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STANDARDS

A Synthesis of the CSLS Provincial Productivity Reports, 1997-2007

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A Synthesis of the CSLS Provincial Productivity Reports, 1997-2007

Abstract

This report, based on the CSLS Provincial Productivity Database, provides a portrait of the productivity performance of the ten Canadian provinces over the 1997-2007 period. Level and growth rate estimates of labour and multifactor productivity are presented and discussed, with an emphasis on the provinces' market sector. Two-digit NAICS industry level estimates are also presented. Capital intensity and labour quality figures are also provided, and a standard growth accounting framework is used to determine the sources of labour productivity growth, as well as the sources of labour productivity level gaps between Canada and the provinces.

A Synthesis of the CSLS Provincial Productivity Reports, 1997-2007

Executive Summary

The aim of this report is to outline the productivity experience of the ten Canadian provinces for the overall market sector as well as 15 two-digit NAICS industries over the 1997-2007 period. Using data from the CSLS Provincial Productivity Database, productivity level and growth estimates are given. There is one section devoted to each province, and the section reviews labour, capital and multifactor productivity, industrial composition and decomposes labour productivity growth into labour quality growth, capital intensity and multifactor productivity.

The key observations of this analysis are:

- There was wide variation in labour productivity growth rates across provinces. Newfoundland had the highest labour productivity growth rate (4.8 per cent per year), followed by Manitoba (2.1 per cent), Saskatchewan (2.1 per cent), Nova Scotia (1.9 per cent), New Brunswick (1.8 per cent) and Quebec (1.8 per cent). Alberta (1.0 per cent) had the lowest growth rate in the country, and British Columbia (1.2 per cent), Prince Edward Island (1.6 per cent) and Ontario (1.7 per cent) also experienced a lower growth rate than the national growth rate.
- Capital intensity growth was the main contributor to labour productivity growth nationally and in six of the ten provinces. Capital intensity made its largest contribution to labour productivity growth in Alberta (2.43 per cent per year), followed by Saskatchewan (1.60 per cent per year), Prince Edward Island (1.42 per cent per year), New Brunswick (1.13 per cent per year) and Manitoba (1.12 per cent per year). The lowest capital intensity growth rate was attained by Newfoundland (0.39 per cent per year), followed by Quebec (0.54 per cent), Ontario (0.56 per cent), British Columbia (0.62 per cent) and Nova Scotia (0.64 per cent).
- Capital intensity growth is composed of growth in capital stock and changes in capital composition. In every province except Saskatchewan, increases in capital stock were a larger contributor to capital intensity growth than was capital composition growth.
- In four of the ten provinces, multifactor productivity was the largest contributor to labour productivity growth. The highest multifactor productivity growth rate by far was enjoyed by Newfoundland (4.14 per cent per year), followed by Nova Scotia (1.12 per cent), Quebec (0.94 per cent), Ontario (0.82 per cent), Manitoba (0.62 per cent), and British Columbia (0.48 per cent). Four provinces experienced multifactor productivity growth lower than the national average; Alberta had the lowest growth (down 1.58 per cent per year), followed by Prince

Edward Island (down 0.18 per cent), Saskatchewan (up 0.11 per cent) and New Brunswick (up 0.37 per cent).

- Changes in labour quality were the smallest contributor to labour productivity growth nationally. The absolute contribution of labour quality growth to labour productivity growth was highest in Saskatchewan (0.37 per cent per year), followed by Prince Edward Island (0.35 per cent), Manitoba (0.35 per cent) and Ontario (0.32 per cent). There were six provinces that experienced labour quality contributions to labour productivity growth below the national average; British Columbia (0.08 per cent) had the lowest contribution by far, followed by Nova Scotia (0.15 per cent), Alberta (0.23 per cent), New Brunswick (0.26 per cent), Quebec (0.27 per cent) and Newfoundland (0.27 per cent).
- Large variations in productivity growth are heavily affected by industrial composition, as some industries experienced high growth in almost every province (such as agriculture, forestry, fishing and hunting), while others experienced negative growth in almost every province (such as arts, entertainment and recreation).
- Large variations in labour productivity growth across provinces reflect not only the different industry mixes, but also the differences in production process within an industry but across provinces. A case in point is the mining, and oil and gas extraction industry which experienced labour productivity growth at an average annual rate of 15.3 per cent in Newfoundland and Labrador, but declined 4.3 per cent annually in Alberta from 1997 to 2007.

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A Synthesis of the CSLS Provincial Productivity Reports, 1997-2007

Introduction

Productivity is the key factor that determines living standards in the long run. If the amount of output each worker produces does not increase, real wages and incomes cannot rise (Sharpe, 2010a). Since 2000, Canada's labour productivity growth has been abysmal, both from an historical and an international perspective (Sharpe and Thomson, 2010b).¹ Improving this poor performance must be a key objective of Canada's economic agenda. To develop policies with this goal in mind, it is important to understand the nature of labour productivity at both the national and provincial levels, including the sources of growth at the market sector and industry levels.

This report analyzes the productivity performance of the 10 Canadian Provinces² over the 1997-2007 period. It is based on the CSLS Provincial Productivity Database. Level and growth rate estimates of labour, capital and multifactor productivity are discussed, with an emphasis on the market sector. Two-digit NAICS industry level estimates are also presented.³

This report is divided into twelve sections. The first section provides a brief overview of basic concepts related to productivity, along with the methodology and the data sources used. The following 10 sections discuss trends in each province, starting with Newfoundland and moving westward to British Columbia, while the last section concludes. The ten provincial sections are divided into nine subsections reviewing industry composition by nominal GDP and total hours worked, labour productivity, capital productivity, multifactor productivity, capital intensity, labour quality, sources of labour productivity growth in the market sector, and sources of labour productivity gap by industry. Each provincial section ends with a conclusion specific to that province. An appendix provides details on the growth accounting framework used in the report.

¹ From 1981 to 2000, labour productivity in Canada's business sector grew at an average annual rate of 1.6 per cent. In the 2000-2009 period, labour productivity growth dropped sharply to a mere 0.7 per cent per year in Canada. This slowdown in labour productivity growth in Canada was not experienced in the United States, which grew at an average annual rate of 2.5 per cent during the same period (up from 2.0 per cent during the 1981-2000 period).

² For convenience, Newfoundland and Labrador will be referred to only as Newfoundland for the rest of this report.

³ This report builds on and extends earlier CSLS work on provincial productivity. The CSLS Provincial Productivity Database is available at http://www.csls.ca/data/mfp_new.asp. Previous CSLS reports on this topic include Sharpe and Arsenault (2009), Sharpe (2010) and Sharpe and Thomson (2010a, 2010b).

I. Basic Concepts, Methodology and Data Sources

In this section, we first define the main concepts used in this report, as well as explain important topics related to productivity analysis – such as the difference between partial and total productivity measures, and the distinction between productivity growth rates and levels. This is followed by a brief discussion on methodology and data sources. Although the basics of the growth accounting framework used in the report are presented in this section, its details are only discussed in the Appendix.

Basic Concepts

Productivity is, broadly speaking, a measure of how much output is produced per unit of input used. The output and input measures used will affect, however, the productivity estimates. In this subsection, we define the input, output and productivity measures used throughout this paper:

- The **labour services input** is defined as total *quality adjusted* hours worked in a particular sector or in the market sector as a whole. It is the weighted sum of hours worked across different categories of workers, with the weights being equal to relative labour compensation shares.
- **Labour quality** (also known as **labour composition**) is defined residually as the difference between growth in labour services and growth in hours worked (*unadjusted* by quality). In Canada, the variables used to differentiate labour quality are education (four education levels), experience (proxied by seven age groups) and class of workers (paid employees versus self-employed workers). Overall, there are 56 different categories of workers.⁴
- The **capital services input** represents the flow of services provided by the capital stock. The difference between capital stock and capital services stems from the fact that not all forms of capital assets provide services at the same rate. Short-lived assets, such as a car or a computer, must provide all of their services in just a few years before they completely depreciate. Office buildings provide their services over decades. As a consequence, over a single year, a dollar's worth of a car provides relatively more capital services than a dollar's worth of a building. Thus, capital services growth is driven by: 1) increases in the level of **capital stock**; and 2) shifts in the **capital composition** caused by more investment in assets that provide relatively more services per dollar of capital stock (i.e. short lived assets).
- **Capital intensity** is defined as capital services per hour worked.
- **Gross domestic product (GDP)** measures the value of all *final* goods and services produced in a defined geographic region during a certain time period, typically a year or a quarter.
- **Labour productivity** is defined as real GDP per hour worked.

⁴ For more information on how Statistics Canada calculates labour quality, see Gu *et al* (2002).

- **Capital productivity** is real GDP per unit of capital services.
- **Multifactor Productivity (MFP)**⁵ growth is measured as the difference between real output growth and combined input growth. In other words, MFP reflects output growth that is not accounted for by input growth. The inputs that are taken into account to construct a combined input aggregate vary whether we are calculating MFP using a gross output basis or a value added basis. The gross output basis takes into consideration labour, capital, and intermediate inputs, while the value added basis takes into account only capital and labour (because intermediate consumption is already subtracted from value added). Thus, MFP captures the residual effects of several elements of the production process, such as improvements in technology and organizations, capacity utilization, increasing returns to scale, mismeasurement, etc. In this report, MFP growth is calculated on a value added basis.

When discussing productivity, there are two important dimensions to consider. The first is whether productivity is measured using a partial productivity approach or a multifactor productivity approach. The second is whether the focus is on growth rates, levels, or both.

There is a fundamental distinction between partial and multifactor productivity (MFP). Partial productivity measures refer to the relationship between output and a single input, such as labour or capital. Multifactor productivity, on the other hand, attempts to measure how efficiently all factors of production are used in the production process. This report provides estimates for two partial productivity measures – labour productivity (the most commonly used measure of productivity) and capital productivity –, as well as multifactor productivity.

Productivity can be expressed either in growth rates or in levels. The economics literature largely focuses on productivity growth rates, which reflect increases in *real* output per hour or per unit of capital. In this report we are also interested in making level comparisons between provinces. Ideally, productivity level comparisons are done in current dollars (i.e. using *nominal* GDP), as these estimates capture changes in relative prices. However, at the time the CSLS Provincial Productivity Database was constructed, nominal GDP figures at the industry level were available only up to 2005. As a consequence, the productivity levels were calculated using real GDP. One advantage of using real GDP instead of nominal GDP for the level comparisons is that the growth rates and changes in levels are consistent with each other. Regardless of whether nominal or real GDP figures are used for productivity level comparisons, it is important to note that these comparisons should be used with caution, due not only to differences in industry composition between provinces, but also due to the lack of industry purchasing power parities (PPPs) estimates at the provincial level.

As mentioned above, this report makes provincial comparisons of both productivity levels and growth rates. These comparisons are done both at the **market sector level** and at the **two-digit NAICS industry level**.⁶ The North American Industry Classification System (NAICS) breaks down the economy into 20 sectors:

⁵ Also known as total factor productivity (TFP).

⁶ The words *industry* and *sector* are used interchangeably in this report.

Exhibit A: The North American Industry Classification System (NAICS) at the Two-Digit Level

Sector Number	Description
11	Agriculture, Forestry, Fishing and Hunting
21	Mining, and Oil and Gas Extraction
22	Utilities
23	Construction
31-33	Manufacturing
42	Wholesale Trade
44-45	Retail Trade
48-49	Transportation and Warehousing
51	Information and Cultural Industries
52	Finance and Insurance
53	Real Estate, Rental and Leasing
54	Professional, Scientific, and Technical Services
55	Management of Companies and Enterprises
56	Administrative and Support, Waste Management and Remediation Services
61	Education Services
62	Health Care and Social Assistance
71	Arts, Entertainment, and Recreation
72	Accommodation and Food Services
81	Other Services (except Public Administration)
92	Public Administration

The market sector is comprised by 17 of the 20 sectors, all of which have been highlighted in Exhibit A. The only three sectors that are not included in the market sector are: education services, health care and social assistance, and public administration. For practical purposes, we have grouped the finance and insurance, real estate, rental and leasing, and management of companies and enterprises sectors into only one sector, which will be referred to as the finance, insurance, real estate, rental and leasing (FIRE) sector. Since this change is only a slight departure from the standard NAICS breakdown, we will still refer to these 15 sectors as NAICS sectors.

The provincial comparisons are done by ranking the productivity growth rates and levels of different provinces from 1 (highest) to 10 (lowest). Each province has two market sector ranks: an **equally-weighted rank** and an **industry composition weighted rank**. The industry composition weighted market sector rank, which will be referred throughout this report simply as the market sector rank, takes into account the province's market sector output, labour input and capital input, which are basically a sum of the outputs and inputs of the 15 two-digit NAICS industries in the province. Thus, it gives more weight to the sectors that comprise a more significant part of the province's economy. The equally-weighted market sector rank, as the name implies, attributes equal weights to all industries. Comparing the two ranks allows for important characteristics of the province's productivity performance to be identified. For instance, a province with a high market sector rank and a low equally-weighted market sector rank in labour productivity growth will most likely have strong labour productivity growth in its largest industries, but low productivity growth in most of the fifteen two-digit NAICS industries.

Lastly, we also perform **growth accounting** exercises in order to measure how different factors contributed to labour productivity growth. Contributions to labour productivity growth were broken

down into three factors: 1) capital intensity⁷; 2) labour quality; and 3) multifactor productivity.⁸ Formally, this decomposition is a consequence of the growth accounting framework adopted in this report. However, it is also quite intuitive:

- Workers that have access to more capital (i.e. higher capital intensity) tend to have, *ceteris paribus*, higher labour productivity. Imagine, for example, two teams with two workers each. In the first team, one worker has a shovel and the other has a snow blower. In the second team, both workers have snow blowers. The second team uses capital more intensively than the first, and thus is able to clear much more snow in the same period of time.
- Improvements in labour quality tend to increase the amount of output a worker can produce in a given time period. Thus, an experienced coal miner will normally be able to extract more coal than a novice miner during a given timeframe.
- Technological progress can substantially increase output per worker. A logger with a chainsaw, for instance, is much more productive than one with an axe. This is an example of productivity growth driven by MFP. It should be noted, however, that technological progress is only one of the several possible factors to drive MFP growth.

Methodology and Data Sources

Statistics Canada has detailed the methodologies and data sources used in the preparation of its estimates of multifactor productivity (MFP) at the national level in Baldwin *et al.* (2007). The provincial estimates used in this report have been prepared by Statistics Canada for the Centre for the Study of Living Standards (CSLS) and largely follow the methodologies used for the national estimates. There are, however, certain differences between the national and provincial estimates which are discussed in detail in Sharpe and Arsenault (2009). CSLS supplemented Statistics Canada data by calculating multifactor productivity level estimates for the provinces relative to the Canadian average.⁹

The growth accounting framework used in this report is the same as the one used in Sharpe and Thomson (2010a). It assumes a Cobb-Douglas production function such that:

where Y is real output, K stands for capital services, L for labour input (quality adjusted hours), A for multifactor productivity and α is the share of output that takes the form of capital compensation. For more information, refer to the Appendix.

⁷ Note, once again, that capital intensity has been defined here as capital services per hour worked, *not* capital stock per hour worked.

⁸ To understand the reasons behind this decomposition, refer to the Appendix.

⁹ For more details, see Appendix.

II. An Analysis of Newfoundland and Labrador's Productivity, 1997-2007: Mining, and Oil and Gas Extraction Drives Strong Productivity Growth

i. Industry Composition by Nominal GDP and Total Hours Worked

In order to understand Newfoundland's overall productivity performance, it is essential to understand how each of the 15 two-digit NAICS industries contributed to the province's market sector in terms of nominal GDP and actual hours worked. Table 1 details these contribution shares for 1997 and 2007. In Newfoundland, the industries that had the largest GDP shares in 2007 were the mining, and oil and gas extraction (59.7 per cent of the province's nominal GDP in the market sector), retail trade (5.1 per cent), and manufacturing (5.0 per cent). In terms of total hours worked, the three industries that had the highest contributions in 2007 were retail trade (19.3 per cent of total hours worked), manufacturing (11.8 per cent), and construction (8.4 per cent).

Table 1: Industry Share of Nominal GDP and Total Hours Worked in Newfoundland and Labrador

	1997				2007			
	GDP		Hours Worked		GDP		Hours Worked	
	Canada	Newfoundland and Labrador						
Market Sector	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Agriculture, Forestry, Fishing and Hunting	3.2	5.1	5.4	5.9	2.1	1.8	3.4	3.0
Mining, and Oil and Gas Extraction	5.5	8.2	1.7	3.6	11.1	59.7	2.0	5.3
Utilities	4.2	7.5	0.9	1.7	3.0	2.9	0.8	1.7
Construction	7.0	9.9	7.9	9.0	9.0	4.4	10.1	8.4
Manufacturing	23.2	11.1	18.3	10.1	16.8	5.0	14.8	11.8
Wholesale Trade	7.1	6.4	7.4	6.0	7.1	2.8	6.9	5.0
Retail Trade	6.9	9.8	13.1	21.4	7.4	5.1	12.9	19.3
Transportation and Warehousing	6.2	7.2	6.3	7.6	5.6	2.8	6.6	7.8
Information and Cultural Industries	4.3	5.6	2.5	2.8	4.3	2.2	2.7	3.0
FIRE*	15.0	13.1	7.5	5.9	14.6	4.6	7.8	4.7
Professional, Scientific and Technical Services	4.9	3.8	6.3	4.2	6.2	2.4	7.9	5.8
ASWMR**	2.5	1.5	4.0	2.3	3.3	1.1	5.7	4.3
Arts, Entertainment and Recreation	0.9	0.7	1.5	0.7	0.9	0.2	1.9	1.1
Accommodation and Food Services	3.2	3.6	7.8	8.8	2.8	1.6	7.0	8.2
Other Services (Except Public Administration)	5.7	6.6	9.4	9.9	5.8	3.4	9.5	10.6

Source: Shares calculated by the CSLS, based on Statistics Canada data (Cansim Table 383-0011).

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

Comparing Newfoundland's industry composition in 1997 and 2007, we can see how, in a single decade, mining, and oil and gas extraction acquired a pivotal role in the province's economy. In 1997, the mining, oil and gas extraction industry was responsible for only 8.2 per cent of the province's nominal GDP. By 2007, this industry's nominal GDP share had jumped to 59.7, which reflects an increase of 628.0 per cent.¹⁰ Note also that, during this short time span, the share of total hours worked in

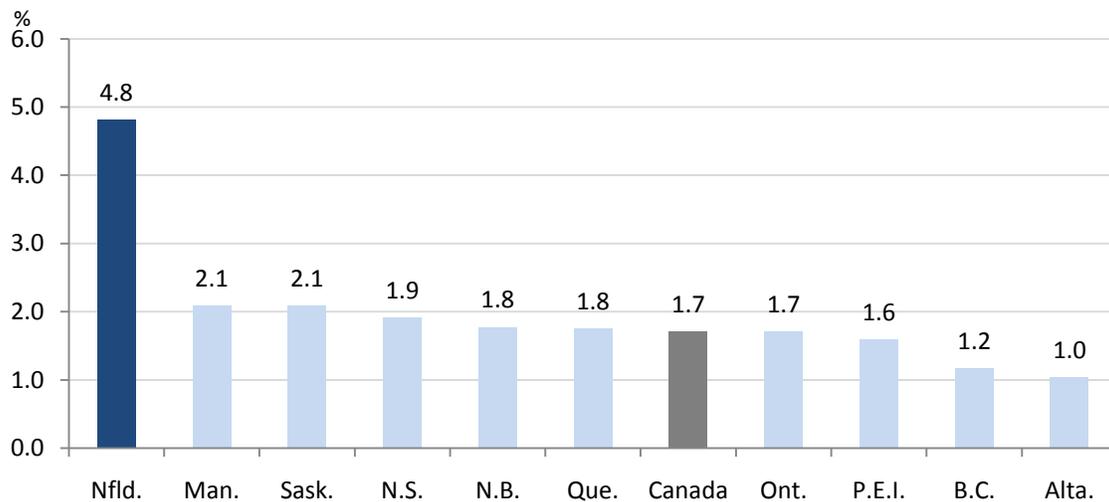
¹⁰ It is also interesting to note that Newfoundland had the largest GDP shares in mining, and oil and gas extraction among all the provinces, considerably higher than Alberta's (34.0 per cent of the province's nominal GDP in the market sector), and Saskatchewan's (31.7 per cent).

mining, and oil and gas extraction did not increase nearly as much as the industry's nominal GDP contribution, going from 3.6 to 5.3 per cent (a 47.2 per cent increase).

ii. Labour Productivity

Labour productivity, defined as real GDP per hour worked,¹¹ grew at an average rate of 4.8 per cent per year in Newfoundland's market sector during the 1997-2007 period. This is almost three times the national average of 1.7 per cent per year. Newfoundland ranks 1st among the provinces in terms of labour productivity growth (Chart 1).

Chart 1: Labour Productivity Growth in Canada and the Provinces, Market Sector, 1997-2007
(Average Annual Growth Rates)



Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

During the period in question, the industry that experienced the highest labour productivity growth rate in Newfoundland was the mining, and oil and gas extraction industry (15.3 per cent per year), followed by agriculture, forestry, fishing and hunting (8.9 per cent), and information and cultural industries (4.1 per cent) (Table 2). The industry that had the lowest labour productivity growth rate was arts, entertainment and recreation (-5.1 per cent per year), followed by administrative and support, waste management and remediation services, and construction (-2.2 per cent and -1.4 per cent, respectively).

In terms of labour productivity growth, Newfoundland had an astounding growth rate in its most important industry, i.e. mining, and oil and gas extraction, and abysmal growth rates in almost everything else, which explains why the province had both the highest market sector rank and the second lowest equally-weighted market sector rank. Simply put, eight of the 15 two-digit NAICS industries in Newfoundland ranked 8th or below, while only three industries ranked 3rd or above. The province had the lowest labour productivity growth rates in Canada in the following three industries: construction, manufacturing, and other services. At the same time, the province had the highest labour productivity growth in mining, and oil and gas extraction, and agriculture, forestry, fishing and hunting.

¹¹ Note that the total hours worked figures used to calculate labour productivity are unadjusted for labour quality.

Newfoundland's labour productivity level in 2007 was \$39.60 (1997 dollars) per hour, which represents 109.7 per cent of the Canadian level, up from 81.2 per cent in 1997. The province had the highest labour productivity level of any province in 2007, even exceeding that of Alberta.¹²

Table 2: Labour Productivity Levels and Growth Rates in Newfoundland and Labrador, 1997-2007

	Compound Annual Growth Rate, 1997-2007	Provincial Ranking	Province's Labour Productivity Level Relative to Canada's, 1997	Province's Labour Productivity Level Relative to Canada's, 2007	Labour Productivity Level, 2007	Provincial Ranking, 2007
	(per cent)		(Canada=100)	(Canada=100)	(1997 Dollars)	
Market Sector	4.8	1	81.2	109.7	39.6	1
Agriculture, Forestry, Fishing and Hunting	8.9	1	120.7	187.5	50.9	1
Mining, and Oil and Gas Extraction	15.3	1	57.0	296.9	233.6	1
Utilities	-0.7	4	72.1	73.8	99.3	8
Construction	-1.4	10	100.5	73.4	23.4	9
Manufacturing	-0.7	10	70.8	52.9	25.3	10
Wholesale Trade	4.0	4	91.1	93.5	39.2	5
Retail Trade	3.2	7	71.5	70.5	15.5	10
Transportation and Warehousing	-0.5	9	78.6	69.8	22.2	9
Information and Cultural Industries	4.1	6	97.3	108.1	74.2	3
FIRE*	2.0	3	89.3	93.7	65.9	8
Professional, Scientific and Technical Services	-0.9	9	93.6	74.9	20.2	8
ASWMR**	-2.2	8	84.7	65.5	13.0	8
Arts, Entertainment and Recreation	-5.1	8	121.7	81.4	13.2	5
Accommodation and Food Services	1.4	5	80.4	83.0	11.4	9
Other Services (Except Public Administration)	0.7	10	78.2	67.9	11.0	10
Absolute Equally-Weighted Average Rank		6.3				6.9
Equally-Weighted Market Sector Rank		9				7

Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

In 2007, only three of the 15 two-digit NAICS industries in Newfoundland had labour productivity levels above Canada's. The three industries were mining, and oil and gas extraction (296.9 per cent of the Canadian level), agriculture, forestry, fishing and hunting (187.5 per cent), and information and cultural industries (108.1 per cent). Industries that had lower levels than the national average included: manufacturing (52.9 per cent of the Canadian level), administrative and support, waste management and remediation services (65.5 per cent), and other services (67.9 per cent).

Similarly to the pattern observed in labour productivity growth, Newfoundland had extremely high relative labour productivity level in mining, and oil and gas extraction in 2007, but low relative levels in almost everything else. In particular, Newfoundland's manufacturing, other services and retail industries had the lowest labour productivity levels among all the ten provinces. Meanwhile, the province's mining, and oil and gas extraction, and agriculture, forestry, fishing and hunting had the highest levels in Canada.

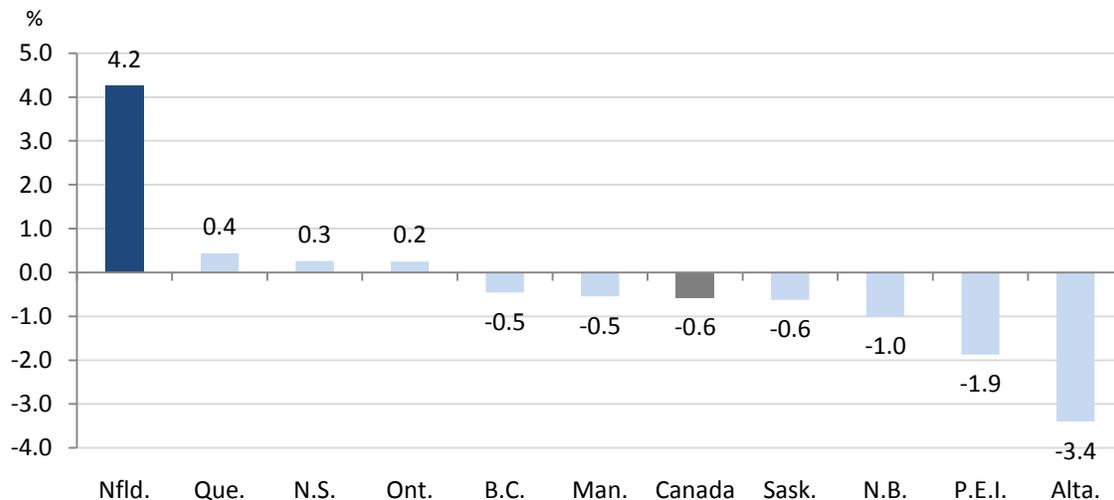
¹²In 2007, the labour productivity level of the Northwest Territories (market sector) was \$83.81 (2002 dollars) per hour. Newfoundland's labour productivity level in the same year, using 2002 dollars, was \$46.78 per hour, only 55.8 per cent that of the Northwest Territories.

iii. Capital Productivity

Capital productivity, defined as real GDP per unit of capital services, increased at a rate of 4.2 per cent per year in Newfoundland's market sector during the 1997-2007 period. This is in sharp contrast with the national average, which fell 0.6 per cent per year during the period in question. The province's capital productivity growth in the market sector ranked 1st in Canada (Chart 2).

In Newfoundland, seven of the 15 two-digit NAICS industries had negative capital productivity growth rates during the period. The industries that had the worst performances were professional, scientific and technical services (-12.8 per cent per year), arts, entertainment and recreation (-4.4 per cent), and FIRE (finance, insurance, real estate, rental and leasing) (-3.8 per cent) (Table 3). The industries that had the highest positive growth rates were mining, and oil and gas extraction (19.2 per cent per year), administrative and support, waste management and remediation services (13.4 per cent), and agriculture, forestry, fishing and hunting (2.8 per cent).

Chart 2: Capital Productivity Growth Rates in Canada and the Provinces, Market Sector, 1997-2007
(Average Annual Growth Rates)



Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

As mentioned previously, the province's market sector ranked 1st in Canada (4th if the equally-weighted market sector ranking is used), with only four of the 15 two-digit NAICS industries at 8th place or lower. The professional, scientific and technical services industry had the worst capital productivity growth rates among all provinces. In contrast, the oil, mining and gas extraction industry had the highest capital productivity growth in Canada.

Newfoundland's capital productivity level in the market sector in 2007 was 160.8 per cent of the Canadian level, up from 100.2 per cent in 1997. In 2007, only 5 of the 15 two-digit NAICS industries in the province had capital productivity levels above the Canadian average. The five industries that had capital productivity levels above Canada's in 2007 were mining, and oil and gas extraction (1,732.4 per cent of the Canadian level), administrative and support, waste management and remediation services (568.9 per cent), agriculture, forestry, fishing and hunting (154.4 per cent), utilities (115.5 per cent), and

retail trade (104.0 per cent). The industries with lowest capital productivity levels in the province were professional, scientific and technical services (43.4 per cent of the Canadian level), arts, entertainment and recreation (57.4 per cent), and construction (57.7 per cent).

Newfoundland's market sector had the highest capital productivity level in Canada in 2007. However, the province ranked 8th according to the equally-weighted market sector rank. High capital productivity levels are, therefore, not a widespread characteristic of Newfoundland industries, but rather are concentrated in the province's major industries. In particular, mining, and oil and gas extraction, which ranked 1st in Canada, had a capital productivity level of \$13.41 (1997 dollars) per unit of capital services. Other industries that had high capital productivity levels in Newfoundland compared to the other provinces were administrative and support, waste management and remediation services (ranked 1st), agriculture, forestry, fishing and hunting (ranked 2nd), and utilities (ranked 2nd).

Table 3: Capital Productivity Levels and Growth Rates in Newfoundland and Labrador, 1997-2007

Market Sector	Compound Annual Growth Rate, 1997-2007	Provincial Ranking	Province's Capital Productivity Level Relative to Canada's, 1997	Province's Capital Productivity Level Relative to Canada's, 2007	Capital Productivity Level, 2007	Provincial Ranking, 2007
	(per cent)		(Canada=100)	(Canada=100)	(1997 Dollars)	
Market Sector	4.2	1	100.2	160.8	3.69	1
Agriculture, Forestry, Fishing and Hunting	2.8	2	143.0	154.5	3.24	2
Mining, and Oil and Gas Extraction	19.2	1	166.6	1,732.4	13.41	1
Utilities	0.8	3	106.5	115.5	1.49	2
Construction	-0.1	6	67.1	57.7	3.94	10
Manufacturing	0.1	8	114.4	98.3	2.68	5
Wholesale Trade	1.0	3	76.5	85.9	2.73	7
Retail Trade	0.0	4	94.0	104.0	4.76	6
Transportation and Warehousing	-3.3	8	109.3	95.1	2.29	9
Information and Cultural Industries	0.1	5	89.7	85.9	1.65	10
FIRE*	-3.8	9	86.4	64.2	1.05	9
Professional, Scientific and Technical Services	-12.8	10	85.1	43.4	1.06	10
ASWMR**	13.4	1	122.1	568.9	17.53	1
Arts, Entertainment and Recreation	-4.4	6	56.7	57.3	1.18	8
Accommodation and Food Services	-1.4	6	103.3	93.4	4.02	4
Other Services (Except Public Administration)	-2.4	6	97.4	83.0	4.42	7
Absolute Equally-Weighted Average Rank		5.2				6.1
Equally-Weighted Market Sector Rank		4				8

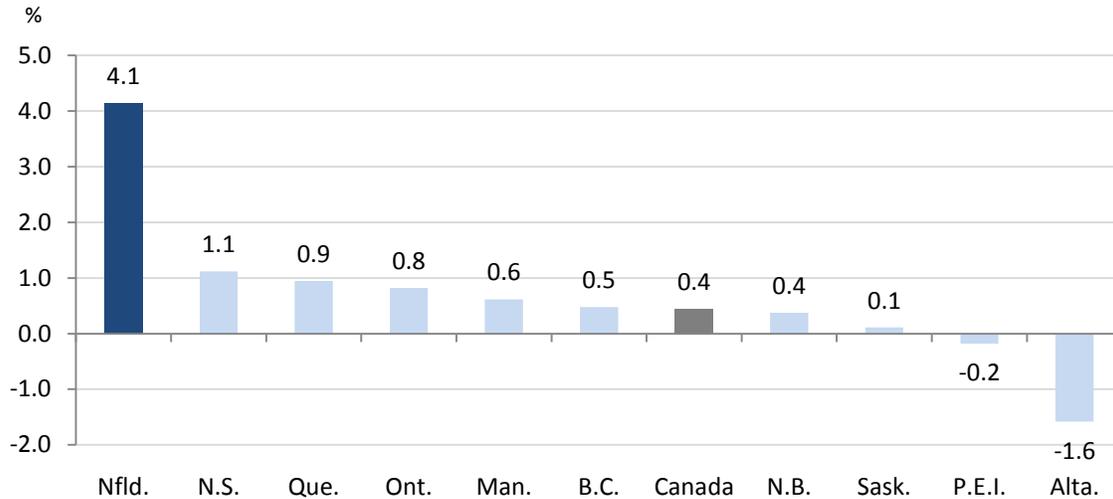
Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

iv. Multifactor Productivity

Newfoundland's multifactor productivity in the market sector grew at an average rate of 4.1 per cent per year during the 1997-2007 period. This is ten times the national average of 0.4 per cent per year, which explains why the province easily ranked first in Canada in terms of multifactor productivity growth (Chart 3).

Chart 3: Multifactor Productivity Growth in Canada and the Provinces, Market Sector, 1997-2007
(Average Annual Growth Rates)



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

The industry that experienced the highest multifactor productivity growth rate in Newfoundland was mining, and oil and gas extraction (18.8 per cent per year), followed by agriculture, forestry, fishing and hunting (4.6 per cent), and wholesale trade (2.9 per cent) (Table 4). The industries that had the lowest multifactor productivity growth rates were arts, entertainment and recreation (-4.6 per cent per year), professional, scientific and technical services (-3.9 per cent), and transportation and warehousing (-1.9 per cent).

Compared to the other provinces, during the 1997-2007 period Newfoundland had incredible multifactor productivity growth rates in its key industry, but abysmal growth in everything else. This is the main reason why the province had the highest market sector rank in Canada, but the second lowest equally-weighted market sector rank (only above New Brunswick). Of the 15 two-digit NAICS industries, six were ranked 9th place or lower. In particular, the following four industries had the worst multifactor productivity growth rates among all provinces: professional, scientific and technical services, construction, other services, and manufacturing. Conversely, mining, and oil and gas extraction had the highest multifactor productivity growth in Canada.

The province's multifactor productivity level in 2007 was 135.4 per cent of the Canadian level, up from 94.3 per cent in 1997. In 2007, only 4 of the 15 two-digit NAICS industries in Newfoundland had multifactor productivity levels above those of Canada. These industries were mining, and oil and gas extraction (1,453.3 per cent of the Canadian level), agriculture, forestry, fishing and hunting (165.6 per cent), administrative and support, waste management and remediation services (105.4 per cent), and utilities (103.0 per cent). In contrast, the industries with lowest multifactor productivity levels were manufacturing (64.1 per cent of the Canadian level), professional, scientific and technical services (66.4 per cent), and construction (68 per cent).

In terms of multifactor productivity levels, Newfoundland's market sector ranked 1st in Canada in 2007. However, the province ranked 9th according to the equally-weighted market sector rank. The divergence between the two rankings tells a similar story as the one we have seen in sections three and

four. Namely, that in 2007 Newfoundland had extremely high multifactor productivity levels relative to Canada in its main industry (mining, and oil and gas extraction), but low levels in almost everything else. At the industry level, Newfoundland ranked 8th or below in nine of the 15 two-digit NAICS industries. In particular, the following six industries had the lowest levels in Canada: manufacturing, professional, scientific and technical services, other services, transportation and warehousing, retail trade, and FIRE.

Table 4: Multifactor Productivity Levels and Growth Rates in Newfoundland and Labrador, 1997-2007

Market Sector	Compound Annual Growth Rate, 1997-2007	Provincial Ranking	Province's Multifactor Productivity Level Relative to Canada's, 1997	Province's Multifactor Productivity Level Relative to Canada's, 2007	Provincial Ranking, 2007
	(per cent)		(Canada=100)	(Canada=100)	
Market Sector	4.1	1	94.3	135.4	1
Agriculture, Forestry, Fishing and Hunting	4.6	2	135.8	165.6	1
Mining, and Oil and Gas Extraction	18.8	1	159.1	1,453.3	1
Utilities	0.4	4	96.5	103.0	5
Construction	-1.1	10	89.3	68.0	9
Manufacturing	-0.4	10	79.8	64.1	10
Wholesale Trade	2.9	4	87.6	93.5	5
Retail Trade	1.7	7	77.7	74.5	10
Transportation and Warehousing	-1.9	9	84.1	72.9	10
Information and Cultural Industries	1.5	6	95.7	95.8	8
FIRE*	-1.8	9	90.4	75.4	10
Professional, Scientific and Technical Services	-3.9	10	92.1	66.4	10
ASWMR**	1.2	2	89.8	105.4	2
Arts, Entertainment and Recreation	-4.6	7	99.5	76.3	5
Accommodation and Food Services	0.8	4	85.7	87.6	9
Other Services (Except Public Administration)	-0.5	10	81.3	68.8	10
Absolute Equally-Weighted Average Rank		6.3			7.0
Equally-Weighted Market Sector Rank		9			9

Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

v. Capital Intensity

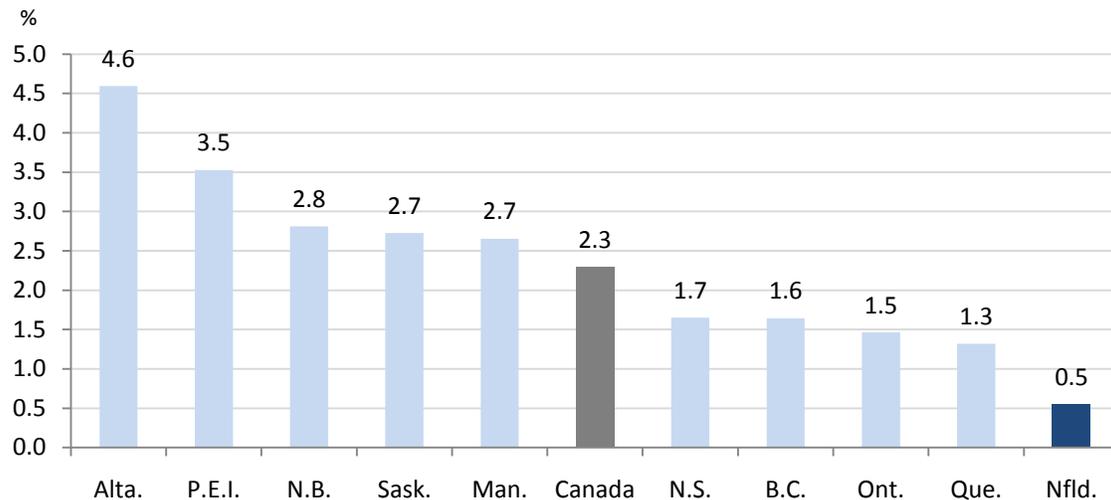
Capital intensity, defined as capital services per hour worked (unadjusted for labour quality), grew at an average rate of 0.5 per cent per year in Newfoundland's market sector during the 1997-2007 period, well below the national average of 2.3 per cent per year. Newfoundland ranked last among the ten provinces in terms of capital intensity (Chart 4).

During this period, the industries that experienced the highest capital intensity growth were professional, scientific and technical services (13.7 per cent per year), FIRE (6.0 per cent), and agriculture, forestry, fishing and hunting (5.9 per cent) (Table 5). Conversely, the industries that had the lowest growth rates were administrative and support, waste management and remediation services (-13.7 per cent per year), mining, and oil and gas extraction (-3.3 per cent), and utilities (-1.5 per cent).

Even though the province ranked last according to its market sector rank, its equally-weighted rank was considerably higher, 6th place. The province's poor capital intensity growth performance was driven mostly by mining, and oil and gas extraction (which had the lowest growth rates in Canada when compared to equivalent industries in the other provinces). The province ranked 7th or below in seven of

the 15 two-digit NAICS industries. In particular, it had the lowest growth rates among the ten provinces in the following three industries: administrative and support, waste management and remediation services, mining, and oil and gas extraction, and utilities. On the other hand, agriculture, forestry, fishing and hunting had the highest capital intensity growth rates in Canada when compared to the same industries in other provinces.

Chart 4: Capital Intensity Growth in Canada and the Provinces, Market Sector, 1997-2007
(Average Annual Growth Rates)



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

Table 5: Capital Intensity Levels and Growth Rates in Newfoundland and Labrador, 1997-2007

Market Sector	Compound Annual Growth Rate, 1997-2007	Provincial Ranking	Province's Capital Intensity Level Relative to Canada's, 1997	Province's Capital Intensity Level Relative to Canada's, 2007	Capital Intensity Level, 2007	Provincial Ranking, 2007
	(per cent)		(Canada=100)	(Canada=100)	(1997 Dollars)	
Market Sector	0.5	10	81.1	68.2	10.7	8
Agriculture, Forestry, Fishing and Hunting	5.9	1	84.8	121.4	15.7	4
Mining, and Oil and Gas Extraction	-3.3	10	34.3	17.1	17.4	10
Utilities	-1.5	8	67.4	63.9	66.7	9
Construction	-1.4	8	150.8	127.3	5.9	4
Manufacturing	-0.9	7	62.2	53.8	9.4	8
Wholesale Trade	3.0	6	119.1	108.9	14.4	4
Retail Trade	3.2	8	76.1	67.8	3.3	8
Transportation and Warehousing	2.9	4	71.8	73.4	9.7	8
Information and Cultural Industries	4.0	5	109.9	127.6	45.4	2
FIRE*	6.0	2	103.3	145.9	62.5	2
Professional, Scientific and Technical Services	13.7	2	110.0	172.7	19.1	1
ASWMR**	-13.7	10	69.3	11.5	0.7	10
Arts, Entertainment and Recreation	-0.7	7	213.6	142.0	11.2	3
Accommodation and Food Services	2.8	5	78.6	88.9	2.8	8
Other Services (Except Public Administration)	3.2	6	80.3	81.8	2.5	8
Absolute Equally-Weighted Average Rank		5.9				5.9
Equally-Weighted Market Sector Rank		6				6

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

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

Newfoundland's capital intensity level in 2007 was 68.2 per cent of the Canadian level, down from 81.1 per cent in 1997. According to the market sector rank the province had the 8th lowest capital intensity level in Canada in 2007, even though its equally-weighted market sector rank is marginally better (6th place).

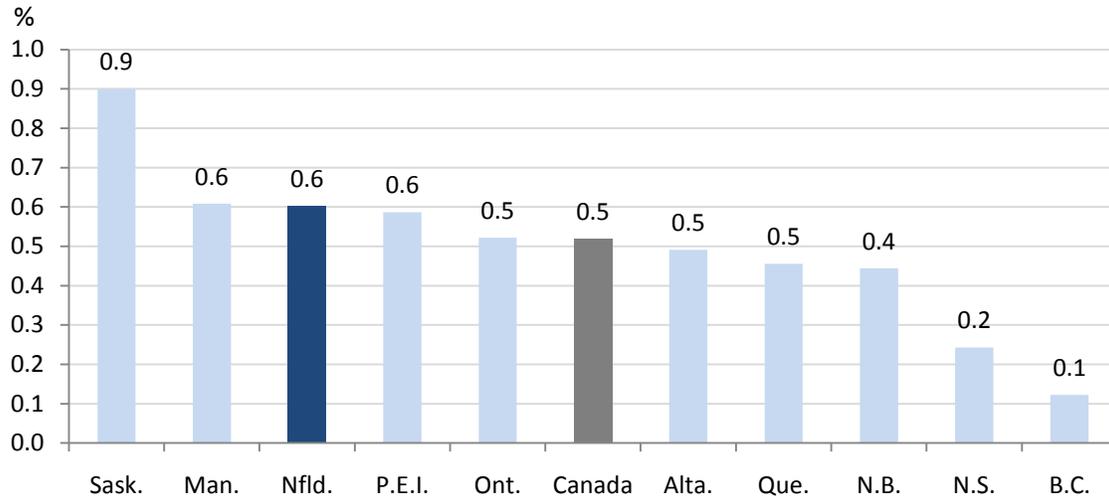
In 2007, eight of the 15 two-digit NAICS industries had capital intensity levels above the Canadian levels. Industries with high relative levels included: professional, scientific and technical services (172.7 per cent of the Canadian level), FIRE (145.9 per cent), arts, entertainment and recreation (142.0 per cent). The industries that had the lowest relative levels were administrative and support, waste management and remediation services (11.5 per cent of the Canadian level), mining, and oil and gas extraction (17.1 per cent), and manufacturing (53.8 per cent).

Compared to the other provinces, Newfoundland's industries had capital intensity levels that were either significantly above the average, or significantly below in 2007. This can be seen in the fact that eight of the 15 two-digit NAICS industries were ranked 8th or below, while the rest of the industries were ranked 4th or above. In particular, Newfoundland had the lowest capital intensity levels compared to the other provinces in the following industries: administrative and support, waste management and remediation services, and mining, and oil and gas extraction. The province had the highest capital intensity levels compared to the other provinces in professional, scientific and technical services.

vi. Labour Quality

Newfoundland's market sector experienced labour quality growth slightly above the national average during the 1997-2007 period. The province grew at an average rate of 0.6 per cent per year, while the national average was 0.5 per cent per year. The province ranked 3rd in Canada in terms of labour quality growth (Chart 5).

Chart 5: Labour Quality Growth in Canada and the Provinces, Market Sector, 1997-2007
(Average Annual Growth Rates)



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

During the period in question, the industries that experienced the highest labour quality growth rates in Newfoundland were agriculture, forestry, fishing and mining (1.2 per cent per year), transportation and warehousing (1.0 per cent), retail trade, and other services (both of which grew at an average annual rate of 0.8 per cent) (Table 6). The industries that had the lowest labour quality growth rates were mining, and oil and gas extraction (-0.8 per cent per year), wholesale trade (-0.3 per cent), and arts, entertainment and recreation (-0.3 per cent).

In terms of labour quality growth, the province ranked 7th or below in only five of the 15 two-digit NAICS industries. The worst comparative performances were in mining, and oil and gas extraction, wholesale trade, and arts, entertainment and recreation, all of which earned the province the last place in the ranking. Conversely, the province excelled in retail trade, and transportation and warehousing.

Table 6: Labour Quality Levels and Growth Rates in Newfoundland and Labrador, 1997-2007¹³

Market Sector	Compound Annual Growth Rate, 1997-2007	Provincial Ranking
	(per cent)	
Market Sector	0.6	3
Agriculture, Forestry, Fishing and Hunting	1.2	2
Mining, and Oil and Gas Extraction	-0.8	10
Utilities	0.3	3
Construction	0.1	3
Manufacturing	0.4	4
Wholesale Trade	-0.4	10
Retail Trade	0.8	1
Transportation and Warehousing	1.0	1
Information and Cultural Industries	0.3	6
FIRE*	0.4	6
Professional, Scientific and Technical Services	0.7	2
ASWMR**	-0.1	7
Arts, Entertainment and Recreation	-0.3	10
Accommodation and Food Services	-0.1	9
Other Services (Except Public Administration)	0.8	2
Absolute Equally-Weighted Average Rank		5.1
Equally-Weighted Market Sector Rank		3

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

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

vii. Sources of Labour Productivity Growth in the Market Sector

Newfoundland's labour productivity grew at an average rate of 4.8 per cent per year during the 1997-2007 period, almost three times the national average of 1.7 per cent per year. Charts 6 and 7 show both the percentage point and per cent contributions to labour productivity growth by the sources of growth for Newfoundland and Canada over the 1997-2007 period.

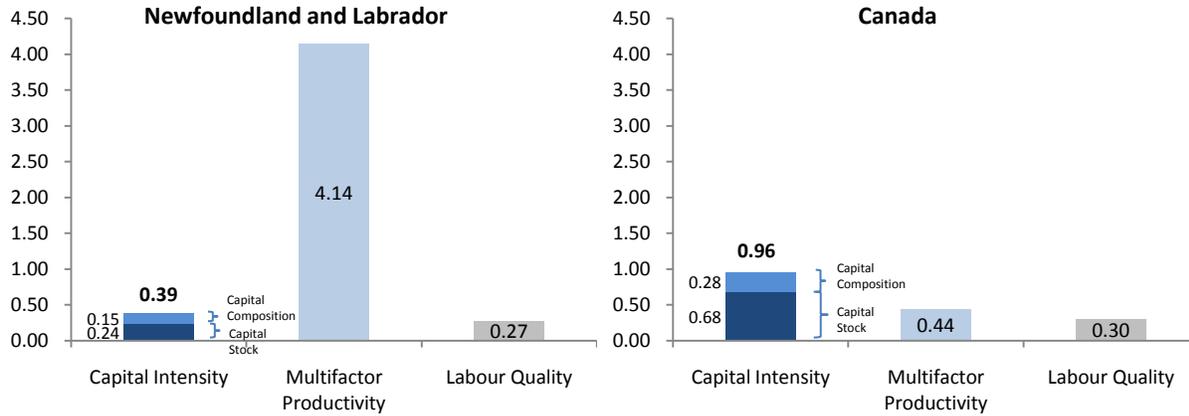
Newfoundland's labour productivity growth was driven mainly by multifactor productivity growth, which accounted for 4.14 percentage points of the overall labour productivity growth (or, alternatively, 85.9 per cent of total growth). Capital intensity growth contributed only 0.39 percentage points (7.9 per cent), of which 0.15 were due to capital composition growth (3.0 per cent) and 0.24 were due to capital stock growth (4.9 per cent). A small but steady increase in labour quality was responsible for 0.27 percentage points of the labour productivity growth experienced in the province (5.5 per cent).

Comparing the two charts, it can be seen that this growth accounting exercise yields very different results for Newfoundland and Canada. Capital intensity growth was the main driver for labour productivity growth in Canada, accounting for 56.1 per cent of total growth, but it played only a small role in Newfoundland (7.9 per cent). Although multifactor productivity growth was also important in Canada, accounting for 25.5 per cent of labour productivity growth during the 1997-2007 period, it was far more important in Newfoundland, where it was responsible for 85.9 per cent of total growth. Labour quality growth was by far the less important component in both Newfoundland and in Canada, although

¹³ Labour quality levels are not shown here because they are assumed to be the same (and equal to 100.0) across all provinces and in Canada in the base year, 1997 (Sharpe and Thomson, 2010a). They differ after 1997, incorporating the different labour quality growth rates experienced by the provinces and Canada. For example, labour quality in Newfoundland's market sector grew at an average annual rate of 0.6 per cent over the 1997-2007 period, while Canada's labour quality grew at an average annual rate of 0.5 per cent. As a consequence, Newfoundland's labour quality level was 100.8 per cent of the Canadian level in 2007.

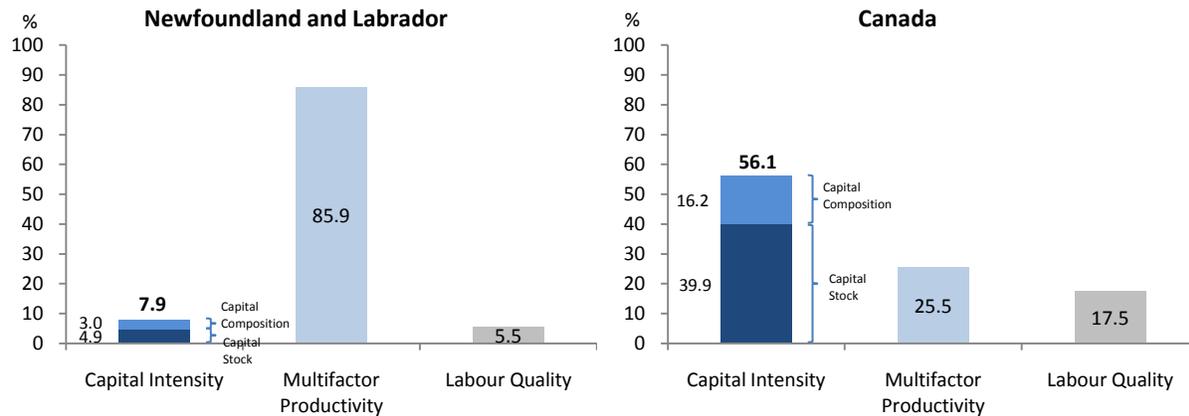
its contribution to labour productivity growth was even smaller in Newfoundland than in Canada (5.5 per cent vs. 17.5 per cent, respectively).

Chart 6: Percentage Point Contribution to Labour Productivity Growth by the Source of Labour Productivity Growth in the Market Sector in Newfoundland and Labrador and in Canada, 1997 to 2007



Source: CSL Provincial Productivity Database, Appendix Table 17, http://www.csls.ca/data/mfp_new.asp.

Chart 7: Per Cent Contribution to Labour Productivity Growth by the Source of Labour Productivity Growth in the Market Sector in Newfoundland and Labrador and in Canada, 1997 to 2007



Source: CSL Provincial Productivity Database, Appendix Table 17, http://www.csls.ca/data/mfp_new.asp.

Note: Numbers may not sum to 100 due to rounding.

Table 7 details the contributions in absolute and per cent terms of capital intensity, MFP, and labour quality growth to labour productivity growth in Newfoundland over the 1997-2007 period at the two-digit NAICS industry level.

Table 7: Contributions to Labour Productivity Growth at the Industry Level by Source in Newfoundland and Labrador, 1997-2007

Market Sector	Labour Productivity	Capital Intensity			MFP	Labour Quality
		Total	Capital Composition	Capital Stock		
Percentage Point Contributions to Labour Productivity Growth						
Market Sector	4.8	0.4	0.1	0.2	4.1	0.3
Agriculture, Forestry, Fishing and Hunting	8.9	3.5	-2.7	6.3	4.6	0.6
Mining, and Oil and Gas Extraction	15.3	-3.0	-0.3	-2.7	18.8	0.0
Utilities	-0.7	-1.1	1.3	-2.4	0.4	0.1
Construction	-1.4	-0.5	-0.1	-0.4	-1.1	0.1
Manufacturing	-0.7	-0.6	-0.3	-0.4	-0.4	0.3
Wholesale Trade	4.0	1.3	0.1	1.2	2.9	-0.2
Retail Trade	3.2	0.8	0.0	0.8		0.6
Transportation and Warehousing	-0.5	0.6	0.4	0.2	-1.9	0.8
Information and Cultural Industries	4.1	2.4	0.8	1.6	1.5	0.1
FIRE*	2.0	3.7	1.4	2.2	-1.8	0.1
Professional, Scientific and Technical Services	-0.9	2.4	0.1	2.3	-3.9	0.6
ASWMR**	-2.2	-3.3			1.2	-0.1
Arts, Entertainment and Recreation	-5.1	-0.3	-0.1	-0.2	-4.6	-0.1
Accommodation and Food Services	1.4	0.6	0.0	0.6	0.8	-0.1
Other Services (Except Public Administration)	0.7	0.6	0.2	0.3	-0.5	0.6
Per Cent Contributions to Labour Productivity Growth						
Market Sector	100.0	8.0	3.0	4.9	85.9	5.5
Agriculture, Forestry, Fishing and Hunting	100.0	39.8	-30.9	70.5	51.6	6.2
Mining, and Oil and Gas Extraction	100.0	-19.6	-2.0	-17.6	123.1	0.1
Utilities	100.0	167.8	-202.1	365.4	-58.1	-10.5
Construction	100.0	31.7	5.5	26.1	73.9	-5.4
Manufacturing	100.0	87.6	36.1	50.9	56.6	-44.3
Wholesale Trade	100.0	33.5	2.9	30.5	71.0	-5.2
Retail Trade	100.0	25.5	-1.1	26.6		20.3
Transportation and Warehousing	100.0	-130.1	-89.4	-39.4	392.1	-166.6
Information and Cultural Industries	100.0	58.7	18.9	39.2	37.3	3.0
FIRE*	100.0	186.0	73.1	110.7	-89.7	6.8
Professional, Scientific and Technical Services	100.0	-263.1	-15.5	-244.8	414.7	-62.8
ASWMR**	100.0	150.7			-56.2	3.7
Arts, Entertainment and Recreation	100.0	6.4	1.7	4.6	91.8	2.2
Accommodation and Food Services	100.0	46.7	-0.9	47.6	60.7	-7.7
Other Services (Except Public Administration)	100.0	76.7	31.6	44.2	-65.0	88.6

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

Note: Per cent contributions may not sum to 100 due to rounding.

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

viii. Sources of Labour Productivity Level Gap by Industry

Newfoundland's labour productivity level in 2007 was 109.7 per cent of the Canadian level, which implies a positive labour productivity differential of 9.7 percentage points. Table 8 makes it clear that this positive differential was driven mainly by the above average multifactor productivity level,

which was responsible for 31.8 percentage points of the differential. The capital intensity and labour quality levels accounted for -22.4 and 0.4 percentage points of the differential respectively.¹⁴

Newfoundland had labour productivity gaps in 12 of the 15 two-digit NAICS industries. In most cases, the below average multifactor productivity level was the main culprit, with significant contributions to the gap that were occasionally compounded by below average capital intensity levels.

