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## FINANCES OF THE NATION

### THE CANADIAN PRODUCTIVITY LANDSCAPE— AN OVERVIEW

Andrew Sharpe and Tim Sargent\*

*For almost 60 years, the Canadian Tax Foundation published an annual monograph, Finances of the Nation, and its predecessor, The National Finances. In a change of format, the 2014 Canadian Tax Journal introduced a new “Finances of the Nation” feature, which presents annual surveys of provincial and territorial budgets and topical articles on taxation and public expenditures in Canada.*

*It is widely recognized that Canada’s productivity performance in recent years has been at best mediocre. But productivity is a complex issue, and the public understanding of the subject, even among professionals, is poor. The objective of this article is to provide a comprehensive but accessible account of the productivity landscape in Canada, including productivity developments and proximate explanations of trends. The article provides an overview of the basic concepts, metrics, trends, and types of analysis found in productivity discussion in this country.*

*The underlying data for the Finances of the Nation monographs and for the articles in this journal will be published online in the near future.*

**KEYWORDS:** PRODUCTIVITY ■ CANADA

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\* Of the Centre for the Study of Living Standards, Ottawa (e-mail: andrew.sharpe@csls.ca; tim.sargent@csls.ca). We would like to thank Trevor Tombe and Michael Smart for the invitation to write this article. We also thank Chris Haun for excellent research assistance.

## INTRODUCTION

It is widely recognized that Canada's productivity performance in recent years has been at best mediocre. But productivity, particularly productivity measurement, is a complex issue, and the public understanding of the subject, even among professionals, is poor. The objective of this article to provide an overview of the basic concepts, metrics, trends, and types of analysis found in productivity discussion in this country.

The main body of the article is divided into nine sections. Understanding the notion and nature of productivity is essential to fruitful debate on the topic. The first section defines productivity and identifies the key productivity metrics, namely, labour productivity and total factor productivity (TFP). The second section discusses why productivity growth is crucial for improvement in both material living standards and well-being.

The measurement of productivity can be challenging. The third section highlights the measurement choices and issues facing productivity analysts, including a focus on productivity levels or growth rates; use of nominal versus real productivity-level estimates; output and productivity in the non-business sector, where output is not measured independently from input; and the challenge of developing price series needed to produce estimates of real output and productivity for new products.

Serious productivity analysis requires reliable data. Canada is very fortunate that Statistics Canada produces high-quality, easily accessible productivity statistics at the national and provincial/territorial levels for a large number of industries, in a timely manner, and for extensive periods. The fourth section of the article briefly reviews the productivity statistics provided by Statistics Canada.

Canada's productivity performance has been characterized by many analysts as abysmal. Indeed, since 2000, business sector output per hour has advanced at less than 1 percent per year. The fifth section of the article examines aggregate productivity trends and levels in Canada and the United States from 1947 to 2022. Productivity growth since 2000 is decomposed to allow us to assess the contributions of within-industry and reallocation effects.

The sixth section looks at Canada's aggregate productivity performance compared to that of other member countries of the Organisation for Economic Co-operation and Development (OECD) over the 2000-2022 period. The seventh section examines labour productivity growth for 15 industries in Canada from 1961 to 2019. The eighth section analyzes labour productivity growth by province for the 2000-2022 period.

The workhorse framework for analyzing the sources of output and labour productivity growth is growth accounting, which decomposes labour productivity growth into contributions from TFP growth, capital intensity growth, and labour quality improvements. The ninth section provides Statistics Canada's most recent growth accounting estimates to identify the drivers of labour productivity growth in Canada.

A brief concluding section summarizes key points emerging from our analysis.

The objective of this article is to provide a comprehensive but accessible account of the productivity landscape in Canada, including productivity developments and proximate explanations of trends. What the article does not attempt to do is to

provide an analysis of the reasons that have been advanced to explain Canada's poor productivity performance, from both a historical and an international perspective, since 2000. These reasons include lagging public and private investment, inadequate research and development spending, an excessively regulated environment, a slower pace of technological progress, and a low level of competitive intensity. A discussion of these factors is beyond the scope of this article. Readers are referred to the symposium on productivity growth in Canada in the fall 2023 issue of the *International Productivity Monitor*<sup>1</sup> for detailed analysis of the factors explaining slower productivity growth in this country.

The article also does not discuss policies to improve productivity growth, many of which flow from the identification of the causes of our poor productivity performance. Also not included are projections for future productivity growth in Canada, a topic of importance but also much uncertainty. The subject of productivity is vast, with many elements, and one article cannot cover all topics.

## PRODUCTIVITY CONCEPTS AND DEFINITIONS

An understanding of the concept of productivity is essential to any constructive discussion of the subject. This section defines productivity and identifies the key productivity metrics, namely, labour productivity and TFP, also referred to as multi-factor productivity (MFP).

Productivity is defined as the relationship or ratio between a measure of output and a measure of input. This relationship can be expressed in terms of a productivity level at a point in time or in terms of a productivity growth rate over time. Output can be measured in physical terms, such as tonnes of steel, or in value terms, expressed as the price multiplied by the quantity of, say, steel. Physical quantities of output are generally represented by real or constant output measures that adjust for changes in prices.

