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New Estimates of Labour, Capital and Multifactor Productivity Growth and Levels for Canadian Provinces at the Three-digit NAICS Level, 1997- 2007

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Abstract

This report presents new estimates of the levels and growth rates of labour, capital and multifactor productivity for the Canadian provinces by industry for the 1997-2007 period at the market sector, two-digit, and three-digit NAICS industry levels. Also, estimates of the sources of labour productivity growth (capital intensity, labour quality, and multifactor productivity) are presented. Furthermore, this report examines the labour productivity gap between the provinces and the Canadian average. The report closes with a provincial and industry-level perspective on Alberta's relative productivity performance.

New Estimates of Labour, Capital and Multifactor Productivity Growth and Levels for Canadian Provinces at the Three-digit NAICS Level, 1997-2007

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New Estimates of Labour, Capital and Multifactor Productivity Growth and Levels for Canadian Provinces at the Three-digit NAICS Level, 1997-2007

Executive Summary

This report presents new estimates of labour, capital and multifactor productivity (MFP) or total factor productivity levels and growth for the Canadian provinces across the market, two-digit, and three-digit levels of North American Industry Classification System (NAICS) industrial aggregations. We also discuss the sources of labour productivity growth: labour quality, capital composition, capital intensity, and multifactor productivity. Labour productivity growth is the main driver of increasing living standards for Canadians, making it a key variable for public policy.

The estimates have been prepared by Statistics Canada for the Centre for the Study of Living Standards (CSLS), which received financial support from Alberta Finance and Enterprise to produce this report. The estimates are posted on the CSLS website for free public access.

This report has three main objectives. The first is to provide a detailed account of the growth accounting methods used to create the national and provincial database and the key differences between the two. The second is to provide a complete overview of the results from the provincial productivity database. Finally, the third objective is to provide insight on labour productivity growth and the sources of growth in the province of Alberta.

Methodologies and Data Sources for the Provincial Productivity Database

In the provincial productivity database, labour productivity is a function of labour input, capital input, and a residual called multifactor productivity (MFP). This is a common formulation of growth accounting. However, this database is the first time that capital and labour input at the provincial and industry levels will be quality adjusted. Because of adjusting for quality in inputs, the multifactor productivity measured in this database only captures technological advancements and other changes considered outside of improvements in capital and labour. This is an important distinction, and it allows us to provide far more detail on the sources of labour productivity growth than has ever been available before for Canada.

It should be noted that there are several slight differences between the calculation of the sources of growth at the national and provincial level:

- The health and education industries are completely excluded from the market sector aggregate at the provincial level while the business sector

portion of these industries is included in the national level business sector estimates.

- The estimate for Canada based on the provincial program is an aggregation of the ten provinces, and thus excludes the three territories.
- Output in the provincial program is derived from the IO tables in both Laspeyres and Paasche prices, rather than in Laspeyres prices only as in the national estimates.
- Land and inventories are excluded from capital input estimates at the provincial level.
- The effect of tax parameters is not taken into account in the estimation of user costs of capital at the provincial level.

In general, however, the estimates remain fairly consistent between the provincial and national programs. In the market sector, the difference in MFP growth between the methods is only 0.1 percentage points per year for the 1997 to 2007 period.

Results Section of the Productivity Database

The key results for each productivity or source of growth measure are:

Labour Productivity

- In Canada, the labour productivity level in the market sector in 2007 was \$36.06 per hour (in 1997 dollars). The province with the highest real output per hour was Newfoundland at \$39.57 per hour. The province with the lowest labour productivity level was Prince Edward Island with \$22.10 per hour.
- Output per hour in the market sector in Canada advanced at a 1.71 per cent average annual rate between 1997 and 2007. Newfoundland was the province with by far the most rapid labour productivity growth at 4.82 per cent per year from 1997 to 2007. Alberta had the weakest productivity growth at 1.04 per cent per year. The difference between the growth rates in Newfoundland and Alberta stemmed from the mining, and oil and gas extraction industry, which had negative growth in Alberta (-4.3 per cent per year) and very high growth in Newfoundland (15.3 per cent per year) .

Labour Quality

- At the Canada level, labour quality in the market sector advanced at a 0.52 per cent average annual rate between 1997 and 2007. Saskatchewan was the province with the most rapid labour quality growth (0.90 per cent per year). British Columbia experienced the slowest increase in labour quality, a very weak 0.12 per cent per year.

Capital Productivity

- In Canada, capital productivity in the market sector in 2007 was \$2.30 GDP (\$1997) per dollar of capital services. The province with the highest capital productivity was Newfoundland at \$3.69 of GDP per dollar of capital services. The province with the lowest capital productivity was Alberta which had a capital productivity of \$1.40 of real GDP per dollar of capital services. Newfoundland's high productivity is due to the extremely high capital productivity in its mining, and gas and oil extraction industry of \$13.41 of GDP per dollar of capital services.
- At the Canada level, the capital productivity (dollars of real GDP per dollar of real capital services) in the market sector fell at a 0.57 per cent average annual rate between 1997 and 2007. Newfoundland again was the province with by far the most rapid capital productivity growth (4.25 per cent per year). Alberta had the worst capital productivity performance, with real GDP per unit of capital services falling at a 3.40 per cent average annual rate. Again, mining, and oil and gas extraction played a major role in Alberta and Newfoundland due to a high rate of growth in Newfoundland (19.2 per cent) and negative growth in Alberta (-8.3 per cent).

Capital Composition

- At the Canada level, capital composition, which is defined as the dollars of capital services per dollar of capital stock, advanced in the market sector at a 1.2 per cent average annual rate between 1997 and 2007. Prince Edward Island and Saskatchewan were the provinces with the most rapid capital composition growth (2.34 and 1.98 per cent per year respectively). Nova Scotia experienced the slowest increase in capital composition, a relatively weak 0.51 per cent per year.
- Ontario had the highest level of capital composition at 111.2 per cent of the national average. Newfoundland had the lowest at 47.6 per cent of the national average due to the high proportion of long-lived assets in its mining and oil and gas industry.

Capital Intensity

- At the Canada level, capital intensity (dollars of capital services per hour) in the market sector rose at a 2.30 per cent average annual rate between 1997 and 2007. Alberta had the highest capital intensity growth, with capital intensity rising at a 4.59 per cent average annual rate. Newfoundland was the province with by far the slowest capital intensity growth (0.55 per cent per year). It is interesting to note that Newfoundland and Alberta's positions are now reversed from labour and capital productivity.

- The capital intensity level in the market sector for Canada in 2007 was \$15.70 (\$1997) of capital services per hour. The level varied greatly among provinces with Alberta having the highest amount at \$28.12 of capital services per hour, nearly double the Canadian average. Alberta's capital intensity is so high because of Alberta's very high capital intensity in utilities and in mining and oil and gas extraction.

Multifactor Productivity

- Newfoundland was the province with the highest MFP level with a level of 135.4 per cent of the national average in 2007. Prince Edward Island had the lowest relative MFP level at 74.1 per cent of the national average in 2007.
- At the Canada level, multifactor productivity in the market sector rose at a 0.44 per cent average annual rate between 1997 and 2007. Newfoundland, again, was the province with by far the most rapid multifactor productivity growth, an impressive 4.14 per cent per year. Alberta had by far the worst multifactor productivity performance; MFP fell at 1.58 per cent per year.

Sources of Labour Productivity Growth

- At the Canada level, the 1.7 per cent average annual rate of labour productivity growth for the market sector for the 1997-2007 period can be decomposed into a 0.3 percentage point (17.5 per cent) contribution from labour quality, a 1.0 percentage point contribution from capital services intensity (56.6 per cent) and a 0.4 percentage point contribution from MFP growth (25.5 per cent).
- The relative importance of the sources of labour productivity growth at the industry level deviated significantly in many instances from that observed in the market sector. This is unsurprising due to the different production processes in each industry.

Sources of the Market Sector Labour Productivity Gap by Province

- Newfoundland had the highest labour productivity level in the market sector in 2007 because of its exceptional multifactor productivity level relative to the Canadian average.
- The three Maritime Provinces, Prince Edward Island, Nova Scotia, and New Brunswick, all have low labour productivity levels, multifactor productivity, and capital intensity ratios. Moreover, in each of these provinces the below average labour productivity, multifactor productivity, and capital intensity levels are widespread across industries.

Alberta's Productivity Performance, 1997 to 2007

- Alberta's market sector experienced the worst productivity performance among the ten Canadian provinces over the 1997-2007 period. Labour productivity advanced a meagre 1.0 per cent per year, capital productivity fell 3.4 per cent per year, and multifactor productivity decreased 1.6 per cent per year.
- This poor aggregate labour productivity performance was not reflected at the industry level. Indeed, Alberta ranked first among the ten provinces for labour productivity growth and fourth for multifactor productivity growth (but still tenth for capital productivity growth) when industries are given equal weighting.
- This discrepancy reflected the falling productivity in the oil and gas extraction industry. Labour productivity fell 5.7 per cent per year, capital productivity 8.4 per cent per year, and MFP 7.9 per cent per year. These developments were closely related to the shift of resources into the oil sands, where more labour and capital are needed to extract a barrel of oil than in conventional oil production. Previously, oil production in Alberta was primarily from conventional sources which are far less capital intensive.
- The falling productivity levels of the large and growing oil and gas extraction sector in turn reduced the aggregate productivity performance through a composition effect, even though most other industries enjoyed labour and multifactor productivity growth near or above the national average.

Conclusions

Labour productivity growth and sources of growth varied widely across provinces depending on industrial structure and natural resource endowment. In the case of both labour productivity and MFP, the variance of these measures in the mining and oil and gas extraction industry played major roles in provinces with large resource endowments. In Newfoundland, the mining and oil and natural gas extraction sector was a major source of labour productivity and MFP growth. In contrast, in Alberta, this sector made a negative contribution. This is explained by the nature of the sectors in the two provinces. In Newfoundland, large investments in the offshore oil sector were made in the 1980s and the first half of the 1990s, but with little investment after 1997. This meant that additional output could be produced after 1997 without much new investment, resulting in very high capital productivity and multifactor productivity growth rates. In Alberta, the development of the oil sands after 1997 meant that investment was massive, while production was not yet at full capacity. This resulted in negative capital and multifactor productivity growth.

New Estimates of Labour, Capital and Multifactor Productivity Growth and Levels for Canadian Provinces at the Three-digit NAICS Level, 1997-2007¹

I. Introduction

This report presents new estimates of labour, capital and multifactor productivity (MFP) or total factor productivity² levels and growth for the Canadian provinces across the market, two-digit, and three-digit levels of the North American Industry Classification System (NAICS) industrial aggregations for 1997 to 2007.³ We discuss the growth and levels of labour productivity, labour quality, capital composition, capital intensity, and multifactor productivity; the sources of growth by province and industry; and reasons behind the differences in labour productivity levels between the provinces and the Canadian average. Labour productivity is a main source of the growth of living standards for Canadians, making it a key variable for public policy.

The estimates have been prepared by Statistics Canada for the Centre for the Study of Living Standards (CSLS), which received financial support from Alberta Finance and Enterprise to produce this report. The estimates are posted on the CSLS website for free public access.⁴

This report is divided into ten sections. The first section provides a brief overview of the methodologies and data sources used by Statistics Canada to construct the provincial productivity database. The second section through to the seventh section present the new growth and levels estimates at the market, two-digit and three-digit levels of industry aggregation for labour productivity, labour quality, capital productivity, capital composition, capital intensity and multifactor productivity. The eighth section examines the sources of growth by province in the market sector and two-digit levels of NAICS aggregation. The ninth section provides an analysis of the sources of the labour productivity level gap at the market level between each province and the national

¹ The authors are Executive Director and Economist, respectively, at the Centre for the Study of Living Standards (CSLS). They would like to thank Alberta Finance and Enterprise (AFE) for financial assistance for this project, and in particular Jan Reurink from AFE for support. The authors also thank Wulong Gu from Statistics Canada for his help in the preparation of the estimates and for drafting section II of this report; and Alexander Murray of the CSLS for comments and editorial assistance. Earlier, less comprehensive versions of this report have been published in the Spring 2009 issue of the *International Productivity Monitor* (Sharpe and Arsenault, 2009) and presented at the 2009 Canadian Economics Association annual meeting (Sharpe, Arsenault, and Gu, 2009). Email: andrew.sharpe@csls.ca.

² The terms multifactor productivity and total factor productivity are used as synonyms in this report.

³ Most of the data in this report were supplied to the CSLS by Statistics Canada in the Spring of 2009. Since then, estimates of many variables for 2008 have been released. The estimates in this report have not been updated to 2008 as the full data set needed were not yet available at the time the report was drafted. Productivity growth is a long-term trend subject to short-term variability due to the business cycle. The year 2007 is a business cycle peak. Consequently, the period 1997 to 2007 is more cyclically neutral than 1997 to 2008 which would include the recessionary year of 2008.

⁴ The full database is available at http://www.csls.ca/data/mfp_new.asp.

average. The tenth section provides an analysis of the multifactor productivity data for the province of Alberta. The report concludes with section eleven on future work and section twelve on the report's conclusions.

II. Methodologies and Data Sources for the Provincial Productivity Database

Statistics Canada has detailed the methodologies and data sources used in the preparation of its estimates of multifactor (MFP) productivity at the national level in the publication *User Guide for Statistics Canada's Annual Multifactor Productivity Program* (Baldwin, Gu, and Yan, 2007). The methodologies and data sources used to generate the provincial multifactor productivity estimates largely follow those used for the national estimates. There are, however, notable differences.

In this section, we present the growth accounting framework on which MFP measurement is built in Canada. This section was originally in Sharpe, Arsenault and Gu (2009) and was drafted by Wulong Gu of Statistics Canada. We then provide an overview of the data available from the national MFP program and the Provincial Multifactor Productivity database. We then outline the exact methodologies and data sources used in producing the provincial estimates, with particular emphasis on how they differ from those used to produce the MFP at the national level. The section concludes with a detailed explanation and example of how we calculated MFP levels using the productivity database.

A. Growth Accounting Framework

Multifactor productivity growth measures have been developed as summary statistics to measure improvements in the efficiency of the production process. They do so by comparing actual growth rates in output with the increase in output that would have been expected from an increase in inputs using preexisting production techniques.

The growth accounting system provides the framework for measurement of MFP. It allows the decomposition of output growth (GDP) into the portion that comes from increases in labour input and capital input and a residual (MFP) that captures changes in output that are not directly related to the increasing use of inputs.

The growth accounting framework is based on the extensive literature identifying human capital, physical capital and technological progress as the three fundamental determinants of economic growth. In Canada, the framework used in the MFP program decomposes output growth into five distinct components.

Two components refer to human capital, or labour inputs:

1. Output growth related to changes in hours worked (H)
2. Output growth related to changes in the average skills composition (or quality) of hours worked (QL)

Two components refer to physical capital, or capital inputs:

3. Output growth related to changes in the amount of capital per hour worked, or capital intensity (KI)
4. Output growth related to changes in the average composition (or quality) of capital (QK)

The final component is a residual component, and is often interpreted as a proxy of technological progress:

5. Residual output growth, also called multifactor productivity growth (MFP)

With the exception of hours worked, which is assumed to have a one-to-one relationship with output growth (but a negative relationship with capital intensity), each of the other three factors (excluding MFP) must be weighted by its importance in the economy. In practice, the share of labour (Ls) and capital (Ks) in income are used to weigh the components.⁵ In simple mathematical terms, output growth can thus be decomposed as such, where Δ is the percentage change:

$$(1) \Delta GDP = \Delta H + (\Delta QL \times Ls) + (\Delta KI \times Ks) + (\Delta QK \times Ks) + \Delta MFP$$

Significant challenges arise in the measurement of each of these components, both from a theoretical and practical standpoint. Because MFP is measured as a residual component of output growth, it embodies the measurement issues facing each component. These challenges and their significance for the interpretation of growth accounting results will be discussed later in the section detailing the methodology and data sources used in MFP measurement in Canada.

Labour productivity growth, or changes in output per hour worked, is a partial measure of productivity growth. It represents the portion of output growth not accounted for by changes in hours worked ($\Delta GDP - \Delta H$). Using formula (1), we can see that changes in output per hour worked can be expressed as the sum of the remaining four components share: labour quality, capital intensity, and capital composition weighted by their income; and MFP. Evidently, growth accounting is not only a way to obtain estimates of MFP, but also a diagnosis tool to assess the importance of different factors to growth across time and space. As such, it is useful not only in the context of MFP analysis, but also as a way to shed new light on estimates of labour productivity.

⁵ The labour share is measured as the share of labour compensation in nominal GDP, while the capital share is measured as a residual of the labour share. The labour share in Canada hovers around 0.6, with the capital share around 0.4. For more information on the composition of and trends in the labour share in Canada, see Sharpe, Arsenault and Harrison (2008). It should also be noted that there are different ‘types’ of labour (in terms of education or experience) and capital (in terms of depreciation and asset life, and hence the speed at which they provide services). The weights that are generally used to aggregate changes in a type of factor (labour or capital) are the relative shares of each type of factor in the total compensation received by that factor.

This dual role is important to note because economists differ in their interpretation of multifactor productivity and the importance to give this concept relative to labour productivity. Some see multifactor productivity as more important than labour and capital productivity as it represents gains in efficiency in the use of both of these factors of production. To this group multifactor productivity is the fundamental productivity concept. Others see multifactor productivity as less fundamental and view it more as one of the sources of labour productivity growth. Since it is labour productivity growth that drives real wage and income growth, which this groups sees as the key area of interest and concern of economists, this group sees labour productivity as the fundamental productivity concept. This group also points out that multifactor productivity estimates are much more affected than labour productivity estimates by data limitations and by the underlying assumptions used to generate the estimates. In both cases, however, the growth accounting exercises is considered to hold some analytical value.

B. An Overview of the Provincial Productivity Database

A number of levels of industry disaggregation exist within the System of National Accounts, each including an increasing amount of industry detail. The Small (S) level of aggregation represents two-digit NAICS (North American Industrial Classification System) industries (up to 25 industry aggregation), the Medium (M) level three-digit NAICS industries (up to 63 industry aggregation) and the Link (L) level four-digit NAICS industries (up to 121 industry aggregation). At the national level, the Multifactor Productivity program develops estimates of MFP and its component at the S- and M-level for the 1961-2007 period and L-level for the 1961-2005 period.⁶

The provincial productivity database constructed by Statistics Canada for this project covers the ten provinces over the period 1997 to 2007. The database includes indexes for multifactor productivity (MFP), gross domestic product (GDP), capital input (K), and labour input (L) for the market sector, 15 industries at the S-level of industry aggregation⁷, and up to 43 industries at the M-level of industry aggregation⁸. Excluded from the database, from the industry dimension, are the non-market sector industries,

⁶ The national and provincial MFP programs exclude some industry aggregation due to data limitations. MFP estimates for Canada are updated annually at the S-level with a seven-month lag, and at the M- and L-level with a 36-month lag. An annual index of MFP in the business sector is available publically for the 1997-2007 period at <http://www40.statcan.gc.ca/l01/cst01/econ86a-eng.htm?sdi=multifactor>. Estimates of MFP by industry and by province, and for a longer time series, are available through CANSIM for a fee (Table 383-0021 for the S-level and Table 383-0022 for the M- and L- level).

⁷ The 15 industries are: agriculture, forestry, fishing and hunting (AFFH); mining and oil and gas extraction; utilities; construction; manufacturing; wholesale trade; retail trade; transportation and warehousing; information and cultural industries; finance, insurance, real estate and renting and leasing (FIRE); administrative and support, waste management and remediation services (ASWMR); arts, entertainment and recreation; accommodation and food services; professional, scientific, and technical services; and other services (except public administration).

⁸ The 15 industries are: agriculture, forestry, fishing and hunting (AFFH); mining and oil and gas extraction; utilities, construction, manufacturing, wholesale trade, retail trade, transportation and warehousing, information and cultural industries; finance, insurance, real estate and renting and leasing (FIRE); administrative and support, waste management and remediation services (ASWMR); arts, entertainment and recreation; and other services (except public administration).

which include health care, education, and public administration, and from the geographic dimension, the three territories.⁹ The database also includes indexes of total hours and labour composition, which are used to calculate the labour input index, and indexes of capital stock and capital composition, which are used to calculate the capital services index.

From these basic data, the Centre for the Study of Living Standards developed a series of additional tables, including growth accounting summaries for each province and indexes of MFP levels across provinces with the ten-province aggregate as a base. These summary tables are included in the database posted on the CSLS website.¹⁰

C. Detailed Methodology

The data requirements for the national and provincial productivity databases are quite onerous. In general, the methodologies and data sources used to generate the provincial MFP estimates largely follow those used for the national estimates. This section will review the methodologies of Baldwin, Gu, and Yan (2007), and highlight differences between the provincial and national estimates.¹¹

MFP estimates can be developed based on either a value-added measure of output (in which case inputs are capital and labour) or a gross output measure (in which case input are labour, capital, and intermediate inputs, that is energy, materials and services). Because provincial estimates are available only on a value-added basis, we focus primarily on the measurement of these estimates.

This section follows a structure similar to the one presented earlier in this section on growth accounting. First, we discuss the measurement of output. Secondly, we discuss the measurement of labour inputs, that is hours worked and their skills composition. Thirdly, we review the methodology used to measure capital inputs, that is the capital stock and its composition.

1. Output

At the national level, Statistics Canada's MFP program provides chained-Fisher quantity indices for the period 1961-2007 at the S-level and 1961-2005 at the M- and L-level.¹² Annual estimates are derived from annual Input-Output (IO) table up to 2005. For

⁹ The business sector components of the health sector (e.g. doctors' offices) and the education sector (e.g. private schools) are therefore excluded from the market sector, unlike the national level.

¹⁰ The entire database may be accessed at http://www.csls.com/data/mfp_new.asp

¹¹ In this section, we compare national estimates with a ten-province aggregate obtained using methodologies consistent with those used for the new provincial productivity database. The reader should be aware that some of the differences between these estimates stem not from methodological differences, but from differences in coverage. Indeed, the ten-province aggregate exclude the three Territories and is for the market sector, not the business sector. This section draws heavily on Baldwin, Gu and Yan (2007), Baldwin and Gu (2007) and Gu *et al* (2007).

¹² A chain index is rebased on a period to period basis (annually in the case of output), and is then accumulated multiplicatively from a reference period value. In other words, a chain volume index

the following years, estimates of real GDP are projections obtained from the Industry Accounts Division. All estimates are estimated at basic prices.¹³

National GDP estimates obtained from the IO tables are based on make-and-use tables in current prices and in Laspeyres prices (using prices in period t-1). The IO tables in Paasche prices (using prices in period t+1) are not used in the MFP program to insure that estimates are comparable with those produced in the United States.¹⁴ A make matrix provides data on the value of a given commodity made by a given industry in the reference year. A use matrix provides data on the value of a given commodity used as an input in a given industry in the reference year. Value added for a given industry can be obtained by subtracting the sum of the value of all its inputs (from the use matrix) from the value of its output (from the make matrix). Estimates of nominal value-added are derived from the make-and-use table in current prices, while real GDP in the form of a chained-Fisher index is derived from the current prices and Laspeyres price indices.

Table 1: Real Output Growth in Canada, 1997-2007
Compound Annual Growth Rate

	Based on Provincial Estimates*	Based on National Estimates**	Difference
<u>Market / Business sector</u>	<u>3.6</u>	<u>3.6</u>	<u>0.0</u>
Agriculture, forestry, fishing and hunting	1.3	1.7	0.5
Mining and Oil and Gas Extraction	1.5	1.8	0.3
Utilities	0.7	1.4	0.6
Construction	5.5	5.4	-0.1
Manufacturing	1.9	2.1	0.2
Wholesale Trade	5.2	5.6	0.3
Retail Trade	5.1	5.3	0.3
Transportation and Warehousing	2.9	2.8	-0.1
Information and Cultural Industries	5.6	5.6	0.0
Finance, Insurance, Real Estate and Renting and Leasing	4.1	3.9	-0.2
Professional, Scientific and Technical Services	5.5	5.4	-0.1
Other Services (Except Public Administration)	...	3.6	...

*Aggregation of the ten provinces, market sector **National estimates, business sector

calculates the volume index in each pair of consecutive years, always treating the earlier year as the base period (while the base period is changing every year, the reference period - which is the year in which the volume and nominal index are identical - is fixed and arbitrary). Growth rates for a chain index are thus unaffected by changes in the reference period. A Fisher volume index is a measure of change in volume from period to period which is calculated as the geometric mean of a Paasche volume index and a Laspeyres volume index. In other words, it is the mean of two distinct measures of change in volume: one calculated as if prices were constant in the first of two consecutive periods (Laspeyres volume) and the other calculated as if prices were constant in the second of the two consecutive periods (Paasche volume). A chain Fisher index is thus the geometric mean of a chain Laspeyres index and a chain Paasche index.

¹³ The difference between value-added estimated at market prices and basic prices is taxes on products less subsidies on products.

¹⁴ This methodology for estimating GDP at the national level was adopted by the Canadian Productivity Accounts to ensure that the method for deflating output of the wholesale and retail trade industries are comparable to the U.S. estimates produced by the Bureau of Economic Analysis.

These output estimates are for the business sector, not total economy. The construction of those estimates involves the splitting of the chained-Fisher GDP index for all economic activities between the business and non-business sectors. The share of the business sector in total economic activities is estimated as the portion of GDP in chained-Laspeyres dollars going to the business sector for the period covered by IO tables (1997-2005). For subsequent years, the share is extrapolated using the growth of hours worked for the non-business sector, with the assumption of no productivity growth for the non-business sector.

Two methodological differences exist between the national and provincial estimates of output in the respective MFP programs. The most important difference is that for the provincial estimates, chained-Fisher index of GDP are derived from the IO tables in both Laspeyres and Paasche prices, rather than from the IO tables in Laspeyres prices only. This methodological difference translates into some differences in output growth at the industry-level (Table 1). The second difference is the treatment of the health and education industries, which are completely excluded from the business sector aggregate at the provincial level while the business sector portion of these industries are included at the national level. As is shown in Table 1, however, these two methodological differences have little effect on the aggregate output growth rate in Canada over the period 1997-2007.

2. Capital Input

The capital input measures the flow of services provided by the capital stock, hence the term ‘capital services’. It can be divided into two components: the level of the capital stock and the composition of the capital stock. In practice, capital services are measured directly as the weighted sum of capital stock across assets using their user costs as weights (Baldwin and Gu, 2007).

The difference between capital stock and capital services stems from the fact that not all forms of capital assets (or stock) provide services at the same rate, just as not all hours worked provide labour services at the same rate. Short-lived assets, such as a car or computer, must provide all of their services in just the few years before they completely depreciate. Office buildings provide their services over decades. So, in a year, a dollar’s worth of a car provides relatively more services than a dollar’s worth of a building. Because of differences in capital services between assets, capital input can increase not only because investment increases the amount of the capital stock, but also if investment shifts toward assets—such as equipment—that provide relatively more services per dollar of capital stock. In practice, the effect of capital composition, that is the shift towards short-lived assets, is measured as the difference between capital stock and capital services.

The measurement of capital services is theoretically straightforward. As noted earlier, capital services can be estimated as the weighted sum of capital stock across assets using their user costs as weights. In practice, however, the methodology used to

estimate the user cost of different type of assets is a thorny issue. While the price of the capital good is available (the acquisition price of capital goods are observable), the price of the services that the capital good should command, when it is used over a period that is shorter than its length of life, is not usually observed and needs to be inferred.

The user cost of capital can be thought of as the price that a well functioning market would produce for an asset that is being rented by an owner to a user of that asset. That price would comprise a term reflecting the opportunity cost of capital, a term reflecting the depreciation of the asset, and a term reflecting capital gains or losses from holding the asset. This formulation requires data on the rate of return, depreciation, capital gains from holding assets, tax rates on capital, and the price of the asset. In Canada, the following formula serves as the basis for estimating user costs:

$$(2) C_{kt} = (1 - U_t Z_{kt} - ITC_{kt}) / (1 - U_t) [q_{kt} r_t + q_{kt} \delta_{kt} - q_{kt} \pi_{kt}] + \emptyset_t \quad \text{where:}$$

- C_{kt} is the user cost for asset type k at time t ;
- U_t is the corporate income tax rate at time t ;
- Z_{kt} is the present value of depreciation deductions for tax purposes on a dollar's investment in asset type k over the lifetime of the investment at time t ;
- ITC_{kt} is the rate of the investment tax credit for asset type k at time t ;
- q_{kt} is the market price for asset type k at time t ;
- r_t is the real rate of return at time t ;
- δ_{kt} is the depreciation rate of asset type k at time t ;
- π_{kt} is the expected capital gains;
- and \emptyset_t is the effective rate of property taxes at time t ;

Analysts who calculate rental prices of capital services face several choices with regard to the expected rate of return; depreciation rates; expected capital gains; expectations; and finally whether to include tax parameters in the formulae or not. Needless to say, each of these choices requires significant justification, either from a practical or theoretical perspective. Baldwin and Gu (2007) review each of these in detail.

Other aspects of the estimation procedure for capital services merit mention. First, unlike outside researchers, Statistics Canada benefits from detailed capital stock data by asset type. As such, its estimation of capital services is based on the bottom-up approach. This bottom-up approach involves the estimation of capital stock by asset, the aggregation of capital stock of various asset types within each industry to estimate industry capital services, and the aggregation of capital services across industries to derive capital services in the business sector and in the aggregate industry sectors. This 'bottom-up' approach for estimating aggregate capital input takes into account the difference in the rate of return across industries (as well as tax differences in tax parameters) and does not require the assumption of perfect mobility of capital inputs across industries.¹⁵

¹⁵ Other researchers have used aggregate data in an attempt to reproduce Statistics Canada MFP estimates. Diewert (2008) found that using available data and a 'top-down' approach to capital services measurement

Second, the rate of return used in the user cost formulae is measured endogenously rather than exogenously from observed market rates. The main advantage of using an endogenous rate of return, based on estimates from the System of National Accounts, is the provision of a fully integrated set of accounts.¹⁶ Finally, the user costs of the assets with negative user costs are set to equal the average user costs of the assets across all industries for those assets, and are then adjusted for inter-industry differences in the user cost of capital.

The concept of capital input used in the provincial productivity database is similar to the one adopted for the national MFP estimates.¹⁷ Similar to the national estimates, the capital input in the provincial productivity database measures the flow of services provided by the capital stock. The methodologies for estimating capital input differ slightly between the two databases. For the provincial MFP estimates, land and inventories are excluded from capital input estimates due to data limitations, and the effect of tax parameters is not taken into account in the estimation of user costs of capital. The differences in methodologies have little effect on the capital input estimates at the aggregate business sector, but have some effect at the industry level, most notably in the business services industry.

Table 2: Capital Input Growth in Canada, 1997-2007
Compound Annual Growth Rate

	Based on Provincial Estimates*	Based on National Estimates**	Difference
<u>Market / Business sector</u>	<u>4.2</u>	<u>4.3</u>	<u>0.1</u>
Agriculture, forestry, fishing and hunting	-0.7	-0.1	0.6
Mining and Oil and Gas Extraction	7.6	7.4	-0.2
Utilities	0.8	0.4	-0.3
Construction	4.1	5.2	1.1
Manufacturing	0.3	1.5	1.2
Wholesale Trade	5.4	5.2	-0.2
Retail Trade	6.1	5.9	-0.2
Transportation and Warehousing	4.9	5.0	0.1
Information and Cultural Industries	5.0	4.5	-0.5
Finance, Insurance, Real Estate and Renting and Leasing	5.0	4.7	-0.3
Professional, Scientific and Technical Services	13.1	7.6	-5.5
Other Services (Except Public Administration)	...	6.3	...

*Aggregation of the ten provinces, market sector **National estimates, business sector

lead to much lower estimates of capital services, and thus much higher estimates of MFP. For example, Diewert estimated MFP growth to be 1.14 per cent per year compared to 0.43 per cent per year according to Statistics Canada official estimates (Diewert, 2008:25). Methodological differences in the measurement of capital services, as well as differences in the initial capital stock, accounted for most of the difference.

¹⁶ See Baldwin and Gu (2007) for a full discussion of the benefits and problems related to endogenous and exogenous rates of return. The effect of using either rate of returns affects primarily the contribution of capital composition to output growth. In general, the effect on annual MFP growth rates is relatively small.

¹⁷ For a detailed discussion of methods for estimating capital services, see Baldwin and Gu (2007)

Both nationally and provincially, the database source for estimating capital input is the investment data by asset type maintained by the Investment and Capital Stock Division of Statistics Canada. To ensure the consistency of industry coverage between the investment data and GDP estimates, an estimate for investment in rental buildings is added to the finance, insurance and real estate industry (FIRE).