Table 8: Sources of the Labour Productivity Gap Relative to Canada for Newfoundland and Labrador at the Two-Digit Industry Level, 2007

Market Sector	Labour Productivity Relative Level	Labour Productivity Differential	Percentage Point Contributions to Labour Productivity Differential			Percent Contributions to Labour Productivity Differential			
			Capital Intensity	Multifactor Productivity	Labour Quality	Labour Productivity	Capital Intensity	Multifactor Productivity	Labour Quality
Market Sector	109.7	9.7	-22.4	31.8	0.4	100.0	-230.3	326.4	3.9
Agriculture, Forestry, Fishing and Hunting	187.5	87.5	15.8	70.2	1.5	100.0	18.1	80.3	1.7
Mining, and Oil and Gas Extraction	296.9	196.9	-285.9	484.3	-1.5	100.0	-145.2	245.9	-0.7
Utilities	73.8	-26.2	-29.1	2.6	0.3	100.0	110.8	-9.8	-1.0
Construction	73.4	-26.6	6.5	-33.2	0.1	100.0	-24.4	124.6	-0.2
Manufacturing	52.9	-47.1	-14.3	-32.8	0.0	100.0	30.3	69.7	0.0
Wholesale Trade	93.5	-6.5	3.6	-6.5	-3.6	100.0	-54.9	99.7	55.2
Retail Trade	70.5	-29.5	-9.1	-24.9	4.4	100.0	30.7	84.2	-15.0
Transportation and Warehousing	69.8	-30.2	-7.2	-26.5	3.6	100.0	23.9	88.0	-11.9
Information and Cultural Industries	108.1	8.1	13.8	-4.4	-1.2	100.0	169.6	-54.4	-15.2
FIRE*	93.7	-6.3	21.2	-27.3	-0.1	100.0	-336.6	434.5	2.0
Professional, Scientific and Technical Services	74.9	-25.1	9.8	-35.6	0.6	100.0	-39.2	141.6	-2.4
ASWMR**	65.5	-34.5	-38.1	4.3	-0.7	100.0	110.5	-12.4	2.0
Arts, Entertainment and Recreation	81.4	-18.6	7.9	-24.5	-2.1	100.0	-42.7	131.5	11.1
Accommodation and Food Services	83.0	-17.0	-2.4	-12.1	-2.4	100.0	14.3	71.4	14.2
Other Services (Except Public Administration)	67.9	-32.1	-3.7	-31.0	2.6	100.0	11.7	96.5	-8.2

Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

ix. Conclusion

During the 1997-2007 period, Newfoundland's market sector experienced an impressive productivity performance according to all productivity measures discussed in this report. The province's labour productivity grew at an average annual rate of 4.8 per cent (almost three times the national average of 1.7 per cent), its capital productivity grew at an average annual rate of 4.2 per cent (while the national average was -0.6 per cent) and multifactor productivity growth reached 4.1 per cent per year (ten times the national average of 0.4 per cent). These results were driven mainly by one industry – namely, mining, and oil and gas extraction, which accounted for almost 60% per cent of nominal GDP in the province in 2007. During the period in question, the mining, and oil and gas extraction industry in Newfoundland showed extremely high labour productivity growth (15.3 per cent per year), capital productivity growth (19.2 per cent), and multifactor productivity growth (18.8 per cent) compared to equivalent industries in the other provinces.

¹⁴ Again, it is important to bear in mind that labour quality levels were assumed to be equal to 100.0 in all provinces and in Canada for the base year of 1997. They differ after 1997, incorporating the different labour quality growth rates experienced by the provinces and Canada.

Newfoundland's labour, capital, and multifactor productivity levels in the market sector in 2007 were above national levels. The province's labour productivity level, in particular, was 109.7 per cent of the national level, which implies a labour productivity differential of 9.7 percentage points. This positive differential was due mainly to the province's above average multifactor productivity level in the market sector.

Table 9 provides a summary of levels (in 1997 and 2007) and growth rates (for the 1997-2007 period) for the productivity measures discussed in this report, along with rankings that show how Newfoundland fared in comparison to the other provinces. A key observation is the sharp contrast between the province's market sector rank (1st in all three productivity categories), and its equally-weighted market sector rank (7th or lower in the three productivity categories). Taken together, these two ranks tell us that, despite high productivity growth rates and levels in mining, and oil and gas extraction, most of the other industries in the province had below average performances.

Table 9: Summary of Newfoundland and Labrador's Productivity Performance in the Market Sector

	Market Sector Growth, 1997 to 2007			Per Cent of the Canadian Level		Level Rankings, 2007	
	Compound Annual Growth Rate	Market Sector Rank	Equally-Weighted Market Sector Rank	1997	2007	Market Sector Rank	Equally-Weighted Market Sector Rank
Labour Productivity	4.8	1	10	81.2	109.7	1	7
Capital Productivity	4.2	1	4	100.2	160.8	1	8
Multifactor Productivity	4.1	1	9	94.3	135.4	1	9
Capital Intensity	0.5	10	6	81.1	68.2	8	6
Labour Quality	0.6	3	3	n.a.	n.a.	n.a.	n.a.

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

III. An Analysis of Prince Edward Island's Productivity, 1997-2007: Falling Multifactor Productivity Dampens Labour Productivity Growth

i. Industry Composition by Nominal GDP and Total Hours Worked

In order to understand Prince Edward Island's overall productivity performance, it is essential to understand how each of the 15 two-digit NAICS industries contributed to the province's market sector in terms of nominal GDP and actual hours worked. Table 10 details these contribution shares for 1997 and 2007. In Prince Edward Island, the industries that had the highest GDP shares in 2007 were manufacturing (16.2 per cent of the province's nominal GDP in the market sector), FIRE (finance, insurance, real estate, rental and leasing) (12.4 per cent), and retail trade (11.7 per cent). In terms of total hours worked, the three industries that had the highest contributions in 2007 were manufacturing (15.8 per cent of total hours worked), retail trade (15.3 per cent), and agriculture, forestry, fishing and hunting (11.2 per cent).

Table 10: Industry Share of Nominal GDP and Total Hours Worked in Prince Edward Island

	1997				2007			
	GDP		Hours Worked		GDP		Hours Worked	
	Canada	Prince Edward Island						
Market Sector	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Agriculture, Forestry, Fishing and Hunting	3.2	13.4	5.4	17.1	2.1	10.9	3.4	11.2
Mining, and Oil and Gas Extraction	5.5	0.2	1.7	0.2	11.1	0.0	2.0	0.1
Utilities	4.2	1.9	0.9	0.4	3.0	1.2	0.8	0.3
Construction	7.0	8.4	7.9	11.5	9.0	11.0	10.1	10.2
Manufacturing	23.2	13.1	18.3	9.9	16.8	16.2	14.8	15.8
Wholesale Trade	7.1	6.3	7.4	4.5	7.1	5.1	6.9	5.0
Retail Trade	6.9	10.5	13.1	15.7	7.4	11.7	12.9	15.3
Transportation and Warehousing	6.2	6.2	6.3	5.9	5.6	4.8	6.6	5.5
Information and Cultural Industries	4.3	4.9	2.5	1.6	4.3	5.0	2.7	1.5
FIRE*	15.0	15.9	7.5	4.8	14.6	12.4	7.8	4.7
Professional, Scientific and Technical Services	4.9	3.0	6.3	3.3	6.2	3.8	7.9	3.6
ASWMR**	2.5	1.3	4.0	1.8	3.3	3.3	5.7	5.4
Arts, Entertainment and Recreation	0.9	0.8	1.5	1.0	0.9	1.3	1.9	2.3
Accommodation and Food Services	3.2	5.4	7.8	10.2	2.8	5.1	7.0	9.5
Other Services (Except Public Administration)	5.7	8.6	9.4	12.1	5.8	8.3	9.5	9.4

Source: Shares calculated by the CSLS, based on Statistics Canada data (Cansim Table 1283-0011).

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

It is interesting to note that Prince Edward Island's shares (both in terms of GDP and total hours worked) in mining, and oil and gas extraction, and utilities were notably below the national shares. This undoubtedly had an impact in the province's labour productivity level, since these two sectors are usually associated with high GDP per hour worked.¹⁵ The GDP share of mining, and oil and gas in Prince Edward Island, in particular, approached zero, and was the lowest among all the provinces in both 1997

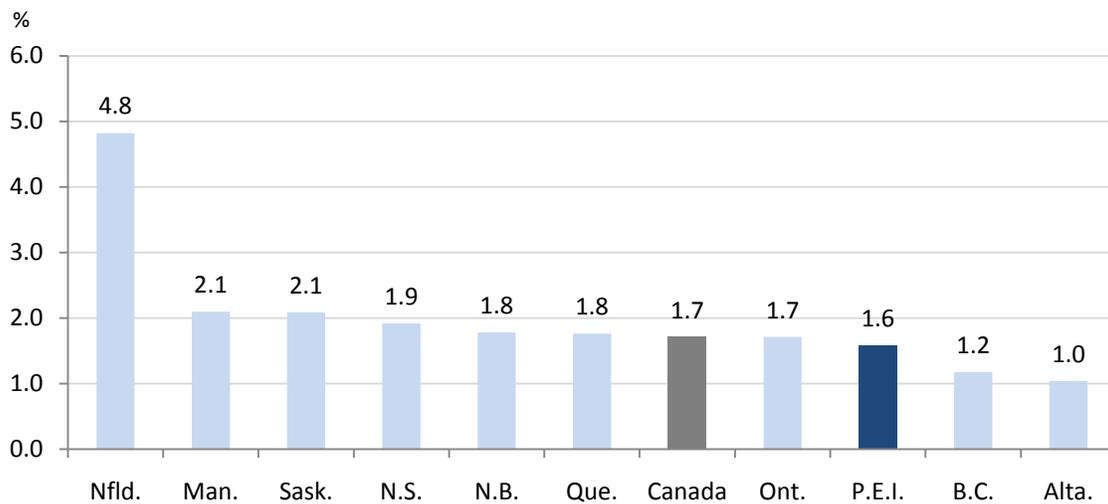
¹⁵ In 2007, while labour productivity in Canada's market sector was \$36.06 (1997 dollars) per hour worked, the labour productivity levels in the Canadian mining, and oil and gas extraction industry, and utilities industry were \$78.69 (1997 dollars) per hour worked, and \$134.61 (1997 dollars) per hour worked, respectively.

and 2007. In this sense, the province is the exact opposite of Newfoundland and Labrador, in which mining, and oil and gas extraction accounted for almost 60 per cent of nominal GDP in 2007.

ii. Labour Productivity

Labour productivity, defined as real GDP per hour worked,¹⁶ grew at an average rate of 1.6 per cent per year in Prince Edward Island's market sector during the 1997-2007 period. This is marginally below the national average of 1.7 per cent per year. Prince Edward Island ranks 8th among the provinces in terms of labour productivity growth, only above British Columbia and Alberta (Chart 8).

Chart 8: Labour Productivity Growth in Canada and the Provinces, Market Sector, 1997-2007
(Average Annual Growth Rates)



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

During the 1997-2007 period, the industry that experienced the highest labour productivity growth rate in Prince Edward Island was the information and cultural industry (4.8 per cent per year), followed by other services (4.6 per cent), and retail trade (3.8 per cent) (Table 11). The industry that had the lowest labour productivity growth rate was mining, and oil and gas extraction (-8.8 per cent per year), followed by utilities (-4.7 per cent), and arts, entertainment and recreation (-4.2 per cent).

In terms of labour productivity growth, Prince Edward Island ranked 7th or below in nine of the 15 two-digit NAICS industries. This widespread low labour productivity growth across several industries explains why the province had both the third worst market sector rank (only above British Columbia and Alberta) and the third worst equally-weighted market sector rank (only above British Columbia and Newfoundland). In particular, mining, and oil and gas extraction, utilities, wholesale trade, and transportation and warehousing had the lowest labour productivity growth rates in Canada when compared to equivalent industries in other provinces. Notable exceptions were other services (4.6 per cent per year), accommodation and food services (2.6 per cent per year), and professional, scientific and technical services (2.4 per cent per year), all of which ranked 1st in Canada.

¹⁶ Note that the total hours worked figures used to calculate labour productivity are unadjusted for labour quality.

Prince Edward Island's labour productivity level in 2007 was \$22.11 (1997 dollars) per hour, which represents 61.3 per cent of the Canadian level, down from 62.1 per cent in 1997. The province ranked 10th in terms of labour productivity level in Canada in 2007, significantly below the second worst province, Nova Scotia, which had a labour productivity level equal to 75.1 per cent of the Canadian level. In 2007, only one of the 15 two-digit NAICS industries in Prince Edward Island had labour productivity levels above Canada's – namely, information and cultural industries (137.9 per cent of the Canadian average). The industries that had the lowest levels in the province were mining, and oil and gas extraction (10.7 per cent of the Canadian level), wholesale trade (43.7 per cent), and utilities (48.0 per cent).

At the industry level, Prince Edward Island's information and cultural industries ranked 1st in terms of relative labour productivity level in 2007. However, seven of the province's industries ranked 10th in Canada. These industries were mining, and oil and gas extraction, wholesale trade, utilities, transportation and warehousing, arts, entertainment and recreation, construction, and agriculture, forestry, fishing and hunting.

Table 11: Labour Productivity Levels and Growth Rates in Prince Edward Island, 1997-2007

	Compound Annual Growth Rate, 1997-2007	Provincial Ranking	Province's Labour Productivity Level Relative to Canada's, 1997	Province's Labour Productivity Level Relative to Canada's, 2007	Labour Productivity Level, 2007	Provincial Ranking, 2007
	(per cent)		(Canada=100)	(Canada=100)	(1997 Dollars)	
Market Sector	1.6	8	62.1	61.3	22.1	10
Agriculture, Forestry, Fishing and Hunting	3.0	8	82.2	73.1	19.9	10
Mining, and Oil and Gas Extraction	-8.8	10	21.4	10.7	8.4	10
Utilities	-4.7	10	70.8	48.0	64.6	10
Construction	2.8	3	51.9	57.5	18.3	10
Manufacturing	0.2	8	65.0	53.1	25.4	9
Wholesale Trade	-3.5	10	90.0	43.7	18.3	10
Retail Trade	3.8	4	79.3	82.9	18.3	7
Transportation and Warehousing	-1.2	10	68.0	56.3	17.9	10
Information and Cultural Industries	4.8	3	116.0	137.9	94.6	1
FIRE*	1.4	7	100.9	99.8	70.2	3
Professional, Scientific and Technical Services	2.4	1	71.4	79.3	21.4	7
ASWMR**	-2.2	8	73.3	56.7	11.2	10
Arts, Entertainment and Recreation	-4.2	7	83.2	61.2	9.9	9
Accommodation and Food Services	2.6	1	81.4	94.5	13.0	5
Other Services (Except Public Administration)	4.6	1	65.9	83.8	13.6	7
Absolute Equally Weighted Average Rank		6.1				7.9
Equally Weighted Market Sector Rank		8				10

Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

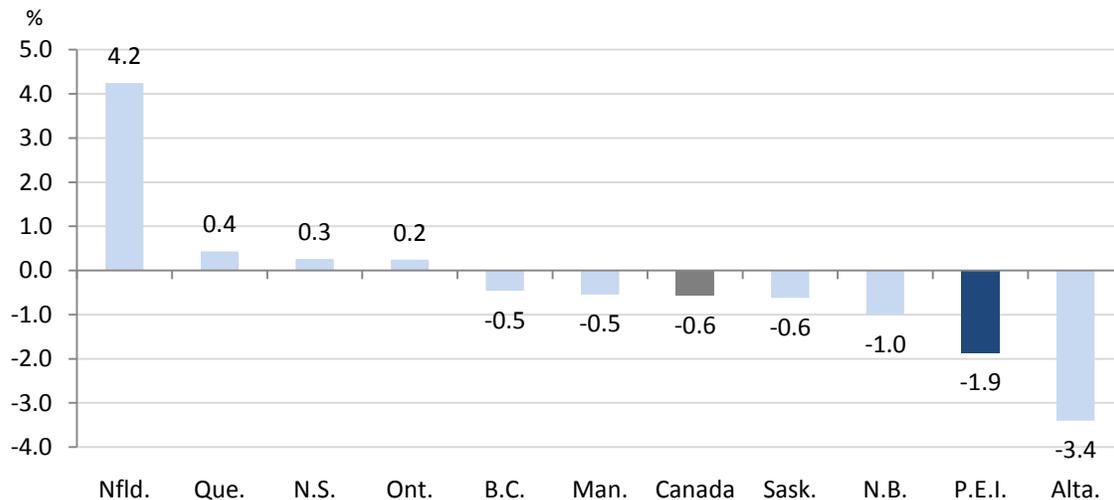
iii. Capital Productivity

Capital productivity, defined as real GDP per unit of capital services, fell at a rate of -1.9 per cent per year in Prince Edward Island's market sector during the 1007-2007 period. Declining capital productivity was by no means unique to Prince Edward Island, having happened in six of the ten

provinces. Canada's capital productivity declined 0.6 per cent per year over the period. Prince Edward Island ranked 9th in Canada in terms of capital productivity (Chart 9).

In Prince Edward Island, 11 of the 15 two-digit NAICS industries had negative capital productivity growth rates during the period. The industries that had the worst performances were mining, and oil and gas extraction (-25.7 per cent per year), utilities (-11.6 per cent), and professional, scientific and technical services (-10.6 per cent) (Table 12). The four industries that had positive growth rates were arts, entertainment and recreation (5.7 per cent per year), information and cultural industries (4.5 per cent), manufacturing (1.6 per cent), and accommodation and food services (0.4 per cent).

Chart 9: Capital Productivity Growth Rates in Canada and the Provinces, Market Sector, 1997-2007
(Average Annual Growth Rates)



Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

In terms of capital productivity growth, Prince Edward Island ranked 7th or below in 10 of the 15 two-digit NAICS industries. Again, this widespread low capital productivity growth across several industries explains why the province had both the second worst market sector rank (only above Alberta) and the worst equally-weighted market sector rank. The following Prince Edward industries had the worst growth rates in Canada when compared to equivalent industries in other provinces: mining, and oil and gas extraction, utilities, FIRE, construction, and agriculture, forestry, fishing and hunting. In contrast, arts, entertainment and recreation, and information and cultural industries had the highest growth rates in Canada.

Prince Edward Island's capital productivity level in the market sector in 2007 was 96.2 per cent of the Canadian level, down from 109.7 per cent in 1997. Only six of the 15 two-digit NAICS industries in the province had capital productivity levels above the Canadian average. The industries with highest relative capital productivity levels in the province were arts, entertainment and recreation (221.3 per cent of the Canadian level), transportation and warehousing (180.5 per cent), and information and cultural industries (122.8 per cent). The industries with lowest relative capital productivity levels in the province were mining, and oil and gas extraction (14.8 per cent of the Canadian level), utilities (30.7 per cent), and professional, scientific and technical services (60.3 per cent).

Prince Edward Island's market sector ranked 8th in terms of capital productivity level in Canada in 2007 (its equally-weighted market sector rank was only marginally better, 6th place). Compared to the other provinces, Prince Edward Island had the lowest relative capital productivity levels in Canada in four industries: mining, and oil and gas extraction, utilities, FIRE, and retail trade. Conversely, the province had the highest capital productivity levels in Canada in three industries: arts, entertainment and recreation, information and cultural industries, and transportation and warehousing.

Table 12: Capital Productivity Levels and Growth Rates in Prince Edward Island, 1997-2007

Market Sector	Compound Annual Growth Rate, 1997-2007	Provincial Ranking	Province's Capital Productivity Level Relative to Canada's, 1997	Province's Capital Productivity Level Relative to Canada's, 2007	Capital Productivity Level, 2007	Provincial Ranking, 2007
	(per cent)		(Canada=100)	(Canada=100)	(1997 Dollars)	
Market Sector	-1.9	9	109.7	96.2	2.21	8
Agriculture, Forestry, Fishing and Hunting	-1.6	10	117.0	81.6	1.71	9
Mining, and Oil and Gas Extraction	-25.7	10	160.8	14.8	0.11	10
Utilities	-11.6	10	105.2	30.7	0.40	10
Construction	-4.4	10	200.7	111.1	7.59	4
Manufacturing	1.6	5	117.0	116.6	3.18	3
Wholesale Trade	-1.2	8	103.5	93.2	2.96	5
Retail Trade	-2.4	9	96.6	83.8	3.84	10
Transportation and Warehousing	-2.7	7	195.0	180.5	4.35	1
Information and Cultural Industries	4.5	1	83.4	122.8	2.37	1
FIRE*	-4.5	10	87.6	60.5	0.99	10
Professional, Scientific and Technical Services	-10.6	9	92.1	60.3	1.47	9
ASWMR**	-1.6	5	85.0	95.9	2.95	5
Arts, Entertainment and Recreation	5.7	1	80.3	221.3	4.56	1
Accommodation and Food Services	0.4	2	86.8	94.1	4.05	3
Other Services (Except Public Administration)	-2.6	7	130.5	108.9	5.80	3
Absolute Equally-Weighted Average Rank		6.9				5.6
Equally-Weighted Market Sector Rank		10				6

Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

iv. Multifactor Productivity

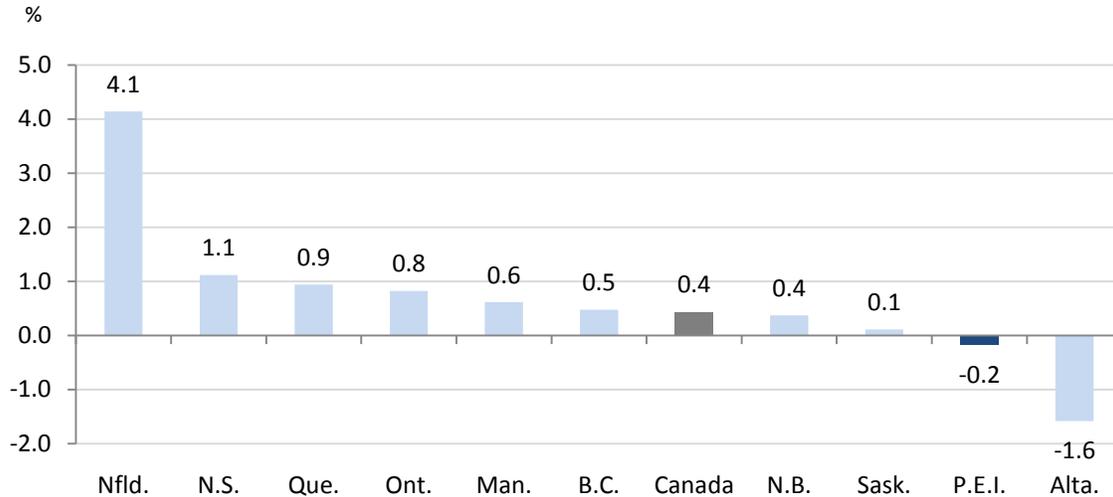
Prince Edward Island's multifactor productivity in the market sector grew at an average rate of -0.2 per cent per year during the 1997-2007 period, below the national average of 0.4 per cent per year. The province ranked 9th in Canada (Chart 10).

The industry that experienced the highest multifactor productivity growth rate in Prince Edward Island was information and cultural industries (4.7 per cent per year), followed by other services (3.6 per cent), and retail trade (2.1 per cent) (Table 13). The industries that had the lowest multifactor productivity growth rates were mining, and oil and gas extraction (-20.5 per cent per year), utilities (-9.9 per cent), and wholesale trade (-2.4 per cent).

In terms of multifactor productivity growth, Prince Edward Island ranked 7th place or lower in eight of the 15 two-digit NAICS. The following five industries experienced the worst growth rates among all provinces: mining, and oil and gas extraction, utilities, wholesale trade, FIRE, and agriculture, forestry, fishing and hunting. Conversely, information and cultural industries, accommodation and food services,

and professional, scientific and technical services had ranked 1st in Canada in terms of multifactor productivity growth.

Chart 10: Multifactor Productivity Growth in Canada and the Provinces, Market Sector, 1997-2007
(Average Annual Growth Rates)



Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

The province's multifactor productivity level was 74.1 per cent of the Canadian level in 2007, up from 78.8 per cent in 1997. Only one of the 15 two-digit NAICS industries in Prince Edward Island had multifactor productivity levels above those of Canada – namely, information and cultural industries (130.9 per cent of the Canadian level). The industries with lowest relative multifactor productivity in the province were mining, and oil and gas extraction (13.3 per cent of the Canadian level), utilities (35.1 per cent), and wholesale trade (59.6 per cent).

In terms of multifactor productivity levels, Prince Edward Island ranked 10th in Canada according to both its market sector rank and its equally-weighted market sector rank. Overall, the province had low levels of multifactor productivity, ranking 7th or below in 11 of the 15 two-digit NAICS industries. In particular, Prince Edward Island had the lowest multifactor productivity levels among all the provinces in the following five industries: mining, and oil and gas extraction, utilities, wholesale trade, construction, and administrative and support, waste management and remediation services.

Table 13: Multifactor Productivity Levels and Growth Rates in Prince Edward Island, 1997-2007

Market Sector	Compound Annual Growth Rate, 1997-2007	Provincial Ranking	Province's Multifactor Productivity Level Relative to Canada's, 1997	Province's Multifactor Productivity Level Relative to Canada's, 2007	Provincial Ranking, 2007
	(per cent)		(Canada=100)	(Canada=100)	
Market Sector	-0.2	9	78.8	74.1	10
Agriculture, Forestry, Fishing and Hunting	0.5	10	97.7	79.9	9
Mining, and Oil and Gas Extraction	-20.5	10	81.0	13.3	10
Utilities	-9.9	10	97.0	35.1	10
Construction	1.7	3	63.7	64.2	10
Manufacturing	0.9	7	81.5	74.6	8
Wholesale Trade	-2.4	10	94.8	59.6	10
Retail Trade	2.1	5	83.8	83.6	9
Transportation and Warehousing	-1.9	9	96.3	83.5	7
Information and Cultural Industries	4.7	1	95.8	130.9	1
FIRE*	-2.1	10	94.5	76.5	9
Professional, Scientific and Technical Services	-0.5	1	76.5	78.1	7
ASWMR**	-2.0	9	73.8	62.7	10
Arts, Entertainment and Recreation	-1.7	4	84.5	87.4	4
Accommodation and Food Services	1.6	1	83.1	91.9	6
Other Services (Except Public Administration)	3.6	2	76.6	97.0	5
Absolute Equally-Weighted Average Rank		6.1			7.7
Equally-Weighted Market Sector Rank		8			10

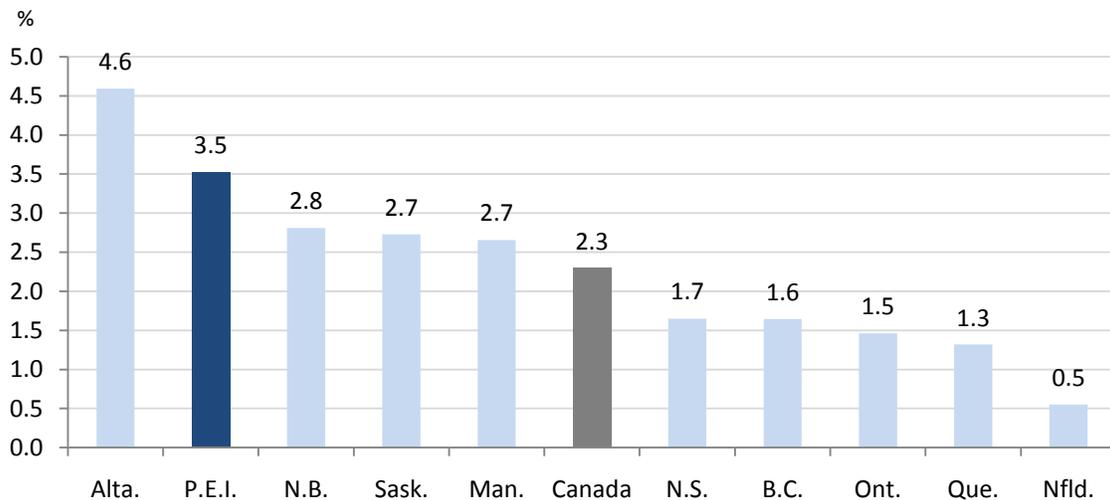
Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

v. Capital Intensity

Capital intensity, defined as capital services per hour worked (unadjusted for labour quality), grew at an average rate of 3.5 per cent per year in Prince Edward Island's market sector during the 1997-2007 period. This was significantly above the national average of 2.3 per cent per year. The province ranked 2nd among the ten provinces in terms of capital intensity (Chart 11).

Chart 11: Capital Intensity Growth in Canada and the Provinces, Market Sector, 1997-2007 (Average Annual Growth Rates)



Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

During the 1997-2007 period, the industries that experienced the highest capital intensity growth rates in Prince Edward Island were mining, and oil and gas (22.8 per cent per year), professional, scientific and technical services (14.5 per cent), and utilities (7.8 per cent) (Table 14). Conversely, the industries that had the lowest growth rates were arts, entertainment and recreation (-9.4 per cent per year), wholesale trade (-2.3 per cent), and manufacturing (-1.4 per cent).

The province ranked 3rd or higher in eight of the 15 two-digit NAICS industries in terms of capital intensity growth. The following five industries, in particular, had the highest capital intensity growth rates in Canada when compared to equivalent industries in the other provinces: mining, and oil and gas extraction, professional, scientific and technical services, utilities, construction, and FIRE. On the other hand, arts, entertainment and recreation and wholesale trade had the lowest capital intensity growth rates in among all the provinces.

Prince Edward Island's capital intensity level was 63.7 per cent of the Canadian level in 2007, up from 56.5 per cent in 1997. The province's relative capital intensity level ranked 9th in Canada according to its market sector rank (it ranked marginally better, 7th, according to its equally-weighted market sector rank).

In 2007, only five of the 15 two-digit NAICS industries had capital intensity levels above the Canadian levels. Industries with high relative levels in the province included: FIRE (165.1 per cent of the Canadian level), utilities (156.3 per cent), and professional, scientific and technical services (131.5 per cent). The industries that had the lowest capital intensity levels in Prince Edward Island were arts, entertainment and recreation (27.6 per cent of the Canadian level), transportation and warehousing (31.2 per cent), and manufacturing (45.5 per cent).

At the industry level, the province ranked 9th or lower in six of the 15 two-digit NAICS industries in terms of capital intensity levels. In particular, Prince Edward Island had the lowest capital intensity levels among all the provinces in the following four industries: arts, entertainment and recreation, transportation and warehousing, retail trade, and construction. On the other hand, the Prince Edward Island's FIRE industry had the highest capital intensity level in Canada.

Table 14: Capital Intensity Levels and Growth Rates in Prince Edward Island, 1997-2007

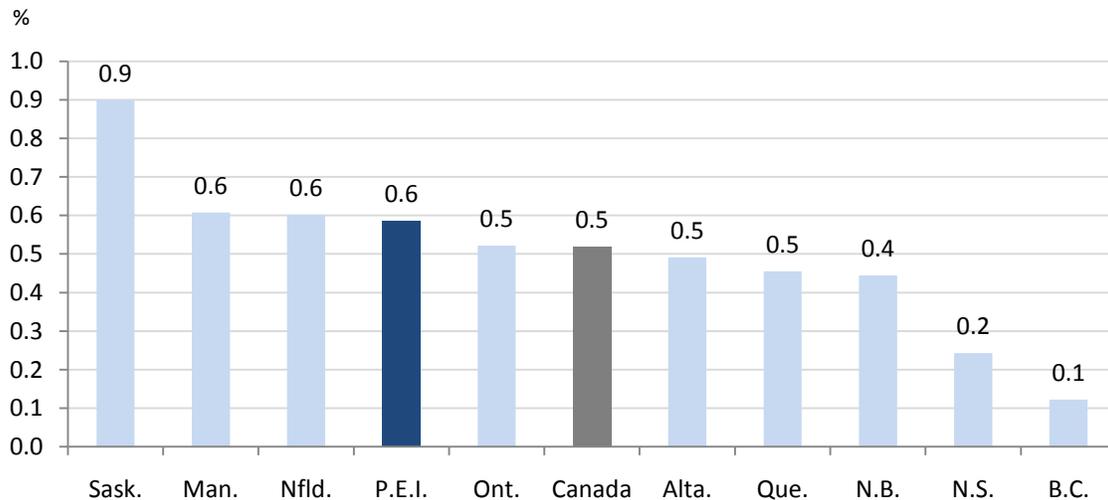
Market Sector	Compound Annual Growth Rate, 1997-2007	Provincial Ranking	Province's Capital Intensity Level Relative to Canada's, 1997	Province's Capital Intensity Level Relative to Canada's, 2007	Capital Intensity Level, 2007	Provincial Ranking, 2007
	(per cent)		(Canada=100)	(Canada=100)	(1997 Dollars)	
Market Sector	3.5	2	56.5	63.7	10.0	9
Agriculture, Forestry, Fishing and Hunting	4.7	3	70.0	89.6	11.6	6
Mining, and Oil and Gas Extraction	22.8	1	13.3	72.5	73.8	4
Utilities	7.8	1	67.1	156.3	163.1	3
Construction	7.5	1	26.0	51.7	2.4	10
Manufacturing	-1.4	8	55.7	45.5	8.0	9
Wholesale Trade	-2.3	10	87.1	46.9	6.2	10
Retail Trade	6.3	2	82.7	98.9	4.8	3
Transportation and Warehousing	1.5	8	35.0	31.2	4.1	10
Information and Cultural Industries	0.3	9	141.1	113.9	40.6	5
FIRE*	6.2	1	115.1	165.1	70.7	1
Professional, Scientific and Technical Services	14.5	1	77.5	131.5	14.5	2
ASWMR**	-0.6	7	85.8	59.2	3.8	6
Arts, Entertainment and Recreation	-9.4	10	103.8	27.6	2.2	10
Accommodation and Food Services	2.1	7	94.4	100.5	3.2	5
Other Services (Except Public Administration)	7.4	2	50.5	76.9	2.3	9
Absolute Equally-Weighted Average Rank		4.7				6.2
Equally-Weighted Market Sector Rank		3				7

Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

vi. Labour Quality

Prince Edward Island experienced slightly above average labour quality growth in its market sector during the 1997-2007 period. The province grew at an average rate of 0.6 per cent per year, while the national average was 0.5 per cent per year. The province ranked 4th in Canada in terms of labour quality growth (Chart 12).

Chart 12: Labour Quality Growth in Canada and the Provinces, Market Sector, 1997-2007 (Average Annual Growth Rates)

Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

During the period in question, the industries that experienced the highest labour quality growth rates in Prince Edward Island were arts, entertainment and recreation (1.2 per cent per year), transportation and warehousing (0.8 per cent), and accommodation and food services (0.6 per cent) (Table 15). The industries that had the lowest labour quality growth rates were utilities (-0.8 per cent per

year), other services (-0.7 per cent), mining, and oil and gas extraction, and information and cultural industries (both of which grew at an average rate of -0.3 per cent).

As mentioned previously, Prince Edward Island's market sector ranked 4th in Canada in terms of labour quality growth. However, the province's equally-weighted market sector rank was considerably lower, 9th (only above British Columbia). This divergence between the two ranks indicates that most of the province's industries had low labour quality growth. In particular, the following industries had the lowest labour quality growth rates in Canada when compared to equivalent industries in other provinces: utilities, other services, and information and cultural industries.

Table 15: Labour Quality Levels and Growth Rates in Prince Edward Island, 1997-2007¹⁷

Market Sector	Compound Annual Growth Rate, 1997-2007	Provincial Ranking
	(per cent)	
Market Sector	0.6	4
Agriculture, Forestry, Fishing and Hunting	0.3	7
Mining, and Oil and Gas Extraction	-0.3	7
Utilities	-0.8	10
Construction	0.4	1
Manufacturing	0.3	6
Wholesale Trade	-0.2	9
Retail Trade	0.0	5
Transportation and Warehousing	0.8	2
Information and Cultural Industries	-0.3	10
FIRE*	-0.2	9
Professional, Scientific and Technical Services	0.1	9
ASWMR**	0.3	4
Arts, Entertainment and Recreation	1.2	3
Accommodation and Food Services	0.6	1
Other Services (Except Public Administration)	-0.7	10
Absolute Equally-Weighted Average Rank		6.2
Equally-Weighted Market Sector Rank		9

Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

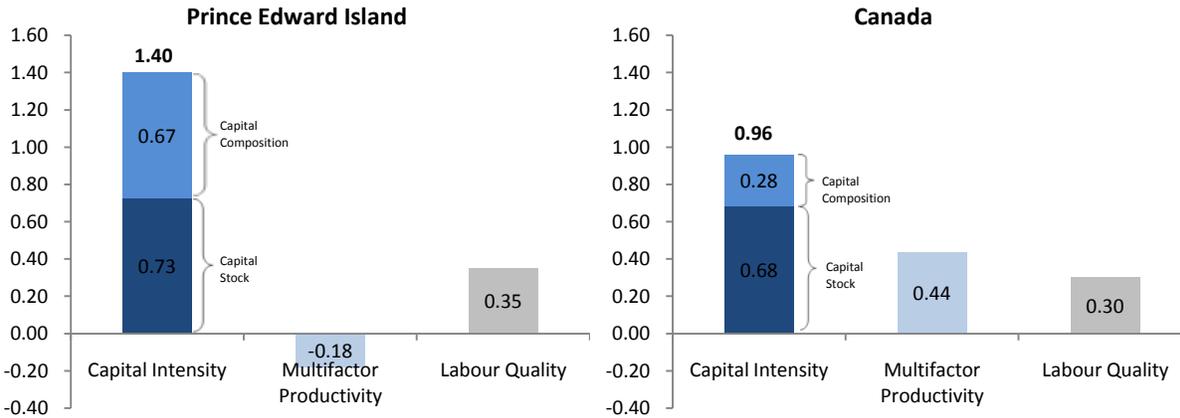
*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

vii. Sources of Labour Productivity Growth in the Market Sector

Prince Edward Island's labour productivity grew at an average rate of 1.6 per cent per year during the 1997-2007 period, slightly below the national average of 1.7 per cent per year. Charts 13 and 14 show both the percentage point and per cent contributions to labour productivity growth by the sources of growth for Prince Edward Island and Canada over the period.

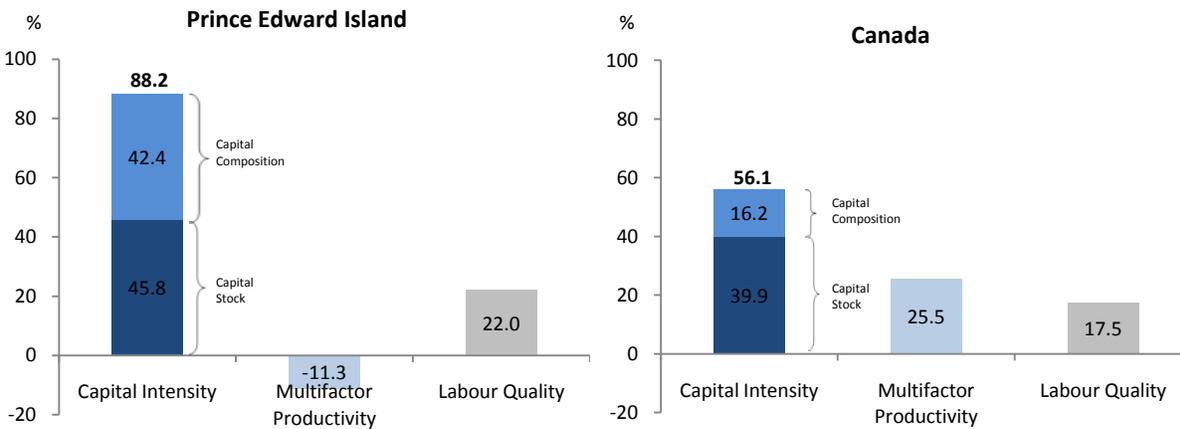
¹⁷ Labour quality levels are not shown here because they are assumed to be the same (and equal to 100.0) across all provinces and in Canada in the base year, 1997 (Sharpe and Thomson, 2010a). They differ after 1997, incorporating the different labour quality growth rates experienced by the provinces and Canada. For example, labour quality in Prince Edward Island's market sector grew at an average annual rate of 0.6 per cent over the 1997-2007 period, while Canada's labour quality grew at an average annual rate of 0.5 per cent. As a consequence, Prince Edward Island's labour quality level was 100.7 per cent of the Canadian level in 2007.

Chart 13: Percentage Point Contribution to Labour Productivity Growth by the Source of Labour Productivity Growth in the Market Sector in Prince Edward Island and in Canada, 1997 to 2007



Source: CSLs Provincial Productivity Database, Appendix Table 107, http://www.csls.ca/data/mfp_new.asp.

Chart 14: Per Cent Contribution to Labour Productivity Growth by the Source of Labour Productivity Growth in the Market Sector in Prince Edward Island and in Canada, 1997 to 2007



Source: CSLs Provincial Productivity Database, Appendix Table 107, http://www.csls.ca/data/mfp_new.asp.

Note: Numbers may not sum to 100 due to rounding.

Prince Edward Island's labour productivity growth was driven mainly by capital intensity growth, which accounted for 1.40 percentage points of the overall labour productivity growth (or, alternatively, 88.2 per cent of total growth). The contribution of capital intensity to labour productivity growth can be broken down into two components: capital composition growth, which was responsible for 0.67 percentage points (42.4 per cent), and capital stock growth, which accounted for 0.73 per cent (45.8 per cent). Labour quality growth was responsible for 0.35 percentage points (6.5 per cent) of the labour productivity growth experienced in the province. Finally, multifactor productivity growth actually had a negative contribution to labour productivity growth. It accounted for a decrease of 0.18 percentage points (-11.3 per cent) of labour productivity growth.¹⁸

Comparing the two charts, it can be seen that capital intensity played a greater part in Prince Edward Island's labour productivity growth than in Canada's (88.2 per cent vs. 56.1 per cent).

¹⁸ During the 1997-2007 period, the only other province where multifactor productivity growth was negative was Alberta.

Furthermore, multifactor productivity growth actually hindered the province's growth, while it was an important labour productivity growth driver in Canada (-11.3 per cent vs. 25.5 per cent). Finally, labour quality growth had a slightly lower importance driving labour productivity growth in Prince Edward Island than it had in Canada (22.0 per cent vs. 17.5 per cent).

Table 16 details the contributions in absolute and per cent terms of capital intensity, MFP, and labour quality growth to labour productivity growth in Prince Edward Island over the 1997-2007 period at the two-digit NAICS industry level.

Table 16: Contributions to Labour Productivity Growth at the Industry Level by Source in Prince Edward Island, 1997-2007

Market Sector	Labour Productivity	Capital Intensity			MFP	Labour Quality
		Total	Capital Composition	Capital Stock		
Percentage Point Contributions to Labour Productivity Growth						
Market Sector	1.6	1.4	0.7	0.7	-0.2	0.3
Agriculture, Forestry, Fishing and Hunting	3.0	2.4	0.5	1.9	0.5	0.1
Mining, and Oil and Gas Extraction	-8.8	14.3			-20.5	0.3
Utilities	-4.7	6.1			-9.9	-0.2
Construction	2.8	0.7	0.1	0.7	1.7	0.3
Manufacturing	0.2	-0.9	-0.1	-0.8	0.9	0.1
Wholesale Trade	-3.5	-1.0	-0.1	-0.9	-2.4	-0.1
Retail Trade	3.8	1.7	0.2	1.5		0.0
Transportation and Warehousing	-1.2	0.1	0.7	-0.6	-1.9	0.5
Information and Cultural Industries	4.8	0.2			4.7	0.0
FIRE*	1.4	3.6	1.4	2.2	-2.1	-0.1
Professional, Scientific and Technical Services	2.4	2.8	0.1	2.7	-0.5	0.1
ASWMR**	-2.2	-0.4			-2.0	0.3
Arts, Entertainment and Recreation	-4.2	-3.4	-51.7	47.9	-1.7	0.8
Accommodation and Food Services	2.6	0.6	0.1	0.5	1.6	0.4
Other Services (Except Public Administration)	4.6	1.5	1.1	0.5	3.6	-0.6
Per Cent Contributions to Labour Productivity Growth						
Market Sector	100.0	89.2	42.4	45.8	-11.3	22.0
Agriculture, Forestry, Fishing and Hunting	100.0	79.2	15.9	63.0	15.6	4.7
Mining, and Oil and Gas Extraction	100.0	-163.3			233.2	-3.6
Utilities	100.0	-130.9			213.1	5.0
Construction	100.0	26.9	2.9	23.8	60.5	11.9
Manufacturing	100.0	-467.3	-42.2	-423.3	498.4	73.2
Wholesale Trade	100.0	28.7	3.5	25.1	69.5	2.5
Retail Trade	100.0	44.3	4.3	39.8		0.4
Transportation and Warehousing	100.0	-8.4	-57.2	46.2	151.1	-43.7
Information and Cultural Industries	100.0	3.2			97.3	-0.7
FIRE*	100.0	256.0	97.6	154.6	-144.9	-5.8
Professional, Scientific and Technical Services	100.0	116.0	2.3	113.4	-19.6	4.0
ASWMR**	100.0	18.7			93.3	-11.9
Arts, Entertainment and Recreation	100.0	80.3	1221.7	-1130.8	39.6	-19.6
Accommodation and Food Services	100.0	22.9	4.9	17.8	61.8	14.7
Other Services (Except Public Administration)	100.0	33.4	23.2	9.9	78.1	-12.1

Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

Note: Per cent contributions may not sum to 100 due to rounding.

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

viii. Sources of Labour Productivity Level Gap by Industry

Prince Edward Island's labour productivity level was only 61.3 per cent of the Canadian level in 2007, which implies a labour productivity gap of 38.7 percentage points. Table 17 makes it clear that the

gap was caused by below average capital intensity and multifactor productivity levels in the province's market sector. The capital intensity level was responsible for 15.3 percentage points of the gap, while the multifactor productivity level was responsible for 23.7 percentage points of the gap. The province's labour quality level contributed to a small 0.3 percentage point reduction of the gap.¹⁹

Prince Edward Island had a labour productivity gap in 14 of the 15 two-digit NAICS industries. In most cases, the below average multifactor productivity level was the main culprit, with significant contributions to the gap that were sometimes compounded by below average capital intensity levels. The only industry that had a positive labour productivity differential was information and cultural industries, which had a capital intensity level well above the Canadian average.

Table 17: Sources of the Labour Productivity Gap Relative to Canada for Prince Edward Island at the Two-Digit Industry Level, 2007

Market Sector	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 Quality	Labour Productivity	Capital Intensity	Multifactor Productivity	Labour Quality
Market Sector	61.3	-38.7	-15.3	-23.7	0.3	100.0	39.5	61.3	-0.8
Agriculture, Forestry, Fishing and Hunting	73.1	-26.9	-5.0	-19.3	-2.6	100.0	18.5	71.8	9.7
Mining, and Oil and Gas Extraction	10.7	-89.3	-8.3	-80.5	-0.5	100.0	9.2	90.2	0.5
Utilities	48.0	-52.0	23.9	-74.3	-1.6	100.0	-46.0	142.9	3.1
Construction	57.5	-42.5	-10.0	-34.1	1.6	100.0	23.5	80.1	-3.7
Manufacturing	53.1	-46.9	-24.6	-21.7	-0.6	100.0	52.4	46.3	1.3
Wholesale Trade	43.7	-56.3	-18.9	-35.2	-2.2	100.0	33.6	62.5	3.9
Retail Trade	82.9	-17.1	-0.3	-16.3	-0.5	100.0	1.7	95.5	2.8
Transportation and Warehousing	56.3	-43.7	-31.7	-13.7	1.7	100.0	72.5	31.3	-3.8
Information and Cultural Industries	137.9	37.9	9.7	31.8	-3.6	100.0	25.6	83.8	-9.4
FIRE*	99.8	-0.2	29.0	-26.8	-2.4	100.0	-15,481.2	14,299.9	1,281.3
Professional, Scientific and Technical Services	79.3	-20.7	5.1	-22.1	-3.7	100.0	-24.5	106.8	17.7
ASWMR**	56.7	-43.3	-9.4	-35.6	1.7	100.0	21.8	82.2	-3.9
Arts, Entertainment and Recreation	61.2	-38.8	-34.4	-10.6	6.2	100.0	88.5	27.4	-15.9
Accommodation and Food Services	94.5	-5.5	0.1	-8.2	2.6	100.0	-2.6	150.7	-48.1
Other Services (Except Public Administration)	83.8	-16.2	-5.5	-2.7	-8.0	100.0	33.9	16.9	49.2

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

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

ix. Conclusion

During the 1997-2007 period, Prince Edward Island experienced declines in both capital productivity (-1.9 per cent per year) and multifactor productivity (-0.2 per cent), coupled with a labour productivity growth rate slightly below the national average (1.6 per cent vs. 1.7 per cent). Despite low labour productivity growth overall, three of the 15 two-digit NAICS industries enjoyed the highest growth rates in Canada when compared to equivalent industries in other provinces: other services (4.6 per cent per year), accommodation and food services (2.6 per cent), and professional, scientific and technical services (2.4 per cent). Information and cultural industries also performed well in terms of labour productivity (3rd highest growth rate in Canada, highest level in 2007).

¹⁹ Again, it is important to bear in mind that labour quality levels were assumed to be equal to 100.0 in all provinces and in Canada for the base year of 1997. They differ after 1997, incorporating the different labour quality growth rates experienced by the provinces and Canada.

Prince Edward Island's labour, capital, and multifactor productivity levels in 2007 were all below the national levels. In particular, the province's labour productivity level was only 61.3 per cent of the Canadian level, with the labour productivity gap between Prince Edward Island's market sector and Canada's reaching 38.7 per cent. The gap was caused mainly by the province's below average multifactor productivity level, responsible for 61.3 per cent of the gap, although the below average capital intensity level also played an important role, accounting for 39.5 per cent of the gap.

Table 18 provides a summary of both levels (in 1997 and 2007) and growth rates (for the 1997-2007 period) for the productivity measures discussed in this report, along with rankings that show how Prince Edward Island fared in comparison to the other provinces. Two observations are immediately clear from this table. First, both growth rates and levels in Prince Edward Island were, in general, below the national averages, and close to the bottom of their respective distributions. Second, this poor performance was not confined to the market sector rank, but is followed closely by the equally-weighted market sector rank, which indicates that low growth rates and levels were widespread throughout all the province's industries.

Table 18: Summary of Prince Edward Island's Productivity Performance in the Market Sector

	Market Sector Growth, 1997 to 2007			Per Cent of the Canadian Level		Level Rankings, 2007	
	Compound Annual Growth Rate	Market Sector Rank	Equally-Weighted Market Sector Rank	1997	2007	Market Sector Rank	Equally-Weighted Market Sector Rank
Labour Productivity	1.6	8	8	62.1	61.3	10	10
Capital Productivity	-1.9	9	10	109.7	96.2	8	6
Multifactor Productivity	-0.2	9	8	78.8	74.1	10	10
Capital Intensity	3.5	2	3	56.5	63.7	9	7
Labour Quality	0.6	4	9	n.a.	n.a.	n.a.	n.a.

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

IV. An Analysis of Nova Scotia's Productivity Performance, 1997-2007: Strong Growth, Low Levels

i. Industry Composition by Nominal GDP and Total Hours Worked

In order to understand Nova Scotia's overall productivity performance, it is essential to understand how each of the 15 two-digit NAICS industries contributed to the province's market sector in terms of nominal GDP and actual hours worked. Table 19 details these contribution shares for 1997 and 2007. In Nova Scotia, the industries that had the highest GDP shares in 2007 were FIRE (finance, insurance, real estate, rental and leasing) (14.2 per cent of GDP), manufacturing (13.2 per cent), and retail trade (11.1 per cent). In terms of actual hours worked, the three industries that had the highest shares in 2007 were retail trade (16.5 per cent), manufacturing (12.8 per cent), and construction (10.4 per cent).

Table 19: Industry Share of Nominal GDP and Total Hours worked in Nova Scotia

Market Sector	1997				2007			
	GDP		Hours Worked		GDP		Hours Worked	
	Canada	Nova Scotia	Canada	Nova Scotia	Canada	Nova Scotia	Canada	Nova Scotia
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Agriculture, Forestry, Fishing and Hunting	3.2	4.3	5.4	5.8	2.1	3.3	3.4	4.8
Mining, and Oil and Gas Extraction	5.5	2.6	1.7	1.4	11.1	6.9	2.0	1.0
Utilities	4.2	3.8	0.9	0.8	3.0	3.4	0.8	0.7
Construction	7.0	8.3	7.9	8.4	9.0	9.4	10.1	10.4
Manufacturing	23.2	16.2	18.3	14.3	16.8	13.2	14.8	12.8
Wholesale Trade	7.1	7.3	7.4	6.4	7.1	7.0	6.9	5.9
Retail Trade	6.9	9.8	13.1	18.1	7.4	11.1	12.9	16.5
Transportation and Warehousing	6.2	6.6	6.3	7.0	5.6	5.6	6.6	6.9
Information and Cultural Industries	4.3	5.5	2.5	2.8	4.3	5.3	2.7	2.5
FIRE*	15.0	16.6	7.5	6.2	14.6	14.2	7.8	6.8
Professional, Scientific and Technical Services	4.9	4.7	6.3	4.8	6.2	4.9	7.9	6.2
ASWMR**	2.5	1.8	4.0	2.8	3.3	3.4	5.7	5.5
Arts, Entertainment and Recreation	0.9	1.0	1.5	1.3	0.9	0.8	1.9	2.0
Accommodation and Food Services	3.2	4.1	7.8	8.8	2.8	3.7	7.0	8.0
Other Services (Except Public Administration)	5.7	7.4	9.4	11.2	5.8	7.8	9.5	10.0

Source: Shares calculated by the CSLS, based on Statistics Canada data (Cansim Table 2183-0011).

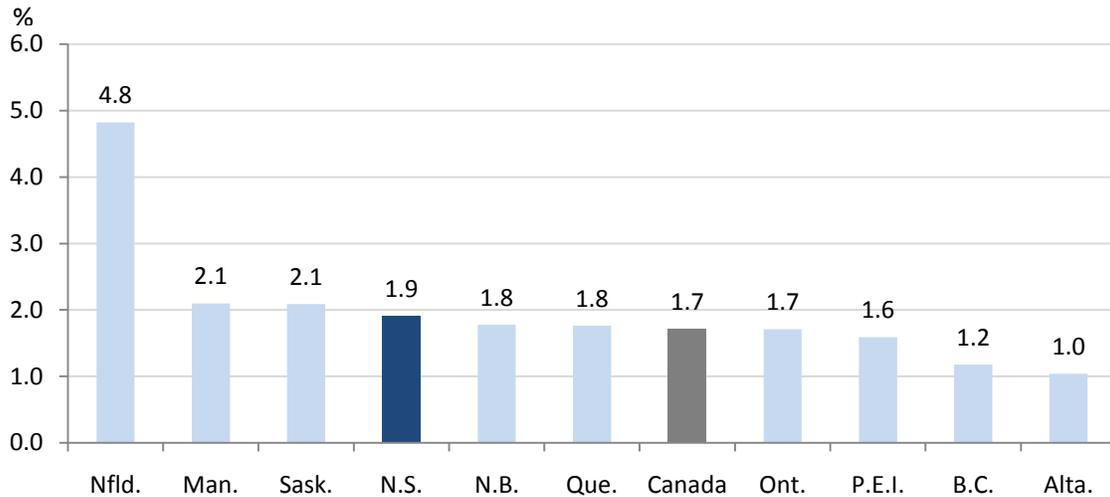
*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

ii. Labour Productivity

Labour productivity, defined as real GDP per hour worked,²⁰ grew at an average rate of 1.9 per cent per year in Nova Scotia's market sector during the 1997-2007 period. This is somewhat better than the national average of 1.7 per cent per year. While Manitoba and Saskatchewan witnessed greater labour productivity growth than Nova Scotia, only Newfoundland experienced much higher growth rates (Chart 15).

²⁰ Note that the total hours worked figures used to calculate labour productivity are unadjusted for labour quality.

**Chart 15: Labour Productivity Growth in Canada and the Provinces, Market Sector, 1997-2007
(Average Annual Growth Rates)**



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

During the 1997-2007 period, the industry that experienced the highest labour productivity growth rate in Nova Scotia was the mining, and oil and gas extraction (8.1 per cent per year), followed by information and cultural industry (5.0 per cent), and the retail trade (3.7 per cent) (Table 20). The industry that had the lowest labour productivity growth rate was the arts, entertainment and recreation (-6.0 per cent), followed by the professional, scientific and technical services (-0.9 per cent) and utilities (-0.1 per cent).

Nova Scotia did quite well with regards to labour productivity growth when compared to other provinces, though with very uneven relative results across industries. The province ranked 3rd or higher in 6 of the 15 two-digit NAICS industries, but also came 7th or below in 6 industries. Overall, Nova Scotia experienced the 4th highest rate among provinces. Nova Scotia had the lowest labour productivity growth rate of any province in the arts, entertainment and recreation (-6.9 per cent) as well as finance, insurance, real estate, rental and leasing (1.0 per cent). Nova Scotia tended to have higher growth in its larger industries, which is why it ranked 4th in market sector labour productivity growth but had an equally weighted market sector rank of 6th.

Nova Scotia's labour productivity level in 2007 was \$27.10 (1997 dollars) per hour, which represents 75.1 per cent of the Canadian level, down from 73.6 per cent in 1997. The province had the 2nd lowest labour productivity level in Canada in 2007, ahead of only Prince Edward Island.

In terms of labour productivity levels, Nova Scotia fared comparatively poorly. In 2007, only 2 of the 15 two-digit NAICS industries had a higher productivity level in the province than the national level. Only mining and oil and gas extraction and the information and culture industry have levels above the Canadian level (114.4 per cent and 102.9 per cent, respectively). While all other industries were less productive in Nova Scotia than in Canada as a whole, two industries were particularly lagging their national counterpart: arts entertainment and recreation (55.2 per cent of the national level) and manufacturing (63.0 per cent). There was no industry for which Nova Scotia ranked among the top four

provinces with regards to level, and there were 10 industries in which Nova Scotia was ranked in the bottom 3.

