N/A	100.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Agriculture, Forestry, Fishing and Hunting	4.42	1.16	-0.43	0.73	5.15	19.2	5.06	-1.89	3.17	22.4	0.39	0.10	-0.04	0.06	0.45	0.34	0.11
Mining and Oil and Gas Extraction	0.37	0.34	0.00	0.34	0.71	1.6	1.47	0.01	1.48	3.1	0.03	0.03	0.00	0.03	0.06	0.03	0.03
Utilities	0.61	0.06	0.09	0.15	0.76	2.7	0.25	0.39	0.64	3.3	0.05	0.01	0.01	0.01	0.07	0.01	0.05
Construction	1.37	-0.01	0.02	0.01	1.38	6.0	-0.04	0.08	0.04	6.0	0.12	0.00	0.00	0.00	0.12	0.19	-0.07
Manufacturing	9.80	0.22	-1.61	-1.40	8.40	42.6	0.94	-7.01	-6.08	36.5	0.86	0.02	-0.14	-0.12	0.73	0.53	0.21
Wholesale Trade	1.43	-0.09	0.15	0.06	1.49	6.2	-0.39	0.66	0.27	6.5	0.12	-0.01	0.01	0.01	0.13	0.10	0.03
Retail Trade	1.95	-0.08	-0.06	-0.14	1.81	8.5	-0.34	-0.27	-0.60	7.9	0.17	-0.01	-0.01	-0.01	0.16	0.24	-0.08
Transportation and Warehousing	1.60	0.02	0.00	0.03	1.63	6.9	0.11	0.02	0.13	7.1	0.14	0.00	0.00	0.00	0.14	0.14	0.00
Information and Cultural Industries	1.00	-0.03	0.22	0.20	1.19	4.3	-0.12	0.97	0.85	5.2	0.09	0.00	0.02	0.02	0.10	0.04	0.07
Finance, Insurance, Real Estate and Renting and Leasing[1]	1.16	1.10	0.15	1.25	2.41	5.0	4.79	0.65	5.45	10.5	0.10	0.10	0.01	0.11	0.21	0.09	0.12
Professional, Scientific and Technical Services	0.14	0.39	-0.89	-0.50	-0.36	0.6	1.67	-3.86	-2.19	-1.6	0.01	0.03	-0.08	-0.04	-0.03	0.03	-0.07
Other Services (except Public Administration)[2]	0.53	0.10	-2.19	-2.09	-1.56	2.3	0.45	-9.52	-9.07	-6.8	0.05	0.01	-0.19	-0.18	-0.14	0.27	-0.40
Sum Total	24.37	3.19	-4.55	-1.36	23.01	105.9	13.85	-19.76	-5.91	100.0	2.13	0.28	-0.40	-0.12	2.01	2.01	0.00
Total Churn Measure:		3.59	5.83			**Total Churn Measure:**	15.61	25.33			**Total Churn Measure:**	0.31	0.51				
Average Annual Churn:		0.08	0.13			**Average Annual Churn:**	0.34	0.55			**Average Annual Churn:**	0.01	0.01				

Notes:
The aggregate is the business sector. The business sector covers the whole economy less public a dministration, non-profit institutions and the rental value of owner-occupied dwellings. GDP for the business sector is calculated as the sum of the GDP of the consistuent sectors.

Labour productivity is real GDP per hour worked. Real GDP is calculated from Statistics Canada, Canadian Productivity Accounts KLEMS Database, CANSIM Table 383-0021. Current-dollar GDP estimates for 2002 were extended forward to 2007 and backward to 1961 using the growth rates of the corresponding real GDP series from the same table.

1. This combines the North American Industry Classification System (NAICS) codes 52-53 with the exception of owner-occupied dwellings industry.

2. This combines the North American Industry Classification System (NAICS) codes 55,56,61,62,71,72,81.

Table 4a

Decomposition of Aggregate Labour Productivity Growth by Sector into Within-Sector and Reallocation Effects, 1961-1973

	Labour Productivity				Sector Minus Business Sector Productivity		Share of Total Hours Worked		
	1961 Level	1973 Level	Compound Annual Growth Rate	Absolute Change	1961 Level	1961-1973 Absolute Change	1961	1973	Absolute Change
	(Constant 2002 Dollars per Hour Worked)		(Per Cent)	(Constant 2002 Dollars per Hour Worked)			(Per Cent)		(Percentage Points)
	A	B	C	D = B-A	E = A - 15.32	F = D - 7.66	G	H	I = H-G
Business Sector[1]	15.32	22.98	3.44	7.66	N/A	N/A	100.0	100.0	N/A
Agriculture, Forestry, Fishing and Hunting	6.73	12.88	5.56	6.15	-8.59	-1.51	16.86	9.08	-7.78
Mining and Oil and Gas Extraction	95.76	173.66	5.09	77.90	80.44	70.24	1.58	1.55	-0.03
Utilities	56.90	117.17	6.20	60.27	41.58	52.61	0.69	0.74	0.05
Construction	19.29	20.61	0.55	1.32	3.97	-6.34	9.49	9.84	0.35
Manufacturing	13.42	21.75	4.11	8.33	-1.90	0.67	26.28	27.40	1.11
Wholesale Trade	11.43	14.60	2.06	3.17	-3.89	-4.49	4.82	6.62	1.81
Retail Trade	6.89	10.64	3.69	3.75	-8.43	-3.91	11.88	12.74	0.86
Transportation and Warehousing	12.14	21.99	5.08	9.85	-3.18	2.19	7.12	6.15	-0.97
Information and Cultural Industries	11.92	20.42	4.59	8.51	-3.41	0.85	1.94	2.16	0.21
Finance, Insurance, Real Estate and Renting and Leasing[1]	44.78	45.33	0.10	0.55	29.46	-7.11	4.28	5.81	1.52
Professional, Scientific and Technical Services	21.69	23.37	0.62	1.68	6.37	-5.98	1.72	2.94	1.22
Other Services (except Public Administration)[2]	16.22	18.86	1.26	2.64	0.90	-5.02	13.33	14.98	1.65
Sum Total							100.0	100.0	0.00
								Total Churn Measure:	17.6
								Average Annual Churn:	1.46

Source: Calculated by CSLS from Statistics Canada, Canadian Productivity Accounts KLEMS Database, CANSIM Table 383-0021.

Notes:
The churn measure is the sum of the absolute values changes in share of total hours worked or the sum of the absolute values of the reallocation effect. The average annual churn is the total churn measure divided by the number of years in the period.

In column [E] the business sector average labour productivity over the period is subtracted from the sector's period average labour productivity in order to obtain reallocation effects that can be interpreted inuititvely. In the absence of this adjustment, a sector that experiences an increase in labour share always experiences a positive reallocation effect. This is misleading, because the reallocation effect should be negative if, for example, a below-average productivity sector experiences an increase in labour share.