A number of inputs are used in the production process (for example, labour, capital, raw materials, services, and energy). Productivity ratios, called partial productivity measures, can be calculated for all of these inputs. The most widely used partial productivity metric is labour productivity, defined as the ratio of output to labour input. The ratio can be calculated in terms of the nominal value of output or in terms of physical or constant price (real) output per unit of labour input. The latter can be measured as persons employed or hours worked.

Productivity growth rates are based on real output measures. Growth rates can, of course, be calculated from value measures of productivity, but these growth rates in value productivity ratios are not considered to be true productivity growth rate measures because they can reflect changes in the output prices and not changes in the physical quantity of output produced per unit of input.

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1 Centre for the Study of Living Standards and Productivity Institute, "Canada's Productivity Performance," *International Productivity Monitor*, Fall 2023, no. 45 (Ottawa and Manchester, UK: CSLS and Productivity Institute, 2023) (forthcoming).

On the other hand, productivity-level comparisons are often best made in terms of productivity values, since economic decisions are based on values and prices. Changes in relative prices, such as oil price shocks, may have no effect on physical output and productivity, but may alter the value of output and of productivity, and may influence the allocation of economic resources. For example, high oil prices spurred the development of the oil sands in Alberta. High prices ensured that the value of output, measured in current prices, and the value of output per unit of input were high and profitable, even though the amount of labour required to extract a barrel of oil increased, reducing the level of labour productivity. Profitability trumps productivity in economic decision making.

In addition to partial productivity measures, TFP (or MFP) measures can be calculated. The most widely used measure of TFP combines labour and capital growth rates into a total input growth rate, with TFP growth being defined as the difference between output growth and total input growth. The growth rates of the factor inputs are weighted by their income shares (which are assumed to approximate their relative contribution to output) to obtain the total input growth. Note that since capital and labour are measured in different units, it is not possible to aggregate them to obtain an absolute level of TFP. Intuitively, TFP can be considered as a measure of productivity that accounts for changes in both labour and capital—that is, the increase in real output that cannot be explained or accounted for by increased inputs of labour and capital.

## WHY PRODUCTIVITY IS IMPORTANT

Economists consider productivity to be the Holy Grail. Societies strive to increase the living standards of the population, defined as income per capita, and the only sustainable long-term way to do so is through increased output per hour worked. In the short to medium term, real income can be increased by longer work hours or by higher employment rates. But, unlike productivity, these sources of economic growth are upward-bounded. Improved terms of trade, defined as the prices of exports compared to the prices of imports, can also boost real income, but such improvements are generally reversed over time.

Real incomes are already high in Canada and other developed countries. Some argue that economic growth, which is determined by productivity growth (and labour force growth), is no longer needed or at least should not be a priority—we are rich enough. Instead, attention should be directed to addressing other issues, such as climate change, inclusion and diversity, Indigenous reconciliation, poverty, and inequality. There is no doubt that these issues are important and merit close attention. But the additional resources that accrue to the economy through productivity gains make it much easier to deal with these issues.

There is clearly more room to manoeuvre in a world where real incomes and tax revenues are growing than in a world where they are fixed because of zero productivity growth. Productivity growth can provide the resource cushion needed to address the costly financial challenge presented by the increasing share of the population in elderly age groups, for whom health costs are high and employment income and the

associated tax revenues are minimal, and to fund the implementation of the expensive policies required to move to net zero emissions by 2050. The income dividend from productivity growth can mean that real after-tax incomes will not need to fall to pay for solutions to these challenges, despite their cost.

Many Canadians exhibit unease when they encounter the term “productivity” (sometimes referred to as “the P word”). Governments often inadvertently validate the public’s concerns by avoiding the use of the term in policy documents. This unease reflects a misunderstanding of the nature of productivity growth, and avoidance of the term undermines the recognition and acceptance of the importance of productivity in the eyes of the general public. The two most widely expressed concerns about increased productivity are that it requires more intense work and that it leads to job loss.

It is true that one source of productivity gains can be more intense work, achieved by either longer hours on the job (greater output per worker) or workplace speed-up (greater output per hour worked). But this source of productivity growth is very small and not sustainable. Few, if any, economic analysts propose more intensive work as the solution, or even a solution, to Canada’s productivity woes. Labour productivity growth is determined by much more than the effort exerted by the worker in the workplace. It reflects the amount of capital (the tools and equipment) that the worker has to work with, the education and skills of the worker, the state of technology, and the organizational structure of the workplace, among other factors. These drivers of productivity are not related to worker effort. The call for faster productivity growth is for workers to work smarter, not harder.

Productivity gains at the level of the firm or industry may indeed lead to job loss, especially if demand for the product produced is weak owing to low price and income elasticities. But these job losses do not mean that aggregate employment will necessarily fall. In a growing dynamic economy, workers who lose their job in a sector experiencing strong productivity gains because of rapid technological advances can often find employment in other sectors. In addition, productivity growth boosts real income, creating jobs through increased consumer spending.

Of course, some workers who are displaced by productivity gains may encounter transitional problems in finding new employment. They merit support through retraining and relocation programs, which can be financed by the increased income and tax revenues from the greater output arising from productivity growth. In any case, because of competitive market forces, it is virtually impossible for governments to prevent firms from introducing new technologies and equipment that raise productivity and, in certain cases, cost jobs. During periods of low unemployment and labour shortages, which the Canadian economy is now enjoying, there should be little concern that productivity growth will reduce employment at the economy-wide level.