Table 20: Labour Productivity Levels and Growth Rates in Nova Scotia, 1997-2007

Market Sector	Compound Annual Growth Rate, 1997-2007	Rank out of 10 provinces	Province's Labour Productivity Level Relative to Canada's, 1997	Province's Labour Productivity Level Relative to Canada's, 2007	Labour Productivity Level, 2007	Rank out of 10 provinces, 2007
	(per cent)		(Canada=100)	(Canada=100)	(1997 Dollars)	
Market Sector	1.9	4	73.6	75.1	27.1	9
Agriculture, Forestry, Fishing and Hunting	3.3	7	90.9	83.3	22.6	7
Mining, and Oil and Gas Extraction	8.1	2	41.8	114.4	90.0	5
Utilities	-0.1	3	76.1	82.7	111.3	5
Construction	1.5	7	82.5	80.5	25.7	7
Manufacturing	1.8	5	65.9	63.0	30.1	8
Wholesale Trade	1.7	9	88.0	72.2	30.3	9
Retail Trade	3.7	6	75.9	78.5	17.3	9
Transportation and Warehousing	0.9	4	71.5	73.0	23.2	8
Information and Cultural Industries	5.0	2	84.9	102.9	70.6	5
FIRE*	1.0	10	98.5	93.6	65.8	9
Professional, Scientific and Technical Services	-0.9	9	93.5	74.8	20.2	9
ASWMR**	1.6	3	74.9	84.8	16.8	6
Arts, Entertainment and Recreation	-6.0	10	90.8	55.2	8.9	10
Accommodation and Food Services	1.8	3	83.3	89.4	12.3	8
Other Services (Except Public Administration)	3.3	3	71.8	80.5	13.1	8
Absolute Equally Weighted Average Rank		5.5				7.5
Equally Weighted Market Sector Rank		6				9

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

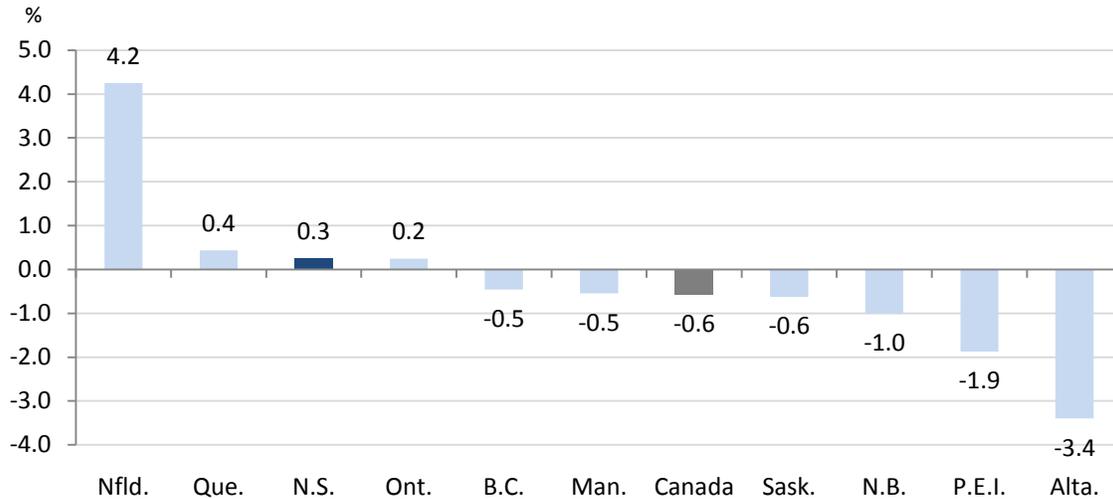
*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

iii. Capital Productivity

Capital productivity, defined as real GDP per unit of capital services, grew at a rate of 0.3 per cent per year in Nova Scotia's market sector during the 1997-2007 period. In contrast, Canada's capital productivity declined 0.6 per cent per year over the period (Chart 16).

In Nova Scotia, 9 of the 15 two-digit NAICS industries had negative capital productivity growth rates during the period. The industries that had the worst performances were the professional, scientific and technical services (-6.5 per cent per year), the arts, entertainment and recreation (-5.2 per cent per), and other services except public administration (-4.9 per cent) (Table 21). Of the few industries that had positive growth rates, the ones that performed better were utilities (2.5 per cent per year), manufacturing (2.2 per cent), and agriculture, forestry, fishing and hunting (1.3 per cent).

**Chart 16: Capital Productivity Growth Rates in Canada and the Provinces, Market Sector, 1997-2007
(Average Annual Growth Rates)**



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

Compared to the rest of Canada, Nova Scotia had very good capital productivity growth rates during the period. Nova Scotia ranked 3rd in growth of capital productivity and was one of only four provinces that saw an increase rather than a decline in the measure. The high relative growth rate was not present in all industries; with 6 of the 15 two-digit NAICS industries at 7th place or lower, but 5 industries ranked 3rd or higher. Transportation and warehousing along with other services excluding public administration had the worst capital productivity growth rates among all provinces. In contrast, utilities in Nova Scotia had the highest capital productivity growth in Canada.

Nova Scotia's capital productivity level in the market sector in 2007 was 120.5 per cent of the Canadian level, up from 110.9 per cent in 1997, putting the province in 2nd place. In 2007, 8 of the 15 two-digit NAICS industries in the province had capital productivity levels above the Canadian average. The industries with highest relative capital productivity levels were: mining and oil and gas (256.2 per cent of the national level), administrative and support, waste and remediation (ASWMR) (164.7 per cent), and manufacturing (140.7 per cent). The seven industries that had capital productivity levels lower than Canada's in 2007 were: professional, scientific and technical services (63.0 per cent), other services except public administration (66.1 per cent), arts, entertainment and recreation (73.5 per cent), accommodation and food services (81.7 per cent), Finance, insurance, real estate, rental and leasing (89.4 per cent), wholesale trade (94.1 per cent) and transportation and warehousing (98.4 per cent).

Nova Scotia's market sector had the 2nd highest capital productivity level in Canada in 2007, behind only Newfoundland and Labrador.²¹ This reflects the high overall capital productivity level in the province, which ranked 3rd or above in 4 of the 15 two-digit NAICS industries and 4th in 5 industries. Nova Scotia had the highest capital productivity level in Canada in manufacturing.

²¹ The province's equally-weighted market sector rank was slightly lower, 3rd, only behind Ontario and British Columbia.

Table 21: Capital Productivity Levels and Growth Rates in Nova Scotia, 1997-2007

	Compound Annual Growth Rate, 1997-2007	Rank out of 10 provinces	Province's Capital Productivity Level Relative to Canada's, 1997	Province's Capital Productivity Level Relative to Canada's, 2007	Capital Productivity Level, 2007	Rank out of 10 provinces, 2007
	(per cent)		(Canada=100)	(Canada=100)	(1997 Dollars)	
Market Sector	0.3	3	110.9	120.5	2.77	2
Agriculture, Forestry, Fishing and Hunting	1.3	8	126.8	118.2	2.48	3
Mining, and Oil and Gas Extraction	-0.3	3	147.1	256.2	1.98	4
Utilities	2.5	1	105.4	135.0	1.74	1
Construction	0.6	5	144.4	133.1	9.09	2
Manufacturing	2.2	2	133.1	140.7	3.83	2
Wholesale Trade	-0.6	7	98.3	94.1	2.99	4
Retail Trade	-0.7	5	116.1	119.7	5.48	4
Transportation and Warehousing	-4.4	10	126.8	98.4	2.37	7
Information and Cultural Industries	1.1	4	95.8	101.4	1.95	4
FIRE*	-0.8	3	88.5	89.4	1.47	5
Professional, Scientific and Technical Services	-6.5	3	61.5	63.0	1.54	8
ASWMR**	0.5	4	118.3	164.7	5.07	4
Arts, Entertainment and Recreation	-5.2	7	79.2	73.5	1.51	6
Accommodation and Food Services	-2.1	8	97.0	81.7	3.52	7
Other Services (Except Public Administration)	-4.9	10	100.6	66.1	3.52	10
Absolute Equally Weighted Average Rank		5.3				4.7
Equally Weighted Market Sector Rank		5				3

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

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

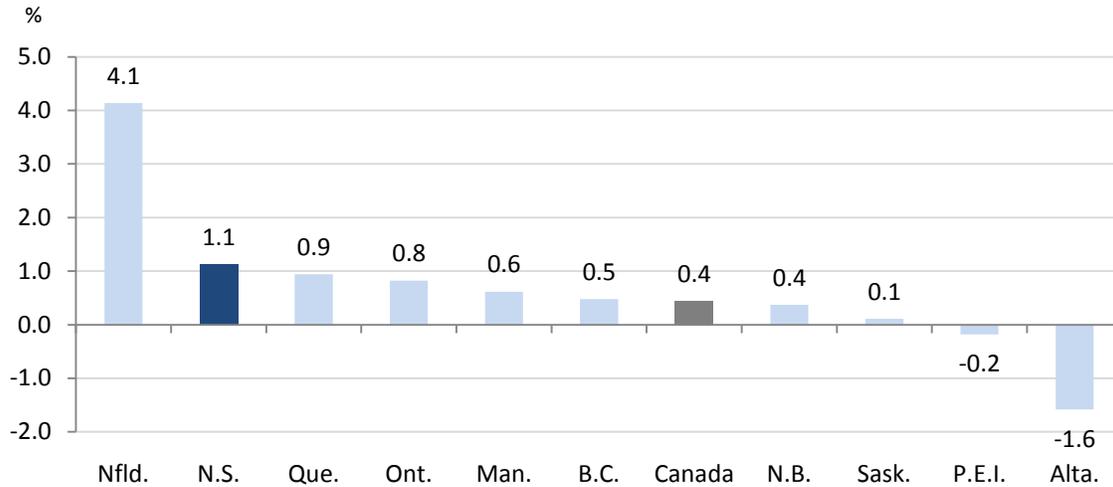
iv. Multifactor Productivity

Nova Scotia's multifactor productivity in the market sector grew at an average rate of 1.1 per cent per year during the 1997-2007 period, well above the national average of 0.4 per cent per year. The province ranked 2nd in Canada (Chart 17).

The industry that experienced the highest multifactor productivity growth rate in Nova Scotia was mining, and oil and gas extraction (4.6 per cent per year), followed by retail trade (2.6 per cent), and agriculture, forestry, fishing and hunting (2.5 per cent) (Table 22). The industries that had the lowest multifactor productivity growth rates were the arts, entertainment and recreation (-6.2 per cent), professional, scientific and technical services (-3.1 per cent), and the transportation and warehousing (-0.6 per cent).

The province ranked 2nd in Canada according to the market sector ranking in 2007. Of the 15 two-digit NAICS industries, 5 were ranked 3rd or higher while 3 were ranked at 7th place or lower. Arts, entertainment and recreation had the worst multifactor productivity growth rates among all provinces. Conversely, utilities in Nova Scotia had the highest multifactor productivity growth in Canada.

**Chart 17: Multifactor Productivity Growth in Canada and the Provinces, Market Sector, 1997-2007
(Average Annual Growth Rates)**



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

The province's multifactor productivity level in 2007 was 93.4 per cent of the Canadian level, up from 87.3 per cent in 1997. In 2007, 4 of the 15 two-digit NAICS industries in Nova Scotia had multifactor productivity levels above those of Canada. The industries with the highest relative multifactor productivity levels were: mining, oil and gas extraction (233.2 per cent of the national average), utilities (116.9 per cent), and agriculture, forestry, fishing and hunting (102.8 per cent). In contrast, the industries with lowest relative multifactor productivity levels were arts, entertainment and recreation (55.9 per cent), professional, scientific and technical services (73.2 per cent) and the wholesale trade (77.5 per cent).

Table 22: Multifactor Productivity Levels and Growth Rates in Nova Scotia, 1997-2007

	Compound Annual Growth Rate, 1997-2007	Rank out of 10 provinces	Province's Multifactor Productivity Level Relative to Canada's, 1997	Province's Multifactor Productivity Level Relative to Canada's, 2007	Rank out of 10 provinces, 2007
	(per cent)		(Canada=100)	(Canada=100)	
Market Sector	1.1	2	87.3	93.4	5
Agriculture, Forestry, Fishing and Hunting	2.5	6	103.3	102.8	5
Mining, and Oil and Gas Extraction	4.6	2	91.2	233.2	3
Utilities	1.5	1	98.2	116.9	1
Construction	1.3	6	94.1	91.1	5
Manufacturing	1.9	2	87.6	88.5	6
Wholesale Trade	0.6	9	91.0	77.5	9
Retail Trade	2.6	4	85.0	89.0	7
Transportation and Warehousing	-0.6	5	81.4	80.5	9
Information and Cultural Industries	2.4	2	92.9	101.6	5
FIRE*	-0.2	4	94.2	92.4	6
Professional, Scientific and Technical Services	-3.1	9	93.7	73.4	9
ASWMR**	0.7	3	85.0	94.9	5
Arts, Entertainment and Recreation	-6.2	10	86.3	55.9	10
Accommodation and Food Services	0.7	5	86.7	87.7	8
Other Services (Except Public Administration)	1.7	4	75.4	79.4	8
Absolute Equally Weighted Average Rank		4.8			6.4
Equally Weighted Market Sector Rank		3			7

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

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

In terms of multifactor productivity levels, Nova Scotia's market sector ranked 5th in Canada in 2007. The province fared poorly in several industries with 7 of the 15 two-digit NAICS industries ranking 7th or below and was ranked 3rd or above in only 2 industries. In 2007, Nova Scotia had the highest relative multifactor productivity levels in utilities, and the lowest in arts, entertainment and recreation.

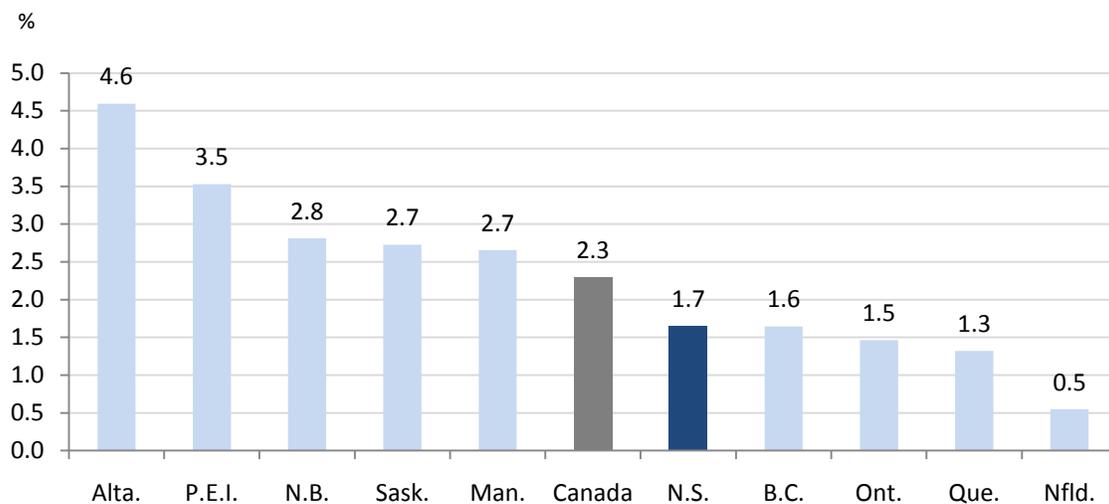
v. Capital Intensity

Capital intensity, defined as capital services per hour worked (unadjusted for labour quality), grew at an average rate of 1.7 per cent per year in Nova Scotia's market sector. This was well below the national average of 2.3 per cent per year. Nova Scotia ranks 6th among the ten provinces in terms of capital intensity growth (Chart 18).

During this period, the industries that experienced the highest capital intensity growth were: other services except public administration (8.6 per cent per year), mining and oil and gas extraction (8.4 per cent), and professional, scientific and technical services (6.0 per cent) (Table 23). Conversely, the industries that had the lowest growth rates were: utilities (-2.5 per cent), arts, entertainment and recreation (-0.9 per cent), and manufacturing (-0.4 per cent).

In 2007, 5 of the 15 two-digit NAICS industries had capital intensity levels above the Canadian levels. Industries with high relative levels included: other services except public administration (121.7 per cent of the Canadian level), professional, scientific and technical services (118.9 per cent), and accommodation and food services (109.5 per cent). The industries that had the lowest relative levels were mining, and oil and gas extraction (44.6 per cent of the Canadian level), wholesale trade (44.8 per cent), and administrative and support, waste management and remediation services (51.5 per cent).

Chart 18: Capital Intensity Growth in Canada and the Provinces, Market Sector, 1997-2007
(Average Annual Growth Rates)



Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

Compared to the other provinces, Nova Scotia had much lower capital intensity growth rates than Canada as a whole during the 1997-2007 period. The province ranked 7th or below in 6 of the 15

two-digit NAICS industries, but ranked 3rd or above in 4 industries. On the one hand, professional, scientific and professional services had the worst capital intensity growth rates among all the provinces. On the other hand, other services except government services along with transportation and warehousing, had the strongest capital intensity growth rates in Canada.

Nova Scotia's capital intensity level in 2007 was 62.3 per cent of the Canadian level, down from 66.4 per cent in 1997. According to the market sector rank the province had the lowest capital intensity level in Canada in 2007, by both the market sector rank and the equally-weighted market sector rank. This overall poor showing stems from 10 of the 15 two-digit NAICS industries having capital intensity levels ranked 7th or below, with only one industry ranked in the top 3.

Table 23: Capital Intensity Levels and Growth Rates in Nova Scotia, 1997-2007

	Compound Annual Growth Rate, 1997-2007	Rank out of 10 provinces	Province's Capital Intensity Level Relative to Canada's, 1997	Province's Capital Intensity Level Relative to Canada's, 2007	Capital Intensity Level, 2007	Rank out of 10 provinces, 2007
	(per cent)		(Canada=100)	(Canada=100)	(1997 Dollars)	
Market Sector	1.7	6	66.4	62.3	9.8	10
Agriculture, Forestry, Fishing and Hunting	1.9	7	72.0	70.4	9.1	10
Mining, and Oil and Gas Extraction	8.4	2	28.6	44.6	45.4	5
Utilities	-2.5	9	71.8	61.2	63.9	10
Construction	0.9	6	57.1	60.5	2.8	8
Manufacturing	-0.4	6	49.5	44.8	7.9	10
Wholesale Trade	2.3	7	89.6	76.8	10.1	7
Retail Trade	4.4	4	65.7	65.6	3.2	9
Transportation and Warehousing	5.5	1	56.7	74.3	9.8	7
Information and Cultural Industries	3.8	6	90.3	102.9	36.6	6
FIRE*	1.8	9	111.3	104.7	44.9	7
Professional, Scientific and Technical Services	6.0	10	152.7	118.9	13.1	3
ASWMR**	1.0	6	63.8	51.5	3.3	8
Arts, Entertainment and Recreation	-0.9	8	115.0	75.1	5.9	7
Accommodation and Food Services	3.9	2	86.3	109.5	3.5	4
Other Services (Except Public Administration)	8.6	1	71.2	121.7	3.7	3
Absolute Equally Weighted Average Rank		5.6				6.9
Equally Weighted Market Sector Rank		5				10

Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

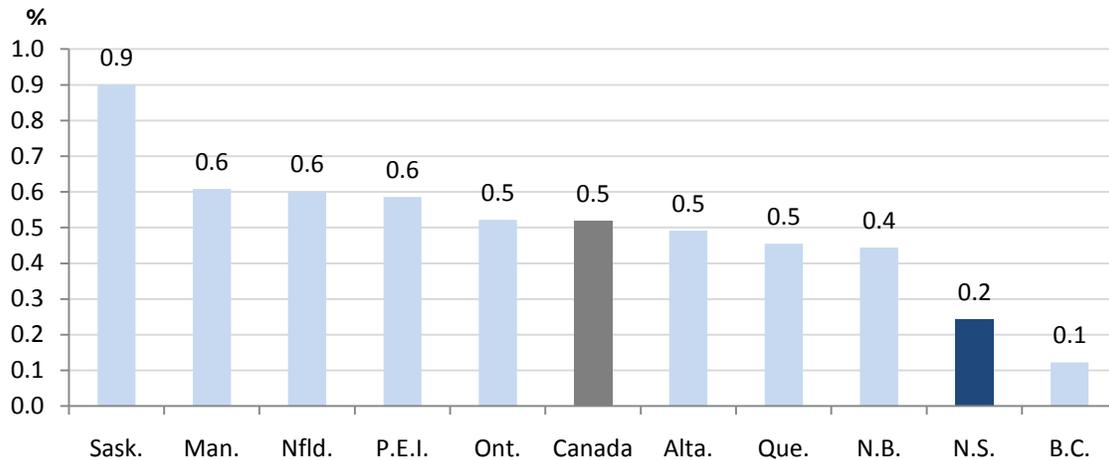
vi. Labour Quality

Nova Scotia experienced very slow labour quality growth in the market sector during the 1997-2007 period. The province grew at an average rate of 0.2 per cent per year, while the national average was 0.5 per cent per year. As a consequence, the province ranks 9th in Canada in terms of labour quality growth (Chart 19).

During the period in question, the industries that experienced the highest labour quality growth rates were in the arts, entertainment and recreation (0.9 per cent per year), utilities (0.9 per cent), and the wholesale trade (0.6 per cent) (Table 24). The industries that had the lowest labour quality growth rates were: mining, and oil and gas extraction (-0.4 per cent per year), other services and the retail trade (both grew at -0.3 per cent).

Nova Scotia had poor labour quality growth rates during the 1997-2007 period, surpassing only British Columbia. Low market sector labour quality growth manifested itself in most industries, as 8 of the 15 two-digit NAICS industries were ranked 8th or below when compared to other provinces. The province fared particularly poorly in agriculture, forestry, fishing and hunting, manufacturing, and mining, and oil and gas extraction, all of which had the lowest growth rates among all the provinces. Taken together, this earned the province the 2nd lowest ranking ranking.

Chart 19: Labour Quality Growth in Canada and the Provinces, Market Sector, 1997-2007
(Average Annual Growth Rates)



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

Table 24: Labour Quality Levels and Growth Rates in Nova Scotia, 1997-2007²²

Market Sector	Compound Annual Growth Rate, 1997-2007	Rank out of 10 Provinces
	(per cent)	
Market Sector	0.2	9
Agriculture, Forestry, Fishing and Hunting	0.0	9
Mining, and Oil and Gas Extraction	-0.4	9
Utilities	0.9	1
Construction	0.0	8
Manufacturing	0.1	9
Wholesale Trade	0.6	1
Retail Trade	-0.1	8
Transportation and Warehousing	0.3	8
Information and Cultural Industries	0.5	5
FIRE*	0.1	8
Professional, Scientific and Technical Services	0.5	5
ASWMR**	0.6	2
Arts, Entertainment and Recreation	0.9	4
Accommodation and Food Services	0.2	4
Other Services (Except Public Administration)	-0.1	8
Absolute Equally Weighted Average Rank		5.9
Equally Weighted Market Sector Rank		8

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

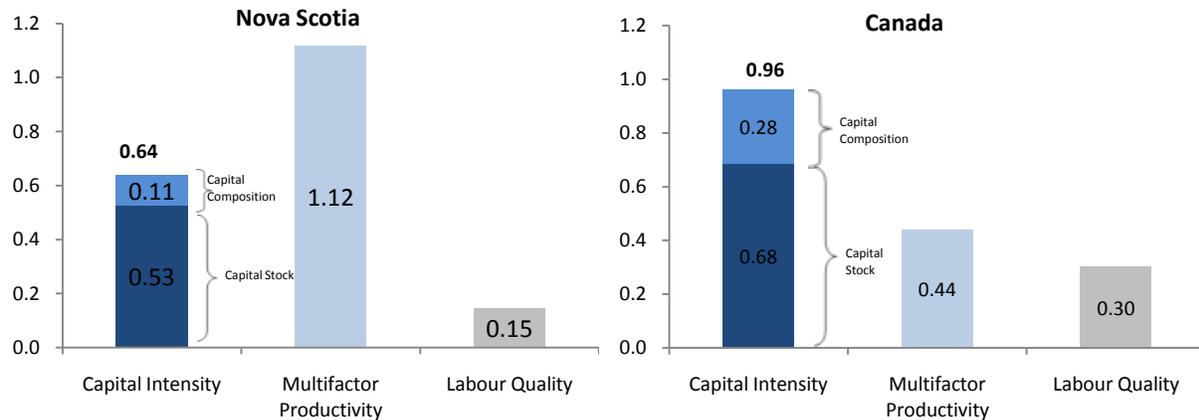
*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

²² Labour quality levels are not shown here because they are assumed to be the same across all provinces in the base year, 1997 (Sharpe and Thomson, 2010a). They differ after 1997, incorporating the different labour quality growth rates experienced by the provinces and Canada. For example, labour quality in Nova Scotia's market sector grew at an average annual rate of 0.2 per cent over the 1997-2007 period, while Canada's labour quality grew at an average annual rate of 0.5 per cent. As a consequence, Nova Scotia's labour quality level was 97.3 per cent of the Canadian level in 2007.

vii. Sources of Labour Productivity Growth in the Market Sector

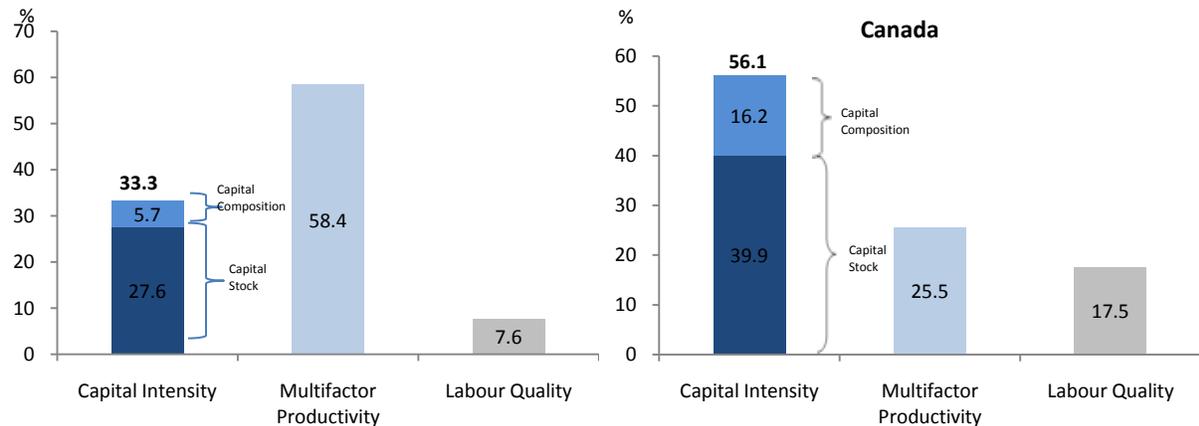
Nova Scotia's labour productivity grew at an average rate of 1.9 per cent per year during the 1997-2007 period, somewhat better than the national average of 1.7 per cent per year. Charts 20 and 21 show both the percentage point and per cent contributions to labour productivity growth by the sources of growth for Nova Scotia and Canada over the aforementioned period.

Chart 20: Percentage Point Contribution to Labour Productivity Growth by the Source of Labour Productivity Growth in the Market Sector in Nova Scotia and in Canada, 1997 to 2007



Source: CSLS Provincial Productivity Database, Appendix Table 197, http://www.csls.ca/data/mfp_new.asp.

Chart 21: Per Cent Contribution to Labour Productivity Growth by the Source of Labour Productivity Growth in the Market Sector in Nova Scotia and in Canada, 1997 to 2007



Source: CSLS Provincial Productivity Database, Appendix Table 197, http://www.csls.ca/data/mfp_new.asp.

Note: Numbers may not sum to 100 due to rounding.

Nova Scotia's labour productivity growth was driven mainly by multifactor productivity growth, which accounted for 1.12 percentage points of the overall labour productivity growth (or, alternatively, 58.4 per cent of total growth). The contribution of capital intensity to labour productivity growth can be broken down into two components: capital composition growth, which was responsible for 0.11 percentage points of labour productivity growth (5.7 per cent), and capital stock growth, which accounted for 0.53 percentage points (27.6 per cent). Finally, a small increase in labour quality was responsible for 0.15 percentage points of the labour productivity growth experienced in the province (7.6 per cent).

Comparing the two charts, it can be seen that the driver of labour productivity growth in Nova Scotia and in Canada were quite different. Multifactor productivity explains only 25.5 per cent of the labour productivity growth in Canada, and yet it explains 58.4 per cent of Nova Scotia's labour productivity growth. Conversely, labour quality explains 17.5 per cent of labour productivity growth in Canada, but only 7.6 per cent in Nova Scotia. Capital intensity growth was responsible for only 33.3 per cent of the growth in labour productivity for Nova Scotia and 56.1 per cent for Canada.

Table 25 details the contributions in absolute and per cent terms of capital intensity, MFP, and labour quality growth to labour productivity growth in Nova Scotia over the 1997-2007 period at the two-digit NAICS industry level.

Table 25: Contributions to Labour Productivity Growth at the Industry Level by Source in Nova Scotia, 1997-2007

Market Sector	Labour Productivity	Capital Intensity			MFP	Labour Quality	
		Total	Capital Composition	Capital Stock			
		Percentage Point Contributions to Labour Productivity Growth					
Market Sector	1.9	0.6	0.1	0.5	1.1	0.1	
Agriculture, Forestry, Fishing and Hunting	3.3	0.8	0.2	0.6	2.5	0.0	
Mining, and Oil and Gas Extraction	8.1	3.5	-0.1	3.6	4.6	-0.1	
Utilities	-0.1	-1.8			1.5	0.2	
Construction	1.5	0.2	0.0	0.2	1.3	0.0	
Manufacturing	1.8	-0.2	0.4	-0.5	1.9	0.1	
Wholesale Trade	1.7	0.7	0.1	0.7	0.6	0.4	
Retail Trade	3.7	1.1	0.0	1.0		-0.1	
Transportation and Warehousing	0.9	1.2	0.3	0.9	-0.6	0.2	
Information and Cultural Industries	5.0	2.3	0.6	1.7	2.4	0.2	
FIRE*	1.0	1.1	0.5	0.6	-0.2	0.0	
Professional, Scientific and Technical Services	-0.9	1.8	0.1	1.7	-3.1	0.4	
ASWMR**	1.6	0.3	0.0	0.3	0.7	0.5	
Arts, Entertainment and Recreation	-6.0	-0.4			-6.2	0.6	
Accommodation and Food Services	1.8	0.9	0.0	0.9	0.7	0.2	
Other Services (Except Public Administration)	3.3	1.6	0.4	1.2	1.7	-0.1	
		Per Cent Contributions to Labour Productivity Growth					
Market Sector	100.0	33.5	5.7	27.6	58.4	7.6	
Agriculture, Forestry, Fishing and Hunting	100.0	23.9	4.9	19.0	75.7	-0.2	
Mining, and Oil and Gas Extraction	100.0	43.0	-1.2	44.2	56.8	-1.6	
Utilities	100.0	1961.0			-1638.9	-253.0	
Construction	100.0	12.0	1.3	10.6	88.2	-0.3	
Manufacturing	100.0	-8.8	20.0	-28.5	106.1	2.8	
Wholesale Trade	100.0	43.1	3.1	39.9	31.8	24.5	
Retail Trade	100.0	29.5	1.3	28.1		-1.5	
Transportation and Warehousing	100.0	140.7	34.6	104.4	-63.3	23.2	
Information and Cultural Industries	100.0	46.1	11.3	34.5	48.6	4.0	
FIRE*	100.0	113.1	51.3	60.5	-17.4	4.4	
Professional, Scientific and Technical Services	100.0	-202.1	-7.8	-193.6	342.4	-47.1	
ASWMR**	100.0	21.2	0.7	20.4	47.4	30.9	
Arts, Entertainment and Recreation	100.0	6.1			103.8	-10.3	
Accommodation and Food Services	100.0	48.8	0.6	48.2	42.0	8.6	
Other Services (Except Public Administration)	100.0	50.1	12.3	37.1	52.2	-3.1	

Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

Note: Per cent contributions may not sum to 100 due to rounding.

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

viii. Sources of Labour Productivity Level Differential by Industry

Nova Scotia's labour productivity level in 2007 was 75.1 per cent of the Canadian level, which implies a labour productivity gap of 24.9 percentage points. Table 26 shows that the gap was caused predominantly by the market sector's low capital intensity level, which was responsible for 17.7 percentage points of the gap (or 70.1 per cent of the gap). The multifactor productivity and labour quality level accounted for 5.9 and 1.4 percentage points of the gap respectively (23.6 and 5.5 per cent of the gap).²³

Nova Scotia had a negative labour productivity gap in 13 of the 15 two-digit NAICS industries. Within many industries, both capital intensity and multifactor productivity made large negative contributions to the differential. The level of capital intensity lowers labour productivity relative to the national level in 10 industries, while multifactor productivity and labour quality each do so in 11 industries. Capital intensity was the largest contributor to the gap in 5 of the 13 industries with gaps, while multifactor productivity was the most responsible in the other 8.

Table 26: Sources of the Labour Productivity Gap Relative to Canada for Nova Scotia at the Two-Digit Industry Level, 2007

Market Sector	Labour Productivity Relative Level	Labour Productivity Gap	Percentage Point Contributions to Labour Productivity Gap		
			Capital Intensity	Multifactor Productivity	Labour Quality
Market Sector	75.1	-24.9	-17.7	-5.9	-1.4
Agriculture, Forestry, Fishing and Hunting	83.3	-16.7	-15.1	2.6	-4.2
Mining, and Oil and Gas Extraction	114.4	14.4	-75.7	90.6	-0.6
Utilities	82.7	-17.3	-33.3	14.2	1.8
Construction	80.5	-19.5	-10.2	-8.4	-0.8
Manufacturing	63.0	-37.0	-25.8	-9.8	-1.4
Wholesale Trade	72.2	-27.8	-7.9	-21.8	1.9
Retail Trade	78.5	-21.5	-9.9	-10.3	-1.2
Transportation and Warehousing	73.0	-27.0	-7.4	-18.6	-1.0
Information and Cultural Industries	102.9	2.9	1.7	1.6	-0.4
FIRE*	93.6	-6.4	2.5	-7.7	-1.2
Professional, Scientific and Technical Services	74.8	-25.2	2.8	-26.9	-1.0
ASWMR**	84.8	-15.2	-14.4	-4.9	4.1
Arts, Entertainment and Recreation	55.2	-44.8	-6.1	-43.9	5.2
Accommodation and Food Services	89.4	-10.6	1.9	-12.4	-0.1
Other Services (Except Public Administration)	80.5	-19.5	4.7	-20.7	-3.5

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

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

ix. Conclusion

During the 1997-2007 period, Nova Scotia experienced a slow growth in capital productivity (0.3 per cent per year) and comparatively high labour and multifactor productivity growth rates (1.9 and 1.1 per cent, respectively). The province experienced faster growth than the national rate in labour, capital and multifactor productivity growth rates. This was due to strong multifactor productivity growth. The

²³ Again, it is important to bear in mind that labour quality levels were assumed to be equal to 100.0 in all provinces and in Canada for the base year of 1997. They differ after 1997, incorporating the different labour quality growth rates experienced by the provinces and Canada.

proportions of labour productivity growth caused by growth in capital stock, capital composition and labour quality to labour productivity were all lower in Nova Scotia than in Canada as a whole.

Nova Scotia's capital productivity level in 2007 was well above national level. The labour productivity level, however, was below Canada's, with the labour productivity gap between Nova Scotia's market sector and Canada's reaching 24.9 percentage points. This was due mainly to the low capital intensity level in Nova Scotia, which explains 70.1 per cent of the gap. The Multifactor productivity level was also below the national level, standing at 93.4 per cent of the national level and ranking 7th among all provinces.

Table 27 provides a summary of both levels (in 2007) and growth rates (for the 1997-2007 period) for the productivity measures discussed in this report, along with rankings that show how Nova Scotia fared in comparison to the other provinces. A key observation is that Nova Scotia's growth rate performance was generally better than its level performance. On the one hand, growth rates were above the national rates for all productivity measures. On the other hand, Nova Scotia's levels relative to the Canadian levels were well below the national average for labour and multifactor productivities, as well as capital intensity. It should be noted, however, that the comparatively high growth rates implied an overall improvement of Nova Scotia's relative levels in 2007 compared to its 1997 values.

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

	Market Sector Growth, 1997 to 2007			Per Cent of the Canadian Level		Level Rankings, 2007	
	Compound Annual Growth Rate	Market Sector Rank	Equally Weighted Market Sector Rank	1997	2007	Market Sector Rank	Equally Weighted Market Sector Rank
Labour Productivity	1.9	4	5	73.6	75.1	9	9
Capital Productivity	0.3	3	5	110.9	120.5	2	3
Multifactor Productivity	1.1	2	3	87.3	93.4	5	7
Capital Intensity	1.7	6	5	66.4	62.3	10	10
Labour Quality	0.2	9	8				

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

V. An Analysis of New Brunswick's Productivity Performance, 1997-2007: Labour Productivity Driven by Capital Intensity Growth

i. Industry Composition by Nominal GDP and Total Hours Worked

In order to understand New Brunswick's overall productivity performance, it is essential to understand how each of the 15 two-digit NAICS industries contributed to the province's market sector in terms of nominal GDP and actual hours worked. Table 28 details these contribution shares for 1997 and 2007. In New Brunswick, the industries that had the highest GDP shares in 2007 were manufacturing (18.6 per cent of GDP), finance, insurance, real estate, rental and leasing (11.6 per cent), and construction (10.4 per cent). In terms of actual hours worked, the three industries that had the highest shares in 2007 were manufacturing (15.0 per cent), retail (14.8 per cent), and construction (11.0 per cent).

Table 28: Industry Share of Nominal GDP and Total Hours Worked in New Brunswick

Market Sector	1997				2007			
	GDP		Hours Worked		GDP		Hours Worked	
	Canada	New Brunswick						
Market Sector	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Agriculture, Forestry, Fishing and Hunting	3.2	5.7	5.4	7.5	2.1	3.5	3.4	4.6
Mining, and Oil and Gas Extraction	5.5	3.1	1.7	1.6	11.1	5.3	2.0	1.5
Utilities	4.2	5.8	0.9	1.4	3.0	5.2	0.8	1.4
Construction	7.0	7.8	7.9	9.4	9.0	10.4	10.1	11.0
Manufacturing	23.2	21.2	18.3	15.0	16.8	18.6	14.8	15.0
Wholesale Trade	7.1	6.3	7.4	6.6	7.1	7.1	6.9	4.9
Retail Trade	6.9	8.5	13.1	16.0	7.4	9.7	12.9	14.8
Transportation and Warehousing	6.2	8.2	6.3	8.5	5.6	6.4	6.6	8.7
Information and Cultural Industries	4.3	4.4	2.5	2.2	4.3	4.1	2.7	2.2
FIRE*	15.0	12.8	7.5	5.5	14.6	11.6	7.8	5.1
Professional, Scientific and Technical Services	4.9	3.6	6.3	4.2	6.2	4.2	7.9	5.0
ASWMR**	2.5	1.6	4.0	2.7	3.3	3.6	5.7	6.8
Arts, Entertainment and Recreation	0.9	0.8	1.5	1.0	0.9	0.7	1.9	1.5
Accommodation and Food Services	3.2	3.7	7.8	8.4	2.8	3.2	7.0	7.5
Other Services (Except Public Administration)	5.7	6.3	9.4	10.0	5.8	6.7	9.5	10.1

Source: Shares calculated by the CSLS, based on Statistics Canada data (Cansim Table 3083-0011).

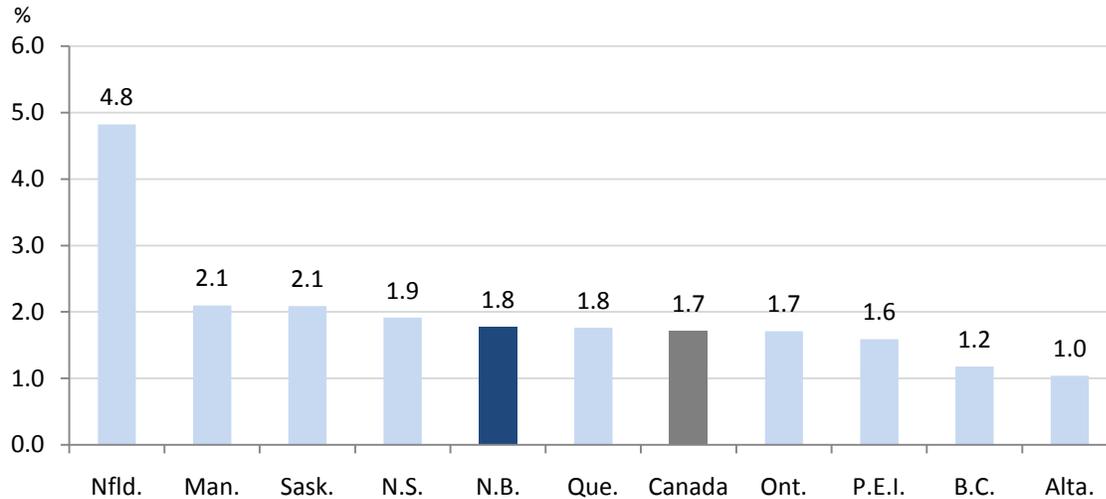
*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

ii. Labour Productivity

Labour productivity, defined as real GDP per hour worked,²⁴ grew at an average rate of 1.8 per cent per year in New Brunswick's market sector during the 1997-2007 period. This is somewhat better than the national average of 1.7 per cent per year, the 5th highest growth rate experienced by a province. While Manitoba, Saskatchewan and Nova Scotia witnessed greater labour productivity growth than New Brunswick, only Newfoundland experienced much higher growth rates (Chart 22).

²⁴ Note that the total hours worked figures used to calculate labour productivity are unadjusted for labour quality.

**Chart 22: Labour Productivity Growth in Canada and the Provinces, Market Sector, 1997-2007
(Average Annual Growth Rates)**



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

During the 1997-2007 period, the industry that experienced the highest labour productivity growth rate in New Brunswick was agriculture, forestry, fishing and hunting (7.6 per cent per year), followed by wholesale trade (4.5 per cent), and the information and cultural industries (4.4 per cent) (Table 29). The industry that had the lowest labour productivity growth rate was arts, entertainment and recreation (-5.5 per cent), followed by the mining, and oil and gas extraction (-4.8 per cent) and utilities (-1.1 per cent).

New Brunswick experienced growth in labour productivity in the market sector outpacing five provinces, but underperforming in many industries. The province ranked 3rd or higher in four of the 15 two-digit NAICS industries, but also came 7th or below in six industries. New Brunswick had the best labour productivity growth rate of any province in wholesale (4.5 per cent per annum) as well as construction (3.5 per cent). New Brunswick tended to have below average growth in its larger industries, which is why it ranked 5th in market sector labour productivity growth but had an equally weighted market sector rank of 4th.

New Brunswick's labour productivity level in 2007 was \$28.20 (1997 dollars) per hour, which represents 78.1 per cent of the Canadian level, down from 77.5 per cent in 1997. The province had the 3rd lowest labour productivity level in Canada in 2007, ahead of only Prince Edward Island and Nova Scotia.

At the industry level, New Brunswick ranked low in terms of labour productivity levels. Only agriculture, forestry, fishing and hunting (136.1 per cent of the national level) and the information and culture industry (107.5 per cent) have levels above the Canadian level in 2007. While all other industries were less productive in New Brunswick than in Canada as a whole, one industry was particularly behind: mining, oil and gas extraction (35.7 per cent) was just over a third as productive as the national counterpart. There were three other industries where New Brunswick lagged the national labour productivity by at least 30 per cent: arts entertainment and recreation (61.9 per cent), utilities (64.0 per cent), and administrative and support, waste management and remediation services (64.3 per cent).

There were only two industries for which New Brunswick ranked among the top four provinces with regards to level, and there were eight industries in which New Brunswick was ranked in the bottom three.

Table 29: Labour Productivity Levels and Growth Rates in New Brunswick, 1997-2007

Market Sector	Compound Annual Growth Rate, 1997-2007	Rank out of 10 Provinces	Province's Labour Productivity Level Relative to Canada's		Labour Productivity Level, 2007	Rank out of 10 Provinces, 2007
	(per cent)		1997 (Canada=100)	2007 (Canada=100)	(1997 Dollars)	
Market Sector	1.8	5	77.5	78.1	28.2	8
Agriculture, Forestry, Fishing and Hunting	7.6	2	98.3	136.1	36.9	3
Mining, and Oil and Gas Extraction	-4.8	9	46.7	35.7	28.1	9
Utilities	-1.1	6	65.4	64.0	86.2	9
Construction	3.5	1	72.5	86.4	27.6	6
Manufacturing	0.9	6	86.8	76.1	36.4	6
Wholesale Trade	4.5	1	77.4	83.4	34.9	8
Retail Trade	3.8	5	79.3	82.5	18.2	8
Transportation and Warehousing	0.2	8	76.9	73.2	23.2	7
Information and Cultural Industries	4.4	4	94.0	107.5	73.7	4
FIRE*	2.2	2	90.6	96.7	68.0	6
Professional, Scientific and Technical Services	0.9	6	84.8	81.3	21.9	6
ASWMR**	-1.1	7	74.0	64.3	12.7	9
Arts, Entertainment and Recreation	-5.5	9	96.9	61.9	10.0	8
Accommodation and Food Services	0.7	7	83.5	80.0	11.0	10
Other Services (Except Public Administration)	1.8	7	78.8	76.2	12.4	9
Absolute Equally Weighted Average Rank		5.3				7.2
Equally Weighted Market Sector Rank		4				8

Source: CSLs Provincial Productivity Database, Appendix Tables, http://www.csis.ca/data/mfp_new.asp.

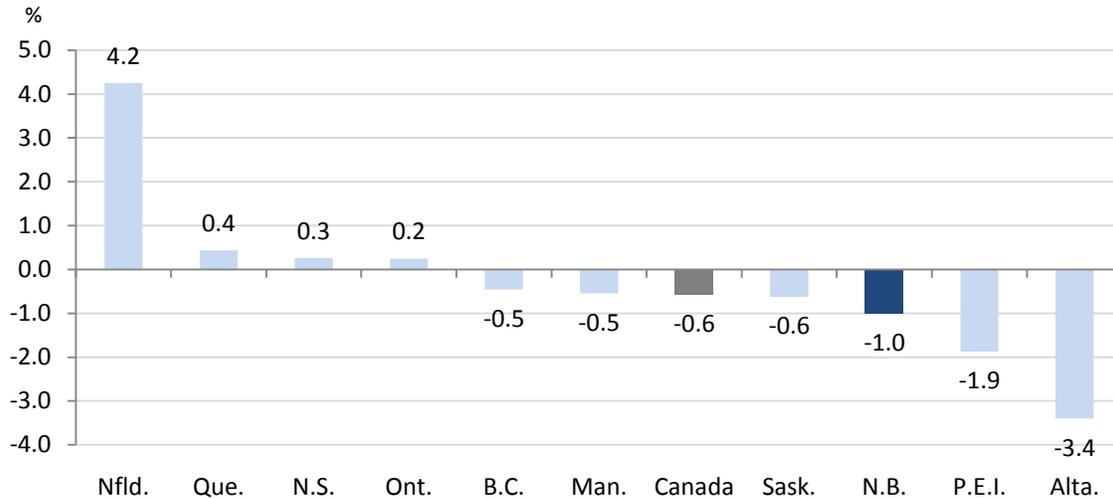
*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

iii. Capital Productivity

Capital productivity, defined as real GDP per unit of capital services, declined at a rate of 1.0 per cent per year in New Brunswick's market sector during the 1997-2007 period. Falling capital productivity was by no means unique to New Brunswick, having taken place in six of the ten provinces. Canada's capital productivity declined 0.6 per cent per year over the period. The province's capital productivity growth in the market sector ranked 3rd last in Canada (Chart 23).

In New Brunswick, 11 of the 15 two-digit NAICS industries had negative capital productivity growth rates during the period. The industries that had the worst performances were professional, scientific and technical services (-7.8 per cent per year), followed by mining, oil and gas extraction (-5.1 per cent), and transportation and warehousing (-3.9 per cent) (Table 30). Of the few industries that had positive growth rates, the ones that performed better were administrative and support, waste management and remediation services (8.7 per cent), followed by agriculture, forestry, fishing and hunting (3.8 per cent) and wholesale trade (2.8 per cent).

**Chart 23: Capital Productivity Growth Rates in Canada and the Provinces, Market Sector, 1997-2007
(Average Annual Growth Rates)**



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

Consistent with the weak capital productivity growth at the market sector level, eight of the 15 two-digit NAICS industries ranked 7th or lower. Two industries, retail trade and information and cultural industries, had the worst capital productivity growth rates among all provinces. On the other hand, some industries did rather well, with four of the 15 two-digit NAICS industries at 3rd place or higher, but eight industries ranked 7th or lower. New Brunswick's agriculture, forestry, fishing and hunting, along with wholesale trade, had the highest capital productivity growth in Canada.

New Brunswick's capital productivity level in the market sector in 2007 was 103.1 per cent of the Canadian level, down from 107.7 per cent in 1997, putting the province in 6th place. In 2007, 7 of the 15 two-digit NAICS industries in the province had capital productivity levels above the Canadian average. The industries with highest relative capital productivity levels were: administrative and support, waste and remediation (ASWMR) (446.3 per cent), followed by agriculture, forestry, fishing and hunting (180.0 per cent of the national level) and mining, and oil and gas extraction (154.8 per cent). The eight industries that had capital productivity levels lower than Canada's in 2007 were: finance, insurance, real estate, rental and leasing (70 per cent), followed by utilities (78.5 per cent), manufacturing (80.5 per cent), accommodation and food services (81.4 per cent), information and cultural industries (86.1 per cent), professional, scientific and technical services (86.7 per cent), other services (except public administration) (87.3 per cent), and retail trade (88.5 per cent).

New Brunswick's market sector had the 6th highest capital productivity level in Canada in 2007. This reflects the mediocre overall capital productivity level in the province, which ranked in the bottom half for nine industries. Despite a generally poor showing across industries, agriculture, forestry, fishing and hunting had the highest capital productivity level of all the provinces.

Table 30: Capital Productivity Levels and Growth Rates in New Brunswick, 1997-2007

Market Sector	Compound Annual Growth Rate, 1997-2007	Rank out of 10 Provinces	Province's Capital Productivity Level Relative to Canada's, 1997	Province's Capital Productivity Level Relative to Canada's, 2007	Capital Productivity Level, 2007	Rank out of 10 Provinces, 2007
	(per cent)		(Canada=100)	(Canada=100)	(1997 Dollars)	
Market Sector	-1.0	8	107.7	103.1	2.37	6
Agriculture, Forestry, Fishing and Hunting	3.8	1	151.3	180.0	3.78	1
Mining, and Oil and Gas Extraction	-5.1	8	145.5	154.8	1.20	6
Utilities	-2.6	8	102.1	78.5	1.01	8
Construction	1.0	4	115.0	110.3	7.54	5
Manufacturing	-0.5	9	99.5	80.5	2.19	8
Wholesale Trade	2.8	1	90.9	121.8	3.87	2
Retail Trade	-3.8	10	117.9	88.5	4.05	8
Transportation and Warehousing	-3.9	9	128.4	105.0	2.53	4
Information and Cultural Industries	-1.8	10	108.9	86.1	1.66	9
FIRE*	-3.6	8	92.3	70.0	1.15	8
Professional, Scientific and Technical Services	-7.8	6	97.3	86.7	2.12	6
ASWMR**	8.7	2	146.3	446.3	13.75	2
Arts, Entertainment and Recreation	-2.7	3	96.6	116.4	2.40	4
Accommodation and Food Services	-3.1	9	107.1	81.4	3.50	8
Other Services (Except Public Administration)	-1.9	5	97.4	87.3	4.65	6
Absolute Equally Weighted Average Rank		6.2				5.7
Equally Weighted Market Sector Rank		8				7

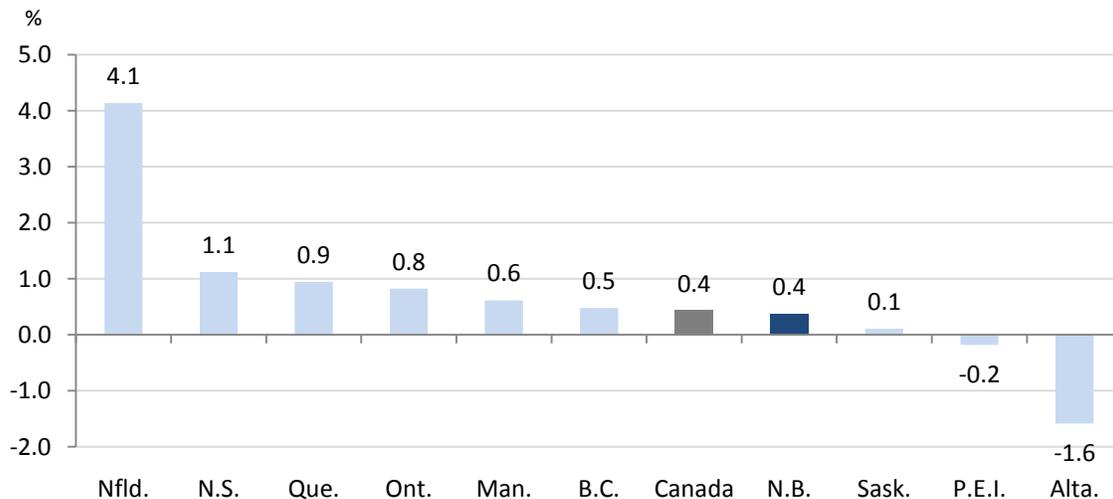
Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

iv. Multifactor Productivity

New Brunswick's multifactor productivity in the market sector grew at an average rate of 0.37 per cent per year during the 1997-2007 period, slightly below the national average of 0.44 per cent per year. The province ranked 7th in Canada (Chart 24).

Chart 24: Multifactor Productivity Growth in Canada and the Provinces, Market Sector, 1997-2007 (Average Annual Growth Rates)



Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

The industry that experienced the highest multifactor productivity growth rate in New Brunswick was agriculture, forestry, fishing and hunting (5.6 per cent per year), followed by wholesale

trade (4.0 per cent), and construction (3.1 per cent) (Table 31). The industries that had the lowest multifactor productivity growth rates were the arts, entertainment and recreation industry (-5.8 per cent per year), mining, and oil and gas extraction (-5.0 per cent), and utilities (-2.3 per cent).

New Brunswick experienced low multifactor productivity growth in many industries. Of the 15 two-digit NAICS industries, only three were ranked 3rd or higher while 11 were ranked at 7th place or lower. Despite the generally poor showing, two New Brunswick industries had the highest multifactor growth rate among all provinces: agriculture, forestry, fishing and hunting and the wholesale trade.

The province's multifactor productivity level in 2007 was 88.5 per cent of the Canadian level, down slightly from 89.0 per cent in 1997. In 2007, only 2 of the 15 two-digit NAICS industries in New Brunswick had multifactor productivity higher than the national level. The industries with the highest relative multifactor productivity levels were: agriculture, forestry, fishing and hunting (158.9 per cent of the national average) and wholesale trade (102.1 per cent). In contrast, the industries with lowest relative multifactor productivity levels were arts, entertainment and recreation (67.5 per cent of the national average), other services (74.7 per cent) and utilities (75.2 per cent).

In terms of multifactor productivity levels, New Brunswick's market sector ranked 7th in Canada in 2007. The province fared poorly in several industries with 9 of the 15 two-digit NAICS industries ranking 7th or below, and was ranked 3rd or above in only 2 industries. In 2007, New Brunswick had the lowest in accommodation and food services.

Table 31: Multifactor Productivity Levels and Growth Rates in New Brunswick, 1997-2007

Market Sector	Compound Annual Growth Rate, 1997-2007	Rank out of 10 provinces	Province's Multifactor Productivity Level Relative to Canada's		Rank of 10 provinces, 2007
	(per cent)		1997 (Canada=100)	2007 (Canada=100)	
Market Sector	0.4	7	89.0	88.5	7
Agriculture, Forestry, Fishing and Hunting	5.6	1	118.5	158.9	2
Mining, and Oil and Gas Extraction	-5.0	8	100.1	97.8	7
Utilities	-2.3	8	92.5	75.2	9
Construction	3.1	2	80.2	92.6	4
Manufacturing	-0.1	9	93.0	77.1	7
Wholesale Trade	4.0	1	86.0	102.1	3
Retail Trade	1.6	9	88.2	83.7	8
Transportation and Warehousing	-1.3	8	87.5	80.7	8
Information and Cultural Industries	1.2	8	101.0	98.3	6
FIRE*	-1.4	8	92.2	80.1	8
Professional, Scientific and Technical Services	-1.2	7	90.1	85.7	5
ASWMR**	0.4	4	82.9	89.9	6
Arts, Entertainment and Recreation	-5.8	9	100.0	67.5	9
Accommodation and Food Services	0.0	8	88.7	83.6	10
Other Services (Except Public Administration)	0.1	9	83.2	74.7	9
Absolute Equally Weighted Average Rank		6.6			6.7
Equally Weighted Market Sector Rank		10			8

Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

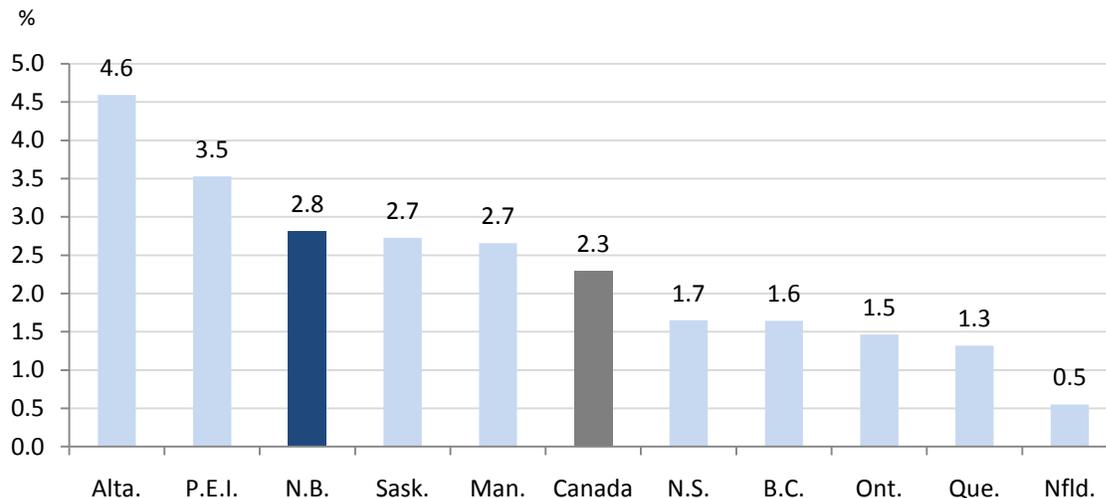
v. Capital Intensity

Capital intensity, defined as capital services per hour worked (unadjusted for labour quality), grew at an average rate of 2.8 per cent per year in New Brunswick's market sector. This was well above the national average of 2.3 per cent per year. New Brunswick ranked 3rd among the ten provinces in terms of capital intensity growth, behind only Alberta and Prince Edward Island (Chart 25).