Table 4a

Decomposition of Aggregate Labour Productivity Growth by Sector into Within-Sector and Reallocation Effects, 1961-1973 (continued)

	Contribution to Aggregate Labour Productivity Growth															Sector Relative Productivity Performance	
	Within-Sector Effect	Reallocation Effect			Total Effect	Within-Sector Effect	Reallocation Effect			Total Effect	Within-Sector Effect	Reallocation Effect			Total Effect	Expected Effect	Difference From Expected
		Level	Growth	Total			Level	Growth	Total			Level	Growth	Total			
	(Constant 2002 Dollars per Hour Worked)					(Per Cent)					(Percentage Points)						
	J=G/100*D	K=E*I/100	L=F*I/100	M=K+L	N=J+M	O=J/7.66*100	P=K/7.66*100	Q=L/7.66*100	R=P+Q	S=O+R	T=O/3.44*100	U=P/3.44*100	V=Q/3.44*100	W=U+V	X=T+W	Y=X*G/100	Z=X-Y
Business Sector[1]	7.66	N/A	N/A	N/A	N/A	100.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Agriculture, Forestry, Fishing and Hunting	1.04	0.67	0.12	0.79	1.82	13.5	8.72	1.53	10.25	23.8	0.47	0.30	0.05	0.35	0.82	0.58	0.24
Mining and Oil and Gas Extraction	1.23	-0.02	-0.02	-0.05	1.19	16.1	-0.31	-0.27	-0.59	15.5	0.55	-0.01	-0.01	-0.02	0.53	0.05	0.48
Utilities	0.42	0.02	0.03	0.05	0.46	5.4	0.27	0.34	0.61	6.0	0.19	0.01	0.01	0.02	0.21	0.02	0.18
Construction	0.12	0.01	-0.02	-0.01	0.12	1.6	0.18	-0.29	-0.11	1.5	0.06	0.01	-0.01	0.00	0.05	0.33	-0.27
Manufacturing	2.19	-0.02	0.01	-0.01	2.18	28.6	-0.28	0.10	-0.18	28.4	0.98	-0.01	0.00	-0.01	0.98	0.90	0.07
Wholesale Trade	0.15	-0.07	-0.08	-0.15	0.00	2.0	-0.92	-1.06	-1.98	0.0	0.07	-0.03	-0.04	-0.07	0.00	0.17	-0.16
Retail Trade	0.45	-0.07	-0.03	-0.11	0.34	5.8	-0.94	-0.44	-1.38	4.4	0.20	-0.03	-0.02	-0.05	0.15	0.41	-0.26
Transportation and Warehousing	0.70	0.03	-0.02	0.01	0.71	9.2	0.40	-0.28	0.13	9.3	0.31	0.01	-0.01	0.00	0.32	0.24	0.07
Information and Cultural Industries	0.17	-0.01	0.00	-0.01	0.16	2.2	-0.09	0.02	-0.07	2.1	0.07	0.00	0.00	0.00	0.07	0.07	0.00
Finance, Insurance, Real Estate and Renting and Leasing[1]	0.02	0.45	-0.11	0.34	0.36	0.3	5.86	-1.41	4.44	4.7	0.01	0.20	-0.05	0.15	0.16	0.15	0.02
Professional, Scientific and Technical Services	0.03	0.08	-0.07	0.00	0.03	0.4	1.02	-0.95	0.06	0.4	0.01	0.03	-0.03	0.00	0.02	0.06	-0.04
Other Services (except Public Administration)[2]	0.35	0.01	-0.08	-0.07	0.28	4.6	0.19	-1.08	-0.89	3.7	0.16	0.01	-0.04	-0.03	0.13	0.46	-0.33
Sum Total	6.87	1.08	-0.29	0.79	7.66	89.7	14.10	-3.80	10.30	100.0	3.08	0.48	-0.13	0.35	3.44	3.44	0.00
Total Churn Measure:		1.47	0.60			**Total Churn Measure:**	19.19	7.77			**Total Churn Measure:**	0.66	0.27				
Average Annual Churn:		0.12	0.05			**Average Annual Churn:**	1.60	0.65			**Average Annual Churn:**	0.05	0.02				

Notes:
The aggregate is the business sector. The business sector covers the whole economy less public a dministration, non-profit institutions and the rental value of owner-occupied dwellings. GDP for the business sector is calculated as the sum of the GDP of the consistuent sectors.

Labour productivity is real GDP per hour worked. Real GDP is calculated from Statistics Canada, Canadian Productivity Accounts KLEMS Database, CANSIM Table 383-0021. Current-dollar GDP estimates for 2002 were extended forward to 2007 and backward to 1961 using the growth rates of the corresponding real GDP series from the same table.

1. This combines the North American Industry Classification System (NAICS) codes 52-53 with the exception of owner-occupied dwellings industry.

2. This combines the North American Industry Classification System (NAICS) codes 55,56,61,62,71,72,81.

Table 4b

Decomposition of Aggregate Labour Productivity Growth by Sector into Within-Sector and Reallocation Effects, 1973-2000 (continued)

	Contribution to Aggregate Labour Productivity Growth															Sector Relative Productivity Performance	
	Within-Sector Effect	Reallocation Effect			Total Effect	Within-Sector Effect	Reallocation Effect			Total Effect	Within-Sector Effect	Reallocation Effect			Total Effect	Expected Effect	Difference From Expected
		Level	Growth	Total			Level	Growth	Total			Level	Growth	Total			
	(Constant 2002 Dollars per Hour Worked)					(Per Cent)					(Percentage Points)						
	J=G/100*D	K=E*I/100	L=F*I/100	M=K+L	N=J+M	O=J/12.52*100	P=K/12.52*100	Q=L/12.52*100	R=P+Q	S=O+R	T=O/1.62*100	U=P/1.62*100	V=Q/1.62*100	W=U+V	X=T+W	Y=X*G/100	Z=X-Y
Business Sector[1]	12.52	N/A	N/A	N/A	N/A	100.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Agriculture, Forestry, Fishing and Hunting	1.22	0.47	-0.04	0.43	1.65	9.7	3.75	-0.32	3.43	13.1	0.16	0.06	-0.01	0.06	0.21	0.15	0.07
Mining and Oil and Gas Extraction	-0.20	-0.14	0.02	-0.12	-0.32	-1.6	-1.12	0.19	-0.93	-2.5	-0.03	-0.02	0.00	-0.02	-0.04	0.03	-0.07
Utilities	0.25	0.03	0.01	0.04	0.28	2.0	0.25	0.05	0.30	2.3	0.03	0.00	0.00	0.00	0.04	0.01	0.02
Construction	0.94	0.05	0.06	0.11	1.05	7.5	0.39	0.48	0.87	8.4	0.12	0.01	0.01	0.01	0.14	0.16	-0.02
Manufacturing	6.89	0.11	-1.15	-1.04	5.85	55.0	0.89	-9.20	-8.30	46.7	0.89	0.01	-0.15	-0.13	0.76	0.44	0.31
Wholesale Trade	1.15	-0.06	0.03	-0.02	1.13	9.2	-0.45	0.26	-0.19	9.0	0.15	-0.01	0.00	0.00	0.15	0.11	0.04
Retail Trade	1.01	0.01	0.00	0.01	1.02	8.0	0.05	0.02	0.07	8.1	0.13	0.00	0.00	0.00	0.13	0.21	-0.08
Transportation and Warehousing	0.70	0.00	0.00	0.00	0.69	5.6	-0.02	-0.02	-0.04	5.5	0.09	0.00	0.00	0.00	0.09	0.10	-0.01
Information and Cultural Industries	0.65	-0.02	0.13	0.11	0.76	5.2	-0.15	1.05	0.90	6.1	0.08	0.00	0.02	0.01	0.10	0.04	0.06
Finance, Insurance, Real Estate and Renting and Leasing[3]	1.33	0.35	0.16	0.52	1.84	10.6	2.82	1.30	4.12	14.7	0.17	0.05	0.02	0.07	0.24	0.09	0.14
Professional, Scientific and Technical Services	0.17	0.02	-0.29	-0.27	-0.10	1.3	0.13	-2.31	-2.18	-0.8	0.02	0.00	-0.04	-0.04	-0.01	0.05	-0.06
Other Services (except Public Administration)[2]	0.05	-0.35	-1.03	-1.38	-1.33	0.4	-2.79	-8.24	-11.03	-10.6	0.01	-0.05	-0.13	-0.18	-0.17	0.24	-0.42
Sum Total	14.15	0.47	-2.10	-1.62	12.52	113.0	3.77	-16.74	-12.97	100.0	1.83	0.06	-0.27	-0.21	1.62	1.62	0.00
Total Churn Measure:		1.61	2.94			Total Churn Measure:	12.82	23.45			**Total Churn Measure:**	0.21	0.38				
Average Annual Churn:		0.06	0.11			**Average Annual Churn:**	0.47	0.87			**Average Annual Churn:**	0.01	0.01				