## **PRODUCTIVITY MEASUREMENT ISSUES**

The measurement of productivity can be challenging. It requires reliable estimates of inputs such as the capital stock or capital services and of real output. The latter

can be particularly difficult to measure. This section highlights the two most important measurement issues or problems that bedevil those who produce and analyze productivity statistics—namely, the measurement of real output and productivity in the non-business sector, and the development of price series that capture the impact of new and higher-quality goods and services on real output and income, and hence on productivity growth

In the business sector, goods and services are sold on the market, resulting in data on the prices of the goods and services produced. These prices can then be used to deflate the value of the goods and services to obtain an inflation-adjusted or constant price estimate of output. These real output estimates, combined with input data, can then be used to calculate productivity indexes and productivity growth rates.

In the non-business sector, which roughly corresponds to the public or government sector, output is not marketed but provided without charge, resulting in the absence of price series for the services produced. This means that it is not possible to calculate in the standard manner inflation-adjusted or real estimates of output and productivity growth rates for the non-business sector. Rather, the value of output produced by the sector is approximated by the value of inputs, and changes in real output are represented by changes in real inputs.

Labour input is by far the largest input in the non-business sector; accordingly, the value of output is roughly equivalent to the compensation of workers in this sector, and changes in the real output of the sector are determined by changes in total hours worked, which are equivalent to changes in employment when average hours are constant. Changes in real output are therefore not independent of changes in labour input. Indeed, they are the same, resulting in zero measured labour productivity growth in the non-business sector.

Studies have shown that there are in fact productivity gains in the non-business sector, even though they are not captured by the official productivity statistics.<sup>2</sup> Productivity estimates for the total economy include both the business and the non-business sectors. The underestimation of productivity growth in the non-business sector because of the measurement conventions results in a downward bias in productivity growth for the total economy relative to the business sector. Consequently, the business sector is more widely used than the total economy for the analysis of aggregate productivity trends, because it is considered to provide a more accurate representation of true or actual productivity growth.

A key feature of the modern economy is the frequent introduction of new and improved goods and services. The incorporation of these products into the statistical system to produce consistent time series on real output and income represents a

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2 See Ravi Somani, “Public-Sector Productivity (Part 1): Why Is It Important and How Can We Measure It?” World Bank Group, February 2021 (<https://documents1.worldbank.org/curated/en/913321612847439794/pdf/Public-Sector-Productivity-Part-One-Why-Is-It-Important-and-How-Can-We-Measure-It.pdf>); and Office of National Statistics, “Public Service Productivity: Total, UK, 2020,” April 2023 ([www.ons.gov.uk/economy/economicoutputandproductivity/publicservicesproductivity/articles/publicservicesproductivityestimates-totalpublicservices/2020](http://www.ons.gov.uk/economy/economicoutputandproductivity/publicservicesproductivity/articles/publicservicesproductivityestimates-totalpublicservices/2020)).

major challenge. The heart of this challenge lies in the development of price series that capture quality changes. This is particularly difficult for new products such as the smart phone, which provides services that never existed previously and therefore cannot be linked to an existing price index.

Statistical agencies recognize and understand the need to adjust price series for changes in quality (both improvement and in some cases deterioration), and they use various statistical techniques to do so. But it is unclear whether the current steps taken by statistical offices to adjust price series for the quality changes arising from new and improved products are adequate. Price series may not be capturing the impact of new and higher-quality goods and services on real output and income, and hence on productivity growth.

Indeed, some argue that current quality adjustment measures are inadequate and result in the overestimation of price increases and hence the underestimation of real output and productivity growth.<sup>3</sup> According to this view, because of the inability of statistical agencies to fully capture or quantify in price series the many benefits of the digital age for the utility of consumers, official estimates of real incomes and productivity growth are much lower than the true estimates would be.

Others make the case that there have always been new products that boost consumer utility, such as the introduction of home television sets in the 1950s.<sup>4</sup> This means that the challenge of incorporating new and improved goods and services into price indexes is not new. More importantly, it is unclear that this challenge is greater now than in the past, despite the hype around the digital economy. This may suggest that while there may be an underestimation of real output and productivity growth, the magnitude of this underestimation may not be greater now than in the past. In other words, true income and productivity growth may always have been underestimated, and the gap between official estimates and true estimates may be no wider today than it was 50 years ago.

## PRODUCTIVITY DATA SOURCES FOR CANADA

Statistics Canada provides Canadians with first-class statistics on productivity. Indeed, Canada's productivity database, in terms of its quantity and breadth (length of the time series and the disaggregation by detailed industry and by province and territory) as well as its overall quality, is one of the best, if not the best, in the world. Productivity statistics are easily accessible at no cost from the Statistics Canada website. They are also timely, with annual labour productivity estimates being produced within 10 weeks of the end of the reference year. This section of the article highlights several particularly useful tables among the many productivity estimates produced by Statistics Canada. These tables present detailed annual labour productivity estimates

3 See, for example, National Academies of Sciences, Engineering, and Medicine, *Modernizing the Consumer Price Index for the 21st Century* (Washington, DC: The National Academies Press, 2022) (<https://doi.org/10.17226/26485>).