3. Labour input

As was noted earlier, labour input includes both the number of hours worked and the quality (or composition) of these hours. In the context of its Productivity Accounts, Statistics Canada already produced labour statistics covering the 1997-2007 period (including hours, jobs and labour compensation) for Canada and the provinces, for both the business and non-business sectors at the L-level of industry aggregation. The national and provincial data are consistent and are built from estimates obtained through the Labour Force Survey and the Survey of Employment, Payrolls and Hours (particularly for industry estimates). The Public Institutions Division's (PID) estimates of public sector employment are also used to estimate hours worked in the non-business sector.

Labour composition captures changes in the 'quality' of workers. In practice, hours worked are weighted by the share of labour compensation of a given group relative to other groups, with the relative weights assumed to reflect productivity differences. The variables used to differentiate labour quality in Canada are education (four education level), experience (proxied with seven age groups) and the class of workers (paid employees versus self-employed workers).¹⁸ In other words, 56 different types of workers are identified. The hours worked of each group is then weighted by its share of labour compensation to obtain an aggregate measure of labour services. Labour services will increase if there is a compositional shift in hours worked favouring high productivity workers (as proxied by relative labour compensation) and/or if there is an increase in the number of hours worked.¹⁹ Labour composition can then be computed as the difference between growth in hours worked and growth in labour services.

The measure of labour composition in Canada does not differentiate workers based on gender. Differences in hourly labour compensation between genders are assumed to be related to factors other than productivity differences (which are captured through education, experience and the class of worker), for example workplace discrimination. Moreover, unlike for capital input, changes in the industry composition of labour are not accounted for, mainly because little or no additional information seems to

¹⁸ It is worth mentioning that experience is proxied by age, and as such fails to capture spells out of the labour force, which may be particularly important for women with children.

¹⁹ In general, this methodology will capture underlying trends in educational attainment, experience and class of worker (in as much as these variables are related to higher income). In terms of comparative statics, any change in relative income across the 56 groups of workers will not translate into changes in labour composition as long as the relative importance of hours worked across these groups remains identical. However, if the relative income (and thus the weights) of a given group changes, this change can magnify/dampen the compositional shift in hours worked observed for this group.

be embedded in the industry breakdown once education and experience are accounted for.

The concept of labour input in the provincial productivity database is the same as the one adopted for the national MFP estimates.²⁰ The methodologies and data sources for constructing labour inputs are identical in the two databases. For both national and provincial estimates, labour input is estimated as the weighted sum of hours worked across different types of workers using labour compensation as weights. Small differences remain at the industry level because of the exclusion of the three Territories. Table 3 confirms the similarities in methodology: There is little difference at the aggregate market/business sector, and the differences at the industry level due to differences in geographical coverage are only minor.

Table 3: Labour Input Growth in Canada, 1997-2007
Compound Annual Growth Rate

	Based on Provincial Estimates*	Based on National Estimates**	Difference
<u>Market / Business sector</u>	<u>2.4</u>	<u>2.5</u>	<u>0.1</u>
Agriculture, forestry, fishing and hunting	-1.9	-1.7	0.3
Mining and Oil and Gas Extraction	3.9	3.8	-0.1
Utilities	1.8	1.7	-0.1
Construction	3.9	3.7	-0.1
Manufacturing	0.1	0.3	0.2
Wholesale Trade	1.8	1.9	0.2
Retail Trade	1.8	1.9	0.1
Transportation and Warehousing	2.6	2.5	-0.1
Information and Cultural Industries	3.1	3.5	0.4
Finance, Insurance, Real Estate and Renting and Leasing	3.0	3.2	0.2
Professional, Scientific and Technical Services	4.8	4.9	0.1
Other Services (Except Public Administration)	...	3.2	...

*Aggregation of the ten provinces, market sector **National estimates, business sector

4. A Summary of Methodological Differences

There are a number of differences in the methodologies for the measurement of output, labour, and capital between the national and provincial level. The key differences that were noted are:

- The health and education industries are completely excluded from the market sector aggregate at the provincial level while the business sector portion of these industries is included in the national level estimate of the business sector.

²⁰ For a detailed discussion of the methodologies and data sources used to estimate labour input, see Gu *et al.* (2002).

- The estimate for Canada based on the provincial program is an aggregation of the ten provinces, and thus excludes the three territories.
- Output in the provincial program is derived from the IO tables in both Laspeyres and Paasche prices, rather than from the IO tables in Laspeyres prices only.
- Land and inventories are excluded from capital input estimates at the provincial level.
- The effect of tax parameters is not taken into account in the estimation of user costs of capital at the provincial level.

For some industries, the sum of these methodological differences translates into significant differences in growth rates (Table 4). In general, however, the estimates remain fairly consistent between the provincial and national program for MFP growth in the 1997 to 2007 period. At the market/business sector level, the difference is only 0.1 percentage point.

Table 4: Multifactor productivity growth in Canada, 1997-2007
Compound Annual Growth Rate

	Based on Provincial Estimates*	Based on National Estimates**	Difference
<u>Market / Business sector</u>	0.4	0.3	-0.1
Agriculture, forestry, fishing and hunting	2.5	2.5	0.0
Mining and Oil and Gas Extraction	-4.8	-4.3	0.5
Utilities	-0.3	0.7	0.9
Construction	1.6	1.3	-0.3
Manufacturing	1.8	1.2	-0.6
Wholesale Trade	2.2	2.5	0.2
Retail Trade	2.1	2.3	0.2
Transportation and Warehousing	-0.5	-0.5	0.0
Information and Cultural Industries	1.5	1.5	0.0
Finance, Insurance, Real Estate and Renting and Leasing	0.0	-0.1	-0.1
Professional, Scientific and Technical Services	-0.7	0.1	0.8
Other Services (Except Public Administration)	...	0.4	...

*Aggregation of the ten provinces, market sector **National estimates, business sector

D. Summary of the Results

Table 5 provides a summary of the differences between the two methods of creating national estimates and it provides a summary of the growth rates of each factor in each industry for the period 1997 to 2007. The results are discussed from section III through section VIII.

Table 5: Productivity Measures by Province for the Market Sector, 1997-2007

Compound Annual Rate of Growth

	Labour Productivity	Capital Productivity	Labour Composition	Capital Composition	Multifactor Productivity
Canada – Based on Provincial Estimates*	1.7	-0.7	0.6	1.6	0.3
Canada – Based on National Estimates**	1.7	-0.6	0.5	1.2	0.4
Newfoundland	4.8	4.2	0.6	0.9	4.1
Prince Edward Island	1.6	-1.9	0.6	2.3	-0.2
Nova Scotia	1.9	0.3	0.2	0.5	1.1
New Brunswick	1.8	-1.0	0.4	0.7	0.4
Quebec	1.8	0.4	0.5	1.2	0.9
Ontario	1.7	0.2	0.5	1.1	0.8
Manitoba	2.1	-0.5	0.6	1.4	0.6
Saskatchewan	2.1	-0.6	0.9	2.0	0.1
Alberta	1.0	-3.4	0.5	1.3	-1.6
British Columbia	1.2	-0.5	0.1	1.0	0.5

*Aggregation of the ten provinces, market sector **National estimates, business sector

E. Calculating MFP Levels

1. Using the Provincial Productivity Database to Calculate MFP Levels

In the multifactor productivity results section of this report estimates of relative levels of MFP have been calculated at the two and three-digit industry level comparing the performance of provinces in each of the 15 industries to the Canadian average in 2007 using data available from the provincial productivity database. The method for calculating the MFP levels was adapted from Baldwin, Gu, and Yan (2008) and was applied to the available provincial and national data by using real GDP for the output variable, hours adjusted for quality relative to the province's initial level as the labour input variable, and the dollar value of capital services for the capital input variable. The formula for calculating the MFP levels in a particular year in a particular industry between a province and Canada is:

$$(3) \ln(\text{Relative MFP}_{p,i}) = \ln(\text{GDP}_{p,i}/\text{GDP}_{c,i}) - k_{p,c}\ln(K_{p,i}/K_{c,i}) - l_{p,c}\ln(L_{p,i}/L_{c,i})$$

- $\text{GDP}_{p,i}$ is the real GDP (\$1997) in industry i in province p ;
- $\text{GDP}_{c,i}$ is the real GDP (\$1997) in industry i in Canada;

- $k_{p,c}$ is the average share of capital input in production between Canada and the province
- $l_{p,c}$ is the average share of labour input in production between Canada and the province
- $K_{p,i}$ is the amount of capital services (\$1997) in industry i in province p ;
- $K_{c,i}$ is the amount of capital services (\$1997) in industry i in Canada;
- $L_{p,i}$ is the amount of labour input (hours of quality adjusted labour) in industry i in province p ;
- $L_{c,i}$ is the amount of labour input (hours of quality adjusted labour) in industry i in Canada.

The level of output in the Statistics Canada database, in current dollars for a province in a particular industry in a particular year, was estimated as in Section II of this report. To calculate real output in a given year for a given province in a given industry, the 1997 current dollars level of output was multiplied by the index of output growth for that year.

The level of capital services in current dollars in a province in a particular industry by year are from the provincial productivity database and are calculated as defined in section II of the report. To obtain the real level of capital services for a given year, the 1997 level of capital services was multiplied by the index of real capital services growth for that year as calculated by Statistics Canada.

The level of labour input in hours in a province within a particular industry in a particular year are from the provincial productivity database and are the quality unadjusted number of hours per year.

The ratios of labour costs relative to total output for a province in a given year in a given industry were calculated using the nominal values of output and labour costs for that year. However, the ratio for the years 2006 and 2007 was calculated using the nominal values from 2005 because nominal values were not available.

Table 6: Data and Intermediate Values used in MFP Relative Level Calculation – Alberta Accommodations and Food Services Industry, 2007

	Alberta		Canada	
	1997	2007	1997	2007
Index of Real Output (1997 = 100)	100.0	143.8	100.0	122.5
Index of Labour Input (1997 = 100)	100.0	115.1	100.0	110.3
Index of Capital Services (1997 = 100)	100.0	152.1	100.0	127.1
Millions of Hours	196.9	223.0	1565.7	1699.5
Nominal Labour Compensation (millions of current dollars)	1819.4	N.A.	15040.6	N.A.
Nominal Capital Services Cost (millions of current dollars)	748.9	N.A.	4318.1	N.A.
Nominal Output (millions of current dollars)	2568.4	N.A.	19358.7	N.A.

	Formula	2007	
		Alberta	Canada
Real GDP Output (millions of \$1997)	Index of Real Output (2007) x Nominal Output (1997)	3692.2	23711.3
Labour Input (Millions of Quality Adjusted Hours)	Index of Labour Input (2007) x Hours (1997)	226.7	1726.4
Capital Input (millions of \$1997)	Index of Capital Services (2007) x Nominal Capital Services Cost (1997)	1139.2	5489.3
Share of Labour Income in nominal GDP *	Nominal Labour Compensation / Nominal Output	0.72	0.77
Share of Capital Income in nominal GDP	1 – Share of Labour Input in nominal GDP	0.28	0.23

Source: CSLS Provincial Productivity Database, http://www.csls.ca/data/mfp_new.asp.

* The nominal levels of labour and capital income and output from 2005 are used to calculate the share of labour and capital income in nominal GDP.

Using the formula outlined in this section,

$$\ln(\text{Relative MFP}_{p,i}) = \ln(\text{GDP}_{p,i}/\text{GDP}_{c,i}) - k_{p,c}\ln(K_{p,i}/K_{c,i}) - l_{p,c}\ln(L_{p,i}/L_{c,i}) = 0.070$$

Then taking e to the power of the result and multiplying by 100

$$\text{Relative MFP}_{p,i} = 107.2$$

The MFP level in the Alberta accommodations and food services industry relative to the Canadian average is 107.2 percent. In other words, the MFP level in Alberta's accommodations and food services industry is 7.2 per cent higher than the Canadian average.

2. Assumptions and Measurement Issues

The above method for calculating relative MFP has a number of assumptions and possible biases in the way output, labour input, and capital input are measured and relative MFP levels computed.

The rate of growth in labour input and labour quality is adjusted for each province for computing the multifactor productivity levels relative to the initial quality of the province. However, estimates are not corrected for labour quality differences in the base year. The following example illustrates why this may cause a bias.

Let us assume that Newfoundland has the same relative output and labour and capital inputs as the rest of Canada, but the quality of labour is lower in Newfoundland.²¹ This would mean that Newfoundland's quality adjusted labour input is really more productive because it has an effectively lower labour input than Canada yet makes the same amount of output relative to its amount of capital. This would create a downward bias in Newfoundland's relative MFP level because it would underestimate the fact that Newfoundland is more productive given the real value of its labour input. The converse would be true for a province with relatively higher labour quality than average. A province with higher labour quality than average would have an upward bias in its MFP level estimate because the amount of labour input would be underreported relative to the average. However, labour quality at a provincial level is not indexed relative to other provinces or the national average. Comparisons between the relative levels of labour quality are therefore biased by the fact that the initial differences in labour quality are not captured. It is difficult to quantify the size of this bias, although the fact that the differences in the labour quality growth are relatively small suggests that the difference in labour quality itself is also likely small.

Although, there is a bias in the comparison of labour input, there is not one in the measurement of capital input. Capital services are measured as a function of the amount of capital stock and the composition²² of the stock. If two provinces had the same amount of capital stock but one had a higher composition, then the latter province would be measured as having more capital input because of the increased level of capital services provided by its capital stock. Therefore, capital input is quality adjusted between provinces and can be compared interprovincially.

A third assumption is that the output price level is the same across all provinces. In the Wulong, Gu, and Yan (2008), when comparing American to Canadian productivity levels, it is necessary to adjust for the fact that one dollar US buys a different amount of goods even after correcting for the exchange rate. Although, all Canadian provinces use the same currency, one dollar in Prince Edward Island may not buy the same amount of goods as one dollar in Ontario. If this is true, then comparisons of output across provinces will have errors because the database does not correct for this source of measurement bias

²¹ The term Newfoundland is used to refer the province of Newfoundland and Labrador throughout this report.

²² See Section II for a definition and thorough examination of capital composition.

in the base year of 1997. However, like labour input levels, the change overtime in a province's purchasing power is captured by adjusting for the changing price level in that province.

Lastly, the capital and labour share ratios of inputs for 2006 and 2007 are assumed as being the same as the year 2005 because there was no nominal labour compensation or output data available for those two years. The magnitude of the bias from this assumption depends on the size of the industry in and the size of the province. Smaller industries and provinces tend to have more variance in their shares of capital and labour inputs. For instance, the labour share in the wholesale trade industry in New Brunswick falls from 0.66 to 0.39 from 1997 to 2007 but in Ontario it only falls from 0.68 to 0.67.

In summary the assumptions are:

1. Labour quality is assumed the same across all provinces in 1997, but differences in labour quality growth are captured after 1997.
2. In contrast to the assumption that labour quality is equal across all provinces in 1997, differences in capital composition, or quality, are captured in 1997 because capital services are used rather than capital stock as the capital input.
3. Output price levels are assumed to be the same across all provinces for the entire period 1997 to 2007.
4. The capital and labour shares of nominal GDP are the same in 2006 and 2007 as they are in 2005.

III. Labour Productivity by Province

A. Overall Labour Productivity in the Market Sector by Province

1. Labour Productivity Levels

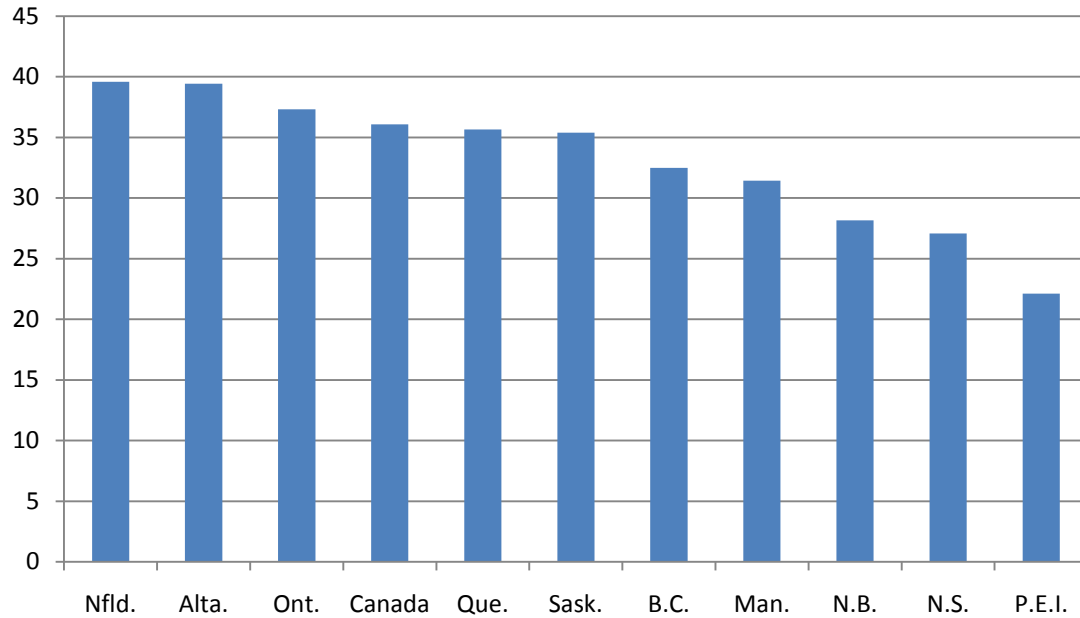
Labour productivity levels, measured in real dollars of GDP per hour, are calculated for all provinces in 2007.²³

In Canada, labour productivity in 2007 was \$36.06 per hour (Chart 1). The province with the highest real output per hour was Newfoundland at \$39.57 per hour. Newfoundland's high productivity is certainly due to the extremely high productivity in its mining, and gas and oil extraction industry. Similarly, Alberta is ranked second with a labour productivity of \$39.4 per hour because of the relative importance of the mining, and gas and oil extraction industry where labour productivity is \$75.2 per hour. Alberta's

²³ Unless otherwise indicated, all real dollar values are expressed in 1997 constant prices.

Chart 1: Labour Productivity Levels in the Market Sector by Province, 2007

Real GDP (\$1997) per unadjusted hour

Source: CSLs Provincial Productivity Database, http://www.csls.ca/data/mfp_new.asp.

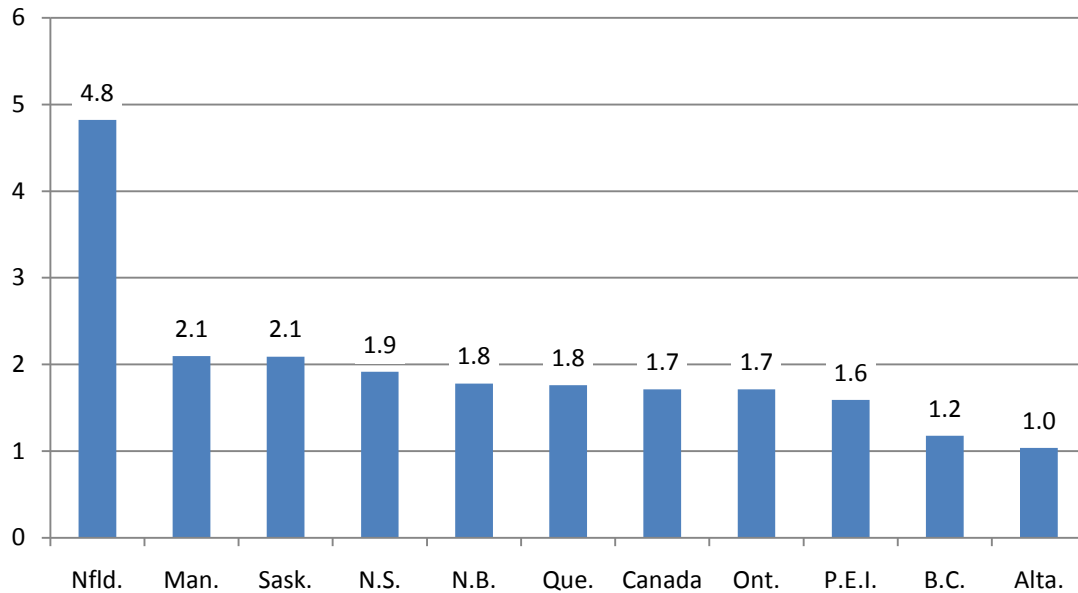
high labour productivity contrasts with its low rate of productivity growth over the period from 1997 to 2007.

The province with the lowest productivity was Prince Edward Island which had a labour productivity of \$22.10 per hour, less than two thirds the national average. It was substantially lower than the province with the second lowest productivity, Nova Scotia, which had a labour productivity rate of \$27.07 per hour. The three small Maritime Provinces of New Brunswick, Nova Scotia, and Prince Edward Island have less than 78 per cent of the labour productivity of Canada as a whole.

2. Labour Productivity Growth

Chart 2 provides estimates of labour productivity growth for the market sector of the provinces. At the Canada level, output per hour in the market sector advanced at an annual rate of 1.71 per cent between 1997 and 2007. The first three years of the period (1997-2000) saw much more rapid productivity growth than the period since 2000 - 3.21 per cent per year versus 1.08 per cent. This report will focus on the whole period, not the two sub-periods.

Chart 2: Labour Productivity Growth in the Market Sector by Province, 1997-2007
Average Annual Rate of Growth



Source: CSLS Provincial Productivity Database, http://www.csls.ca/data/mfp_new.asp.

There was significant variation in market sector labour productivity growth by province. Newfoundland was the province with by far the most rapid labour productivity growth. At 4.82 per cent per year from 1997 to 2007, Newfoundland's rate of advance was nearly three times greater than the national average and more than double that of the province with the second fastest labour productivity growth, Manitoba (2.10 per cent). At the other end of the spectrum, Alberta had the weakest productivity growth at 1.04 per cent per year, followed closely by British Columbia at 1.18 per cent.

B. Labour Productivity at the Two-digit Industry Level

1. Labour Productivity Levels

Appendix Table 1 and Appendix Table 2 provide the absolute and relative levels of labour productivity for each province at the two-digit industry level for 2007.

For Canada in 2007, the labour productivity levels at the two-digit level in industries varied greatly from \$13.77 per hour in the accommodation and food services industry to \$134.61 per hour in the utilities industry. The province with the largest range in relative labour productivity levels between industries was Newfoundland, which had industries that ranged from 296.9 per cent to 52.9 per cent of the national average. Most industries showed relatively little range between provinces with the exception of the mining, and oil and gas extraction industry, which had labour productivity levels ranging from \$8.43 per hour in Prince Edward Island to \$233.64 per hour in Newfoundland. The industry with the least variance was the finance, insurance and real estate market where the province with the lowest labour productivity (British Columbia, \$65.47 per hour) was

Table 7: Labour Productivity Levels at the Two-digit Industry Level by Province – Ranking, 2007
Real GDP per hour

	Nfld.	Alta.	Ont.	Que.	Sask.	B.C.	Man.	N.B.	N.S.	P.E.I.
Market Sector	1	2	3	4	5	6	7	8	9	10
Agriculture, forestry, fishing and hunting	1	4	9	5	6	2	8	3	7	10
Mining and Oil and Gas Extraction	1	6	7	8	3	4	2	9	5	10
Utilities	8	2	6	4	3	1	7	9	5	10
Construction	9	1	3	2	4	8	5	6	7	10
Manufacturing	10	1	2	3	5	4	7	6	8	9
Wholesale Trade	5	6	2	7	1	4	3	8	9	10
Retail Trade	10	1	3	5	6	4	2	8	9	7
Transportation and Warehousing	9	2	4	5	1	3	6	7	8	10
Information and Cultural Industries	3	2	8	9	10	7	6	4	5	1
FIRE*	8	1	2	5	7	10	4	6	9	3
Professional, Scientific and Technical Services	8	2	1	3	5	4	10	6	9	7
AWSMR**	8	1	3	2	5	7	4	9	6	10
Arts, Entertainment and Recreation	5	6	2	1	4	7	3	8	10	9
Accommodation and Food Services	9	1	4	3	7	2	6	10	8	5
Other Services (Except Public Administration)	10	4	6	2	1	5	3	9	8	7
Unweighted average	6.6	2.6	4.1	4.3	4.6	4.9	5.2	7.3	7.6	8
Unweighted Market Sector Rank	7	1	2	3	4	5	6	8	9	10

* Finance, Insurance, Real Estate and Renting and Leasing ** Administrative and Support, Waste and Remediation

Source: CSLS Provincial Productivity Database, http://www.csls.ca/data/mfp_new.asp.

only 14 percent lower than the highest (Alberta, \$75.73 per hour).²⁴ It would be expected that productivity levels between provinces should be more stable in industries that are less dependent on provincial variables, such as resource endowments.

Table 7 provides rankings of the provinces by labour productivity levels in the market sector and by industry. It also provides each province's unweighted average rank across industries. The comparison between the market sector rank and the unweighted rank shows the importance of the mining and oil and gas extraction industry in Newfoundland. Despite being ranked eighth or below in ten industries, Newfoundland had the highest level of labour productivity in Canada. Another particularly poor performing province was P.E.I. which was ranked tenth in seven industries. In fact, many of the smaller provinces, including Nova Scotia, New Brunswick, and Manitoba, have low labour productivity levels across nearly all industries. Furthermore, they each have little variation in their rankings, which suggests that there is a similar factor in each province causing the poor labour productivity in each industry.

²⁴ Note: in this paper, FIRE includes the imputed value of rents. Thus, the labour productivity of this industry is exaggerated because rents do not take any labour to produce.

2. Labour Productivity Growth Rates

Appendix Table 3 provides labour productivity growth rates at the two-digit industry aggregation. Table 8 provides key descriptive statistics about labour productivity growth by industry across provinces between 1997 and 2007. In Canada as a whole, three industries experienced negative labour productivity growth from 1997 to 2007 - the mining, and oil and gas extraction industry (-2.2 per cent per year); arts, entertainment, and recreation (-1.2 per cent per year); and the utilities industry (-0.9 per cent per year). However, there were no industries in which labour productivity fell in all provinces.

Among all the two-digit industries in Canada, the fastest growing sector was the agriculture, forestry, fishing and hunting industry that had labour productivity growth of 4.2 per cent per year from 1997 to 2007. The industry with the lowest labour productivity growth was the mining and oil and gas extraction industry with -2.2 per cent per year from 1997 to 2007.

Table 8: Labour Productivity Growth at the Two-digit Industry Level by Province – Summary Statistics, 1997-2007
Compound Annual Rate of Growth

	Canada	Range by Province					Standard Deviation
		Per Cent		Point Diff.	Province		
		Low	High		Bottom	Top	
	A	B	C	D=C-B	E	F	G
Market Sector	1.7	1.0	4.8	3.8	Alta.	Nfld.	1.1
Agriculture, Forestry, Fishing and Hunting	4.2	1.7	8.9	7.2	B.C.	Nfld.	2.4
Mining, and Oil and Gas Extraction	-2.2	-8.8	15.3	24.1	P.E.I.	Nfld.	7.4
Utilities	-0.9	-4.7	2.1	6.8	P.E.I.	B.C.	1.8
Construction	1.7	-1.4	3.5	5.0	Nfld.	N.B.	1.6
Manufacturing	2.2	-0.7	2.9	3.6	Nfld.	B.C.	1.2
Wholesale Trade	3.7	-3.5	4.5	8.0	P.E.I.	N.B.	2.4
Retail Trade	3.3	2.9	4.9	2	B.C.	Alta.	0.7
Transportation and Warehousing	0.7	-1.2	2.3	3.5	P.E.I.	Sask.	1
Information and Cultural Industries	3.0	1.3	5.3	4.0	Que.	Alta.	1.2
FIRE*	1.5	1.0	3.9	2.9	N.S.	Sask.	0.9
Professional, Scientific and Technical Services	1.3	-0.9	2.4	3.3	Nfld.	P.E.I.	1.3
AWSMR**	0.3	-2.5	2.0	4.5	B.C.	Man.	1.8
Arts, Entertainment and Recreation	-1.2	-6	5.7	11.7	N.S.	Man.	3.5
Accommodation and Food Services	1.1	0.4	2.6	2.2	Man.	P.E.I.	0.8
Other Services (Except Public Administration)	2.1	0.7	4.6	3.8	Nfld.	P.E.I.	1.2

* Finance, Insurance, Real Estate and Renting and Leasing ** Administrative and Support, Waste and Remediation
Source: CSLs Provincial Productivity Database, http://www.csls.ca/data/mfp_new.asp.

There was significant variation in the rates of growth of labour productivity among provinces at the two-digit level of industry. In particular, the mining and oil and gas and arts, entertainment and recreation industries had very large ranges between the fastest and slowest growing provinces. In each of these industries, the difference between the province with the highest rate of growth and the lowest rate of growth was over 10 percentage points with mining, and oil and gas extraction having a range of 24.1 percentage points. The immense difference in the mining, oil, and gas extraction industry is unsurprising given the fact that endowments play a large role in the labour productivity of the industry in any particular province.

The industry with the lowest variation among provinces was the retail trade industry with a difference of 2 percentage points between the province with the fastest growing labour productivity, Alberta, and the province with the lowest labour productivity growth, British Columbia. This indicates that the retail trade industry capital and labour inputs' effectiveness is far less affected by location than other industries.

Table 9: Labour Productivity Growth Ranking by Province and Two-digit Industry, 1997-2007

Based on Compound Annual Rate of Growth

	Nfld.	Man.	Sask.	N.S.	N.B.	Que.	Ont.	P.E.I.	B.C.	Alta.
Market Sector	1	2	3	4	5	6	7	8	9	10
Agriculture, Forestry, Fishing and Hunting	1	4	5	7	2	6	8	9	10	3
Mining, and Oil and Gas Extraction	1	3	8	2	9	5	6	10	4	7
Utilities	4	9	2	3	6	8	5	10	1	7
Construction	10	5	8	7	1	4	6	3	9	2
Manufacturing	10	7	9	5	6	3	2	8	1	4
Wholesale Trade	4	7	5	9	1	6	2	10	3	8
Retail Trade	7	2	3	6	5	9	8	4	10	1
Transportation and Warehousing	9	6	1	4	8	5	7	10	3	2
Information and Cultural Industries	7	8	6	2	4	10	9	3	5	1
FIRE*	5	3	1	10	2	8	6	7	9	4
Professional, Scientific and Technical Services	10	8	2	9	6	5	4	1	7	3
ASWMR**	9	1	2	3	7	4	6	8	10	5
Arts, Entertainment and Recreation	8	1	5	10	9	3	2	7	6	4
Accommodation and Food Services	5	10	6	3	7	4	9	1	8	2
Other Services (Except Public Administration)	10	5	2	3	7	4	8	1	9	6
Unweighted Average	6.7	5.3	4.3	5.5	5.3	5.6	5.9	6.1	6.3	3.9
Unweighted Market Sector Rank	10	3	2	5	4	6	7	8	9	1

* Finance, Insurance, Real Estate and Renting and Leasing ** Administrative and Support, Waste and Remediation

Source: CSLs Provincial Productivity Database, http://www.csls.ca/data/mfp_new.asp.

Table 9 provides the market sector ranking and unweighted market sector ranking for labour productivity growth by province. These estimates provide a sense of whether or not a province's labour productivity growth performance is broadly-based or whether it is driven by a small number of particular industries. At the bottom, a ranking of provinces based on the unweighted average industry rank is provided, and can be compared with the rank obtained in the market sector.

Although Newfoundland ranks first in labour productivity growth, it is ranked tenth in the unweighted average because of the poor performance in many of its industries including seven that are ranked between eighth and tenth in the country by labour productivity growth.

Conversely, Alberta had a market ranking of tenth but had an unweighted ranking of first because of the strong labour productivity growth in nearly all industries. Alberta is first, second or third in seven of fifteen industries. However, Alberta's mining, and oil and gas extraction category, which is a very large sector, had a ranking of seventh.

Prince Edward Island was the province with the most variability in its ranking, with three industries ranked first and three ranked last. B.C. had the second most variability with two industries ranked first and four ranked last.

C. Labour Productivity at the Three-digit Industry Level

1. Labour Productivity Levels

Appendix Table 1 and Appendix Table 2 present the absolute levels and relative levels of labour productivity for each province at the three-digit industry level for 2007.

Although not all data are available for all industries in all provinces, it is still possible to note some differences in the levels in industries between the reporting provinces.

The three-digit industry with the highest productivity level in 2007 was the pipeline industry (\$259.6 per hour). The industry with the lowest level is the personal and laundry services and private households (\$12.1 per hour). The industry with the largest reported range was the pipeline transportation industry that ranged from \$2316.6 per hour in Manitoba to \$180.6 per hour in Alberta.

2. Labour Productivity Growth

Appendix Table 3 provides the data for the labour productivity growth in each province at the three-digit industry level for available industries.