Notes:
The aggregate is the business sector. The business sector covers the whole economy less public a dministration, non-profit institutions and the rental value of owner-occupied dwellings. GDP for the business sector is calculated as the sum of the GDP of the consistuent sectors.

Labour productivity is real GDP per hour worked. Real GDP is calculated from Statistics Canada, Canadian Productivity Accounts KLEMS Database, CANSIM Table 383-0021. Current-dollar GDP estimates for 2002 were extended forward to 2007 and backward to 1961 using the growth rates of the corresponding real GDP series from the same table.

1. This combines the North American Industry Classification System (NAICS) codes 52-53 with the exception of owner-occupied dwellings industry.

2. This combines the North American Industry Classification System (NAICS) codes 55,56,61,62,71,72,81.

Table 4b

Decomposition of Aggregate Labour Productivity Growth by Sector into Within-Sector and Reallocation Effects, 1973-2000 (continued)

	Contribution to Aggregate Labour Productivity Growth															Sector Relative Productivity Performance	
	Within-Sector Effect	Reallocation Effect			Total Effect	Within-Sector Effect	Reallocation Effect			Total Effect	Within-Sector Effect	Reallocation Effect			Total Effect	Expected Effect	Difference From Expected
		Level	Growth	Total			Level	Growth	Total			Level	Growth	Total			
	(Constant 2002 Dollars per Hour Worked)					(Per Cent)					(Percentage Points)						
	J=G/100*D	K=E*I/100	L=F*I/100	M=K+L	N=J+M	O=J/12.52*100	P=K/12.52*100	Q=L/12.52*100	R=P+Q	S=O+R	T=O/1.62*100	U=P/1.62*100	V=Q/1.62*100	W=U+V	X=T+W	Y=X*G/100	Z=X-Y
Business Sector[1]	12.52	N/A	N/A	N/A	N/A	100.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Agriculture, Forestry, Fishing and Hunting	1.22	0.47	-0.04	0.43	1.65	9.7	3.75	-0.32	3.43	13.1	0.16	0.06	-0.01	0.06	0.21	0.15	0.07
Mining and Oil and Gas Extraction	-0.20	-0.14	0.02	-0.12	-0.32	-1.6	-1.12	0.19	-0.93	-2.5	-0.03	-0.02	0.00	-0.02	-0.04	0.03	-0.07
Utilities	0.25	0.03	0.01	0.04	0.28	2.0	0.25	0.05	0.30	2.3	0.03	0.00	0.00	0.00	0.04	0.01	0.02
Construction	0.94	0.05	0.06	0.11	1.05	7.5	0.39	0.48	0.87	8.4	0.12	0.01	0.01	0.01	0.14	0.16	-0.02
Manufacturing	6.89	0.11	-1.15	-1.04	5.85	55.0	0.89	-9.20	-8.30	46.7	0.89	0.01	-0.15	-0.13	0.76	0.44	0.31
Wholesale Trade	1.15	-0.06	0.03	-0.02	1.13	9.2	-0.45	0.26	-0.19	9.0	0.15	-0.01	0.00	0.00	0.15	0.11	0.04
Retail Trade	1.01	0.01	0.00	0.01	1.02	8.0	0.05	0.02	0.07	8.1	0.13	0.00	0.00	0.00	0.13	0.21	-0.08
Transportation and Warehousing	0.70	0.00	0.00	0.00	0.69	5.6	-0.02	-0.02	-0.04	5.5	0.09	0.00	0.00	0.00	0.09	0.10	-0.01
Information and Cultural Industries	0.65	-0.02	0.13	0.11	0.76	5.2	-0.15	1.05	0.90	6.1	0.08	0.00	0.02	0.01	0.10	0.04	0.06
Finance, Insurance, Real Estate and Renting and Leasing[1]	1.33	0.35	0.16	0.52	1.84	10.6	2.82	1.30	4.12	14.7	0.17	0.05	0.02	0.07	0.24	0.09	0.14
Professional, Scientific and Technical Services	0.17	0.02	-0.29	-0.27	-0.10	1.3	0.13	-2.31	-2.18	-0.8	0.02	0.00	-0.04	-0.04	-0.01	0.05	-0.06
Other Services (except Public Administration)[2]	0.05	-0.35	-1.03	-1.38	-1.33	0.4	-2.79	-8.24	-11.03	-10.6	0.01	-0.05	-0.13	-0.18	-0.17	0.24	-0.42
Sum Total	14.15	0.47	-2.10	-1.62	12.52	113.0	3.77	-16.74	-12.97	100.0	1.83	0.06	-0.27	-0.21	1.62	1.62	0.00
Total Churn Measure:		1.61	2.94			**Total Churn Measure:**	12.82	23.45			**Total Churn Measure:**	0.21	0.38				
Average Annual Churn:		0.06	0.11			**Average Annual Churn:**	0.47	0.87			**Average Annual Churn:**	0.01	0.01				

Notes:
The aggregate is the business sector. The business sector covers the whole economy less public a dministration, non-profit institutions and the rental value of owner-occupied dwellings. GDP for the business sector is calculated as the sum of the GDP of the consistuent sectors.