4 See, for example, Robert J. Gordon, *The Rise and Fall of American Growth* (Princeton, NJ: Princeton University Press, 2017).

by industry and by province and territory, long-term quarterly aggregate labour and MFP estimates, and estimates of the sources of productivity growth.

The most useful, and certainly the most comprehensive, table that Statistics Canada provides on productivity is table 36-10-0480-01.<sup>5</sup> This table provides annual estimates of output per hour worked in 2012 dollars for the years 1997-2022 for Canada, the 10 provinces, and the three territories, and for all industries at the two-digit, three-digit, and four-digit NAICS<sup>6</sup> level (a total of 322 industries). In other words, there are more than 100,000 data points with productivity estimates in the table (26 years × 14 jurisdictions × up to 322 industries).

A key feature of the series is that there are no empty cells (other than those where the industry does not operate in the jurisdiction) because of confidentiality restrictions, even in small jurisdictions where there is only one firm in an industry. For example, there is only one oil refinery in New Brunswick, yet productivity estimates are available for the oil refinery industry in that province. In addition to estimates for output per hour worked in 2012 dollars, the table also provides time series estimates from 1997 for 12 other variables for all 14 jurisdictions and industries. The variables are output or gross domestic product (GDP) in 2012 dollars, nominal GDP (to 2019), total hours worked, persons employed, total labour compensation, labour compensation per hour worked, and unit labour costs. Again, no cells are missing. This brings the total number of data points provided in the table to more than 1.5 million.

Table 36-10-0206-01<sup>7</sup> provides indexes of quarterly labour productivity estimates from 1981 to the second quarter of 2023 for Canada (as of November 2023), for the business sector only. The table also provides quarterly estimates of output, employment, hours worked, average hours worked, labour compensation, unit labour costs, and labour compensation per hour. It should be noted that owing to the short-term cyclical nature of productivity movements, quarterly productivity estimates are much more volatile than annual estimates. This means that the latest quarterly productivity numbers may not be indicative of underlying productivity trends or developments. The primary focus of productivity research is on explaining long-run productivity trends.

Table 36-10-0208-01<sup>8</sup> provides annual indexes of labour productivity for Canada from 1961 to 2021 for the business sector and 15 NAICS industries. Based on

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5 Statistics Canada table 36-10-0480-01 (formerly CANSIM table 383-0033), "Labour Productivity and Related Measures by Business Sector Industry and by Non-Commercial Activity Consistent with the Industry Accounts," May 19, 2023.

6 North American Industry Classification System.

7 Statistics Canada table 36-10-0206-01 (formerly CANSIM table 383-0008), "Indexes of Business Sector Labour Productivity, Unit Labour Cost and Related Measures, Seasonally Adjusted," September 6, 2023.

8 Statistics Canada table 36-10-0208-01 (formerly CANSIM table 383-0021), "Multifactor Productivity, Value-Added, Capital Input and Labour Input in the Aggregate Business Sector and Major Sub-Sectors, by Industry," April 18, 2023.



the standard growth accounting framework, this table also provides estimates of the sources of labour productivity growth—namely, contributions from capital intensity, labour quality or composition, and MFP—as well as estimates for capital and labour inputs, hours worked, employment, and GDP.

Archived table 36-10-0305-01<sup>9</sup> provides estimates of labour productivity from 1946 to 2000 for the total Canadian economy and the business sector. This table is particularly useful for long-term comparisons of US and Canadian labour productivity growth performance.

## **CANADA'S AGGREGATE PRODUCTIVITY PERFORMANCE**

### **PRODUCTIVITY GROWTH RATES**

From both a historical and an international perspective, Canada's productivity performance since 1973, and especially since 2000, has been poor. Figure 1 illustrates labour productivity performance in the business sector for cyclically neutral (peak-to-peak) periods from 1947 to 2022 for both Canada and the United States.

In the first quarter-century of the post-war period (1947-1973), the growth of business sector output per hour in Canada was very strong at an average rate of 3.9 percent per year, doubling in 18 years. Canada's productivity growth rate in this period exceeded the average annual rate in the United States, at 3.2 percent. This superior performance was not repeated in any period in the following half-century.

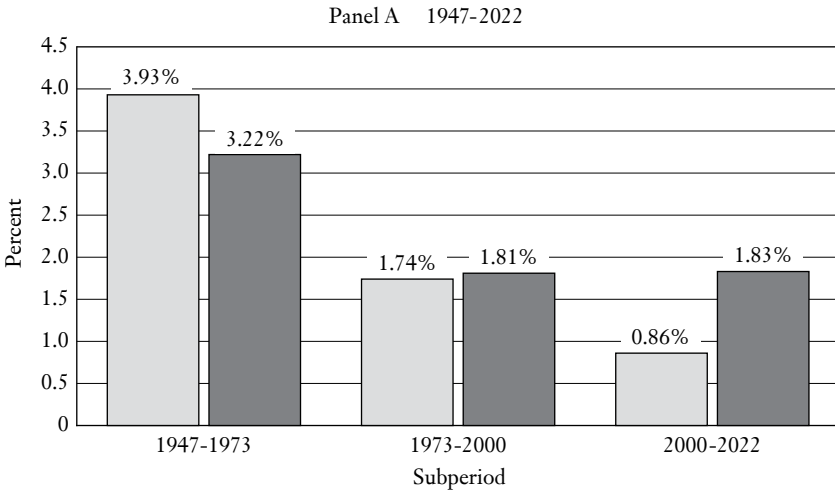
In the next quarter-century, labour productivity growth in Canada fell off by more than one-half (2.2 percentage points) to 1.7 percent from 1973 to 2000. At this rate, it would take 40 years for the level of labour productivity to double. The fall-off was smaller in the United States (1.4 points) to 1.8 percent from 1973 to 2000. This post-1973 slowdown in productivity growth in both countries was a major economic development. It generated a large literature, although a consensus of the reasons for the slowdown has not emerged.