There are 43 three-digit industries each with 1 to 10 provinces reporting and the data at the Canadian level. Although not all data are available for all industries in all

provinces, it is still possible to note some differences in the growth rates in industries between the reporting provinces.

There was substantial variation in the growth of labour productivity at the three-digit level among provinces. Both the fishing, hunting and trapping; and leather and allied product manufacturing industries had over 50 percentage point ranges in the growth rates between provinces. Fishing, hunting and trapping had a standard deviation of 16.2 per cent among all 10 provinces. Leather and allied product manufacturing had a standard deviation of 28.9 percent with 3 provinces reporting.

The industry with the lowest range in labour productivity was the plastics and rubber products manufacturing industry with a range of 0.7 percentage points with 4 provinces reporting.

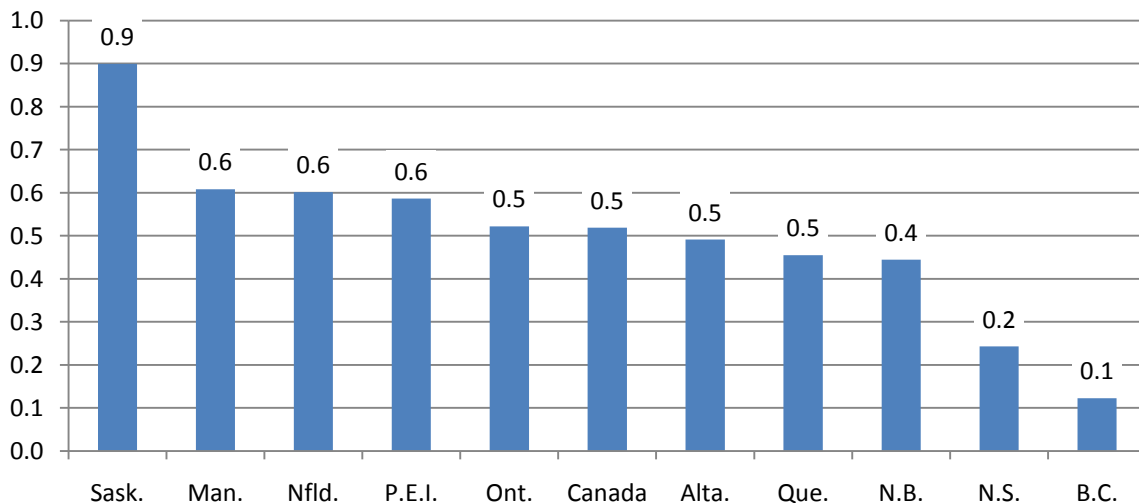
The fastest growing three-digit industry in any province was leather and allied product manufacturing in Saskatchewan with an annual average growth rate of 49.3 per cent. The lowest was the fishing, hunting and trapping industry in Saskatchewan with an annual average growth rate of -24.1 per cent.

IV. Labour Quality

Labour quality is measured as an index relative to the base year in each province and industry. Therefore, there is no level measure for labour quality and the initial level of labour quality in 1997 is not adjusted for in interprovincial comparisons of multifactor productivity or labour inputs. Therefore, only growth rates may be calculated.

A. Labour Quality Growth in the Market Sector

Chart 3: Labour Quality Growth in the Market Sector by Province, 1997-2007
Average Annual Rate of Growth



Source: CSLs Provincial Productivity Database, http://www.csls.ca/data/mfp_new.asp.

At the Canada level, labour quality in the market sector advanced at a 0.52 per cent average annual rate between 1997 and 2007 (Table 5). The first three years of the period (1997-2000) saw very similar growth to the post-2000 period: 0.56 per cent per year versus 0.50 per cent.

There is much less variation in market sector labour quality growth across provinces than manifested by the three productivity measures (Chart 3). Saskatchewan was the province with the most rapid labour quality growth (0.90 per cent per year), followed by Manitoba (0.61 per cent), and Newfoundland (0.60 per cent). British Columbia experienced the slowest increase in labour quality, a very weak 0.12 per cent per year, followed by Nova Scotia (0.24 per cent).

B. Labour Quality Growth at the Two-digit Industry Level

Appendix Table 4 provides the rates of labour quality growth in each province at the two-digit industry level for available industries for the period 1997 to 2007. Table 10

Table 10: Labour Quality Growth at the Two-digit Industry Level by Province – Summary Statistics, 1997-2007

Based on Compound Annual Rate of Growth

	Canada	Range by Province					Standard Deviation
		Per Cent		Point Diff.	Province		
		Low	High		Bottom	Top	
	A	B	C	D=C-B	E	F	G
Market Sector	0.5	0.1	0.9	0.8	B.C.	Sask.	0.2
Agriculture, Forestry, Fishing and Hunting	0.9	-0.4	1.4	1.8	B.C.	Alta.	0.5
Mining, and Oil and Gas Extraction	0.0	-0.8	0.2	1.0	Nfld.	Alta.	0.3
Utilities	0.1	-0.8	0.9	1.7	P.E.I.	N.S.	0.4
Construction	0.1	-0.1	0.4	0.5	Sask.	P.E.I.	0.1
Manufacturing	0.4	-0.2	0.6	0.8	B.C.	Que.	0.3
Wholesale Trade	0.3	-0.4	0.6	1.0	Nfld.	N.S.	0.3
Retail Trade	0.1	-0.2	0.8	1.1	Alta.	Nfld.	0.3
Transportation and Warehousing	0.4	-0.1	1.0	1.1	B.C.	Nfld.	0.3
Information and Cultural Industries	0.6	-0.3	1.1	1.4	P.E.I.	Man.	0.4
FIRE*	0.4	-0.2	0.6	0.8	Alta.	Man.	0.3
Professional, Scientific and Technical Services	0.7	0.0	0.8	0.8	Man.	Ont.	0.3
ASWMR**	0.0	-0.4	0.6	1.0	Alta.	Man.	0.4
Arts, Entertainment and Recreation	0.0	-0.3	1.4	1.7	Nfld.	Man.	0.6
Accommodation and Food Services	0.2	-0.3	0.6	0.9	N.B.	P.E.I.	0.3
Other Services (Except Public Administration)	0.4	-0.7	1.1	1.8	P.E.I.	N.B.	0.6

* Finance, Insurance, Real Estate and Renting and Leasing ** Administrative and Support, Waste and Remediation

Source: CSLs Provincial Productivity Database, http://www.csls.ca/data/mfp_new.asp.

provides key descriptive statistics about labour quality growth by industry across provinces between 1997 and 2007. Three industries experienced no labour quality growth – the mining, and oil and gas extraction industry; the administration and support, and waste and remediation industry; and the arts, entertainment, and recreation industry.

Among two-digit industries in Canada, the industry with the fastest growing labour quality was the agriculture, forestry, fishing and hunting (0.9 per cent per year).

There is very little variation between provinces in the growth of labour quality at the two-digit industry level. The standard deviation between industries in the rates of growth of labour quality at the two-digit level varied from 0.1 per cent from 1997 to 2007 in the manufacturing industry to 0.6 per cent in the other services (excluding public administration) industry. The range in labour quality growth rates among the top and bottom province in manufacturing was 0.8 percentage points. In administrative and support, and waste and remediation industry the difference was 1.8 percentage points.

Table 11: Labour Quality Growth Provincial Ranking by Industry, 1997-2007

Based on Compound Annual Rate of Growth

	Sask.	Man.	Nfld.	P.E.I.	Ont.	Alta.	Que.	N.B.	N.S.	B.C.
Market Sector	1	2	3	4	5	6	7	8	9	10
Agriculture, Forestry, Fishing and Hunting	8	5	2	7	4	1	3	6	9	10
Mining, and Oil and Gas Extraction	3	5	10	7	6	1	4	2	9	8
Utilities	6	5	3	10	7	4	2	8	1	9
Construction	10	5	3	1	2	6	9	7	8	4
Manufacturing	8	5	4	6	3	7	1	2	9	10
Wholesale Trade	4	5	10	9	2	6	3	8	1	7
Retail Trade	9	6	1	5	2	10	4	3	8	7
Transportation and Warehousing	6	9	1	2	5	7	4	3	8	10
Information and Cultural Industries	7	1	6	10	4	3	8	9	5	2
FIRE*	3	1	6	9	4	10	7	2	8	5
Professional, Scientific and Technical Services	4	10	2	9	1	6	3	8	5	7
ASWMR**	6	1	7	4	5	10	8	3	2	9
Arts, Entertainment and Recreation	6	1	10	3	7	5	8	2	4	9
Accommodation and Food Services	3	8	9	1	2	5	6	10	4	7
Other Services (Except Public Administration)	4	9	2	10	3	7	6	1	8	5
Absolute Unweighted Average Rank	5.8	5.1	5.1	6.2	3.8	5.9	5.1	4.9	5.9	7.3
Unweighted Market Sector Rank	6	5	3	9	1	7	4	2	8	10

* Finance, Insurance, Real Estate and Renting and Leasing ** Administrative and Support, Waste and Remediation

Source: CSLs Provincial Productivity Database, http://www.csls.ca/data/mfp_new.asp.

Table 11 provides the market sector ranking and unweighted market sector ranking by province for labour quality growth. These estimates provide a sense of whether or not a province's labour quality growth performance is broadly-based or whether it is driven by a small number of particular industries. At the bottom, a ranking of provinces based on the unweighted average industry rank is provided, and can be compared with the rank obtained in the market sector.

Ontario, Prince Edward Island, New Brunswick and Saskatchewan all show evidence of certain industries being the main cause for their market rank. Ontario had an unweighted ranking far above its market sector ranking because its market sector ranking is much lower due to the poor performance in the utilities and mining sectors. Prince Edward Island had a substantially lower unweighted ranking indicating that its well performing sectors (construction, transportation and warehousing, and accommodations and food services industry) make up a large part of its market sector growth. New Brunswick had an unweighted ranking far above its market sector ranking showing that its slowly growing industries (utilities, wholesale trade, information and cultural industries, and accommodation and food services) are the industries contributing the most to its market sector growth. The unweighted ranking in Saskatchewan is lower than its market sector rank because of a number of poor performing industries.

Newfoundland and Prince Edward Island had the most variation in their rankings among industries. Each had two first-place rankings and three tenth-place rankings. The fact that both are relatively small provinces in output relative to Canada may explain this variability.

C. Labour Quality Growth at the Three-digit Industry Level

Appendix Table 4 provides the data for the labour quality growth in each province at the three-digit industry level for available industries.

At the three-digit level, there are 42 industries each with 1 to 10 provinces as well as all two-digit industries reporting labour quality statistics. Although not all data are available for all industries in all provinces, it is still possible to note some differences in the labour quality growth rates from the reporting provinces.

There was substantially more reported variation in the growth of labour quality at the three-digit level among provinces compared to variation at the two-digit level. The three-digit industry with the highest range for labour quality growth was the fishing, hunting, and trapping industry with a range of 50.1 percentage points and a standard deviation of 12.1 with 10 provinces reporting. The three-digit industries with the lowest range were the electric power generation, transmission and distribution industry with a range of 0.7 percentage points and 3 provinces reporting, and the mining (excluding oil and gas extraction) industry with a range of 0.7 percentage points and 8 provinces reporting.

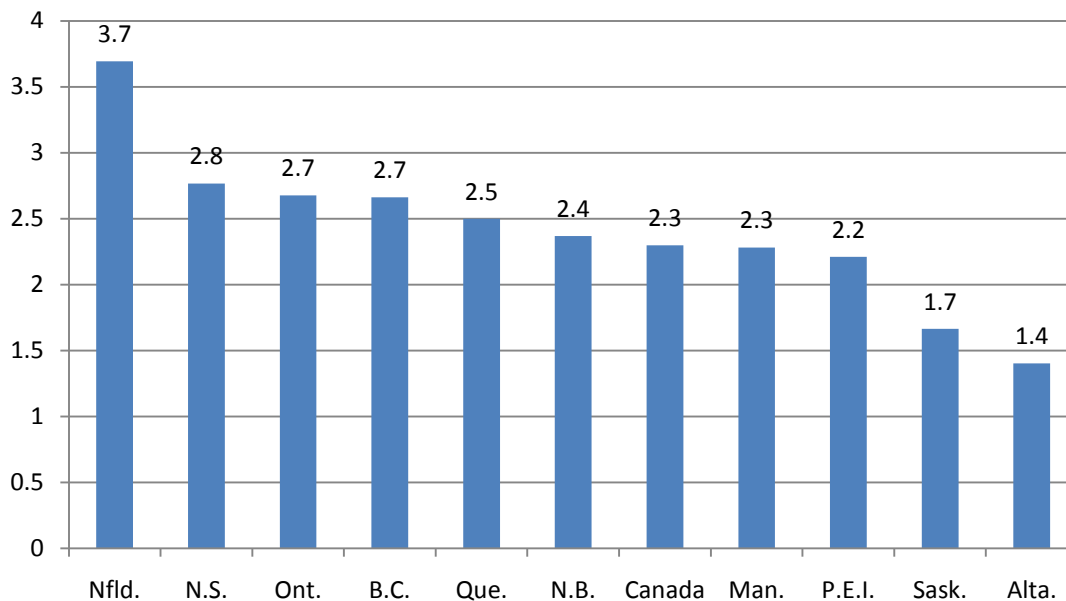
V. Capital Productivity

A. Capital Productivity in the Market Sector

1. Capital Productivity Levels

Capital productivity levels are measured in 1997 dollars of GDP per real dollar of capital services and are calculated for the most recently available year of 2007.

Chart 4: Capital Productivity Levels in the Market Sector by Province, 2007
Real GDP per dollar of Capital Services (\$1997)



Source: CSLs Provincial Productivity Database, http://www.csls.ca/data/mfp_new.asp.

In Canada, the capital productivity in 2007 was \$2.30 GDP (\$1997) per dollar of capital services (Chart 4). The province with the highest capital productivity was Newfoundland at \$3.69 of GDP per dollar of capital services. Newfoundland's high productivity is certainly due to the extremely high capital productivity in its mining, and gas and oil extraction industry of \$13.41 of GDP per dollar of capital services.

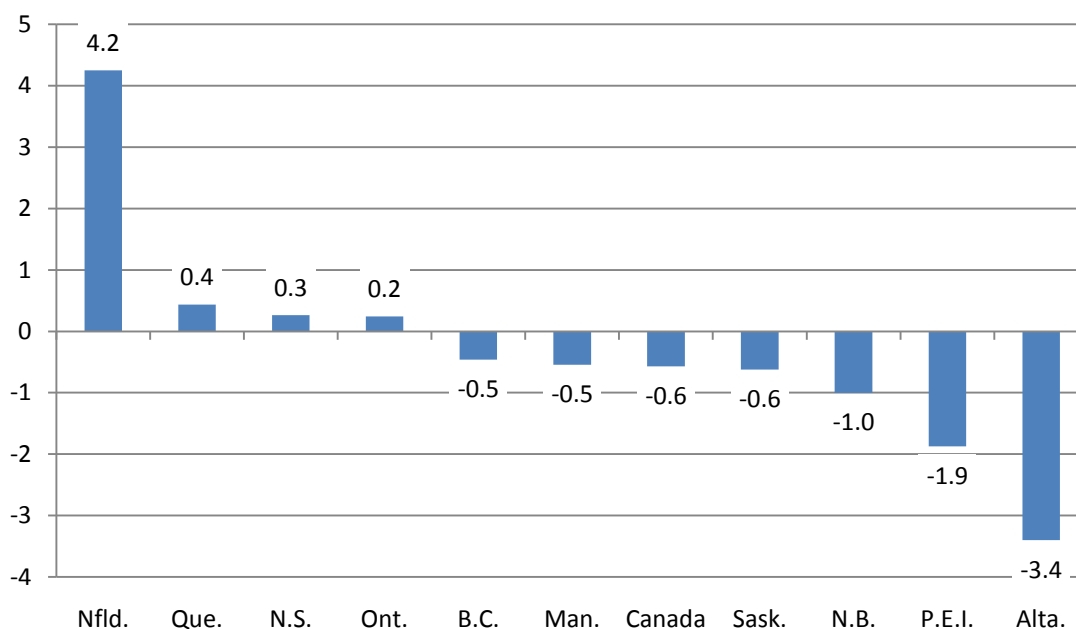
The province with the lowest market sector capital productivity was Alberta which had a capital productivity of \$1.40 of real GDP per dollar of capital services, less than two thirds of the national average. Alberta's capital productivity level was low in nearly all industries. Furthermore, Alberta's capital productivity level was substantially lower than the province with the second lowest productivity, Saskatchewan, which had a capital productivity level of \$1.67 real GDP per dollar of capital services.

2. Capital Productivity Growth

At the Canada level, capital intensity in the market sector fell at a 0.57 per cent average annual rate between 1997 and 2007 (Table 5). The first three years of the period (1997-2000) saw positive capital productivity growth (1.15 per cent per year), while the period since 2000 experienced falling capital productivity (-1.30 per cent per year). Again, this report will focus on the whole period, not the two sub-periods.

There was an even greater range in market sector capital productivity growth (7.6 percentage points) by province than in labour productivity (3.8 percentage points) (Chart 5). Newfoundland again was the province with by far the most rapid capital productivity growth (4.25 per cent per year). No other province was close. Quebec was second with capital productivity growth at a meagre 0.44 per cent. At the other end of the spectrum, Alberta had the worst capital productivity performance, with real GDP per unit of capital services falling at a 3.40 per cent average annual rate.

Chart 5: Capital Productivity Growth in the Market Sector by Province, 1997-2007
Average Annual Rate of Growth



Source: CSLs Provincial Productivity Database, http://www.csls.ca/data/mfp_new.asp.

B. Capital Productivity at the Two-digit Industry Level

1. Capital Productivity Levels

Appendix Table 5 and Appendix Table 6 provide data on the absolute and relative capital productivity levels for each province at the two-digit industry level for 2007.

The capital productivity levels in industries varied greatly from \$6.83 real GDP per dollar of capital services in the construction industry to \$0.77 real GDP per dollar of capital services in the mining, and oil and gas extraction industry. Most industries had relatively high variance among provinces with the exception of the accommodation and food services industry which had capital productivity levels only ranging from \$5.38 real GDP per dollar of capital services in Ontario to \$3.24 real GDP per dollar of capital services in Alberta. The industry with the most variance among provinces was the mining and oil and gas industry in which capital productivity ranged from \$0.11 real GDP per dollar of capital services in Prince Edward Island to \$13.41 real GDP per dollar of capital services in Newfoundland. Unsurprisingly, industries that are a substantial part of output in all provinces have lower provincial variance in capital productivity.

Table 12 provides the market sector ranking and unweighted market sector ranking by province for capital productivity levels. Again, the strong capital productivity of Newfoundland's mining and oil and gas extraction industry substantially supports its high market sector ranking despite the fact that many of its industries have below average

Table 12: Capital Productivity Levels at the Two-digit Industry Level by Province – Ranking, 1997-2007

Based on dollars of output per dollar of capital services (\$1997)

	Nfld.	N.S.	Ont.	B.C.	Que.	N.B.	Man.	P.E.I.	Sask.	Alta.
Market Sector	1	2	3	4	5	6	7	8	9	10
Agriculture, forestry, fishing and hunting	2	3	6	4	5	1	7	9	10	8
Mining and Oil and Gas Extraction	1	4	5	7	2	6	3	10	8	9
Utilities	2	1	3	6	4	8	7	10	5	9
Construction	10	2	6	3	9	5	8	4	7	1
Manufacturing	5	2	4	1	6	8	9	3	7	10
Wholesale Trade	7	4	3	1	8	2	10	5	6	9
Retail Trade	6	4	7	5	9	8	3	10	1	2
Transportation and Warehousing	9	7	6	3	5	4	2	1	8	10
Information and Cultural Industries	10	4	6	2	3	9	8	1	5	7
FIRE*	9	5	1	7	4	8	6	10	2	3
Professional, Scientific and Technical Services	10	8	2	1	3	6	4	9	7	5
AWSMR**	1	4	7	8	3	2	6	5	10	9
Arts, Entertainment and Recreation	8	6	5	9	3	4	2	1	10	7
Accommodation and Food Services	4	7	1	9	2	8	5	3	6	10
Other Services (Except Public Administration)	7	10	1	5	8	6	4	3	2	9
Absolute Unweighted Average Rank	5.8	4.6	4.1	4.7	4.9	5.7	5.7	5.8	6.4	7.4
Unweighted Market Sector Rank	7	2	1	3	4	5	5	7	9	10

* Finance, Insurance, Real Estate and Renting and Leasing ** Administrative and Support, Waste and Remediation

Source: CSLs Provincial Productivity Database, http://www.csls.ca/data/mfp_new.asp.

capital productivity levels. Interestingly, Alberta had a high relative labour productivity level but very low capital productivity level across nearly all industries.

2. Capital Productivity Growth

Appendix Table 7 provides the data for capital productivity growth in each province at the two-digit industry level for available industries. Table 13 provides key descriptive statistics about capital productivity growth by industry across provinces between 1997 and 2007. Ten industries and the market sector as a whole experienced negative capital productivity growth.

Among all the two-digit industries in Canada, the industry with the fastest growing capital intensity was the agriculture, forestry, fishing and hunting industry that had capital productivity growth of 2.0 per cent per year from 1997 to 2007. The industry

Table 13: Capital Productivity Growth at the Two-digit Industry Level by Province – Summary Statistics, 1997-2007

Based on Compound Annual Rate of Growth

	Canada	Range by Province					Standard Deviation
		Per Cent		Point Diff.	Province		
		Low	High		Bottom	Top	
	A	B	C	D=C-B	E	F	G
Market Sector	-0.6	-3.4	4.2	7.6	Alta.	Nfld.	2.0
Agriculture, Forestry, Fishing and Hunting	2.0	-1.6	3.8	5.4	P.E.I.	N.B.	1.5
Mining, and Oil and Gas Extraction	-5.7	-25.7	19.2	45.0	P.E.I.	Nfld.	11.0
Utilities	0.0	-11.6	2.5	14.0	P.E.I.	N.S.	4.0
Construction	1.4	-4.4	12.3	16.7	P.E.I.	Alta.	4.6
Manufacturing	1.6	-0.7	5.3	6.0	Man.	B.C.	1.7
Wholesale Trade	-0.2	-2.8	2.8	5.6	Que.	N.B.	1.9
Retail Trade	-1.0	-3.8	3.6	7.4	N.B.	Sask.	2.2
Transportation and Warehousing	-1.9	-4.4	1.9	6.2	N.S.	Sask.	1.9
Information and Cultural Industries	0.5	-1.8	4.5	6.3	N.B.	P.E.I.	1.9
FIRE*	-0.9	-4.5	0.0	4.5	P.E.I.	Ont.	1.5
Professional, Scientific and Technical Services	-6.7	-12.8	-5.2	7.6	Nfld.	Que.	2.3
ASWMR**	-2.8	-8.7	13.4	22.1	Sask.	Nfld.	7.1
Arts, Entertainment and Recreation	-4.5	-12.1	5.7	17.8	B.C.	P.E.I.	4.7
Accommodation and Food Services	-0.4	-4.3	1.8	6.1	B.C.	Ont.	1.8
Other Services (Except Public Administration)	-0.8	-4.9	8.1	13.0	N.S.	Sask.	3.7

* Finance, Insurance, Real Estate and Renting and Leasing ** Administrative and Support, Waste and Remediation

Source: CSLs Provincial Productivity Database, http://www.csls.ca/data/mfp_new.asp.

with the lowest capital intensity growth was the mining, and oil and gas extraction industry with -5.7 per cent growth per year from 1997 to 2007.

The two-digit industry with the widest range of capital growth rates across provinces was the mining, oil and gas extraction industry, with a range of 45.0 percentage points. The finance, insurance, real estate and renting and leasing industry had the smallest range of values, at 4.5 percentage points.

Overall, the capital productivity growth in Canada was low in nearly all industries. However, even in some of the poorest performing industries, certain provinces enjoyed very high capital productivity growth, such as mining, and oil and natural gas in Newfoundland and construction in Alberta.

Table 14 provides a ranking of provinces in terms of capital productivity growth for the market sector and each of the fifteen industry groupings. These estimates provide a sense of whether or not a province's capital productivity growth performance is

Table 14: Capital Productivity Growth Ranking by Province and Industry, 1997-2007

Based on Compound Annual Rate of Growth

	Nfld.	Que.	N.S.	Ont.	B.C.	Man.	Sask.	N.B.	P.E.I.	Alta.
Market Sector	1	2	3	4	5	6	7	8	9	10
Agriculture, Forestry, Fishing and Hunting	2	4	8	9	7	3	6	1	10	5
Mining, and Oil and Gas Extraction	1	4	3	5	6	2	7	8	10	9
Utilities	3	2	1	5	6	7	4	8	10	9
Construction	6	7	5	8	3	9	2	4	10	1
Manufacturing	8	3	2	6	1	10	4	9	5	7
Wholesale Trade	3	10	7	5	4	6	2	1	8	9
Retail Trade	4	6	5	8	7	3	1	10	9	2
Transportation and Warehousing	8	4	10	5	3	2	1	9	7	6
Information and Cultural Industries	5	2	4	6	3	8	9	10	1	7
FIRE*	9	4	3	1	7	6	2	8	10	5
Professional, Scientific and Technical Services	10	1	3	2	4	5	8	6	9	7
ASWMR**	1	3	4	6	8	7	10	2	5	9
Arts, Entertainment and Recreation	6	2	7	5	10	4	9	3	1	8
Accommodation and Food Services	6	4	8	1	10	7	3	9	2	5
Other Services (Except Public Administration)	6	8	10	3	4	2	1	5	7	9
Absolute Unweighted Average Rank	5.2	4.3	5.3	5	5.5	5.4	4.6	6.2	6.9	6.5
Unweighted Market Sector Rank	4	1	5	3	7	6	2	8	10	9

* Finance, Insurance, Real Estate and Renting and Leasing ** Administrative and Support, Waste and Remediation

Source: CSLS Provincial Productivity Database, http://www.csls.ca/data/mfp_new.asp.

broadly-based or whether it is driven by a small number of particular industries. At the bottom, a ranking of provinces based on the unweighted average industry rank is provided, and can be compared with the rank obtained in the market sector.

The unweighted market sector ranking is within three places of the market sector ranking in capital productivity in all provinces with the exception of Saskatchewan which is ranked seventh in the market sector, but second based on its unweighted market sector ranking. Saskatchewan's unweighted market sector ranking is likely significantly higher due to having six industries ranked first or second. Therefore, it must be that the major contributors to Saskatchewan's market sector rank are from the five industries that are ranked seventh or below which depressed its market sector ranking. Also note that unlike labour productivity growth, Alberta and Prince Edward Island consistently underperformed the Canadian average in most industries for capital productivity growth giving it both a low weighted and unweighted ranking.

C. Capital Productivity at the Three-digit Industry Level

1. Capital Productivity Levels

Appendix Table 5 and Appendix Table 6 present the absolute and relative levels of capital productivity for each province at the three-digit industry level for 2007.

Although not all data are available for all industries in all provinces, it is still possible to note some differences in the levels in industries between the reporting provinces.

The industry with the highest capital productivity in Canada was the religious, grant-making, civic, and professional and similar organizations industry at \$5.4 of real GDP per dollar of capital services. The industries with the lowest level of capital productivity were the oil and gas extraction industry (\$0.6 of real GDP per dollar of capital services) and the beverage and tobacco product manufacturing industry (\$1.0 of real GDP per dollar of capital services).

The industry with the largest reported range was the fishing, hunting and trapping industry with a range from \$0.0 of real GDP per dollar of capital services in Saskatchewan to \$21.2 of real GDP per dollar of capital services in New Brunswick.

2. Capital Productivity Growth

Appendix Table 7 provides the data for the capital productivity growth in each province at the three-digit industry level for available industries.

At the three-digit level, there are 28 industries each with 1 to 10 provinces as well as all two-digit industries reporting capital productivity statistics. Although not all data are available for all industries in all provinces, it is still possible to note some differences in the growth rates from the reporting provinces.

There was less reported variation in the capital productivity growth at the three-digit level among provinces compared to variation at the two-digit level. This means that too many key provinces are missing to make accurate inferences about the range of capital productivity growth rates by industry and province. That considered, the three-digit industry with the highest range in capital productivity growth was the petroleum and coal products manufacturing industry with a range of 17.3 percentage points and 3 provinces reporting. The three-digit industry with the lowest range was the plastics and rubber products manufacturing industry with a range of 1.5 percentage points and 3 provinces reporting.

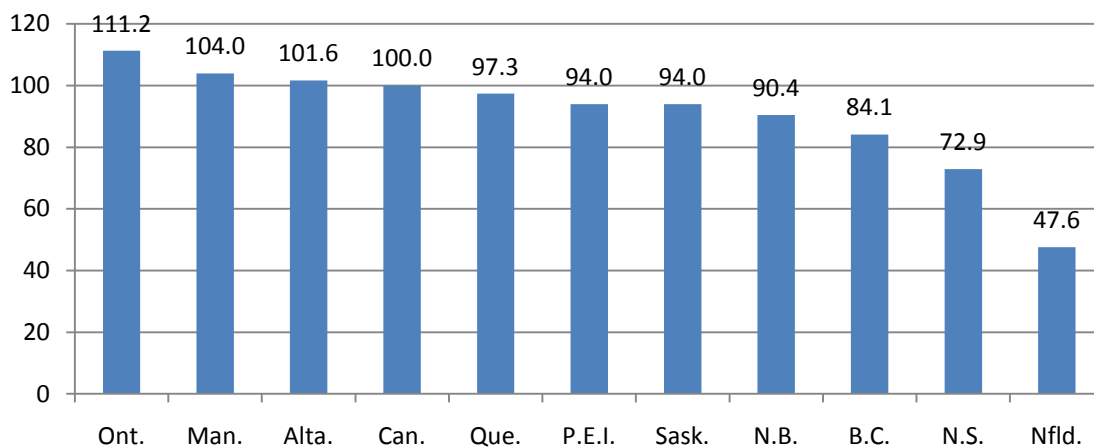
VI. Capital Composition

A. Overall Capital Composition Growth at the Market Sector

1. Capital Composition Levels

The relative composition levels measure the relative dollars of capital services per dollar of capital stock in each province for 2007.²⁵ A province with a higher capital composition than the average had assets that produce more services per unit of capital stock. For a full description of the calculation of capital services see Section II.

Chart 6: Relative Capital Composition Levels in the Market Sector by Province, 2007
Canada = 100



Source: CSLs Provincial Productivity Database, http://www.csls.ca/data/mfp_new.asp.

²⁵ In this database, capital services are measured based on the weighted average of user costs rather than simply depreciation (for the full details see Section II.A.2). Because of this, it is possible for the capital services to exceed the capital stock in an industry.

Ontario had the highest level of capital composition at 111.2 per cent of the national average. Newfoundland had the lowest at 47.6 per cent. The low capital composition in Newfoundland is due to the relatively low capital services provided by the capital stock of Newfoundland's mining and oil and gas extraction industry.

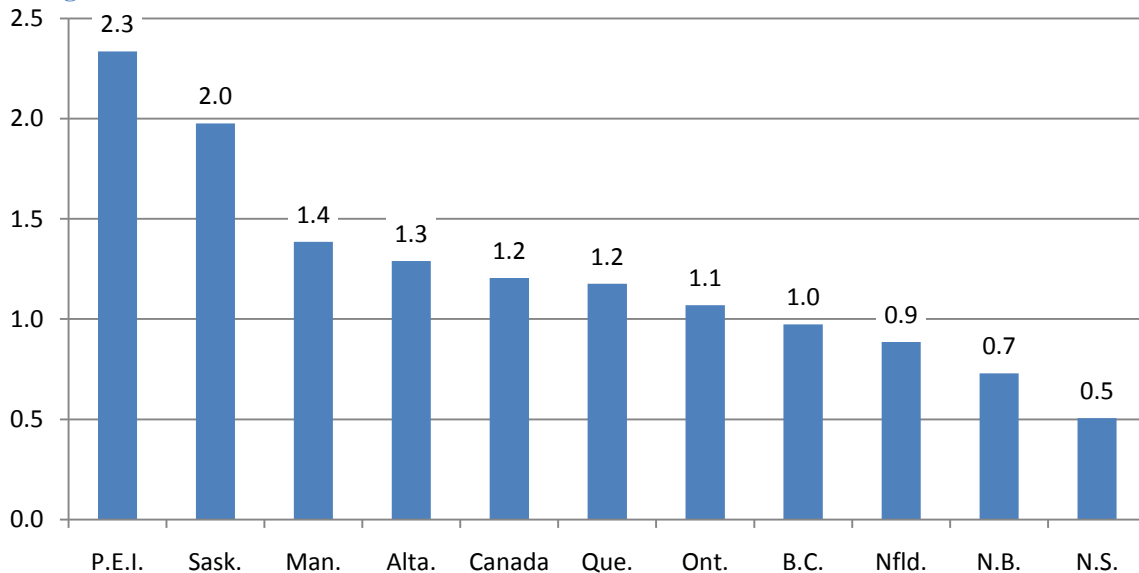
2. Capital Composition Growth

At the Canada level, capital composition in the market sector advanced at a 1.2 per cent average annual rate between 1997 and 2007 (Table 5 on page 13). Capital composition growth was twice as fast in the first three years of the period (1997-2000) than in the post-2000 period: 1.86 per cent per year versus 0.93 per cent.