During this period, the industry that experienced the highest capital intensity growth was professional, scientific and technical services (9.5 per cent per year), followed by retail trade (7.8 per cent) and information and cultural industries (6.3 per cent) (Table 32). Conversely, the industries that had the lowest growth rates were: administrative and support, waste management and remediation services (-9.0 per cent), arts, entertainment and recreation (-2.9 per cent), and mining, and oil and gas extraction (-0.3 per cent).

In 2007, two of the 15 two-digit NAICS industries had capital intensity levels above the Canadian levels. Industries with high relative levels included: finance, insurance, real estate, rental and leasing (138.0 per cent of the Canadian level), and information and cultural industries (126.5 per cent). The industries that had the lowest relative levels were administrative and support, waste management and remediation services (14.4 per cent of the Canadian level), mining, oil and gas extraction (23.1 per cent), and arts, entertainment and recreation (53.2 per cent).

Chart 25: Capital Intensity Growth in Canada and the Provinces, Market Sector, 1997-2007
(Average Annual Growth Rates)



Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

At the industry level, New Brunswick enjoyed stronger capital intensity growth rates than Canada as a whole during the 1997-2007 period. The province ranked 3rd or above in seven of the 15 two-digit NAICS industries, but ranked 7th or below in four industries. The retail trade and information and cultural industries each had the higher capital intensity growth rates than in any other province.

Table 32: Capital Intensity Levels and Growth Rates in New Brunswick, 1997-2007

Market Sector	Compound Annual Growth Rate, 1997-2007	Rank out of 10 Provinces	Province's Capital Intensity Level Relative to Canada's		Capital Intensity Level, 2007	Rank out of 10 Provinces, 2007
	(per cent)		1997 (Canada=100)	2007 (Canada=100)	(1997 Dollars)	
Market Sector	2.8	3	72.0	75.7	11.9	7
Agriculture, Forestry, Fishing and Hunting	3.7	4	64.9	75.6	9.8	8
Mining, and Oil and Gas Extraction	0.3	8	32.1	23.1	23.5	8
Utilities	1.5	3	64.0	81.5	85.1	7
Construction	2.5	5	62.9	78.3	3.7	6
Manufacturing	1.4	3	87.0	94.6	16.6	5
Wholesale Trade	1.7	8	85.1	68.4	9.0	8
Retail Trade	7.8	1	67.4	93.1	4.5	4
Transportation and Warehousing	4.2	2	60.1	69.7	9.2	9
Information and Cultural Industries	6.3	1	87.4	126.5	45.0	3
FIRE*	6.0	3	98.4	138.0	59.1	3
Professional, Scientific and Technical Services	9.5	5	86.8	93.7	10.3	8
ASWMR**	-9.0	9	50.7	14.4	0.9	9
Arts, Entertainment and Recreation	-2.9	9	100.2	53.2	4.2	9
Accommodation and Food Services	3.8	3	78.4	98.4	3.1	7
Other Services (Except Public Administration)	3.7	5	81.3	87.2	2.7	6
Absolute Equally Weighted Average Rank		4.6				6.7
Equally Weighted Market Sector Rank		2				9

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

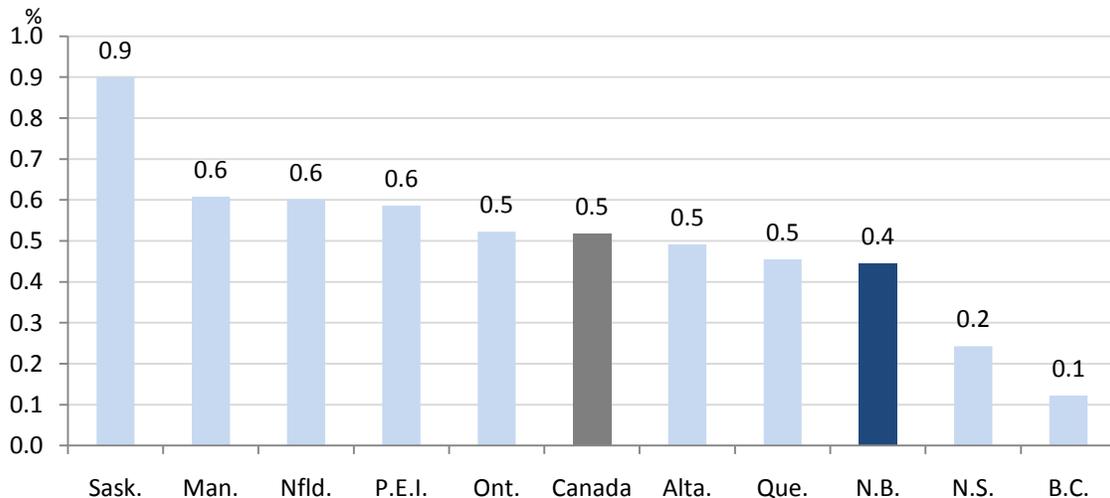
*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

New Brunswick's capital intensity level in 2007 was 75.7 per cent of the Canadian level, up from 72.0 per cent in 1997. According to the market sector rank the province had the 4th lowest capital intensity level in Canada in 2007. This overall poor showing stems from 7 of the 15 two-digit NAICS industries having capital intensity levels ranked 7th or below, with only 2 industries ranked in the top 3.

vi. Labour Quality

New Brunswick experienced slow labour quality growth in the market sector during the 1997-2007 period. The province grew at an average rate of 0.4 per cent per year, while the national average was 0.5 per cent per year. As a consequence, the province ranks 8th in Canada in terms of labour quality growth (Chart 26).

Chart 26: Labour Quality Growth in Canada and the Provinces, Market Sector, 1997-2007 (Average Annual Growth Rates)



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

During the period in question, the industries that experienced the highest labour quality growth rates were the arts, entertainment and recreation (1.2 per cent per year), followed by other services (except public administration) (1.1 per cent) and the transportation and warehousing (0.6 per cent) (Table 33). The industry that had the lowest labour quality growth rate was: accommodation and food services (-0.3 per cent per year), followed by information and cultural industries and wholesale trade (both grew at -0.1 per cent).

Low market sector labour quality growth did not manifest itself in most industries, as 8 of the 15 two-digit NAICS industries were ranked 3rd or above when compared to other provinces. In fact, labour quality growth was the 2nd highest in the country using the equally weighted market sector rank. The province fared particularly poorly relative to other provinces in accommodation and food services where the lowest growth rate among all the provinces was attained. New Brunswick achieved the highest labour quality growth of any province in other services (excluding public administration).

Table 33: Labour Quality Levels and Growth Rates in New Brunswick, 1997-2007²⁵

Market Sector	Compound Annual Growth Rate, 1997-2007	Rank	Province's Labour Quality Level Relative to Canada's		Rank, 2007
	(per cent)		1997 (Canada=100)	2007 (Canada=100)	
Market Sector	0.4	8	100.0	99.3	7
Agriculture, Forestry, Fishing and Hunting	0.6	6	100.0	97.3	6
Mining, and Oil and Gas Extraction	0.1	2	100.0	101.1	2
Utilities	-0.1	8	100.0	98.1	8
Construction	0.0	7	100.0	99.1	7
Manufacturing	0.6	2	100.0	102.1	2
Wholesale Trade	-0.1	8	100.0	96.0	8
Retail Trade	0.2	3	100.0	100.7	3
Transportation and Warehousing	0.6	3	100.0	101.9	3
Information and Cultural Industries	-0.1	9	100.0	93.4	9
FIRE*	0.6	2	100.0	101.4	2
Professional, Scientific and Technical Services	0.1	8	100.0	95.1	8
ASWMR**	0.4	3	100.0	104.5	3
Arts, Entertainment and Recreation	1.2	2	100.0	112.7	2
Accommodation and Food Services	-0.3	10	100.0	94.9	10
Other Services (Except Public Administration)	1.1	1	100.0	106.7	1
Absolute Equally Weighted Average Rank		4.9			4.9
Equally Weighted Market Sector Rank		2			2

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

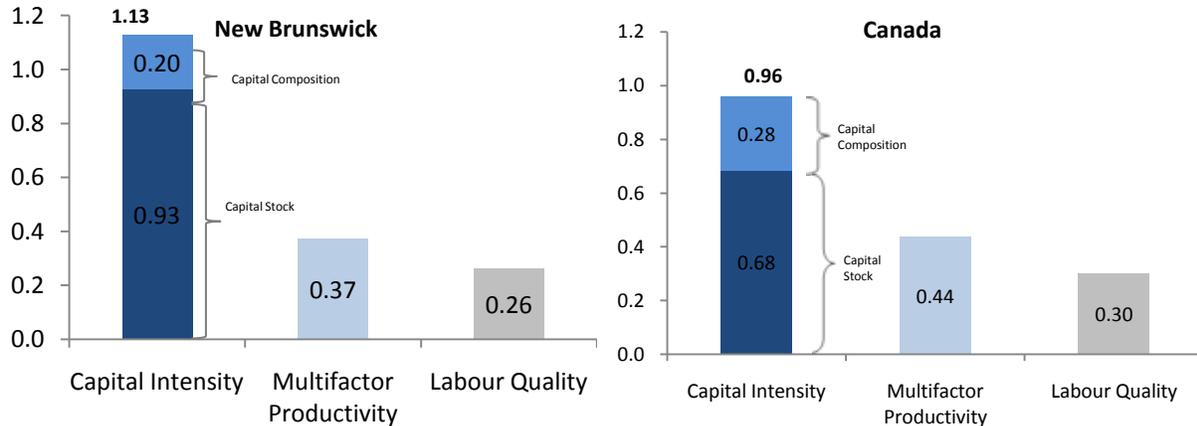
*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

²⁵ Labour quality levels are not shown here because they are assumed to be the same across all provinces in the base year, 1997 (Sharpe and Thomson, 2010a). They differ after 1997, incorporating the different labour quality growth rates experienced by the provinces and Canada. For example, labour quality in New Brunswick's market sector grew at an average annual rate of 0.4 per cent over the 1997-2007 period, while Canada's labour quality grew at an average annual rate of 0.5 per cent. As a consequence, New Brunswick's labour quality level was 99.3 per cent of the Canadian level in 2007.

vii. Sources of Labour Productivity Growth in the Market Sector

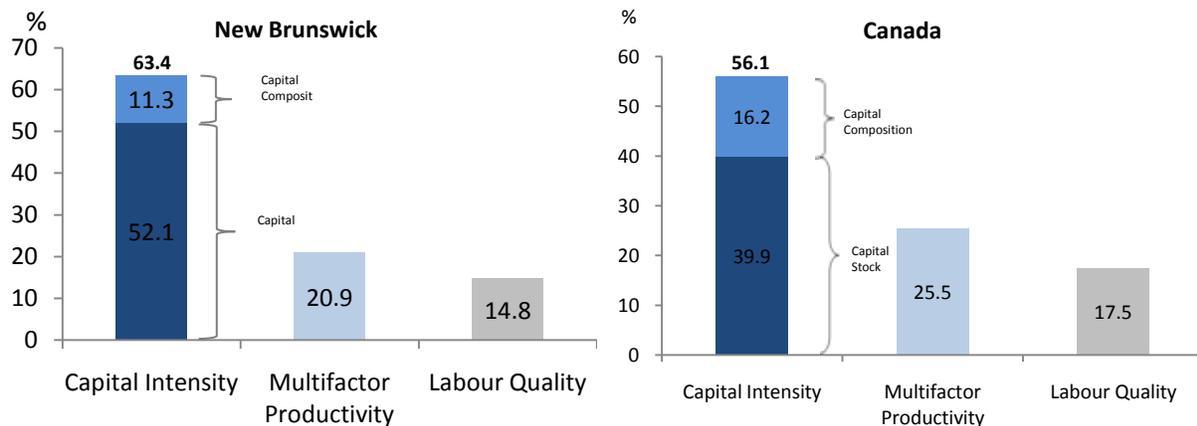
New Brunswick's labour productivity grew at an average rate of 1.8 per cent per year during the 1997-2007 period, somewhat better than the national average of 1.7 per cent per year. Charts 27 and 28 show both the percentage point and per cent contributions to labour productivity growth by the sources of growth for New Brunswick and Canada over the aforementioned period.

Chart 27: Percentage Point Contribution to Labour Productivity Growth by the Source of Labour Productivity Growth in the Market Sector in New Brunswick and in Canada, 1997 to 2007



Source: CSL Provincial Productivity Database, Appendix Table 287, http://www.csls.ca/data/mfp_new.asp.

Chart 28: Per Cent Contribution to Labour Productivity Growth by the Source of Labour Productivity Growth in the Market Sector in New Brunswick and in Canada, 1997 to 2007



Source: CSL Provincial Productivity Database, Appendix Table 287, http://www.csls.ca/data/mfp_new.asp.

Note: Numbers may not sum to 100 due to rounding.

New Brunswick's labour productivity growth was driven mainly by capital intensity growth, which accounted for 1.13 percentage points of the overall labour productivity growth (or, alternatively, 63.4 per cent of total growth). The contribution of capital intensity to labour productivity growth can be broken down into two components: capital composition growth, which was responsible for 0.20 percentage points of labour productivity growth (11.3 per cent), and capital stock growth, which accounted for 0.93 percentage points (52.1 per cent). Multifactor productivity contributed 0.37 percentage points to the annual growth rate (20.9 per cent). Finally, a small increase in labour quality

was responsible for 0.26 percentage points of the labour productivity growth experienced in the province (14.8 per cent).

Comparing the two charts, it can be seen that the driver of labour productivity growth in New Brunswick and in Canada were fairly different. Increased capital stock explains only 39.3 per cent of the labour productivity growth in Canada, and yet it explains 52.1 per cent of New Brunswick's labour productivity growth. Multifactor productivity was responsible 25.5 per cent of growth for the nation, but only 20.9 per cent for New Brunswick. Labour quality accounted for a higher proportion of Canadian labour productivity growth than it did in New Brunswick (17.5 versus 14.8 per cent), and this held for capital composition as well (16.2 versus 11.3 per cent). Capital intensity was thus the only factor that proportionally contributed more to New Brunswick's growth rather than the national rate.

Table 34 details the contributions in absolute and per cent terms of capital intensity, MFP, and labour quality growth to labour productivity growth in New Brunswick over the 1997-2007 period at the two-digit NAICS industry level.

Table 34: Contributions to Labour Productivity Growth at the Industry Level by Source in New Brunswick, 1997-2007

Market Sector	Labour Productivity	Capital Intensity			MFP	Labour Quality
		Total	Capital Composition	Capital Stock		
Percentage Point Contributions to Labour Productivity Growth						
Market Sector	1.8	1.1	0.2	0.9	0.4	0.3
Agriculture, Forestry, Fishing and Hunting	7.6	1.6	1.5	0.1	5.6	0.4
Mining, and Oil and Gas Extraction	-4.8	0.1	0.0	0.1	-5.0	0.1
Utilities	-1.1	1.2			-2.3	0.0
Construction	3.5	0.4	0.0	0.4	3.1	0.0
Manufacturing	0.9	0.7	0.1	0.5	-0.1	0.3
Wholesale Trade	4.5	0.6	0.3	0.3	4.0	-0.1
Retail Trade	3.8	2.0	-0.1	2.1		0.1
Transportation and Warehousing	0.2	1.1	0.2	0.9	-1.3	0.5
Information and Cultural Industries	4.4	3.3	1.0	2.2	1.2	-0.1
FIRE*	2.2	3.4	1.1	2.3	-1.4	0.2
Professional, Scientific and Technical Services	0.9	2.0	0.1	1.9	-1.2	0.1
ASWMR**	-1.1	-1.8	-2.2	0.4	0.4	0.4
Arts, Entertainment and Recreation	-5.5	-0.6			-5.8	0.8
Accommodation and Food Services	0.7	0.9	-0.1	1.0	0.0	-0.2
Other Services (Except Public Administration)	1.8	0.7	0.2	0.6	0.1	0.9
Per Cent Contributions to Labour Productivity Growth						
Market Sector	100.0	63.7	11.3	52.1	20.9	14.8
Agriculture, Forestry, Fishing and Hunting	100.0	20.4	19.3	1.1	73.4	4.7
Mining, and Oil and Gas Extraction	100.0	-1.7	-0.4	-1.3	103.4	-1.9
Utilities	100.0	-102.3			199.4	0.6
Construction	100.0	11.3	0.9	10.4	87.6	0.7
Manufacturing	100.0	72.8	15.8	56.7	-7.4	34.4
Wholesale Trade	100.0	13.5	7.6	5.9	87.9	-1.9
Retail Trade	100.0	53.4	-1.8	55.4		3.9
Transportation and Warehousing	100.0	565.4	92.7	468.3	-702.0	244.8
Information and Cultural Industries	100.0	74.0	23.9	49.0	26.8	-1.6
FIRE*	100.0	157.9	49.7	105.8	-66.2	10.4
Professional, Scientific and Technical Services	100.0	217.1	8.7	207.4	-126.9	12.2
ASWMR**	100.0	169.1	209.9	-39.9	-34.9	-35.3
Arts, Entertainment and Recreation	100.0	10.5			104.0	-14.9
Accommodation and Food Services	100.0	140.7	-9.2	150.3	-3.9	-36.4
Other Services (Except Public Administration)	100.0	42.2	10.3	31.6	8.3	49.0

Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

Note: Per cent contributions may not sum to 100 due to rounding.

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

viii. Sources of Labour Productivity Level Differential by Industry

New Brunswick's labour productivity level in 2007 was 78.1 per cent of the Canadian level, which implies a labour productivity gap of 21.9 percentage points. Table 35 shows that the gap was caused almost equally by the market sector's below average capital intensity and multifactor productivity levels, which were responsible for 10.7 and 10.9 percentage points of the gap, respectively (or 48.8 and 49.5 per cent of the gap). Labour quality accounted for only 0.4 percentage points of the gap (1.7 per cent).²⁶

New Brunswick had a negative labour productivity gap in 13 of the 15 two-digit NAICS industries. Within many industries, both capital intensity and multifactor productivity made large negative contributions to the differential. The levels of capital intensity and multifactor productivity each lower labour productivity relative to the national level in 13 industries, and labour quality adversely affects labour productivity in seven industries. Capital intensity was the largest contributor to the gap in three of the 13 industries with gaps, while multifactor productivity was the most responsible in the other 10.

Table 35: Sources of the Labour Productivity Gap Relative to Canada for New Brunswick at the Two-Digit Industry Level, 2007

Market Sector	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 Quality	Labour Productivity	Capital Intensity	Multifactor Productivity	Labour Quality
Market Sector	78.1	-21.9	-10.7	-10.9	-0.4	100.0	48.8	49.5	1.7
Agriculture, Forestry, Fishing and Hunting	136.1	36.1	-16.6	54.2	-1.6	100.0	-46.0	150.4	-4.5
Mining, and Oil and Gas Extraction	35.7	-64.3	-63.1	-1.4	0.2	100.0	98.2	2.1	-0.3
Utilities	64.0	-36.0	-12.6	-23.0	-0.4	100.0	35.0	64.0	1.0
Construction	86.4	-13.6	-5.8	-7.2	-0.6	100.0	42.7	52.9	4.5
Manufacturing	76.1	-23.9	-2.1	-22.8	1.0	100.0	8.9	95.4	-4.3
Wholesale Trade	83.4	-16.6	-16.6	1.9	-2.0	100.0	99.6	-11.5	11.8
Retail Trade	82.5	-17.5	-1.8	-16.1	0.4	100.0	10.5	92.0	-2.4
Transportation and Warehousing	73.2	-26.8	-9.5	-18.5	1.1	100.0	35.3	68.8	-4.2
Information and Cultural Industries	107.5	7.5	12.7	-1.8	-3.4	100.0	169.9	-24.5	-45.4
FIRE*	96.7	-3.3	17.8	-21.8	0.6	100.0	-534.2	652.7	-18.5
Professional, Scientific and Technical Services	81.3	-18.7	-1.0	-13.9	-3.8	100.0	5.4	74.3	20.2
ASWMR**	64.3	-35.7	-29.9	-8.6	2.9	100.0	83.9	24.2	-8.1
Arts, Entertainment and Recreation	61.9	-38.1	-13.8	-31.2	6.9	100.0	36.2	81.9	-18.1
Accommodation and Food Services	80.0	-20.0	-0.3	-16.1	-3.6	100.0	1.7	80.5	17.8
Other Services (Except Public Administration)	76.2	-23.8	-2.7	-25.5	4.4	100.0	11.4	106.9	-18.3

Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

²⁶ Again, it is important to bear in mind that labour quality levels were assumed to be equal to 100.0 in all provinces and in Canada for the base year of 1997. They differ after 1997, incorporating the different labour quality growth rates experienced by the provinces and Canada.

ix. Conclusion

During the 1997-2007 period, New Brunswick experienced a declining capital productivity (-1.0 per cent per year), below average multifactor productivity growth (0.4 per cent) and yet slightly above average labour productivity growth (1.8 percent). The increase in labour productivity was driven primarily by capital intensity growth surpassing the national rate (2.8 versus 2.3 per cent). The proportion of labour productivity growth caused by growth in multifactor productivity and labour quality were lower in New Brunswick than in Canada as a whole.

New Brunswick's capital productivity level in 2007 was slightly above national level. The labour productivity level, however, was well below Canada's, with the labour productivity gap between New Brunswick's market sector and Canada's reaching 21.9 percentage points. This was due almost evenly to the low capital intensity and multifactor productivity levels in New Brunswick, which explains 48.4 and 49.5 per cent of the gap, respectively. Low labour quality explains the remaining portion.

Table 36 provides a summary of both levels (in 2007) and growth rates (for the 1997-2007 period) for the productivity measures discussed in this report, along with rankings that show how New Brunswick fared in comparison to the other provinces. A key observation is that New Brunswick combined generally weak growth rates with generally low levels. It is only through high capital intensity growth that labour productivity slightly outpaced the national rate and New Brunswick enjoys a higher level of capital productivity, but lower multifactor and labour productivity level.

Table 36: Summary of New Brunswick's Productivity Performance in the Market Sector

	Market Sector Growth, 1997 to 2007			Per Cent of the Canadian Level		Level Rankings, 2007	
	Compound Annual Growth Rate	Provincial Rank	Provincial Equally Weighted Rank	1997	2007	Provincial Rank	Provincial Equally Weighted Rank
Labour Productivity	1.8	5	4	77.5	78.1	8	8
Capital Productivity	-1.0	8	8	107.7	103.1	6	7
Multifactor Productivity	0.4	7	10	89.0	88.5	7	8
Capital Intensity	2.8	3	2	72.0	75.7	7	9
Labour Quality	0.4	8	2	n.a.	n.a.	n.a.	n.a.

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

VI. An Analysis of Quebec's Productivity Performance, 1997-2007: Superior Multifactor Productivity Growth, Weak Capital Intensity Growth

i. Industry Composition by Nominal GDP and Total Hours Worked

In order to understand Quebec's overall productivity performance, it is essential to understand how each of the 15 two-digit NAICS industries contributed to the province's market sector in terms of nominal GDP and actual hours worked. Table 37 details these contribution shares for 1997 and 2007. In Quebec, the industries that had the highest GDP shares in 2007 were manufacturing (22.8 per cent of GDP), FIRE (finance, insurance, real estate, rental and leasing) (13.6 per cent) and retail trade (8.5 per cent). In terms of actual hours worked, the three industries that had the highest shares in 2007 were manufacturing (19.2 per cent), retail trade (14.2 per cent), and other services (except public administration) (10.1 per cent).

Table 37: Industry Share of Nominal GDP and Total Hours Worked in Quebec

Market Sector	1997				2007			
	GDP		Hours Worked		GDP		Hours Worked	
	Canada	Quebec	Canada	Quebec	Canada	Quebec	Canada	Quebec
Market Sector	100.0							
Agriculture, Forestry, Fishing and Hunting	3.2	2.4	5.4	3.5	2.1	2.3	3.4	2.8
Mining, and Oil and Gas Extraction	5.5	1.1	1.7	0.7	11.1	1.4	2.0	0.5
Utilities	4.2	5.8	0.9	0.9	3.0	5.5	0.8	1.0
Construction	7.0	6.3	7.9	6.1	9.0	7.9	10.1	6.9
Manufacturing	23.2	29.1	18.3	23.6	16.8	22.8	14.8	19.2
Wholesale Trade	7.1	6.7	7.4	7.4	7.1	7.4	6.9	7.1
Retail Trade	6.9	7.6	13.1	14.0	7.4	8.5	12.9	14.2
Transportation and Warehousing	6.2	5.7	6.3	5.9	5.6	5.3	6.6	6.2
Information and Cultural Industries	4.3	4.8	2.5	2.6	4.3	4.6	2.7	2.8
FIRE*	15.0	13.8	7.5	6.7	14.6	13.6	7.8	7.2
Professional, Scientific and Technical Services	4.9	4.4	6.3	5.7	6.2	5.9	7.9	7.3
ASWMR**	2.5	2.5	4.0	3.9	3.3	3.7	5.7	5.4
Arts, Entertainment and Recreation	0.9	1.0	1.5	1.5	0.9	1.1	1.9	1.8
Accommodation and Food Services	3.2	3.0	7.8	7.9	2.8	3.1	7.0	7.3
Other Services (Except Public Administration)	5.7	5.8	9.4	9.6	5.8	6.8	9.5	10.1

Source: Shares calculated by the CSLs, based on Statistics Canada data (Cansim Table 3983-0011).

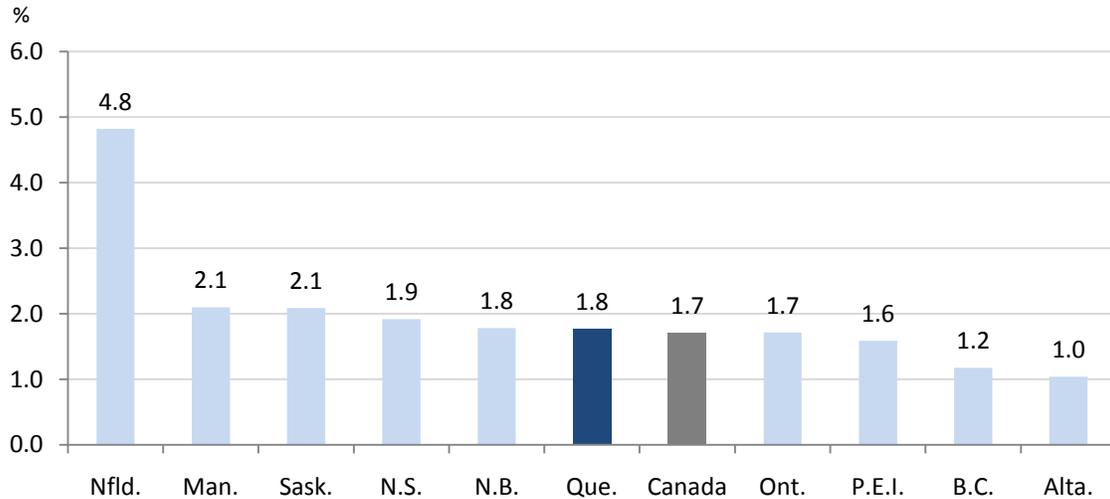
*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

ii. Labour Productivity

Labour productivity, defined as real GDP per hour worked,²⁷ grew at an average rate of 1.8 per cent per year in Quebec's market sector during the 1997-2007 period. This is somewhat better than the national average of 1.7 per cent per year (Chart 29).

²⁷ Note that the total hours worked figures used to calculate labour productivity are unadjusted for labour quality.

**Chart 29: Labour Productivity Growth in Canada and the Provinces, Market Sector, 1997-2007
(Average Annual Growth Rates)**



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

During the 1997-2007 period, the industry that experienced the highest labour productivity growth rate in Quebec was the agriculture, forestry, fishing and hunting (3.8 per cent per year), followed by wholesale trade (3.4 per cent), and other services (except public administration) (3.3 per cent) (Table 38). The industry that had the lowest labour productivity growth rate was in the utilities industry (-1.5 per cent), followed by the arts, entertainment and recreation (-0.4 per cent) and mining, and oil and gas extraction (-0.1 per cent).

Compared to the other provinces, Quebec had average labour productivity growth rates at the industry level during this period. The province ranked 3rd or higher in only two of the 15 two-digit NAICS industries, and also came 7th or below in four industries. This means that nine of the 15 industries were ranked 4th through 6th, indicating that Quebec was in the middle in most industries when it came to growth. Overall, Quebec experienced the 6th highest rate among provinces. Quebec had the lowest labour productivity growth rate of any province in the information and cultural industries (1.3 per cent). Quebec did not achieve the highest or second highest ranking in any industry, though it achieved a 3rd place ranking in manufacturing (2.4 per cent) and arts, entertainment and recreation (-0.4 per cent).

Quebec's labour productivity level in 2007 was \$35.60 (1997 dollars) per hour, which represents 98.8 per cent of the Canadian level, up slightly from 98.3 per cent in 1997. The province had the 4th highest labour productivity level in Canada in 2007, behind Newfoundland, Alberta and Ontario.

At the industry level, Quebec enjoyed a high equally weighted labour productivity level rank. In 2007, six of the 15 two-digit NAICS industries had higher productivity in the province than the national level. The highest relative level was in utilities (121.3 per cent of the national level), followed by construction (121.1 per cent) and arts, entertainment and recreation (116.9 per cent). The lowest relative productivity level was in mining, oil and gas extraction (60.3 per cent of the national level), followed by wholesale trade (90.0 per cent) and information and cultural industries (92.9). Quebec was ranked 3rd or higher in seven industries, and ranked 7th or lower in only three industries.

Table 38: Labour Productivity Levels and Growth Rates in Quebec, 1997-2007

Market Sector	Compound Annual Growth Rate, 1997-2007	Rank	Province's Labour Productivity Level Relative to Canada's, 1997	Province's Labour Productivity Level Relative to Canada's, 2007	Labour Productivity Level, 2007	Rank, 2007
	(per cent)		(Canada=100)	(Canada=100)	(1997 Dollars)	
Market Sector	1.8	6	98.3	98.8	35.6	4
Agriculture, Forestry, Fishing and Hunting	3.8	6	112.2	107.4	29.2	5
Mining, and Oil and Gas Extraction	0.1	5	47.4	60.3	47.5	8
Utilities	-1.5	8	128.8	121.3	163.3	4
Construction	2.2	4	115.8	121.1	38.6	2
Manufacturing	2.4	3	95.9	97.1	46.4	3
Wholesale Trade	3.4	6	93.0	90.0	37.7	7
Retail Trade	2.9	9	101.5	97.2	21.4	5
Transportation and Warehousing	0.4	5	96.3	93.8	29.8	5
Information and Cultural Industries	1.3	10	110.1	92.9	63.8	9
FIRE*	1.1	8	101.0	96.8	68.1	5
Professional, Scientific and Technical Services	1.4	5	96.5	97.4	26.3	3
ASWMR**	1.1	4	98.9	106.9	21.2	2
Arts, Entertainment and Recreation	-0.4	3	107.6	116.9	18.9	1
Accommodation and Food Services	1.7	4	90.7	96.9	13.3	3
Other Services (Except Public Administration)	3.3	4	94.8	106.0	17.2	2
Absolute Equally Weighted Average Rank		5.6				4.3
Equally Weighted Market Sector Rank		6				3

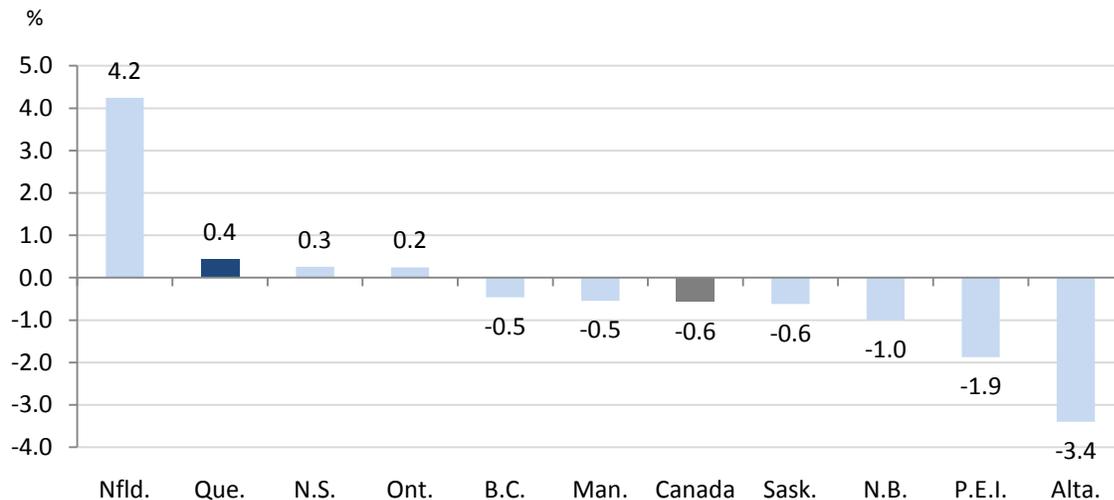
Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

iii. Capital Productivity

Capital productivity, defined as real GDP per unit of capital services, grew at a rate of 0.4 per cent per year in Quebec's market sector during the 1997-2007 period, ranking 2nd among the provinces. In contrast, Canada's capital productivity declined 0.6 per cent per year over the period (Chart 30).

Chart 30: Capital Productivity Growth Rates in Canada and the Provinces, Market Sector, 1997-2007 (Average Annual Growth Rates)



Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

In Quebec, 10 of the 15 two-digit NAICS industries had negative capital productivity growth rates during the period. The industry that had the worst performance was the professional, scientific and technical services (-5.2 per cent per year), followed by other services except public administration (-3.0 per cent) and wholesale trade (-2.8 per cent) (Table 39). Of the few industries that had positive growth rates, the best performing sectors were agriculture, forestry, fishing and hunting (2.7 per cent), followed by information and cultural industries (2.4 per cent) and administrative and support, waste management and remediation services (2.3 per cent).

At the industry level, Quebec ranked 3rd or higher in seven industries and 7th or lower in three industries. Using the equally weighted market sector ranking, Quebec had experienced the highest capital productivity growth in the country. The province ranked 2nd in growth of capital productivity using the total market sector ranking and was one of only four provinces that saw an increase rather than a decline in the measure. The wholesale trade in Quebec had the worst capital productivity growth rates among all provinces. In contrast, professional, scientific and technical services had the highest capital productivity growth in Canada.

Quebec's capital productivity level in the market sector in 2007 was 108.8 per cent of the Canadian level, up from 98.4 per cent in 1997, putting the province in 5th place. In 2007, nine of the 15 two-digit NAICS industries in the province had capital productivity levels above the Canadian average. The industries with highest capital productivity levels relative to the national average were: mining and oil and gas (314.3 per cent of the national level), administrative and support, waste and remediation (ASWMR) (190.2 per cent), and arts, entertainment and recreation (120.5 per cent). The six industries that had capital productivity levels lower than Canada's in 2007 were: construction (67.6 per cent), other services (except public administration) (70.6 per cent), wholesale trade (82.7 per cent), retail trade (84.6 per cent), Finance, insurance, real estate, rental and leasing (89.7 per cent), and manufacturing (97.7 per cent).

Quebec's market sector had the 5th highest capital productivity level in Canada in 2007.²⁸ Quebec did not rank 1st for capital productivity levels in any industry, however, the province did rank 2nd in mining, and oil and gas extraction and in accommodation and food services. Similarly, the province did not rank 10th for capital productivity levels in any industry, however, the province did rank 9th in construction and retail trade.

²⁸ The province's equally-weighted market sector rank was slightly lower, 4th, only behind Ontario, British Columbia and Nova Scotia.

Table 39: Capital Productivity Levels and Growth Rates in Quebec, 1997-2007

Market Sector	Compound Annual Growth Rate, 1997-2007	Rank	Province's Capital Productivity Level Relative to Canada's		Capital Productivity Level, 2007	Provincial Ranking, 2007
	(per cent)		1997 (Canada=100)	2007 (Canada=100)	(1997 Dollars)	
Market Sector	0.4	2	98.4	108.8	2.50	5
Agriculture, Forestry, Fishing and Hunting	2.7	3	102.1	109.2	2.29	5
Mining, and Oil and Gas Extraction	-0.9	4	191.6	314.3	2.43	2
Utilities	1.2	2	95.9	108.2	1.40	4
Construction	-0.8	7	84.4	67.6	4.62	9
Manufacturing	2.0	3	94.2	97.7	2.66	6
Wholesale Trade	-2.8	10	108.1	82.7	2.63	8
Retail Trade	-1.0	6	84.6	84.6	3.87	9
Transportation and Warehousing	-2.4	4	108.8	103.8	2.50	5
Information and Cultural Industries	2.4	2	94.4	113.5	2.19	3
FIRE*	-1.6	4	96.3	89.7	1.47	4
Professional, Scientific and Technical Services	-5.2	1	88.0	103.6	2.53	3
ASWMR**	2.3	3	114.4	190.2	5.86	3
Arts, Entertainment and Recreation	-1.9	2	92.2	120.5	2.48	3
Accommodation and Food Services	-0.3	4	110.6	111.8	4.81	2
Other Services (Except Public Administration)	-3.0	8	88.1	70.6	3.76	8
Absolute Equally Weighted Average Rank		4.2				4.9
Equally Weighted Market Sector Rank		1				4

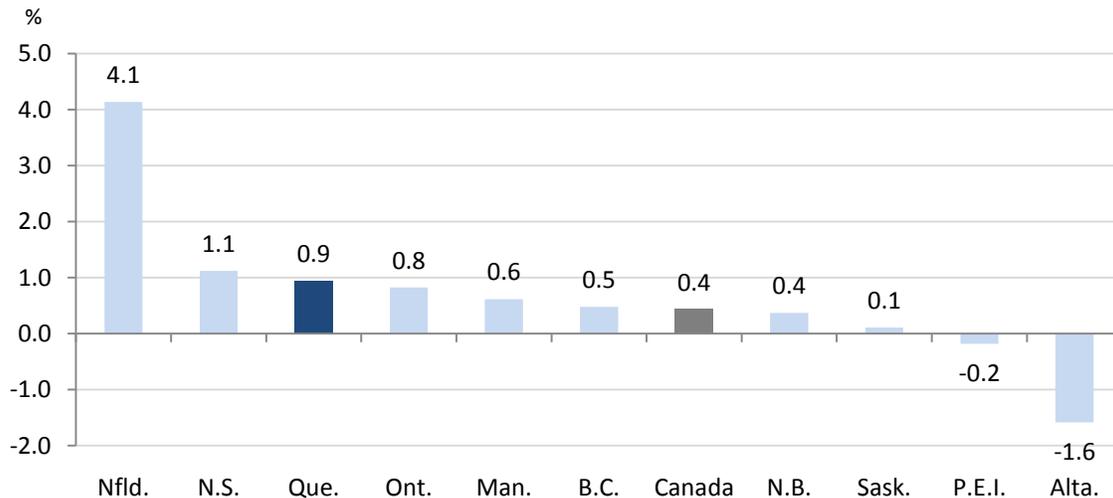
Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

iv. Multifactor Productivity

Quebec's multifactor productivity in the market sector grew at an average rate of 0.9 per cent per year during the 1997-2007 period, well above the national average of 0.4 per cent per year. The province ranked 3rd in Canada with regards to multifactor growth (Chart 31).

Chart 31: Multifactor Productivity Growth in Canada and the Provinces, Market Sector, 1997-2007 (Average Annual Growth Rates)



Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

The industry that experienced the highest multifactor productivity growth rate in Quebec was agriculture, forestry, fishing and hunting (2.9 per cent per year), followed by manufacturing and manufacturing and cultural industries (1.9 per cent) (Table 40). The industries that had the lowest multifactor productivity growth rates were the arts, entertainment and recreation and transportation and warehousing (-0.8 per cent each), professional, scientific and technical services and finance, insurance, real estate, rental and leasing (-0.6 per cent).

Compared to the other provinces, Quebec had strong multifactor productivity growth rates during the period. Indeed, the province ranked 1st using the equally weighted market sector rank. Of the 15 two-digit NAICS industries, six were ranked 3rd or higher while only two were ranked at 7th place or lower. Administrative and support, waste management and remediation services had the best multifactor productivity growth rates among all provinces.

Table 40: Multifactor Productivity Levels and Growth Rates in Quebec, 1997-2007

Market Sector	Compound Annual Growth Rate, 1997-2007	Rank out of 10 provinces	Province's Multifactor Productivity Level Relative to Canada's, 1997	Province's Multifactor Productivity Level Relative to Canada's, 2007	Rank out of 10 provinces, 2007
	(per cent)		(Canada=100)	(Canada=100)	
Market Sector	0.9	3	98.2	103.3	3
Agriculture, Forestry, Fishing and Hunting	2.9	5	104.9	108.6	4
Mining, and Oil and Gas Extraction	-0.3	4	122.6	194.2	4
Utilities	0.6	2	101.4	110.4	2
Construction	1.5	5	105.2	103.8	2
Manufacturing	1.9	2	95.0	96.0	4
Wholesale Trade	1.2	7	96.9	87.5	7
Retail Trade	1.7	7	97.4	93.4	6
Transportation and Warehousing	-0.8	6	99.1	96.0	6
Information and Cultural Industries	1.9	4	100.5	104.7	3
FIRE*	-0.6	6	99.1	93.4	4
Professional, Scientific and Technical Services	-0.6	3	97.2	98.2	3
ASWMR**	1.4	1	106.6	127.5	1
Arts, Entertainment and Recreation	-0.8	2	104.7	118.6	1
Accommodation and Food Services	1.2	3	94.8	100.7	4
Other Services (Except Public Administration)	1.6	5	92.9	96.9	6
Absolute Equally Weighted Average Rank		4.1			3.8
Equally Weighted Market Sector Rank		1			2

Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

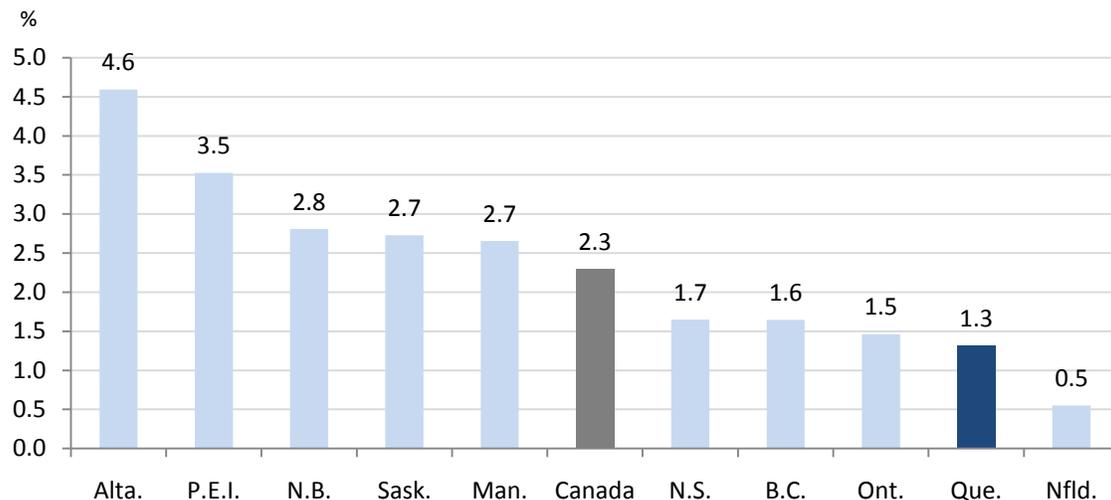
The province's multifactor productivity level in 2007 was 103.3 per cent of the Canadian level, up from 98.2 per cent in 1997. In 2007, eight of the 15 two-digit NAICS industries in Quebec had multifactor productivity levels above those of Canada. The industries with the highest relative multifactor productivity levels were: mining, oil and gas extraction (194.2 per cent of the national average), administrative and support, waste management and remediation services (127.5 per cent) and arts, entertainment and recreation (118.6). In contrast, the industries with the lowest relative multifactor productivity levels were the wholesale trade (87.5 per cent), followed by finance, insurance, real estate, rental and leasing (93.4 per cent) and retail trade (93.4 per cent).

In terms of multifactor productivity levels, Quebec's market sector ranked 3rd in Canada in 2007. Quebec ranked higher than five provinces in market sector multifactor productivity levels. The province fared quite well in all industries with; six of the 15 two-digit NAICS industries ranking 3rd or above, and was not ranked below 7th in any industry. In 2007, Quebec had the highest relative multifactor productivity levels in arts, entertainment and recreation, as well as administrative and support, waste management and remediation services.

v. Capital Intensity

Capital intensity, defined as capital services per hour worked (unadjusted for labour quality), grew at an average rate of 1.3 per cent per year in Quebec's market sector. This was well below the national average of 2.3 per cent per year. Quebec ranks 9th among the ten provinces in terms of capital intensity growth (Chart 32).

Chart 32: Capital Intensity Growth in Canada and the Provinces, Market Sector, 1997-2007
(Average Annual Growth Rates)



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

During this period, the industries that experienced the highest capital intensity growth were: professional, scientific and technical services (7.0 per cent), and other services except public administration (6.5 per cent per year) and wholesale trade (6.3 per cent) (Table 41). Conversely, the industries that had the lowest growth rates were: utilities (-2.7 per cent), administrative and support, waste management and remediation services (-1.2 per cent), and information and cultural industries (-1.1 per cent).

Compared to the other provinces, Quebec had somewhat lower capital intensity growth rates than Canada as a whole during the 1997-2007 period. The province ranked 7th or below in eight of the 15 two-digit NAICS industries, but ranked 3rd or above in two industries. On the one hand, utilities and information and cultural industries had the worst capital intensity growth rates among all the provinces. On the other hand, the wholesale trade, had the strongest capital intensity growth rate in Canada.

In 2007, six of the 15 two-digit NAICS industries had capital intensity levels above the national level. Industries with high relative levels included: construction (179.2 per cent of the national) other services except public administration (150.1 per cent), and retail trade 114.9 (per cent). The industries that had the lowest relative levels were mining, and oil and gas extraction (19.2 per cent) and administrative and support, waste management and remediation services (56.2 per cent). The low level of capital intensity in mining and oil and gas extraction likely reflects a composition effect where the industry average nationally is skewed higher by capital intensive oil extraction; Quebec has no oil extraction but does engage in mining, which is less capital intensive.

Table 41: Capital Intensity Levels and Growth Rates in Quebec, 1997-2007

Market Sector	Compound Annual Growth Rate, 1997-2007	Rank	Province's Capital Intensity Level Relative to Canada's, 1997	Province's Capital Intensity Level Relative to Canada's, 2007	Capital Intensity Level, 2007	Rank, 2007
	(per cent)		(Canada=100)	(Canada=100)	(1997 Dollars)	
Market Sector	1.3	9	100.0	90.8	14.3	3
Agriculture, Forestry, Fishing and Hunting	1.0	9	109.7	98.4	12.7	5
Mining, and Oil and Gas Extraction	1.1	6	24.7	19.2	19.5	9
Utilities	-2.7	10	134.3	112.1	117.0	5
Construction	3.0	4	137.5	179.2	8.4	1
Manufacturing	0.3	5	102.1	99.4	17.5	3
Wholesale Trade	6.3	1	86.4	108.8	14.4	5
Retail Trade	3.9	7	120.1	114.9	5.5	1
Transportation and Warehousing	2.9	5	88.7	90.3	11.9	5
Information and Cultural Industries	-1.1	10	118.0	83.0	29.6	10
FIRE*	2.7	8	105.1	107.9	46.2	6
Professional, Scientific and Technical Services	7.0	8	109.7	94.0	10.4	7
ASWMR**	-1.2	8	86.8	56.2	3.6	7
Arts, Entertainment and Recreation	1.6	6	116.3	97.0	7.6	6
Accommodation and Food Services	2.1	8	81.9	86.7	2.8	9
Other Services (Except Public Administration)	6.5	3	107.5	150.1	4.6	1
Absolute Equally Weighted Average Rank		6.5				5.3
Equally Weighted Market Sector Rank		10				4

Source: CCLS Provincial Productivity Database, Appendix Tables, http://www.ccls.ca/data/mfp_new.asp.

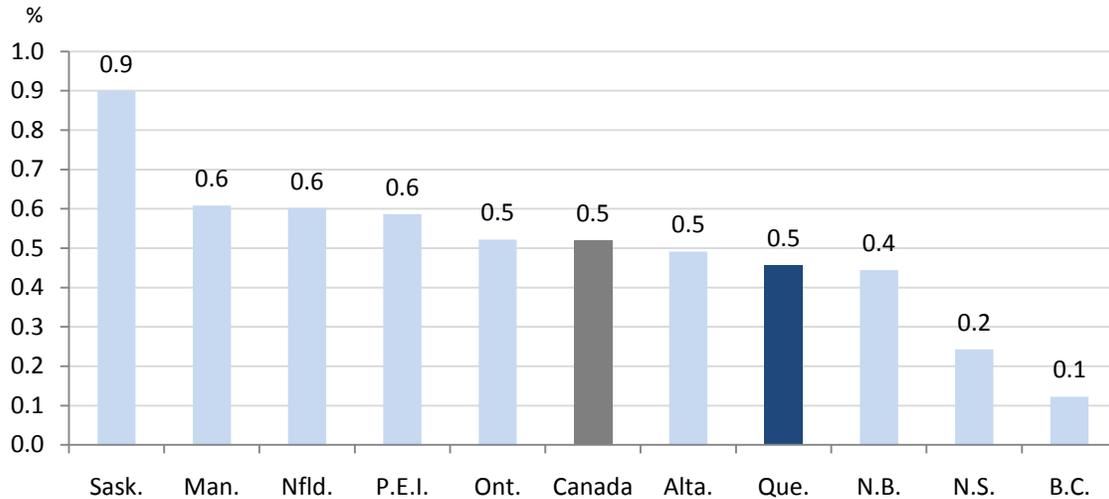
*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

Quebec's capital intensity level in 2007 was 90.8 per cent of the Canadian level, down from 100.0 per cent in 1997. Quebec's capital intensity level was the 3rd highest in Canada, behind Alberta and Saskatchewan. This strong showing reflects having only three industries ranked lower than 7th. Three industries in Quebec had the highest capital intensity level compared to all provinces, construction, retail trade, and other services (other than public administration). However, information and cultural industries in Quebec had the lowest capital intensity of any province.

vi. Labour Quality

Quebec experienced below-average labour quality growth in the market sector during the 1997-2007 period. The province grew at an average rate of 0.46 per cent per year, while the national average was 0.52 per cent per year. The province ranked 7th for labour quality growth in Canada (Chart 33).

Chart 33: Labour Quality Growth in Canada and the Provinces, Market Sector, 1997-2007
(Average Annual Growth Rates)



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

During the period in question, the industries that experienced the highest labour quality growth rates were in the agriculture, forestry, fishing and hunting (0.9 per cent per year), professional, scientific and technical services (0.7 per cent), and manufacturing (0.6 per cent) (Table 42). The industries that had the lowest labour quality growth rates were: administrative and support, waste management and remediation services (-0.3 per cent), arts, entertainment and recreation and construction (-0.1 per cent each).

Table 42: Labour Quality Levels and Growth Rates in Quebec, 1997-2007²⁹

Market Sector	Compound Annual Growth Rate, 1997-2007	Rank	Province's Labour Quality Level Relative to Canada's, 1997	Province's Labour Quality Level Relative to Canada's, 2007	Rank, 2007
	(per cent)		(Canada=100)	(Canada=100)	
Market Sector	0.5	7	100.0	99.4	6
Agriculture, Forestry, Fishing and Hunting	0.9	3	100.0	99.6	3
Mining, and Oil and Gas Extraction	0.1	4	100.0	100.6	4
Utilities	0.4	2	100.0	103.0	2
Construction	-0.1	9	100.0	97.8	9
Manufacturing	0.6	1	100.0	102.4	1
Wholesale Trade	0.3	3	100.0	99.8	3
Retail Trade	0.1	4	100.0	100.0	4
Transportation and Warehousing	0.6	4	100.0	101.3	4
Information and Cultural Industries	0.1	8	100.0	95.2	8
FIRE*	0.3	7	100.0	98.7	7
Professional, Scientific and Technical Services	0.7	3	100.0	100.6	3
ASWMR**	-0.3	8	100.0	97.0	8
Arts, Entertainment and Recreation	-0.1	8	100.0	99.3	8
Accommodation and Food Services	0.1	6	100.0	99.3	6
Other Services (Except Public Administration)	0.2	6	100.0	98.2	6
Absolute Equally Weighted Average Rank		5.1			5.1
Equally Weighted Market Sector Rank		3			3

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

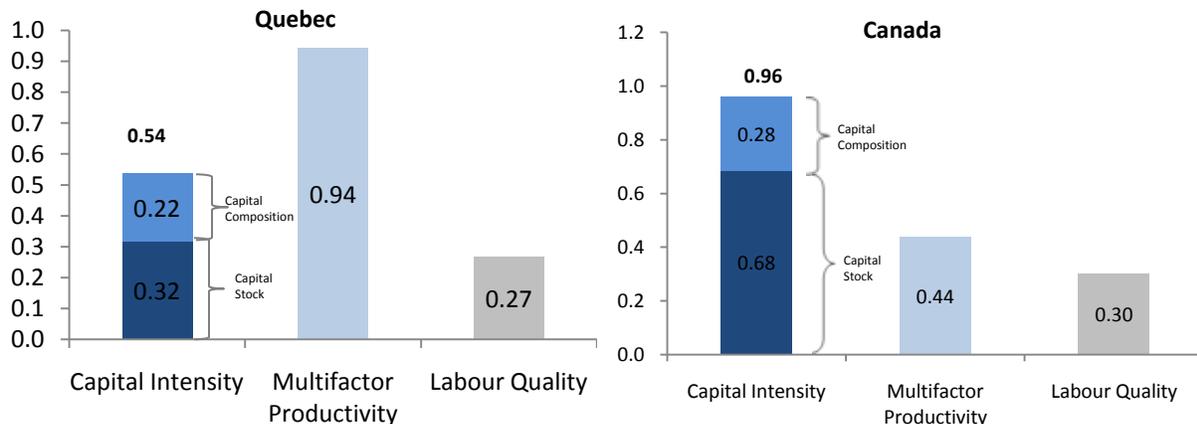
²⁹ Labour quality levels are not shown here because they are assumed to be the same across all provinces in the base year, 1997 (Sharpe and Thomson, 2010a). They differ after 1997, incorporating the different labour quality growth rates experienced by the provinces and Canada. For example, labour quality in Quebec's market sector grew at an average annual rate of 0.46 per cent over the 1997-2007 period, while Canada's labour quality grew at an average annual rate of 0.52 per cent. As a consequence, Quebec's labour quality level was 99.4 per cent of the Canadian level in 2007.

Quebec experienced slightly below average labour quality growth rates in the market sector during the 1997-2007 period, surpassing only three provinces. However, Quebec ranks 3rd using the equally weighted market sector rank, which implies that smaller industries in Quebec actually experienced much better growth. There were five industries ranked 7th or lower and five ranked 3rd or higher. The province notably attained the highest growth in labour quality in manufacturing compared to all provinces.

vii. Sources of Labour Productivity Growth in the Market Sector

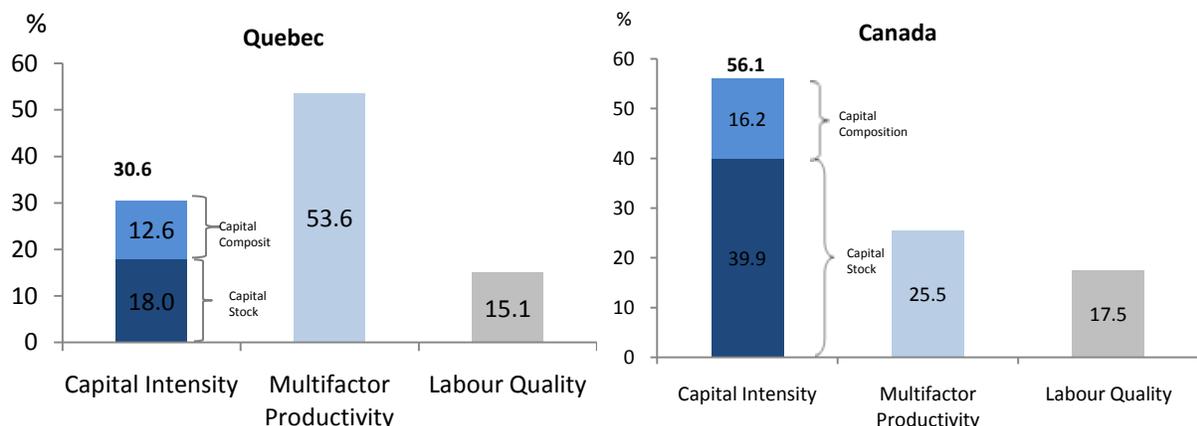
Quebec's labour productivity grew at an average rate of 1.8 per cent per year during the 1997-2007 period, somewhat better than the national average of 1.7 per cent per year. Charts 34 and 35 show both the percentage point and per cent contributions to labour productivity growth by the sources of growth for Quebec and Canada over the aforementioned period.

Chart 34: Percentage Point Contribution to Labour Productivity Growth by the Source of Labour Productivity Growth in the Market Sector in Quebec and in Canada, 1997 to 2007



Source: CSL Provincial Productivity Database, Appendix Table 377, http://www.csls.ca/data/mfp_new.asp.

Chart 35: Per Cent Contribution to Labour Productivity Growth by the Source of Labour Productivity Growth in the Market Sector in Quebec and in Canada, 1997 to 2007



Source: CSL Provincial Productivity Database, Appendix Table 377, http://www.csls.ca/data/mfp_new.asp.

Note: Numbers may not sum to 100 due to rounding.