After 2000, productivity growth continued to deteriorate in Canada, falling by 0.7 points to 0.9 percent per year from 2000 to 2022.<sup>10</sup> It would now take 100 years for labour productivity to double. In contrast, productivity growth in the United States was unchanged at 1.8 percent between 1973-2000 and 2000-2022. These divergent developments resulted in a large increase in the productivity growth gap between Canada and the United States. From a gap of 0.1 percentage points in 1973-2000, it jumped to 1.0 points in 2000-2022.

9 Statistics Canada table 36-10-0305-01 (formerly CANSIM table 383-0005), "Indexes of Labour Productivity and Related Variables, by Industry According to the Canadian System of National Accounts," March 6, 2007.

10 For a detailed analysis of the post-2000 productivity slowdown in Canada, see Andrew Sharpe and John Tsang, "The Stylized Facts About Slower Productivity Growth in Canada," in Centre for the Study of Living Standards and Productivity Institute, *International Productivity Monitor*, Fall 2018, no. 35 (Ottawa: CSLS, 2018), 52-72 ([www.csls.ca/ipm/35/IPM-35-Sharpe-Tsang.pdf](http://www.csls.ca/ipm/35/IPM-35-Sharpe-Tsang.pdf)).

**FIGURE 1 Business Sector Output per Hour Trends in Canada and the United States, 1947-2022**



(Figure 1 is concluded on the next page.)

Productivity developments since 2000 can be divided into three subperiods based on the 2000, 2008, and 2019 cyclical peaks and 2022, the most recent year. The most recent (2019-2022) subperiod is, of course, not a full business cycle, so cyclical or COVID-19 pandemic-related factors may be the predominant drivers of productivity changes.

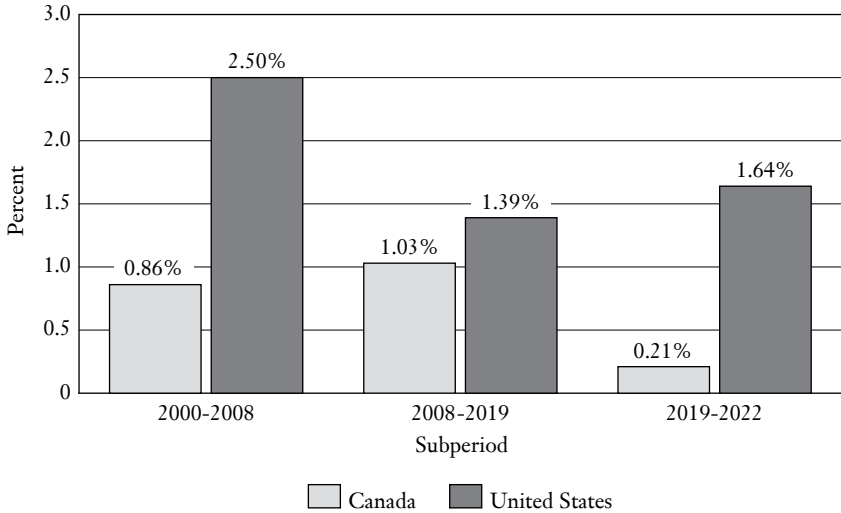
Output per hour in the business sector in Canada increased from 0.9 percent per year in 2000-2008 to 1.0 percent in 2008-2019. Productivity growth was much stronger in the United States in 2000-2008, at 2.5 percent per year. The first half of this period enjoyed rapid productivity gains from investments in information and communication technologies (ICT) made in the 1990s. Productivity growth in the United States fell off to 1.4 percent per year from 2008 to 2019. In both periods, productivity growth in Canada lagged behind that in the United States, especially in the first period, when the gap was 1.6 percentage points.

The equitable sharing of productivity gains is a key feature of an inclusive economy and society.<sup>11</sup> A key metric of this equitable sharing is the relationship between median wages and labour productivity growth. In the 1980s and 1990s, growth in median wages lagged far behind labour productivity growth owing to increasing

11 Keith Banting, Andrew Sharpe, and France St-Hilaire, eds., *The Review of Economic Performance and Social Progress: Towards a Social Understanding of Productivity*, vol. 2 (Ottawa and Montreal: Centre for the Study of Living Standards and Institute for Research in Public Policy, 2002) ([www.csls.ca/repsp/repsp2.asp](http://www.csls.ca/repsp/repsp2.asp)).

**FIGURE 1 Concluded**

Panel B 2000-2022



Note: The growth rates shown in this figure are compound average annual rates of growth.