There is significant variation in market sector capital composition growth across provinces (Chart 7). Prince Edward Island and Saskatchewan were the provinces with the most rapid capital composition growth (2.34 and 1.98 per cent per year respectively), followed by Manitoba (1.38 per cent), and Alberta (1.29 per cent). Nova Scotia experienced the slowest increase in capital composition, a relatively weak 0.51 per cent per year, followed by New Brunswick (0.73 per cent).

Chart 7: Capital Composition Growth by Province, 1997-2007

Average Annual Rate of Growth



Source: CSLs Provincial Productivity Database, http://www.csls.ca/data/mfp_new.asp.

B. Capital Composition at the Two-digit Industry Level

1. Capital Composition Levels

Appendix Table 8 and Appendix Table 9 provide the absolute and relative levels on capital composition for each province at the two-digit industry level for 2007.

Table 15: Capital Composition Levels at the Two-digit Industry Level by Province – Ranking, 2007

Based on levels relative to the Canadian average

	Ont.	Man.	Alta.	Que.	P.E.I.	Sask.	N.B.	B.C.	N.S.	Nfld.
Market Sector	1	2	3	4	5	6	7	8	9	10
Agriculture, Forestry, Fishing and Hunting	10	6	7	5	4	2	3	1	9	8
Mining, and Oil and Gas Extraction	3	5	2	8		1	4	6	7	9
Utilities	2	4	1	6		5		3		7
Construction	7	6	2	4	10	1	8	5	9	3
Manufacturing	4	1	3	2	5	9	6	7	10	8
Wholesale Trade	1	5	3	2	7	6	9	8	10	4
Retail Trade	2	5	8	1	3	9	6	4	10	7
Transportation and Warehousing	3	7	2	1	10	8	4	9	5	6
Information and Cultural Industries	2		5	1		7	8	4	6	3
FIRE*	7	3	8	10	1	5	2	9	6	4
Professional, Scientific and Technical Services	5	10	6	9	3	4	8	7	1	2
ASWMR**	3		2	4			6	1	5	
Arts, Entertainment and Recreation	5		3	4	6			1		2
Accommodation and Food Services	10	3	5	9	8	2	1	7	4	6
Other Services (Except Public Administration)	8	7	4	1	9	10	5	6	2	3
Absolute Unweighted Average Rank	4.6	4.9	4	4.4	5.9	5.4	5.5	5.4	6.6	5.5
Unweighted Market Sector Rank	3	4	1	2	9	5	8	6	10	7

Table 15 provides an unweighted and weighted market sector ranking of provinces in terms of capital composition growth for the market sector and each of the fifteen industry groupings. These estimates provide a sense of whether or not a province's capital composition level is broadly-based or whether it is driven by a small number of particular industries. At the bottom, a ranking of provinces based on the unweighted average industry rank is provided, and can be compared with the rank obtained in the market sector.

There is not much difference in the unweighted ranking and the weighted ranking for capital composition levels by province. Although Prince Edward Island had an unweighted rank of ninth and a market sector rank of 5, the discrepancy is possibly due to the four industries with missing values causing a bias in its unweighted ranking. Also note that the narrow range in the absolute unweighted average ranking of the provinces means that it is likely not influenced by province specific variables.

2. Capital Composition Growth Rates

Appendix Table 10 contains the capital composition growth rates by province at the two-digit industry level.

Among the two-digit industries in Canada, the industry with the fastest capital composition growth was the other services (except public administration) industry that had capital composition growth of 5.8 per cent per year from 1997 to 2007. The industry with the lowest capital composition growth was the construction industry with -0.4 per cent growth per year.

The industry with the highest variation among provinces at the two-digit level was the arts, entertainment, and recreation industry which had a range of 5.1 percentage points.

Table 16: Capital Composition Growth at the Two-digit Industry Level by Province – Summary Statistics, 1997-2007

Based on Compound Annual Rate of Growth

	Canada	Range by Province					Standard Deviation
		Per Cent		Point Diff.	Province		
		Low	High		Bottom	Top	
	A	B	C	D=C-B	E	F	G
Market Sector	1.2	0.5	2.3	1.8	N.S.	P.E.I.	0.6
Agriculture, Forestry, Fishing and Hunting	0.1	-0.1	0.5	0.5	Sask.	N.B.	0.1
Mining, and Oil and Gas Extraction	0.9	-0.2	1.7	1.9	N.S.	Que.	0.5
Utilities	0.6	0.0	1.3	1.3	Que.	Alta.	0.5
Construction	-0.4	0.2	0.8	0.6	Alta.	P.E.I.	0.2
Manufacturing	0.6	0.2	1.1	0.9	Sask.	Nfld.	0.3
Wholesale Trade	0.7	0.2	0.8	0.6	Nfld.	B.C.	0.2
Retail Trade	0.5	-0.4	1.2	1.6	Sask.	B.C.	0.5
Transportation and Warehousing	1.8	1.0	5.7	4.7	N.B.	P.E.I.	1.4
Information and Cultural Industries	1.2	0.7	2.7	2.0	Que.	Sask.	0.7
FIRE	1.8	1.5	2.6	1.1	B.C.	Alta.	0.3
Professional, Scientific and Technical Services	1.1	-0.2	1.3	1.5	Que.	Ont.	0.5
AWSMR	1.2	0.0	2.0	2.0	B.C.	N.B.	0.7
Arts, Entertainment and Recreation	2.7	0.9	6.1	5.1	P.E.I.	Alta.	1.9
Accommodation and Food Services	0.6	-0.3	0.6	0.9	N.B.	Alta.	0.3
Other Services (Except Public Administration)	5.8	0.4	3.0	2.7	Ont.	P.E.I.	0.8

* Finance, Insurance, Real Estate and Renting and Leasing ** Administrative and Support, Waste and Remediation

Source: CSLS Provincial Productivity Database, http://www.csls.ca/data/mfp_new.asp.

Table 17: Capital Composition Growth Provincial Ranking by Industry, 1997-2007
Based on Compound Annual Rate of Growth

	P.E.I.	Sask.	Man.	Alta.	Que.	Ont.	B.C.	Nfld.	N.B.	N.S.
Market Sector	1	2	3	4	5	6	7	8	9	10
Agriculture, Forestry, Fishing and Hunting	2	10	8	7	3	9	5	4	1	6
Mining, and Oil and Gas Extraction	10	4	5	2	1	3	6	8	7	9
Utilities	8	6	5	1	7	4	3	2	10	9
Construction	1	9	2	10	5	6	8	3	7	4
Manufacturing	9	10	8	2	7	6	4	1	5	3
Wholesale Trade	8	5	3	7	4	2	1	10	6	9
Retail Trade	2	10	7	6	3	4	1	8	9	5
Transportation and Warehousing	1	7	9	3	6	8	4	2	10	5
Information and Cultural Industries	9	1	10	5	8	4	6	3	2	7
FIRE*	2	5	6	1	4	9	10	8	3	7
Professional, Scientific and Technical Services	9	4	7	3	10	1	5	2	6	8
AWSMR**	8	10	9	4	2	3	6	7	1	5
Arts, Entertainment and Recreation	6	10	9	1	2	4	3	5	8	7
Accommodation and Food Services	3	9	5	1	4	2	8	7	10	6
Other Services (Except Public Administration)	1	2	9	7	4	10	6	5	8	3
Unweighted Average	5.3	6.8	6.8	4	4.7	5	5.1	5	6.2	6.2
Unweighted Market Sector Ranking	6	10	9	1	2	4	5	3	8	7

* Finance, Insurance, Real Estate and Renting and Leasing ** Administrative and Support, Waste and Remediation

Source: CSLs Provincial Productivity Database, http://www.csls.ca/data/mfp_new.asp.

The industry with the lowest variation among provinces was the agriculture, forestry, fishing, and hunting industry with a range of 0.5 percentage points between the province with the fastest growing capital composition, New Brunswick, and the province with the lowest capital composition growth, Saskatchewan.

Table 17 provides an unweighted market sector ranking and market sector ranking for provinces in terms of capital composition growth as well as the ranking for each province in each of the 15 industries. These estimates provide a sense of whether or not a province's capital composition growth performance is broadly-based or whether it is driven by a small number of particular industries. At the bottom, a ranking of provinces based on the unweighted average industry rank is provided, and can be compared with the rank obtained in the market sector.

Several provinces have different unweighted rankings compared to their market ranking in capital composition growth. Prince Edward Island and Saskatchewan rank substantially lower in their unweighted ranking, suggesting that their industries with high capital composition growth are their major ones. Conversely, Newfoundland had a very low market sector ranking in capital composition, but a very high unweighted ranking,

which means that Newfoundland's major industries, such as mining, and oil and gas extraction, have had the lowest capital composition growth.

Prince Edward Island continued to have the most variability in its rankings despite ranking first in the market sector. Although P.E.I was ranked first or second in six out of fifteen industries, it was also ranked eighth or below in seven out of fifteen industries.

C. Capital Composition at the Three-digit Level

1. Capital Composition Levels

Appendix Table 8 and Appendix Table 9 provide absolute and relative levels of capital composition for each available province at the three-digit industry level for 2007.

Although not all data are available for all industries in all provinces, it is still possible to note some important points in the levels in specific industries from the reporting provinces.

The industry with the highest reported capital composition is the personal and laundry services and private households industry at \$3.04 of capital services per dollar of capital stock. The industry with the lowest is the religious, grant-making, professional and similar industry which has a capital composition level of \$0.05 of capital services per dollar capital stock.

The industry with the largest range in values was the miscellaneous manufacturing sector which had a range from \$0.74 of capital services per dollar of capital stock in British Columbia to \$2.41 of capital services per dollar of capital stock in Alberta.

2. Capital Composition Growth

Appendix Table 10 provides the data for the capital composition growth in each province at the three-digit industry level for available industries.

At the three-digit level, there are 28 industries each with 1 to 10 provinces reporting capital composition growth statistics as well as all two-digit industries. Although not all data are available for all industries in all provinces, it is still possible to note some differences in the growth rates in specific industries from the reporting provinces.

There was more reported variation in the growth of capital composition at the three-digit level among provinces compared to variation at the two-digit level. The three-digit industry with the highest range of multifactor productivity growth was the fishing, hunting, and trapping industry with a range of 32.4 percentage points and with 6 provinces reporting. The three-digit industry with the smallest range of 0.9 percentage points was the food manufacturing with 5 provinces reporting.

VII. Capital Intensity

A. Capital Intensity in the Market Sector

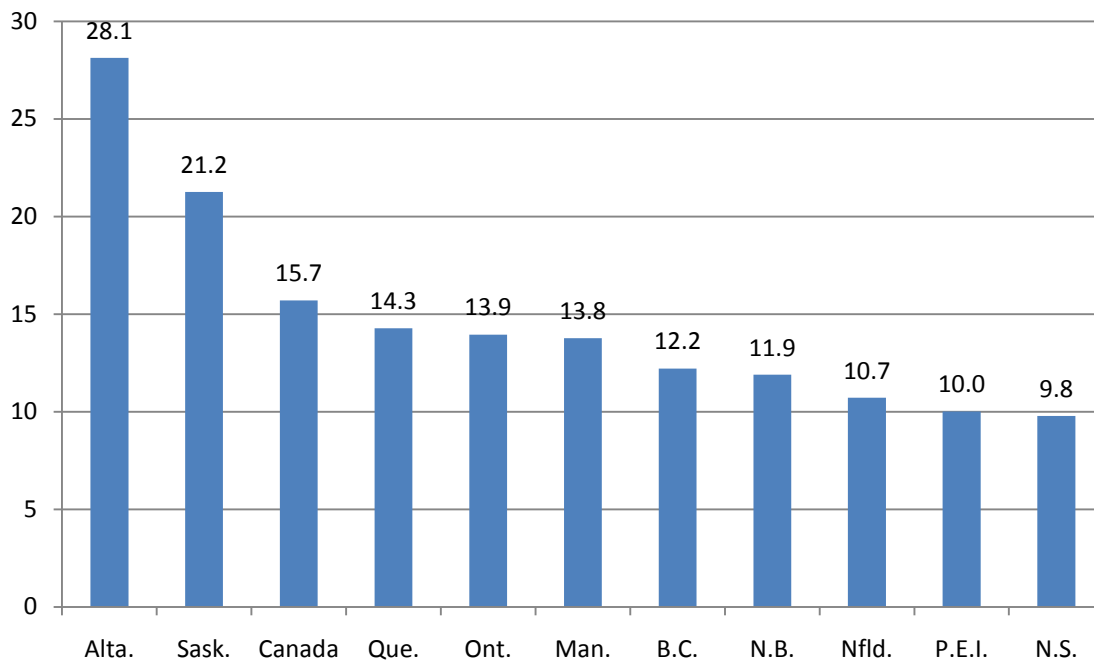
1. Capital Intensity Levels

Capital intensity levels are measured in dollars of capital services (\$1997) per hour for all provinces for 2007.

The capital intensity level in the market sector for Canada in 2007 was \$15.70 of capital services per hour. The level varied greatly among provinces. Alberta had by far the highest amount at \$28.12 of capital services per hour, nearly double the Canadian average. Alberta's capital intensity is so high because of Alberta's very high capital intensity in utilities and in mining, oil and gas extraction. In these two industries, Alberta had a relatively large industry giving a large influence over the provincial average, and they each have above average levels of capital intensity.

The province with the lowest capital intensity is Nova Scotia at \$9.78 of capital services per hour. Nova Scotia had very low capital intensity relative to other provinces in nearly all industries, and its output is not reliant on capital intensive industries such as mining and oil and gas extraction or utilities.

Chart 8: Capital Intensity Levels in the Market Sector by Province, 2007
Real Capital Services (\$1997) per Hour

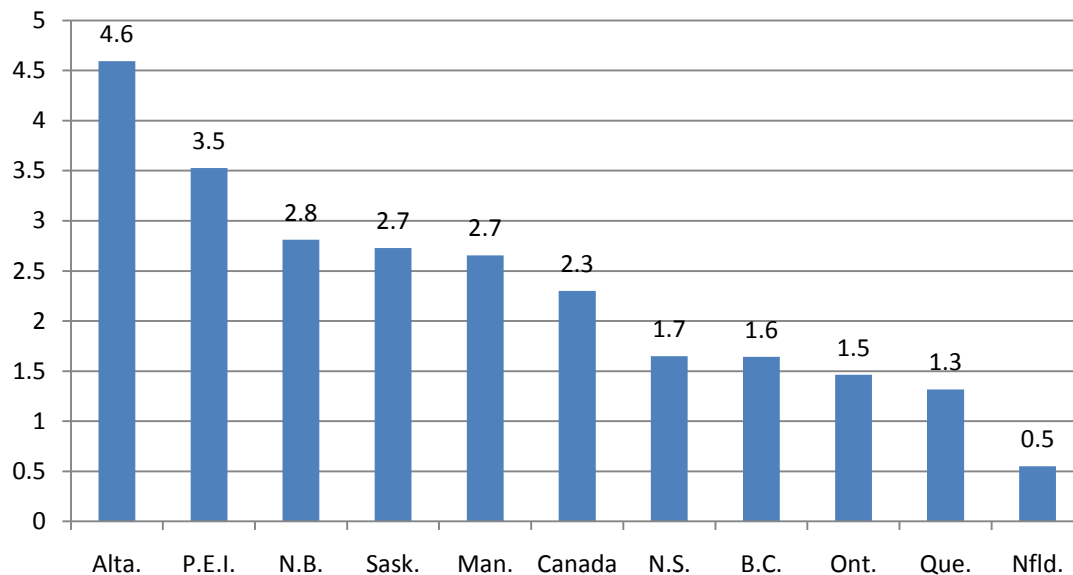


Source: CSLs Provincial Productivity Database, http://www.csls.ca/data/mfp_new.asp.

2. Capital Intensity Growth

At the Canada level, capital intensity (dollars of capital services per hour) in the market sector rose at a 2.30 average annual rate between 1997 and 2007. Newfoundland was the province with by far the least rapid capital intensity growth (0.55 per cent per year). At the other end of the spectrum, Alberta had the highest capital intensity growth, with capital intensity rising at a 4.59 per cent average annual rate. This contrasts with the finding that Newfoundland was the province with the highest capital and labour productivity growth, and Alberta the lowest. There was approximately the same amount of variation in market sector capital intensity growth by province as in labour productivity.

Chart 9: Capital Intensity Growth in the Market Sector by Province, 1997-2007
Annual Compound Growth Rate



Source: CSLS Provincial Productivity Database, http://www.csls.ca/data/mfp_new.asp.

B. Capital Intensity at the Two-digit Industry Level

1. Capital Intensity Levels

Appendix Table 11 and Appendix Table 12 provide absolute and relative levels of capital intensity for each province at the two-digit industry level for 2007.

The capital intensity levels vary greatly by industry from \$104.38 of capital services per hour in utilities to \$3.05 of capital service per hour in the other services industry. This is unsurprising given that the amount of capital required in the production of goods and services varies widely by industry.

The variance within each industry can be quite large. In mining and oil and gas extraction, Newfoundland had only \$17.42 of capital services per hour, whereas Alberta had \$137.73 of capital services per hour. Similarly, in the administration, support, and waste management and remediation industry the capital intensity varied from \$0.74 to \$11.92 of capital services per hour .

Similar to the productivity measures, a few industries have little variation in capital intensity across provinces. For instance, the retail trade; finance, insurance, renting and leasing industry; and information and cultural industries had ranges where the capital intensity in the province with the lowest capital intensity was less than half that of the province with the highest capital intensity.

Based on a comparison of the unweighted market sector ranking and market sector ranking available in Table 18, no province had an industry that had a disproportionate effect on its market sector ranking. Alberta had by far the highest unweighted market sector ranking with only one industry ranked below fifth. Again, provinces with small economies had some of the lowest capital intensity levels and the highest variance in their rankings by industry.

Table 18: Capital Intensity Levels Provincial Ranking by Industry, 1997-2007

Based on Compound Annual Rate of Growth

	Alta.	Sask.	Que.	Ont.	Man.	B.C.	N.B.	Nfld.	P.E.I.	N.S.
Market Sector	1	2	3	4	5	6	7	8	9	10
Agriculture, forestry, fishing and hunting	3	1	5	9	7	2	8	4	6	10
Mining and Oil and Gas Extraction	1	2	9	7	6	3	8	10	4	5
Utilities	1	4	5	8	6	2	7	9	3	10
Construction	9	2	1	5	3	7	6	4	10	8
Manufacturing	1	4	3	2	6	7	5	8	9	10
Wholesale Trade	3	1	5	6	2	9	8	4	10	7
Retail Trade	5	10	1	2	7	6	4	8	3	9
Transportation and Warehousing	1	2	5	3	6	4	9	8	10	7
Information and Cultural Industries	1	8	10	7	4	9	3	2	5	6
FIRE*	4	10	6	9	5	8	3	2	1	7
Professional, Scientific and Technical Services	4	5	7	6	10	9	8	1	2	3
AWSMR**	1	2	7	4	5	3	9	10	6	8
Arts, Entertainment and Recreation	4	1	6	5	8	2	9	3	10	7
Accommodation and Food Services	1	3	9	10	6	2	7	8	5	4
Other Services (Except Public Administration)	2	7	1	10	5	4	6	8	9	3
Absolute Unweighted Average Rank	2.63	4	5.19	6.06	5.69	5.19	6.69	6.06	6.38	7.13
Unweighted Market Sector Rank	1	2	3	6	5	3	9	6	8	10

2. Capital Intensity Growth

Appendix Table 13 provides the capital intensity growth for all provinces at the two-digit industry level. Table 19 provides key descriptive statistics about capital intensity growth by industry across provinces between 1997 and 2007. Only one industry experienced negative capital intensity growth, utilities, which was -0.9 per cent growth from 1997 to 2007.

Among all the two-digit industries in Canada, the industry with the fastest growing capital intensity was the professional, scientific and technical services industry that had capital intensity growth of 8.6 per cent per year from 1997 to 2007.

The rates of growth of capital intensity among provinces at the two-digit level varied greatly by province. The range in manufacturing was the lowest at 3.9 percentage points. The range in administrative and support, and waste and remediation industry was the highest at 25.1 percentage points. Mining, oil and gas extraction also had a range and

Table 19: Capital Intensity Growth by Province and Industry – Summary Statistics, 1997-2007

Based on Compound Annual Rate of Growth

	Canada	Range by Province					Standard Deviation
		Per Cent		Point Diff.	Province		
		Low	High		Bottom	Top	
	A	B	C	D=C-B	E	F	G
Market Sector	2.3	0.5	4.6	4.0	Nfld.	Alta.	1.2
Agriculture, Forestry, Fishing and Hunting	2.2	0.1	5.9	5.8	B.C.	Nfld.	1.8
Mining and Oil and Gas Extraction	3.6	-3.3	22.8	26.1	Nfld.	P.E.I.	7.5
Utilities	-0.9	-2.7	7.8	10.5	Que.	P.E.I.	3.1
Construction	0.3	-8.2	7.5	15.7	Alta.	P.E.I.	4.5
Manufacturing	0.6	-2.3	1.6	3.9	B.C.	Man.	1.5
Wholesale Trade	3.9	-2.3	6.3	8.7	P.E.I.	Que.	2.3
Retail Trade	4.4	0.3	7.8	7.5	Sask.	N.B.	2.0
Transportation and Warehousing	2.7	0.4	5.5	5.1	Sask.	N.S.	1.6
Information and Cultural Industries	2.5	-1.1	6.3	7.4	Que.	N.B.	2.4
Finance, Insurance, Real Estate and Renting and Leasing	2.4	1.5	6.2	4.7	Ont.	P.E.I.	1.7
Professional, Scientific and Technical Services	8.6	6.0	14.5	8.6	N.S.	P.E.I.	3.1
Administrative and Support, Waste and Remediation	3.2	-13.7	11.4	25.1	Nfld.	Sask.	7.7
Arts, Entertainment and Recreation	3.4	-9.4	9.4	18.7	P.E.I.	B.C.	5.8
Accommodation and Food Services	1.5	-1.3	5.0	6.3	Ont.	B.C.	1.8
Other Services (Except Public Administration)	3.0	-4.0	8.6	12.6	Sask.	N.S.	3.8

* Finance, Insurance, Real Estate and Renting and Leasing ** Administrative and Support, Waste and Remediation

Source: CSLs Provincial Productivity Database, http://www.csls.ca/data/mfp_new.asp.

variability similar to the administration and support, and waste and remediation industries with a range of 26.1 percentage points.

The industries with higher variation in capital intensity growth between provinces tended to also have above average capital intensity growth. This can be explained by the fact that industries with high variance had outliers that were generally higher than the average rate of the other provinces, increasing the unweighted standard deviation and increasing the average. Another explanation is that industries with above average capital intensity growth have a single province with very low capital intensity growth creating a high level of variance.

Table 20 provides a weighted market sector ranking and unweighted market sector ranking of provinces in terms of capital intensity growth by industry. These estimates provide a sense of whether or not a province's capital intensity growth performance is broadly-based or whether it is driven by a small number of particular industries. At the bottom, a ranking of provinces based on the unweighted average industry rank is provided, and can be compared with the rank obtained in the market sector.

Table 20: Capital Intensity Growth Ranking by Province and Industry, 1997-2007
Based on Compound Annual Rate of Growth

	Alta.	P.E.I.	N.B.	Sask.	Man.	N.S.	B.C.	Ont.	Que.	Nfld.
Market Sector	1	2	3	4	5	6	7	8	9	10
Agriculture, Forestry, Fishing and Hunting	2	3	4	5	6	7	10	8	9	1
Mining, and Oil and Gas Extraction	4	1	8	7	3	2	5	9	6	10
Utilities	4	1	3	5	6	9	2	7	10	8
Construction	10	1	5	7	2	6	9	3	4	8
Manufacturing	2	8	3	9	1	6	10	4	5	7
Wholesale Trade	2	10	8	9	3	7	5	4	1	6
Retail Trade	9	2	1	10	5	4	6	3	7	8
Transportation and Warehousing	3	8	2	10	9	1	7	6	5	4
Information and Cultural Industries	2	9	1	3	4	6	8	7	10	5
FIRE*	6	1	3	4	5	9	7	10	8	2
Professional, Scientific and Technical Services	4	1	5	3	9	10	7	6	8	2
ASWMR**	2	7	9	1	3	6	5	4	8	10
Arts, Entertainment and Recreation	3	10	9	4	2	8	1	5	6	7
Accommodation and Food Services	4	7	3	9	6	2	1	10	8	5
Other Services (Except Public Administration)	4	2	5	10	8	1	7	9	3	6
Absolute Unweighted Average Rank	4.1	5	4.6	6.6	4.5	5.3	5.9	6.4	6.4	6.2
Unweighted Market Sector Rank	1	4	3	10	2	5	6	8	9	7

* Finance, Insurance, Real Estate and Renting and Leasing ** Administrative and Support, Waste and Remediation
Source: CSLs Provincial Productivity Database, http://www.csls.ca/data/mfp_new.asp.

The unweighted ranking roughly equals the market ranking in capital intensity in all provinces with the exception of Saskatchewan which is ranked fourth in the market sector but tenth based on its unweighted ranking. Saskatchewan's unweighted ranking is likely significantly lower due to having six industries ranked ninth or tenth, however, the weight of Saskatchewan's larger industries, like agriculture and finance, make its market ranking higher overall.

C. Capital Intensity at the Three-digit Industry Level

1. Capital Intensity Levels

Appendix Table 11 and Appendix Table 12 present the absolute and relative levels of capital intensity for each province at the three-digit industry level for 2007.

Although not all data are available for all industries in all provinces, it is still possible to note some important points in the levels of specific industries from the reporting provinces.

The industry with the highest reported capital intensity level is the oil and gas extraction industry with a national average of \$266.6 of capital services per hour. The industry with the lowest is the repair and maintenance industry at \$3.5 of capital services per hour.

The industry with the largest relative range in values between reporting provinces was the chemical manufacturing industry with a range from \$131 of capital services per hour to \$29.1 dollars of capital services per hour.

2. Capital Intensity Growth

Appendix Table 13 provides the data for capital intensity growth in each province at the three-digit industry level for available industries for the years 1997 to 2007.

At the three-digit level, there are 28 three-digit industries with at least one province reporting capital intensity each with 1 to 10 provinces reporting as well as all two-digit industries. Although not all data are available for all industries in all provinces, it is still possible to note some differences in the growth rates from the reporting provinces.

There was less reported variation in the growth of capital intensity at the three-digit level among provinces compared to variation at the two-digit level. This is because of the low proportion of provinces with available data in each industry. The three-digit industry with the highest range in capital productivity growth was the petroleum and coal products manufacturing industry with a range of 17.3 percentage points with 3 provinces reporting. The three-digit industry with the lowest range was the plastics and rubber products manufacturing industry with a range of 1.5 percentage points with 3 provinces reporting.

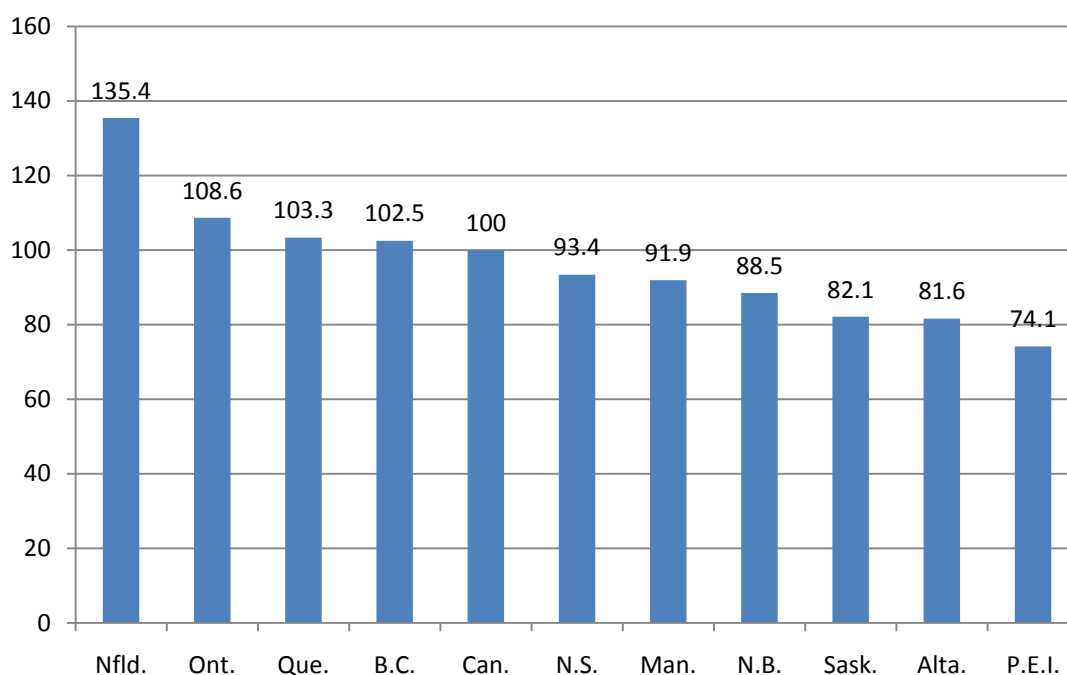
VIII. Multifactor Productivity

A. Multifactor Productivity at the Market Level

1. Multifactor Productivity Levels

The province with the highest MFP level in the market sector in 2007 was Newfoundland at 135.4 per cent the national average. The province with the lowest MFP level was Prince Edward Island at 74.1 per cent of the national average (Chart 10).

Chart 10: Multifactor Productivity Levels in the Market Sector by Province, 2007
Canada = 100



Source: CSLS Provincial Productivity Database, http://www.csls.ca/data/mfp_new.asp.

Please see the methodology in Section II.D for a detailed description of how these levels were calculated from the productivity database.

Ontario is the only province which consistently had an MFP level higher than the Canadian average in the market sector over the period 1997 to 2007, although British Columbia only had one year slightly below average. Many provinces consistently performed below the Canadian average for the market sector over the period including Alberta, Prince Edward Island, Nova Scotia, New Brunswick, Manitoba, and Saskatchewan (Table 21).

Table 21: Relative MFP Level by Province in the Market Sector, 1997 - 2007 (Canada = 100)

	Nfld.	P.E.I.	N.S.	N.B.	Ont.	Que.	Man.	Sask.	Alta.	B.C.	Can.
1997	88.5	77.7	86.4	88.3	105.0	98.4	89.9	83.3	99.0	102.1	100.0
1998	91.8	79.1	85.9	88.3	105.2	98.6	90.2	85.6	98.7	101.6	100.0
1999	91.6	77.6	86.9	87.9	107.9	98.9	86.4	82.4	93.1	99.9	100.0
2000	98.9	75.1	87.4	86.3	108.6	98.5	87.4	81.8	90.2	100.1	100.0
2001	97.0	72.1	89.6	88.9	108.9	99.7	86.4	80.3	87.8	101.8	100.0
2002	117.2	74.0	90.7	89.3	109.4	99.5	86.2	78.1	86.5	102.7	100.0
2003	124.4	73.6	92.1	92.3	108.6	100.1	85.8	81.6	85.0	103.2	100.0
2004	117.8	74.3	91.4	90.5	108.7	99.5	85.7	83.9	85.1	103.7	100.0
2005	115.5	73.0	90.6	88.6	108.8	99.8	88.1	84.9	84.2	104.6	100.0
2006	119.2	72.4	91.9	89.2	108.3	100.9	90.0	81.3	84.4	104.3	100.0
2007	135.4	74.1	93.4	88.5	108.6	103.3	91.9	82.1	81.6	102.5	100.0

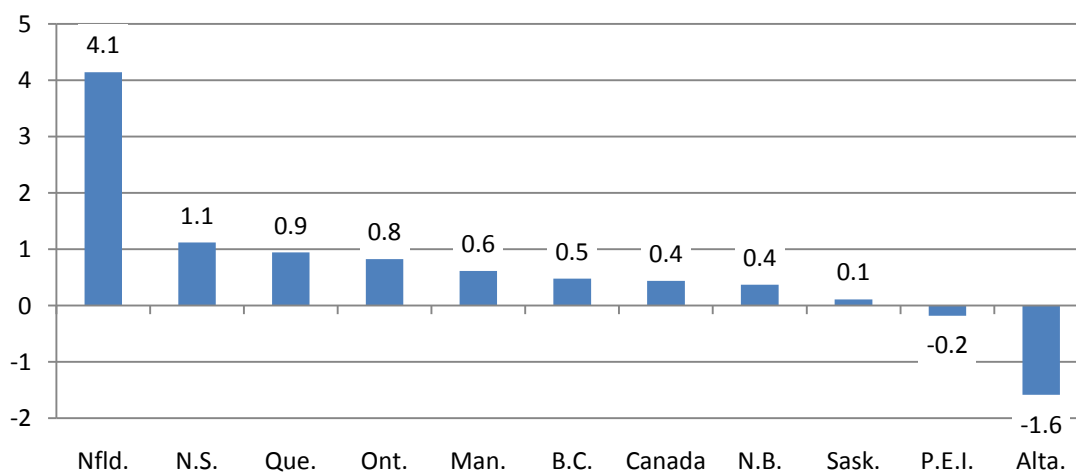
Source: CSLS Provincial Productivity Database, http://www.csls.ca/data/mfp_new.asp.