Labour productivity is real GDP per hour worked. Real GDP is calculated from Statistics Canada, Canadian Productivity Accounts KLEMS Database, CANSIM Table 383-0021. Current-dollar GDP estimates for 2002 were extended forward to 2007 and backward to 1961 using the growth rates of the corresponding real GDP series from the same table.

1. This combines the North American Industry Classification System (NAICS) codes 52-53 with the exception of owner-occupied dwellings industry.

2. This combines the North American Industry Classification System (NAICS) codes 55,56,61,62,71,72,81.

Table 4c

Decomposition of Aggregate Labour Productivity Growth by Sector into Within-Sector and Reallocation Effects, 1973-1981

	Labour Productivity				Sector Minus Business Sector Productivity		Share of Total Hours Worked		
	1973 Level	1981 Level	Compound Annual Growth Rate	Absolute Change	1973 Level	1973-1981 Absolute Change	1973	1981	Absolute Change
	(Constant 2002 Dollars per Hour Worked)		(Per Cent)	(Constant 2002 Dollars per Hour Worked)			(Per Cent)		(Percentage Points)
	A	B	C	D = B-A	E = A - 22.98	F = D - 3.34	G	H	I = H-G
Business Sector[1]	22.98	26.32	1.71	3.34	N/A	N/A	100.0	100.0	N/A
Agriculture, Forestry, Fishing and Hunting	12.88	16.06	2.80	3.18	-10.10	-0.16	9.08	7.19	-1.89
Mining and Oil and Gas Extraction	173.66	103.16	-6.30	-70.50	150.68	-73.84	1.55	1.87	0.31
Utilities	117.17	118.31	0.12	1.14	94.19	-2.20	0.74	0.94	0.20
Construction	20.61	29.63	4.64	9.03	-2.37	5.69	9.84	8.86	-0.98
Manufacturing	21.75	26.63	2.56	4.87	-1.23	1.54	27.40	23.34	-4.06
Wholesale Trade	14.60	17.39	2.21	2.79	-8.38	-0.55	6.62	6.37	-0.25
Retail Trade	10.64	12.13	1.65	1.49	-12.34	-1.84	12.74	13.05	0.32
Transportation and Warehousing	21.99	24.59	1.41	2.60	-0.99	-0.73	6.15	6.36	0.21
Information and Cultural Industries	20.42	33.89	6.54	13.47	-2.56	10.13	2.16	2.31	0.16
Finance, Insurance, Real Estate and Renting and Leasing[1]	45.33	49.22	1.03	3.89	22.35	0.55	5.81	7.23	1.42
Professional, Scientific and Technical Services	23.37	25.77	1.23	2.40	0.39	-0.94	2.94	4.15	1.21
Other Services (except Public Administration)[2]	18.86	19.75	0.58	0.89	-4.12	-2.45	14.98	18.34	3.36
Sum Total							100.0	100.0	0.00
								Total Churn Measure:	14.4
								Average Annual Churn:	1.80

Source: Calculated by CSLS from Statistics Canada, Canadian Productivity Accounts KLEMS Database, CANSIM Table 383-0021.

Notes:
The churn measure is the sum of the absolute values changes in share of total hours worked or the sum of the absolute values of the reallocation effect. The average annual churn is the total churn measure divided by the number of years in the period.

In column [E] the business sector average labour productivity over the period is subtracted from the sector's period average labour productivity in order to obtain reallocation effects that can be interpreted inuititvely. In the absence of this adjustment, a sector that experiences an increase in labour share always experiences a positive reallocation effect. This is misleading, because the reallocation effect should be negative if, for example, a below-average productivity sector experiences an increase in labour share.

Table 4c

Decomposition of Aggregate Labour Productivity Growth by Sector into Within-Sector and Reallocation Effects, 1973-1981 (continued)

	Contribution to Aggregate Labour Productivity Growth															Sector Relative Productivity Performance	
	Within-Sector Effect	Reallocation Effect			Total Effect	Within-Sector Effect	Reallocation Effect			Total Effect	Within-Sector Effect	Reallocation Effect			Total Effect	Expected Effect	Difference From Expected
		Level	Growth	Total			Level	Growth	Total			Level	Growth	Total			
	(Constant 2002 Dollars per Hour Worked)					(Per Cent)					(Percentage Points)						
	J=G/100*D	K=E*I/100	L=F*I/100	M=K+L	N=J+M	O=J/3.34*100	P=K/3.34*100	Q=L/3.34*100	R=P+Q	S=O+R	T=O/1.71*100	U=P/1.71*100	V=Q/1.71*100	W=U+V	X=T+W	Y=X*G/100	Z=X-Y
Business Sector[1]	3.34	N/A	N/A	N/A	N/A	100.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Agriculture, Forestry, Fishing and Hunting	0.29	0.19	0.00	0.19	0.48	8.7	5.73	0.09	5.82	14.5	0.15	0.10	0.00	0.10	0.25	0.16	0.09
Mining and Oil and Gas Extraction	-1.10	0.47	-0.23	0.24	-0.85	-32.8	14.19	-6.95	7.23	-25.6	-0.56	0.24	-0.12	0.12	-0.44	0.03	-0.46
Utilities	0.01	0.19	0.00	0.18	0.19	0.3	5.65	-0.13	5.52	5.8	0.00	0.10	0.00	0.09	0.10	0.01	0.09
Construction	0.89	0.02	-0.06	-0.03	0.86	26.6	0.70	-1.68	-0.98	25.6	0.45	0.01	-0.03	-0.02	0.44	0.17	0.27
Manufacturing	1.34	0.05	-0.06	-0.01	1.32	40.0	1.50	-1.87	-0.37	39.6	0.68	0.03	-0.03	-0.01	0.68	0.47	0.21
Wholesale Trade	0.18	0.02	0.00	0.02	0.21	5.5	0.63	0.04	0.67	6.2	0.09	0.01	0.00	0.01	0.11	0.11	-0.01
Retail Trade	0.19	-0.04	-0.01	-0.04	0.15	5.7	-1.17	-0.18	-1.35	4.3	0.10	-0.02	0.00	-0.02	0.07	0.22	-0.14
Transportation and Warehousing	0.16	0.00	0.00	0.00	0.16	4.8	-0.06	-0.05	-0.11	4.7	0.08	0.00	0.00	0.00	0.08	0.11	-0.02
Information and Cultural Industries	0.29	0.00	0.02	0.01	0.30	8.7	-0.12	0.47	0.35	9.1	0.15	0.00	0.01	0.01	0.15	0.04	0.12
Finance, Insurance, Real Estate and Renting and Leasing[1]	0.23	0.32	0.01	0.33	0.55	6.8	9.52	0.23	9.75	16.5	0.12	0.16	0.00	0.17	0.28	0.10	0.18
Professional, Scientific and Technical Services	0.07	0.00	-0.01	-0.01	0.06	2.1	0.14	-0.34	-0.20	1.9	0.04	0.00	-0.01	0.00	0.03	0.05	-0.02
Other Services (except Public Administration)[2]	0.13	-0.14	-0.08	-0.22	-0.09	4.0	-4.15	-2.47	-6.62	-2.6	0.07	-0.07	-0.04	-0.11	-0.04	0.26	-0.30
Sum Total	2.68	1.09	-0.43	0.66	3.34	80.3	32.55	-12.82	19.73	100.0	1.37	0.56	-0.22	0.34	1.71	1.71	0.00
Total Churn Measure:		1.45	0.48			**Total Churn Measure:**	43.56	14.49			**Total Churn Measure:**	0.74	0.25				
Average Annual Churn:		0.18	0.06			**Average Annual Churn:**	5.45	1.81			**Average Annual Churn:**	0.09	0.03				

Notes:
The aggregate is the business sector. The business sector covers the whole economy less public a dministration, non-profit institutions and the rental value of owner-occupied dwellings. GDP for the business sector is calculated as the sum of the GDP of the consistuent sectors.