Sources: Canada labour productivity data for 1947-1960 from Statistics Canada table 36-10-0305-01 (formerly CANSIM table 383-0005), “Indexes of Labour Productivity and Related Variables, by Industry According to the Canadian System of National Accounts,” March 6, 2007; for 1961-2021, from Statistics Canada table 36-10-0208-01 (formerly CANSIM table 383-0021), “Multifactor Productivity, Value-Added, Capital Input and Labour Input in the Aggregate Business Sector and Major Sub-Sectors, by Industry,” April 18, 2023; and for 2022, from Statistics Canada table 36-10-0402-01 (formerly CANSIM table 379-0030), “Gross Domestic Product (GDP) at Basic Prices, by Industry, Provinces and Territories (x 1,000,000),” May 1, 2023. US labour productivity data from United States, Bureau of Labor Statistics, Labor Productivity and Cost Measures—Major Sectors—August 3, 2023 (XLSX sheet).

wage inequality and a fall in the labour share of income.<sup>12</sup> Since 2000, and especially during the second half of the 2010s, the gap between median wage growth and labour productivity growth has narrowed considerably, largely because of the increased bargaining power of workers given the relatively low unemployment rate. However, slower productivity growth means that there is less potential for real wages to increase, even though there is more equitable sharing of productivity gains.

12 Andrew Sharpe and James Ashwell, “The Evolution of the Productivity-Median Wage Gap in Canada, 1976-2019,” in Centre for the Study of Living Standards and Productivity Institute, *International Productivity Monitor*, Fall 2021, no. 41 (Ottawa and Manchester, UK: CCLS and Productivity Institute, 2021), 98-117 ([www.csls.ca/ipm/41/IPM\\_41\\_Sharpe.pdf](http://www.csls.ca/ipm/41/IPM_41_Sharpe.pdf)).

Since 2019, labour productivity growth has virtually evaporated in Canada, advancing by a derisory average annual rate of 0.2 percent between 2019 and 2022. Productivity growth surged by 8.2 percent in 2020 through a composition effect as low productivity workers in service industries were laid off. As these workers returned to the workplace in 2021 and 2022, productivity fell by 5.7 percent and 1.8 percent, respectively. It is likely, but not certain, that these adjustments to the pandemic shock have played themselves out. Crucial questions, looking ahead, are whether the long-term trend in labour productivity growth in Canada, at around 1 percent in the last two decades, will reassert itself, and whether the shortfall in productivity growth experienced in 2019–2022 can be regained or is permanently lost. Indeed, it is unclear whether this low rate of productivity growth is a temporary phenomenon that will unwind as the pandemic effects disappear or whether it heralds a new era of trend labour productivity growth well below the mediocre 0.9 percent annual rate experienced from 2000 to 2019.

In contrast to Canada, labour productivity growth in the United States from 2019 to 2022 did not fall off but instead advanced at a 1.6 percent annual rate. This might suggest that the pandemic has not had a negative effect on trend productivity growth south of the border. Given that economic patterns in Canada generally follow those in the United States with a lag, the recent stability of productivity growth in the United States suggests that there has been no deterioration in trend productivity growth, which, if correct, bodes well for Canada.

## PRODUCTIVITY LEVELS

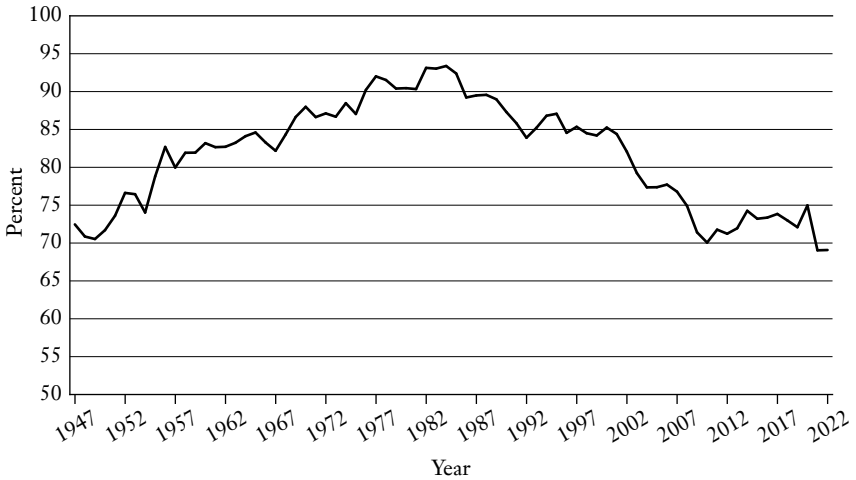
The comparison of Canada-US aggregate productivity levels in the business sector requires a benchmark estimate of Canada's productivity relative to that of the United States based on the purchasing power parity exchange rate at the industry level. The Centre for the Study of Living Standards (CSLS) uses an estimate of business sector output per hour for Canada that is 84.2 percent of the US level in 1999, taken from a 2008 Statistics Canada study.<sup>13</sup> This is the benchmark used in the calculations and analysis that follow.

Trends in the level of aggregate labour productivity in Canada compared to the United States depend on the relative growth rates of labour productivity in the two countries. In the post-war period up to the early 1980s, business sector output per hour in Canada exceeded that in the United States, resulting in reduction of the gap between the productivity levels of the two countries. Indeed, according to CSLS estimates, in the first several years of the 1980s, Canada's level of business sector output per hour was more than 90 percent of that in the United States, as shown in figure 2. Since then, Canada's relative productivity level has more or less continually fallen relative to the United States, reflecting the productivity growth differential, and by 2022 it was only 70 percent of the US level.