2. Multifactor Productivity Growth

At the Canada level, multifactor productivity per hour in the market sector rose at a 0.44 average annual rate between 1997 and 2007 (Table 5). The first three years of the period (1997-2000) saw much stronger multifactor productivity growth (2.02 per cent per year), while the period since 2000 had experienced falling multifactor productivity (-0.24 per cent per year).

Chart 11: Multifactor Productivity Growth in the Market Sector by Province, 1997-2007

Average Annual Rate of Growth



Source: CSLS Provincial Productivity Database, http://www.csls.ca/data/mfp_new.asp.

Newfoundland was the province with by far the most rapid multifactor productivity growth, an impressive 4.14 per cent per year (Chart 11). No other province was close. Nova Scotia was second with multifactor productivity growth at 1.12 per cent, and Quebec third at 0.94 per cent. Alberta had by far the worst multifactor productivity performance, falling at a 1.58 per cent average annual rate. The only other province to experience negative multifactor productivity growth was Prince Edward Island (-0.18 per cent per year).

B. Multifactor Productivity at the Two-digit Industry Level

1. Multifactor Productivity Levels

Appendix Table 14 provides the relative multifactor productivity levels for all of the provinces at the two -digit industry level for 2007.

Table 22: Provincial Ranking of Multifactor Productivity Level Ranking by Industry, 2007

Based on level estimates relative to Canada

	Nfld.	Ont.	Que.	B.C.	Man.	N.S.	N.B.	Sask.	Alta.	P.E.I.
Market Sector	1	2	3	4	5	6	7	8	9	10
Agriculture, forestry, fishing and hunting	1	9	4	3	8	5	2	7	6	10
Mining and Oil and Gas Extraction	1	5	4	6	2	3	7	8	9	10
Utilities	5	6	2	4	7	1	9	3	8	10
Construction	9	3	2	7	8	5	4	6	1	10
Manufacturing	10	2	3	1	8	6	7	5	4	9
Wholesale Trade	5	1	7	2	8	9	4	3	6	10
Retail Trade	10	5	6	4	2	7	8	3	1	9
Transportation and Warehousing	10	5	6	1	3	9	8	2	4	7
Information and Cultural Industries	8	6	4	2	9	5	7	10	3	1
FIRE*	9	1	5	7	4	6	8	2	3	10
Professional, Scientific and Technical Services	10	1	3	4	8	9	5	6	2	7
AWSMR**	9	2	4	3	6	8	10	7	1	5
Arts, Entertainment and Recreation	6	3	1	9	2	10	7	8	5	4
Accommodation and Food Services	2	3	1	9	6	4	7	8	5	10
Other Services (Except Public Administration)	10	2	5	4	3	9	8	1	6	7
Unweighted Average	7	3.6	3.8	4.4	5.6	6.4	6.73	5.27	4.27	7.93
Unweighted Market Sector Rank	9	1	2	4	6	7	8	5	3	10

* Finance, Insurance, Real Estate and Renting and Leasing ** Administrative and Support, Waste and Remediation

Source: CSLs Provincial Productivity Database, http://www.csls.ca/data/mfp_new.asp.

The most striking statistic from the two-digit industry table comparing relative provincial MFP levels to Canada in each industry is that Newfoundland's mining and oil and gas sector had a relative MFP level of 1453.3 per cent of the national average in 2007. It is hypothesized that this measure largely reflects the increase in the accessibility of the resource endowment to Newfoundland relative to that of the rest of Canada. Prince Edward Island had an MFP level 13.3 per cent of the Canadian average in the industry. Mining and oil and gas extraction by far had the most variance among provincial MFP levels.

Table 22 provides the market sector ranking and the unweighted market sector ranking for the MFP levels in 2007 by industry. The very high multifactor productivity levels of Newfoundland's mining and oil and gas industry are, again, the main cause of its high market sector multifactor productivity level ranking. Similarly, Alberta had a low level of multifactor productivity in one of its major sectors, the mining and oil and gas extraction industry, so its unweighted market sector ranking is substantially higher. Newfoundland and Prince Edward Island have the most variability in their ranking. However unlike capital productivity, the Maritime Provinces of Nova Scotia and New Brunswick had less variance in their ranking, although their overall ranking is low.

2. Multifactor Productivity Growth

Table 23 provides key descriptive statistics about multifactor productivity growth by industry across provinces between 1997 and 2007. The average MFP growth in the market sector in Canada from 1997 to 2007 was 0.4 per cent. Of the 15 industry groupings, only three (agriculture, forestry, fishing and hunting; retail trade; and information and cultural industries) had positive multifactor productivity growth across all provinces. Conversely, only one industry grouping displayed negative multifactor growth across all provinces: professional, scientific and technical services.

Some industries displayed significantly more variability in MFP growth across provinces than others. Mining and oil and gas, for which MFP level relies in large part on the accessibility of the resource endowment, was by far the industry with the most MFP growth variability. While Newfoundland experienced average MFP growth of 18.8 per cent per year in that industry, Prince Edward Island experienced negative average MFP growth of -20.5 per cent.

Industries with higher MFP growth variability also generally performed poorly in terms of MFP growth over the period. For example, MFP growth in utilities had a standard deviation of 3.3 per cent across provinces, and displayed negative MFP growth in Canada (-0.3 per cent per year). The arts, entertainment and recreation industry was similar, with a standard deviation of 2.8 percentage points across provinces and the second lowest MFP growth (-2.0 per cent per year) after the mining and oil and gas industry.

Table 23: Multifactor Productivity Growth at the Two-digit Industry Level by Province –
Summary Statistics, 1997-2007
Compound Annual Growth Rate

	Canada	Range by Province					Standard Deviation
		Per Cent		Point Diff.	Province		
		Low	High		Bottom	Top	
	A	B	C	D=C-B	E	F	G
Market Sector	0.4	-1.6	4.1	5.7	Alta.	Nfld.	1.4
Agriculture, Forestry, Fishing and Hunting	2.5	0.5	5.6	5.1	P.E.I.	N.B.	1.5
Mining and Oil and Gas Extraction	-4.8	-20.5	18.8	39.3	P.E.I.	Nfld.	10.0
Utilities	-0.3	-9.9	1.5	11.5	P.E.I.	N.S.	3.3
Construction	1.6	-1.1	4.6	5.6	Nfld.	Alta.	1.6
Manufacturing	1.8	-0.4	4.0	4.4	Nfld.	B.C.	1.3
Wholesale Trade	2.2	-2.4	4.0	6.4	P.E.I.	N.B.	1.9
Retail Trade	2.1	1.5	4.4	2.9	Ont.	Alta.	1.0
Transportation and Warehousing	-0.5	-1.9	1.9	3.8	Nfld.	Sask.	1.1
Information and Cultural Industries	1.5	0.5	4.7	4.2	Man.	P.E.I.	1.1
Finance, Insurance, Real Estate and Renting and Leasing	0.0	-2.1	1.4	3.4	P.E.I.	Sask.	1.0
Professional, Scientific and Technical Services	-0.7	-3.9	-0.5	3.4	Nfld.	P.E.I.	1.2
Administrative and Support, Waste and Remediation	-0.4	-2.6	1.4	4.0	B.C.	Que.	1.4
Arts, Entertainment and Recreation	-2.0	-6.2	2.3	8.6	N.S.	Man.	2.8
Accommodation and Food Services	0.6	-0.5	1.6	2.1	B.C.	P.E.I.	0.7
Other Services (Except Public Administration)	1.2	-0.5	4.4	4.9	Nfld.	Sask.	1.6

Source: CSLs Provincial Productivity Database, http://www.csls.ca/data/mfp_new.asp.

Table 24 provides a ranking of provinces in terms of MFP growth for the market sector and each of the fifteen industry groupings. These estimates provide a sense of whether or not a province's MFP growth performance is broadly-based or whether it is driven by a small number of particular industries. At the bottom, a ranking of provinces based on the unweighted average industry rank is provided, and can be compared with the rank obtained in the market sector.

Newfoundland, for example, ranks first in the market sector, but eighth according to the unweighted average, in large part because of the increasing clout of the mining and oil and gas industry in that province. In other words, while Newfoundland produces strong MFP growth at the market sector, other provinces which do not have the benefit of large offshore oil reserves do not follow its lead. Conversely, Alberta - the worst MFP performer at the market sector level – ranks fourth based on the unweighted market sector ranking of industries, suggesting that its strong MFP performance in many sectors is outweighed by a few poorly performing but dominant industries: mining and oil and gas and, to a lesser extent, utilities. A similar story seems to be developing in Saskatchewan.

Table 24: Provincial Ranking of Multifactor Productivity Growth by Industry, 1997-2007
Based on Compound Annual Growth Rate

	Nfld.	N.S.	Que.	Ont.	Man.	B.C.	N.B.	Sask.	P.E.I.	Alta.
Market Sector	1	2	3	4	5	6	7	8	9	10
Agriculture, forestry, fishing and hunting	2	6	5	9	4	8	1	7	10	3
Mining and Oil and Gas Extraction	1	2	4	6	3	5	8	7	10	9
Utilities	4	1	2	6	7	5	8	3	10	9
Construction	10	6	5	8	7	9	2	3	4	1
Manufacturing	10	2	3	4	8	1	9	6	7	5
Wholesale Trade	4	9	7	5	6	2	1	3	10	8
Retail Trade	8	4	7	10	3	6	9	2	5	1
Transportation and Warehousing	10	5	6	7	3	2	8	1	9	4
Information and Cultural Industries	6	2	4	9	10	3	8	7	1	5
FIRE*	9	4	6	2	5	7	8	1	10	3
Professional, Scientific and Technical Services	10	9	3	2	8	6	7	5	1	4
ASWMR**	2	3	1	6	5	10	4	8	9	7
Arts, Entertainment and Recreation	7	10	2	3	1	8	9	6	4	5
Accommodation and Food Services	4	5	3	6	9	10	8	7	1	2
Other Services (Except Public Administration)	10	4	5	6	3	7	9	1	2	8
Unweighted Average Rank	6.1	4.6	4.1	5.8	5.4	5.9	6.6	4.7	6.4	5.3
Unweighted Market Sector Rank	8	2	1	6	5	7	10	3	9	4

* Finance, Insurance, Real Estate and Renting and Leasing ** Administrative and Support, Waste and Remediation
Source: CSLs Provincial Productivity Database, http://www.csls.ca/data/mfp_new.asp.

Among other provinces, the relative MFP performance appears to more stable, reflecting in most cases a more diversified economy. Quebec ranks first based on the unweighted market sector ranking with no industry ranking below seventh. New Brunswick, on the other hand, had only four industries with a rank better than six, and is last based on the unweighted average rank. This poor performance was already reflected at the market sector level, however, where it ranked only seventh

From a provincial perspective, Prince Edward Island was by far the province displaying the most variable performance across industries. In eight of the fifteen industries, Prince Edward Island ranked either first (three industries) or last (five industries) in terms of multifactor productivity growth. It was closely followed by Newfoundland, which ranked first in two industries and last in five industries. This level of variability is not particularly surprising given the small size of these two provinces. None of the other provinces ranked first or last in more than three industry groupings.

C. Multifactor Productivity at the Three-digit Industry Level

1. Multifactor Productivity Levels

Appendix Table 14 provides data on relative MFP levels for each province at the three-digit industry level for 2007.

Although not all data are available for all industries in all provinces, it is still possible to note some differences in the growth rates from the reporting provinces.

The industry with the widest reported range of values is the fishing, hunting and trapping industry with a range from 229.1 per cent in New Brunswick to 2.4 per cent in Saskatchewan. This range is very large and may be due to the large variance in the productivity of the subsectors fishing, hunting and trapping. New Brunswick industry is much more focused in fishing than other provinces. It is also possible that it is a data quality issue.

2. Multifactor Productivity Growth

Appendix Table 15 provides the data for the multifactor productivity growth in each province at the three-digit industry level for available industries.

At the three-digit level, there are 28 industries each with 1 to 10 provinces reporting multifactor productivity statistics as well as all two-digit industries. Although not all data are available for all industries in all provinces, it is still possible to note some differences in the growth rates from the reporting provinces.

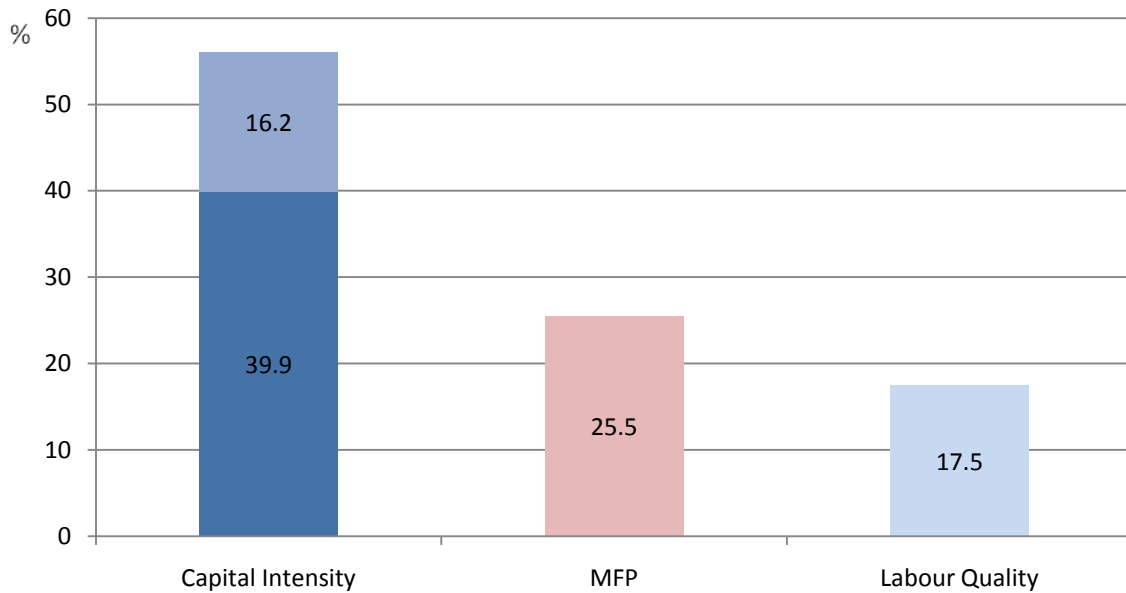
There was more reported variation in the growth of multifactor productivity at the three-digit level among provinces compared to variation at the two-digit level. The three-digit industry with the highest range of multifactor productivity growth was the fishing, hunting, and trapping industry with a range of 34.4 percentage points and a standard deviation of 11.8 with 10 provinces reporting. The three-digit industries with the lowest range of 1.6 percentage points were the mining (except oil and gas extraction) industry with 2 provinces reporting; food manufacturing industry with 4 provinces reporting; wood product manufacturing with 4 provinces reporting; and the broadcasting and telecommunications industry with 5 provinces reporting.

IX. Sources of Labour Productivity Growth

A. The Market Sector

Table 25 provides estimates of the sources of labour productivity growth for the market sector for Canada and the provinces for the 1997-2007 period. As noted earlier, labour productivity growth can be decomposed into a labour composition or quality effect, a capital services intensity effect (in turn broken down into capital stock and capital composition effect), and multifactor productivity growth, the residual.

Chart 12: Percent Contribution to Labour Productivity Growth by the Sources of Labour Productivity Growth in the Market Sector in Canada, 1997 to 2007



Source: Appendix Table 16

Note: Capital Intensity is divided into changes in capital composition (on top) and capital stock (on the bottom).

As was noted by way of illustration earlier in the report, at the Canada level, the 1.7 average annual rate of labour productivity growth for the market sector for the 1997-2007 period can be decomposed into a 0.3 percentage point (17.5 per cent) contribution from labour quality, a 1.0 percentage point contribution from capital services intensity (57.6 per cent) and a 0.4 percentage point contribution from MFP growth (25.5 per cent) (Chart 12).

The relative importance of the sources of labour productivity growth at the provincial level deviated significantly in many instances from that observed at the national level. Differences in the provincial labour productivity growth rate can affect the relative importance of the sources of growth. Equally, differences in the absolute or percentage point contributions from the three sources of productivity growth affect the relative importance of these sources. For example, the percentage point contribution of labour quality to labour productivity growth ranged from a low of 0.1 percentage points in British Columbia to a high of 0.4 percentage points in Saskatchewan while the per cent contribution ranged from a high of 22.1 per cent in Alberta to a low of 5.5 per cent in Newfoundland. The weak labour productivity growth in Alberta (1.0 per cent) and the very strong growth in Newfoundland (4.8 per cent), combined with the narrow range of labour quality contributions, accounts for this situation.

The contribution of capital services intensity to labour productivity growth varied greatly across provinces. This situation reflected differences in capital services intensity

Table 25: Sources of Labour Productivity Growth in the Market Sector by Province, 1997-2007

	Canada	Nfld.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
	Average annual rate of growth										
Output	3.61	6.68	2.95	3.22	3.08	3.33	3.71	2.86	1.98	4.06	3.29
Total Hours	1.87	1.78	1.34	1.28	1.28	1.54	1.97	0.75	-0.10	2.99	2.08
Labour Composition	0.52	0.60	0.59	0.24	0.44	0.46	0.52	0.61	0.90	0.49	0.12
Capital Services	4.21	2.34	4.92	2.95	4.12	2.88	3.46	3.42	2.62	7.72	3.76
Capital Stock	2.97	1.44	2.52	2.43	3.37	1.68	2.36	2.01	0.63	6.35	2.76
Capital Composition	1.20	0.89	2.34	0.51	0.73	1.18	1.07	1.38	1.98	1.29	0.97
Capital Services Intensity	2.30	0.55	3.53	1.65	2.81	1.32	1.46	2.65	2.73	4.59	1.64
	Percentage point contributions to labour productivity growth										
Labour Productivity (Output per hour)	1.71	4.82	1.59	1.92	1.78	1.76	1.71	2.10	2.09	1.04	1.18
Labour Composition	0.30	0.27	0.35	0.15	0.26	0.27	0.32	0.35	0.37	0.23	0.08
Capital Services Intensity	0.97	0.39	1.42	0.64	1.13	0.54	0.56	1.12	1.60	2.43	0.62
Capital Stock	0.68	0.24	0.73	0.53	0.93	0.32	0.38	0.66	0.39	2.00	0.45
Capital Composition	0.28	0.15	0.67	0.11	0.20	0.22	0.17	0.45	1.21	0.41	0.16
Multifactor Productivity	0.44	4.14	-0.18	1.12	0.37	0.94	0.82	0.62	0.11	-1.58	0.48
	Percent contributions to labour productivity growth										
Labour Productivity (Output per hour)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Labour Composition	17.5	5.5	22.0	7.6	14.8	15.1	18.8	16.6	17.8	22.1	6.5
Capital Services Intensity	56.6	8.0	89.2	33.5	63.7	30.7	32.5	53.4	76.5	233.9	52.6
Capital Stock	39.9	4.9	45.8	27.6	52.1	18.0	22.2	31.3	18.5	192.4	38.6
Capital Composition	16.2	3.0	42.4	5.7	11.3	12.6	10.1	21.6	57.7	39.1	13.6
Multifactor Productivity	25.5	85.9	-11.3	58.4	20.9	53.6	48.1	29.4	5.3	-152.5	40.6

Source : CSLS Provincial Productivity Database, http://www.csls.ca/data/mfp_new.asp.

growth, and possibly differences in the capital share of income. The largest contribution of capital services intensity was in Alberta (2.4 percentage points) and the smallest in Newfoundland (0.4 points). Given the weak labour productivity growth in Alberta, capital services intensity growth was responsible for 234 per cent of labour productivity growth in this province. In contrast, given the strong labour productivity growth in Newfoundland, capital services intensity growth accounted for only 8.0 per cent of labour productivity growth.

Labour productivity growth not accounted for by labour quality growth and capital services intensity growth is said to be accounted for by MFP growth. Given the very large contribution of increased capital services intensity to labour productivity growth in Alberta, it is not surprising to find that MFP was responsible for -152.5 per cent of labour productivity in this province. In contrast, with the limited importance of capital services intensity growth for labour productivity growth in Newfoundland, MFP accounted for 85.9 per cent of labour productivity growth.

B. Two-digit Industry Level

Appendix Table 16 provides estimates of the sources of labour productivity growth for the two-digit industries for Canada for the 1997-2007 period. As noted earlier, labour productivity growth can be decomposed into a labour composition or quality effect, a capital services intensity effect (in turn broken down into capital stock and capital composition effect), and multifactor productivity growth, the residual.

The relative importance of the sources of labour productivity growth at the industry level deviated significantly in many instances from that observed in the market sector. This is certainly unsurprising due to the different production processes in each industry.

The changes in labour composition, also known as labour quality, were a relatively unimportant factor in the change in labour productivity. Labour composition only contributed more than a 16 per cent change in two industries – transportation and warehousing, and professional, scientific and technical services. Labour quality only contributed 17.5 per cent to the increase in labour productivity in Canada in the market sector from 1997 to 2007.

The contribution of capital services intensity to labour productivity growth varied greatly across industries, although in nearly all cases it was a major contributing factor. In the market sector itself, capital intensity made a 0.97 percentage point contribution to the labour productivity growth or 56.6 per cent of the growth. The amount contributed by capital intensity growth in each industry varied widely. The various contributions of capital intensity to labour productivity reflect differences in the capital share of input into the production process between industries and over time. The largest contribution of capital services intensity to labour productivity was in administrative and support, waste management and remediation services, where capital intensity growth accounted for 232.7 per cent of the labour productivity growth. Compare this to the two industries with

the least labour productivity growth caused by an increase in capital intensity, manufacturing and construction, in which a change in capital intensity only accounted for four and 12 per cent of the labour productivity. The variance in capital intensity growth in each industry is a likely cause of the variation in the contribution of capital intensity growth to labour productivity growth in each province, each of which had a variety of different industries.

Labour productivity growth not accounted for by labour quality growth and capital services intensity growth is said to be accounted for by MFP growth. In the administrative and support, and waste management and remediation services industry, labour productivity grew slowly at 0.34 per cent per year despite the large increases in capital intensity. Therefore, it is not surprising to find that MFP contributed -117.1 per cent of labour productivity growth in this industry. Similarly, in the mining, and oil and gas extraction industry, the capital intensity increased at a rate of 2.88 per cent per year from 1997 to 2007 but the labour productivity was decreasing at 2.24 percent per year. Therefore, the percentage contribution from MFP was -4.78 percentage points per year from 1997 to 2007. Equivalently, one can say that MFP contributed 213 per cent to the fall in the mining, and oil and natural gas extraction industry.

One industry where MFP made up a large proportion of the gain in labour productivity was construction. Of the 1.75 per cent growth in labour productivity per year in construction, 1.64 percentage points, or 93.5 per cent of the total, came from increases in MFP growth.

Overall, the differences in labour productivity growth across industries can be explained by the wide range of growth rates in capital intensity and in MFP growth rates and less by labour composition. However, the size of the contribution of each of these three factors in labour productivity among industries and, therefore among provinces, varies greatly. This also indicates that the variation among provinces in sources of growth is likely due to the various industrial strengths in each province.

X. Sources of the Labour Productivity Level Gap by Province

The relative labour productivity level by province can be broken down into three components: a multifactor productivity component, a capital-labour ratio component, and a labour quality component. Using the national average as the reference level, it is then possible to see the how these factors affect labour productivity among industries and provinces.

The formula for this relationship is:

$$\ln(\text{Relative } LP_{p,i}) = \ln(MFP_{p,i}/MFP_{c,i}) + k_{p,c} \ln((K_{p,i}/L_{p,i})/(K_{c,i}/L_{c,i})) + \ln(LQ_{p,i}/LQ_{c,i})$$

- $LP_{p,i}$ is the relative labour productivity level in industry i between the province and Canada.

- $MFP_{p,i}$ is the MFP level in industry i in province p ;
- $MFP_{c,i}$ is the MFP level in industry i in Canada;
- $k_{p,c}$ is the average share of capital input in production between Canada and the province
- $K_{p,i}$ is the amount of capital services in industry i in province p ;
- $K_{c,i}$ is the amount of capital services in industry i in Canada;
- $L_{p,i}$ is the amount of labour input (quality adjusted hours) in industry i in province p ;
- $L_{c,i}$ is the amount of labour input (quality adjusted hours) in industry i in Canada;
- $LQ_{p,i}$ is the labour quality index in industry i in province p ;
- $LQ_{c,i}$ is the labour quality index in industry i in Canada;

The formula is derived from the one used to calculate MFP levels in Section II.D.

Newfoundland had the highest labour productivity level in 2007 because of its exceptional multifactor productivity relative to the Canadian average. However, Newfoundland is the province with the lowest capital intensity ratio, or the least amount

Table 26: Sources of the Labour Productivity Gap Relative to Canada in the Market Sector by Province, 2007

	Labour Productivity Relative Level	Labour Productivity Gap	Percentage Point Contributions to Labour Productivity Gap		Percent Contributions to Labour Productivity Gap		
			Capital Intensity	Multifactor Productivity	Labour Productivity	Capital Intensity	Multifactor Productivity
Canada	100.0	0.0	0.0	0.0	100.0	0.0	0.0
Nfld.	109.7	9.7	-22.9	31.8	100.0	-235.3	326.4
P.E.I.	61.3	-38.7	-15.5	-23.7	100.0	40.1	61.3
N.S.	75.1	-24.9	-16.6	-5.9	100.0	66.8	23.6
N.B.	78.1	-21.9	-10.4	-10.9	100.0	47.5	49.5
Que.	98.8	-1.2	-3.8	3.2	100.0	320.1	-273.3
Ont.	103.5	3.5	-5.0	8.4	100.0	-142.4	241.4
Man.	87.1	-12.9	-5.8	-7.9	100.0	45.1	61.4
Sask.	98.1	-1.9	13.9	-19.6	100.0	-738.9	1037.4
Alta.	109.3	9.3	30.9	-21.2	100.0	330.9	-227.8
B.C.	90.1	-9.9	-8.5	2.3	100.0	85.6	-23.4

Source: CSLs Provincial Productivity Database, http://www.csls.ca/data/mfp_new.asp.

Note: The percentage point contributions to the labour productivity gap from capital intensity and multifactor productivity do not sum to the gap because the contribution for the relative change in labour quality has been omitted.

of capital services per unit of labour in Canada. This contrasts with Saskatchewan and Alberta which had average or above average labour productivity, but due to significantly higher capital intensity.

Also note that the other three Atlantic provinces, Prince Edward Island, Nova Scotia, and New Brunswick, all have low labour productivity levels, multifactor productivity, and capital intensity ratios. Moreover, in each of these provinces the below average labour productivity, multifactor productivity, and capital intensity levels are widespread. The correlation between domestic market size and below average labour productivity levels and source of labour productivity levels suggests that there are efficiency gains, or possible economies of scale, by having a larger domestic market. Another potential explanation of their poor labour productivity level is that the purchasing power parity (PPP) is much higher in smaller provinces because of lower relative prices.

XI. Alberta's Labour, Capital, and Multifactor Productivity

Appendix Table 17 gives a summary on all of the sources of labour productivity growth and their relative importance in each industry to Alberta's over the period from 1997 to 2007.

Table 27 provides a summary of Alberta's productivity performance across all productivity and related measures discussed in this paper. As noted in the previous sections, Alberta had the worst labour productivity growth (1.0 per cent per year), capital productivity growth (-3.4 per cent per year), and multifactor productivity growth (-1.6 per cent per year) in the market sector. However, the trend within each of Alberta's industries is quite different. This discrepancy reflected the falling productivity in the oil and gas extraction sector. Labour productivity fell 5.7 per cent per year, capital productivity 8.4 per cent, and MFP fell by 7.9 per cent. These developments were closely related to the shift of resources into the oil sands, where more labour and capital are needed to extract a

Table 27: Summary of Alberta's Productivity Performance in the Market Sector

	Market Sector Growth, 1997 to 2007			Market Sector Levels, 2007		
	Compound Growth Rate	Market Sector Rank	Unweighted Market Sector Rank	Per Cent of the Canadian Level	Market Sector Rank	Unweighted Market Sector Rank
Labour Productivity	1.0	10	1	109.3	2	1
Labour Quality	0.5	6	7	NA		
Capital Productivity	-3.4	10	9	61.0	10	10
Capital Composition	1.3	4	1	101.6	3	1
Capital Intensity	4.6	1	1	179.1	1	1
Multifactor Productivity	-1.6	10	4	81.6	9	3

barrel of oil than in conventional oil production. This coincided with a fall in the amount of oil extracted from conventional reserves which require much less capital.

A. Labour Productivity

Overall, Alberta had very low labour productivity growth in the market sector from 1997 to 2007 in comparison to the rest of Canada. Despite this, Alberta had the highest unweighted ranking among all two-digit level industries in Canada due to being ranked third or higher in seven out of 15 industries in labour productivity growth. The low market sector labour productivity growth was primarily due to the poor labour productivity growth in its mining, and oil and gas extraction industry which had negative growth, and represents a major portion of Alberta's economy. Although growth was low, Alberta had the second highest labour productivity level in Canada at 39.57 dollars of GDP per hour – only second to Newfoundland, and it had the highest level in ten of fifteen industries making it first in the unweighted market sector rank. This means that although market sector growth was slow over the period of 1997 to 2007, Alberta had a high level of labour productivity to start in 1997 relative to the rest of Canada. In fact, Alberta's labour productivity level was ranked first or second in ten out of fifteen industries.

B. Capital Productivity

Alberta had the lowest capital productivity growth of all provinces in the period from 1997 to 2007. Unlike labour productivity, its poor performance was not relegated to the mining, and oil and gas extraction industry but to nearly all industries. Alberta was the ninth lowest province in capital productivity growth in 5 industries and seventh or lower in 11 of the 15 industries. Also, Alberta had a below average capital productivity level in all industries except for construction and retail trade. Alberta's capital productivity in the construction industry in which the industry's capital productivity of 15.91 dollars of GDP per dollar of capital services was substantially above the national average of 6.83 dollars of GDP per dollar of capital services.

C. Multifactor Productivity

Appendix Table 18 gives a summary on the relative MFP levels of Alberta compared to the national average in each industry in 2007.