Labour productivity is real GDP per hour worked. Real GDP is calculated from Statistics Canada, Canadian Productivity Accounts KLEMS Database, CANSIM Table 383-0021. Current-dollar GDP estimates for 2002 were extended forward to 2007 and backward to 1961 using the growth rates of the corresponding real GDP series from the same table.

1. This combines the North American Industry Classification System (NAICS) codes 52-53 with the exception of owner-occupied dwellings industry.

2. This combines the North American Industry Classification System (NAICS) codes 55,56,61,62,71,72,81.

Table 4d

Decomposition of Aggregate Labour Productivity Growth by Sector into Within-Sector and Reallocation Effects, 1981-1989

	Labour Productivity				Sector Minus Business Sector Productivity		Share of Total Hours Worked		
	1981 Level	1989 Level	Compound Annual Growth Rate	Absolute Change	1981 Level	1981-1989 Absolute Change	1981	1989	Absolute Change
	(Constant 2002 Dollars per Hour Worked)		(Per Cent)	(Constant 2002 Dollars per Hour Worked)			(Per Cent)		(Percentage Points)
	A	B	C	D = B-A	E = A - 26.32	F = D - 2.88	G	H	I = H-G
Business Sector[1]	26.32	29.20	1.31	2.88	N/A	N/A	100.0	100.0	N/A
Agriculture, Forestry, Fishing and Hunting	16.06	17.84	1.32	1.78	-10.25	-1.10	7.19	6.21	-0.98
Mining and Oil and Gas Extraction	103.16	125.39	2.47	22.23	76.84	19.35	1.87	1.62	-0.25
Utilities	118.31	130.64	1.25	12.33	91.99	9.45	0.94	0.91	-0.03
Construction	29.63	29.33	-0.13	-0.30	3.31	-3.18	8.86	9.11	0.25
Manufacturing	26.63	32.26	2.43	5.64	0.31	2.76	23.34	20.93	-2.40
Wholesale Trade	17.39	25.45	4.88	8.06	-8.93	5.19	6.37	6.44	0.07
Retail Trade	12.13	14.31	2.09	2.18	-14.19	-0.69	13.05	13.24	0.19
Transportation and Warehousing	24.59	29.27	2.20	4.68	-1.73	1.80	6.36	6.11	-0.25
Information and Cultural Industries	33.89	41.78	2.65	7.89	7.57	5.01	2.31	2.43	0.11
Finance, Insurance, Real Estate and Renting and Leasing[1]	49.22	51.74	0.63	2.52	22.90	-0.36	7.23	7.26	0.03
Professional, Scientific and Technical Services	25.77	27.05	0.61	1.28	-0.55	-1.60	4.15	5.04	0.89
Other Services (except Public Administration)[2]	19.75	19.26	-0.32	-0.49	-6.57	-3.37	18.34	20.71	2.37
Sum Total							100.0	100.0	0.00
								Total Churn Measure:	7.8
								Average Annual Churn:	0.98

Source: Calculated by CSLS from Statistics Canada, Canadian Productivity Accounts KLEMS Database, CANSIM Table 383-0021.

Notes:
The churn measure is the sum of the absolute values changes in share of total hours worked or the sum of the absolute values of the reallocation effect. The average annual churn is the total churn measure divided by the number of years in the period.

In column [E] the business sector average labour productivity over the period is subtracted from the sector's period average labour productivity in order to obtain reallocation effects that can be interpreted inuititvely. In the absence of this adjustment, a sector that experiences an increase in labour share always experiences a positive reallocation effect. This is misleading, because the reallocation effect should be negative if, for example, a below-average productivity sector experiences an increase in labour share.

Table 4d

Decomposition of Aggregate Labour Productivity Growth by Sector into Within-Sector and Reallocation Effects, 1981-1989 (continued)

	Contribution to Aggregate Labour Productivity Growth															Sector Relative Productivity Performance	
	Within-Sector Effect	Reallocation Effect			Total Effect	Within-Sector Effect	Reallocation Effect			Total Effect	Within-Sector Effect	Reallocation Effect			Total Effect	Expected Effect	Difference From Expected
		Level	Growth	Total			Level	Growth	Total			Level	Growth	Total			
	(Constant 2002 Dollars per Hour Worked)					(Per Cent)					(Percentage Points)						
	J=G/100*D	K=E*I/100	L=F*I/100	M=K+L	N=J+M	O=J/2.88*100	P=K/2.88*100	Q=L/2.88*100	R=P+Q	S=O+R	T=O/1.31*100	U=P/1.31*100	V=Q/1.31*100	W=U+V	X=T+W	Y=X*G/100	Z=X-Y
Business Sector[1]	2.88	N/A	N/A	N/A	N/A	100.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Agriculture, Forestry, Fishing and Hunting	0.13	0.10	0.01	0.11	0.24	4.4	3.49	0.37	3.86	8.3	0.06	0.05	0.00	0.05	0.11	0.09	0.01
Mining and Oil and Gas Extraction	0.42	-0.19	-0.05	-0.24	0.18	14.4	-6.62	-1.67	-8.29	6.2	0.19	-0.09	-0.02	-0.11	0.08	0.02	0.06
Utilities	0.12	-0.03	0.00	-0.03	0.09	4.0	-0.89	-0.09	-0.99	3.0	0.05	-0.01	0.00	-0.01	0.04	0.01	0.03
Construction	-0.03	0.01	-0.01	0.00	-0.03	-0.9	0.29	-0.28	0.01	-0.9	-0.01	0.00	0.00	0.00	-0.01	0.12	-0.13
Manufacturing	1.32	-0.01	-0.07	-0.07	1.24	45.7	-0.26	-2.30	-2.56	43.2	0.60	0.00	-0.03	-0.03	0.56	0.30	0.26
Wholesale Trade	0.51	-0.01	0.00	0.00	0.51	17.9	-0.20	0.12	-0.08	17.8	0.23	0.00	0.00	0.00	0.23	0.08	0.15
Retail Trade	0.28	-0.03	0.00	-0.03	0.26	9.9	-0.93	-0.05	-0.98	8.9	0.13	-0.01	0.00	-0.01	0.12	0.17	-0.05
Transportation and Warehousing	0.30	0.00	0.00	0.00	0.30	10.3	0.15	-0.15	-0.01	10.3	0.13	0.00	0.00	0.00	0.13	0.08	0.05
Information and Cultural Industries	0.18	0.01	0.01	0.01	0.20	6.3	0.30	0.20	0.50	6.8	0.08	0.00	0.00	0.01	0.09	0.03	0.06
Finance, Insurance, Real Estate and Rentinz and Leasing[2]	0.18	0.01	0.00	0.01	0.19	6.3	0.22	0.00	0.21	6.5	0.08	0.00	0.00	0.00	0.09	0.09	-0.01
Professional, Scientific and Technical Services	0.05	0.00	-0.01	-0.02	0.03	1.8	-0.17	-0.49	-0.66	1.2	0.02	0.00	-0.01	-0.01	0.02	0.05	-0.04
Other Services (except Public Administration)[2]	-0.09	-0.16	-0.08	-0.24	-0.33	-3.1	-5.40	-2.77	-8.17	-11.3	-0.04	-0.07	-0.04	-0.11	-0.15	0.24	-0.39
Sum Total	3.37	-0.29	-0.20	-0.49	2.88	117.1	-10.03	-7.12	-17.15	100.0	1.53	-0.13	-0.09	-0.22	1.31	1.31	0.00
Total Churn Measure:		0.54	0.24			**Total Churn Measure:**	18.91	8.50			**Total Churn Measure:**	0.25	0.11				
Average Annual Churn:		0.07	0.03			**Average Annual Churn:**	2.36	1.06			**Average Annual Churn:**	0.03	0.01				