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13 John R. Baldwin, Wulong Gu, and Beiling Yan, *Relative Multifactor Productivity Levels in Canada and the United States: A Sectoral Analysis* (Ottawa: Statistics Canada, July 2008), at 32, table 8.

**FIGURE 2 Relative Labour Productivity Levels (GDP per Hour) in the Business Sector, Canada as a Percentage of the United States, 1947-2022**



GDP = gross domestic product.

Note: US-Canada purchasing power parity is based on the 1999 Statistics Canada benchmark of Canadian business sector output per hour at 84.2 percent of US business sector output per hour.

Sources: Canada labour productivity data for 1947-1960 from Statistics Canada table 36-10-0305-01 (formerly CANSIM table 383-0005), “Indexes of Labour Productivity and Related Variables, by Industry According to the Canadian System of National Accounts,” March 6, 2007; for 1961-2021, from Statistics Canada table 36-10-0208-01 (formerly CANSIM table 383-0021), “Multifactor Productivity, Value-Added, Capital Input and Labour Input in the Aggregate Business Sector and Major Sub-Sectors, by Industry,” April 18, 2023; and for 2022, from Statistics Canada table 36-10-0480-01 (formerly CANSIM table 383-0033), “Labour Productivity and Related Measures by Business Sector Industry and by Non-Commercial Activity Consistent with the Industry Accounts,” May 19, 2023. US labour productivity data from United States, Bureau of Labor Statistics, Labor Productivity and Cost Measures—Major Sectors—August 3, 2023 (XLSX sheet). The 1999 benchmark of Canada’s output per hour at 84.2 percent of US output per hour is from John R. Baldwin, Wulong Gu, and Beiling Yan, *Relative Multifactor Productivity Levels in Canada and the United States: A Sectoral Analysis* (Ottawa: Statistics Canada, July 2008), at 32, table 8.

## WITHIN-SECTOR AND REALLOCATION EFFECTS

Aggregate labour productivity is determined by both within-sector productivity effects and reallocation effects of labour input between industries with different levels and rates of growth in labour productivity. For example, an increase in the share of workers in industries with above-average levels of labour productivity will boost aggregate productivity, just as a decrease in the share of labour will reduce aggregate productivity. Equally, movement of the share of labour to industries with above-average productivity growth will raise productivity, while movement to industries with below-average productivity growth will lower productivity. The former effect is

called the level reallocation effect and the latter the growth-rate reallocation effect. The net or overall reallocation effect is the sum of these two effects.<sup>14</sup>

Table 1 provides estimates of the within-sector, level reallocation effect, growth-rate reallocation effect, and net reallocation effect for business sector labour productivity in Canada from 2000 to 2022 and for the 2000-2008, 2008-2019, and 2019-2022 subperiods. Key findings are highlighted below.

- Not surprisingly, in all periods, the within-sector effect (that is, own-sector productivity growth) was the dominant source of aggregate productivity growth, accounting for at a minimum around three-quarters of aggregate productivity growth.
- Over the 2000-2022 period, the net reallocation effect was a positive 0.07 percent per year, less than 10 percent of productivity growth (0.92 percent). The level reallocation effect was 0.20 percent per year, offset by a negative growth-rate reallocation effect of 0.13 percent.
- There was a very large positive level reallocation effect of 0.52 percent per year in 2000-2008, offset by a negative 0.25 percent growth-rate reallocation effect, resulting in a net reallocation effect of 0.27 percent. This represented 27 percent of productivity growth, the largest effect of any in the period. Movement of workers into high productivity but slow (or even negative) productivity growth resource industries explain these shift effects.

## CANADA'S PRODUCTIVITY PERFORMANCE RELATIVE TO THAT OF OECD COUNTRIES

Figure 3, which shows the growth rate for total economy output per hour from 2000 to 2022 for OECD countries, provides the following insights into Canada's productivity performance from an international perspective:

- Canada's total economy output per hour advanced by 0.85 percent per year between 2000 and 2022, resulting in the ranking of Canada as 28th out of 38 countries.
- The vast majority of the countries in the top half of the distribution were in Eastern Europe or former developing countries. Unlike the original OECD

14 The relationship between productivity growth over a given period and these effects is expressed by the following equation:

$$\Delta P = \sum b_i^0 \Delta P_i + \sum (P_i^0 - P^0) \Delta b_i + \sum (\Delta P_i - \overline{\Delta P}) \Delta b_i,$$

where  $P$  is the overall business sector labour productivity level;  $P_i$  is the labour productivity level in sector  $i$ ;  $b_i$  is the share of total economy-wide labour hours employed in sector  $i$ ; the subscript 0 indicates a variable in time 0 (the beginning of the period), as opposed to time 1 (the end of the period);  $\Delta$  indicates change over the period; and  $\overline{\Delta P}$  is the average change in business sector productivity across sectors over the period. The first term in the equation captures the within-sector productivity effect, while the second and third terms capture the level reallocation effect and the growth-rate reallocation effect, respectively.