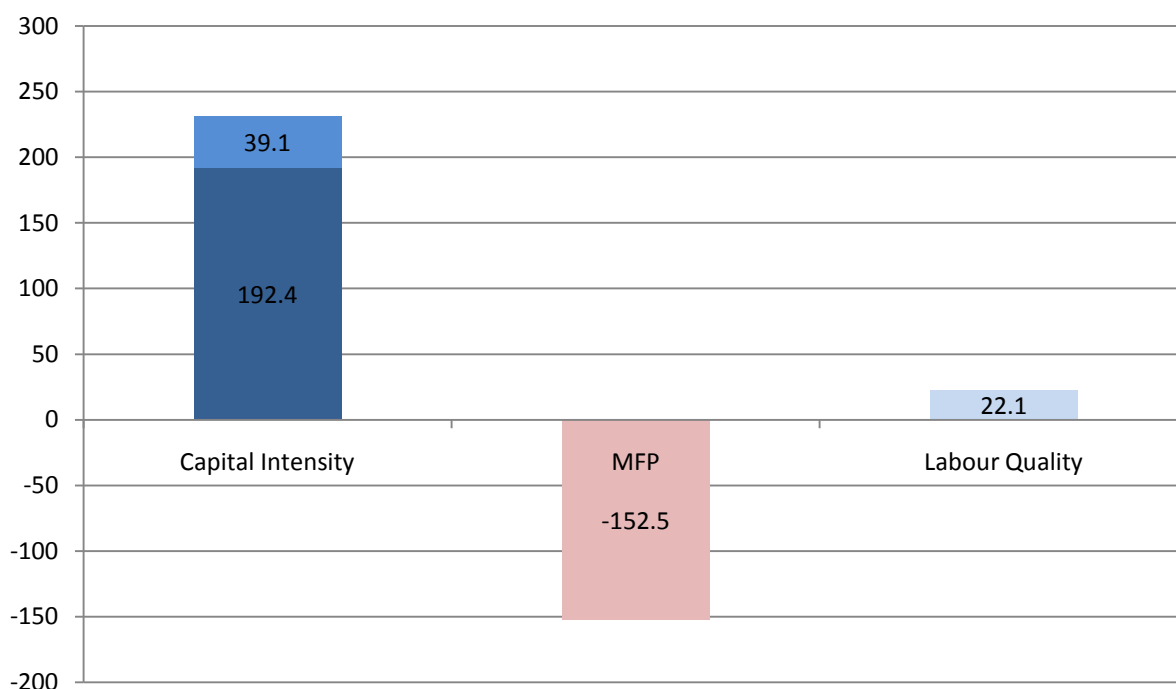
Alberta's multifactor productivity growth was the lowest overall in Canada for the period 1997 to 2007. However, like labour productivity growth, it would appear that Alberta's poor MFP growth is concentrated in its mining and oil and gas extraction industry. In fact, Alberta was ranked fourth in the unweighted ranking, and was ranked third or higher in five industries. In 2007, Alberta had a below average MFP level in nine out of fifteen industries which is very similar to 1997 in which it had a below average level of MFP in nine industries. The best performing industry in Alberta for MFP level and growth was the construction industry which was consistently above the national average for the years 1997 to 2007. The industry in which Alberta had the lowest MFP

level relative to the national average was the agriculture, forestry, fishing and hunting industry (45.3 per cent). However, the low MFP level in the oil and gas extraction industry (73.7 per cent) seems to be of more importance to Alberta's market sector MFP level.

D. Sources of Labour Productivity Growth in the Market Sector

Chart 13 shows the percent contributions to labour productivity growth by the sources of growth for Alberta over the period from 1997 to 2007. Clearly, Alberta's labour productivity growth was driven mainly by the province's increase in capital intensity (which accounted for 231.5 per cent of labour productivity growth) and its decline in MFP (which accounted for -152.5 per cent of labour productivity growth).

Chart 13: Percent Contribution to Labour Productivity Growth by the Sources of Labour Productivity Growth in the Market Sector in Alberta, 1997 to 2007



Source: Appendix Table 17

Note: Capital Intensity is divided into changes in capital composition (on top) and capital stock (on the bottom).

E. Sources of Labour Productivity Level Gap by Industry

Table 28: Sources of the Labour Productivity Gap Relative to Canada for Alberta at the Two-digit Industry level, 2007

	Labour Productivity Relative Level	Labour Productivity Gap	Percentage Point Contributions to Labour Productivity Gap		Percent Contributions to Labour Productivity Gap		
			Capital Intensity	Multifactor Productivity	Labour Productivity	Capital Intensity	Multifactor Productivity
Market Sector	109.3	9.3	30.9	-21.2	100.0	330.9	-227.8
Agriculture, Forestry, Fishing and Hunting	109.4	9.4	87.5	-82.8	100.0	927.3	-877.0
Mining, and Oil and Gas Extraction	95.5	-4.5	23.5	-29.9	100.0	-525.6	667.1
Utilities	135.8	35.8	59.8	-25.3	100.0	167.1	-70.7
Construction	124.8	24.8	-17.2	42.6	100.0	-69.2	171.6
Manufacturing	119.4	19.4	24.8	-2.8	100.0	127.6	-14.1
Wholesale Trade	119.1	19.1	6.6	-12.4	100.0	34.5	-65.2
Retail Trade	106.3	6.3	-2.7	21.3	100.0	-43.3	340.4
Transportation and Warehousing	117.1	17.1	15.8	-1.0	100.0	92.9	-6.1
Information and Cultural Industries	139.0	39.0	25.0	2.7	100.0	64.0	6.9
FIRE*	107.7	7.7	10.8	2.8	100.0	141.7	36.7
Professional, Scientific and Technical Services	106.1	6.1	3.9	4.4	100.0	64.1	72.1
ASWMR**	110.8	10.8	12.6	7.3	100.0	116.4	67.4
Arts, Entertainment and Recreation	79.1	-20.9	1.9	-26.0	100.0	-9.3	124.5
Accommodation and Food Services	120.3	20.3	17.6	-1.9	100.0	87.1	-9.2
Other Services (Except Public Administration)	100.8	0.8	10.2	-6.7	100.0	1277.7	-835.9

Source: CSLS Provincial Productivity Database, http://www.csls.ca/data/mfp_new.asp.

Note: The percentage point contributions to the labour productivity gap from capital intensity and multifactor productivity do not sum to the gap because the relative change in labour quality has been omitted.

At the market sector level, Alberta's relatively high level of labour productivity was due to a high relative level of capital intensity. In fact, in industries where Alberta had an above average labour productivity level, it was usually due to Alberta's relatively high capital intensity rather than Alberta's multifactor productivity. (The construction and retail trade industries were exceptions.) Moreover, Alberta's MFP level was the second lowest in the country and was below average in 9 out of 15 industries (Table 28).

As noted above, Alberta had the worst labour, capital, and multifactor productivity growth in the market sector. Overall, the industries that may explain Alberta's labour productivity and multifactor productivity growth seem to be the mining and oil and gas extraction industry and to a lesser extent the utilities industry. However, this was not the case for Alberta's low capital productivity growth, which was low in nearly every industry over the period 1997 to 2007. Furthermore, Alberta's capital productivity level is below the Canadian average in nearly all industries, which means

that the capital services supplied by Alberta's capital stock are not being used as efficiently as elsewhere in Canada.

Despite Alberta's low MFP growth and levels and Alberta's poor capital productivity, Alberta had a high level of labour productivity in nearly all industries due to Alberta's very high capital intensity, or dollars of capital services per hour. Although it is generally considered that technological improvements create a large part of productivity growth in a developed economy, Alberta's case seems to show that other provinces may be able to increase labour productivity by becoming more heavily capitalized. It is possible that Alberta has been overcapitalized. However, it is difficult to say what symptoms, if any, Alberta has shown to this regard, although it is apparent that nearly all provinces (with the exception of Saskatchewan and Alberta) have had capital intensity levels that are lowering their relative labour productivity levels.

XII. Future Work and Conclusions

A. Future Work

Future work will be needed in a few areas to eliminate the data gaps and to study why there are different sources of labour productivity growth across industries and provinces.

A further addition that could be made to the database is the inclusion of labour quality levels, so comparisons can be made across provinces. Currently, labour productivity is only calculated relative to the provinces base year making it impossible to compare multifactor productivity between provinces after adjusting for labour quality levels. An interprovincial measure of labour quality would allow further research into what causes differing MFP and labour productivity levels between provinces.

Similar to the above point, the estimates for the levels of labour productivity growth and the sources of labour productivity growth could be made more accurate by adjusting for the PPP across provinces. It is possible that in provinces with lower relative prices, the productivity level estimates have a downward bias. In particular, this could be the case for the relatively poor labour productivity level performance of the Maritime Provinces of New Brunswick, Nova Scotia, and Prince Edward Island.

Furthermore, expanding the database to include investment and communications technology capital would provide a better understanding of how developments in computer technology over the 1997 to 2007 period, a period when technology investment increased rapidly, affected productivity growth in each industry and province.

One particularly visible policy issue is that the Maritime Provinces have lower labour productivity, capital intensity, and multifactor productivity levels relative to Canada in nearly all industries (also discussed in Harrison and Sharpe, 2009). It is hypothesized that this is because of the lack of economies of scale in smaller provinces,

or due to the lack of adjustment in the data for purchasing power. Further study is required to confirm either of these hypotheses.

Future lines of research will also want to continue to explore determinants of labour productivity, multifactor productivity and other sources of labour productivity growth. Within this database, it is clear that natural resource endowments likely play a central role in the multifactor productivity, and hence labour productivity, of at least some Canadian provinces and industries. What is not clear is how much of a role the endowment has in differing labour and multifactor productivity levels and growth. Further research may also identify other factors that could be used to explain labour productivity levels and growth.

B. Conclusions

This report has presented new estimates of labour productivity, labour quality, capital productivity, capital composition, capital intensity and multifactor productivity growth and levels for each province by industry at three levels for 1997 to 2007. These estimates were produced by Statistics Canada for the Centre for the Study of Living Standards, with financial support from Alberta Finance and Enterprise. The full database upon which these estimates are based is posted at http://www.csls.ca/mfp_data.asp and can be accessed without charge.

The first major finding of the report is the poor productivity performance of Alberta over the 1997-2007. This province experienced the slowest labour productivity growth (1.0 per cent per year), the worst capital productivity growth (-3.4 per cent) and the worst multifactor productivity growth (-1.6 per cent) of all ten provinces.

Another notable fact is the strong productivity performance of Newfoundland over the 1997-2007. This province experienced by far the fastest labour productivity growth (4.8 per cent per year), by far the best capital productivity growth (4.2 per cent) and by far the best multifactor productivity growth (4.1 per cent) of all ten provinces.

The mining and oil and gas extraction sector played a key role in shaping productivity performance at the provincial level. This role, perhaps surprisingly, can be both positive and negative. Newfoundland experienced by far the most rapid market sector labour productivity growth among the provinces. The very rapid labour productivity growth (15.3 per cent per year) in the mining and oil and gas extraction (primarily the latter) as well as the increased importance of this high productivity level industry in the province's employment, were the drivers of this productivity success. In contrast, Alberta performed poorly in labour productivity growth over the 1997-2007 period as the shift from conventional oil extraction to oil sands extraction led to a decline in labour productivity in the mining and oil and gas extraction industry. In both cases, the aggregate productivity performance was driven by the performance of the mining and oil and gas sector, which overshadowed Alberta's strengths and Newfoundland's weaknesses across other industries in their respective economies.

A key trend in the Canadian economy is that capital productivity fell in nearly every province and industry in Canada. This finding indicates that Canadian industries have been using their available capital increasingly inefficiently, despite an increase in capital composition. In part, this may reflect rising capital intensity across provinces; as the stock of capital increases relative to other inputs, diminishing returns set in and the average level of output per unit of capital declines.

A fifth major finding is the relative underperformance of smaller provinces, such as P.E.I., Nova Scotia, and New Brunswick, in terms of the levels and growth rates of labour, capital and multifactor productivity. The relatively low levels may indicate that there are economies of scale or agglomeration economies in larger markets in each of these productivity measures. Furthermore, these provinces each tended to have more variable unweighted rankings, indicating major discrepancies between the provinces labour productivity growth and sources of growth among industries.

The major findings on Alberta are that the poor labour productivity growth and MFP growth seemed to be concentrated mainly in the mining and oil, and gas extraction industry in Alberta. Alberta's labour productivity performance is in large part explained by the 7.4 per cent average annual decline in labour productivity in the mining and oil and gas extraction, in large part due to the shift in resources from conventional oil and gas production to non-conventional production (i.e. the oil sands). A much greater amount of capital and labour is needed to extract a barrel of oil in the latter sub-industry. Despite the poor labour productivity growth, Alberta has the second highest labour productivity level which is one of the most important variables in both profitability and the income of employees.

However, Alberta had very low capital productivity relative to other provinces. A possible explanation is that Alberta could have been underutilizing its available capital services over the period 1997 to 2007 and the inefficient use of Alberta's capital stock is being measured by decreasing MFP in the province over the period. Furthermore, the importance of resource endowments, and the efficiency at which resources can be extracted from that endowment could be causing the fall in MFP, and consequently, the low labour productivity growth in Alberta.

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Appendix Tables

Appendix Table 1: Labour Productivity Levels by Province at the Two and Three-digit Industry Level for 2007

Dollars of output per hour (\$1997)

	Canada	Nfld.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
Market Sector	36.1	39.6	22.1	27.1	28.2	35.6	37.3	31.4	35.4	39.4	32.5
Agriculture, Forestry, Fishing and Hunting	27.1	50.9	19.9	22.6	36.9	29.2	20.2	22.1	23.5	29.7	38.8
Crop and Animal Production	22.6	24.0	13.9	15.7	28.1	25.4	18.6	21.6	23.6	28.2	18.6
Forestry and Logging	53.6	47.8	472.1	29.3	64.9	41.1	45.2	47.2	5.6	64.3	68.1
Fishing, Hunting and Trapping	40.6	81.0	45.7	29.6	27.3	43.8	16.6	50.1	0.8	3.8	87.0
Support Activities for Agriculture and Forestry	18.4	12.9	19.9	17.1	25.6	26.7	13.8	22.0	16.5	15.8	17.9
Mining, and Oil and Gas Extraction	78.7	233.6	8.4	90.0	28.1	47.5	48.2	100.5	94.6	75.2	90.9
Oil and Gas Extraction	167.3						17.0	384.5	212.6	134.6	379.1
Mining (Except Oil and Gas Extraction)	68.1	172.5		24.4	31.6	46.8	59.0		124.9	88.9	55.6
Support Activities for Mining and Oil and Gas Extraction	22.9				23.7	66.3	17.2		25.6	22.7	18.1
Utilities	134.6	99.3	64.6	111.3	86.2	163.3	110.3	102.2	176.1	182.8	217.9
Electric Power Generation, Transmission and Distribution	139.2					167.7	110.8	109.6		240.6	244.0
Natural Gas Distribution, Water and Other Systems	107.9					121.4	111.8	55.1		87.1	151.4
Construction	31.9	23.4	18.3	25.7	27.6	38.6	30.5	27.8	29.4	39.8	23.8
Manufacturing	47.8	25.3	25.4	30.1	36.4	46.4	50.8	33.6	41.6	57.1	46.2
Food Manufacturing	45.0	22.8		20.4	19.9	48.1	56.5	50.9	38.5	40.1	39.0
Plastics and Rubber Products Manufacturing	38.7			20.6		40.1	41.3			37.5	
Non-metallic Mineral Product Manufacturing	47.1	22.7				44.6	47.4			62.2	42.9
Primary Metal Manufacturing	75.9					114.5	58.1				80.8
Fabricated Metal Product Manufacturing	36.3					34.8	36.3	20.7		48.8	39.7
Machinery Manufacturing	47.1	22.0	22.1			41.3	48.2	32.9	35.3	65.0	47.6
Computer and Electronic Product Manufacturing	57.3					42.2	67.7			67.0	83.5
Electrical Equipment, Appliance and Component Manufacturing	36.9					48.1	35.8	20.9	53.1	18.2	
Transportation Equipment Manufacturing	65.7			44.5		77.7	67.8	32.8	20.4	38.6	
Furniture and Related Product Manufacturing	29.0					28.7	35.2	14.0	19.6	30.2	
Miscellaneous Manufacturing	32.2					31.4	37.7			33.0	24.9
Beverage and Tobacco Product Manufacturing	63.4					66.3	67.0				
Textile and Textile Product Mills	24.3	6.1		38.7		19.3	34.9	11.7		40.8	
Clothing Manufacturing	18.4		14.8			16.2	25.6	19.6	16.2	29.4	
Leather and Allied Product Manufacturing	15.0					13.6	19.2		642.4		
Wood Product Manufacturing	47.6			34.0	44.5	38.5	39.2	24.9	52.7	60.3	63.0
Paper Manufacturing	49.3					52.0	46.4			84.4	41.7
Printing and Related Support Activities	29.4	5.7		22.7	30.7	19.2	39.8	32.6	28.9	29.9	30.4
Petroleum and Coal Products Manufacturing	41.2					62.2	28.1	15.9		41.2	
Chemical Manufacturing	83.2	23.4	25.3			81.6	71.2	66.5	159.1	168.0	
Wholesale Trade	41.9	39.2	18.3	30.3	34.9	37.7	46.5	40.1	48.6	38.8	39.4
Retail Trade	22.0	15.5	18.3	17.3	18.2	21.4	22.6	23.5	20.2	25.5	21.6
Transportation and Warehousing	31.8	22.2	17.9	23.2	23.2	29.8	31.1	29.6	38.1	36.4	34.7

Truck Transportation	23.1	21.9	15.5	20.2	18.6	24.2	23.8	16.1	19.1	26.2	20.9
Transit	28.7										
Pipeline Transportation	259.6					690.5	1680.0	2316.6	425.8	180.6	210.8
Warehousing and Storage	29.7				17.1	25.0	29.8		49.0		28.0
Air, Rail, Water and Scenic and Sightseeing Transportation and Support Activities for Transportation	41.7	25.1	24.4	37.9	37.3	39.9	43.4	44.2	49.6	45.9	41.0
Postal service Couriers and Messengers	23.6										
Information and Cultural Industries	68.6	74.2	94.6	70.6	73.7	63.8	66.8	70.6	59.7	87.6	69.6
Motion Picture and Sound Recording Industries	30.9					35.0					
Broadcasting and Telecommunications	103.0					92.6	101.3	103.8		123.9	132.1
Publishing Industries, Information Services and Data Processing Services	40.6			27.8		37.2					
FIRE*	70.3	65.9	70.2	65.8	68.0	68.1	71.9	69.0	66.9	75.7	65.5
Professional, Scientific and Technical Services	27.0	20.2	21.4	20.2	21.9	26.3	29.1	18.3	22.4	28.6	23.4
AWSMR	19.8	13.0	11.2	16.8	12.7	21.2	20.9	18.7	18.0	21.9	15.3
Administrative and Support Services	18.2	12.3	9.3	16.0	11.7	20.0	19.3	16.2	16.0	19.3	14.0
Waste management and Remediation Services	56.3	22.9	40.9	24.5	42.1	41.2	68.8	87.2	44.2	86.0	44.5
Arts, Entertainment and Recreation	16.2	13.2	9.9	8.9	10.0	18.9	18.9	16.8	14.1	12.8	12.0
Accommodation and Food Services	13.8	11.4	13.0	12.3	11.0	13.3	13.2	12.7	12.6	16.6	14.8
Other Services (Except Public Administration)	16.3	11.0	13.6	13.1	12.4	17.2	16.1	16.4	18.5	16.4	16.4
Repair and Maintenance	17.9	12.7	13.4	12.6	14.9	17.4	19.6	14.8	16.7	17.8	17.6
Religious, Grant-making, Civic, and Professional and Similar Organizations	30.6		14.8	28.6	7.2	50.1	37.7		207.1	12.7	30.8
Personal and Laundry Services and Private Households	12.1	11.0	12.8	10.9	9.7	12.4	11.5	14.2	12.3	13.8	12.7

* Finance, Insurance, Real Estate and Renting and Leasing ** Administrative and Support, Waste and Remediation

Source: CSLS Provincial Productivity Database, http://www.csls.ca/data/mfp_new.asp.

Appendix Table 2: Relative Labour Productivity Levels by Province at the Two and Three-digit Industry Level for 2007

Dollars of output per hour (\$1997), Canada = 100

	Canada	Nfld.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
Market Sector	100.0	109.7	61.3	75.1	78.1	98.8	103.5	87.1	98.1	109.3	90.1
Agriculture, Forestry, Fishing and Hunting	100.0	187.5	73.1	83.3	136.1	107.4	74.5	81.2	86.4	109.4	143.0
Crop and Animal Production	100.0	106.3	61.4	69.4	124.5	112.7	82.5	95.8	104.5	124.9	82.5
Forestry and Logging	100.0	89.2	881.6	54.8	121.2	76.7	84.3	88.2	10.4	120.0	127.2
Fishing, Hunting and Trapping	100.0	199.6	112.7	72.9	67.2	107.8	41.0	123.4	2.0	9.3	214.3
Support Activities for Agriculture and Forestry	100.0	70.2	108.1	92.9	139.1	144.6	75.0	119.5	89.6	85.9	97.4
Mining, and Oil and Gas Extraction	100.0	296.9	10.7	114.4	35.7	60.3	61.3	127.8	120.2	95.5	115.5
Oil and Gas Extraction	100.0						10.1	229.8	127.0	80.4	226.5
Mining (Except Oil and Gas Extraction)	100.0	253.3		35.9	46.4	68.7	86.7		183.4	130.6	81.6
Support Activities for Mining and Oil and Gas Extraction	100.0				103.3	289.5	75.1		111.8	99.1	79.0
Utilities	100.0	73.8	48.0	82.7	64.0	121.3	81.9	75.9	130.8	135.8	161.9
Electric Power Generation, Transmission and Distribution	100.0					120.5	79.6	78.7		172.8	175.3
Natural Gas Distribution, Water and Other Systems	100.0					112.5	103.6	51.1		80.8	140.3
Construction	100.0	73.4	57.5	80.5	86.4	121.1	95.8	87.2	92.1	124.8	74.7
Manufacturing	100.0	52.9	53.1	63.0	76.1	97.1	106.3	70.3	86.9	119.4	96.7
Food Manufacturing	100.0	50.6		45.5	44.3	107.0	125.8	113.1	85.6	89.3	86.7
Plastics and Rubber Products Manufacturing	100.0			53.3		103.6	106.7			96.9	
Non-metallic Mineral Product Manufacturing	100.0	48.2				94.8	100.7			132.0	91.0
Primary Metal Manufacturing	100.0					150.8	76.5				106.3
Fabricated Metal Product Manufacturing	100.0					95.9	99.9	56.8		134.3	109.1
Machinery Manufacturing	100.0	46.7	46.8			87.6	102.3	69.7	74.9	138.0	101.1
Computer and Electronic Product Manufacturing	100.0					73.6	118.1			117.0	145.8
Electrical Equipment, Appliance and Component Manufacturing	100.0					130.4	97.2	56.7	143.9	49.4	
Transportation Equipment Manufacturing	100.0			67.8		118.4	103.3	50.0	31.1	58.9	
Furniture and Related Product Manufacturing	100.0					98.8	121.4	48.3	67.5	104.2	
Miscellaneous Manufacturing	100.0					97.5	117.0			102.3	77.2
Beverage and Tobacco Product Manufacturing	100.0					104.6	105.6				
Textile and Textile Product Mills	100.0	25.2		159.2		79.4	143.7	48.1		167.6	
Clothing Manufacturing	100.0		80.4			87.8	139.3	106.7	88.3	159.5	
Leather and Allied Product Manufacturing	100.0					90.7	128.1		4278.5		
Wood Product Manufacturing	100.0			71.3	93.4	80.8	82.2	52.2	110.6	126.6	132.3
Paper Manufacturing	100.0					105.4	94.1			171.2	84.7
Printing and Related Support Activities	100.0	19.5		77.1	104.5	65.2	135.2	110.9	98.4	101.6	103.5
Petroleum and Coal Products Manufacturing	100.0					150.8	68.0	38.6		99.9	
Chemical Manufacturing	100.0	28.1	30.4			98.0	85.6	79.9	191.2	201.9	
Wholesale Trade	100.0	93.5	43.7	72.2	83.4	90.0	110.9	95.6	115.8	92.6	94.1
Retail Trade	100.0	70.5	82.9	78.5	82.5	97.2	102.7	106.5	91.5	115.6	98.1
Transportation and Warehousing	100.0	69.8	56.3	73.0	73.2	93.8	97.8	93.0	119.8	114.7	109.3
Truck Transportation	100.0	94.8	67.2	87.4	80.8	104.7	103.3	69.9	82.8	113.8	90.5
Transit	100.0										
Pipeline Transportation	100.0					266.0	647.3	892.5	164.0	69.6	81.2

Warehousing and Storage	100.0				57.4	84.2	100.2		164.9		94.2
Air, Rail, Water and Scenic and Sightseeing Transportation and Support Activities for Transportation	100.0	60.3	58.4	90.8	89.3	95.6	104.0	106.1	118.9	110.1	98.4
Postal service Couriers and Messengers	100.0										
Information and Cultural Industries	100.0	108.1	137.9	102.9	107.5	92.9	97.3	102.9	87.1	127.7	101.4
Motion Picture and Sound Recording Industries	100.0					113.3					
Broadcasting and Telecommunications	100.0					89.9	98.3	100.8		120.4	128.3
Publishing Industries, Information Services and Data Processing Services	100.0			68.5		91.6					
FIRE*	100.0	93.7	99.8	93.6	96.7	96.8	102.2	98.1	95.2	107.7	93.1
Professional, Scientific and Technical Services	100.0	74.9	79.3	74.8	81.3	97.4	107.9	67.8	83.1	106.1	86.6
AWSMR	100.0	65.5	56.7	84.8	64.3	106.9	105.6	94.2	90.9	110.8	77.1
Administrative and Support Services	100.0	67.7	51.0	87.8	64.1	109.9	105.7	88.8	87.9	105.7	76.9
Waste management and Remediation Services	100.0	40.6	72.6	43.5	74.6	73.1	122.1	154.7	78.5	152.7	78.9
Arts, Entertainment and Recreation	100.0	81.4	61.2	55.2	61.9	116.9	116.7	103.6	87.4	79.1	74.4
Accommodation and Food Services	100.0	83.0	94.5	89.4	80.0	96.9	96.2	92.4	91.8	120.3	107.4
Other Services (Except Public Administration)	100.0	67.9	83.8	80.5	76.2	106.0	98.8	101.0	113.6	100.8	100.8
Repair and Maintenance	100.0	71.3	75.2	70.4	83.4	97.3	109.8	82.8	93.4	99.6	98.6
Religious, Grant-making, Civic, and Professional and Similar Organizations	100.0		48.5	93.5	23.5	163.8	123.4		677.9	41.7	100.9
Personal and Laundry Services and Private Households	100.0	90.7	106.0	90.2	80.3	102.7	94.9	117.1	101.8	113.9	105.4

* Finance, Insurance, Real Estate and Renting and Leasing ** Administrative and Support, Waste and Remediation

Source: CSLs Provincial Productivity Database, http://www.csls.ca/data/mfp_new.asp.

Appendix Table 3: Labour Productivity Growth by Province at the Two and Three-digit Industry Level, 1997 - 2007
Compound Annual Growth Rate

	Canada	Nfld.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
Market Sector	1.7	4.8	1.6	1.9	1.8	1.8	1.7	2.1	2.1	1.0	1.2
Agriculture, Forestry, Fishing and Hunting	4.6	8.9	3.0	3.3	7.6	3.8	3.0	4.9	4.7	7.3	1.7
Crop and Animal Production	3.0	4.2	1.0	4.2	7.5	3.3	3.6	4.7	4.9	7.2	1.8
Forestry and Logging	6.6	4.8	22.0	5.4	9.0	3.8	2.3	5.2	-16.0	8.0	2.6
Fishing, Hunting and Trapping	0.3	14.3	9.7	-0.1	8.1	10.3	-2.6	27.5	-24.1	-22.6	11.3
Support Activities for Agriculture and Forestry	6.3	-0.5	4.0	4.0	6.6	3.5	-3.3	5.4	2.3	-0.8	-1.1
Mining, and Oil and Gas Extraction	-2.2	15.3	-8.8	8.1	-4.8	0.1	-4.1	6.1	-4.7	-4.3	0.5
Oil and Gas Extraction	-4.0						-13.9	-8.3	-6.9	-5.7	5.4
Mining (Except Oil and Gas Extraction)	-0.6	10.2		-5.0	-4.2	-1.4	-3.4		-1.0	5.6	-3.1
Support Activities for Mining and Oil and Gas Extraction	-2.3				-3.5	11.3	-5.6		-2.6	-2.3	-5.3
Utilities	-0.9	-0.7	-4.7	-0.1	-1.1	-1.5	-0.9	-2.7	0.7	-1.4	2.1
Electric Power Generation, Transmission and Distribution	-1.0					-1.4	-0.8	-3.0		-1.1	0.8
Natural Gas Distribution, Water and Other Systems	-0.7					-2.5	-1.4	-2.1		-2.4	5.4
Construction	1.7	-1.4	2.8	1.5	3.5	2.2	1.7	2.1	1.0	3.0	-0.7
Manufacturing	2.2	-0.7	0.2	1.8	0.9	2.4	2.4	0.9	0.1	2.2	2.9
Food Manufacturing	3.0	2.5		-2.3	-2.8	5.0	3.8	3.5	-2.9	1.9	3.6
Plastics and Rubber Products Manufacturing	1.4			2.0		1.8	1.2			1.9	
Non-metallic Mineral Product Manufacturing	2.3	-1.1				3.0	2.3			1.7	1.0
Primary Metal Manufacturing	4.4					7.5	2.7				4.4
Fabricated Metal Product Manufacturing	1.7					1.7	1.1	-2.4		5.2	3.0
Machinery Manufacturing	2.8	1.8	0.0			1.7	2.8	-4.2	1.6	5.5	4.5
Computer and Electronic Product Manufacturing	3.4					-2.8	5.8			6.4	9.4
Electrical Equipment, Appliance and Component Manufacturing	0.2					3.5	-0.5	-2.1	0.2	-5.4	
Transportation Equipment Manufacturing	3.3			1.9		4.1	3.2	0.9	-2.5	5.8	
Furniture and Related Product Manufacturing	2.7					3.7	3.0	-1.7	-0.9	3.3	
Miscellaneous Manufacturing	3.2					1.9	5.8			0.3	0.9
Beverage and Tobacco Product Manufacturing	-0.8					0.4	-2.5				
Textile and Textile Product Mills	0.2	-5.2		2.3		-2.2	3.6	-1.6		6.0	
Clothing Manufacturing	-1.3		2.8			-2.6	1.1	0.3	1.2	0.3	
Leather and Allied Product Manufacturing	-1.7					-2.8	1.7		49.3		
Wood Product Manufacturing	3.1			5.6	3.1	0.7	2.9	2.7	1.0	4.7	4.7
Paper Manufacturing	-0.1					0.0	-0.8			0.6	0.8
Printing and Related Support Activities	1.1	-9.6		4.3	5.8	-1.9	3.1	1.7	1.4	1.9	1.7
Petroleum and Coal Products Manufacturing	-2.8					-0.3	-5.4	-13.0		-0.7	
Chemical Manufacturing	2.3	1.3	-2.2			5.4	1.8	0.4	6.8	-0.6	
Wholesale Trade	3.7	4.0	-3.5	1.7	4.5	3.4	4.2	3.2	3.9	2.7	4.0
Retail Trade	3.3	3.2	3.8	3.7	3.8	2.9	3.1	4.3	4.0	4.9	2.9
Transportation and Warehousing	0.7	-0.5	-1.2	0.9	0.2	0.4	0.2	0.4	2.3	1.3	1.0
Truck Transportation	0.3	1.3	-0.4	2.5	-0.5	1.0	-0.1	-2.0	0.7	1.1	-0.5
Transit	1.3										
Pipeline Transportation	1.2					1.5	11.1	6.0	4.6	2.1	-0.4
Warehousing and Storage	-0.3				-2.4	-5.1	-0.4		7.0		-1.0
Air, Rail, Water and Scenic and Sightseeing Transportation and Support Activities for Transportation	1.3	-1.6	1.2	1.9	0.9	0.9	2.2	0.7	3.7	0.9	
Postal service Couriers and Messengers	1.0										
Information and Cultural Industries	3.0	4.1	4.8	5.0	4.4	1.3	2.7	3.3	4.1	5.3	4.2
Motion Picture and Sound Recording Industries	1.3					0.0					
Broadcasting and Telecommunications	4.0					1.8	3.5	3.4		6.3	7.2
Publishing Industries, Information Services and Data Processing Services	1.6			2.4		-0.1					

FIRE*	1.5	2.0	1.4	1.0	2.2	1.1	1.5	2.0	3.9	2.0	1.1
Professional, Scientific and Technical Services	1.3	-0.9	2.4	-0.9	0.9	1.4	1.5	-0.8	2.0	1.8	0.5
AWSMR	0.3	-2.2	-2.2	1.6	-1.1	1.1	0.6	2.0	1.7	0.8	-2.5
Administrative and Support Services	0.0	-2.4	-2.6	1.1	-1.6	0.9	0.4	1.0	0.9	-0.1	-3.0
Waste management and Remediation Services	4.2	0.4	0.9	5.3	7.8	4.5	2.4	12.2	4.5	7.9	2.9
Arts, Entertainment and Recreation	-1.2	-5.1	-4.2	-6.0	-5.5	-0.4	-0.2	5.7	-3.8	-2.2	-3.9
Accommodation and Food Services	1.1	1.4	2.6	1.8	0.7	1.7	0.5	0.4	0.9	2.4	0.5
Other Services (Except Public Administration)	2.1	0.7	4.6	3.3	1.8	3.3	1.5	2.8	3.7	1.9	1.3
Repair and Maintenance	2.7	0.4	3.8	0.5	1.7	3.2	3.3	2.0	3.2	1.9	1.7
Religious, Grant-making, Civic, and Professional and Similar Organizations	3.0		-0.3	6.3	-6.9	8.5	4.4		25.8	-4.5	2.3
Personal and Laundry Services and Private Households	0.4	2.0	4.9	3.5	1.0	1.1	-0.6	1.9	-0.3	1.9	0.2

* Finance, Insurance, Real Estate and Renting and Leasing ** Administrative and Support, Waste and Remediation

Source: CSLs Provincial Productivity Database, http://www.csls.ca/data/mfp_new.asp.