Notes:
The aggregate is the business sector. The business sector covers the whole economy less public a dministration, non-profit institutions and the rental value of owner-occupied dwellings. GDP for the business sector is calculated as the sum of the GDP of the consistuent sectors.

Labour productivity is real GDP per hour worked. Real GDP is calculated from Statistics Canada, Canadian Productivity Accounts KLEMS Database, CANSIM Table 383-0021. Current-dollar GDP estimates for 2002 were extended forward to 2007 and backward to 1961 using the growth rates of the corresponding real GDP series from the same table.

1. This combines the North American Industry Classification System (NAICS) codes 52-53 with the exception of owner-occupied dwellings industry.

2. This combines the North American Industry Classification System (NAICS) codes 55,56,61,62,71,72,81.

Table 4e

Decomposition of Aggregate Labour Productivity Growth by Sector into Within-Sector and Reallocation Effects, 1989-2000

	Labour Productivity				Sector Minus Business Sector Productivity		Share of Total Hours Worked		
	1989 Level	2000 Level	Compound Annual Growth Rate	Absolute Change	1989 Level	1989-2000 Absolute Change	1989	2000	Absolute Change
	(Constant 2002 Dollars per Hour Worked)		(Per Cent)	(Constant 2002 Dollars per Hour Worked)			(Per Cent)		(Percentage Points)
	A	B	C	D = B-A	E = A - 29.20	F = D - 6.31	G	H	I = H-G
Business Sector[1]	29.20	35.51	1.79	6.31	N/A	N/A	100.0	100.0	N/A
Agriculture, Forestry, Fishing and Hunting	17.84	26.28	3.58	8.44	-11.36	2.13	6.21	4.43	-1.78
Mining and Oil and Gas Extraction	125.39	160.66	2.28	35.27	96.19	28.96	1.62	1.46	-0.16
Utilities	130.64	150.40	1.29	19.76	101.44	13.46	0.91	0.77	-0.14
Construction	29.33	30.20	0.26	0.87	0.13	-5.44	9.11	7.78	-1.33
Manufacturing	32.26	46.91	3.46	14.64	3.07	8.33	20.93	18.28	-2.66
Wholesale Trade	25.45	31.96	2.09	6.50	-3.74	0.19	6.44	7.29	0.85
Retail Trade	14.31	18.54	2.38	4.23	-14.88	-2.08	13.24	12.68	-0.56
Transportation and Warehousing	29.27	33.34	1.19	4.07	0.07	-2.24	6.11	6.36	0.25
Information and Cultural Industries	41.78	50.67	1.77	8.89	12.58	2.59	2.43	2.90	0.47
Finance, Insurance, Real Estate and Renting and Leasing[1]	51.74	68.16	2.54	16.43	22.54	10.12	7.26	7.39	0.13
Professional, Scientific and Technical Services	27.05	29.10	0.67	2.05	-2.14	-4.26	5.04	7.20	2.16
Other Services (except Public Administration)[2]	19.26	19.22	-0.02	-0.04	-9.94	-6.35	20.71	23.46	2.75
Sum Total							100.0	100.0	0.00
								Total Churn Measure:	13.2
								Average Annual Churn:	1.20

Source: Calculated by CSLS from Statistics Canada, Canadian Productivity Accounts KLEMS Database, CANSIM Table 383-0021.

Notes:

The churn measure is the sum of the absolute values changes in share of total hours worked or the sum of the absolute values of the reallocation effect. The average annual churn is the total churn measure divided by the number of years in the period.

In column [E] the business sector average labour productivity over the period is subtracted from the sector's period average labour productivity in order to obtain reallocation effects that can be interpreted inuititvely. In the absence of this adjustment, a sector that experiences an increase in labour share always experiences a positive reallocation effect. This is misleading, because the reallocation effect should be negative if, for example, a below-average productivity sector experiences an increase in labour share.

Table 4e

Decomposition of Aggregate Labour Productivity Growth by Sector into Within-Sector and Reallocation Effects, 1989-2000 (continued)