Quebec's labour productivity growth was driven mainly by multifactor productivity growth, which accounted for 0.94 percentage points of the overall labour productivity growth (or, alternatively, 53.6 per cent of total growth). The contribution of capital intensity to labour productivity growth can be broken down into two components: capital composition growth, which was responsible for 0.22 percentage points of labour productivity growth (12.6 per cent), and capital stock growth, which accounted for 0.32 percentage points (18.0 per cent). Finally, a small increase in labour quality was responsible for 0.27 percentage points of the labour productivity growth experienced in the province (15.1 per cent).

Comparing the two charts, it can be seen that the driver of labour productivity growth in Quebec and in Canada were quite different. Whereas multifactor productivity was the main driver of labour productivity in Quebec, capital intensity growth was the main driver nationally. Multifactor productivity explains only 25.5 per cent of the labour productivity growth in Canada, and yet it explains 53.6 per cent of Quebec's labour productivity growth. Conversely, capital intensity growth was responsible for only 30.5 per cent of the growth in labour productivity for Quebec and 56.1 per cent for Canada. Labour quality explains 17.5 per cent of labour productivity growth in Canada, and about the same in Quebec, 15.1 per cent.

Table 43 details the contributions in absolute and per cent terms of capital intensity, MFP, and labour quality growth to labour productivity growth in Quebec over the 1997-2007 period at the two-digit NAICS industry level.

Table 43: Contributions to Labour Productivity Growth at the Industry Level by Source in Quebec, 1997-2007

	Labour Productivity	Capital Intensity			MFP	Labour Quality
		Total	Capital Composition	Capital Stock		
Percentage Point Contributions to Labour Productivity Growth						
Market Sector	1.8	0.5	0.2	0.3	0.9	0.3
Agriculture, Forestry, Fishing and Hunting	3.8	0.5	2.7	-2.2	2.9	0.4
Mining, and Oil and Gas Extraction	0.1	0.3	-1.5	1.8	-0.3	0.1
Utilities	-1.5	-2.2	-0.2	-2.0	0.6	0.1
Construction	2.2	0.8	0.0	0.7	1.5	-0.1
Manufacturing	2.4	0.1	-0.5	0.6	1.9	0.4
Wholesale Trade	3.4	1.9	0.2	1.8	1.2	0.2
Retail Trade	2.9	1.1	0.1	0.9		0.1
Transportation and Warehousing	0.4	0.9	0.3	0.6	-0.8	0.4
Information and Cultural Industries	1.3	-0.6	-0.3	-0.3	1.9	0.0
FIRE*	1.1	1.5	0.6	0.9	-0.6	0.1
Professional, Scientific and Technical Services	1.4	1.5	0.0	1.5	-0.6	0.6
ASWMR**	1.1	-0.1	0.0	-0.1	1.4	-0.2
Arts, Entertainment and Recreation	-0.4	0.5	0.3	0.2	-0.8	-0.1
Accommodation and Food Services	1.7	0.4	0.1	0.4	1.2	0.1
Other Services (Except Public Administration)	3.3	1.4	0.4	1.0	1.6	0.2
Per Cent Contributions to Labour Productivity Growth						
Market Sector	100.0	30.7	12.6	18.0	53.6	15.1
Agriculture, Forestry, Fishing and Hunting	100.0	13.2	70.6	-57.3	76.0	10.1
Mining, and Oil and Gas Extraction	100.0	241.4	-1037.0	1257.0	-182.1	41.2
Utilities	100.0	143.8	12.6	131.3	-39.0	-5.7
Construction	100.0	35.9	2.1	33.7	67.2	-3.6
Manufacturing	100.0	6.0	-21.0	27.0	78.7	14.8
Wholesale Trade	100.0	57.3	4.6	52.4	36.3	5.5
Retail Trade	100.0	36.5	4.0	32.3		2.8
Transportation and Warehousing	100.0	204.5	60.9	141.3	-199.7	96.9
Information and Cultural Industries	100.0	-47.7	-20.6	-26.9	147.2	1.4
FIRE*	100.0	143.1	59.4	82.0	-53.3	10.9
Professional, Scientific and Technical Services	100.0	104.2	-1.7	106.1	-42.9	38.9
ASWMR**	100.0	-7.7	-2.6	-5.1	128.0	-19.8
Arts, Entertainment and Recreation	100.0	-141.5	-85.3	-54.5	218.7	21.7
Accommodation and Food Services	100.0	24.8	3.5	21.2	68.6	6.2
Other Services (Except Public Administration)	100.0	43.0	11.1	31.3	50.5	5.6

Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

Note: Per cent contributions may not sum to 100 due to rounding.

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

viii. Sources of Labour Productivity Level Differential by Industry

Quebec's labour productivity level in 2007 was 98.8 per cent of the Canadian level, which implies a labour productivity gap of 1.2 percentage points. Table 44 shows that the gap was caused predominantly by the market sector's low capital intensity level, which was responsible for 4.1 percentage points of the gap (or 342.7 per cent of the gap). Multifactor productivity was actually higher in Quebec than Canada, and reduced the differential by 3.2 percentage points (-273.3 per cent of the gap).³⁰ Labour quality accounted for 0.4 percentage points of the gap (30.6 per cent of the gap).

Quebec had a negative labour productivity gap in nine of the 15 two-digit NAICS industries. Capital intensity was the largest contributor to the gap in three of the nine industries with gaps, while multifactor productivity was the most responsible in the other six. The level of capital intensity lowers

³⁰ Again, it is important to bear in mind that labour quality levels were assumed to be equal to 100.0 in all provinces and in Canada for the base year of 1997. They differ after 1997, incorporating the different labour quality growth rates experienced by the provinces and Canada.

labour productivity relative to the national level in nine of 15 industries, while multifactor productivity and labour quality each do so in seven industries. Mining, oil and gas extraction must be singled out both for its high multifactor productivity and low capital intensity levels in Quebec; capital intensity was responsible for 91.9 per cent of the gap whereas multifactor productivity increased labour productivity relative to Canada by 52.1 percentage points.

Table 44: Sources of the Labour Productivity Gap Relative to Canada for Quebec at the Two-Digit Industry Level, 2007

Market Sector	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 Quality	Labour Productivity	Capital Intensity	Multifactor Productivity	Labour Quality
Market Sector	98.8	-1.2	-4.1	3.2	-0.4	100.0	342.7	-273.3	30.6
Agriculture, Forestry, Fishing and Hunting	107.4	7.4	-0.9	8.5	-0.2	100.0	-12.4	114.9	-2.6
Mining, and Oil and Gas Extraction	60.3	-39.7	-91.9	52.1	0.1	100.0	231.8	-131.4	-0.4
Utilities	121.3	21.3	9.6	10.9	0.8	100.0	45.1	51.4	3.6
Construction	121.1	21.1	18.7	4.1	-1.7	100.0	88.6	19.6	-8.2
Manufacturing	97.1	-2.9	-0.2	-4.0	1.4	100.0	8.2	138.6	-46.8
Wholesale Trade	90.0	-10.0	2.7	-12.6	-0.1	100.0	-27.1	125.8	1.3
Retail Trade	97.2	-2.8	3.9	-6.7	0.0	100.0	-137.3	237.3	0.1
Transportation and Warehousing	93.8	-6.2	-3.2	-3.9	0.9	100.0	51.2	62.8	-14.1
Information and Cultural Industries	92.9	-7.1	-9.1	4.4	-2.3	100.0	129.7	-62.6	32.9
FIRE*	96.8	-3.2	4.1	-6.7	-0.6	100.0	-129.4	210.9	18.5
Professional, Scientific and Technical Services	97.4	-2.6	-1.3	-1.8	0.4	100.0	48.2	68.3	-16.5
ASWMR**	106.9	6.9	-15.9	25.1	-2.3	100.0	-230.5	364.1	-33.6
Arts, Entertainment and Recreation	116.9	16.9	-1.0	18.4	-0.5	100.0	-6.2	109.4	-3.2
Accommodation and Food Services	96.9	-3.1	-3.3	0.7	-0.5	100.0	105.1	-22.2	17.0
Other Services (Except Public Administration)	106.0	6.0	10.6	-3.2	-1.4	100.0	177.3	-54.2	-23.1

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

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

ix. Conclusion

During the 1997-2007 period, Quebec experienced comparatively high growth rates of capital productivity (0.4 per cent per year) and multifactor productivity (0.9 per cent), and above average labour productivity growth rates (1.8 per cent). The high growth rates in labour and capital productivity was driven by strong multifactor productivity growth. The per cent contribution to growth of capital stock, capital composition and labour quality to labour productivity growth were all lower in Quebec than in Canada as a whole.

Quebec's capital productivity level in 2007 was well above national level. The multifactor productivity level was also above the national level, standing at 103.3 per cent of the national level and ranking 3rd among all provinces. The labour productivity level in Quebec was slightly below that of Canada, creating a labour productivity gap of 1.2 percentage points. This was due mainly to the low capital intensity level in Quebec, which explains more than 100 per cent of the gap.

Table 45 provides a summary of both levels (in 2007) and growth rates (for the 1997-2007 period) for the productivity measures discussed in this report, along with rankings that show how Quebec fared in comparison to the other provinces. A key observation is that, while Quebec performed strongly regarding capital and multifactor productivity growth and levels, performance was poor with regards to capital intensity growth and level. Another core observation is that growth was heavily driven by multifactor productivity.

Table 45: Summary of Quebec's Productivity Performance in the Market Sector

	Market Sector Growth, 1997 to 2007			Per Cent of the Canadian Level		Level Rankings, 2007	
	Compound Annual Growth Rate	Market Sector Rank	Equally Weighted Market Sector Rank	1997	2007	Market Sector Rank	Equally Weighted Market Sector Rank
Labour Productivity	1.8	6	6	98.3	98.8	4	3
Capital Productivity	0.4	2	1	98.4	108.8	5	4
Multifactor Productivity	0.9	3	1	98.2	103.3	3	2
Capital Intensity	1.3	9	10	100.0	90.8	3	4
Labour Quality	0.5	7	3	n.a.	n.a.	n.a.	n.a.

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

VII. An Analysis of Ontario's Productivity, 1997-2007: High Productivity Levels, but Average Productivity Growth

i. Industry Composition by Nominal GDP and Total Hours Worked

In order to understand Ontario's overall productivity performance, it is essential to understand how each of the 15 two-digit NAICS industries contributed to the province's market sector in terms of nominal GDP and actual hours worked. Table 46 details these contribution shares for 1997 and 2007. In Ontario, the industries that had the highest GDP shares in 2007 were manufacturing (20.8 per cent of the province's nominal GDP in the market sector), FIRE (finance, insurance, real estate, rental and leasing) (18.8 per cent), and wholesale trade (8.5 per cent). In terms of total hours worked, the three industries that had the highest contributions in 2007 were manufacturing (16.6 per cent of total hours worked), retail trade (12.0 per cent), and FIRE (9.5 per cent).

Table 46: Industry Share of Nominal GDP and Total Hours Worked in Ontario

Market Sector	1997				2007			
	GDP		Hours Worked		GDP		Hours Worked	
	Canada	Ontario	Canada	Ontario	Canada	Ontario	Canada	Ontario
Market Sector	100.0							
Agriculture, Forestry, Fishing and Hunting	3.2	1.6	5.4	3.2	2.1	1.1	3.4	2.2
Mining, and Oil and Gas Extraction	5.5	1.1	1.7	0.5	11.1	1.8	2.0	0.5
Utilities	4.2	3.8	0.9	1.0	3.0	2.2	0.8	0.7
Construction	7.0	6.2	7.9	7.4	9.0	8.0	10.1	8.8
Manufacturing	23.2	28.4	18.3	22.1	16.8	20.8	14.8	16.6
Wholesale Trade	7.1	7.9	7.4	8.0	7.1	8.5	6.9	7.6
Retail Trade	6.9	6.5	13.1	12.2	7.4	7.4	12.9	12.0
Transportation and Warehousing	6.2	5.3	6.3	5.4	5.6	5.0	6.6	5.8
Information and Cultural Industries	4.3	4.2	2.5	2.6	4.3	5.1	2.7	3.2
FIRE*	15.0	17.1	7.5	8.6	14.6	18.8	7.8	9.5
Professional, Scientific and Technical Services	4.9	5.5	6.3	6.8	6.2	7.6	7.9	8.9
ASWMR**	2.5	2.9	4.0	4.6	3.3	4.1	5.7	6.6
Arts, Entertainment and Recreation	0.9	1.0	1.5	1.6	0.9	1.0	1.9	1.8
Accommodation and Food Services	3.2	2.7	7.8	6.8	2.8	2.7	7.0	6.4
Other Services (Except Public Administration)	5.7	5.8	9.4	9.1	5.8	6.0	9.5	9.3

Source: Shares calculated by the CSLS, based on Statistics Canada data (Cansim Table 4883-0011).

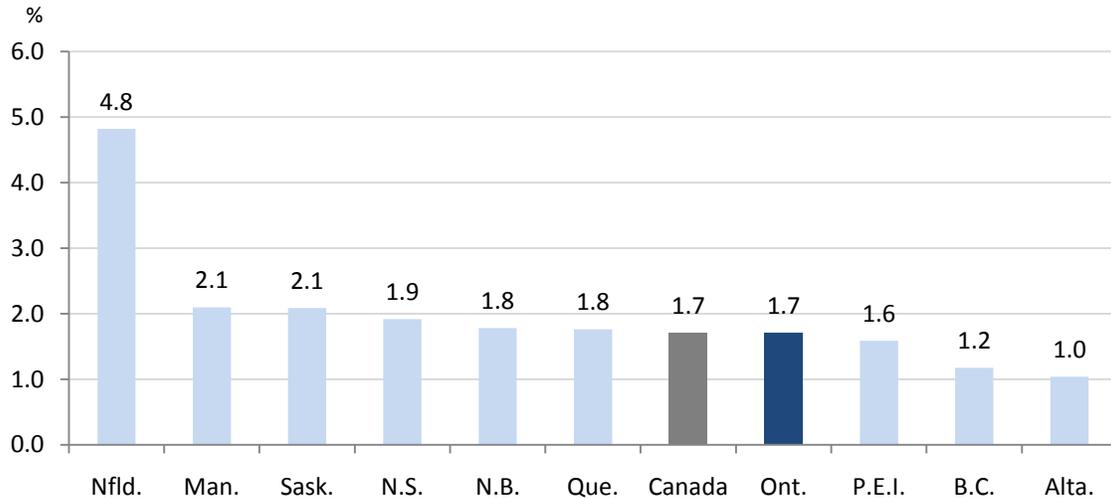
*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

ii. Labour Productivity

Labour productivity, defined as real GDP per hour worked,³¹ grew at an average rate of 1.7 per cent per year in Ontario's market sector during the 1997-2007 period, which was approximately the same rate as the national average. This is not surprising given the size of Ontario's economy relative to Canada's. More specifically, Ontario accounted for 37.8 per cent of Canada's nominal GDP, and 40.0 per cent of total hours worked in Canada in 2007. Ontario ranked 7th among the provinces in terms of labour productivity growth (Chart 36).

³¹ Note that the total hours worked figures used to calculate labour productivity are unadjusted for labour quality.

**Chart 36: Labour Productivity Growth in Canada and the Provinces, Market Sector, 1997-2007
(Average Annual Growth Rates)**



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

During period in question, the industry that experienced the highest labour productivity growth rate in Ontario was wholesale trade (4.2 per cent per year), followed by retail trade (3.1 per cent), and agriculture, forestry, fishing and hunting (3.0 per cent) (Table 47). The industry that had the lowest labour productivity growth rate was mining, and oil and gas extraction (-4.1 per cent per year), followed by utilities (-0.9 per cent), and arts, entertainment and recreation (-0.2 per cent).

In terms of labour productivity growth, the province ranked 7th or below in only six of the 15 two-digit NAICS industries, none of which ranked 10th. At the same time, it ranked 4th or above in only four industries, none of which ranked 1st.

Ontario's labour productivity level in 2007 was \$37.32 (1997 dollars) per hour, which represents 103.5 per cent of the Canadian level, the same level the province had in 1997. Ontario had the 3rd highest labour productivity level in Canada in 2007 (2nd according to the equally-weighted market sector rank).

In 2007, seven of the 15 two-digit NAICS industries in Ontario had labour productivity levels above Canada's. The industries with the highest relative labour productivity levels in the province were arts, entertainment and recreation (116.7 per cent of the Canadian level), wholesale trade (110.9 per cent), and professional, scientific and technical services (107.9 per cent). The industries that had the lowest levels in the province were mining, and oil and gas extraction (61.3 per cent of the Canadian level), agriculture, forestry, fishing and hunting (74.5 per cent), and utilities (81.9 per cent).

In terms of labour productivity levels, 10 of the 15 two-digit NAICS industries in Ontario ranked 4th or above. In particular, Ontario's professional, scientific and technical services ranked 1st among all the provinces. Furthermore, none of Ontario's industries ranked last.

Table 47: Labour Productivity Levels and Growth Rates in Ontario, 1997-2007

Market Sector	Compound Annual Growth Rate, 1997-2007	Provincial Ranking	Province's Labour Productivity Level Relative to Canada's, 1997	Province's Labour Productivity Level Relative to Canada's, 2007	Labour Productivity Level, 2007	Provincial Ranking, 2007
	(per cent)		(Canada=100)	(Canada=100)	(1997 Dollars)	
Market Sector	1.7	7	103.5	103.5	37.3	3
Agriculture, Forestry, Fishing and Hunting	3.0	8	83.5	74.5	20.2	9
Mining, and Oil and Gas Extraction	-4.1	6	74.0	61.3	48.2	7
Utilities	-0.9	5	81.8	81.9	110.3	6
Construction	1.7	6	96.4	95.8	30.5	3
Manufacturing	2.4	2	105.0	106.3	50.8	2
Wholesale Trade	4.2	2	106.3	110.9	46.5	2
Retail Trade	3.1	8	105.2	102.7	22.6	3
Transportation and Warehousing	0.2	7	102.4	97.8	31.1	4
Information and Cultural Industries	2.7	9	100.5	97.3	66.8	8
FIRE*	1.5	6	102.5	102.2	71.9	2
Professional, Scientific and Technical Services	1.5	4	106.3	107.9	29.1	1
ASWMR**	0.6	6	102.7	105.6	20.9	3
Arts, Entertainment and Recreation	-0.2	2	105.5	116.7	18.9	2
Accommodation and Food Services	0.5	9	101.9	96.2	13.2	4
Other Services (Except Public Administration)	1.5	8	105.0	98.8	16.1	6
Absolute Equally-Weighted Average Rank		5.9				4.1
Equally-Weighted Market Sector Rank		7				2

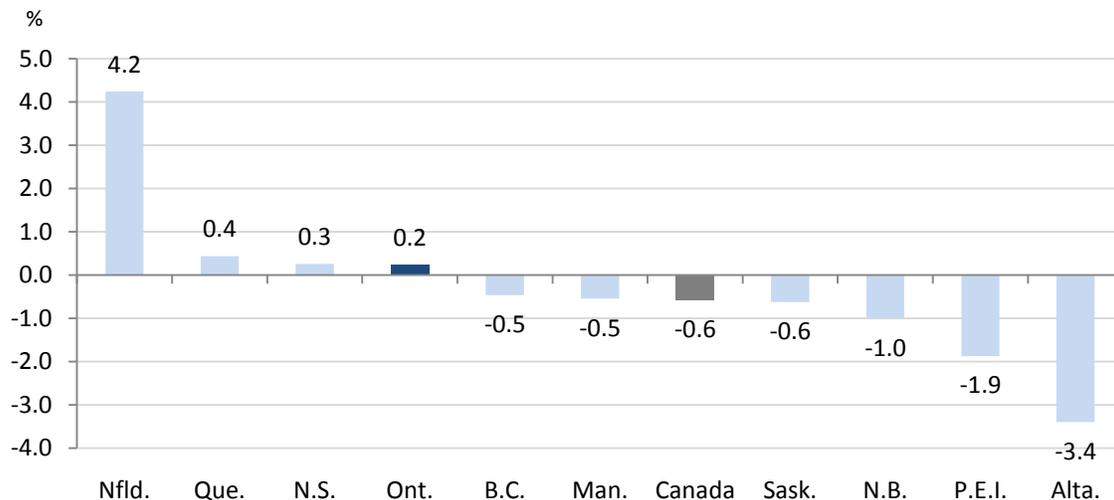
Source: CSLs Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

iii. Capital Productivity

Capital productivity, defined as real GDP per unit of capital services, increased at a rate of 0.2 per cent per year in Ontario's market sector during the 1997-2007 period. The national average, in contrast, declined by 0.6 per cent per year. Ontario ranked 4th in Canada in terms of capital productivity growth (Chart 37).

Chart 37: Capital Productivity Growth Rates in Canada and the Provinces, Market Sector, 1997-2007 (Average Annual Growth Rates)



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

In Ontario, seven of the 15 two-digit NAICS industries had negative capital productivity growth rates during the period. The industries that experienced the worst performances were professional, scientific and technical services (-6.2 per cent per year), administrative and support, waste management and remediation services (-4.0 per cent), and arts, entertainment and recreation (-3.4 per cent) (Table 48). The industries that had the best performances were accommodation and food services (1.8 per cent per year), other services (1.4 per cent), and manufacturing (1.3 per cent).

In terms of capital productivity levels, six of the 15 two-digit NAICS industries in Ontario ranked 4th place or above. The accommodation and food services industry, and the FIRE industry had the highest capital productivity in Canada when compared to equivalent industries in other provinces. None of Ontario's industries ranked last in terms of capital productivity growth.

Ontario's capital productivity level in the market sector in 2007 was 116.5 per cent of the Canadian level, up from 107.4 per cent in 1997. 10 of the 15 two-digit NAICS industries in the province had capital productivity levels above the Canadian average. The industries with highest capital productivity levels in the province were mining, and oil and gas extraction (200.6 per cent of the Canadian level), other services (148.9 per cent), and accommodation and food services (125.0 per cent). The five industries that had capital productivity levels lower than Canada's in 2007 were construction (85.7 per cent of the Canadian level), administrative and support, waste management and remediation services (88.0 per cent), retail trade (93.5 per cent), information and cultural industries (97.8 per cent), and transportation and warehousing (99.0 per cent).

Ontario's market sector had the 3rd highest capital productivity level in Canada in 2007. The province's equally weighted market sector rank was even higher, 1st. This reflects the high overall capital productivity levels at the industry level in the province, which ranked 4th or above in seven of the 15 two-digit NAICS industries. Ontario had the highest capital productivity level in Canada in other services, accommodation and food services, and FIRE.

Table 48: Capital Productivity Levels and Growth Rates in Ontario, 1997-2007

	Compound Annual Growth Rate, 1997-2007	Provincial Ranking	Province's Capital Productivity Level Relative to Canada's, 1997	Province's Capital Productivity Level Relative to Canada's, 2007	Capital Productivity Level, 2007	Provincial Ranking, 2007
	(per cent)		(Canada=100)	(Canada=100)	(1997 Dollars)	
Market Sector	0.2	4	107.4	116.5	2.68	3
Agriculture, Forestry, Fishing and Hunting	1.1	9	114.1	104.3	2.19	6
Mining, and Oil and Gas Extraction	-1.3	5	127.4	200.6	1.55	5
Utilities	0.4	4	106.9	111.4	1.44	3
Construction	-1.9	8	119.6	85.7	5.86	6
Manufacturing	1.3	6	103.4	100.1	2.73	4
Wholesale Trade	0.8	5	99.0	109.0	3.46	3
Retail Trade	-2.1	8	104.5	93.5	4.28	7
Transportation and Warehousing	-2.4	4	103.7	99.0	2.38	6
Information and Cultural Industries	0.0	6	103.1	97.8	1.88	6
FIRE*	0.0	1	102.6	112.3	1.84	1
Professional, Scientific and Technical Services	-6.2	2	101.4	107.3	2.62	2
ASWMR**	-4.0	6	99.9	88.0	2.71	7
Arts, Entertainment and Recreation	-3.4	5	103.5	116.0	2.39	5
Accommodation and Food Services	1.8	1	100.4	125.0	5.38	1
Other Services (Except Public Administration)	1.4	3	119.3	148.9	7.93	1
Absolute Equally-Weighted Average Rank		4.9				4.2
Equally-Weighted Market Sector Rank		3				1

Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

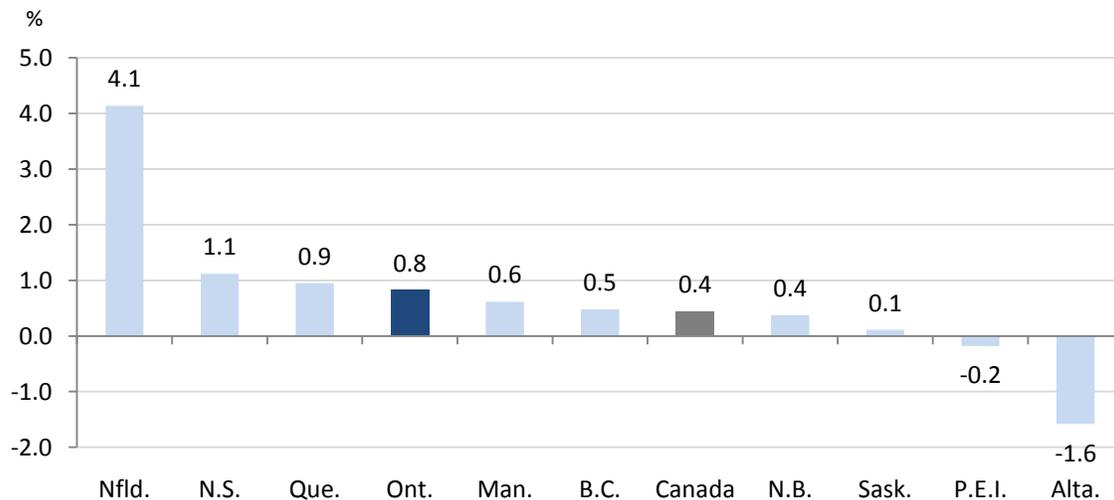
iv. Multifactor Productivity

Ontario's multifactor productivity in the market sector grew at an average rate of 0.8 per cent per year during the 1997-2007 period, twice the national average of 0.4 per cent per year. The province ranked 4th in Canada in terms of multifactor productivity (Chart 38).

The industry that experienced the highest multifactor productivity growth rate in Ontario was wholesale trade (2.8 per cent per year), followed by manufacturing (1.7 per cent), and retail trade (1.5 per cent) (Table 49). The industries that had the lowest multifactor productivity growth rates were mining, and oil and gas extraction (-2.2 per cent per year), transportation and warehousing (-1.0 per cent), and arts, entertainment and recreation (-0.9 per cent).

In terms of multifactor productivity growth, only five of the 15 two-digit NAICS industries in Ontario ranked at 7th place or lower. The retail industry had the worst multifactor productivity growth rate in Canada when compared to equivalent industries in the other provinces. In contrast, Ontario's professional, scientific and technical services had the highest multifactor productivity growth rate in Canada.

Chart 38: Multifactor Productivity Growth in Canada and the Provinces, Market Sector, 1997-2007 (Average Annual Growth Rates)



Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

The province's multifactor productivity level was 108.6 per cent of the Canadian level in 2007, up from 104.5 per cent in 1997. Nine of the 15 two-digit NAICS industries in Ontario had multifactor productivity levels above Canada's. The industries with the highest multifactor productivity levels in the province were mining, and oil and gas extraction (147.6 per cent of the Canadian level), arts, entertainment and recreation (116.5 per cent), and wholesale trade (109.5 per cent). In contrast, the industries with the lowest multifactor productivity levels in the province were construction (92.8 per cent of the Canadian level), information and cultural industries (96.9 per cent), and transportation and warehousing (97.8 per cent).

In terms of multifactor productivity levels, Ontario's market sector ranked 2nd in Canada in 2007 (the province ranked 1st according to the equally-weighted market sector ranking). Overall, the province had extremely high multifactor productivity levels, with nine of the 15 two-digit NAICS industries ranking 3rd or above. In 2007, Ontario had the highest multifactor productivity levels in the FIRE industry, as well as in professional, scientific and technical services.

Table 49: Multifactor Productivity Levels and Growth Rates in Ontario, 1997-2007

Market Sector	Compound Annual Growth Rate, 1997-2007	Provincial Ranking	Province's Multifactor Productivity Level Relative to Canada's, 1997	Province's Multifactor Productivity Level Relative to Canada's, 2007	Provincial Ranking, 2007
	(per cent)		(Canada=100)	(Canada=100)	
Market Sector	0.8	4	104.5	108.6	2
Agriculture, Forestry, Fishing and Hunting	1.7	9	98.0	90.2	8
Mining, and Oil and Gas Extraction	-2.2	6	113.0	147.6	5
Utilities	0.0	6	99.8	102.4	6
Construction	0.9	7	99.8	92.8	3
Manufacturing	1.7	4	104.0	103.0	2
Wholesale Trade	2.8	5	103.6	109.5	2
Retail Trade	1.5	10	105.3	99.1	5
Transportation and Warehousing	-1.0	7	102.9	97.8	5
Information and Cultural Industries	1.1	9	100.6	96.9	7
FIRE*	0.5	2	101.9	107.2	1
Professional, Scientific and Technical Services	-0.5	1	104.7	106.9	1
ASWMR**	-0.7	6	102.1	99.1	3
Arts, Entertainment and Recreation	-0.9	3	103.9	116.5	2
Accommodation and Food Services	0.5	6	101.7	100.9	3
Other Services (Except Public Administration)	1.0	6	110.0	108.1	3
Absolute Equally-Weighted Average Rank		5.8			3.7
Equally-Weighted Market Sector Rank		6			1

Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

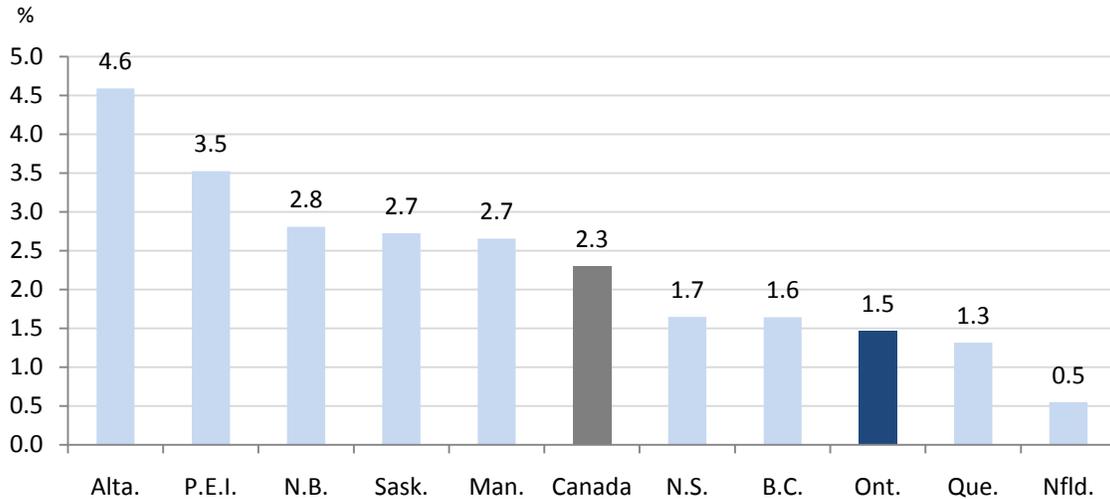
v. Capital Intensity

Capital intensity, defined as capital services per hour worked (unadjusted for labour quality), grew at an average rate of 1.5 per cent per year in Ontario's market sector during the 1997-2007 period, below the national average of 2.3 per cent per year. Ontario ranked 8th among the ten provinces in terms of capital intensity (Chart 39).

During this period, the industries that experienced the highest capital intensity growth rates in the province were professional, scientific and technical services (8.2 per cent per year), retail trade (5.3 per cent), administrative and support, waste management, and remediation services (4.9 per cent). Conversely, the industries that had the lowest growth rates in the province were mining, and oil and gas extraction (-2.8 per cent per year), accommodation and food services, and utilities (both of which grew at -1.3 per cent).

In terms of capital intensity growth, the province ranked 7th or below in seven of the 15 two-digit NAICS industries. In particular, the accommodation and food services, and the FIRE industries had the worst capital intensity in Canada when compared to equivalent industries in the other provinces. None of Ontario's industries ranked 1st.

**Chart 39: Capital Intensity Growth in Canada and the Provinces, Market Sector, 1997-2007
(Average Annual Growth Rates)**



Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

Table 50: Capital Intensity Levels and Growth Rates in Ontario, 1997-2007

	Compound Annual Growth Rate, 1997-2007	Provincial Ranking	Province's Capital Intensity Level Relative to Canada's, 1997	Province's Capital Intensity Level Relative to Canada's, 2007	Capital Intensity Level, 2007	Provincial Ranking, 2007
	(per cent)		(Canada=100)	(Canada=100)	(1997 Dollars)	
Market Sector	1.5	8	96.4	88.8	13.9	4
Agriculture, Forestry, Fishing and Hunting	1.9	8	73.5	71.4	9.2	9
Mining, and Oil and Gas Extraction	-2.8	9	58.1	30.5	31.1	7
Utilities	-1.3	7	76.3	73.6	76.8	8
Construction	3.7	3	80.5	111.7	5.2	5
Manufacturing	1.1	4	101.0	106.2	18.6	2
Wholesale Trade	3.3	4	107.6	101.7	13.4	6
Retail Trade	5.3	3	100.9	109.8	5.3	2
Transportation and Warehousing	2.7	6	98.2	98.7	13.0	3
Information and Cultural Industries	2.7	7	98.5	100.9	35.9	7
FIRE*	1.5	10	100.0	91.0	39.0	9
Professional, Scientific and Technical Services	8.2	6	105.2	100.6	11.1	6
ASWMR**	4.9	4	102.4	120.0	7.7	4
Arts, Entertainment and Recreation	3.3	5	102.4	100.6	7.9	5
Accommodation and Food Services	-1.3	10	101.6	77.0	2.5	10
Other Services (Except Public Administration)	0.1	9	88.1	66.4	2.0	10
Absolute Equally-Weighted Average Rank		6.3				6.2
Equally-Weighted Market Sector Rank		8				7

Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

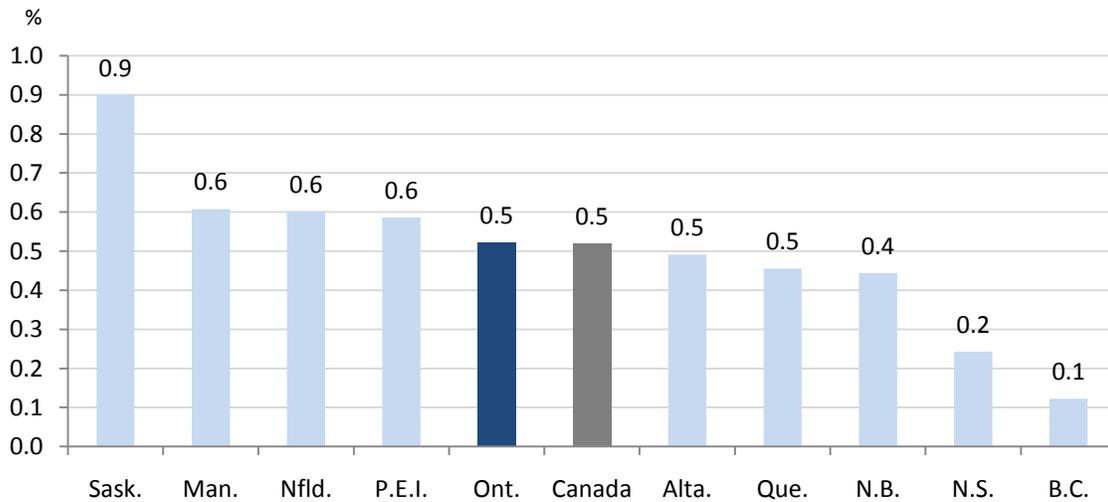
Ontario's capital intensity level was 88.8 per cent of the Canadian level in 2007, down from 96.4 per cent in 1997. Of the 15 two-digit NAICS industries, eight had levels above the national average in 2007. The industries with the highest capital intensity levels in the province were administrative and support, waste management and remediation services (120 per cent of the Canadian level), construction (111.7 per cent), and retail trade (109.8 per cent). The industries with the lowest capital intensity levels in the province were mining, and oil and gas extraction (30.5 per cent per year), other services (66.4 per cent per year), and agriculture, forestry, fishing and hunting (71.4 per cent).

In terms of capital intensity levels, Ontario's market sector ranked 4th in Canada in 2007 (the province ranked 7th according to the equally-weighted market sector ranking). Ontario had the lowest capital intensity levels in accommodation and food services, as well as in other services. Although none of the province's industries ranked 1st, the manufacturing industry reached 2nd place.

vi. Labour Quality

Ontario's labour quality grew at an average rate of 0.5 per cent per year during the 1997-2007 period, roughly the same as the national average. The province ranked 5th in Canada in terms of labour quality growth (Chart 40).

Chart 40: Labour Quality Growth in Canada and the Provinces, Market Sector, 1997-2007
(Average Annual Growth Rates)



Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

During the period in question, the industries that experienced the highest labour quality growth rates in the province were professional, scientific and technical services (0.8 per cent per year), agriculture, forestry, fishing and hunting (0.7 per cent), and information and cultural industries (0.6 per cent). The industries that had the lowest labour quality growth rates were mining, and oil and gas (-0.3 per cent per year), arts, entertainment and recreation (0.0 per cent), and utilities (0.0 per cent).

Despite ranking 5th according to its market sector rank, Ontario ranked 1st in terms of its equally-weighted market sector rank. This indicates that Ontario had exceptionally high labour quality growth rates in most of its industries, despite having average rates in its market sector. In fact, the province ranked 4th or above in 10 of the 15 two-digit NAICS industries – even though it ranked 1st only in professional, scientific and technical services. None of the province's industries ranked below 7th place in terms of labour quality.

Table 51: Labour Quality Levels and Growth Rates in Ontario, 1997-2007³²

Market Sector	Compound Annual Growth Rate, 1997-2007	Provincial Ranking
	(per cent)	
Market Sector	0.5	5
Agriculture, Forestry, Fishing and Hunting	0.7	4
Mining, and Oil and Gas Extraction	-0.3	6
Utilities	0.0	7
Construction	0.1	2
Manufacturing	0.5	3
Wholesale Trade	0.4	2
Retail Trade	0.2	2
Transportation and Warehousing	0.5	5
Information and Cultural Industries	0.6	4
FIRE*	0.5	4
Professional, Scientific and Technical Services	0.8	1
ASWMR**	0.3	5
Arts, Entertainment and Recreation	0.0	7
Accommodation and Food Services	0.3	2
Other Services (Except Public Administration)	0.5	3
Absolute Equally-Weighted Average Rank		3.8
Equally-Weighted Market Sector Rank		1

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

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

vii. Sources of Labour Productivity Growth in the Market Sector

Ontario's labour productivity grew at an average rate of 1.7 per cent per year during the 1997-2007 period, approximately the same as the national average. Charts 41 and 42 show both the percentage point and per cent contributions to labour productivity growth by the sources of growth for Ontario and Canada over the 1997-2007 period.

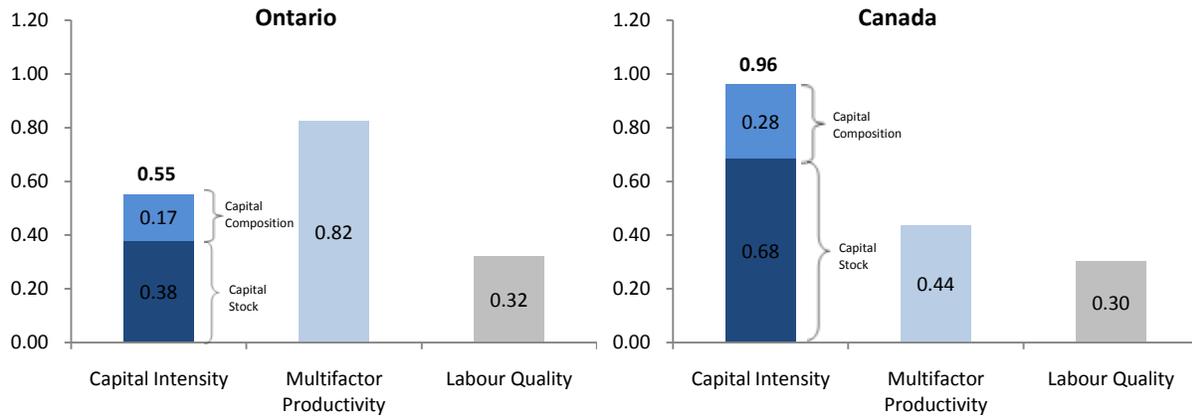
Ontario's labour productivity growth was driven mainly by multifactor productivity growth, which accounted for 0.82 percentage points of the overall labour productivity growth (or, alternatively, 48.1 per cent of total growth). Capital intensity growth contributed with 0.55 percentage points (32.3 per cent), of which 0.17 percentage points were due to capital composition growth (10.1 per cent) and 0.38 percentage points were due to capital stock growth (22.2 per cent). Labour quality was responsible for 0.32 percentage points of the labour productivity growth experienced in the province (18.8 per cent).

Comparing the two charts, it can be seen that labour quality had approximately the same relative contribution to labour productivity growth in Ontario and in Canada (albeit slightly higher in

³² Labour quality levels are not shown here because they are assumed to be the same (and equal to 100.0) across all provinces and in Canada in the base year, 1997 (Sharpe and Thomson, 2010a). They differ after 1997, incorporating the different labour quality growth rates experienced by the provinces and Canada. For example, labour quality in Ontario's market sector grew at an average annual rate of 0.52 per cent over the 1997-2007 period, while Canada's labour quality grew at an average annual rate of 0.51 per cent. As a consequence, Ontario's labour quality level was 100.03 per cent of the Canadian level in 2007.

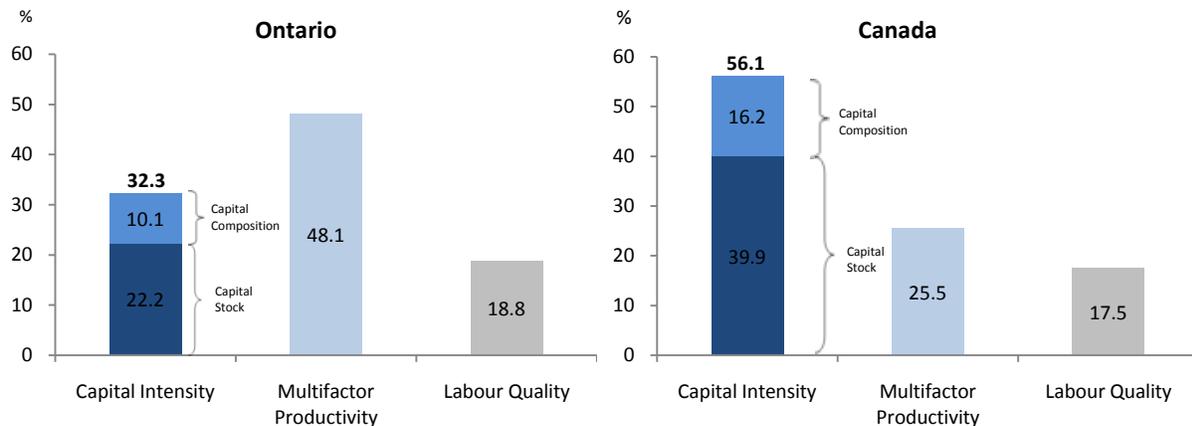
Ontario). The main difference between the two was in the role of multifactor productivity and capital intensity. Whereas multifactor productivity explained only 25.5 per cent of labour productivity growth in Canada, it explained 48.1 per cent of Ontario's labour productivity growth. Conversely, capital intensity explained 56.1 per cent of labour productivity growth in Canada, but only 32.3 per cent in Ontario.

Chart 41: Percentage Point Contribution to Labour Productivity Growth by the Source of Labour Productivity Growth in the Market Sector in Ontario and in Canada, 1997 to 2007



Source: CSLS Provincial Productivity Database, Appendix Table 467, http://www.csls.ca/data/mfp_new.asp.

Chart 42: Per Cent Contribution to Labour Productivity Growth by the Source of Labour Productivity Growth in the Market Sector in Ontario and in Canada, 1997 to 2007



Source: CSLS Provincial Productivity Database, Appendix Table 467, http://www.csls.ca/data/mfp_new.asp.

Note: Numbers may not sum to 100 due to rounding.

Table 52 details the contributions in absolute and per cent terms of capital intensity, MFP, and labour quality growth to labour productivity growth in Ontario over the 1997-2007 period at the two-digit NAICS industry level.

Table 52: Contributions to Labour Productivity Growth at the Industry Level by Source in Ontario, 1997-2007

	Labour Productivity	Capital Intensity			MFP	Labour Quality
		Total	Capital Composition	Capital Stock		
Percentage Point Contributions to Labour Productivity Growth						
Market Sector	1.7	0.6	0.2	0.4	0.8	0.3
Agriculture, Forestry, Fishing and Hunting	3.0	1.0	1.0	0.0	1.7	0.3
Mining, and Oil and Gas Extraction	-4.1	-1.9	-0.5	-1.4	-2.2	-0.1
Utilities	-0.9	-0.9	-1.2	0.3	0.0	0.0
Construction	1.7	0.7	0.0	0.6	0.9	0.1
Manufacturing	2.4	0.4	1.9	-1.4	1.7	0.3
Wholesale Trade	4.2	1.0	0.1	0.9	2.8	0.3
Retail Trade	3.1	1.4	0.1	1.3		0.2
Transportation and Warehousing	0.2	0.8	0.2	0.6	-1.0	0.4
Information and Cultural Industries	2.7	1.3	0.3	1.0	1.1	0.3
FIRE*	1.5	0.8	0.3	0.5	0.5	0.2
Professional, Scientific and Technical Services	1.5	1.3	0.1	1.2	-0.5	0.6
ASWMR**	0.6	1.1	0.1	1.0	-0.7	0.2
Arts, Entertainment and Recreation	-0.2	0.8	0.2	0.5	-0.9	0.0
Accommodation and Food Services	0.5	-0.3	-0.3	0.0	0.5	0.3
Other Services (Except Public Administration)	1.5	0.1	0.0	0.0	1.0	0.4
Per Cent Contributions to Labour Productivity Growth						
Market Sector	100.0	32.5	10.1	22.2	48.1	18.8
Agriculture, Forestry, Fishing and Hunting	100.0	32.9	34.5	-1.7	55.4	10.9
Mining, and Oil and Gas Extraction	100.0	45.6	12.2	33.3	53.1	2.4
Utilities	100.0	96.4	134.4	-37.7	2.9	0.8
Construction	100.0	39.0	2.0	36.9	53.7	6.8
Manufacturing	100.0	17.8	78.1	-60.0	69.6	12.1
Wholesale Trade	100.0	25.1	3.4	21.5	67.3	6.7
Retail Trade	100.0	44.3	2.0	42.2		5.5
Transportation and Warehousing	100.0	372.4	103.7	265.1	-430.7	162.0
Information and Cultural Industries	100.0	47.8	10.3	37.0	40.7	10.7
FIRE*	100.0	53.8	19.5	33.7	31.3	14.5
Professional, Scientific and Technical Services	100.0	91.3	9.3	80.9	-34.0	42.8
ASWMR**	100.0	178.2	16.5	160.1	-110.5	33.4
Arts, Entertainment and Recreation	100.0	-382.1	-108.4	-268.7	461.9	16.7
Accommodation and Food Services	100.0	-57.9	-50.6	-7.3	105.9	52.2
Other Services (Except Public Administration)	100.0	3.6	0.5	3.1	68.5	27.5

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

Note: Per cent contributions may not sum to 100 due to rounding.

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

viii. Sources of Labour Productivity Level Gap by Industry

Ontario's labour productivity level in 2007 was 103.5 per cent of the Canadian level, which implies a positive labour productivity differential of 3.5 percentage points. Table 53 makes it clear that this differential was caused predominantly by the market sector's above average multifactor

productivity level, which was responsible for 8.4 percentage points of the differential. The capital intensity and labour quality levels accounted for -4.9 and 0.0 percentage points of the differential.³³

Ontario had a labour productivity gap in eight of the 15 two-digit NAICS industries. In most cases, the below average capital intensity level was the main culprit. The exceptions were construction, FIRE, and information and cultural industries, all of which had labour productivity gaps caused by their low multifactor productivity levels.

Table 53: Sources of the Labour Productivity Gap Relative to Canada for Ontario 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 Quality	Labour Productivity	Capital Intensity	Multifactor Productivity	Labour Quality
Market Sector	103.5	3.5	-4.9	8.4	0.0	100.0	-142.0	241.4	0.6
Agriculture, Forestry, Fishing and Hunting	74.5	-25.5	-15.9	-8.9	-0.7	100.0	62.4	35.0	2.6
Mining, and Oil and Gas Extraction	61.3	-38.7	-68.8	30.8	-0.6	100.0	177.8	-79.4	1.7
Utilities	81.9	-18.1	-19.8	2.2	-0.5	100.0	109.4	-12.0	2.6
Construction	95.8	-4.2	2.8	-7.3	0.2	100.0	-66.5	172.0	-5.4
Manufacturing	106.3	6.3	2.5	3.1	0.7	100.0	39.8	49.2	11.0
Wholesale Trade	110.9	10.9	0.6	9.6	0.7	100.0	5.6	88.0	6.4
Retail Trade	102.7	2.7	2.8	-1.0	0.9	100.0	102.7	-35.1	32.4
Transportation and Warehousing	97.8	-2.2	-0.4	-2.2	0.4	100.0	18.3	100.7	-19.0
Information and Cultural Industries	97.3	-2.7	0.5	-3.2	0.0	100.0	-17.1	118.4	-1.4
FIRE*	102.2	2.2	-5.1	7.0	0.2	100.0	-235.2	323.8	11.3
Professional, Scientific and Technical Services	107.9	7.9	0.1	6.9	0.9	100.0	1.3	87.7	11.1
ASWMR**	105.6	5.6	4.4	-1.0	2.1	100.0	79.6	-17.3	37.8
Arts, Entertainment and Recreation	116.7	16.7	0.2	16.5	0.0	100.0	1.0	98.9	0.1
Accommodation and Food Services	96.2	-3.8	-5.6	0.8	1.0	100.0	149.1	-22.2	-26.9
Other Services (Except Public Administration)	98.8	-1.2	-9.8	7.7	0.9	100.0	837.1	-659.4	-77.7

Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

ix. Conclusion

During the 1997-2007 period, Ontario's capital and multifactor productivity growth rates significantly surpassed the national average. More specifically, capital productivity increased at an average annual rate of 0.2 per cent, while the national average declined by 0.4 per cent, and multifactor productivity grew at an average rate of 0.8 per cent per year, double the national average. Labour productivity growth in the province was about the same as the national average, 1.7 per cent per year. However, it is important to note that while labour productivity growth in Canada was driven mainly by increases in capital intensity, responsible for 56.1 per cent of labour productivity growth in Canada, in Ontario it was caused chiefly by robust multifactor productivity growth, which accounted for 48.1 per cent of total growth.

Ontario's labour, capital, and multifactor productivity levels in 2007 were above the national levels. The province's labour productivity level, in particular, was 103.5 per cent of the Canadian level,

³³ Again, it is important to bear in mind that labour quality levels were assumed to be equal to 100.0 in all provinces and in Canada for the base year of 1997. They differ after 1997, incorporating the different labour quality growth rates experienced by the provinces and Canada.

which implies a positive labour productivity differential of 3.5 percentage points. This differential was caused by the above average multifactor productivity level, which was able to offset the negative contribution caused by the below average capital intensity.

Table 54 provides a summary of both levels (in 1997 and 2007) and growth rates (for the 1997-2007 period) for the productivity measures discussed in this report, along with rankings that show how Ontario fared in comparison to the other provinces. A key observation is that even though Ontario's growth rate performance was worse than its level performance, the province still did relatively well when compared to the rest of Canada. Ontario had below average growth rates and levels only in terms of capital intensity, while excelling in capital and multifactor productivity growth rates and levels. Furthermore, even though the province's market sector rank in labour, capital, and multifactor productivity were high (either 2nd or 3rd place), its equally-weighted market sector ranks were even higher (either 1st or 2nd place), which indicates high productivity levels throughout all of Ontario's industries.

Table 54: Summary of Ontario's Productivity Performance in the Market Sector

	Market Sector Growth, 1997 to 2007			Per Cent of the Canadian Level		Level Rankings, 2007	
	Compound Annual Growth Rate	Market Sector Rank	Equally-Weighted Market Sector Rank	1997	2007	Market Sector Rank	Equally-Weighted Market Sector Rank
Labour Productivity	1.7	7	7	103.5	103.5	3	2
Capital Productivity	0.2	4	3	107.4	116.5	3	1
Multifactor Productivity	0.8	4	6	104.5	108.6	2	1
Capital Intensity	1.5	8	8	96.4	88.8	4	7
Labour Quality	0.5	5	1	n.a.	n.a.	n.a.	n.a.

Source: CCLS Provincial Productivity Database, Appendix Tables, http://www.ccls.ca/data/mfp_new.asp.

VIII. An Analysis of Manitoba's Productivity, 1997-2007: Above Average Labour Productivity Growth Lead to Convergence Towards the National Level

i. Industry Composition by Nominal GDP and Total Hours Worked

In order to understand Manitoba's overall productivity performance, it is essential to understand how each of the 15 two-digit NAICS industries contributed to the province's market sector in terms of nominal GDP and actual hours worked. Table 55 details these contribution shares for 1997 and 2007. In Manitoba, the industries that had the highest GDP shares in 2007 were manufacturing (18.9 per cent of the province's nominal GDP in the market sector), FIRE (finance, insurance, real estate, rental and leasing) (12.9 per cent), and retail trade (8.6 per cent). In terms of total hours worked, the three industries that had the highest contributions in 2007 were manufacturing (16.4 per cent of total hours worked), retail trade (12.9 per cent), and transportation and warehousing (9.5 per cent).

Table 55: Industry Share of Nominal GDP and Total Hours Worked in Manitoba

Market Sector	1997				2007			
	GDP		Hours Worked		GDP		Hours Worked	
	Canada	Manitoba	Canada	Manitoba	Canada	Manitoba	Canada	Manitoba
Market Sector	100.0							
Agriculture, Forestry, Fishing and Hunting	3.2	6.7	5.4	12.5	2.1	5.0	3.4	8.7
Mining, and Oil and Gas Extraction	5.5	3.2	1.7	1.5	11.1	7.2	2.0	1.1
Utilities	4.2	5.5	0.9	1.0	3.0	4.8	0.8	1.3
Construction	7.0	6.7	7.9	7.5	9.0	6.8	10.1	8.3
Manufacturing	23.2	19.1	18.3	15.7	16.8	18.9	14.8	16.4
Wholesale Trade	7.1	8.3	7.4	7.2	7.1	8.0	6.9	6.0
Retail Trade	6.9	7.6	13.1	12.6	7.4	8.6	12.9	12.9
Transportation and Warehousing	6.2	9.5	6.3	8.6	5.6	8.0	6.6	9.5
Information and Cultural Industries	4.3	3.9	2.5	2.0	4.3	4.4	2.7	2.2
FIRE*	15.0	14.2	7.5	6.4	14.6	12.9	7.8	6.5
Professional, Scientific and Technical Services	4.9	3.3	6.3	4.3	6.2	3.8	7.9	5.4
ASWMR**	2.5	1.7	4.0	2.8	3.3	2.4	5.7	4.2
Arts, Entertainment and Recreation	0.9	0.8	1.5	2.1	0.9	0.8	1.9	1.6
Accommodation and Food Services	3.2	3.4	7.8	7.1	2.8	2.8	7.0	7.1
Other Services (Except Public Administration)	5.7	6.0	9.4	8.9	5.8	5.6	9.5	8.8

Source: Shares calculated by the CSLs, based on Statistics Canada data (Cansim Table 5783-0011).

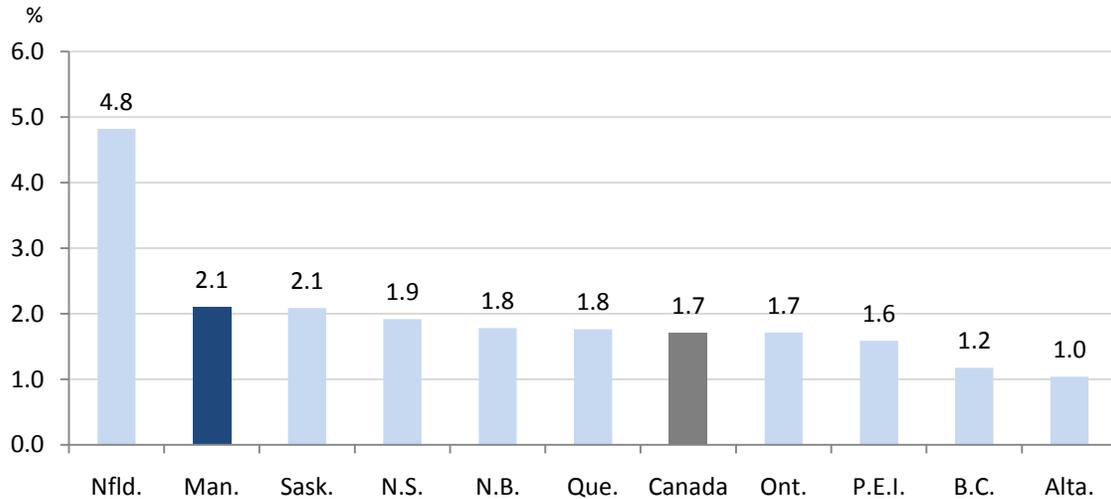
*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

ii. Labour Productivity

Labour productivity, defined as real GDP per hour worked,³⁴ grew at an average rate of 2.1 per cent per year in Manitoba's market sector during the 1997-2007 period, which is above the national average of 1.7 per cent. Manitoba ranked 2nd among the provinces in terms of labour productivity growth (Chart 43).

³⁴ Note that the total hours worked figures used to calculate labour productivity are unadjusted for labour quality.