Appendix Table 4: Labour Quality Growth by Province at the Two and Three-digit Industry Level, 1997 - 2007

Compound Annual Growth Rate

	Canada	Nfld.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
Market Sector	0.5	0.6	0.6	0.2	0.4	0.5	0.5	0.6	0.9	0.5	0.1
Agriculture, Forestry, Fishing and Hunting	0.9	1.2	0.3	0.0	0.6	0.9	0.7	0.7	0.1	1.4	-0.4
Crop and Animal Production	0.8	-1.1	0.7	-0.4	0.5	0.0	0.7	0.8	-0.1	1.3	-0.8
Forestry and Logging	0.1	3.2	6.0	-1.6	0.8	0.7	-0.8	-2.4	2.4	1.0	-0.1
Fishing, Hunting and Trapping	0.8	1.0	0.2	0.5	0.8	-2.6	-2.3	23.4	-6.3	-26.7	2.2
Support Activities for Agriculture and Forestry	0.1	-3.0	0.3	6.2	3.0	3.4	-0.8	-1.8	-1.9	-0.7	-1.5
Mining, and Oil and Gas Extraction	0.0	-0.8	-0.3	-0.4	0.1	0.1	-0.3	0.0	0.1	0.2	-0.3
Oil and Gas Extraction	0.3						0.3	-8.8	1.0	0.3	1.5
Mining (Except Oil and Gas Extraction)	0.4	0.1		0.1	0.4	0.5	-0.1		0.3	0.2	0.5
Support Activities for Mining and Oil and Gas Extraction	0.0				1.5	-0.4	-0.1		0.2	0.1	0.9
Utilities	0.1	0.3	-0.8	0.9	-0.1	0.4	0.0	0.2	0.1	0.2	-0.3
Electric Power Generation, Transmission and Distribution	0.0					0.4	-0.2	0.2		-0.1	-0.3
Natural Gas Distribution, Water and Other Systems	-0.3					-2.8	0.4	2.7		-0.1	-0.6
Construction	0.1	0.1	0.4	0.0	0.0	-0.1	0.1	0.1	-0.1	0.1	0.1
Manufacturing	0.4	0.4	0.3	0.1	0.6	0.6	0.5	0.3	0.1	0.2	-0.2
Food Manufacturing	0.2	0.9		0.7	0.6	0.3	0.6	0.1	0.3	-0.1	0.1
Plastics and Rubber Products Manufacturing	0.9			0.2		1.2	1.0			0.4	
Non-metallic Mineral Product Manufacturing	-0.1	-2.5				0.4	-0.3			-0.8	-0.8
Primary Metal Manufacturing	0.3					0.7	0.3				-0.4
Fabricated Metal Product Manufacturing	0.5					0.9	0.5	0.8		-0.4	0.2
Machinery Manufacturing	0.2	-30.0	4.5			0.8	-0.3	0.7	0.6	1.5	0.1
Computer and Electronic Product Manufacturing	0.9					1.5	0.8			0.6	1.4
Electrical Equipment, Appliance and Component Manufacturing	0.5					0.3	0.6	1.4	1.5	-2.4	
Transportation Equipment Manufacturing	0.4			-0.5		0.7	0.5	0.6	-1.2	-0.9	
Furniture and Related Product Manufacturing	-0.3					0.5	-0.1	0.9	-1.8	-0.9	
Miscellaneous Manufacturing	0.1					0.5	0.8			-0.7	-2.2
Beverage and Tobacco Product Manufacturing	-0.2					0.2	-0.8				
Textile and Textile Product Mills	0.0	-19.7		-0.4		0.6	0.9	-2.6		-4.4	
Clothing Manufacturing	-0.7		-23.7			0.0	-1.0	0.0	-6.8	-5.1	
Leather and Allied Product Manufacturing	-3.9					-1.1	-1.9		-0.3		
Wood Product Manufacturing	0.1			1.1	0.0	0.5	0.1	0.3	0.6	0.6	0.0
Paper Manufacturing	0.5					0.3	0.7			-1.1	0.7
Printing and Related Support Activities	0.0	-6.0		0.9	-4.2	0.5	0.3	-0.7	-1.1	-2.0	0.2
Petroleum and Coal Products Manufacturing	0.3					-0.7	1.6	-10.1		-0.2	
Chemical Manufacturing	0.4	-6.9	1.2			0.7	0.6	-0.9	-0.4	-0.1	
Wholesale Trade	0.3	-0.4	-0.2	0.6	-0.1	0.3	0.4	0.2	0.3	0.1	-0.1
Retail Trade	0.1	0.8	0.0	-0.1	0.2	0.1	0.2	0.0	-0.2	-0.2	0.0
Transportation and Warehousing	0.4	1.0	0.8	0.3	0.6	0.6	0.5	0.2	0.5	0.4	-0.1
Truck Transportation	0.3	0.6	0.5	0.2	0.2	0.6	0.4	0.1	0.1	0.0	-0.2
Transit	0.6										
Pipeline Transportation	-2.5					-3.7	-8.2	15.9	0.8	0.0	-6.5
Warehousing and Storage	0.0				-0.5	-0.4	0.6		-0.3		-1.5
Air, Rail, Water and Scenic and Sightseeing Transportation and Support Activities for Transportation	0.3	0.6	0.4	0.7	0.4	0.5	-0.1	0.5	0.6	-0.2	
Postal service Couriers and Messengers	0.3										
Information and Cultural Industries	0.6	0.3	-0.3	0.5	-0.1	0.1	0.6	1.1	0.3	0.7	0.9
Motion Picture and Sound Recording Industries	-0.7					-3.1					
Broadcasting and Telecommunications	0.2					-0.2	0.2	0.3		0.1	0.7
Publishing Industries, Information Services and Data Processing Services	1.7			2.5		1.2					
FIRE*	0.4	0.4	-0.2	0.1	0.6	0.3	0.5	0.6	0.5	-0.2	0.5

Professional, Scientific and Technical Services	0.7	0.7	0.1	0.5	0.1	0.7	0.8	0.0	0.5	0.4	0.2
AWSMR	0.0	-0.1	0.3	0.6	0.4	-0.3	0.3	0.6	0.3	-0.4	-0.4
Administrative and Support Services	0.0	0.1	0.5	0.6	0.4	-0.3	0.3	0.4	0.4	-0.4	-0.5
Waste management and Remediation Services	0.3	-2.1	-1.2	-0.7	0.4	-1.9	0.1	2.6	1.6	1.5	2.0
Arts, Entertainment and Recreation	0.0	-0.3	1.2	0.9	1.2	-0.1	0.0	1.4	0.1	0.3	-0.1
Accommodation and Food Services	0.2	-0.1	0.6	0.2	-0.3	0.1	0.3	0.0	0.3	0.2	0.0
Other Services (Except Public Administration)	0.4	0.8	-0.7	-0.1	1.1	0.2	0.5	-0.5	0.4	0.1	0.3
Repair and Maintenance	0.4	2.2	0.5	0.2	2.0	0.5	0.5	0.2	1.2	0.3	-0.3
Religious, Grant-making, Civic, and Professional and Similar Organizations	0.4	2.3	-0.5	-0.2	1.2	0.8	0.2	0.5	-0.4	-0.2	0.5
Personal and Laundry Services and Private Households	0.2	-1.0	0.2	0.7	-0.1	-0.4	0.4	-0.8	0.6	0.4	0.3

* Finance, Insurance, Real Estate and Renting and Leasing ** Administrative and Support, Waste and Remediation

Source: CSLs Provincial Productivity Database, http://www.csls.ca/data/mfp_new.asp.

Appendix Table 5: Capital Productivity Levels by Province at the Two and Three-digit Industry Level for 2007

Real GDP per dollar of capital services (\$1997)

[illegible]

Air, Rail, Water and Scenic and Sightseeing Transportation and Support Activities for Transportation	2.3										
Postal service Couriers and Messengers	4.5										
Information and Cultural Industries	1.9	1.6	2.3	1.9	1.6	2.2	1.9	1.7	1.9	1.7	2.3
Motion Picture and Sound Recording Industries	1.6										
Broadcasting and Telecommunications	1.9					2.2	1.8	2.0		1.9	2.1
Publishing Industries, Information Services and Data Processing Services	1.5										
FIRE*	1.6	1.1	1.0	1.5	1.2	1.5	1.8	1.5	1.8	1.5	1.5
Professional, Scientific and Technical Services	2.4	1.1	1.5	1.5	2.1	2.5	2.6	2.4	1.8	2.2	2.9
AWSMR	3.1	17.5	3.0	5.1	13.7	5.9	2.7	2.9	1.7	1.8	1.9
Administrative and Support Services	2.9										
Waste management and Remediation Services	1.4										
Arts, Entertainment and Recreation	2.1	1.2	4.6	1.5	2.4	2.5	2.4	3.4	0.8	1.4	1.0
Accommodation and Food Services	4.3	4.0	4.0	3.5	3.5	4.8	5.4	4.0	3.6	3.2	3.4
Other Services (Except Public Administration)	5.3	4.4	5.8	3.5	4.6	3.8	7.9	5.8	7.3	3.7	5.5
Repair and Maintenance	5.1										
Religious, Grant-making, Civic, and Professional and Similar Organizations	5.4										
Personal and Laundry Services and Private Households	1.4										

* Finance, Insurance, Real Estate and Renting and Leasing ** Administrative and Support, Waste and Remediation

Source: CSLs Provincial Productivity Database, http://www.csls.ca/data/mfp_new.asp.

Appendix Table 6: Relative Capital Productivity Levels by Province at the Two and Three-digit Industry Level for 2007

Dollars of output per hour (\$1997), Canada = 100

	Canada	Nfld.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
Market Sector	100.0	160.8	96.2	120.5	103.1	108.8	116.5	99.4	72.5	61.0	115.9
Agriculture, Forestry, Fishing and Hunting	100.0	154.5	81.6	118.2	180.0	109.2	104.3	94.7	68.3	87.9	113.5
Crop and Animal Production	100.0	94.2	77.2	129.9	198.7	96.1	111.2	105.7	77.4	92.2	123.1
Forestry and Logging	100.0			249.6	112.0	163.8	136.5	97.6	7.3	108.1	92.8
Fishing, Hunting and Trapping	100.0	159.2	117.9	64.0	707.5		54.1		1.5	7.1	
Support Activities for Agriculture and Forestry	100.0			111.2	87.2		60.9	58.9	67.6	47.8	
Mining, and Oil and Gas Extraction	100.0	1732.4	14.8	256.2	154.8	314.3	200.6	288.7	91.8	70.5	143.6
Oil and Gas Extraction	100.0									77.6	116.8
Mining (Except Oil and Gas Extraction)	100.0									129.7	143.4
Support Activities for Mining and Oil and Gas Extraction	100.0									76.7	164.0
Utilities	100.0	115.5	30.7	135.0	78.5	108.2	111.4	85.1	100.9	69.8	92.2
Electric Power Generation, Transmission and Distribution	100.0										
Natural Gas Distribution, Water and Other Systems	100.0										
Construction	100.0	57.7	111.1	133.1	110.3	67.6	85.7	68.4	71.9	232.9	112.8
Manufacturing	100.0	98.3	116.6	140.7	80.5	97.7	100.1	79.6	88.0	71.8	178.6
Food Manufacturing	100.0					106.9	98.7			92.6	137.4
Plastics and Rubber Products Manufacturing	100.0					113.5	92.6			109.1	
Non-metallic Mineral Product Manufacturing	100.0					117.1	100.7			94.7	76.5
Primary Metal Manufacturing	100.0					103.2	113.2				199.3
Fabricated Metal Product Manufacturing	100.0					88.7	105.2			74.5	171.9
Machinery Manufacturing	100.0					98.2	108.2			119.7	135.7
Computer and Electronic Product Manufacturing	100.0					65.0	111.2			119.2	151.3
Electrical Equipment, Appliance and Component Manufacturing	100.0					164.1	81.9			314.7	
Transportation Equipment Manufacturing	100.0					110.0	95.7			230.2	
Furniture and Related Product Manufacturing	100.0					88.8	94.2			129.4	
Miscellaneous Manufacturing	100.0					90.7				54.8	312.5
Beverage and Tobacco Product Manufacturing	100.0					130.9	67.4				
Textile and Textile Product Mills	100.0					67.2	194.5			213.3	
Clothing Manufacturing	100.0					99.7	95.9			71.3	
Leather and Allied Product Manufacturing	100.0					76.2	351.5				
Wood Product Manufacturing	100.0					62.5	118.4			154.7	119.0
Paper Manufacturing	100.0					92.7	86.8			64.3	231.7
Printing and Related Support Activities	100.0					71.6	117.8			215.2	133.8
Petroleum and Coal Products Manufacturing	100.0					85.6	232.3			50.9	
Chemical Manufacturing	100.0					143.4	113.5			65.6	
Wholesale Trade	100.0	85.9	93.2	94.1	121.8	82.7	109.0	73.4	86.1	80.2	146.5
Retail Trade	100.0	104.0	83.8	119.7	88.5	84.6	93.5	126.4	157.3	132.5	114.6
Transportation and Warehousing	100.0	95.1	180.5	98.4	105.0	103.8	99.0	121.9	97.5	77.8	119.1
Truck Transportation	100.0										
Transit	100.0										
Pipeline Transportation	100.0										
Warehousing and Storage	100.0										

Air, Rail, Water and Scenic and Sightseeing Transportation and Support Activities for Transportation	100.0										
Postal service Couriers and Messengers	100.0										
Information and Cultural Industries	100.0	85.9	122.8	101.4	86.1	113.5	97.8	88.4	99.9	88.4	119.4
Motion Picture and Sound Recording Industries	100.0										
Broadcasting and Telecommunications	100.0					116.6	93.5	103.6		98.0	107.9
Publishing Industries, Information Services and Data Processing Services	100.0										
FIRE*	100.0	64.2	60.5	89.4	70.0	89.7	112.3	89.0	107.9	93.4	89.0
Professional, Scientific and Technical Services	100.0	43.4	60.3	63.0	86.7	103.6	107.3	97.6	72.2	89.6	116.9
AWSMR	100.0	568.9	95.9	164.7	446.3	190.2	88.0	93.0	55.7	59.7	61.3
Administrative and Support Services	100.0										
Waste management and Remediation Services	100.0										
Arts, Entertainment and Recreation	100.0	57.3	221.3	73.5	116.4	120.5	116.0	167.4	41.2	70.3	50.8
Accommodation and Food Services	100.0	93.4	94.1	81.7	81.4	111.8	125.0	93.4	83.4	75.3	78.5
Other Services (Except Public Administration)	100.0	83.0	108.9	66.1	87.3	70.6	148.9	108.7	137.1	69.5	103.2
Repair and Maintenance	100.0										
Religious, Grant-making, Civic, and Professional and Similar Organizations	100.0										
Personal and Laundry Services and Private Households	100.0										

* Finance, Insurance, Real Estate and Renting and Leasing ** Administrative and Support, Waste and Remediation

Source: CSLS Provincial Productivity Database, http://www.csls.ca/data/mfp_new.asp.

Appendix Table 7: Capital Productivity Growth by Province at the Two and Three-digit Industry Level, 1997 - 2007

Compound Annual Growth Rate

	Canada	Nfld.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
Market Sector	-0.6	4.2	-1.9	0.3	-1.0	0.4	0.2	-0.5	-0.6	-3.4	-0.5
Agriculture, Forestry, Fishing and Hunting	2.0	2.8	-1.6	1.3	3.8	2.7	1.1	2.7	1.7	2.3	1.6
Crop and Animal Production	2.2	-0.8	-2.8	0.8	5.6	2.3	1.5	2.8	2.0	2.1	1.4
Forestry and Logging	1.5	-4.1	-5.0	1.7	2.0	2.0	2.4	1.9	-21.6	0.9	2.3
Fishing, Hunting and Trapping	2.4	7.4	2.4	1.1	4.7	3.5	-4.0	-0.8	-27.7	-17.5	-6.5
Support Activities for Agriculture and Forestry	-5.6	-2.4	2.6	-7.1	-3.7	4.7	-10.3	-11.8	-14.0	-8.3	-1.7
Mining, and Oil and Gas Extraction	-5.7	19.2	-25.7	-0.3	-5.1	-0.9	-1.3	1.1	-5.0	-8.3	-3.2
Oil and Gas Extraction	-5.9									-8.4	-4.1
Mining (Except Oil and Gas Extraction)	-1.4									-2.0	1.7
Support Activities for Mining and Oil and Gas Extraction	-7.7									-10.2	-3.2
Utilities	0.0	0.8	-11.6	2.5	-2.6	1.2	0.4	-1.6	0.4	-2.7	-0.3
Electric Power Generation, Transmission and Distribution	-0.1										
Natural Gas Distribution, Water and Other Systems	1.2										
Construction	1.4	-0.1	-4.4	0.6	1.0	-0.8	-1.9	-3.4	2.1	12.3	1.4
Manufacturing	1.6	0.1	1.6	2.2	-0.5	2.0	1.3	-0.7	2.0	0.6	5.3
Food Manufacturing	1.7					1.8	2.2			1.6	2.6
Plastics and Rubber Products Manufacturing	0.4					2.0	0.0			0.5	
Non-metallic Mineral Product Manufacturing	1.8					2.9	1.4			3.6	-0.8
Primary Metal Manufacturing	3.4					6.0	2.4				8.9
Fabricated Metal Product Manufacturing	1.8					0.7	2.5			-0.5	4.4
Machinery Manufacturing	2.0					2.6	2.4			3.5	-0.2
Computer and Electronic Product Manufacturing	0.2					-1.7	0.2			1.4	3.9
Electrical Equipment, Appliance and Component Manufacturing	-2.0					1.8	-3.3			4.0	
Transportation Equipment Manufacturing	1.4					4.0	0.8			1.8	
Furniture and Related Product Manufacturing	-0.5					-1.1	-0.6			1.5	
Miscellaneous Manufacturing	1.5					2.3				-2.0	6.8
Beverage and Tobacco Product Manufacturing	-3.7					-1.7	-6.6				
Textile and Textile Product Mills	1.1					-1.8	5.8			7.7	
Clothing Manufacturing	-0.4					0.1	-2.2			-1.9	
Leather and Allied Product Manufacturing	-4.8					-4.4	-2.8				
Wood Product Manufacturing	2.1					-0.9	2.4			7.2	2.8
Paper Manufacturing	4.1					3.9	3.4			2.5	7.3
Printing and Related Support Activities	-1.2					-3.6	-0.1			5.7	-1.2
Petroleum and Coal Products Manufacturing	-7.2					-7.0	-4.1			-14.4	
Chemical Manufacturing	1.9					4.4	2.0			0.6	
Wholesale Trade	-0.2	1.0	-1.2	-0.6	2.8	-2.8	0.8	-0.5	2.7	-2.2	1.0
Retail Trade	-1.0	0.0	-2.4	-0.7	-3.8	-1.0	-2.1	0.1	3.6	2.3	-1.3
Transportation and Warehousing	-1.9	-3.3	-2.7	-4.4	-3.9	-2.4	-2.4	-0.1	1.9	-2.5	-0.9
Truck Transportation	-5.2										
Transit	-2.8										
Pipeline Transportation	2.0										
Warehousing and Storage	2.1										
Air, Rail, Water and Scenic and Sightseeing Transportation and Support Activities for Transportation	-2.8										
Postal service Couriers and Messengers	-3.6										
Information and Cultural Industries	0.5	0.1	4.5	1.1	-1.8	2.4	0.0	-0.9	-1.4	-0.6	1.5
Motion Picture and Sound Recording Industries	-0.9										
Broadcasting and Telecommunications	1.5					3.8	0.9	1.3		1.4	1.8
Publishing Industries, Information Services and Data Processing Services	-5.4										
FIRE*	-0.9	-3.8	-4.5	-0.8	-3.6	-1.6	0.0	-1.9	-0.3	-1.8	-2.0

Professional, Scientific and Technical Services	-6.7	-12.8	-10.6	-6.5	-7.8	-5.2	-6.2	-7.2	-9.6	-8.6	-6.9
AWSMR	-2.8	13.4	-1.6	0.5	8.7	2.3	-4.0	-4.1	-8.7	-6.9	-5.7
Administrative and Support Services	-3.6										
Waste management and Remediation Services	-0.8										
Arts, Entertainment and Recreation	-4.5	-4.4	5.7	-5.2	-2.7	-1.9	-3.4	-3.3	-8.4	-7.7	-12.1
Accommodation and Food Services	-0.4	-1.4	0.4	-2.1	-3.1	-0.3	1.8	-1.7	0.1	-0.6	-4.3
Other Services (Except Public Administration)	-0.8	-2.4	-2.6	-4.9	-1.9	-3.0	1.4	2.0	8.1	-3.3	-1.2
Repair and Maintenance	-0.7										
Religious, Grant-making, Civic, and Professional and Similar Organizations	-7.4										
Personal and Laundry Services and Private Households	-12.6										

* Finance, Insurance, Real Estate and Renting and Leasing ** Administrative and Support, Waste and Remediation

Source: CSLs Provincial Productivity Database, http://www.csls.ca/data/mfp_new.asp.

Appendix Table 8: Capital Composition Levels by Province at the Two and Three-digit Industry Level for 2007

Dollars of Capital Services per Dollar of Capital Stock

[illegible]

Air, Rail, Water and Scenic and Sightseeing Transportation and Support Activities for Transportation	0.1										
Postal service Couriers and Messengers	0.6										
Information and Cultural Industries	0.4	0.4		0.4	0.3	0.5	0.4		0.4	0.4	0.4
Motion Picture and Sound Recording Industries	0.5										
Broadcasting and Telecommunications	0.4	0.4	0.3	0.4	0.3	0.4	0.3	0.4	0.3	0.4	0.4
Publishing Industries, Information Services and Data Processing Services	1.3										
FIRE*	0.2	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.2
Professional, Scientific and Technical Services	1.3	1.9	1.7	2.1	1.3	0.9	1.4	0.7	1.5	1.4	1.4
AWSMR	1.4			0.6	0.2	0.9	1.7			1.7	1.7
Administrative and Support Services	1.7										
Waste management and Remediation Services	0.9										
Arts, Entertainment and Recreation	0.4	0.6	0.1			0.4	0.3			0.4	0.8
Accommodation and Food Services	0.3	0.4	0.3	0.5	0.6	0.3	0.3	0.5	0.5	0.5	0.4
Other Services (Except Public Administration)	0.3	0.6	0.2	0.7	0.5	0.7	0.3	0.3	0.0	0.5	0.4
Repair and Maintenance	0.6										
Religious, Grant-making, Civic, and Professional and Similar Organizations	0.1										
Personal and Laundry Services and Private Households	3.0										

* Finance, Insurance, Real Estate and Renting and Leasing ** Administrative and Support, Waste and Remediation

Source: CSLs Provincial Productivity Database, http://www.csls.ca/data/mfp_new.asp.

Appendix Table 9: Relative Capital Composition Levels by Province at the Two and Three-digit Industry Level for 2007

Canada = 100

	Canada	Nfld.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
Market Sector	100.0	47.6	94.0	72.9	90.4	97.3	111.2	104	94.0	101.6	84
Agriculture, Forestry, Fishing and Hunting	100.0	84.4	104.2	82.7	108.8	94.0	81.0	89	110.0	87.3	171
Crop and Animal Production	100.0	131.2	90.0	70.2	92.4	96.4	78.2	93.1	116.2	90.2	96.2
Forestry and Logging	100.0			56.3	118.3	57.8	89.2	82.1	92.6	74.4	131.1
Fishing, Hunting and Trapping	100.0	55.6	99.1	77.1	7.9		113.5		115.2	205.2	
Support Activities for Agriculture and Forestry	100.0			63.8	237.6		184.5	124.7	77.2	142.3	
Mining, and Oil and Gas Extraction	100.0	11.7		31.9	84.0	25.7	103.1	78.9	155.4	117.0	62.9
Oil and Gas Extraction	100.0									94.9	54.0
Mining (Except Oil and Gas Extraction)	100.0									117.6	67.8
Support Activities for Mining and Oil and Gas Extraction	100.0									233.2	39.4
Utilities	100.0	75.8				83.4	109.9	90.8	83.5	144.0	107.8
Electric Power Generation, Transmission and Distribution	100.0										
Natural Gas Distribution, Water and Other Systems	100.0										
Construction	100.0	136.2	46.8	62.0	76.1	115.9	88.4	91.6	164.0	143.9	112.8
Manufacturing	100.0	56.3	77.7	41.4	65.7	113.2	105.5	127.6	54.9	112.5	65.6
Food Manufacturing	100.0					86.3	101.6			103.7	82.0
Plastics and Rubber Products Manufacturing	100.0					94.4	104.7			113.5	84.8
Non-metallic Mineral Product Manufacturing	100.0					89.5	89.0			113.1	130.0
Primary Metal Manufacturing	100.0					91.9	76.0			272.1	54.9
Fabricated Metal Product Manufacturing	100.0					93.3	81.7			142.5	64.7
Machinery Manufacturing	100.0					103.8	86.9			125.0	113.0
Computer and Electronic Product Manufacturing	100.0					888.7	839.0			750.9	932.8
Electrical Equipment, Appliance and Component Manufacturing	100.0					101.9	204.4			64.6	104.9
Transportation Equipment Manufacturing	100.0					133.5	54.4			61.9	77.5
Furniture and Related Product Manufacturing	100.0					97.7	112.8			56.9	43.5
Miscellaneous Manufacturing	100.0					76.8				153.1	47.1
Beverage and Tobacco Product Manufacturing	100.0					91.4	137.0			70.8	42.8
Textile and Textile Product Mills	100.0					133.9	34.7			166.2	60.4
Clothing Manufacturing	100.0					123.2	124.6			164.4	123.8
Leather and Allied Product Manufacturing	100.0					123.1	15.8			139.2	33.3
Wood Product Manufacturing	100.0					97.8	79.6			39.7	80.8
Paper Manufacturing	100.0					99.0	120.5			82.9	28.3
Printing and Related Support Activities	100.0					77.2	56.2			31.9	47.7
Petroleum and Coal Products Manufacturing	100.0					70.1	26.5			41.7	106.1
Chemical Manufacturing	100.0					98.3	109.0			133.4	87.4
Wholesale Trade	100.0	100.8	80.6	64.2	71.9	106.5	108.8	100.7	83.2	102.7	74.3
Retail Trade	100.0	76.0	95.0	61.5	82.6	129.5	109.5	84.3	67.4	71.0	85.6
Transportation and Warehousing	100.0	89.3	29.5	91.8	100.9	130.4	103.3	88.0	85.6	107.3	76.8
Truck Transportation	100.0										
Transit	100.0										
Pipeline Transportation	100.0										

Warehousing and Storage	100.0										
Air, Rail, Water and Scenic and Sightseeing Transportation and Support Activities for Transportation	100.0										
Postal service Couriers and Messengers	100.0										
Information and Cultural Industries	100.0	97.6		88.5	77.5	108.0	102.4		88.1	93.3	94.9
Motion Picture and Sound Recording Industries	100.0										
Broadcasting and Telecommunications	100.0	129.8	110.9	115.0	110.8	114.7	106.9	118.9	101.1	114.3	127.0
Publishing Industries, Information Services and Data Processing Services	100.0										
FIRE*	100.0	117.0	142.7	108.8	138.6	81.9	107.8	136.4	114.3	107.7	92.5
Professional, Scientific and Technical Services	100.0	152.2	132.7	164.8	100.1	69.7	110.0	57.9	115.9	107.9	107.3
AWSMR	100.0			43.5	16.0	64.5	122.0			126.7	128.2
Administrative and Support Services	100.0										
Waste management and Remediation Services	100.0										
Arts, Entertainment and Recreation	100.0	170.2	34.2			105.5	84.6			110.0	213.3
Accommodation and Food Services	100.0	127.6	98.7	136.6	171.8	92.8	76.0	141.1	144.8	131.2	122.6
Other Services (Except Public Administration)	100.0	186.7	61.6	217.2	169.8	224.8	87.6	101.9	6.4	179.5	147.6
Repair and Maintenance	100.0										
Religious, Grant-making, Civic, and Professional and Similar Organizations	100.0										
Personal and Laundry Services and Private Households	100.0										

* Finance, Insurance, Real Estate and Renting and Leasing ** Administrative and Support, Waste and Remediation

Source: CSLs Provincial Productivity Database, http://www.csls.ca/data/mfp_new.asp.

Appendix Table 10: Capital Composition Growth by Province at the Two and Three-digit Industry Level, 1997 - 2007

Compound Annual Growth Rate

[illegible]

Activities for Transportation											
Postal service Couriers and Messengers	1.0										
Information and Cultural Industries	1.2	1.5		0.9	2.3	0.7	1.4	N/A	2.7	1.3	1.1
Motion Picture and Sound Recording Industries	2.3										
Broadcasting and Telecommunications	1.3	1.6	0.3	0.9	2.2	0.9	1.6	2.5	3.2	1.4	0.8
Publishing Industries, Information Services and Data Processing Services	-1.0										
FIRE*	1.8	2.0	2.5	2.0	2.2	2.1	1.7	2.0	2.1	2.6	1.5
Professional, Scientific and Technical Services	1.1	1.2	0.3	0.4	0.5	-0.2	1.3	0.5	0.9	1.0	0.9
AWSMR	1.2			0.3	2.0	1.3	1.0			0.5	0.0
Administrative and Support Services	1.5										
Waste management and Remediation Services	3.3										
Arts, Entertainment and Recreation	2.7	1.3	0.9			3.1	1.9			6.1	2.1
Accommodation and Food Services	0.6	-0.1	0.6	0.1	-0.3	0.5	0.6	0.2	-0.2	0.6	-0.1
Other Services (Except Public Administration)	5.8	1.9	3.0	2.0	0.9	1.9	0.4	0.6	2.4	1.1	1.5
Repair and Maintenance	3.6										
Religious, Grant-making, Civic, and Professional and Similar Organizations	15.7										
Personal and Laundry Services and Private Households	0.7										

* Finance, Insurance, Real Estate and Renting and Leasing ** Administrative and Support, Waste and Remediation

Source: CSLS Provincial Productivity Database, http://www.csls.ca/data/mfp_new.asp.