	Contribution to Aggregate Labour Productivity Growth															Sector Relative Productivity Performance	
	Within-Sector Effect	Reallocation Effect			Total Effect	Within-Sector Effect	Reallocation Effect			Total Effect	Within-Sector Effect	Reallocation Effect			Total Effect	Expected Effect	Difference From Expected
		Level	Growth	Total			Level	Growth	Total			Level	Growth	Total			
	(Constant 2002 Dollars per Hour Worked)					(Per Cent)					(Percentage Points)						
	J=G/100*D	K=E*I/100	L=F*I/100	M=K+L	N=J+M	O=J/6.31*100	P=K/6.31*100	Q=L/6.31*100	R=P+Q	S=O+R	T=O/1.79*100	U=P/1.79*100	V=Q/1.79*100	W=U+V	X=T+W	Y=X*G/100	Z=X-Y
Business Sector[1]	6.31	N/A	N/A	N/A	N/A	100.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Agriculture, Forestry, Fishing and Hunting	0.52	0.20	-0.04	0.16	0.69	8.3	3.20	-0.60	2.60	10.9	0.15	0.06	-0.01	0.05	0.20	0.11	0.08
Mining and Oil and Gas Extraction	0.57	-0.15	-0.05	-0.20	0.37	9.1	-2.43	-0.73	-3.16	5.9	0.16	-0.04	-0.01	-0.06	0.11	0.03	0.08
Utilities	0.18	-0.14	-0.02	-0.16	0.02	2.9	-2.24	-0.30	-2.53	0.3	0.05	-0.04	-0.01	-0.05	0.01	0.02	-0.01
Construction	0.08	0.00	0.07	0.07	0.15	1.3	-0.03	1.15	1.12	2.4	0.02	0.00	0.02	0.02	0.04	0.16	-0.12
Manufacturing	3.07	-0.08	-0.22	-0.30	2.76	48.6	-1.29	-3.51	-4.80	43.8	0.87	-0.02	-0.06	-0.09	0.79	0.38	0.41
Wholesale Trade	0.42	-0.03	0.00	-0.03	0.39	6.6	-0.51	0.03	-0.48	6.2	0.12	-0.01	0.00	-0.01	0.11	0.12	-0.01
Retail Trade	0.56	0.08	0.01	0.10	0.65	8.9	1.32	0.18	1.51	10.4	0.16	0.02	0.00	0.03	0.19	0.24	-0.05
Transportation and Warehousing	0.25	0.00	-0.01	-0.01	0.24	3.9	0.00	-0.09	-0.09	3.9	0.07	0.00	0.00	0.00	0.07	0.11	-0.04
Information and Cultural Industries	0.22	0.06	0.01	0.07	0.29	3.4	0.94	0.19	1.13	4.6	0.06	0.02	0.00	0.02	0.08	0.04	0.04
Finance, Insurance, Real Estate and Renting and Leasing[1]	1.19	0.03	0.01	0.04	1.24	18.9	0.48	0.21	0.69	19.6	0.34	0.01	0.00	0.01	0.35	0.13	0.22
Professional, Scientific and Technical Services	0.10	-0.05	-0.09	-0.14	-0.04	1.6	-0.73	-1.46	-2.19	-0.6	0.03	-0.01	-0.03	-0.04	-0.01	0.09	-0.10
Other Services (except Public Administration)[2]	-0.01	-0.27	-0.17	-0.45	-0.46	-0.1	-4.34	-2.77	-7.11	-7.2	0.00	-0.08	-0.05	-0.13	-0.13	0.37	-0.50
Sum Total	7.15	-0.35	-0.49	-0.84	6.31	113.3	-5.62	-7.69	-13.32	100.0	2.03	-0.10	-0.14	-0.24	1.79	1.79	0.00
Total Churn Measure:		1.10	0.71			**Total Churn Measure:**	17.50	11.22			**Total Churn Measure:**	0.31	0.20				
Average Annual Churn:		0.10	0.06			**Average Annual Churn:**	1.59	1.02			**Average Annual Churn:**	0.03	0.02				

Notes:

The aggregate is the business sector. The business sector covers the whole economy less public a dministration, non-profit institutions and the rental value of owner-occupied dwellings. GDP for the business sector is calculated as the sum of the GDP of the consistuent sectors.

Labour productivity is real GDP per hour worked. Real GDP is calculated from Statistics Canada, Canadian Productivity Accounts KLEMS Database, CANSIM Table 383-0021. Current-dollar GDP estimates for 2002 were extended forward to 2007 and backward to 1961 using the growth rates of the corresponding real GDP series from the same table.

1. This combines the North American Industry Classification System (NAICS) codes 52-53 with the exception of owner-occupied dwellings industry.

2. This combines the North American Industry Classification System (NAICS) codes 55,56,61,62,71,72,81.

Table 4f

Decomposition of Aggregate Labour Productivity Growth by Sector into Within-Sector and Reallocation Effects, 2000-2007

	Labour Productivity				Sector Minus Business Sector Productivity		Share of Total Hours Worked		
	2000 Level	2007 Level	Compound Annual Growth Rate	Absolute Change	2000 Level	2000-2007 Absolute Change	2000	2007	Absolute Change
	(Constant 2002 Dollars per Hour Worked)		(Per Cent)	(Constant 2002 Dollars per Hour Worked)			(Per Cent)		(Percentage Points)
	A	B	C	D = B-A	E = A - 35.51	F = D - 2.83	G	H	I = H-G
Business Sector[1]	35.51	38.33	1.10	2.83	N/A	N/A	100.0	100.0	N/A
Agriculture, Forestry, Fishing and Hunting	26.28	32.95	3.28	6.67	-9.23	3.84	4.43	3.31	-1.12
Mining and Oil and Gas Extraction	160.66	119.20	-4.17	-41.46	125.16	-44.29	1.46	2.01	0.54
Utilities	150.40	145.96	-0.43	-4.44	114.90	-7.27	0.77	0.83	0.06
Construction	30.20	33.77	1.61	3.57	-5.31	0.74	7.78	9.28	1.51
Manufacturing	46.91	50.69	1.11	3.78	11.40	0.95	18.28	14.96	-3.32
Wholesale Trade	31.96	41.05	3.64	9.09	-3.55	6.26	7.29	7.12	-0.17
Retail Trade	18.54	23.28	3.30	4.73	-16.96	1.90	12.68	12.80	0.12
Transportation and Warehousing	33.34	34.57	0.52	1.24	-2.17	-1.59	6.36	6.34	-0.02
Information and Cultural Industries	50.67	63.24	3.21	12.56	15.17	9.74	2.90	2.73	-0.17
Finance, Insurance, Real Estate and Renting and Leasing[1]	68.16	71.82	0.75	3.66	32.66	0.83	7.39	8.03	0.64
Professional, Scientific and Technical Services	29.10	30.00	0.43	0.89	-6.40	-1.93	7.20	7.76	0.56
Other Services (except Public Administration)[2]	19.22	20.19	0.71	0.97	-16.29	-1.85	23.46	24.83	1.37
Sum Total							100.0	100.0	0.00
								Total Churn Measure:	9.6
								Average Annual Churn:	1.37

Source: Calculated by CSLS from Statistics Canada, Canadian Productivity Accounts KLEMS Database, CANSIM Table 383-0021.

Notes:
The churn measure is the sum of the absolute values changes in share of total hours worked or the sum of the absolute values of the reallocation effect. The average annual churn is the total churn measure divided by the number of years in the period.

In column [E] the business sector average labour productivity over the period is subtracted from the sector's period average labour productivity in order to obtain reallocation effects that can be interpreted inuititvely. In the absence of this adjustment, a sector that experiences an increase in labour share always experiences a positive reallocation effect. This is misleading, because the reallocation effect should be negative if, for example, a below-average productivity sector experiences an increase in labour share.