Chart 43: Labour Productivity Growth in Canada and the Provinces, Market Sector, 1997-2007
(Average Annual Growth Rates)



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

During period in question, the industry that experienced the highest labour productivity growth rate in Manitoba was mining, oil and gas extraction (6.1 per cent per year), followed by arts, entertainment and recreation (5.7 per cent), and agriculture, forestry, fishing and hunting (4.9 per cent) (Table 56). The industry that had the lowest labour productivity growth rate was utilities (-2.7 per cent per year), professional, scientific and technical services (-0.8 per cent), and accommodation and food services (0.4 per cent).

Compared to the other provinces, Manitoba had strong labour productivity growth rates at the industry level during this period. The province ranked 7th or below in only six of the 15 two-digit NAICS industries, including a 10th place ranking in accommodation and food services. At the same time, it ranked 4th or above in six industries, including 1st place rankings in arts, entertainment and recreation and administrative and support, waste management and remediation services.

Manitoba's labour productivity level in 2007 was \$31.40 (1997 dollars) per hour, which represents 87.1 per cent of the Canadian level, significantly better than the 83.9 per cent the province had in 1997. Manitoba had the 7th highest labour productivity level in Canada in 2007.

In 2007, five of the 15 two-digit NAICS industries in Manitoba had a labour productivity level above the national level. The industries with the highest relative labour productivity levels in the province were: mining and oil and gas extraction (127.8 per cent of the Canadian level), retail trade (106.5 per cent), and arts, entertainment and recreation (103.6 per cent). The industries that had the lowest levels in the province were: professional, scientific and technical services (67.8 per cent of the Canadian level), manufacturing (70.3 per cent), and utilities (75.9 per cent).

Compared to the other provinces, Manitoba had high labour productivity levels in several industries, with seven of the 15 two-digit NAICS industries ranking 4th or above. On the other hand, Manitoba ranked 7th or lower in four industries, including a 10th place ranking in professional, scientific and technical services.

Table 56: Labour Productivity Levels and Growth Rates in Manitoba, 1997-2007

Market Sector	Compound Annual Growth Rate, 1997-2007	Provincial Ranking	Province's Labour Productivity Level Relative to Canada's, 1997	Province's Labour Productivity Level Relative to Canada's, 2007	Labour Productivity Level, 2007	Provincial Ranking, 2007
	(per cent)		(Canada=100)	(Canada=100)	(1997 Dollars)	
Market Sector	2.1	2	83.9	87.1	31.4	7
Agriculture, Forestry, Fishing and Hunting	4.9	4	76.3	81.2	22.1	8
Mining, and Oil and Gas Extraction	6.1	3	56.1	127.8	100.5	2
Utilities	-2.7	9	91.2	75.9	102.2	7
Construction	2.1	5	84.5	87.2	27.8	5
Manufacturing	0.9	7	80.5	70.3	33.6	7
Wholesale Trade	3.2	7	100.6	95.6	40.1	3
Retail Trade	4.3	2	96.8	106.5	23.5	2
Transportation and Warehousing	0.4	6	95.6	93.0	29.6	6
Information and Cultural Industries	3.3	8	100.2	102.9	70.6	6
FIRE*	2.0	3	93.1	98.1	69.0	4
Professional, Scientific and Technical Services	-0.8	8	83.9	67.8	18.3	10
ASWMR**	2.0	1	80.0	94.2	18.7	4
Arts, Entertainment and Recreation	5.7	1	52.6	103.6	16.8	3
Accommodation and Food Services	0.4	10	98.9	92.4	12.7	6
Other Services (Except Public Administration)	2.8	5	94.5	101.0	16.4	3
Absolute Equally Weighted Average Rank		5.3				5.1
Equally Weighted Market Sector Rank		3				6

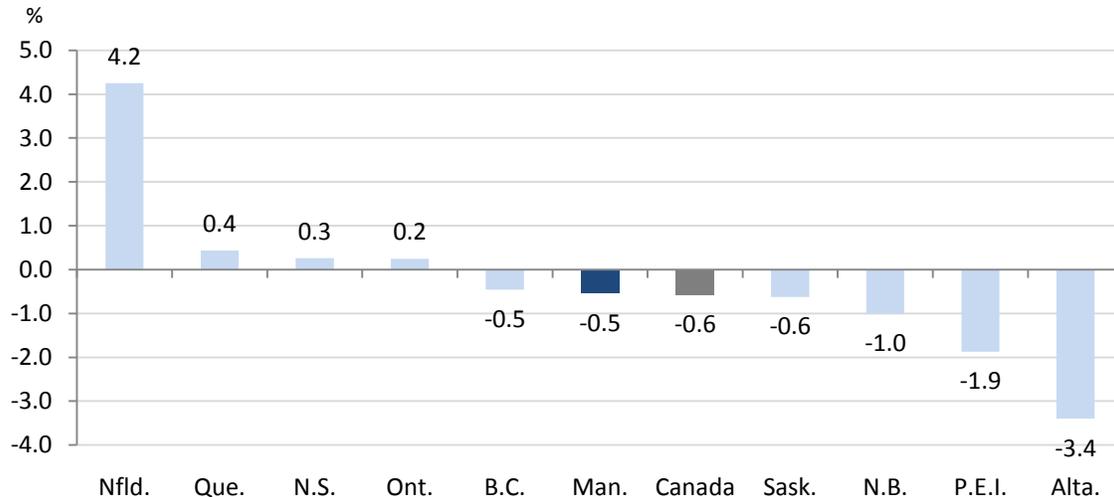
Source: CSLs Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

iii. Capital Productivity

Capital productivity, defined as real GDP per unit of capital services, declined by 0.5 per cent per year in Manitoba's market sector during the 1997-2007 period. The national average, in contrast, declined by 0.6 per cent per year. Manitoba ranked 6th in Canada in terms of capital productivity growth (Chart 44).

Chart 44: Capital Productivity Growth Rates in Canada and the Provinces, Market Sector, 1997-2007 (Average Annual Growth Rates)



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

In Manitoba, 11 of the 15 two-digit NAICS industries had negative capital productivity growth rates during the period. The industries that experienced the worst performances were: professional, scientific and technical services (-7.2 per cent per year), administrative and support, waste management and remediation services (-4.1 per cent), and construction (-3.4 per cent) (Table 57). The industries that had the best performances were: agriculture, forestry, fishing and hunting (2.7 per cent per year), other services (2.0 per cent), and mining, and oil and gas extraction (1.1 per cent).

Compared to the rest of the provinces, Manitoba had higher capital productivity growth rates in most industries. In Manitoba, seven of the 15 two-digit NAICS industries at 4th place or above and six industries ranked 7th place or below. While Manitoba did not have the highest capital productivity growth in any industry, there were two industries where the province ranked 2nd: transportation and warehousing and mining, oil and natural gas extraction. There was also one industry in which Manitoba had the lowest capital productivity growth of any province, manufacturing.

Manitoba's capital productivity level in the market sector in 2007 was 99.4 per cent of the Canadian level, up slightly from 99.1 per cent in 1997. In five of the 15 two-digit NAICS industries in the province had capital productivity levels above the national level. The industries with highest relative capital productivity levels in the province were: mining, and oil and gas extraction (288.7 per cent of the Canadian level), arts, entertainment and recreation (167.4 per cent), and retail trade (126.4 per cent). The ten industries that had capital productivity levels lower than the national level in 2007 were: professional, scientific and technical services (97.6 per cent), agriculture, forestry, fishing and hunting (94.7 per cent), and accommodation and food services (93.4 per cent).

Table 57: Capital Productivity Levels and Growth Rates in Manitoba, 1997-2007

	Compound Annual Growth Rate, 1997-2007	Provincial Ranking	Province's Capital Productivity Level Relative to Canada's		Capital Productivity Level, 2007	Provincial Ranking, 2007
	(per cent)		(Canada=100)		(1997 Dollars)	
Market Sector	-0.5	6	99.1	99.4	2.28	7
Agriculture, Forestry, Fishing and Hunting	2.7	3	88.5	94.7	1.99	7
Mining, and Oil and Gas Extraction	1.1	2	144.1	288.7	2.23	3
Utilities	-1.6	7	99.9	85.1	1.10	7
Construction	-3.4	9	111.3	68.4	4.67	8
Manufacturing	-0.7	10	100.4	79.6	2.17	9
Wholesale Trade	-0.5	6	75.9	73.4	2.33	10
Retail Trade	0.1	3	113.1	126.4	5.79	3
Transportation and Warehousing	-0.1	2	101.2	121.9	2.94	2
Information and Cultural Industries	-0.9	8	102.0	88.4	1.70	7
FIRE*	-1.9	6	98.5	89.0	1.46	6
Professional, Scientific and Technical Services	-7.2	5	102.7	97.6	2.39	4
ASWMR**	-4.1	7	106.7	93.0	2.87	6
Arts, Entertainment and Recreation	-3.3	4	147.8	167.4	3.45	2
Accommodation and Food Services	-1.7	7	106.5	93.4	4.02	4
Other Services (Except Public Administration)	2.0	2	82.1	108.7	5.79	4
Absolute Equally Weighted Average Rank		5.4				5.5
Equally Weighted Market Sector Rank		6				5

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

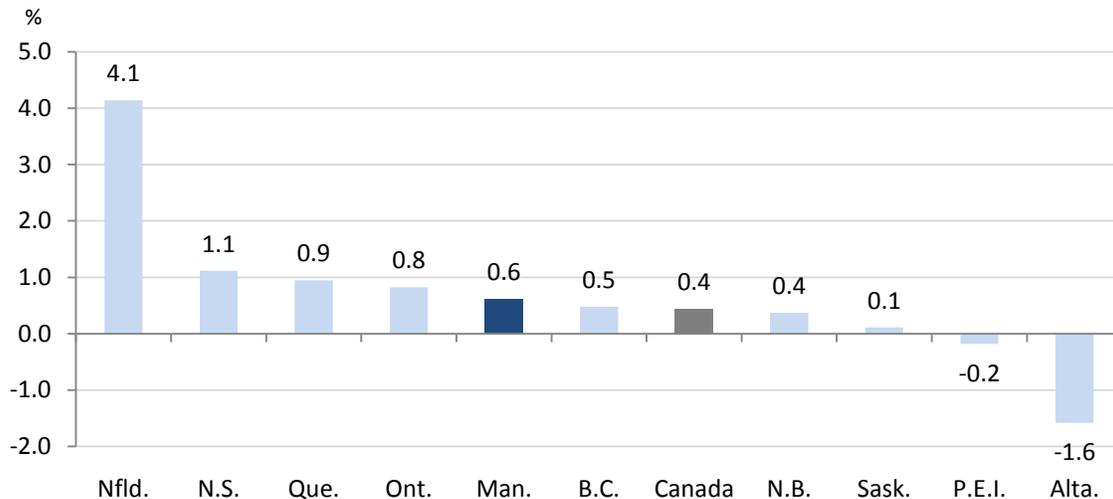
*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

Manitoba's market sector ranked 7th highest in terms of the capital productivity level in Canada in 2007. The province's equally weighted market sector rank was higher, 5th. The province ranked 4th or above in seven of the 15 two-digit NAICS industries, but 7th or below in six industries. Manitoba did not have the highest capital productivity level in any industry, but attained the 2nd highest ranking in transportation and warehousing and arts, entertainment and recreation. Manitoba had the lowest capital productivity level in Canada in wholesale trade.

iv. Multifactor Productivity

Manitoba's multifactor productivity in the market sector grew at an average annual rate of 0.6 per cent during the 1997-2007 period, above the national average of 0.4 per cent per year. The province ranked 5th in Canada in terms of multifactor productivity (Chart 45).

Chart 45: Multifactor Productivity Growth in Canada and the Provinces, Market Sector, 1997-2007
(Average Annual Growth Rates)



Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

The industries that experienced the highest multifactor productivity growth rates in Manitoba were agriculture, forestry, fishing and hunting (3.1 per cent), mining, and oil and gas extraction (3.1 per cent), and retail trade (3.1 per cent) (Table 58). The industry that had the lowest multifactor productivity growth rates were professional, scientific and technical services (-2.1 per cent per year), utilities (-1.9 per cent), and finance, insurance, real estate, rental and leasing (-0.4 per cent).

Compared to the other provinces, Manitoba had above average multifactor productivity growth rankings in most industries over the 1997-2007 period. Of the 15 two-digit NAICS industries, only six were ranked at 7th place or lower. The information and cultural industries had the worst multifactor productivity growth rate in Canada when compared to equivalent industries in the other provinces. In contrast, Manitoba's arts, entertainment and recreation had the highest multifactor productivity growth rate in Canada.

The province's multifactor productivity level in 2007 was 91.9 per cent of the Canadian level, up from 90.2 per cent in 1997. In 2007, five of the 15 two-digit NAICS industries in Manitoba had multifactor productivity levels above Canada's. The industries with the highest multifactor productivity levels in the province were mining, and oil and gas extraction (248.5 per cent of the Canadian level), retail trade (113.0 per cent), and other services (except public administration) (110.4 per cent). In contrast, the industries with the lowest multifactor productivity levels in the province were manufacturing (74.3 per cent of the Canadian level), professional, scientific and technical services (76.6 per cent), and construction (82.0 per cent).

In terms of multifactor productivity levels, Manitoba's market sector ranked 6th in Canada in 2007. Manitoba experienced multifactor productivity such that five of the 15 two-digit NAICS industries ranked 3rd or above, but eight ranked 7th or below. In 2007, Manitoba did not have the highest multifactor productivity level in any industry, but attained the 2nd highest ranking in mining, oil and gas extraction, retail trade and other services (excluding public administration). Manitoba had the lowest multifactor productivity level of any province in information and cultural industries.

Table 58: Multifactor Productivity Levels and Growth Rates in Manitoba, 1997-2007

Market Sector	Compound Annual Growth Rate, 1997-2007	Provincial Ranking	Province's Multifactor Productivity Level Relative to Canada's, 1997	Province's Multifactor Productivity Level Relative to Canada's, 2007	Provincial Ranking, 2007
	(per cent)		(Canada=100)	(Canada=100)	
Market Sector	0.6	5	90.2	91.9	6
Agriculture, Forestry, Fishing and Hunting	3.1	4	85.6	90.3	7
Mining, and Oil and Gas Extraction	3.1	3	112.2	248.5	2
Utilities	-1.9	7	97.6	82.7	7
Construction	0.9	7	88.2	82.0	8
Manufacturing	0.0	8	88.8	74.3	9
Wholesale Trade	1.5	6	93.1	86.7	8
Retail Trade	3.1	3	102.8	113.0	2
Transportation and Warehousing	0.1	3	97.8	103.8	3
Information and Cultural Industries	0.5	10	101.2	91.8	10
FIRE*	-0.4	5	96.1	92.4	5
Professional, Scientific and Technical Services	-2.1	8	88.3	76.6	8
ASWMR**	0.4	4	82.7	89.6	7
Arts, Entertainment and Recreation	2.3	1	68.9	106.2	3
Accommodation and Food Services	-0.2	9	102.1	94.3	5
Other Services (Except Public Administration)	3.0	3	92.3	110.4	2
Absolute Equally Weighted Average Rank		5.4			5.7
Equally Weighted Market Sector Rank		5			6

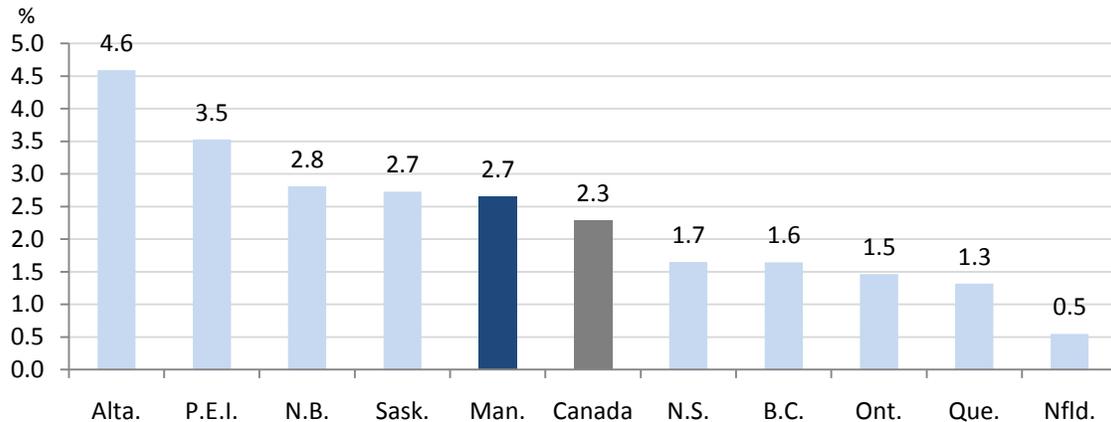
Source: CSLs Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

v. Capital Intensity

Capital intensity, defined as capital services per hour worked (unadjusted for labour quality), grew at an average rate of 2.7 per cent per year in Manitoba's market sector during the 1997-2007 period, above the national average of 2.3 per cent per year. Manitoba ranked 5th among the ten provinces in terms of capital intensity (Chart 46).

Chart 46: Capital Intensity Growth in Canada and the Provinces, Market Sector, 1997-2007
(Average Annual Growth Rates)



Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

During this period, the industries that experienced the highest capital intensity growth rates in the province were: arts, entertainment and recreation (9.3 per cent per year), professional, scientific and technical services (6.8 per cent), and administrative and support, waste management and remediation services (6.3 per cent). Conversely, the industries that had the lowest growth rates in the province were: utilities (-9.0 per cent per year), transportation and warehousing (0.5 per cent), and other services (except public administration) (0.8 per cent).

Compared to the other provinces, Manitoba had strong capital intensity growth rates at the industry level during the 1997-2007 period. The province ranked 7th or below in only three of the 15 two-digit NAICS industries, but ranked 3rd or above in six industries. In particular, utilities had the best capital intensity growth in Canada when compared to equivalent industries in the other provinces. None of Manitoba's industries ranked last in terms of capital intensity.

Table 59: Capital Intensity Levels and Growth Rates in Manitoba, 1997-2007

Market Sector	Compound Annual Growth Rate, 1997-2007	Provincial Ranking	Province's Capital Intensity Level Relative to Canada's		Capital Intensity Level, 2007	Provincial Ranking, 2007
	(per cent)		1997 (Canada=100)	2007 (Canada=100)	(1997 Dollars)	
Market Sector	2.7	5	84.7	87.7	13.8	5
Agriculture, Forestry, Fishing and Hunting	2.1	6	86.1	85.8	11.1	7
Mining, and Oil and Gas Extraction	5.0	3	38.9	44.3	45.0	6
Utilities	-1.1	6	91.3	89.2	93.1	6
Construction	5.7	2	75.9	127.4	5.9	3
Manufacturing	1.6	1	80.1	88.4	15.5	6
Wholesale Trade	3.7	3	132.9	130.3	17.2	2
Retail Trade	4.2	5	85.7	84.2	4.1	7
Transportation and Warehousing	0.5	9	94.8	76.3	10.1	6
Information and Cultural Industries	4.3	4	99.2	118.1	42.0	4
FIRE*	4.1	5	94.1	110.2	47.2	5
Professional, Scientific and Technical Services	6.8	9	82.1	69.5	7.7	10
ASWMR**	6.3	3	75.4	101.4	6.5	5
Arts, Entertainment and Recreation	9.3	2	35.6	61.9	4.9	8
Accommodation and Food Services	2.2	6	92.6	98.9	3.2	6
Other Services (Except Public Administration)	0.8	8	114.9	92.9	2.8	5
Absolute Equally Weighted Average Rank		4.8				5.7
Equally Weighted Market Sector Rank		4				5

Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

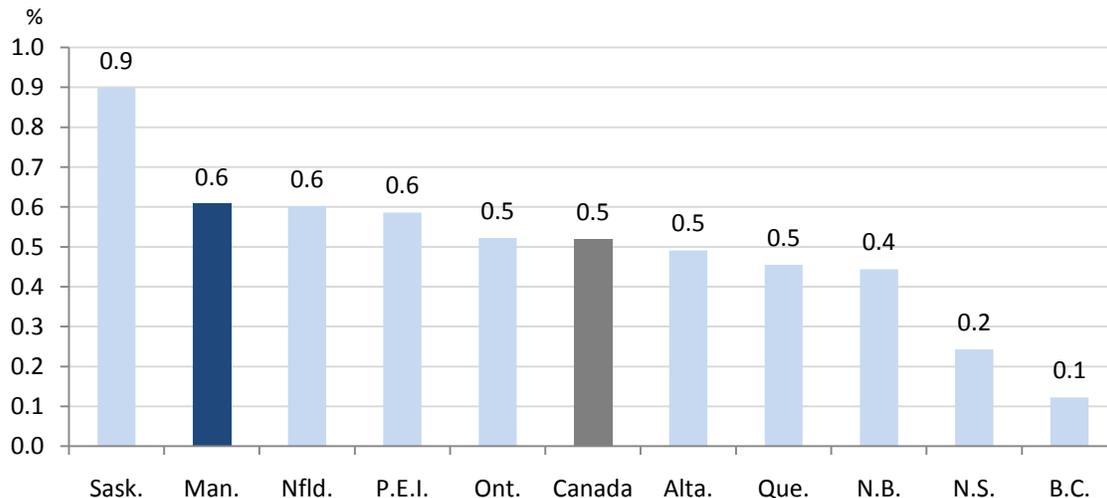
Manitoba's capital intensity level in 2007 was 87.7 per cent of the Canadian level in 2007, up from 84.7 per cent in 1997. Of the 15 two-digit NAICS industries, five had levels above the national average in 2007. The industries with the highest capital intensity levels in the province in 2007 were: wholesale trade (130.3 per cent of the Canadian level), construction (127.4 per cent), and information and cultural industries (118.1 per cent). The industries with the lowest capital intensity levels in the province were: mining, and oil and gas extraction (44.3 per cent), arts, entertainment and recreation (61.9 per cent), and professional, scientific and technical services (69.5 per cent).

In terms of capital intensity levels, Manitoba's market sector ranked 5th in Canada in 2007. Manitoba had the lowest capital intensity level in professional, scientific and technical services. None of the province's industries ranked 1st.

vi. Labour Quality

Manitoba's labour quality grew at an average rate of 0.6 per cent per year during the 1997-2007 period, above the national average of 0.5 per cent. The province ranks 3rd in Canada in terms of labour quality growth (Chart 47).

Chart 47: Labour Quality Growth in Canada and the Provinces, Market Sector, 1997-2007
(Average Annual Growth Rates)



Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

During the period in question, the industries that experienced the highest labour quality growth rates in the province were: arts, entertainment and recreation (1.4 per cent per year), information and cultural industries (1.1 per cent) and agriculture, forestry, fishing and hunting (0.7 per cent). The industries that had the lowest labour quality growth rates were: other services (excluding public administration) (-0.5 per cent per year), accommodation and food services (0.0 per cent) and professional, scientific and technical services (0.0 per cent).

Manitoba ranked well in terms of labour quality growth. In fact, the province ranked 1st in four of the 15 two-digit NAICS industries: information and cultural industries, finance, insurance, real estate,

rental and leasing, administrative and support, waste management and remediation services and arts, entertainment and recreation. In contrast, professional, scientific and technical services ranked last among the provinces.

Table 60: Labour Quality Levels and Growth Rates in Manitoba, 1997-2007³⁵

Market Sector	Compound Annual Growth Rate, 1997-2007	Provincial Ranking
	(per cent)	
Market Sector	0.6	2
Agriculture, Forestry, Fishing and Hunting	0.7	5
Mining, and Oil and Gas Extraction	0.0	5
Utilities	0.2	5
Construction	0.1	5
Manufacturing	0.3	5
Wholesale Trade	0.2	5
Retail Trade	0.0	6
Transportation and Warehousing	0.2	9
Information and Cultural Industries	1.1	1
FIRE*	0.6	1
Professional, Scientific and Technical Services	0.0	10
ASWMR**	0.6	1
Arts, Entertainment and Recreation	1.4	1
Accommodation and Food Services	0.0	8
Other Services (Except Public Administration)	-0.5	9
Absolute Equally Weighted Average Rank		5.1
Equally Weighted Market Sector Rank		3

Source: CCLS Provincial Productivity Database, Appendix Tables, http://www.ccls.ca/data/mfp_new.asp.

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

vii. Sources of Labour Productivity Growth in the Market Sector

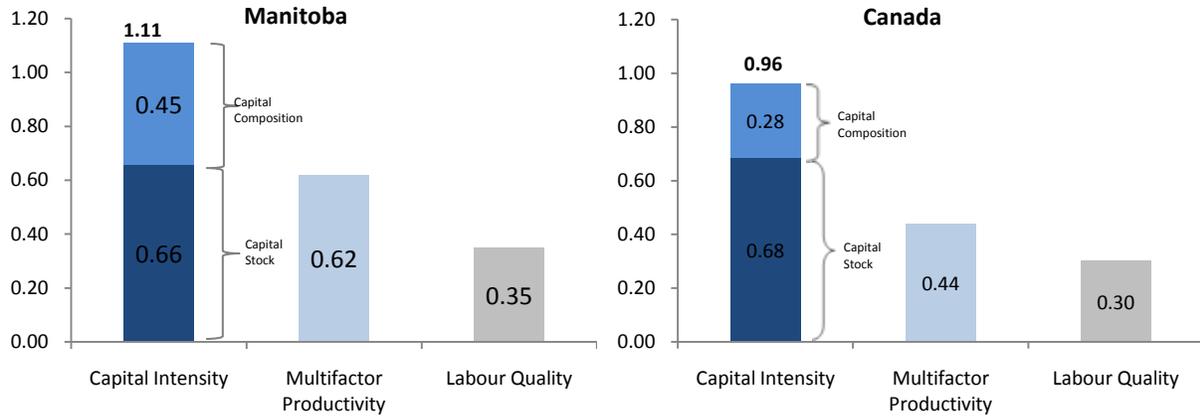
Manitoba's labour productivity grew at an average rate of 2.1 per cent per year during the 1997-2007 period, above the national average. Charts 48 and 49 show both the percentage point and per cent contributions to labour productivity growth by the sources of growth for Manitoba and Canada over the 1997-2007 period.

Manitoba's labour productivity growth was driven mainly by capital intensity growth, which accounted for 1.1 percentage points of the overall labour productivity growth (or, alternatively, 52.9 per cent of total growth), of which 0.66 percentage points (31.3 per cent) were due to growth in capital stock and 0.45 percentage points (21.6 per cent) caused by capital composition. Multifactor productivity growth contributed with 0.62 percentage points (29.4 per cent). Labour quality was responsible for 0.35 percentage points of the labour productivity growth experienced in the province (16.6 per cent).

³⁵ Labour quality levels are not shown here because they are assumed to be the same (and equal to 100.0) across all provinces and in Canada in the base year, 1997 (Sharpe and Thomson, 2010a). They differ after 1997, incorporating the different labour quality growth rates experienced by the provinces and Canada. For example, labour quality in Manitoba's market sector grew at an average annual rate of 0.61 per cent over the 1997-2007 period, while Canada's labour quality grew at an average annual rate of 0.51 per cent. As a consequence, Manitoba's labour quality level was 100.89 per cent of the Canadian level in 2007.

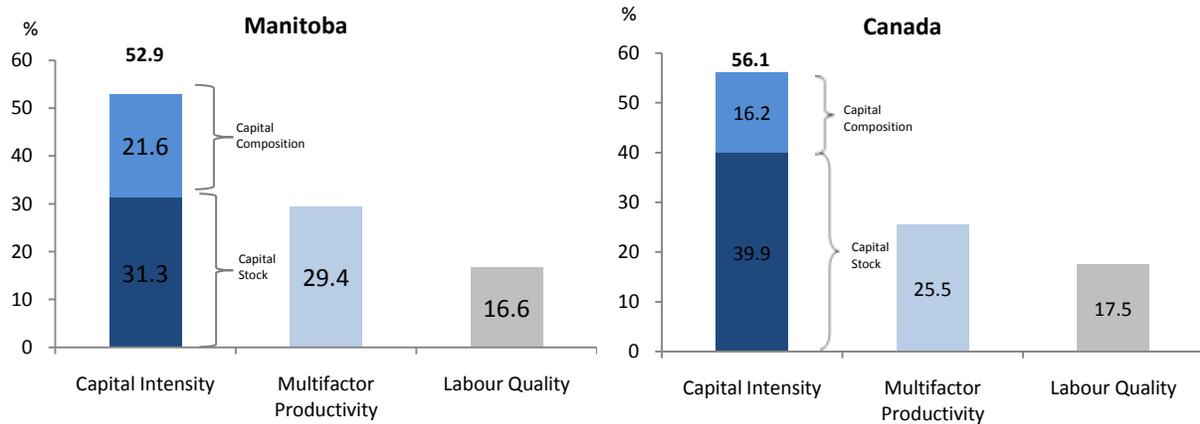
Comparing the two charts, it can be seen that the causes of growth in Manitoba and Canada were essentially the same. Capital intensity was the main driver in both jurisdictions, but slightly less important in Manitoba having explained 52.9 per cent of growth compared to 56.1 in Canada. Multifactor productivity of slightly higher significance in Manitoba, explaining 29.4 per cent of growth compared to 25.5 per cent in Canada. Labour quality was responsible for slightly less of Manitoba's growth (16.6 per cent) compared to national growth (17.5 per cent).

Chart 48: Percentage Point Contribution to Labour Productivity Growth by the Source of Labour Productivity Growth in the Market Sector in Manitoba and in Canada, 1997 to 2007



Source: CSLS Provincial Productivity Database, Appendix Table 17, http://www.csls.ca/data/mfp_new.asp.

Chart 49: Per Cent Contribution to Labour Productivity Growth by the Source of Labour Productivity Growth in the Market Sector in Manitoba and in Canada, 1997 to 2007



Source: CSLS Provincial Productivity Database, Appendix Table 17, http://www.csls.ca/data/mfp_new.asp.

Note: Numbers may not sum to 100 due to rounding.

Table 61 details the contributions in absolute and per cent terms of capital intensity, MFP, and labour quality growth to labour productivity growth in Manitoba over the 1997-2007 period at the two-digit NAICS industry level.

Table 61: Contributions to Labour Productivity Growth at the Industry Level by Source in Manitoba, 1997-2007

Market Sector	Labour Productivity	Capital Intensity			MFP	Labour Quality
		Total	Capital Composition	Capital Stock		
Percentage Point Contributions to Labour Productivity Growth						
Market Sector	2.1	1.1	0.5	0.7	0.6	0.3
Agriculture, Forestry, Fishing and Hunting	4.9	1.5	-0.2	1.7	3.1	0.2
Mining, and Oil and Gas Extraction	6.1	2.9	0.4	2.5	3.1	0.0
Utilities	-2.7	-0.9	-0.4	-0.5	-1.9	0.0
Construction	2.1	1.1	0.1	1.0	0.9	0.0
Manufacturing	0.9	0.7	0.1	0.6	0.0	0.2
Wholesale Trade	3.2	1.6	0.3	1.3	1.5	0.1
Retail Trade	4.3	1.2	0.0	1.1		0.0
Transportation and Warehousing	0.4	0.2	0.1	0.1	0.1	0.1
Information and Cultural Industries	3.3	2.3			0.5	0.5
FIRE*	2.0	2.2	0.8	1.3	-0.4	0.3
Professional, Scientific and Technical Services	-0.8	1.3	0.1	1.2	-2.1	0.0
ASWMR**	2.0	1.1			0.4	0.5
Arts, Entertainment and Recreation	5.7	2.3			2.3	1.0
Accommodation and Food Services	0.4	0.6	0.0	0.6	-0.2	0.0
Other Services (Except Public Administration)	2.8	0.2	0.2	0.0	3.0	-0.4
Per Cent Contributions to Labour Productivity Growth						
Market Sector	100.0	53.4	21.6	31.3	29.4	16.6
Agriculture, Forestry, Fishing and Hunting	100.0	31.1	-3.5	34.6	63.3	4.4
Mining, and Oil and Gas Extraction	100.0	47.4	7.3	40.0	50.6	0.5
Utilities	100.0	31.3	13.5	17.7	70.7	-1.5
Construction	100.0	52.6	3.6	48.8	44.5	2.4
Manufacturing	100.0	76.1	12.6	63.1	1.3	22.5
Wholesale Trade	100.0	48.9	9.2	39.4	47.8	2.5
Retail Trade	100.0	26.8	0.7	26.1		0.5
Transportation and Warehousing	100.0	37.5	22.3	14.9	33.0	29.4
Information and Cultural Industries	100.0	68.8			15.0	15.4
FIRE*	100.0	105.8	40.1	64.4	-18.7	13.0
Professional, Scientific and Technical Services	100.0	-159.0	-7.6	-150.6	253.9	1.8
ASWMR**	100.0	57.4			18.0	24.1
Arts, Entertainment and Recreation	100.0	40.0			40.6	17.7
Accommodation and Food Services	100.0	156.7	8.6	147.8	-49.9	-6.5
Other Services (Except Public Administration)	100.0	7.7	7.2	0.4	107.1	-14.6

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

Note: Per cent contributions may not sum to 100 due to rounding.

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

viii. Sources of Labour Productivity Level Gap by Industry

Manitoba's labour productivity level in 2007 was 87.1 per cent of the Canadian level, which implies a labour productivity gap of 12.9 percentage points. Table 62 makes it clear that this differential was caused mostly by the market sector's low multifactor productivity level, which was responsible for 7.9 percentage points of the gap (61.4 per cent of the gap). The capital intensity and labour quality

levels accounted for 5.4 and -0.5 percentage points of the gap, respectively (42.2 and -3.6 per cent of the gap).³⁶

Manitoba had a labour productivity gap relative to Canada in 10 of the 15 two-digit NAICS industries. In most cases, the low multifactor productivity was the main culprit. The exception was transportation and warehousing, which had labour productivity gap caused by a low multifactor productivity level.

Table 62: Sources of the Labour Productivity Gap Relative to Canada for Manitoba at the Two-Digit Industry Level, 2007

Market Sector	Labour Productivity Relative Level		Percentage Point Contributions to Labour Productivity Gap			Percent Contributions to Labour Productivity Gap			
	Labour Productivity Relative Level	Labour Productivity Gap	Capital Intensity	Multifactor Productivity	Labour Quality	Labour Productivity	Capital Intensity	Multifactor Productivity	Labour Quality
Market Sector	87.1	-12.9	-5.4	-7.9	0.5	100.0	42.2	61.4	-3.6
Agriculture, Forestry, Fishing and Hunting	81.2	-18.8	-9.0	-9.2	-0.6	100.0	47.8	49.1	3.1
Mining, and Oil and Gas Extraction	127.8	27.8	-75.4	103.2	0.0	100.0	-271.7	371.7	0.0
Utilities	75.9	-24.1	-7.5	-16.6	0.1	100.0	31.3	69.1	-0.4
Construction	87.2	-12.8	6.0	-18.5	-0.4	100.0	-47.0	144.2	2.8
Manufacturing	70.3	-29.7	-4.4	-25.0	-0.2	100.0	14.9	84.4	0.8
Wholesale Trade	95.6	-4.4	10.4	-14.0	-0.8	100.0	-239.7	321.1	18.6
Retail Trade	106.5	6.5	-5.4	12.6	-0.7	100.0	-83.5	194.7	-11.2
Transportation and Warehousing	93.0	-7.0	-8.8	3.6	-1.7	100.0	127.2	-51.1	23.9
Information and Cultural Industries	102.9	2.9	9.0	-8.7	2.6	100.0	310.8	-301.8	91.0
FIRE*	98.1	-1.9	5.1	-7.8	0.8	100.0	-265.6	407.7	-42.1
Professional, Scientific and Technical Services	67.8	-32.2	-5.6	-22.1	-4.6	100.0	17.3	68.6	14.1
ASWMR**	94.2	-5.8	0.3	-10.7	4.7	100.0	-4.8	185.7	-81.0
Arts, Entertainment and Recreation	103.6	3.6	-13.1	6.1	10.6	100.0	-358.6	168.4	290.2
Accommodation and Food Services	92.4	-7.6	-0.2	-5.6	-1.8	100.0	3.0	73.3	23.7
Other Services (Except Public Administration)	101.0	1.0	-1.7	10.0	-7.2	100.0	-164.3	956.9	-692.6

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

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

ix. Conclusion

Over the 1997-2007 period, Manitoba experienced higher growth in every metric – labour, capital and multifactor productivities, capital intensity and labour quality – than the national average. Labour productivity grew at a rate of 2.1 per cent per year, compared to the national rate of 1.7 per cent. Growth in labour productivity was primarily driven by capital intensity growth, which was responsible for 52.9 per cent of growth, while multifactor productivity was responsible for 29.4 per cent and labour quality contributed 16.6 per cent.

Manitoba's labour, capital, and multifactor productivity levels in 2007 were below the national levels. The province's labour productivity level, in particular, was only 87.1 per cent of the Canadian

³⁶ Again, it is important to bear in mind that labour quality levels were assumed to be equal to 100.0 in all provinces and in Canada for the base year of 1997. They differ after 1997, incorporating the different labour quality growth rates experienced by the provinces and Canada.

level, which implies a labour productivity gap of 12.9 percentage points. This gap was caused by both low overall multifactor productivity and capital intensity levels. Like the labour productivity gap, all gaps shrank over the 1997-2007 period, reflecting faster growth rates than observed nationally in each domain.

Table 63 provides a summary of both levels (in 1997 and 2007) and growth rates (for the 1997-2007 period) for the productivity measures discussed in this report, along with rankings that show how Manitoba fared in comparison to the other provinces. A key observation is that Manitoba outpaced national growth rates in each domain, but starting from a lower base. Manitoba has thus experienced convergence in each variable, though a sizable gap remains.

Table 63: Summary of Manitoba's Productivity Performance in the Market Sector

	Market Sector Growth, 1997 to 2007			Per Cent of the Canadian Level		Level Rankings, 2007	
	Compound Annual Growth Rate	Provincial Rank	Provincial Equally Weighted Rank	1997	2007	Provincial Rank	Provincial Equally Weighted Rank
Labour Productivity	2.1	2	3	83.9	87.1	7	6
Capital Productivity	-0.5	6	6	99.1	99.4	7	5
Multifactor Productivity	0.6	5	5	90.2	91.9	6	6
Capital Intensity	2.7	5	4	84.7	87.7	5	5
Labour Quality	0.6	2	3	n.a.	n.a.	n.a.	n.a.

Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

IX. An Analysis of Saskatchewan's Productivity, 1997-2007: Capital Intensity Growth Drives Strong Labour Productivity Performance

i. Industry Composition by Nominal GDP and Total Hours Worked

In order to understand Saskatchewan's overall productivity performance, it is essential to understand how each of the 15 two-digit NAICS industries contributed to the province's market sector in terms of nominal GDP and actual hours worked. Table 64 details these contribution shares for 1997 and 2007. In Saskatchewan, the industries that had the highest GDP shares in 2007 were mining, and oil and gas extraction (31.7 per cent of the province's nominal GDP in the market sector), FIRE (finance, insurance, real estate, rental and leasing) (8.8 per cent), construction, and manufacturing (both of which had shares equal to 8.1 per cent). In terms of total hours worked, the three industries that had the highest contributions in 2007 were agriculture, forestry, fishing and hunting (14.7 per cent of total hours worked), retail trade (13.5 per cent), and construction (10.2 per cent).

Table 64: Industry Share of Nominal GDP and Total Hours Worked in Saskatchewan

Market Sector	1997				2007			
	GDP		Hours Worked		GDP		Hours Worked	
	Canada	Saskatchewan	Canada	Saskatchewan	Canada	Saskatchewan	Canada	Saskatchewan
Market Sector	100.0							
Agriculture, Forestry, Fishing and Hunting	3.2	11.9	5.4	22.8	2.1	7.4	3.4	14.7
Mining, and Oil and Gas Extraction	5.5	20.3	1.7	3.8	11.1	31.7	2.0	5.9
Utilities	4.2	3.7	0.9	0.6	3.0	2.6	0.8	0.8
Construction	7.0	7.7	7.9	8.3	9.0	8.1	10.1	10.2
Manufacturing	23.2	9.5	18.3	6.5	16.8	8.1	14.8	7.9
Wholesale Trade	7.1	7.1	7.4	6.1	7.1	7.4	6.9	5.9
Retail Trade	6.9	6.0	13.1	12.4	7.4	6.1	12.9	13.5
Transportation and Warehousing	6.2	7.5	6.3	7.0	5.6	6.5	6.6	8.5
Information and Cultural Industries	4.3	3.5	2.5	2.5	4.3	2.6	2.7	2.2
FIRE*	15.0	10.5	7.5	6.5	14.6	8.8	7.8	6.0
Professional, Scientific and Technical Services	4.9	2.8	6.3	4.3	6.2	2.5	7.9	4.1
ASWMR**	2.5	1.4	4.0	2.6	3.3	1.3	5.7	3.1
Arts, Entertainment and Recreation	0.9	0.6	1.5	0.8	0.9	0.6	1.9	1.7
Accommodation and Food Services	3.2	3.1	7.8	7.7	2.8	2.2	7.0	7.4
Other Services (Except Public Administration)	5.7	4.6	9.4	8.2	5.8	3.9	9.5	8.1

Source: Shares calculated by the CSLS, based on Statistics Canada data (Cansim Table 6683-0011).

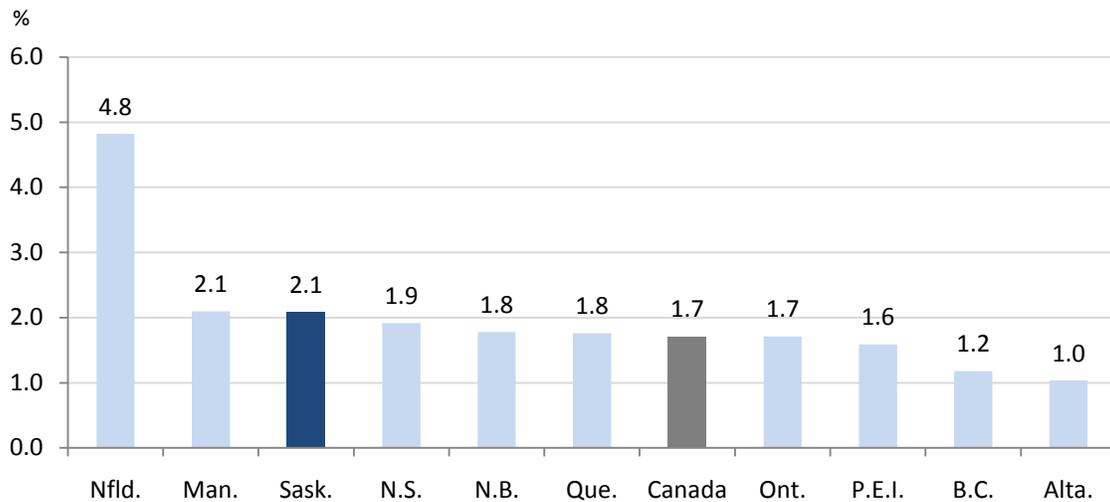
*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

ii. Labour Productivity

Labour productivity, defined as real GDP per hour worked,³⁷ grew at an average rate of 2.1 per cent per year in Saskatchewan's market sector during the 1997-2007 period, which was slightly higher than the national average of 1.7 per cent per year. Saskatchewan ranked 3rd among the provinces in terms of labour productivity growth (Chart 50).

³⁷ Note that the total hours worked figures used to calculate labour productivity are unadjusted for labour quality.

**Chart 50: Labour Productivity Growth in Canada and the Provinces, Market Sector, 1997-2007
(Average Annual Growth Rates)**



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

During the period in question, the industry that experienced the highest labour productivity growth rate in Saskatchewan was agriculture, forestry, fishing and hunting (4.7 per cent per year), followed by information and cultural industries (4.1 per cent), and retail trade (4.0 per cent) (Table 65). The industry that had the lowest labour productivity growth rate was mining, and oil and gas extraction (-4.7 per cent per year), followed by arts, entertainment and recreation (-3.8 per cent), and manufacturing (0.1 per cent).

In terms of labour productivity growth, the province ranked 8th or below in only three of the 15 two-digit NAICS industries, none of which ranked 10th. Furthermore, it ranked 3rd or above in seven of the 15 two-digit NAICS industries. In particular, Saskatchewan ranked 1st in the following two industries: FIRE, and transportation and warehousing.

Saskatchewan's labour productivity level in 2007 was \$35.38 (1997 dollars) per hour, which represents 98.1 per cent of the Canadian level, up from 94.5 per cent in 1997. The province had the 5th highest labour productivity level in Canada in 2007.

In 2007, only five of the 15 two-digit NAICS industries in Saskatchewan had labour productivity levels above the Canadian average. The industries with the highest relative labour productivity levels in the province were utilities (130.8 per cent of the Canadian level), mining, and oil and gas extraction (120.2 per cent), and transportation and warehousing (119.8 per cent). The industries that had the lowest relative levels in the province were professional, scientific and technical services (83.1 per cent of the Canadian level), agriculture, forestry, fishing and hunting (86.4 per cent), and manufacturing (86.9 per cent).

In terms of labour productivity levels, the province ranked 4th or above in seven of the 15 two-digit NAICS industries. In particular, Saskatchewan's transportation and warehousing, wholesale trade, and other services ranked 1st among all the provinces. The only industry in the province that ranked 10th in terms of labour productivity levels was information and cultural industries.

Table 65: Labour Productivity Levels and Growth Rates in Saskatchewan, 1997-2007

Market Sector	Compound Annual Growth Rate, 1997-2007	Rank	Province's Labour Productivity Level Relative to Canada's, 1997	Province's Labour Productivity Level Relative to Canada's, 2007	Labour Productivity Level, 2007	Rank, 2007
	(per cent)		(Canada=100)	(Canada=100)	(1997 Dollars)	
Market Sector	2.1	3	94.5	98.1	35.4	5
Agriculture, Forestry, Fishing and Hunting	4.7	5	82.4	86.4	23.5	6
Mining, and Oil and Gas Extraction	-4.7	8	154.6	120.2	94.6	3
Utilities	0.7	2	111.1	130.8	176.1	3
Construction	1.0	8	98.6	92.1	29.4	4
Manufacturing	0.1	9	107.9	86.9	41.6	5
Wholesale Trade	3.9	5	113.8	115.8	48.6	1
Retail Trade	4.0	3	86.0	91.5	20.2	6
Transportation and Warehousing	2.3	1	102.4	119.8	38.1	1
Information and Cultural Industries	4.1	6	78.0	87.1	59.7	10
FIRE*	3.9	1	75.7	95.2	66.9	7
Professional, Scientific and Technical Services	2.0	2	77.7	83.1	22.4	5
ASWMR**	1.7	2	79.4	90.9	18.0	5
Arts, Entertainment and Recreation	-3.8	5	114.5	87.4	14.1	4
Accommodation and Food Services	0.9	6	93.3	91.8	12.6	7
Other Services (Except Public Administration)	3.7	2	97.0	113.6	18.5	1
Absolute Equally-Weighted Average Rank		4.3				4.5
Equally-Weighted Market Sector Rank		2				4

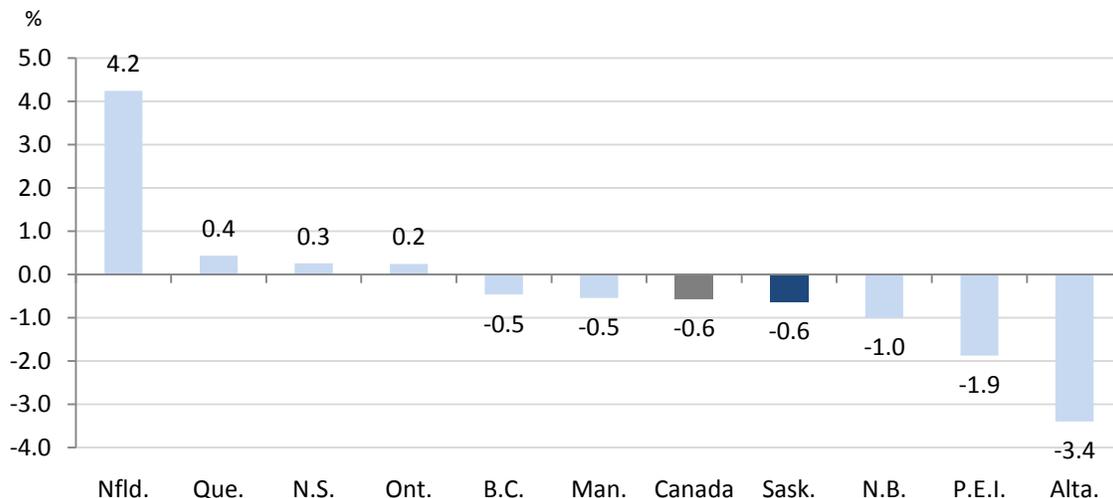
Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

iii. Capital Productivity

Capital productivity, defined as real GDP per unit of capital services, declined at a rate of 0.6 per cent per year in Saskatchewan's market sector during the 1997-2007 period, the same as the national average. Saskatchewan ranked 7th in Canada in terms of capital productivity growth (Chart 51).

Chart 51: Capital Productivity Growth Rates in Canada and the Provinces, Market Sector, 1997-2007 (Average Annual Growth Rates)



Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

In Saskatchewan, six of the 15 two-digit NAICS industries had negative capital productivity growth rates during the period. The industries that experienced the worst performances were professional, scientific and technical services (-9.6 per cent per year), administrative and support, waste management and remediation services (-8.7 per cent), and arts, entertainment and recreation (-8.4 per cent) (Table 66). The industries that had the best performances were other services (8.1 per cent per year), retail trade (3.6 per cent), and wholesale trade (2.7 per cent).

Table 66: Capital Productivity Levels and Growth Rates in Saskatchewan, 1997-2007

Market Sector	Compound Annual Growth Rate, 1997-2007	Rank	Province's Capital Productivity Level Relative to Canada's, 1997	Province's Capital Productivity Level Relative to Canada's, 2007	Capital Productivity Level, 2007	Rank, 2007
	(per cent)		(Canada=100)	(Canada=100)	(1997 Dollars)	
Market Sector	-0.6	7	72.9	72.5	1.67	9
Agriculture, Forestry, Fishing and Hunting	1.7	6	70.4	68.3	1.43	10
Mining, and Oil and Gas Extraction	-5.0	7	85.4	91.8	0.71	8
Utilities	0.4	4	96.9	100.9	1.30	5
Construction	2.1	2	67.3	71.9	4.91	7
Manufacturing	2.0	3	84.9	88.0	2.40	7
Wholesale Trade	2.7	2	64.9	86.1	2.74	6
Retail Trade	3.6	1	99.9	157.3	7.20	1
Transportation and Warehousing	1.9	1	66.4	97.5	2.35	8
Information and Cultural Industries	-1.4	9	121.3	99.9	1.92	5
FIRE*	-0.3	2	101.6	107.9	1.77	2
Professional, Scientific and Technical Services	-9.6	8	98.7	72.2	1.77	7
ASWMR**	-8.7	10	104.5	55.7	1.72	10
Arts, Entertainment and Recreation	-8.4	9	62.6	41.2	0.85	10
Accommodation and Food Services	0.1	3	79.3	83.4	3.59	6
Other Services (Except Public Administration)	8.1	1	57.9	137.1	7.30	2
Absolute Equally-Weighted Average Rank		4.5				6.3
Equally-Weighted Market Sector Rank		2				9

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

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

Although the province ranked 7th in Canada in terms of its market sector rank, its equally-weighted market sector rank was significantly higher, at 2nd place, only below Quebec. This indicates that, despite having sub-par capital productivity growth rates during the period in its market sector, most of Saskatchewan's industries performed very well when compared to equivalent industries in other provinces. In fact, nine of the 15 two-digit NAICS industries ranked 4th or above. Moreover, Saskatchewan's other services, retail trade, and transportation and warehousing industries ranked 1st in Canada in terms of capital productivity growth. The only industry that ranked 10th place was administrative and support, waste management and remediation services.

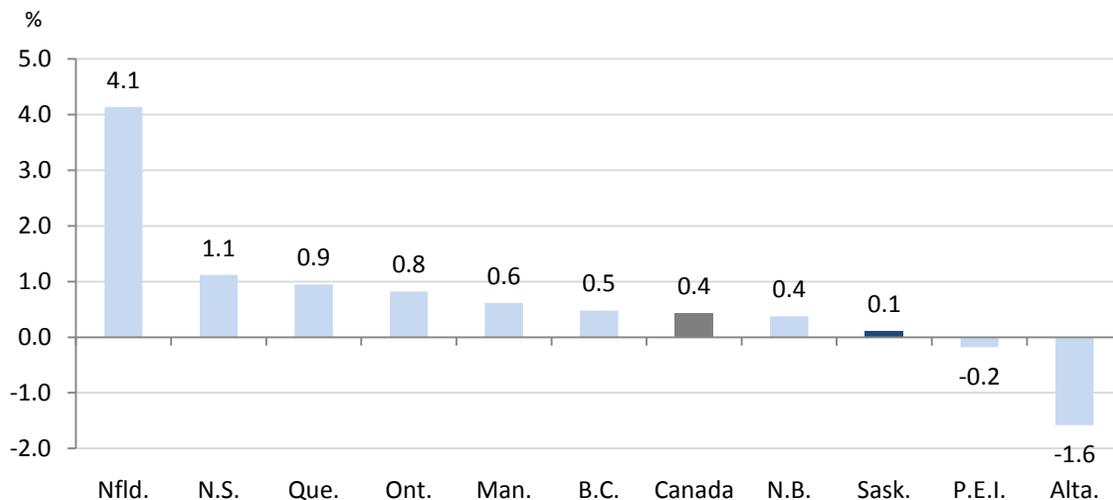
Saskatchewan's capital productivity level in the market sector in 2007 was 72.5 per cent of the Canadian level, slightly down from 72.9 per cent in 1997. Only four of the 15 two-digit NAICS industries in the province had capital productivity levels above the Canadian average: retail trade (157.3 per cent of the Canadian level), other services (137.1 per cent), FIRE (107.9 per cent), and utilities (100.9 per cent). The industries with the lowest capital productivity levels in the province were arts, entertainment

and recreation (41.2 per cent of the Canadian level), administrative and support, waste management and remediation services (55.7 per cent), and agriculture, forestry, fishing and hunting (68.3 per cent). Saskatchewan's market sector had the 9th lowest capital productivity level in Canada in 2007, only above Alberta. This reflects the low overall capital productivity levels in the province, which ranked 7th or below in eight of the 15 two-digit NAICS industries. In particular, Saskatchewan ranked 10th place in the following three industries: arts, entertainment and recreation, accommodation and food services, and agriculture, forestry, fishing and hunting. The main exception to the overall low capital productivity levels at the industry level was the retail trade industry, which ranked 1st in Canada.

iv. Multifactor Productivity

Saskatchewan's multifactor productivity in the market sector grew at an average rate of 0.1 per cent per year during the 1997-2007 period, only one-fourth of the national average, which grew at an average annual rate of 0.4 per cent. The province ranked 8th in Canada in terms of multifactor productivity growth (Chart 53).

Chart 52: Multifactor Productivity Growth in Canada and the Provinces, Market Sector, 1997-2007
(Average Annual Growth Rates)



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

The industry that experienced the highest multifactor productivity growth rate in Saskatchewan was other services (4.4 per cent per year), followed by retail trade (4.0 per cent), and wholesale trade (3.1 per cent). The industries that had the lowest multifactor productivity growth rates were mining, and oil and gas extraction (-4.9 per cent per year), arts, entertainment and recreation (-4.5 per cent), and administrative and support, waste management and remediation services (-1.6 per cent).

Although the province ranked 8th in Canada in terms of its market sector rank, its equally-weighted market sector rank was significantly higher, at 2nd place, only below Quebec. Of the 15 two-digit NAICS industries, only four were ranked at 7th place or lower, and none of those ranked 10th. Transportation and warehousing, FIRE, and other services ranked 1st in Canada.

The province's multifactor productivity level was 82.1 per cent of the Canadian level in 2007, down from 84.8 per cent in 1997. Consistent with this low level at the market sector, at the industry level only six of the 15 two-digit NAICS industries in Saskatchewan had multifactor productivity level above Canada's. The industries with the highest multifactor productivity levels in the province were other services (119.6 per cent of the Canadian level), transportation and warehousing (109.3 per cent), retail trade (108.5 per cent). In contrast, the industries with the lowest multifactor productivity levels in the province were arts, entertainment and recreation (72.2 per cent of the Canadian level), agriculture, forestry, fishing and hunting (76.3 per cent), and administrative and support, waste management and remediation services (78.1 per cent).

In terms of multifactor productivity levels, Saskatchewan's market sector ranked 8th in Canada in 2007 (the province ranked 5th according to its equally-weighted market sector ranking). At the industry level, six of the 15 two-digit NAICS industries ranked 4th or above. In particular, Saskatchewan's other services industry ranked 1st in Canada. The only industry that ranked 10th place in the province was agriculture, forestry, fishing and hunting.