Appendix Table 11: Capital Intensity Levels by Province at the Two and Three-digit Industry Level for 2007

Dollars of capital services per hour (\$1997)

	Canada	Nfld.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
Market Sector	15.7	10.7	10.0	9.8	11.9	14.3	13.9	14	21.2	28.1	12
Agriculture, Forestry, Fishing and Hunting	12.9	15.7	11.6	9.1	9.8	12.7	9.2	11	16.4	16.1	16
Crop and Animal Production	12.2	13.7	9.7	6.5	7.6	14.2	9.0	11.0	16.4	16.5	8.1
Forestry and Logging	20.8			4.6	22.5	9.8	12.9	18.8	29.5	23.1	28.6
Fishing, Hunting and Trapping	13.6	17.0	13.0	15.5	1.3		10.3		18.2	17.7	
Support Activities for Agriculture and Forestry	5.7			4.8	9.1		7.0	11.6	7.5	10.2	
Mining, and Oil and Gas Extraction	101.7	17.4	73.8	45.4	23.5	19.5	31.1	45.0	133.2	137.7	81.8
Oil and Gas Extraction	266.6									276.3	517.0
Mining (Except Oil and Gas Extraction)	43.3									43.6	24.7
Support Activities for Mining and Oil and Gas Extraction	14.0									18.1	6.7
Utilities	104.4	66.7	163.1	63.9	85.1	117.0	76.8	93.1	135.3	203.0	183.2
Electric Power Generation, Transmission and Distribution	109.0										
Natural Gas Distribution, Water and Other Systems	73.0										
Construction	4.7	5.9	2.4	2.8	3.7	8.4	5.2	5.9	6.0	2.5	3.1
Manufacturing	17.6	9.4	8.0	7.9	16.6	17.5	18.6	15.5	17.3	29.2	9.5
Food Manufacturing	17.9					17.9	22.8			17.2	11.3
Plastics and Rubber Products Manufacturing	14.7					13.5	17.0			13.1	
Non-metallic Mineral Product Manufacturing	17.2					13.9	17.2			24.0	20.5
Primary Metal Manufacturing	21.8					31.9	14.8				11.6
Fabricated Metal Product Manufacturing	10.3					11.1	9.7			18.5	6.5
Machinery Manufacturing	14.4					12.8	13.6			16.6	10.7
Computer and Electronic Product Manufacturing	24.4					27.6	25.9			23.9	23.5
Electrical Equipment, Appliance and Component Manufacturing	18.2					14.4	21.5			2.9	
Transportation Equipment Manufacturing	23.6					25.4	25.5			6.0	
Furniture and Related Product Manufacturing	10.4					11.6	13.5			8.4	
Miscellaneous Manufacturing	11.0					11.8				20.5	2.7
Beverage and Tobacco Product Manufacturing	61.2					48.9	95.9				
Textile and Textile Product Mills	7.4					8.7	5.5			5.8	2.2
Clothing Manufacturing	7.3					6.4	10.6			16.3	
Leather and Allied Product Manufacturing	6.1					7.3	2.2			6.1	5.3
Wood Product Manufacturing	16.6					21.4	11.5			13.6	18.4
Paper Manufacturing	14.3					16.3	15.5			38.1	5.2
Printing and Related Support Activities	9.1					8.3	10.5			4.3	7.1
Petroleum and Coal Products Manufacturing	36.1					63.5	10.6			70.8	
Chemical Manufacturing	42.6					29.1	32.1			131.0	
Wholesale Trade	13.2	14.4	6.2	10.1	9.0	14.4	13.4	17.2	17.8	15.2	8.5
Retail Trade	4.8	3.3	4.8	3.2	4.5	5.5	5.3	4.1	2.8	4.2	4.1
Transportation and Warehousing	13.2	9.7	4.1	9.8	9.2	11.9	13.0	10.1	16.2	19.4	12.1
Truck Transportation	11.8										
Transit	10.5										
Pipeline Transportation	177.1										
Warehousing and Storage	6.7										
Air, Rail, Water and Scenic and Sightseeing Transportation and Support Activities for Transportation	18.2										
Postal service Couriers and Messengers	5.3										
Information and Cultural Industries	35.6	45.4	40.6	36.6	45.0	29.6	35.9	42.0	31.5	52.2	30.7
Motion Picture and Sound Recording	19.4										

Industries											
Broadcasting and Telecommunications	53.7					41.4	56.5	52.3		66.0	63.8
Publishing Industries, Information Services and Data Processing Services	27.3										
FIRE*	42.8	62.5	70.7	44.9	59.1	46.2	39.0	47.2	37.8	49.3	44.8
Professional, Scientific and Technical Services	11.0	19.1	14.5	13.1	10.3	10.4	11.1	7.7	12.7	13.1	8.2
AWSMR	6.4	0.7	3.8	3.3	0.9	3.6	7.7	6.5	10.5	11.9	8.1
Administrative and Support Services	5.8										
Waste management and Remediation Services	30.6										
Arts, Entertainment and Recreation	7.9	11.2	2.2	5.9	4.2	7.6	7.9	4.9	16.7	8.8	11.5
Accommodation and Food Services	3.2	2.8	3.2	3.5	3.1	2.8	2.5	3.2	3.5	5.1	4.4
Other Services (Except Public Administration)	3.1	2.5	2.3	3.7	2.7	4.6	2.0	2.8	2.5	4.4	3.0
Repair and Maintenance	3.5										
Religious, Grant-making, Civic, and Professional and Similar Organizations	5.7										
Personal and Laundry Services and Private Households	8.7										

* Finance, Insurance, Real Estate and Renting and Leasing ** Administrative and Support, Waste and Remediation

Source: CSLS Provincial Productivity Database, http://www.csls.ca/data/mfp_new.asp.

Appendix Table 12: Relative Capital Intensity Levels by Province at the Two and Three-digit Industry Level for 2007

Dollars of capital services per hour (\$1997), Canada = 100

	Canada	Nfld.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
Market Sector	100.0	68.2	63.7	62.3	75.7	90.8	88.8	87.7	135.3	179.1	77.7
Agriculture, Forestry, Fishing and Hunting	100.0	121.4	89.6	70.4	75.6	98.4	71.4	85.8	126.5	124.4	125.9
Crop and Animal Production	100.0	112.9	79.5	53.4	62.6	117.2	74.2	90.6	134.9	135.4	67.0
Forestry and Logging	100.0			21.9	108.2	46.8	61.8	90.3	141.6	111.0	137.1
Fishing, Hunting and Trapping	100.0	125.4	95.6	113.9	9.5		75.7		133.9	130.0	
Support Activities for Agriculture and Forestry	100.0			83.6	159.6		123.2	203.0	132.5	179.6	
Mining, and Oil and Gas Extraction	100.0	17.1	72.5	44.6	23.1	19.2	30.5	44.3	131.0	135.5	80.5
Oil and Gas Extraction	100.0									103.6	193.9
Mining (Except Oil and Gas Extraction)	100.0									100.7	56.9
Support Activities for Mining and Oil and Gas Extraction	100.0									129.1	48.2
Utilities	100.0	63.9	156.3	61.2	81.5	112.1	73.6	89.2	129.6	194.5	175.5
Electric Power Generation, Transmission and Distribution	100.0										
Natural Gas Distribution, Water and Other Systems	100.0										
Construction	100.0	127.3	51.7	60.5	78.3	179.2	111.7	127.4	128.1	53.6	66.2
Manufacturing	100.0	53.8	45.5	44.8	94.6	99.4	106.2	88.4	98.7	166.4	54.2
Food Manufacturing	100.0					100.1	127.4			96.4	63.1
Plastics and Rubber Products Manufacturing	100.0					91.3	115.2			88.8	
Non-metallic Mineral Product Manufacturing	100.0					80.9	99.9			139.3	118.9
Primary Metal Manufacturing	100.0					146.1	67.6				53.4
Fabricated Metal Product Manufacturing	100.0					108.1	95.0			180.1	63.5
Machinery Manufacturing	100.0					89.2	94.5			115.4	74.5
Computer and Electronic Product Manufacturing	100.0					113.3	106.2			98.1	96.4
Electrical Equipment, Appliance and Component Manufacturing	100.0					79.5	118.6			15.7	
Transportation Equipment Manufacturing	100.0					107.5	108.0			25.6	
Furniture and Related Product Manufacturing	100.0					111.3	129.0			80.5	
Miscellaneous Manufacturing	100.0					107.5				186.8	24.7
Beverage and Tobacco Product Manufacturing	100.0					79.9	156.6				
Textile and Textile Product Mills	100.0					118.1	73.9			78.6	29.5
Clothing Manufacturing	100.0					88.1	145.3			223.8	
Leather and Allied Product Manufacturing	100.0					119.0	36.4			99.9	86.1
Wood Product Manufacturing	100.0					129.3	69.5			81.8	111.2
Paper Manufacturing	100.0					113.7	108.4			266.2	36.6
Printing and Related Support Activities	100.0					91.0	114.8			47.2	77.4
Petroleum and Coal Products Manufacturing	100.0					176.2	29.3			196.3	
Chemical Manufacturing	100.0					68.4	75.4			307.9	
Wholesale Trade	100.0	108.9	46.9	76.8	68.4	108.8	101.7	130.3	134.5	115.5	64.2
Retail Trade	100.0	67.8	98.9	65.6	93.1	114.9	109.8	84.2	58.1	87.2	85.6
Transportation and Warehousing	100.0	73.4	31.2	74.3	69.7	90.3	98.7	76.3	122.9	147.3	91.8
Truck Transportation	100.0										
Transit	100.0										
Pipeline Transportation	100.0										
Warehousing and Storage	100.0										

[illegible]

Appendix Table 13: Capital Intensity Growth by Province at the Two and Three-digit Industry Level, 1997 - 2007

Compound Annual Growth Rate

	Canada	Nfld.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
Market Sector	2.3	0.5	3.5	1.7	2.8	1.3	1.5	3.0	2.7	4.6	2.0
Agriculture, Forestry, Fishing and Hunting	2.2	5.9	4.7	1.9	3.7	1.0	1.9	2.0	2.9	4.9	0.0
Crop and Animal Production	2.2	5.0	3.9	3.3	1.8	0.9	2.1	1.8	2.9	5.1	0.4
Forestry and Logging	1.4	0.0	0.0	3.6	6.8	1.8	-0.2	3.3	7.2	7.1	0.3
Fishing, Hunting and Trapping	3.9	6.4	7.2	-1.1	3.3	0.0	1.5	0.0	5.1	-6.1	0.0
Support Activities for Agriculture and Forestry	6.3	0.0	0.0	12.0	10.7	0.0	7.8	19.5	18.9	8.2	0.0
Mining, and Oil and Gas Extraction	3.6	-3.3	22.8	8.4	0.3	1.1	-2.8	5.0	0.4	4.4	3.9
Oil and Gas Extraction	2.2									2.9	10.0
Mining (Except Oil and Gas Extraction)	0.8									7.7	-4.7
Support Activities for Mining and Oil and Gas Extraction	6.1									8.8	-2.2
Utilities	-0.9	-1.5	7.8	-2.5	1.5	-2.7	-1.3	-1.1	0.3	1.4	2.4
Electric Power Generation, Transmission and Distribution	-0.9										
Natural Gas Distribution, Water and Other Systems	-1.9										
Construction	0.3	-1.4	7.5	0.9	2.5	3.0	3.7	5.7	-1.0	-8.2	-2.1
Manufacturing	0.6	-0.9	-1.4	-0.4	1.4	0.3	1.1	1.6	-1.9	1.5	-2.3
Food Manufacturing	1.3					3.1	1.6			0.3	1.0
Plastics and Rubber Products Manufacturing	1.0					-0.2	1.3			1.3	
Non-metallic Mineral Product Manufacturing	0.6					0.0	0.9			-1.9	1.8
Primary Metal Manufacturing	1.0					1.4	0.3				-4.1
Fabricated Metal Product Manufacturing	-0.1					0.9	-1.3			5.7	-1.4
Machinery Manufacturing	0.7					-0.8	0.4			2.0	4.7
Computer and Electronic Product Manufacturing	3.2					-1.1	5.6			5.0	5.2
Electrical Equipment, Appliance and Component Manufacturing	2.3					1.7	2.9			-9.0	
Transportation Equipment Manufacturing	1.8					0.0	2.4			3.9	
Furniture and Related Product Manufacturing	3.2					4.9	3.6			1.8	
Miscellaneous Manufacturing	1.7					-0.5				2.3	-5.6
Beverage and Tobacco Product Manufacturing	3.0					2.1	4.4				
Textile and Textile Product Mills	-0.8					-0.4	-2.1			-1.6	
Clothing Manufacturing	-0.9					-2.7	3.4			2.2	
Leather and Allied Product Manufacturing	3.0					1.6	4.6				
Wood Product Manufacturing	0.9					1.6	0.6			-2.3	1.8
Paper Manufacturing	-4.0					-3.7	-4.1			-1.9	-6.1
Printing and Related Support Activities	2.3					1.7	3.1			-3.6	2.9
Petroleum and Coal Products Manufacturing	5.0					7.2	-1.3			16.0	
Chemical Manufacturing	0.3					1.0	-0.2			-1.1	
Wholesale Trade	3.9	3.0	-2.3	2.3	1.7	6.3	3.3	3.7	1.2	5.0	3.0
Retail Trade	4.4	3.2	6.3	4.4	7.8	3.9	5.3	4.2	0.3	2.6	4.2
Transportation and Warehousing	2.7	2.9	1.5	5.5	4.2	2.9	2.7	0.5	0.4	3.9	1.9
Truck Transportation	3.0					2.1	4.4				
Transit	-0.8					-0.4	-2.1			-1.6	
Pipeline Transportation	-0.9					-2.7	3.4			2.2	
Warehousing and Storage	3.0					1.6	4.6				
Air, Rail, Water and Scenic and Sightseeing Transportation and Support Activities for Transportation	0.9					1.6	0.6			-2.3	1.8
Postal service Couriers and Messengers	-4.0					-3.7	-4.1			-1.9	-6.1
Information and Cultural Industries	2.3					1.7	3.1			-3.6	2.9
Motion Picture and Sound Recording Industries	5.0					7.2	-1.3			16.0	
Broadcasting and Telecommunications	0.3					1.0	-0.2			-1.1	

Publishing Industries, Information Services and Data Processing Services	3.9	3.0	-2.3	2.3	1.7	6.3	3.3	3.7	1.2	5.0	3.0
FIRE*	4.4	3.2	6.3	4.4	7.8	3.9	5.3	4.2	0.3	2.6	4.2
Professional, Scientific and Technical Services	2.7	2.9	1.5	5.5	4.2	2.9	2.7	0.5	0.4	3.9	1.9
AWSMR	3.2	-13.7	-0.6	1.0	-9.0	-1.2	4.9	6.3	11.4	8.2	3.4
Administrative and Support Services	3.9										
Waste management and Remediation Services	5.4										
Arts, Entertainment and Recreation	3.4	-0.7	-9.4	-0.9	-2.9	1.6	3.3	9.3	5.0	6.0	9.4
Accommodation and Food Services	1.5	2.8	2.1	3.9	3.8	2.1	-1.3	2.2	0.8	3.0	5.0
Other Services (Except Public Administration)	3.0	3.2	7.4	8.6	3.7	6.5	0.1	0.8	-4.0	5.4	2.6
Repair and Maintenance	3.5										
Religious, Grant-making, Civic, and Professional and Similar Organizations	11.3										
Personal and Laundry Services and Private Households	15.2										

* Finance, Insurance, Real Estate and Renting and Leasing ** Administrative and Support, Waste and Remediation

Source: CSLs Provincial Productivity Database, http://www.csls.ca/data/mfp_new.asp.

Appendix Table 14: Relative Multifactor Productivity by Province at the Two and Three-digit Industry Level for 2007

Canada = 100

[illegible]

Warehousing and Storage	100.0										
Air, Rail, Water and Scenic and Sightseeing Transportation and Support Activities for Transportation	100.0										
Postal service Couriers and Messengers	100.0										
Information and Cultural Industries	100.0	97.1	129.6	103.6	97.6	105.0	99.5	96.7	95.2	105.2	112.7
Motion Picture and Sound Recording Industries	100.0										
Broadcasting and Telecommunications	100.0					106.4	95.4	101.7		105.7	
Publishing Industries, Information Services and Data Processing Services	100.0										
FIRE*	100.0	75.4	76.5	92.4	80.1	93.4	109.5	92.4	101.5	102.7	90.7
Professional, Scientific and Technical Services	100.0	66.4	78.1	73.4	85.7	98.2	113.7	76.6	81.6	104.4	94.4
AWSMR	100.0	87.6	95.8	89.1	81.6	229.9	103.6	94.1	91.2	108.5	102.1
Administrative and Support Services	100.0										
Waste management and Remediation Services	100.0										
Arts, Entertainment and Recreation	100.0	76.3	87.4	55.9	67.5	118.6	116.2	106.2	72.2	74.7	68.0
Accommodation and Food Services	100.0	105.4	62.7	94.9	89.9	127.5	101.2	89.6	78.1	98.3	76.2
Other Services (Except Public Administration)	100.0	68.8	97.0	79.4	74.7	96.9	112.6	110.4	119.6	93.6	102.1
Repair and Maintenance	100.0										
Religious, Grant-making, Civic, and Professional and Similar Organizations	100.0										
Personal and Laundry Services and Private Households	100.0										

* Finance, Insurance, Real Estate and Renting and Leasing ** Administrative and Support, Waste and Remediation

Source: CSLS Provincial Productivity Database, http://www.csls.ca/data/mfp_new.asp.

Appendix Table 15: Multifactor Productivity Growth by Province at the Two and Three-digit Industry Level, 1997 - 2007
Compound Annual Growth Rate

Compound Annual Growth Rate	Canada	Nfld.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
Market Sector	0.4	4.1	-0.2	1.1	0.4	0.9	0.8	0.6	0.1	-1.6	0.5
Agriculture, Forestry, Fishing and Hunting	4.6	4.6	0.5	2.5	5.6	2.9	1.7	3.1	2.4	3.4	1.9
Crop and Animal Production	2.7	2.6	-1.4	3.1	6.1	2.7	2.0	3.0	2.6	3.1	2.0
Forestry and Logging	2.3	0.0	0.0	5.7	5.6	2.5	2.9	5.5	-20.1	4.0	2.5
Fishing, Hunting and Trapping	3.9	8.9	5.5	0.6	5.6	0.0	0.4	0.0	-25.5	-8.4	0.0
Support Activities for Agriculture and Forestry	-0.9	0.0	0.0	-3.8	2.2	0.0	-3.7	4.8	0.3	-1.8	0.0
Mining, and Oil and Gas Extraction	-4.8	18.8	-20.5	4.6	-5.0	-0.3	-2.2	3.1	-4.9	-7.4	-2.1
Oil and Gas Extraction	-5.6									-7.9	-3.6
Mining (Except Oil and Gas Extraction)	-1.1									1.1	-0.5
Support Activities for Mining and Oil and Gas Extraction	-3.8									-4.7	-5.5
Utilities	-0.3	0.4	-9.9	1.5	-2.3	0.6	0.0	-1.9	0.5	-2.4	0.3
Electric Power Generation, Transmission and Distribution	-0.3										
Natural Gas Distribution, Water and Other Systems	0.9										
Construction	1.6	-1.1	1.7	1.3	3.1	1.5	0.9	0.9	1.7	4.6	-0.2
Manufacturing	1.8	-0.4	0.9	1.9	-0.1	1.9	1.7	0.0	1.0	1.4	4.0
Food Manufacturing	2.3					3.4	2.7			1.8	3.1
Plastics and Rubber Products Manufacturing	0.5					1.2	0.2			1.2	
Non-metallic Mineral Product Manufacturing	2.2					2.8	2.1			3.1	0.9
Primary Metal Manufacturing	3.8					6.3	2.2				6.3
Fabricated Metal Product Manufacturing	1.5					0.8	1.4			3.7	3.3
Machinery Manufacturing	2.4					1.4	2.9			3.9	3.0
Computer and Electronic Product Manufacturing	0.9					-4.2	3.2			3.1	6.3
Electrical Equipment, Appliance and Component Manufacturing	-1.0					2.6	-2.3			-2.0	
Transportation Equipment Manufacturing	2.2					3.5	1.9			5.1	
Furniture and Related Product Manufacturing	1.8					1.6	1.7			3.8	
Miscellaneous Manufacturing	2.3					1.7				0.0	3.9
Beverage and Tobacco Product Manufacturing	-2.7					-0.9	-5.4				
Textile and Textile Product Mills	0.6					-2.5	3.7			9.8	
Clothing Manufacturing	-0.3					-1.7	1.8			3.4	
Leather and Allied Product Manufacturing	0.8					-1.9	2.2				
Wood Product Manufacturing	2.6					-0.3	2.6			5.4	4.2
Paper Manufacturing	1.3					1.2	0.7			2.3	1.5
Printing and Related Support Activities	0.4					-2.7	1.6			4.5	0.9
Petroleum and Coal Products Manufacturing	-5.5					-2.8	-4.6			-12.0	
Chemical Manufacturing	1.9					4.4	1.7			-0.2	
Wholesale Trade	2.2	2.9	-2.4	0.6	4.0	1.2	2.8	1.5	3.1	0.9	3.3
Retail Trade	2.1	1.7	2.1	2.6	1.6	1.7	1.5	3.1	4.0	4.4	2.0
Transportation and Warehousing	-0.5	-1.9	-1.9	-0.6	-1.3	-0.8	-1.0	0.1	1.9	-0.5	0.4
Truck Transportation	-1.5										
Transit	-0.1										
Pipeline Transportation	2.8										
Warehousing and Storage	0.3										
Air, Rail, Water and Scenic and Sightseeing Transportation and Support Activities for Transportation	-0.3										
Postal service Couriers and Messengers	0.1										
Information and Cultural Industries	1.5	1.5	4.7	2.4	1.2	1.9	1.1	0.5	1.4	1.6	2.3
Motion Picture and Sound Recording Industries	0.3										
Broadcasting and Telecommunications	2.5					3.1	1.8	2.1		3.1	3.5
Publishing Industries, Information Services and Data Processing Services	-1.5										

FIRE*	0.0	-1.8	-2.1	-0.2	-1.4	-0.6	0.5	-0.4	1.4	0.0	-0.8
Professional, Scientific and Technical Services	-0.7	-3.9	-0.5	-3.1	-1.2	-0.6	-0.5	-2.1	-0.8	-0.6	-0.8
AWSMR	-0.4	1.2	-2.0	0.7	0.4	1.4	-0.7	0.4	-1.6	-0.9	-2.6
Administrative and Support Services	-0.7										
Waste management and Remediation Services	1.2										
Arts, Entertainment and Recreation	-2.0	-4.6	-1.7	-6.2	-5.8	-0.8	-0.9	2.3	-4.5	-3.7	-5.7
Accommodation and Food Services	0.6	0.8	1.6	0.7	0.0	1.2	0.5	-0.2	0.5	1.5	-0.5
Other Services (Except Public Administration)	1.2	-0.5	3.6	1.7	0.1	1.6	1.0	3.0	4.4	0.5	0.6
Repair and Maintenance	1.5										
Religious, Grant-making, Civic, and Professional and Similar Organizations	6.5										
Personal and Laundry Services and Private Households	-2.7										

* Finance, Insurance, Real Estate and Renting and Leasing ** Administrative and Support, Waste and Remediation

Source: CSLs Provincial Productivity Database, http://www.csls.ca/data/mfp_new.asp.

Appendix Table 16: Sources of Labour Productivity Growth by Two-digit Industry in Canada, 1997 - 2007

	Market Sector	Agriculture, forestry, fishing and hunting	Mining and Oil and Gas Extraction	Utilities	Construction	Manufacturing	Wholesale Trade	Retail Trade
	Average annual rate of growth							
Output	3.61	1.28	1.49	0.74	5.54	1.95	5.23	5.06
Total Hours	1.87	-2.81	3.82	1.68	3.73	-0.29	1.45	1.66
Labour Composition	0.52	0.90	0.03	0.14	0.12	0.40	0.30	0.12
Capital Services	4.21	-0.72	7.61	0.75	4.06	0.31	5.40	6.13
Capital Stock	2.97	-0.78	6.61	0.17	4.51	-0.28	4.71	5.55
Capital Composition	1.20	0.06	0.94	0.58	-0.43	0.59	0.67	0.55
Capital Services Intensity	2.30	2.15	3.65	-0.92	0.32	0.61	3.90	4.39
	Percentage point contributions to labour productivity growth							
Labour Productivity (Output per hour)	1.71	4.21	-2.24	-0.93	1.75	2.25	3.73	3.35
Labour Composition	0.30	0.38	0.01	0.03	0.09	0.22	0.20	0.09
Capital Services Intensity	0.97	1.27	2.88	-0.68	0.07	0.27	1.25	1.07
Capital Stock	0.68	1.38	2.50	-0.16	0.08	-0.24	1.09	0.97
Capital Composition	0.28	-0.11	0.36	-0.53	-0.01	0.52	0.15	0.10
Multifactor Productivity	0.44	2.55	-4.78	-0.25	1.64	1.80	2.23	2.13
	Percent contributions to labour productivity growth							
Labour Productivity (Output per hour)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Labour Composition	17.5	9.1	-0.4	-3.6	5.3	9.8	5.4	2.7
Capital Services Intensity	56.6	30.1	-128.4	73.7	4.0	12.2	33.5	31.9
Capital Stock	39.9	32.7	-111.5	16.7	4.4	-10.8	29.2	28.9
Capital Composition	16.2	-2.6	-15.9	56.9	-0.4	23.1	4.1	2.9
Multifactor Productivity	25.5	60.6	213.1	27.4	93.5	79.9	59.8	63.5

	Transportation and Warehousing	Information and Cultural Industries	Finance, Insurance, Real Estate and Renting and Leasing	Professional, Scientific and Technical Services	Administrative and Support, Waste Management and Remediation Services	Arts, Entertainment and Recreation	Accommodation and Food Services	Other Services (Except Public Administration)
	Average annual rate of growth							
Output	2.88	5.60	4.08	5.49	6.20	2.91	2.52	4.01
Total Hours	2.18	2.52	2.53	4.10	5.84	4.16	1.43	1.85
Labour Composition	0.44	0.55	0.41	0.66	0.01	-0.04	0.21	0.41
Capital Services	4.92	5.04	5.03	13.10	9.24	7.75	2.94	4.87
Capital Stock	3.07	3.76	3.14	11.90	7.92	4.92	2.32	-0.90
Capital Composition	1.79	1.24	1.83	1.07	1.22	2.70	0.60	5.83
Capital Services Intensity	2.68	2.46	2.44	8.64	3.21	3.45	1.49	2.97
	Percentage point contributions to labour productivity growth							
Labour Productivity (Output per hour)	0.69	3.00	1.51	1.33	0.34	-1.20	1.08	2.13
Labour Composition	0.30	0.27	0.19	0.54	0.00	-0.02	0.16	0.33
Capital Services Intensity	0.90	1.27	1.34	1.61	0.80	0.93	0.34	0.63
Capital Stock	0.56	0.95	0.84	1.46	0.68	0.59	0.27	-0.12
Capital Composition	0.33	0.31	0.49	0.13	0.11	0.32	0.07	0.75
Multifactor Productivity	-0.49	1.48	-0.01	-0.70	-0.40	-2.03	0.59	1.17
	Percent contributions to labour productivity growth							
Labour Productivity (Output per hour)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Labour Composition	43.2	9.1	12.3	40.4	1.2	1.9	15.1	15.4
Capital Services Intensity	130.6	42.3	88.6	120.7	232.7	-77.2	31.7	29.6
Capital Stock	81.5	31.5	55.3	109.6	199.6	-49.0	25.1	-5.5
Capital Composition	47.6	10.4	32.2	9.9	30.7	-26.9	6.5	35.4
Multifactor Productivity	-71.7	49.4	-0.3	-52.8	-117.1	168.9	54.5	55.2

Source: CSLS Provincial Productivity Database, http://www.csls.ca/data/mfp_new.asp.

Appendix Table 17: Sources of Labour Productivity Growth by Two-digit Industry for Alberta, 1997 - 2007

	Market Sector	Agriculture, forestry, fishing and hunting	Mining and Oil and Gas Extraction	Utilities	Construction	Manufacturing	Wholesale Trade	Retail Trade
	Average annual rate of growth							
Output	4.06	1.49	0.47	1.43	9.10	3.92	5.28	7.62
Total Hours	2.99	-5.41	4.99	2.81	5.88	1.72	2.54	2.61
Labour Composition	0.49	1.36	0.22	0.24	0.06	0.16	0.07	-0.24
Capital Services	7.72	-0.77	9.57	4.21	-2.85	3.27	7.65	5.24
Capital Stock	6.35	-0.91	8.98	2.89	-3.04	2.24	7.29	5.04
Capital Composition	1.29	0.14	0.54	1.27	0.20	1.01	0.34	0.19
Capital Services Intensity	4.59	4.91	4.36	1.35	-8.24	1.52	4.99	2.56
	Percentage point contributions to labour productivity growth							
Labour Productivity (Output per hour)	1.04	7.30	-4.30	-1.35	3.04	2.16	2.67	4.88
Labour Composition	0.23	0.44	0.07	0.02	0.06	0.09	0.04	-0.19
Capital Services Intensity	2.43	3.30	3.28	1.03	-1.53	0.70	1.76	0.61
Capital Stock	2.00	3.91	3.08	0.71	-1.64	0.48	1.68	0.59
Capital Composition	0.41	-0.61	0.18	0.31	0.11	0.22	0.08	0.02
Multifactor Productivity	-1.58	3.42	-7.40	-2.38	4.58	1.36	0.86	4.44
	Percent contributions to labour productivity growth							
Labour Productivity (Output per hour)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Labour Composition	22.1	6.0	-1.6	-1.7	1.9	4.4	1.4	-3.8
Capital Services Intensity	233.9	45.2	-76.2	-76.0	-50.4	32.2	65.9	12.5
Capital Stock	192.4	53.5	-71.5	-52.3	-53.9	22.0	62.8	12.0
Capital Composition	39.1	-8.4	-4.3	-23.0	3.6	10.0	2.9	0.5
Multifactor Productivity	-152.5	46.8	172.1	175.9	150.8	63.0	32.1	91.0

	Transportation and Warehousing	Information and Cultural Industries	Finance, Insurance, Real Estate and Renting and Leasing	Professional, Scientific and Technical Services	Administrative and Support, Waste Management and Remediation Services	Arts, Entertainment and Recreation	Accommodation and Food Services	Other Services (Except Public Administration)
	Average annual rate of growth							
Output	4.31	6.53	5.44	6.57	7.24	3.47	3.70	5.53
Total Hours	2.95	1.17	3.36	4.64	6.42	5.78	1.25	3.57
Labour Composition	0.44	0.66	-0.17	0.44	-0.40	0.32	0.17	0.14
Capital Services	6.94	7.21	7.38	16.64	15.19	12.16	4.28	9.12
Capital Stock	4.17	5.79	4.70	15.49	14.66	5.73	3.64	7.92
Capital Composition	2.66	1.35	2.57	0.99	0.47	6.08	0.62	1.11
Capital Services Intensity	3.87	5.97	3.90	11.47	8.24	6.03	2.99	5.35
	Percentage point contributions to labour productivity growth							
Labour Productivity (Output per hour)	1.32	5.29	2.01	1.85	0.76	-2.18	2.41	1.89
Labour Composition	0.25	0.30	-0.08	0.35	-0.30	0.28	0.12	0.10
Capital Services Intensity	1.59	3.35	2.04	2.12	1.99	1.26	0.81	1.25
Capital Stock	0.95	2.69	1.30	1.97	1.92	0.59	0.69	1.09
Capital Composition	0.61	0.63	0.71	0.13	0.06	0.63	0.12	0.15
Multifactor Productivity	-0.52	1.58	0.05	-0.61	-0.91	-3.66	1.47	0.54
	Percent contributions to labour productivity growth							
Labour Productivity (Output per hour)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Labour Composition	19.2	5.6	-3.7	18.8	-39.7	-12.7	4.9	5.0
Capital Services Intensity	120.4	63.3	101.5	114.6	260.9	-57.6	33.7	66.2
Capital Stock	72.4	50.8	64.6	106.7	251.8	-27.1	28.6	57.5
Capital Composition	46.1	11.8	35.3	6.8	8.0	-28.8	4.9	8.0
Multifactor Productivity	-39.2	29.8	2.3	-33.0	-118.5	167.9	60.8	28.3

Source: CSLS Provincial Productivity Database, http://www.csls.ca/data/mfp_new.asp.

Appendix Table 18: Relative Multifactor Productivity in Alberta at the Two-digit Industry Level,
1997 – 2007
Canada = 100

Year	Market Sector	Agriculture, forestry, fishing and hunting	Accommodation and Food Services	Administrative and Support, Waste Management and Remediation Services	Arts, Entertainment and Recreation	Mining and Oil and Gas Extraction	Utilities	Construction
1997	99.0	36.7	97.1	102.5	90.9	99.2	99.3	104.8
1998	98.7	34.0	97.9	103.2	72.4	98.7	96.6	108.5
1999	93.1	36.0	90.9	101.0	72.0	96.5	85.7	103.3
2000	90.2	39.6	91.7	103.9	69.3	88.0	87.8	113.3
2001	87.8	38.8	93.3	105.6	71.3	82.9	87.1	114.4
2002	86.5	31.0	95.2	102.0	86.1	79.5	79.7	113.1
2003	85.0	41.9	96.6	107.0	81.7	76.5	76.3	111.8
2004	85.1	41.4	104.5	115.6	78.0	77.9	78.6	115.8
2005	84.2	48.7	107.4	109.1	78.0	76.3	79.3	139.5
2006	84.4	45.9	112.0	107.0	78.1	76.8	82.3	148.9
2007	81.6	45.3	107.2	98.3	74.7	73.7	80.5	146.4

Year	Manufacturing	Wholesale Trade	Retail Trade	Transportation and Warehousing	Information and Cultural Industries	Finance, Insurance, Real Estate and Renting and Leasing	Professional, Scientific and Technical Services	Other Services (Except Public Administration)
1997	98.2	101.3	98.9	97.2	100.0	102.5	102.6	100.4
1998	94.8	95.2	101.6	94.3	100.9	100.9	105.8	103.4
1999	83.2	90.5	101.3	94.1	96.4	95.5	103.1	104.3
2000	83.0	92.2	102.4	96.3	101.2	95.7	110.5	105.7
2001	84.3	88.8	109.1	97.8	102.1	92.4	114.6	105.8
2002	83.3	85.0	105.3	104.1	95.7	97.9	113.5	99.9
2003	84.7	87.5	107.6	104.0	100.8	98.2	114.7	96.3
2004	94.3	89.5	101.8	100.4	106.5	96.9	110.4	94.7
2005	98.7	88.3	106.6	98.1	107.8	98.8	110.3	94.5
2006	99.5	90.8	118.2	100.2	105.1	99.2	108.8	95.9
2007	97.5	89.2	123.0	99.0	102.3	102.7	104.4	93.6

Source: CSLS Provincial Productivity Database, http://www.csls.ca/data/mfp_new.asp.