Table 4f

Decomposition of Aggregate Labour Productivity Growth by Sector into Within-Sector and Reallocation Effects, 2000-2007 (continued)

	Contribution to Aggregate Labour Productivity Growth															Sector Relative Productivity Performance	
	Within-Sector Effect	Reallocation Effect			Total Effect	Within-Sector Effect	Reallocation Effect			Total Effect	Within-Sector Effect	Reallocation Effect			Total Effect	Expected Effect	Difference From Expected
		Level	Growth	Total			Level	Growth	Total			Level	Growth	Total			
	(Constant 2002 Dollars per Hour Worked)					(Per Cent)					(Percentage Points)						
	J=G/100*D	K=E*I/100	L=F*I/100	M=K+L	N=J+M	O=J/2.83*100	P=K/2.83*100	Q=L/2.83*100	R=P+Q	S=O+R	T=O/1.10*100	U=P/1.10*100	V=Q/1.10*100	W=U+V	X=T+W	Y=X*G/100	Z=X-Y
Business Sector[1]	2.83	N/A	N/A	N/A	N/A	100.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Agriculture, Forestry, Fishing and Hunting	0.30	0.10	-0.04	0.06	0.36	10.5	3.66	-1.52	2.14	12.6	0.12	0.04	-0.02	0.02	0.14	0.05	0.09
Mining and Oil and Gas Extraction	-0.61	0.68	-0.24	0.44	-0.17	-21.4	24.03	-8.50	15.53	-5.9	-0.24	0.26	-0.09	0.17	-0.06	0.02	-0.08
Utilities	-0.03	0.06	0.00	0.06	0.03	-1.2	2.24	-0.14	2.10	0.9	-0.01	0.02	0.00	0.02	0.01	0.01	0.00
Construction	0.28	-0.08	0.01	-0.07	0.21	9.8	-2.83	0.40	-2.44	7.4	0.11	-0.03	0.00	-0.03	0.08	0.09	0.00
Manufacturing	0.69	-0.38	-0.03	-0.41	0.28	24.4	-13.37	-1.12	-14.49	9.9	0.27	-0.15	-0.01	-0.16	0.11	0.20	-0.09
Wholesale Trade	0.66	0.01	-0.01	0.00	0.66	23.4	0.21	-0.37	-0.16	23.3	0.26	0.00	0.00	0.00	0.26	0.08	0.18
Retail Trade	0.60	-0.02	0.00	-0.02	0.58	21.2	-0.73	0.08	-0.65	20.6	0.23	-0.01	0.00	-0.01	0.23	0.14	0.09
Transportation and Warehousing	0.08	0.00	0.00	0.00	0.08	2.8	0.02	0.01	0.03	2.8	0.03	0.00	0.00	0.00	0.03	0.07	-0.04
Information and Cultural Industries	0.36	-0.03	-0.02	-0.04	0.32	12.9	-0.89	-0.57	-1.46	11.4	0.14	-0.01	-0.01	-0.02	0.13	0.03	0.09
Finance, Insurance, Real Estate and Renting and Leasing[1]	0.27	0.21	0.01	0.21	0.48	9.6	7.36	0.19	7.54	17.1	0.11	0.08	0.00	0.08	0.19	0.08	0.11
Professional, Scientific and Technical Services	0.06	-0.04	-0.01	-0.05	0.02	2.3	-1.27	-0.38	-1.65	0.6	0.03	-0.01	0.00	-0.02	0.01	0.08	-0.07
Other Services (except Public Administration)[2]	0.23	-0.22	-0.03	-0.25	-0.02	8.1	-7.87	-0.90	-8.77	-0.7	0.09	-0.09	-0.01	-0.10	-0.01	0.26	-0.27
Sum Total	2.89	0.30	-0.36	-0.06	2.83	102.3	10.55	-12.82	-2.27	100.0	1.13	0.12	-0.14	-0.03	1.10	1.10	0.00
Total Churn Measure:		1.82	0.40			**Total Churn Measure:**	64.47	14.18			**Total Churn Measure:**	0.71	0.16				
Average Annual Churn:		0.26	0.06			**Average Annual Churn:**	9.21	2.03			**Average Annual Churn:**	0.10	0.02				

Notes:
The aggregate is the business sector. The business sector covers the whole economy less public a dministration, non-profit institutions and the rental value of owner-occupied dwellings. GDP for the business sector is calculated as the sum of the GDP of the consistuent sectors.

Labour productivity is real GDP per hour worked. Real GDP is calculated from Statistics Canada, Canadian Productivity Accounts KLEMS Database, CANSIM Table 383-0021. Current-dollar GDP estimates for 2002 were extended forward to 2007 and backward to 1961 using the growth rates of the corresponding real GDP series from the same table.

1. This combines the North American Industry Classification System (NAICS) codes 52-53 with the exception of owner-occupied dwellings industry.

2. This combines the North American Industry Classification System (NAICS) codes 55,56,61,62,71,72,81.

Table 4g
A Comparison of Sectoral Contribution in 1973-2000 and 2000-2007 period Divided into Within-Sector and Reallocation Effects

	Labour Productivity		Contribution to Aggregate Labour Productivity Growth								
			1973-2000			2000-2007			Difference Between 1973-2000 and 2000-2007		
	1973-2000	2000-2007	Within-Sector Effect	Reallocation Effect	Total Effect	Within-Sector Effect	Reallocation Effect	Total Effect	Within-Sector Effect	Reallocation Effect	Total Effect
	(Compound Annual Growth Rate)		(Percentage Points)								
	A	B	C	D	E	F	G	H	I = F - C	J = G - D	K = H - E
Business Sector[1]	1.62	1.10	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Agriculture, Forestry, Fishing and Hunting	2.68	3.28	0.16	0.06	0.21	0.12	0.02	0.14	-0.04	-0.03	-0.07
Mining and Oil and Gas Extraction	-0.29	-4.17	-0.03	-0.02	-0.04	-0.24	0.17	-0.06	-0.21	0.19	-0.02
Utilities	0.93	-0.43	0.03	0.00	0.04	-0.01	0.02	0.01	-0.05	0.02	-0.03
Construction	1.43	1.61	0.12	0.01	0.14	0.11	-0.03	0.08	-0.01	-0.04	-0.06
Manufacturing	2.89	1.11	0.89	-0.13	0.76	0.27	-0.16	0.11	-0.62	-0.02	-0.65
Wholesale Trade	2.94	3.64	0.15	0.00	0.15	0.26	0.00	0.26	0.11	0.00	0.11
Retail Trade	2.08	3.30	0.13	0.00	0.13	0.23	-0.01	0.23	0.10	-0.01	0.09
Transportation and Warehousing	1.55	0.52	0.09	0.00	0.09	0.03	0.00	0.03	-0.06	0.00	-0.06
Information and Cultural Industries	3.42	3.21	0.08	0.01	0.10	0.14	-0.02	0.13	0.06	-0.03	0.03
Finance, Insurance, Real Estate and Renting and Leasing[1]	1.52	0.75	0.17	0.07	0.24	0.11	0.08	0.19	-0.07	0.02	-0.05
Professional, Scientific and Technical Services	0.82	0.43	0.02	-0.04	-0.01	0.03	-0.02	0.01	0.00	0.02	0.02
Other Services (except Public Administration)[2]	0.07	0.71	0.01	-0.18	-0.17	0.09	-0.10	-0.01	0.08	0.08	0.16
Sum Total	-	-	1.83	-0.21	1.62	1.13	-0.03	1.10	-0.71	0.19	-0.52

Source: Table 4b and 4f

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