Table 67: Multifactor Productivity Levels and Growth Rates in Saskatchewan, 1997-2007

	Compound Annual Growth Rate, 1997-2007	Rank	Province's Multifactor Productivity Level Relative to Canada's, 1997	Province's Multifactor Productivity Level Relative to Canada's, 2007	Rank, 2007
	(per cent)		(Canada=100)	(Canada=100)	
Market Sector	0.1	8	84.8	82.1	8
Agriculture, Forestry, Fishing and Hunting	2.4	7	77.4	76.3	10
Mining, and Oil and Gas Extraction	-4.9	7	96.2	95.0	8
Utilities	0.5	3	100.0	107.8	3
Construction	1.7	3	85.6	86.1	6
Manufacturing	1.0	6	96.0	88.7	5
Wholesale Trade	3.1	3	92.5	100.7	4
Retail Trade	4.0	2	90.4	108.5	3
Transportation and Warehousing	1.9	1	86.2	109.3	2
Information and Cultural Industries	1.4	7	94.6	93.8	9
FIRE*	1.4	1	88.3	101.5	3
Professional, Scientific and Technical Services	-0.8	5	82.4	81.6	6
ASWMR**	-1.6	8	88.2	78.1	8
Arts, Entertainment and Recreation	-4.5	6	93.2	72.2	7
Accommodation and Food Services	0.5	6	90.3	89.5	7
Other Services (Except Public Administration)	4.4	1	87.4	119.6	1
Absolute Equally-Weighted Average Rank		4.4			5.5
Equally-Weighted Market Sector Rank		2			5

Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

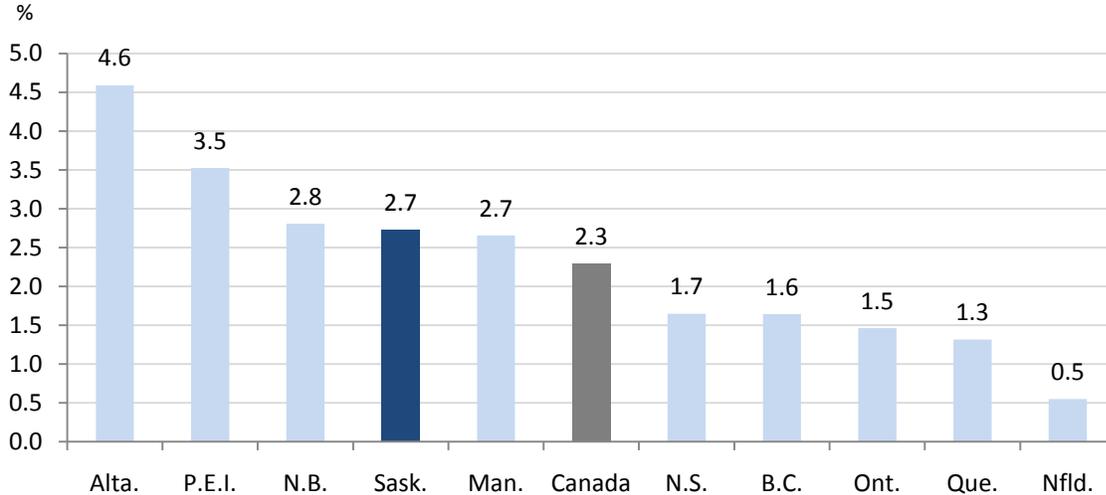
*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

v. Capital Intensity

Capital intensity, defined as capital services per hour worked (unadjusted for labour quality), grew at an average rate of 2.7 per cent per year in Saskatchewan's market sector during the 1997-2007

period, above the national average of 2.3 per cent per year. The province ranked 4th among the ten provinces in terms of capital intensity growth (Chart 53).

Chart 53: Capital Intensity Growth in Canada and the Provinces, Market Sector, 1997-2007 (Average Annual Growth Rates)



Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

During the period, the industries that experienced the highest capital intensity growth rates in the province were professional, scientific and technical services (12.9 per cent per year), administrative and support, waste management and remediation services (11.4 per cent), and arts, entertainment and recreation (5.0 per cent). Conversely, the industries that had the lowest growth rates in the province were other services (-4.0 per cent per year), manufacturing (-1.9 per cent), and construction (-1.0 per cent).

Table 68: Capital Intensity Levels and Growth Rates in Saskatchewan, 1997-2007

	Compound Annual Growth Rate, 1997-2007	Rank	Province's Capital Intensity Level Relative to Canada's, 1997	Province's Capital Intensity Level Relative to Canada's, 2007	Capital Intensity Level, 2007	Rank, 2007
	(per cent)		(Canada=100)	(Canada=100)	(1997 Dollars)	
Market Sector	2.7	4	129.7	135.3	21.2	2
Agriculture, Forestry, Fishing and Hunting	2.9	5	117.2	126.5	16.4	1
Mining, and Oil and Gas Extraction	0.4	7	180.7	131.0	133.2	2
Utilities	0.3	5	114.7	129.6	135.3	4
Construction	-1.0	7	146.2	128.1	6.0	2
Manufacturing	-1.9	9	126.8	98.7	17.3	4
Wholesale Trade	1.2	9	174.8	134.5	17.8	1
Retail Trade	0.3	10	86.3	58.1	2.8	10
Transportation and Warehousing	0.4	10	153.7	122.9	16.2	2
Information and Cultural Industries	5.6	3	65.2	88.4	31.5	8
FIRE*	4.2	4	74.4	88.2	37.8	10
Professional, Scientific and Technical Services	12.9	3	78.4	115.0	12.7	5
ASWMR**	11.4	1	76.2	163.2	10.5	2
Arts, Entertainment and Recreation	5.0	4	182.4	212.4	16.7	1
Accommodation and Food Services	0.8	9	117.7	110.1	3.5	3
Other Services (Except Public Administration)	-4.0	10	167.0	82.8	2.5	7
Absolute Equally-Weighted Average Rank		6.4				4.1
Equally-Weighted Market Sector Rank		9				2

Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

As mentioned before, Saskatchewan's market sector ranked 4th in terms of capital intensity growth. However, the province ranked 9th according to its equally-weighted rank. This divergence between the two rankings indicates that despite having above average growth rates in its market sector, most of Saskatchewan's industries experienced low capital intensity growth relative to the other provinces during the 1997-2007 period. At the industry level, eight of the 15 two-digit NAICS industries ranked 7th or below. In particular, other services, retail trade, and transportation and warehousing ranked 10th place. Administrative and support, waste management and remediation services was the only industry in the province that ranked 1st in terms of capital intensity growth.

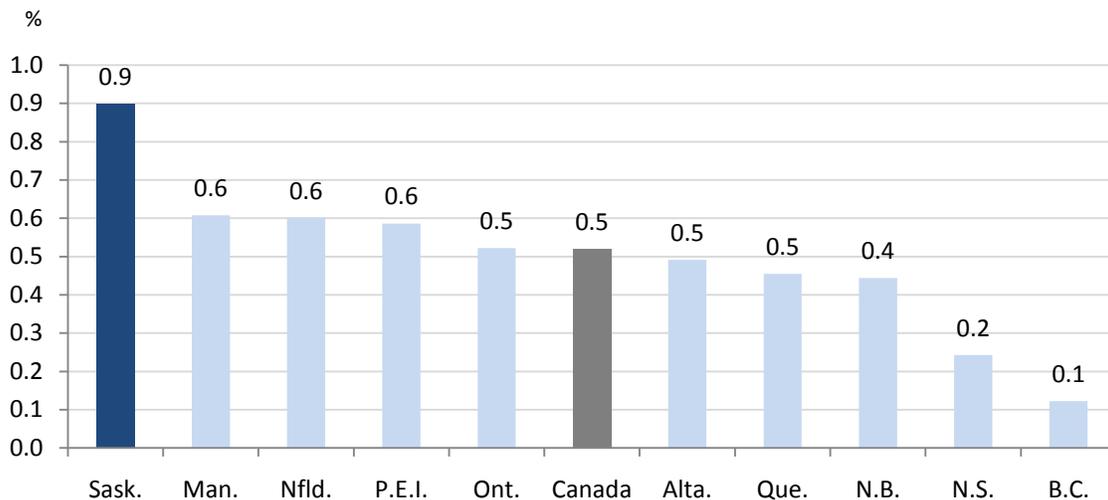
Saskatchewan's capital intensity level was 135.3 per cent of the Canadian level in 2007, up from 129.7 per cent in 1997. Of the 15 two-digit NAICS industries, 10 had levels above the national average in 2007. The industries with the highest capital intensity levels in the province were arts, entertainment and recreation (212.4 per cent of the Canadian level), administrative and support, waste management and remediation services (163.2 per cent), and wholesale trade (134.5 per cent).

In terms of capital intensity levels, Saskatchewan's market sector ranked 2nd in Canada in 2007 (the province also ranked 2nd according to the equally-weighted market sector ranking). 10 of the 15 two-digit NAICS industries in the province ranked 4th or above, with arts, entertainment and recreation, wholesale trade, and agriculture, forestry, fishing and hunting ranking 1st in Canada. The only two industries that ranked 10th place in terms of capital intensity levels were retail trade, and FIRE.

vi. Labour Quality

Saskatchewan's labour quality grew at an average rate of 0.9 per cent per year during the 1997-2007 period, above the national average, which grew at an average annual rate of 0.5 per cent. The province ranked 1st in Canada in terms of labour quality growth (Chart 54).

Chart 54: Labour Quality Growth in Canada and the Provinces, Market Sector, 1997-2007
(Average Annual Growth Rates)



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

During the period in question, the industries that experienced the highest labour quality growth rates in the province were professional, scientific and technical services, FIRE, and transportation and warehousing (all of which grew at 0.5 per cent per year). The industries that had the lowest labour quality growth rates were retail trade (-0.2 per cent per year), and construction (-0.1 per cent).

Despite ranking 1st according to its market sector rank, Saskatchewan ranked 6th in terms of its equally-weighted market sector rank. This difference between the two rankings can be understood by noticing that a significant number of industries in Saskatchewan had average performances in terms of labour quality growth. Indeed, looking at the industry level, none of Saskatchewan's industries ranked 1st place in Canada, only construction ranked 10th place, and seven industries ranked between 4th and 6th place. In addition to the two divergent rankings, the fact that Saskatchewan's labour quality growth in the market sector was significantly higher than the growth experienced by any single industry in the province seems to indicate that changes in industry composition were the main driver behind the province's substantive labour quality growth.

Table 69: Labour Quality Levels and Growth Rates in Saskatchewan, 1997-2007³⁸

Market Sector	Compound Annual Growth Rate, 1997-2007	Rank
	(per cent)	
Market Sector	0.9	1
Agriculture, Forestry, Fishing and Hunting	0.1	8
Mining, and Oil and Gas Extraction	0.1	3
Utilities	0.1	6
Construction	-0.1	10
Manufacturing	0.1	8
Wholesale Trade	0.3	4
Retail Trade	-0.2	9
Transportation and Warehousing	0.5	6
Information and Cultural Industries	0.3	7
FIRE*	0.5	3
Professional, Scientific and Technical Services	0.5	4
ASWMR**	0.3	6
Arts, Entertainment and Recreation	0.1	6
Accommodation and Food Services	0.3	3
Other Services (Except Public Administration)	0.4	4
Absolute Equally-Weighted Average Rank		5.8
Equally-Weighted Market Sector Rank		6

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

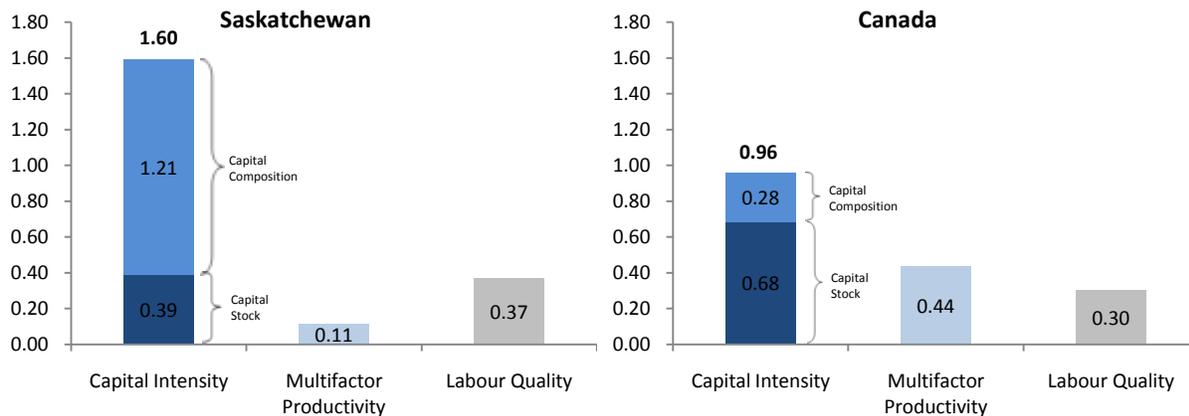
*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

³⁸ Labour quality levels are not shown here because they are assumed to be the same (and equal to 100.0) across all provinces and in Canada in the base year, 1997 (Sharpe and Thomson, 2010a). They differ after 1997, incorporating the different labour quality growth rates experienced by the provinces and Canada. For example, labour quality in Saskatchewan's market sector grew at an average annual rate of 0.9 per cent over the 1997-2007 period, while Canada's labour quality grew at an average annual rate of 0.5 per cent. As a consequence, Saskatchewan's labour quality level was 103.8 per cent of the Canadian level in 2007.

vii. Sources of Labour Productivity Growth in the Market Sector

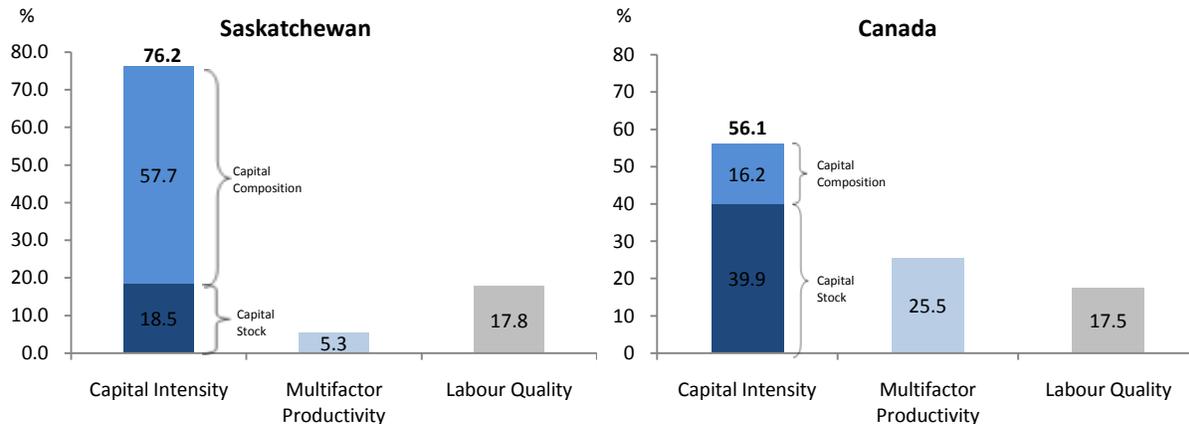
Saskatchewan’s labour productivity grew at an average rate of 2.1 per cent per year during the 1997-2007 period, slightly higher than the national average, which grew at an average annual rate of 1.7 per cent. Charts 55 and 56 show both the percentage point and per cent contributions to labour productivity growth by the sources of growth for Saskatchewan and Canada over the 1997-2007 period.

Chart 55: Percentage Point Contribution to Labour Productivity Growth by the Source of Labour Productivity Growth in the Market Sector in Saskatchewan and in Canada, 1997 to 2007



Source: CSLs Provincial Productivity Database, Appendix Table 647, http://www.csls.ca/data/mfp_new.asp.

Chart 56: Per Cent Contribution to Labour Productivity Growth by the Source of Labour Productivity Growth in the Market Sector in Saskatchewan and in Canada, 1997 to 2007



Source: CSLs Provincial Productivity Database, Appendix Table 647, http://www.csls.ca/data/mfp_new.asp.
 Note: Numbers may not sum to 100 due to rounding.

Saskatchewan’s labour productivity growth was driven mainly by capital intensity, which accounted for 1.60 percentage points of the overall labour productivity growth (or, alternatively, 76.2 per cent of total growth). The contribution of capital intensity to labour productivity growth can be broken down into two components: capital composition growth, which was responsible for 1.21 percentage points of labour productivity growth (57.7 per cent), and capital stock growth, which accounted for 0.39 percentage points of the latter (18.5 per cent).

Comparing the two charts, it can be seen that labour quality had approximately the same relative contribution to labour productivity growth in Saskatchewan and in Canada (albeit slightly higher in Saskatchewan). The main difference between the two was in the role of multifactor productivity and capital intensity. Whereas multifactor productivity explained 25.5 per cent of labour productivity growth in Canada, it explained only 5.3 per cent of Saskatchewan's labour productivity growth. Conversely, capital intensity explained only 56.1 per cent of labour productivity growth in Canada, but 76.2 per cent in Saskatchewan.

Table 70 details the contributions in absolute and per cent terms of capital intensity, MFP, and labour quality growth to labour productivity growth in Saskatchewan over the 1997-2007 period at the two-digit NAICS industry level.

Table 70: Contributions to Labour Productivity Growth at the Industry Level by Source in Saskatchewan, 1997-2007

Market Sector	Labour Productivity	Capital Intensity			MFP	Labour Quality
		Total	Capital Composition	Capital Stock		
Percentage Point Contributions to Labour Productivity Growth						
Market Sector	2.1	1.6	1.2	0.4	0.1	0.4
Agriculture, Forestry, Fishing and Hunting	4.7	2.3	0.1	2.2	2.4	0.0
Mining, and Oil and Gas Extraction	-4.7	0.2	0.0	0.2	-4.9	0.0
Utilities	0.7	0.2	0.0	0.1	0.5	0.0
Construction	1.0	-0.6	-0.2	-0.3	1.7	-0.1
Manufacturing	0.1	-1.0	-5.4	4.4	1.0	0.1
Wholesale Trade	3.9	0.6	0.2	0.4	3.1	0.1
Retail Trade	4.0	0.1	0.0	0.2		-0.1
Transportation and Warehousing	2.3	0.1	0.1	0.0	1.9	0.2
Information and Cultural Industries	4.1	2.6	1.4	1.2	1.4	0.2
FIRE*	3.9	2.2	1.2	1.0	1.4	0.2
Professional, Scientific and Technical Services	2.0	2.4	0.2	2.2	-0.8	0.4
ASWMR**	1.7	3.2			-1.6	0.2
Arts, Entertainment and Recreation	-3.8	0.7			-4.5	0.0
Accommodation and Food Services	0.9	0.2	0.0	0.2	0.5	0.2
Other Services (Except Public Administration)	3.7	-0.9	0.6	-1.5	4.4	0.3
Per Cent Contributions to Labour Productivity Growth						
Market Sector	100.0	76.5	57.7	18.5	5.3	17.8
Agriculture, Forestry, Fishing and Hunting	100.0	48.6	1.5	47.2	50.2	0.0
Mining, and Oil and Gas Extraction	100.0	-5.3	-0.4	-4.9	105.7	-0.7
Utilities	100.0	25.1	6.4	18.7	72.2	2.5
Construction	100.0	-55.0	-22.4	-32.5	165.8	-9.7
Manufacturing	100.0	-1658.2	-9215.2	7540.4	1670.2	104.3
Wholesale Trade	100.0	15.7	5.7	10.0	80.4	3.2
Retail Trade	100.0	3.2	-1.0	4.2		-3.7
Transportation and Warehousing	100.0	6.1	4.9	1.3	83.1	10.4
Information and Cultural Industries	100.0	61.7	33.0	27.9	33.4	3.9
FIRE*	100.0	57.5	30.9	26.1	35.7	5.7
Professional, Scientific and Technical Services	100.0	119.7	9.2	109.5	-39.6	20.5
ASWMR**	100.0	187.5			-95.7	11.1
Arts, Entertainment and Recreation	100.0	-17.9			117.9	-0.8
Accommodation and Food Services	100.0	21.6	-4.4	26.1	58.3	19.8
Other Services (Except Public Administration)	100.0	-25.1	15.7	-39.9	118.5	7.5

Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

Note: Per cent contributions may not sum to 100 due to rounding.

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

viii. Sources of Labour Productivity Level Gap by Industry

Saskatchewan's labour productivity level was 98.1 per cent of the Canadian level in 2007, which implies a labour productivity gap of 1.9 percentage points. Table 71 makes it clear that this gap was caused by the market sector's below average multifactor productivity level, which was responsible for 19.6 percentage points of the gap. The above average levels of capital intensity and labour quality were able to offset a significant part of the gap, 15.9 and 1.8 percentage points, respectively.³⁹

Saskatchewan had a labour productivity gap in 10 of the 15 two-digit NAICS industries. In most cases, the below average multifactor productivity level was the main culprit. The main exceptions were retail trade, and FIRE, where the below average capital intensity levels were responsible for the gaps.

Table 71: Sources of the Labour Productivity Gap Relative to Canada for Saskatchewan at the Two-Digit Industry Level, 2007

Market Sector	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 Quality	Labour Productivity	Capital Intensity	Multifactor Productivity	Labour Quality
Market Sector	98.1	-1.9	15.9	-19.6	1.8	100.0	-844.5	1,037.4	-93.0
Agriculture, Forestry, Fishing and Hunting	86.4	-13.6	14.3	-25.2	-2.7	100.0	-105.3	185.7	19.7
Mining, and Oil and Gas Extraction	120.2	20.2	25.7	-5.6	0.1	100.0	127.1	-27.8	0.7
Utilities	130.8	30.8	22.4	8.6	-0.2	100.0	72.6	28.0	-0.6
Construction	92.1	-7.9	8.0	-14.3	-1.6	100.0	-100.6	180.6	20.0
Manufacturing	86.9	-13.1	-0.5	-11.1	-1.4	100.0	4.1	85.3	10.7
Wholesale Trade	115.8	15.8	15.2	0.8	-0.2	100.0	96.1	4.8	-1.0
Retail Trade	91.5	-8.5	-14.2	7.8	-2.2	100.0	165.6	-91.2	25.6
Transportation and Warehousing	119.8	19.8	9.7	9.8	0.3	100.0	49.0	49.3	1.7
Information and Cultural Industries	87.1	-12.9	-5.7	-5.9	-1.3	100.0	44.4	46.0	9.7
FIRE*	95.2	-4.8	-6.6	1.4	0.3	100.0	135.6	-29.5	-6.0
Professional, Scientific and Technical Services	83.1	-16.9	2.5	-18.6	-0.9	100.0	-15.0	109.8	5.2
ASWMR**	90.9	-9.1	12.7	-23.5	1.7	100.0	-138.7	257.3	-18.7
Arts, Entertainment and Recreation	87.4	-12.6	16.9	-30.5	1.0	100.0	-134.7	243.0	-8.3
Accommodation and Food Services	91.8	-8.2	2.2	-10.7	0.3	100.0	-27.0	130.7	-3.6
Other Services (Except Public Administration)	113.6	13.6	-5.3	19.1	-0.3	100.0	-38.7	140.8	-2.1

Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

ix. Conclusion

During the 1997-2007 period, Saskatchewan's average annual labour productivity growth rate was higher than the national average (2.1 per cent vs. 1.7 per cent). In contrast, the province's multifactor productivity growth was only one-fourth of the national average (0.1 per cent per year vs. 0.4 per cent per year), while its capital productivity growth rate was the same as the national average (-0.6 per cent).

Saskatchewan's labour, capital, and multifactor productivity levels were below the national levels in 2007. The province's labour productivity level, in particular, was only 98.1 per cent of the

³⁹ Again, it is important to bear in mind that labour quality levels were assumed to be equal to 100.0 in all provinces and in Canada for the base year of 1997. They differ after 1997, incorporating the different labour quality growth rates experienced by the provinces and Canada.

Canadian level, which implies a labour productivity gap of 1.9 percentage points. This gap was caused by the below average multifactor productivity level in the province's market sector.

Table 72 provides a summary of both levels (in 1997 and 2007) and growth rates (for the 1997-2007 period) for the productivity measures discussed in this report, along with rankings that show how Saskatchewan fared in comparison to the other provinces. A key observation is that, despite lagging multifactor productivity growth, the province's labour productivity was able to grow more than the national average because of its strong capital intensity growth, which explains 76.2 per cent of the labour productivity growth experienced over the period.

Table 72: Summary of Saskatchewan's Productivity Performance in the Market Sector

	Market Sector Growth, 1997 to 2007			Per Cent of the Canadian Level		Level Rankings, 2007	
	Compound Annual Growth Rate	Market Sector Rank	Equally-Weighted Market Sector Rank	1997	2007	Market Sector Rank	Equally-Weighted Market Sector Rank
Labour Productivity	2.1	3	2	94.5	98.1	5	4
Capital Productivity	-0.6	7	2	72.9	72.5	9	9
Multifactor Productivity	0.1	8	2	84.8	82.1	8	5
Capital Intensity	2.7	4	9	129.7	135.3	2	2
Labour Quality	0.9	1	6				

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

X. An Analysis of Alberta's Productivity, 1997-2007: Falling Productivity in Mining, and Oil and Gas Extraction Severely Dampens Market Sector Labour Productivity Growth

i. Industry Composition by Nominal GDP and Total Hours Worked

In order to understand Alberta's overall productivity performance, it is essential to understand how each of the 15 two-digit NAICS industries contributed to the province's market sector in terms of nominal GDP and actual hours worked. Table 73 details these shares for 1997 and 2007. In Alberta, the industry that had the highest GDP share in 2007 was mining, and oil and gas extraction (34.0 per cent of the province's nominal GDP in the market sector), followed by construction (11.9 per cent) and finance, insurance, real estate, rental and leasing (8.9 per cent). In terms of total hours worked, the three industries that had the highest contributions in 2007 were construction (18.0 per cent of total hours worked), retail trade (11.2 per cent), and other services (excluding public services) (8.8 per cent).

Table 73: Industry Share of Nominal GDP and Total Hours Worked in Alberta

Market Sector	1997				2007			
	GDP		Hours Worked		GDP		Hours Worked	
	Canada	Alberta	Canada	Alberta	Canada	Alberta	Canada	Alberta
Market Sector	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Agriculture, Forestry, Fishing and Hunting	3.2	3.5	5.4	8.4	2.1	1.7	3.4	3.5
Mining, and Oil and Gas Extraction	5.5	24.9	1.7	7.5	11.1	34.0	2.0	8.5
Utilities	4.2	3.1	0.9	0.5	3.0	1.9	0.8	0.5
Construction	7.0	8.5	7.9	10.2	9.0	11.9	10.1	18.0
Manufacturing	23.2	13.0	18.3	9.9	16.8	8.7	14.8	8.4
Wholesale Trade	7.1	6.0	7.4	7.1	7.1	5.0	6.9	6.3
Retail Trade	6.9	5.2	13.1	11.5	7.4	5.2	12.9	11.2
Transportation and Warehousing	6.2	6.7	6.3	7.4	5.6	5.4	6.6	7.0
Information and Cultural Industries	4.3	3.2	2.5	2.1	4.3	2.8	2.7	1.7
FIRE*	15.0	10.7	7.5	6.0	14.6	8.9	7.8	5.9
Professional, Scientific and Technical Services	4.9	5.0	6.3	7.3	6.2	5.4	7.9	8.1
ASWMR**	2.5	2.0	4.0	3.4	3.3	2.2	5.7	4.3
Arts, Entertainment and Recreation	0.9	0.7	1.5	1.4	0.9	0.5	1.9	1.6
Accommodation and Food Services	3.2	3.1	7.8	8.4	2.8	2.3	7.0	6.1
Other Services (Except Public Administration)	5.7	4.4	9.4	8.8	5.8	4.0	9.5	8.8

Source: Shares calculated by the CSLS, based on Statistics Canada data (Cansim Table 7583-0011).

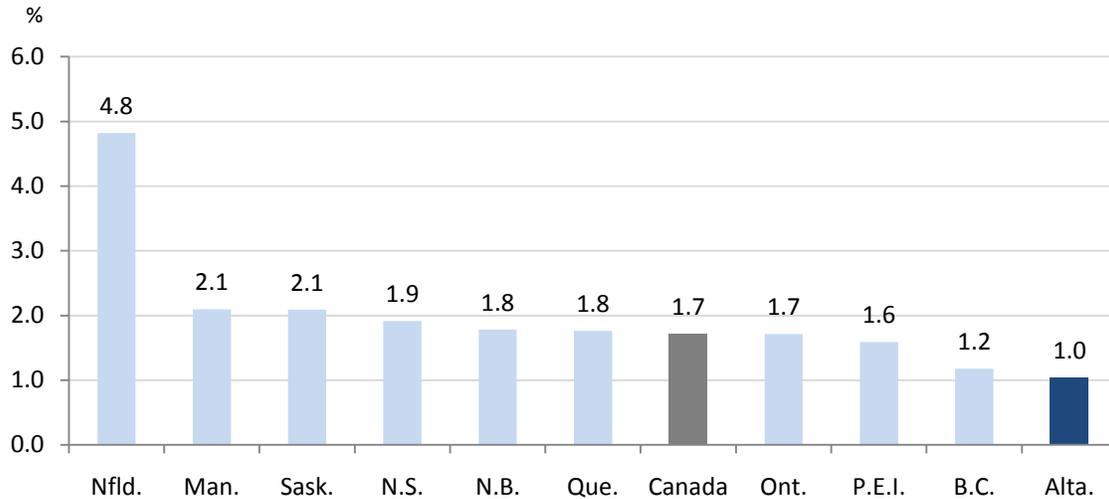
*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

ii. Labour Productivity

Labour productivity, defined as real GDP per hour worked,⁴⁰ grew at an average rate of 1.0 per cent per year in Alberta's market sector during the 1997-2007 period, which was well below the national average of 1.7 per cent per year. Alberta ranked last among the provinces in terms of labour productivity growth (Chart 57).

⁴⁰ Note that the total hours worked figures used to calculate labour productivity are unadjusted for labour quality.

**Chart 57: Labour Productivity Growth in Canada and the Provinces, Market Sector, 1997-2007
(Average Annual Growth Rates)**



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

During the period in question, the industry that experienced the highest labour productivity growth rate in Alberta was agriculture, forestry, fishing and hunting (7.3 per cent per year), followed by information and cultural industries (5.3 per cent), and retail trade (4.9 per cent) (Table 74). The industry that had the lowest labour productivity growth rate was mining, and oil and gas extraction (-4.3 per cent per year), followed by arts, entertainment and recreation (-2.2 per cent), and utilities (-1.4 per cent).

In terms of labour productivity growth, the province ranked 7th or below in only three of the 15 two-digit NAICS industries, none of which ranked 10th. Furthermore, it ranked 3rd or above in seven of the 15 two-digit NAICS industries. In particular, Alberta ranked 1st in the following two industries: retail trade and information and cultural industries. Strong relative growth rates were reflected in Alberta attaining the highest equally weighted market sector rank for labour productivity growth; while the market sector in total performed poorly, this was largely due to the productivity performance of one industry, the negative productivity growth mining, and oil and gas extraction, which accounted for a third of nominal GDP.

Alberta's labour productivity level in 2007 was \$39.40 (1997 dollars) per hour, which represents 109.3 per cent of the Canadian level, down from 116.8 per cent in 1997. Alberta had the 2nd highest labour productivity level in Canada in 2007, below only Newfoundland.

In 2007, 12 of the 15 two-digit NAICS industries in Alberta had labour productivity levels above Canada's. The industries with the highest relative labour productivity levels in the province were: utilities (135.8 per cent of the Canadian level), information and cultural industries (127.7 per cent), and construction (124.8 per cent). The industries that had the lowest levels in the province were: arts, entertainment and recreation (79.1 per cent of the Canadian level), wholesale trade (92.6 per cent), and mining, and oil and gas extraction (95.5 per cent).

In terms of labour productivity levels, the province ranked 3rd or above in 10 of the 15 two-digit NAICS industries. Alberta had six industries ranked 1st among all the provinces: construction,

manufacturing, retail trade, finance, insurance, real estate, rental and leasing, administrative and support, waste management and remediation services and accommodation and food services. There were no industries ranked lower than 6th in Alberta. On an equally weighted basis, Alberta's market sector had the highest productivity level in Canada.

Table 74: Labour Productivity Levels and Growth Rates in Alberta, 1997-2007

Market Sector	Compound Annual Growth Rate, 1997-2007	Provincial Ranking	Province's Labour Productivity Level Relative to Canada's (Canada=100)		Labour Productivity Level, 2007	Provincial Ranking, 2007
	(per cent)		1997	2007	(1997 Dollars)	
Market Sector	1.0	10	116.8	109.3	39.4	2
Agriculture, Forestry, Fishing and Hunting	7.3	3	81.7	109.4	29.7	4
Mining, and Oil and Gas Extraction	-4.3	7	118.2	95.5	75.2	6
Utilities	-1.4	7	141.7	135.8	182.8	2
Construction	3.0	2	110.1	124.8	39.8	1
Manufacturing	2.2	4	120.4	119.4	57.1	1
Wholesale Trade	2.7	8	102.6	92.6	38.8	6
Retail Trade	4.9	1	99.7	115.6	25.5	1
Transportation and Warehousing	1.3	2	107.7	114.7	36.4	2
Information and Cultural Industries	5.3	1	102.5	127.7	87.6	2
FIRE*	2.0	4	102.5	107.7	75.7	1
Professional, Scientific and Technical Services	1.8	3	100.9	106.1	28.6	2
ASWMR**	0.8	5	106.3	110.8	21.9	1
Arts, Entertainment and Recreation	-2.2	4	87.4	79.1	12.8	6
Accommodation and Food Services	2.4	2	105.5	120.3	16.6	1
Other Services (Except Public Administration)	1.9	6	103.1	100.8	16.4	4
Absolute Equally Weighted Average Rank		3.9				2.7
Equally Weighted Market Sector Rank		1				1

Source: CCLS Provincial Productivity Database, Appendix Tables, http://www.ccls.ca/data/mfp_new.asp.

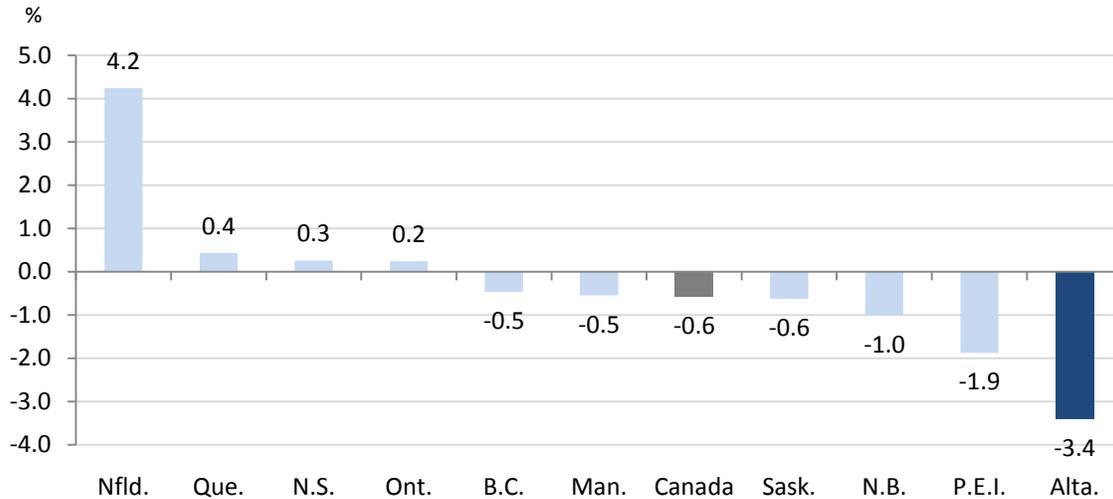
*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

iii. Capital Productivity

Capital productivity, defined as real GDP per unit of capital services, declined at a rate of 3.4 per cent per year in Alberta's market sector during the 1997-2007 period, far below the national average and well below every other province. Alberta ranked 10th in Canada in terms of capital productivity growth (Chart 58).

In Alberta, 11 of the 15 two-digit NAICS industries had negative capital productivity growth rates during the period. The industries that experienced the worst performances were: professional, scientific and technical services (-8.6 per cent per year), Mining, and Oil and Gas extraction (-8.3 per cent), and arts, entertainment and recreation (-7.7 per cent) (Table 75). The industries that had the best performances were: construction (12.3 per cent per year), agriculture, forestry, fishing and hunting (2.3 per cent), and retail trade (2.3 per cent).

Chart 58: Capital Productivity Growth Rates in Canada and the Provinces, Market Sector, 1997-2007
(Average Annual Growth Rates)



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

At the industry level, most industries in Alberta fared poorly compared to their counterparts in other provinces. In fact, nine of the 15 two-digit NAICS industries ranked 7th or below. The following three industries were ranked 10th in Canada in terms of capital productivity growth rates: manufacturing, transportation and warehousing, and accommodation and food services. Only two industries ranked 3rd or above, construction ranked 1st, and retail trade ranked 2nd.

Table 75: Capital Productivity Levels and Growth Rates in Alberta, 1997-2007

Market Sector	Compound Annual Growth Rate, 1997-2007	Provincial Ranking	Province's Capital Productivity Level Relative to Canada's (Canada=100)		Capital Productivity Level, 2007	Provincial Ranking, 2007
	(per cent)		1997	2007	(1997 Dollars)	
Market Sector	-3.4	10	81.4	61.0	1.40	10
Agriculture, Forestry, Fishing and Hunting	2.3	5	85.4	87.9	1.84	8
Mining, and Oil and Gas Extraction	-8.3	9	93.4	70.5	0.55	9
Utilities	-2.7	9	91.7	69.8	0.90	9
Construction	12.3	1	84.1	232.9	15.91	1
Manufacturing	0.6	7	79.5	71.8	1.96	10
Wholesale Trade	-2.2	9	98.6	80.2	2.55	9
Retail Trade	2.3	2	95.4	132.5	6.07	2
Transportation and Warehousing	-2.5	6	82.4	77.8	1.87	10
Information and Cultural Industries	-0.6	7	99.0	88.4	1.70	7
FIRE*	-1.8	5	102.3	93.4	1.53	3
Professional, Scientific and Technical Services	-8.6	7	109.7	89.6	2.19	5
ASWMR**	-6.9	9	92.1	59.7	1.84	9
Arts, Entertainment and Recreation	-7.7	8	98.9	70.3	1.45	7
Accommodation and Food Services	-0.6	5	76.8	75.3	3.24	10
Other Services (Except Public Administration)	-3.3	9	89.5	69.5	3.70	9
Absolute Equally Weighted Average Rank		6.5				7.2
Equally Weighted Market Sector Rank		9				10

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

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

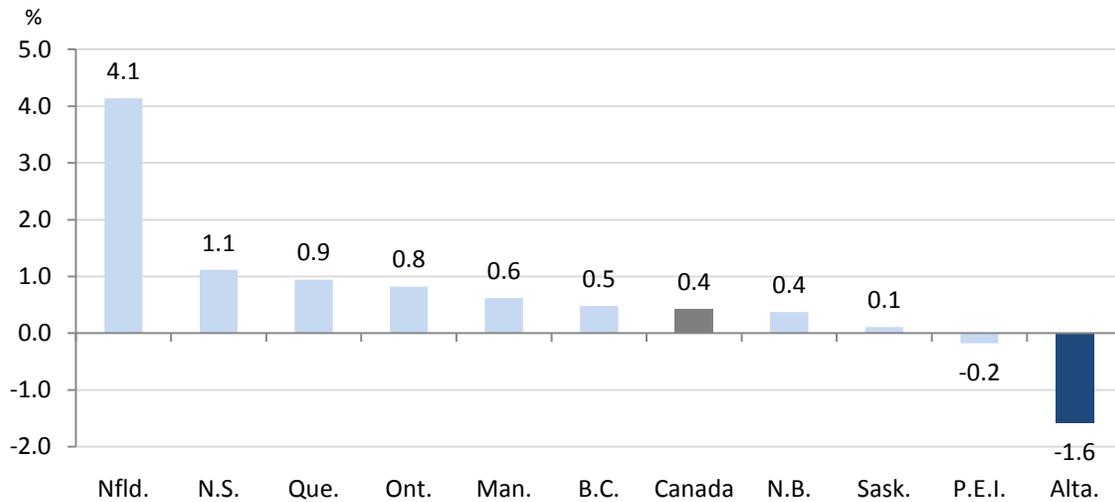
Alberta’s capital productivity level in the market sector in 2007 was 61.0 per cent of the Canadian level, down from 81.4 per cent in 1997. Only two of the 15 two-digit NAICS industries in the province had capital productivity levels above the Canadian average: construction (232.9 per cent of the Canadian level) and retail trade (132.5 per cent). The industries with the lowest capital productivity levels in the province were: administrative and support, waste management and remediation services (59.7 per cent of the Canadian level), other services (except public administration) (69.5 per cent) and utilities (69.8 per cent).

Alberta’s low market sector capital productivity level manifested itself in many industries, as reflected in eight of the 15 two-digit NAICS industries being ranked 7th or below. In particular, Alberta ranked 10th place in the following three industries: manufacturing, transportation and warehousing and accommodation and food services. The main exception to the overall low capital productivity levels at the industry level was construction, which ranked 1st in Canada.

iv. Multifactor Productivity

Alberta’s multifactor productivity in the market sector declined at a rate of 1.6 per cent per year during the 1997-2007 period, a growth rate far lower than the national average, which grew at an average annual rate of 0.4 per cent. The province ranked last in Canada in terms of multifactor productivity growth (Chart 60).

Chart 59: Multifactor Productivity Growth in Canada and the Provinces, Market Sector, 1997-2007
(Average Annual Growth Rates)



Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

The industry that experienced the highest multifactor productivity growth rate in Alberta was construction (4.6 per cent per year), followed by retail trade (4.4 per cent), and agriculture, forestry, fishing and hunting (3.1 per cent). The industries that had the lowest multifactor productivity growth rates were mining, and oil and gas extraction (-7.4 per cent per year), arts, entertainment and recreation (-3.7 per cent), and utilities (-2.4 per cent).

Although the province ranked last in Canada in terms of its market sector rank, its equally-weighted market sector rank was significantly higher, at 4th place. Of the 15 two-digit NAICS industries, five were ranked at 7th place or lower, and none of those ranked 10th. In contrast, six industries were ranked 3rd or higher. Two industries, construction and retail trade, were ranked 1st in Canada. Again, the poor overall performance was driven by the massive decline in multifactor productivity in mining, and oil and gas extraction.

Table 76: Multifactor Productivity Levels and Growth Rates in Alberta, 1997-2007

Market Sector	Compound Annual Growth Rate, 1997-2007	Provincial Ranking	Province's Multifactor Productivity Level Relative to Canada's (Canada=100)		Provincial Ranking, 2007
	(per cent)		1997	2007	
Market Sector	-1.6	10	100.0	81.6	9
Agriculture, Forestry, Fishing and Hunting	3.4	3	86.8	94.3	6
Mining, and Oil and Gas Extraction	-7.4	9	97.4	73.7	9
Utilities	-2.4	9	100.1	80.5	8
Construction	4.6	1	109.8	146.4	1
Manufacturing	1.4	5	101.4	97.5	3
Wholesale Trade	0.9	8	101.7	89.2	6
Retail Trade	4.4	1	98.6	123.0	1
Transportation and Warehousing	-0.5	4	99.1	99.0	4
Information and Cultural Industries	1.6	5	101.1	102.3	4
FIRE*	0.0	3	102.7	102.7	2
Professional, Scientific and Technical Services	-0.6	3	103.3	104.4	2
ASWMR**	-0.9	7	103.4	98.3	4
Arts, Entertainment and Recreation	-3.7	5	88.8	74.7	6
Accommodation and Food Services	1.5	2	97.9	107.2	1
Other Services (Except Public Administration)	0.5	8	100.0	93.6	7
Absolute Equally Weighted Average Rank		4.9			4.3
Equally Weighted Market Sector Rank		4			4

Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

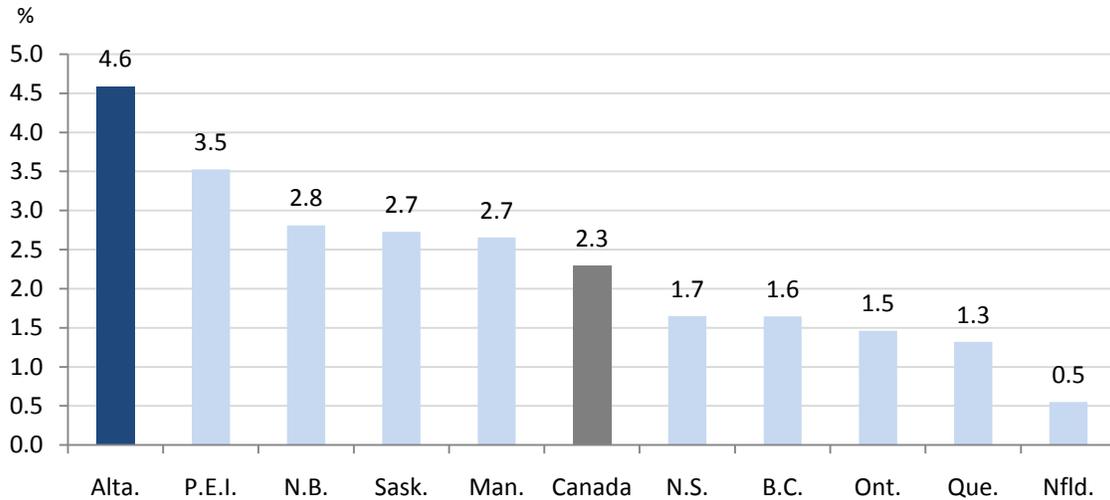
The province's multifactor productivity level was 81.6 per cent of the Canadian level in 2007, down from 100.0 per cent in 1997. Consistent with this low level at the market sector, at the industry level only six of the 15 two-digit NAICS industries in Alberta had multifactor productivity level above Canada's. The industries with the highest relative multifactor productivity levels in the province were: construction (146.4 per cent of the Canadian level), retail trade (123.0 per cent), and accommodation and food services (107.2 per cent). In contrast, the industries with the lowest relative multifactor productivity levels in the province were: Mining, and Oil and Gas extraction (73.7 per cent of the Canadian level), arts, entertainment and recreation (74.7 per cent), and utilities (80.5 per cent).

Despite the second-worst multifactor productivity level ranking, Alberta did quite well using the equally weighted market sector, with a rank of 4th. At the industry level, six of the 15 two-digit NAICS industries ranked 3rd or above, while only three ranked 7th or below. In particular, Alberta's construction, retail trade and accommodation and food services industries ranked 1st in Canada. Again, the low multifactor productivity level of mining, and oil and gas extraction caused by the exploitation of increasingly capital intensive oil sands projects explains this situation.

v. Capital Intensity

Capital intensity, defined as capital services per hour worked (unadjusted for labour quality), grew at an average rate of 4.6 per cent per year in Alberta's market sector during the 1997-2007 period, below the national average of 2.3 per cent per year. Alberta ranked 1st among the ten provinces in terms of capital intensity growth, and well ahead of the nearest province (Chart 60).

Chart 60: Capital Intensity Growth in Canada and the Provinces, Market Sector, 1997-2007
(Average Annual Growth Rates)



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

During the period, the industries that experienced the highest capital intensity growth rates in the province were professional, scientific and technical services (11.5 per cent per year), administrative and support, waste management and remediation services (8.2 per cent), and arts, entertainment and recreation (6.0 per cent). Conversely, the industries that had the lowest growth rates in the province were construction (-8.2 per cent per year), utilities (1.4 per cent), and manufacturing (1.5 per cent).

Alberta's top market sector ranking manifested itself at the industry level with seven of the 15 two-digit NAICS industries ranked 3rd or higher, and only two ranked 7th or below. While no industry ranked 1st, there were five ranked 2nd: agriculture, forestry, fishing and hunting, manufacturing, wholesale trade, information and cultural industries and administrative and support, waste management and remediation services. Though most industries in Alberta high capital intensity growth relative to their counterparts in other provinces, construction was an important exception ranking 10th, the only industry in Alberta to do so.

Table 77: Capital Intensity Levels and Growth Rates in Alberta, 1997-2007

Market Sector	Compound Annual Growth Rate, 1997-2007	Provincial Ranking	Province's Capital Intensity Level Relative to Canada's (Canada=100)		Capital Intensity Level, 2007	Provincial Ranking, 2007
	(per cent)		1997	2007	(1997 Dollars)	
Market Sector	4.6	1	143.4	179.1	28.1	1
Agriculture, Forestry, Fishing and Hunting	4.9	2	95.4	124.4	16.1	3
Mining, and Oil and Gas Extraction	4.4	4	126.4	135.5	137.7	1
Utilities	1.4	4	155.0	194.5	203.0	1
Construction	-8.2	10	130.9	53.6	2.5	9
Manufacturing	1.5	2	152.0	166.4	29.2	1
Wholesale Trade	5.0	2	104.1	115.5	15.2	3
Retail Trade	2.6	9	104.1	87.2	4.2	5
Transportation and Warehousing	3.9	3	131.3	147.3	19.4	1
Information and Cultural Industries	6.0	2	104.6	146.5	52.2	1
FIRE*	3.9	6	100.0	115.2	49.3	4
Professional, Scientific and Technical Services	11.5	4	91.7	118.4	13.1	4
ASWMR**	8.2	2	115.2	185.5	11.9	1
Arts, Entertainment and Recreation	6.0	3	88.0	112.6	8.8	4
Accommodation and Food Services	3.0	4	137.9	159.8	5.1	1
Other Services (Except Public Administration)	5.4	4	115.4	145.0	4.4	2
Absolute Equally Weighted Average Rank		4.1				2.7
Equally Weighted Market Sector Rank		1				1

Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

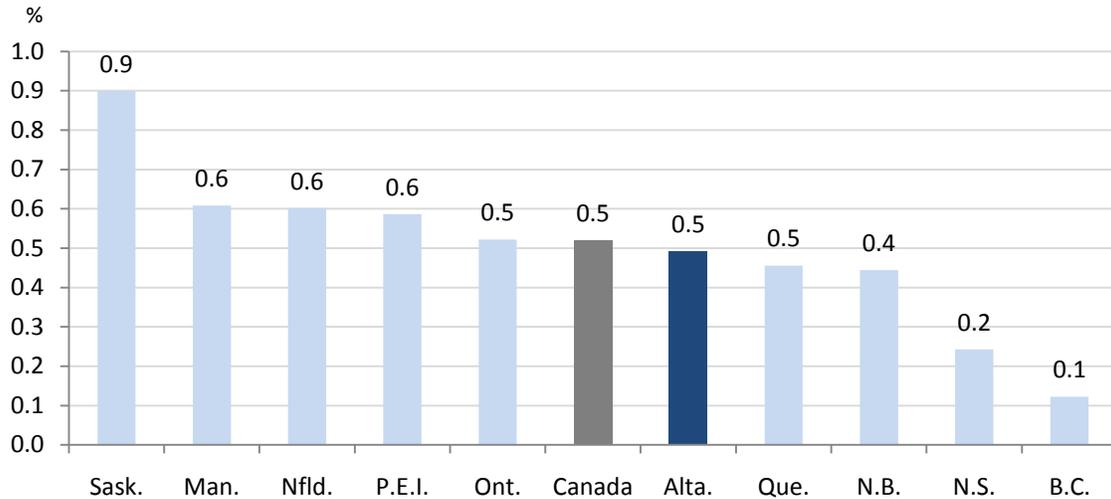
Alberta's capital intensity level was 179.1 per cent of the Canadian level in 2007, up from 143.4 per cent in 1997. Of the 15 two-digit NAICS industries, 13 had levels above the national average in 2007. The industries with the highest relative capital intensity levels in the province were utilities (194.5 per cent of the Canadian level), administrative and support, waste management and remediation services (185.5 per cent), and manufacturing (166.4 per cent).

In terms of capital intensity levels, Alberta's market sector ranked 1st in Canada in 2007 (the province also ranked 1st according to the equally-weighted market sector ranking). A very high proportion, 13 of the 15 two-digit NAICS industries in the province, ranked 4th or above. Seven of the industries were ranked 1st in Canada, including: mining, and oil and gas extraction, utilities, manufacturing, transportation and warehousing, information and cultural industries, administrative and support, waste management and remediation services and accommodation and food services. The lowest rank was in construction, which ranked 9th.

vi. Labour Quality

Alberta's labour quality grew at an average rate of 0.5 per cent per year during the 1997-2007 period, roughly the same as the national average. The province ranked 6th in Canada in terms of labour quality growth (Chart 61).

Chart 61: Labour Quality Growth in Canada and the Provinces, Market Sector, 1997-2007
(Average Annual Growth Rates)



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

During the period in question, the industries that experienced the highest labour quality growth rates in the province were agriculture, forestry, fishing and hunting (1.4 per cent per year), information and cultural industries (0.7 per cent), and transportation and warehousing (0.4 per cent). The industries that had the lowest labour quality growth rates were administrative and support, waste management and remediation services (-0.4 per cent per year), retail trade (-0.2 per cent) and finance, insurance, real estate, rental and leasing (-0.2 per cent).

Table 78: Labour Quality Levels and Growth Rates in Alberta, 1997-2007⁴¹

Market Sector	Compound Annual Growth Rate, 1997-2007	Provincial Ranking	Province's Labour Quality Level Relative to Canada's (Canada=100)		Rank, 2007
	(per cent)		1997	2007	
Market Sector	0.5	6	100.0	99.72	6
Agriculture, Forestry, Fishing and Hunting	1.4	1	100.0	104.6	1
Mining, and Oil and Gas Extraction	0.2	1	100.0	101.9	1
Utilities	0.2	4	100.0	101.1	4
Construction	0.1	6	100.0	99.5	6
Manufacturing	0.2	7	100.0	97.6	7
Wholesale Trade	0.1	6	100.0	97.7	6
Retail Trade	-0.2	10	100.0	96.5	10
Transportation and Warehousing	0.4	7	100.0	100.0	7
Information and Cultural Industries	0.7	3	100.0	101.1	3
FIRE*	-0.2	10	100.0	94.4	10
Professional, Scientific and Technical Services	0.4	6	100.0	97.9	6
ASWMR**	-0.4	10	100.0	96.0	10
Arts, Entertainment and Recreation	0.3	5	100.0	103.6	5
Accommodation and Food Services	0.2	5	100.0	99.6	5
Other Services (Except Public Administration)	0.1	7	100.0	97.3	7
Absolute Equally Weighted Average Rank		5.9			5.9
Equally Weighted Market Sector Rank		7			7

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

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

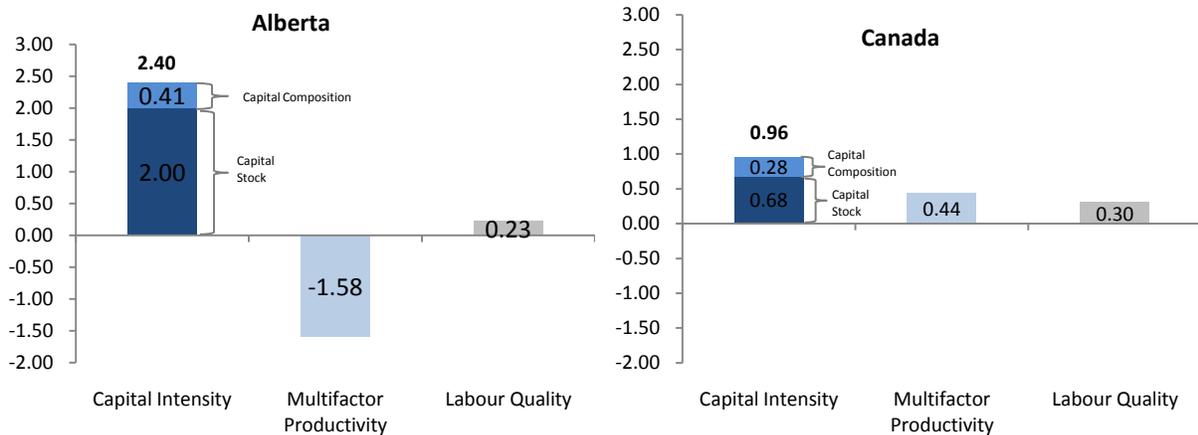
⁴¹ Labour quality levels are not shown here because they are assumed to be the same (and equal to 100.0) across all provinces and in Canada in the base year, 1997 (Sharpe and Thomson, 2010a). They differ after 1997, incorporating the different labour quality growth rates experienced by the provinces and Canada. For example, labour quality in Alberta's market sector grew at an average annual rate of 0.49 per cent over the 1997-2007 period, while Canada's labour quality grew at an average annual rate of 0.52 per cent. As a consequence, Alberta's labour quality level was 99.72 per cent of the Canadian level in 2007.

Industries in Alberta generally ranked poorly for labour quality growth. Alberta had six industries ranked 3rd or above, but six ranked 7th or below. There were three industries where Alberta did especially poorly, ranking last out of all provinces: retail trade, finance, insurance, real estate, rental and leasing and administrative and support, waste management and remediation services. The two strong exceptions to Alberta’s generally poor performance were agriculture, forestry, fishing and hunting and mining, and oil and gas extraction, both of which ranked 1st.

vii. Sources of Labour Productivity Growth in the Market Sector

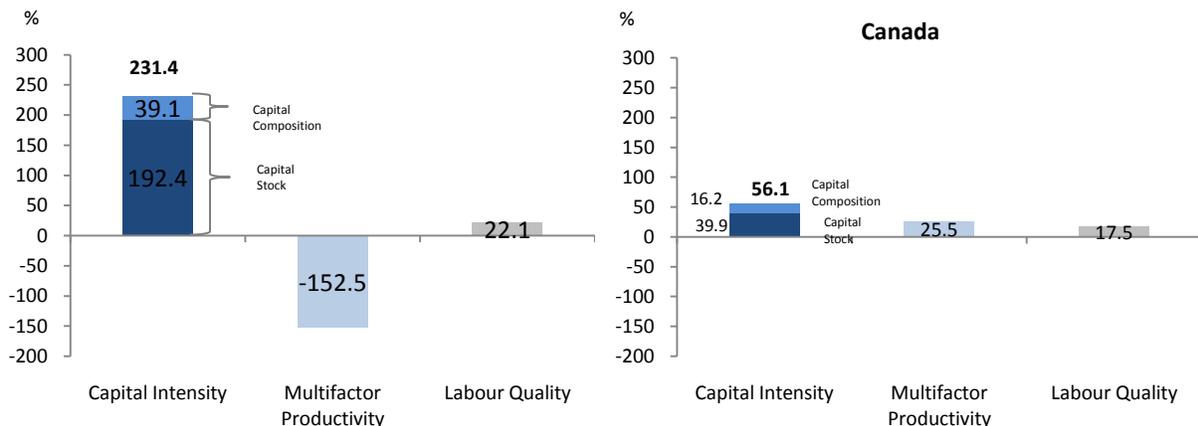
Alberta’s labour productivity grew at an average rate of 1.0 per cent per year during the 1997-2007 period, the lowest in the country and well below the national average, which grew at an average annual rate of 1.7 per cent. Charts 62 and 63 show both the percentage point and per cent contributions to labour productivity growth by the sources of growth for Alberta and Canada over the 1997-2007 period.

Chart 62: Percentage Point Contribution to Labour Productivity Growth by the Source of Labour Productivity Growth in the Market Sector in Alberta and in Canada, 1997 to 2007



Source: CSL Provincial Productivity Database, Appendix Table 17, http://www.csls.ca/data/mfp_new.asp.

Chart 63: Per Cent Contribution to Labour Productivity Growth by the Source of Labour Productivity Growth in the Market Sector in Alberta and in Canada, 1997 to 2007



Source: CSL Provincial Productivity Database, Appendix Table 17, http://www.csls.ca/data/mfp_new.asp.
 Note: Numbers may not sum to 100 due to rounding.

Alberta's labour productivity growth was driven mainly by capital intensity, which accounted for 2.40 percentage points of the overall labour productivity growth (or, alternatively, 231.4 per cent of total growth). The contribution of capital intensity to labour productivity growth can be broken down into two components: capital composition growth, which was responsible for 0.41 percentage points of labour productivity growth (39.1 per cent), and capital stock growth, which accounted for 2.00 percentage points (192.4 per cent). Labour quality growth was responsible for 0.23 percentage points of labour quality growth (22.1 per cent). There was a large negative contribution to growth from multifactor productivity growth; multifactor productivity was responsible for -1.58 percentage points of growth (-152.5 per cent).

The causes of growth in labour productivity were very different between Canada and Alberta. Alberta's large negative multifactor productivity growth was a major difference compared to Canada, where multifactor productivity was responsible for over a quarter of growth. Alberta experienced capital intensity growth on a scale far beyond that enjoyed by Canada, and thus capital intensity was far more important to labour productivity growth for the former than the latter.

Table 79: Contributions to Labour Productivity Growth at the Industry Level by Source in Alberta, 1997-2007

Market Sector	Labour Productivity	Capital Intensity		MFP	Labour Quality	
		Total	Capital Composition			Capital Stock
Percentage Point Contributions to Labour Productivity Growth						
Market Sector	1.0	2.4	0.4	2.0	-1.6	0.2
Agriculture, Forestry, Fishing and Hunting	7.3	3.3	-0.6	3.9	3.4	0.4
Mining, and Oil and Gas Extraction	-4.3	3.3	0.2	3.1	-7.4	0.1
Utilities	-1.4	1.0	0.3	0.7	-2.4	0.0
Construction	3.0	-1.5	0.1	-1.6	4.6	0.1
Manufacturing	2.2	0.7	0.2	0.5	1.4	0.1
Wholesale Trade	2.7	1.8	0.1	1.7	0.9	0.0
Retail Trade	4.9	0.6	0.0	0.6		-0.2
Transportation and Warehousing	1.3	1.6	0.6	1.0	-0.5	0.3
Information and Cultural Industries	5.3	3.3	0.6	2.7	1.6	0.3
FIRE*	2.0	2.0	0.7	1.3	0.0	-0.1
Professional, Scientific and Technical Services	1.8	2.1	0.1	2.0	-0.6	0.3
ASWMR**	0.8	2.0	0.1	1.9	-0.9	-0.3
Arts, Entertainment and Recreation	-2.2	1.3	0.6	0.6	-3.7	0.3
Accommodation and Food Services	2.4	0.8	0.1	0.7	1.5	0.1
Other Services (Except Public Administration)	1.9	1.3	0.2	1.1	0.5	0.1
Per Cent Contributions to Labour Productivity Growth						
Market Sector	100.0	233.9	39.1	192.4	-152.5	22.1
Agriculture, Forestry, Fishing and Hunting	100.0	45.2	-8.4	53.5	46.8	6.0
Mining, and Oil and Gas Extraction	100.0	-76.2	-4.3	-71.5	172.1	-1.6
Utilities	100.0	-76.0	-23.0	-52.3	175.9	-1.7
Construction	100.0	-50.4	3.6	-53.9	150.8	1.9
Manufacturing	100.0	32.2	10.0	22.0	63.0	4.4
Wholesale Trade	100.0	65.9	2.9	62.8	32.1	1.4
Retail Trade	100.0	12.5	0.5	12.0		-3.8
Transportation and Warehousing	100.0	120.4	46.1	72.4	-39.2	19.2
Information and Cultural Industries	100.0	63.3	11.8	50.8	29.8	5.6
FIRE*	100.0	101.5	35.3	64.6	2.3	-3.7
Professional, Scientific and Technical Services	100.0	114.6	6.8	106.7	-33.0	18.8
ASWMR**	100.0	260.9	8.0	251.8	-118.5	-39.7
Arts, Entertainment and Recreation	100.0	-57.6	-28.8	-27.1	167.9	-12.7
Accommodation and Food Services	100.0	33.7	4.9	28.6	60.8	4.9
Other Services (Except Public Administration)	100.0	66.2	8.0	57.5	28.3	5.0

Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

Note: Per cent contributions may not sum to 100 due to rounding.

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

Table 79 details the contributions in absolute and per cent terms of capital intensity, MFP, and labour quality growth to labour productivity growth in Alberta over the 1997-2007 period at the two-digit NAICS industry level.

viii. Sources of Labour Productivity Level Gap by Industry

Alberta's labour productivity level was 109.3 per cent of the Canadian level in 2007, which implies a positive labour productivity differential of 9.3 percentage points. Table 80 makes it clear that this differential was caused by the market sector's above average capital intensity level, which was responsible for 30.7 percentage points of the gap. The differential was significantly reduced by low multifactor productivity, which reduced the differential by 21.2 percentage points, and lower than average labour quality, which reduced the differential by 0.1 percentage points.⁴²

Alberta had a labour productivity gap in only 3 of the 15 two-digit NAICS industries. In these three industries, the below average level of multifactor productivity was the main culprit with significant contributions to the gap. In the 12 industries with a positive differential, 10 were caused by high capital intensity and two by high multifactor productivity.

Table 80: Sources of the Labour Productivity Gap Relative to Canada for Alberta at the Two-Digit Industry Level, 2007

Market Sector	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 Quality	Labour Productivity	Capital Intensity	Multifactor Productivity	Labour Quality
Market Sector	109.3	9.3	30.7	-21.2	-0.1	100.0	329.4	-227.8	-1.6
Agriculture, Forestry, Fishing and Hunting	109.4	9.4	13.7	-6.1	1.9	100.0	144.9	-65.0	20.0
Mining, and Oil and Gas Extraction	95.5	-4.5	25.1	-29.9	0.3	100.0	-560.8	667.1	-6.3
Utilities	135.8	35.8	60.8	-25.3	0.3	100.0	169.9	-70.7	0.8
Construction	124.8	24.8	-17.3	42.6	-0.4	100.0	-69.8	171.6	-1.8
Manufacturing	119.4	19.4	23.7	-2.8	-1.5	100.0	121.9	-14.1	-7.7
Wholesale Trade	92.6	-7.4	5.0	-11.0	-1.4	100.0	-67.7	148.5	19.2
Retail Trade	115.6	15.6	-3.8	22.2	-2.8	100.0	-24.6	142.9	-18.3
Transportation and Warehousing	114.7	14.7	15.7	-1.0	0.0	100.0	107.0	-7.0	0.1
Information and Cultural Industries	127.7	27.7	24.6	2.6	0.5	100.0	88.8	9.3	1.9
FIRE*	107.7	7.7	7.7	2.8	-2.9	100.0	100.6	36.7	-37.3
Professional, Scientific and Technical Services	106.1	6.1	3.5	4.4	-1.8	100.0	56.9	72.1	-29.0
ASWMR**	110.8	10.8	15.9	-1.8	-3.3	100.0	146.5	-16.4	-30.1
Arts, Entertainment and Recreation	79.1	-20.9	2.8	-26.0	2.3	100.0	-13.3	124.5	-11.2
Accommodation and Food Services	120.3	20.3	13.0	7.6	-0.4	100.0	64.2	37.5	-1.8
Other Services (Except Public Administration)	100.8	0.8	9.5	-6.7	-2.0	100.0	1,190.5	-835.9	-254.6

Source: CSDL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

⁴² Again, it is important to bear in mind that labour quality levels were assumed to be equal to 100.0 in all provinces and in Canada for the base year of 1997. They differ after 1997, incorporating the different labour quality growth rates experienced by the provinces and Canada.

ix. Conclusion

During the 1997-2007 period, Alberta experienced lower growth in the three productivity metrics – labour, capital and multifactor productivities – than the national average. Labour productivity grew at a rate of 1.0 per cent per year, compared to the national rate of 1.7 per cent. Growth in labour productivity was primarily driven by capital intensity growth, which was responsible for 231.4 per cent of growth, though growth was reduced by changes in multifactor productivity which was responsible for -152.5 per cent of labour productivity growth.

Alberta enjoyed the second highest labour productivity level in Canada, at 109.3 per cent of the national level, well above the national levels in 2007. Similarly, Alberta had the highest capital intensity levels in the country, at 179.1 per cent of the national rate, due to the importance of the capital intensive mining, and oil and gas extraction industry. Capital productivity however was only 61.0 per cent of the national rate and the lowest in the country. Multifactor productivity was only 81.6 per cent of the national rate. The province's positive labour productivity differential relative to Canada was entirely caused by high capital intensity, with both labour quality and multifactor productivity levels being lower than the Canadian average.

Table 81 provides a summary of both levels (in 1997 and 2007) and growth rates (for the 1997-2007 period) for the productivity measures discussed in this report, along with rankings that show how Alberta fared in comparison to the other provinces. A key observation is that labour productivity was greatly hampered by the lagging mining, and oil and gas extraction industry, as Alberta ranks first using the equally weighted measure and last using the market sector. Another core observation is the importance of capital intensity to Alberta; Alberta enjoyed the highest capital intensity level and the fastest rate of growth. Capital intensity growth was entirely responsible for Alberta's labour productivity growth.

Table 81: Summary of Alberta's Productivity Performance in the Market Sector

	Market Sector Growth, 1997 to 2007			Per Cent of the Canadian Level		Level Rankings, 2007	
	Compound Annual Growth Rate	Provincial Rank	Provincial Equally Weighted Rank	1997	2007	Provincial Rank	Provincial Equally Weighted Rank
Labour Productivity	1.0	10	1	116.8	109.3	2	1
Capital Productivity	-3.4	10	9	81.4	61.0	10	10
Multifactor Productivity	-1.6	10	4	100.0	81.6	9	4
Capital Intensity	4.6	1	1	143.4	179.1	1	1
Labour Quality	0.5	6	7	n.a.	n.a.	n.a.	n.a.

Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

XI. An Analysis of British Columbia's Productivity, 1997-2007: Manufacturing Shines, despite Overall Sub-Par Performance

i. Industry Composition by Nominal GDP and Total Hours Worked

In order to understand British Columbia's overall productivity performance, it is essential to understand how each of the 15 two-digit NAICS industries contributed to the province's market sector in terms of nominal GDP and actual hours worked. Table 82 details these contribution shares for 1997 and 2007. In British Columbia, the industries that had the highest GDP shares in 2007 were FIRE (finance, insurance, real estate, rental and leasing) (15.9 per cent of the province's nominal GDP in the market sector), manufacturing (12.1 per cent), and construction (10.4 per cent). In terms of total hours worked, the three industries that had the highest contributions in 2007 were retail trade (13.3 per cent of total hours worked), construction (11.6 per cent), and manufacturing (10.8 per cent).

Table 82: Industry Share of Nominal GDP and Total Hours Worked in British Columbia

Market Sector	1997				2007			
	GDP		Hours Worked		GDP		Hours Worked	
	Canada	British Columbia						
Market Sector	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Agriculture, Forestry, Fishing and Hunting	3.2	6.0	5.4	5.2	2.1	3.2	3.4	3.8
Mining, and Oil and Gas Extraction	5.5	3.5	1.7	1.2	11.1	7.2	2.0	1.3
Utilities	4.2	3.1	0.9	0.5	3.0	2.5	0.8	0.4
Construction	7.0	8.5	7.9	9.4	9.0	10.4	10.1	11.6
Manufacturing	23.2	15.1	18.3	12.4	16.8	12.1	14.8	10.8
Wholesale Trade	7.1	6.5	7.4	7.0	7.1	6.2	6.9	6.4
Retail Trade	6.9	8.0	13.1	13.9	7.4	8.5	12.9	13.3
Transportation and Warehousing	6.2	8.2	6.3	7.4	5.6	7.5	6.6	7.6
Information and Cultural Industries	4.3	4.6	2.5	2.8	4.3	4.8	2.7	2.5
FIRE*	15.0	16.3	7.5	7.9	14.6	15.9	7.8	7.4
Professional, Scientific and Technical Services	4.9	5.2	6.3	6.7	6.2	6.6	7.9	8.1
ASWMR**	2.5	2.6	4.0	3.8	3.3	3.1	5.7	5.6
Arts, Entertainment and Recreation	0.9	1.1	1.5	1.7	0.9	1.2	1.9	2.5
Accommodation and Food Services	3.2	4.7	7.8	9.6	2.8	4.0	7.0	8.7
Other Services (Except Public Administration)	5.7	6.8	9.4	10.3	5.8	6.8	9.5	9.9

Source: Shares calculated by the CSLS, based on Statistics Canada data (Cansim Table 383-0011).

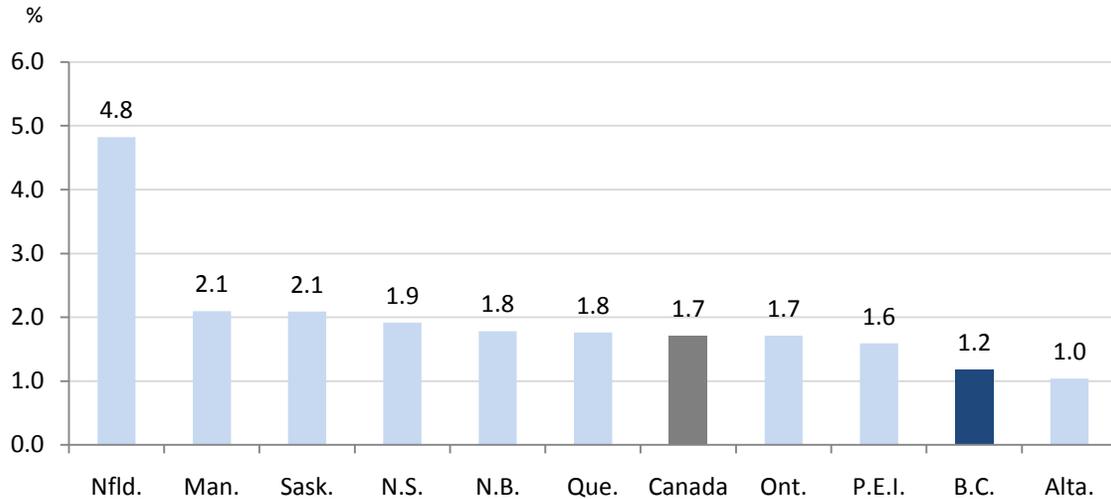
*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

ii. Labour Productivity

Labour productivity, defined as real GDP per hour worked,⁴³ grew at an average rate of 1.2 per cent per year in British Columbia's market sector during the 1997-2007 period, which is significantly below the national average of 1.7 per cent per year. British Columbia ranks 9th among the provinces in terms of labour productivity growth, only above Alberta (Chart 64).

⁴³ Note that the total hours worked figures used to calculate labour productivity are unadjusted for labour quality.

Chart 64: Labour Productivity Growth in Canada and the Provinces, Market Sector, 1997-2007
(Average Annual Growth Rates)



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

During the period in question, the industry that experienced the highest labour productivity growth rate in British Columbia was the information and cultural industry (4.2 per cent per year), followed by wholesale trade (4.0 per cent), manufacturing, and retail trade (both of which grew at an average annual rate of 2.9 per cent) (Table 83). The industry that had the lowest labour productivity growth rate was arts, entertainment and recreation (-3.9 per cent per year), followed by administrative and support, waste management and remediation services (-2.5 per year), and construction (-0.7 per cent).

In terms of labour productivity growth, the province ranked 7th or below in eight of the 15 two-digit NAICS industries. This widespread low labour productivity growth across several industries explains why the province had both the second worst market sector rank (only above Alberta) and the second worst equally-weighted market sector rank (only above Newfoundland). In particular, agriculture, forestry, fishing and hunting, and administrative and support, waste management and remediation services in British Columbia had the lowest labour productivity growth rates among all provinces. Notable exceptions were the utilities and manufacturing industries, in which British Columbia had the highest labour productivity growth among the ten provinces.

British Columbia's labour productivity level in 2007 was \$32.50 (1997 dollars) per hour, which represents 90.1 per cent of the Canadian level, down from 95.0 per cent in 1997. The province had the 6th highest labour productivity level in Canada in 2007.

In 2007, seven of the 15 two-digit NAICS industries in British Columbia had labour productivity levels above Canada's. In particular the industries with the highest relative levels in the province were utilities (161.9 per cent of the Canadian level), agriculture, forestry, fishing and hunting (143.0 per cent), and mining, and oil and gas extraction (115.5 per cent). The industries that had the lowest relative levels in the province were arts, entertainment and recreation (74.4 per cent of the Canadian level), construction (74.7 per cent), and administrative and support, waste management and remediation services (77.1 per cent).

The three industries that had the lowest relative labour productivity levels in British Columbia in 2007 still managed to have higher levels than equivalent industries in other provinces. Arts, entertainment and recreation, and administrative and support, waste management and remediation services ranked 7th, while construction ranked 8th. Meanwhile, British Columbia's FIRE industry, with a labour productivity level that was 93.1 per cent of Canada's, had the lowest level among all the ten provinces. This might seem surprising, given that its relative level was not as low as that of other industries in British Columbia. However, it is important to keep in mind that the dispersion of labour productivity levels can vary widely between different industries.

Table 83: Labour Productivity Levels and Growth Rates in British Columbia, 1997-2007

Market Sector	Compound Annual Growth Rate, 1997-2007	Provincial Ranking	Province's Labour Productivity Level Relative to Canada's, 1997	Province's Labour Productivity Level Relative to Canada's, 2007	Labour Productivity Level, 2007	Provincial Ranking, 2007
	(per cent)		(Canada=100)	(Canada=100)	(1997 Dollars)	
Market Sector	1.2	9	95.0	90.1	32.5	6
Agriculture, Forestry, Fishing and Hunting	1.7	10	182.1	143.0	38.8	2
Mining, and Oil and Gas Extraction	0.5	4	87.3	115.5	90.9	4
Utilities	2.1	1	119.4	161.9	217.9	1
Construction	-0.7	9	95.5	74.7	23.8	8
Manufacturing	2.9	1	90.7	96.7	46.2	4
Wholesale Trade	4.0	3	91.3	94.1	39.4	4
Retail Trade	2.9	10	102.8	98.1	21.6	4
Transportation and Warehousing	1.0	3	106.0	109.3	34.7	3
Information and Cultural Industries	4.2	5	90.8	101.4	69.6	7
FIRE*	1.1	9	97.3	93.1	65.5	10
Professional, Scientific and Technical Services	0.5	7	94.4	86.6	23.4	4
ASWMR**	-2.5	10	102.6	77.1	15.3	7
Arts, Entertainment and Recreation	-3.9	6	98.2	74.4	12.0	7
Accommodation and Food Services	0.5	8	113.6	107.4	14.8	2
Other Services (Except Public Administration)	1.3	9	108.9	100.8	16.4	5
Absolute Equally-Weighted Average Rank		6.3				4.8
Equally-Weighted Market Sector Rank		9				5

Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

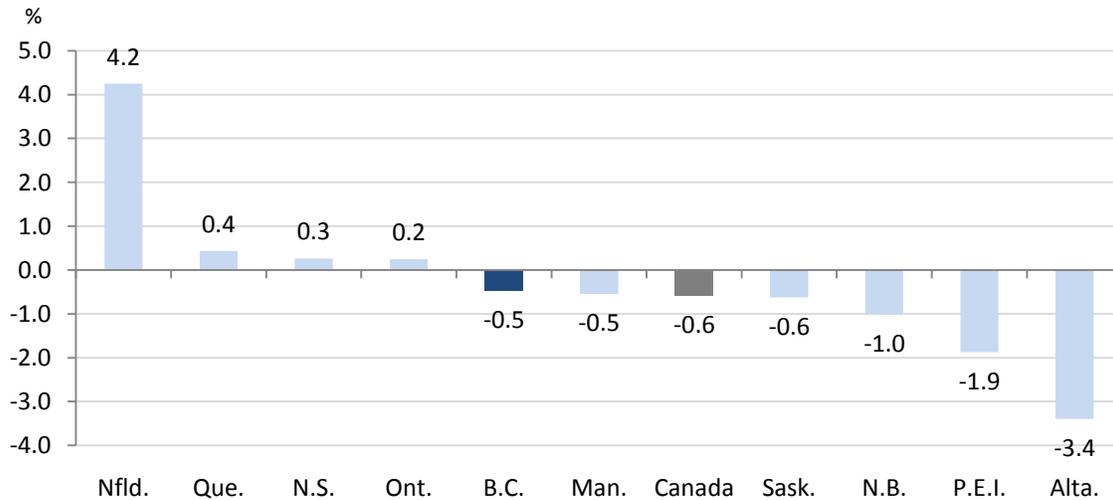
iii. Capital Productivity

Capital productivity, defined as real GDP per unit of capital services, fell at a rate of 0.5 per cent per year in British Columbia's market sector during the 1997-2007 period. Declining capital productivity was by no means unique to British Columbia, having happened in six of the ten provinces. Canada's capital productivity declined 0.6 per cent per year over the period. The province's capital productivity growth in the market sector ranked 5th in Canada (Chart 65).

In British Columbia, 10 of the 15 two-digit NAICS industries had negative capital productivity growth rates during the period. The industries that had the worst performances were arts, entertainment and recreation industry (-12.1 per cent per year), professional, scientific and technical services industry (-6.9 per cent), and administrative and support, waste management and remediation

services (-5.7 per cent) (Table 84). Of the few industries that had positive growth rates, the ones that performed better were manufacturing (5.3 per cent per year), agriculture, forestry, fishing and hunting industry (1.6 per cent), and information and cultural industries (1.5 per cent).

Chart 65: Capital Productivity Growth Rates in Canada and the Provinces, Market Sector, 1997-2007
(Average Annual Growth Rates)



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

Compared to the rest of Canada, British Columbia had mediocre capital productivity growth rates at the industry level during the period, with six of the 15 two-digit NAICS industries at 7th place or lower. Arts, entertainment and recreation, and accommodation and food services had the worst capital productivity growth rates among all provinces. In contrast, manufacturing in British Columbia had the highest capital productivity growth in Canada.

British Columbia's capital productivity level in the market sector in 2007 was 115.9 per cent of the Canadian level, up from 114.6 per cent in 1997. In 2007, 10 of the 15 two-digit NAICS industries in the province had capital productivity levels above the Canadian average. The industries with highest capital productivity levels were manufacturing (178.6 per cent of the Canadian level), wholesale trade (146.5 per cent), and mining, and oil and gas extraction (143.6 per cent). The five industries that had capital productivity levels lower than Canada's in 2007 were arts, entertainment and recreation (50.8 per cent of the Canadian level), administrative and support, waste management and remediation services (61.3 per cent), accommodation and food services (78.5 per cent), FIRE (89.0 per cent), and utilities (92.2 per cent).

British Columbia's market sector had the 4th highest capital productivity level in Canada in 2007. The province's equally-weighted market sector rank was even higher, 2nd, only behind Ontario. This reflects the high overall capital productivity level in the province, which ranked 3rd or above in six of the 15 two-digit NAICS industries. British Columbia had the highest capital productivity level in Canada in manufacturing, as well as in wholesale trade and in professional, scientific and technical services.

Table 84: Capital Productivity Levels and Growth Rates in British Columbia, 1997-2007

Market Sector	Compound Annual Growth Rate, 1997-2007	Provincial Ranking	Province's Capital Productivity Level Relative to Canada's, 1997	Province's Capital Productivity Level Relative to Canada's, 2007	Capital Productivity Level, 2007	Provincial Ranking, 2007
	(per cent)		(Canada=100)	(Canada=100)	(1997 Dollars)	
Market Sector	-0.5	5	114.6	115.9	2.66	4
Agriculture, Forestry, Fishing and Hunting	1.6	7	118.1	113.5	2.38	4
Mining, and Oil and Gas Extraction	-3.2	6	111.1	143.6	1.11	7
Utilities	-0.3	6	94.8	92.2	1.19	6
Construction	1.4	3	113.2	112.8	7.71	3
Manufacturing	5.3	1	125.0	178.6	4.86	1
Wholesale Trade	1.0	4	130.9	146.5	4.65	1
Retail Trade	-1.3	7	117.9	114.6	5.25	5
Transportation and Warehousing	-0.9	3	106.9	119.1	2.87	3
Information and Cultural Industries	1.5	3	108.6	119.4	2.30	2
FIRE*	-2.0	7	99.6	89.0	1.46	6
Professional, Scientific and Technical Services	-6.9	4	119.2	116.9	2.86	1
ASWMR**	-5.7	8	83.1	61.3	1.89	8
Arts, Entertainment and Recreation	-12.1	10	117.0	50.8	1.05	9
Accommodation and Food Services	-4.3	10	117.2	78.5	3.38	9
Other Services (Except Public Administration)	-1.2	4	107.4	103.2	5.49	5
Absolute Equally-Weighted Average Rank		5.5				4.7
Equally-Weighted Market Sector Rank		7				2

Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

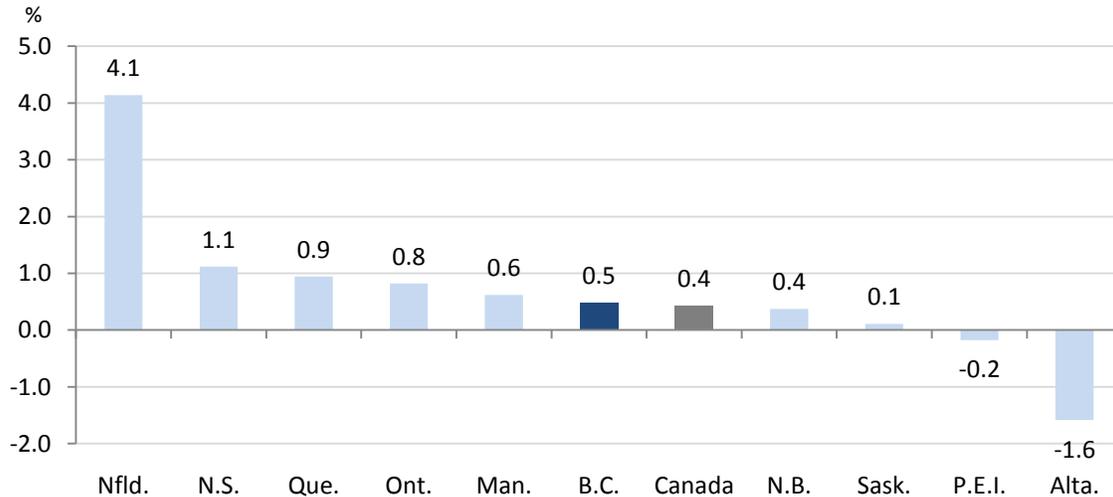
iv. Multifactor Productivity

British Columbia's multifactor productivity in the market sector grew at an average rate of 0.5 per cent per year during the 1997-2007 period, slightly above the national average of 0.4 per cent per year. The province ranked 6th in Canada (Chart 66).

The industry that experienced the highest multifactor productivity growth rate in British Columbia was manufacturing (4.0 per cent per year), followed by wholesale trade (3.3 per cent) and information and cultural industries (2.3 per cent) (Table 85). The industries that had the lowest multifactor productivity growth rates were arts, entertainment and recreation (-5.7 per cent per year), administrative and support, waste management and remediation services (-2.6 per cent), and mining, and oil and gas extraction (-2.1 per cent).

In terms of multifactor productivity growth, the province ranked 6th in Canada according to the market sector ranking (it did marginally worse in the equally-weighted market sector rank, 7th place). Of the 15 two-digit NAICS industries, seven were ranked at 7th place or lower. Administrative and support, waste management and remediation services, and accommodation and food services had the worst multifactor productivity growth rates among all provinces. Conversely, manufacturing in British Columbia had the highest multifactor productivity growth in Canada when compared to equivalent industries in the other provinces.

Chart 66: Multifactor Productivity Growth in Canada and the Provinces, Market Sector, 1997-2007
(Average Annual Growth Rates)



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

The province's multifactor productivity level in 2007 was 102.5 per cent of the Canadian level, up from 101.5 per cent in 1997. In 2007, 10 of the 15 two-digit NAICS industries in British Columbia had multifactor productivity levels above those of Canada. The industries with highest multifactor productivity levels were mining, and oil and gas extraction (140.2 per cent of the Canadian level), agriculture, forestry, fishing and hunting (137.6 per cent), and manufacturing (125.5 per cent). In contrast, the industries with lowest multifactor productivity levels were arts, entertainment and recreation (68.0 per cent of the Canadian level), accommodation and food services (76.2 per cent), and construction (83.3 per cent).

Table 85: Multifactor Productivity Levels and Growth Rates in British Columbia, 1997-2007

Market Sector	Compound Annual Growth Rate, 1997-2007	Provincial Ranking	Province's Multifactor Productivity Level Relative to Canada's, 1997	Province's Multifactor Productivity Level Relative to Canada's, 2007	Provincial Ranking, 2007
	(per cent)		(Canada=100)	(Canada=100)	
Market Sector	0.5	6	102.1	102.5	4
Agriculture, Forestry, Fishing and Hunting	1.9	8	147.0	137.6	3
Mining, and Oil and Gas Extraction	-2.1	5	106.6	140.2	6
Utilities	0.3	5	100.4	106.2	4
Construction	-0.2	9	99.9	83.3	7
Manufacturing	4.0	1	101.7	125.5	1
Wholesale Trade	3.3	2	100.3	111.1	1
Retail Trade	2.0	6	104.3	103.4	4
Transportation and Warehousing	0.4	2	106.3	116.4	1
Information and Cultural Industries	2.3	3	100.1	108.2	2
FIRE*	-0.8	7	98.6	90.7	7
Professional, Scientific and Technical Services	-0.8	6	95.6	94.4	4
ASWMR**	-2.6	10	95.0	76.2	9
Arts, Entertainment and Recreation	-5.7	8	99.6	68.0	8
Accommodation and Food Services	-0.5	10	113.6	102.1	2
Other Services (Except Public Administration)	0.6	7	107.6	102.1	4
Absolute Equally-Weighted Average Rank		5.9			4.2
Equally-Weighted Market Sector Rank		7			3

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

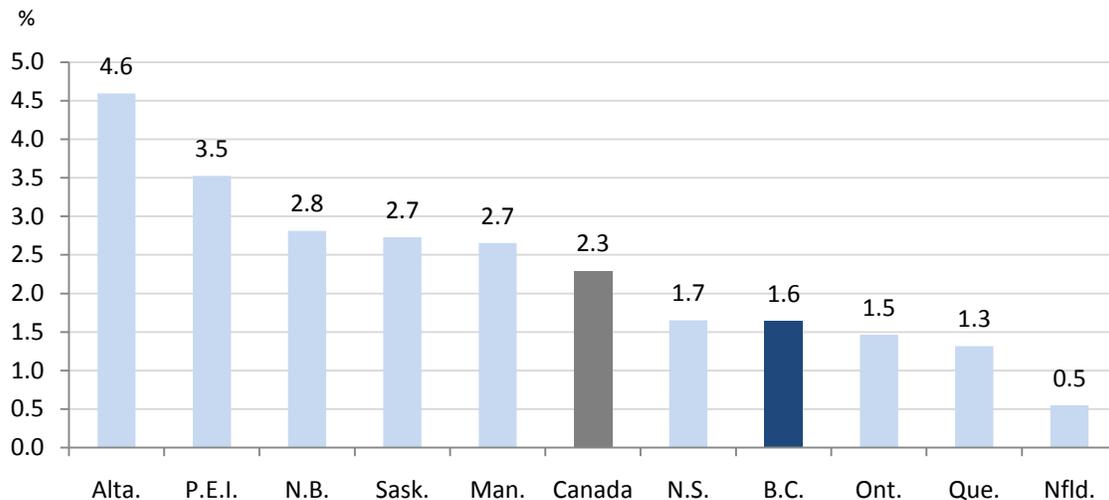
*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

In terms of multifactor productivity levels, British Columbia's market sector ranked 4th in Canada in 2007 (the province was also 4th place according to the equally-weighted market sector rank). Overall, the province had high levels of multifactor productivity, with five of the 15 two-digit NAICS industries ranking 3rd or above. In 2007, British Columbia had the highest multifactor productivity levels among all industries in manufacturing, as well as in transportation and warehousing and wholesale trade.

v. Capital Intensity

Capital intensity, defined as capital services per hour worked (unadjusted for labour quality), grew at an average rate of 1.6 per cent per year in British Columbia's market sector during the 1997-2007 period, which is below the national average of 2.3 per cent per year. British Columbia ranked 7th among the ten provinces in terms of capital intensity (Chart 67).

Chart 67: Capital Intensity Growth in Canada and the Provinces, Market Sector, 1997-2007
(Average Annual Growth Rates)



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

During this period, the industries that experienced the highest capital intensity growth rates were arts, entertainment and recreation (9.4 per cent per year), professional, scientific and technical services (7.9 per cent), and accommodation and food services (5.0 per cent) (Table 86). Conversely, the industries that had the lowest growth rates were manufacturing (-2.3 per cent per year), construction (-2.1 per cent), and agriculture, forestry, fishing and hunting (0.1 per cent).

In terms of capital intensity growth, the province ranked 7th or below in eight of the 15 two-digit NAICS industries. In particular, agriculture, forestry, fishing and hunting, and manufacturing had the worst capital intensity growth rates among all the provinces. On the other hand, arts, entertainment and recreation, along with accommodation and food services, had the strongest capital intensity growth rates in Canada.

Table 86: Capital Intensity Levels and Growth Rates in British Columbia, 1997-2007

Market Sector	Compound Annual Growth Rate, 1997-2007	Provincial Ranking	Province's Capital Intensity Level Relative to Canada's, 1997	Province's Capital Intensity Level Relative to Canada's, 2007	Capital Intensity Level, 2007	Provincial Ranking, 2007
	(per cent)		(Canada=100)	(Canada=100)	(1997 Dollars)	
Market Sector	1.6	7	82.8	77.7	12.2	6
Agriculture, Forestry, Fishing and Hunting	0.1	10	154.1	125.9	16.3	2
Mining, and Oil and Gas Extraction	3.9	5	78.5	80.5	81.8	3
Utilities	2.4	2	125.9	175.5	183.2	2
Construction	-2.1	9	84.4	66.2	3.1	7
Manufacturing	-2.3	10	72.6	54.2	9.5	7
Wholesale Trade	3.0	5	69.7	64.2	8.5	9
Retail Trade	4.2	6	87.2	85.6	4.1	6
Transportation and Warehousing	1.9	7	99.1	91.8	12.1	4
Information and Cultural Industries	2.6	8	84.8	86.2	30.7	9
FIRE*	3.1	7	97.7	104.6	44.8	8
Professional, Scientific and Technical Services	7.9	7	79.2	74.0	8.2	9
ASWMR**	3.4	5	123.6	125.8	8.1	3
Arts, Entertainment and Recreation	9.4	1	84.0	146.5	11.5	2
Accommodation and Food Services	5.0	1	97.0	136.8	4.4	2
Other Services (Except Public Administration)	2.6	7	101.4	97.7	3.0	4
Absolute Equally-Weighted Average Rank		6.0				5.1
Equally-Weighted Market Sector Rank		7				3

Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

British Columbia's capital intensity level in 2007 was 77.7 per cent of the Canadian level, down from 82.8 per cent in 1997. According to the market sector rank the province had the 6th highest capital intensity level in Canada in 2007, even though it ranked 3rd according to the equally-weighted market sector rank.

In 2007, six of the 15 two-digit NAICS industries had capital intensity levels above the Canadian levels. Industries with high relative levels included: utilities (175.5 per cent of the Canadian level), arts, entertainment and recreation (146.5 per cent), and accommodation and food services (136.8 per cent). The industries that had the lowest relative levels were manufacturing (54.2 per cent of the Canadian level), wholesale trade (64.2 per cent), and construction (66.2 per cent).

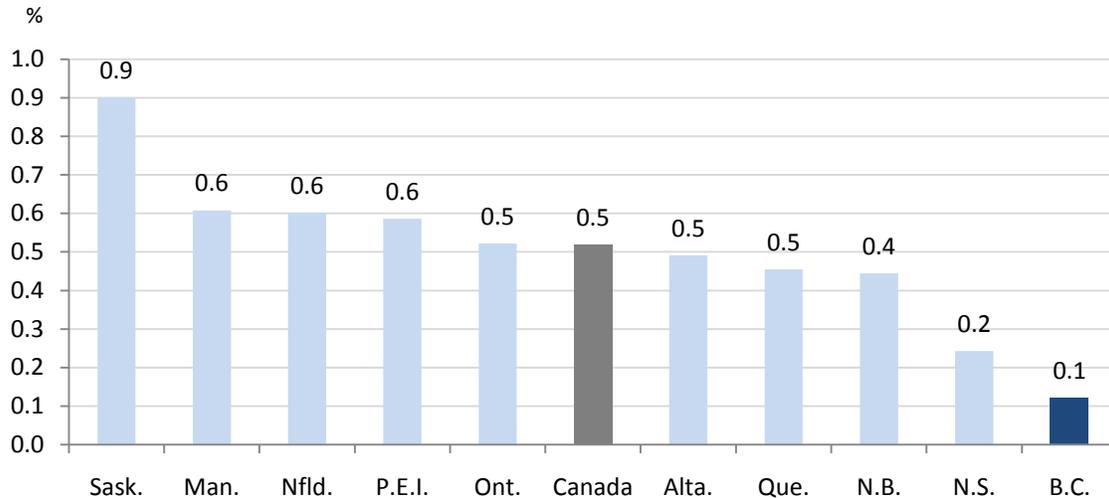
As mentioned before, British Columbia's capital intensity level in 2007 ranked 6th according to the market sector ranking, but ranked 3rd according to the equally-weighted market sector ranking. This disparity is caused by the fact that relative capital intensity levels in British Columbia were either significantly above the Canadian level (six of the 15 two-digit industries are ranked 3rd or above, although none of the industries are ranked 1st in Canada) or significantly below (six industries are ranked 7th or below).

vi. Labour Quality

British Columbia experienced very slow labour quality growth in the market sector during the 1997-2007 period. The province grew at an average rate of 0.1 per cent per year, while the national

average was 0.5 per cent per year. The province ranks 10th in Canada in terms of labour quality growth (Chart 68).

Chart 68: Labour Quality Growth in Canada and the Provinces, Market Sector, 1997-2007
(Average Annual Growth Rates)



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

Table 87: Labour Quality Levels and Growth Rates in British Columbia, 1997-2007⁴⁴

Market Sector	Compound Annual Growth Rate, 1997-2007	Provincial Ranking
	(per cent)	
Market Sector	0.1	10
Agriculture, Forestry, Fishing and Hunting	-0.4	10
Mining, and Oil and Gas Extraction	-0.3	8
Utilities	-0.3	9
Construction	0.1	4
Manufacturing	-0.2	10
Wholesale Trade	-0.1	7
Retail Trade	0.0	7
Transportation and Warehousing	-0.1	10
Information and Cultural Industries	0.9	2
FIRE*	0.5	5
Professional, Scientific and Technical Services	0.2	7
ASWMR**	-0.4	9
Arts, Entertainment and Recreation	-0.1	9
Accommodation and Food Services	0.0	7
Other Services (Except Public Administration)	0.3	5
Absolute Equally-Weighted Average Rank		7.3
Equally-Weighted Market Sector Rank		10

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

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

During the period in question, the industries that experienced the highest labour quality growth rates were information and cultural industries (0.9 per cent per year), FIRE (0.5 per cent), and other

⁴⁴ Labour quality levels are not shown here because they are assumed to be the same (and equal to 100.0) across all provinces and in Canada in the base year, 1997 (Sharpe and Thomson, 2010a). They differ after 1997, incorporating the different labour quality growth rates experienced by the provinces and Canada. For example, labour quality in British Columbia's market sector grew at an average annual rate of 0.1 per cent over the 1997-2007 period, while Canada's labour quality grew at an average annual rate of 0.5 per cent. As a consequence, British Columbia's labour quality level was 96.1 per cent of the Canadian level in 2007.

services (0.3 per cent) (Table 87). The industries that had the lowest labour quality growth rates were agriculture, forestry, fishing and hunting, administrative and support, waste management and remediation services (both of which grew at -0.4 per cent per year), mining, and oil and gas extraction, and utilities (both of which grew at -0.3 per cent per year).

In terms of labour quality growth, the province ranked 7th or below in 10 of the 15 two-digit NAICS industries. The worst comparative performances were in agriculture, forestry, fishing and hunting, manufacturing, and transportation and warehousing, all of which earned the province the last place in the provincial ranking.

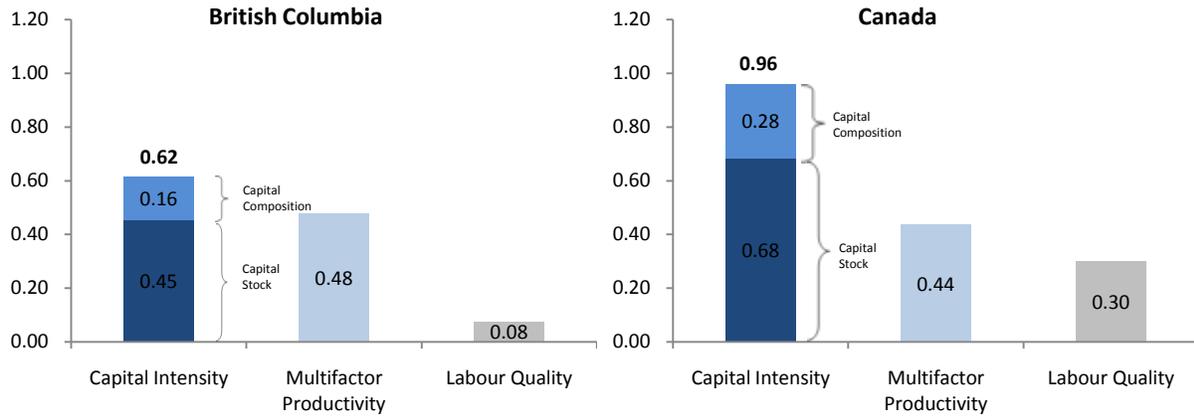
vii. Sources of Labour Productivity Growth in the Market Sector

British Columbia's labour productivity grew at an average rate of 1.2 per cent per year during the 1997-2007 period, significantly below the national average of 1.7 per cent per year. Charts 69 and 70 show both the percentage point and per cent contributions to labour productivity growth by the sources of growth for British Columbia and Canada over the 1997-2007 period.

British Columbia's labour productivity growth was driven mainly by capital intensity growth, which accounted for 0.62 percentage points of the overall labour productivity growth (or, alternatively, 52.2 per cent of total growth). The contribution of capital intensity to labour productivity growth can be broken down into two components: capital composition growth, which was responsible for 0.16 percentage points of labour productivity growth (13.6 per cent), and capital stock growth, which accounted for 0.45 percentage points (38.6 per cent). Multifactor productivity growth also played an important role in labour productivity growth in British Columbia, accounting for 0.48 percentage points of the latter (40.6 per cent). Finally, a small but steady increase in labour quality was responsible for 0.08 percentage points of the labour productivity growth experienced in the province (6.5 per cent).

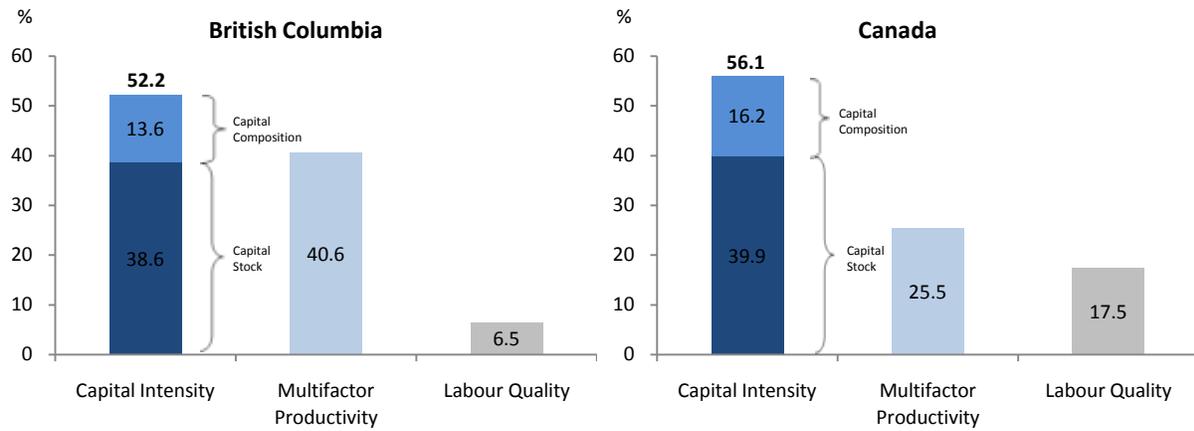
Comparing the two charts, it can be seen that capital intensity had approximately the same contribution in British Columbia and in Canada (albeit slightly higher in Canada). The main difference between the two was in the roles of multifactor productivity and labour quality. Whereas multifactor productivity explained only 25.5 per cent of the labour productivity growth in Canada, it explained 40.6 per cent of British Columbia's labour productivity growth. Conversely, labour quality explained 17.5 per cent of labour productivity growth in Canada, but only 6.5 per cent in British Columbia.

Chart 69: Percentage Point Contribution to Labour Productivity Growth by the Source of Labour Productivity Growth in the Market Sector in British Columbia and in Canada, 1997 to 2007



Source: CSLS Provincial Productivity Database, Appendix Table 17, http://www.csls.ca/data/mfp_new.asp.

Chart 70: Per Cent Contribution to Labour Productivity Growth by the Source of Labour Productivity Growth in the Market Sector in British Columbia and in Canada, 1997 to 2007



Source: CSLS Provincial Productivity Database, Appendix Table 17, http://www.csls.ca/data/mfp_new.asp.

Note: Numbers may not sum to 100 due to rounding.

Table 88 details the contributions in absolute and per cent terms of capital intensity, MFP, and labour quality growth to labour productivity growth in British Columbia over the 1997-2007 period at the two-digit NAICS industry level.

Table 88: Contributions to Labour Productivity Growth at the Industry Level by Source in British Columbia, 1997-2007

Market Sector	Labour Productivity	Capital Intensity			MFP	Labour Quality
		Total	Capital Composition	Capital Stock		
Percentage Point Contributions to Labour Productivity Growth						
Market Sector	1.2	0.6	0.2	0.5	0.5	0.1
Agriculture, Forestry, Fishing and Hunting	1.7	0.2	0.0	0.2	1.9	-0.3
Mining, and Oil and Gas Extraction	0.5	2.9	0.1	2.7	-2.1	-0.1
Utilities	2.1	1.9	1.1	0.7	0.3	-0.1
Construction	-0.7	-0.6	-0.1	-0.5	-0.2	0.1
Manufacturing	2.9	-0.9	0.3	-1.2	4.0	-0.1
Wholesale Trade	4.0	0.8	0.1	0.7	3.3	-0.1
Retail Trade	2.9	0.8	0.2	0.7		0.0
Transportation and Warehousing	1.0	0.6	0.3	0.3	0.4	0.0
Information and Cultural Industries	4.2	1.4	0.4	1.0	2.3	0.5
FIRE*	1.1	1.7	0.5	1.2	-0.8	0.2
Professional, Scientific and Technical Services	0.5	1.1	0.1	1.0	-0.8	0.2
ASWMR**	-2.5	0.4	0.0	0.4	-2.6	-0.3
Arts, Entertainment and Recreation	-3.9	2.0	0.2	1.7	-5.7	-0.1
Accommodation and Food Services	0.5	1.0	0.0	1.0	-0.5	0.0
Other Services (Except Public Administration)	1.3	0.4	0.1	0.3	0.6	0.3
Per Cent Contributions to Labour Productivity Growth						
Market Sector	100.0	52.6	13.6	38.6	40.6	6.5
Agriculture, Forestry, Fishing and Hunting	100.0	9.1	-1.4	10.5	109.3	-18.2
Mining, and Oil and Gas Extraction	100.0	529.8	22.6	505.8	-396.3	-22.0
Utilities	100.0	87.7	52.8	34.5	14.6	-2.5
Construction	100.0	86.7	13.3	73.2	27.7	-14.4
Manufacturing	100.0	-30.4	10.9	-41.0	136.5	-4.7
Wholesale Trade	100.0	19.9	3.5	16.2	81.3	-1.7
Retail Trade	100.0	29.2	6.0	22.9		-1.0
Transportation and Warehousing	100.0	61.7	28.1	33.0	41.8	-3.8
Information and Cultural Industries	100.0	33.0	9.1	23.6	55.0	10.9
FIRE*	100.0	161.3	50.3	109.3	-79.1	19.0
Professional, Scientific and Technical Services	100.0	239.6	18.1	219.6	-180.7	42.9
ASWMR**	100.0	-14.1	0.0	-14.1	103.2	10.8
Arts, Entertainment and Recreation	100.0	-49.9	-6.3	-42.7	145.7	1.5
Accommodation and Food Services	100.0	194.8	-2.9	197.8	-94.0	0.1
Other Services (Except Public Administration)	100.0	33.2	10.3	22.5	47.6	18.8

Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

Note: Per cent contributions may not sum to 100 due to rounding.

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

viii. Sources of Labour Productivity Level Gap by Industry

British Columbia's labour productivity level in 2007 was 90.1 per cent of the Canadian level, which implies a labour productivity gap of 9.9 percentage points. Table 89 makes it clear that the gap was caused predominantly by the market sector's below average capital intensity level, which was responsible for -10.1 percentage points of the gap. The multifactor productivity and labour quality levels accounted for 2.3 and -2.2 percentage points of the gap respectively.⁴⁵

⁴⁵ Again, it is important to bear in mind that labour quality levels were assumed to be equal to 100.0 in all provinces and in Canada for the base year of 1997. They differ after 1997, incorporating the different labour quality growth rates experienced by the provinces and Canada.

British Columbia had labour productivity gaps in eight of the 15 two-digit NAICS industries. In most cases, the below average capital intensity level was the main culprit. In fact, in industries where British Columbia had higher labour productivity levels than those of Canada, the higher levels were achieved mostly due to the above average multifactor productivity levels, which were able to offset the below average capital intensity levels. Notable exceptions were the agriculture, forestry, fishing and hunting industry and the utilities industry, which had positive contributions from both multifactor productivity and capital intensity levels.

Table 89: Sources of the Labour Productivity Gap Relative to Canada for British Columbia at the Two-Digit Industry Level, 2007

Market Sector	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 Quality	Labour Productivity	Capital Intensity	Multifactor Productivity	Labour Quality
Market Sector	90.1	-9.9	-10.1	2.3	-2.2	100.0	101.5	-23.4	21.9
Agriculture, Forestry, Fishing and Hunting	143.0	43.0	13.0	38.4	-8.4	100.0	30.2	89.4	-19.6
Mining, and Oil and Gas Extraction	115.5	15.5	-20.3	36.4	-0.5	100.0	-130.6	233.9	-3.3
Utilities	161.9	61.9	55.3	7.8	-1.3	100.0	89.5	12.6	-2.0
Construction	74.7	-25.3	-9.4	-15.9	0.0	100.0	37.4	62.8	-0.2
Manufacturing	96.7	-3.3	-21.8	22.4	-3.8	100.0	671.6	-687.5	115.9
Wholesale Trade	94.1	-5.9	-13.5	10.2	-2.6	100.0	228.2	-172.8	44.6
Retail Trade	98.1	-1.9	-4.1	3.3	-1.1	100.0	212.6	-171.3	58.7
Transportation and Warehousing	109.3	9.3	-3.2	15.9	-3.4	100.0	-33.8	170.3	-36.4
Information and Cultural Industries	101.4	1.4	-8.0	8.0	1.5	100.0	-556.7	551.9	104.9
FIRE*	93.1	-6.9	2.3	-9.5	0.2	100.0	-33.8	136.3	-2.5
Professional, Scientific and Technical Services	86.6	-13.4	-4.6	-5.4	-3.5	100.0	34.3	40.0	25.8
ASWMR**	77.1	-22.9	3.8	-23.9	-2.9	100.0	-16.7	104.2	12.6
Arts, Entertainment and Recreation	74.4	-25.6	8.2	-33.3	-0.5	100.0	-32.0	130.0	1.9
Accommodation and Food Services	107.4	7.4	6.9	2.1	-1.7	100.0	94.2	28.7	-22.9
Other Services (Except Public Administration)	100.8	0.8	-0.5	2.1	-0.8	100.0	-66.2	262.3	-96.1

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

*Finance, insurance, real estate, rental and leasing **Administrative and support, waste management and remediation services

ix. Conclusion

During the 1997-2007 period, British Columbia experienced a slow but steady decline in capital productivity (-0.5 per cent per year) and unimpressive labour and multifactor productivity growth rates (1.2 and 0.5 per cent, respectively). Although the province had multifactor and capital productivity growth rates slightly above the national average, labour productivity grew significantly less than the national average (1.2 per cent vs. 1.7 per cent). This was due to weak capital intensity growth relative to the national average (1.6 per cent vs. 2.3 per cent), as well as weak labour quality growth (0.1 per cent vs. 0.5 per cent). Despite low labour productivity growth overall, the manufacturing and utilities industries in British Columbia had the highest growth rates compared to equivalent industries in the other provinces over the 1997-2007 period (2.9 and 2.1 per cent per year, respectively).

British Columbia's capital and multifactor productivity levels in 2007 were above national levels. The labour productivity level, however, was below Canada's, with the labour productivity gap between British Columbia's market sector and Canada's reaching 9.9 percentage points. This was due mainly to the below average capital intensity level in British Columbia, which explains 101.5 per cent of the gap.

Table 90 provides a summary of both levels (in 1997 and 2007) and growth rates (for the 1997-2007 period) for the productivity measures discussed in this report, along with rankings that show how British Columbia fared in comparison to the other provinces. A key observation is that British Columbia's growth rate performance was significantly worse than its level performance. On the one hand, growth rates were either close to the average (as was the case of capital productivity, multifactor productivity and capital intensity) or near the bottom of the distribution (labour productivity and labour quality). On the other hand, British Columbia's levels relative to the Canadian levels were either above the average (capital productivity, multifactor productivity) or close to it (labour productivity and capital intensity). It should be noted, however, that the weak growth rates, often below the national average, implied an overall deterioration of British Columbia's relative levels in 2007 compared to its 1997 values.

Table 90: Summary of British Columbia's Productivity Performance in the Market Sector

	Market Sector Growth, 1997 to 2007			Per Cent of the Canadian Level		Level Rankings, 2007	
	Compound Annual Growth Rate	Market Sector Rank	Equally-Weighted Market Sector Rank	1997	2007	Market Sector Rank	Equally-Weighted Market Sector Rank
Labour Productivity	1.2	9	9	95.0	90.1	6	5
Capital Productivity	-0.5	5	7	114.6	115.9	4	2
Multifactor Productivity	0.5	6	7	102.1	102.5	4	3
Capital Intensity	1.6	7	7	82.8	77.7	6	3
Labour Quality	0.1	10	10	n.a.	n.a.	n.a.	n.a.

Source: CSL Provincial Productivity Database, Appendix Tables, http://www.csls.ca/data/mfp_new.asp.

XII. Conclusion

This research report, based on the CCLS Provincial Productivity Database, provided a detailed portrait of the productivity performance of the ten Canadian provinces over the 1997-2007 period at the market sector level and at the two-digit NAICS industry level. It uses the standard growth accounting methodology to decompose labour productivity growth into changes in labour composition, capital intensity, and multifactor productivity.

Of the three sources of labour productivity growth, labour composition was found to be the least important source at the national level (18 per cent) and in all provinces, with contributions ranging from 0.08 per cent per year to 0.37 per cent. On the other hand, capital intensity was found to be by far the most important source at the national level (57 per cent), as well as in most provinces. The contribution of multifactor productivity was between that of labour composition and capital intensity, although there was a wide range across provinces from 4.15 percentage points in Newfoundland and Labrador to -1.58 points in Alberta.

A key finding of the report is that the large variation in labour productivity growth rates and levels across provinces reflects important differences not only in the industry mix, but also in the actual production processes employed within a given industry/sector. An interesting example can be seen in the provinces that had the highest and lowest labour productivity growth rates in Canada during the 1997-2007 period: Newfoundland and Labrador (4.8 per cent per year), and Alberta (1.0 per cent). Both results were driven by the mining and oil and gas extraction sector. However, in Newfoundland and Labrador labour productivity in the sector grew at an astounding average annual rate of 15.3 per cent, while in Alberta it declined by 4.3 per cent per year. These divergent trends reflect the very different nature of this industry in the two provinces. In Newfoundland and Labrador, the mining and oil and gas extraction sector represented less than 9 per cent of the province's GDP in 1997, but it grew rapidly over the period as production from the offshore oil wells took off.

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Appendix – A Growth Accounting Framework

The growth accounting framework used in this report assumes a Cobb-Douglas production function such that

(1)

where Y is real output, K stands for capital services, L for labour input (quality adjusted hours), A for multifactor productivity and α is the share of output that takes the form of capital compensation. The labour input L can be decomposed into hours (H) and labour quality (QL):

(2)

Capital services can be decomposed into capital stock (SK) and capital composition (QK):

(3)

Capital intensity (KI) is defined as:

(4)

Using (1), (2), and (4), the components of labour productivity *growth* can be decomposed as follows:

(5)

where LP stands for labour productivity and Δ is the percentage change. This equation was used in section eight.

The province's MFP levels relative to the Canadian levels (*Relative MFP_{p,i}*) were calculated using the equation below:

(6)

where $k_{p,c}$ is the average share of capital input between Canada and the province, and the subscripts c , p and i stand for Canada, province and industry, respectively.

Finally, the contributions to the relative labour productivity levels between the province and Canada (*Relative LP_{p,i}*) can be found using the following formula:

— — —

This equation was used in section nine. For a detailed discussion about the growth accounting framework used here, refer to Sharpe and Thomson (2010a).