**TABLE 1 Decomposition of Within-Sector and Reallocation Effects on Business Sector Labour Productivity Growth in Canada, 2000-2022**

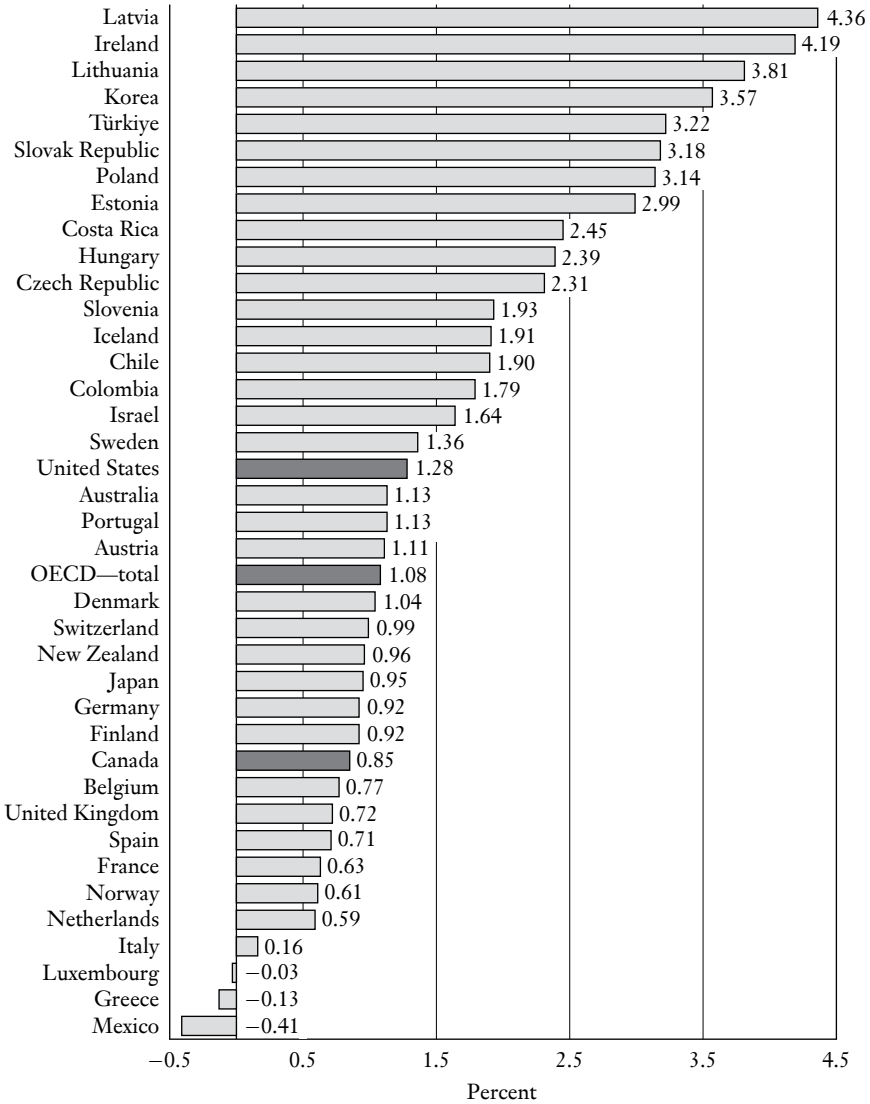
	2000-2008	2008-2019	2019-2022	2000-2022
	<i>percent</i>			
Within-sector effect . . . . .	0.73	1.15	0.18	0.86
Level reallocation effect . . . . .	0.52	-0.03	0.20	0.20
Growth-rate reallocation effect . . . . .	-0.25	-0.06	-0.10	-0.13
Net reallocation effect . . . . .	0.27	-0.09	0.11	0.07
Summed effects . . . . .	1.00	1.06	0.29	0.93
Observed business sector productivity, compound annual growth rate . . . . .	1.00	1.05	0.23	0.92
Discrepancy (summed effects minus observed rate of growth) . . . . .	0.00	0.01	0.05	0.01

Source: Calculations by the Centre for the Study of Living Standards, based on Statistics Canada table 36-10-0480-01 (formerly CANSIM table 383-0033), “Labour Productivity and Related Measures by Business Sector Industry and by Non-Commercial Activity Consistent with the Industry Accounts,” May 19, 2023.

members, these countries initially had low productivity levels, and their above-average productivity growth was in large part due to convergence or technological catchup.

- Canada’s annual productivity growth rate since 2000 at 0.85 percent was only 0.23 percentage points below the OECD average of 1.08 percent. While Canada indeed underperformed relative to the OECD average, it did not do so by a large amount.
- Perhaps surprisingly, given its position in the bottom quarter of OECD countries in terms of its productivity growth rate, Canada was in the middle of the pack among Group of Seven (G7) countries. The United States had the highest average productivity growth rate in the G7, at 1.28 percent per year. Japan and Germany also had higher growth rates than Canada, but—at 0.95 percent and 0.92 percent per year, respectively—the difference was small. Labour productivity growth in Canada exceeded that in the United Kingdom (0.72 percent), France (0.63 percent), and Italy (0.16 percent).
- Canada’s productivity growth rate in 2000-2022 also exceeded that of a number of non-G7 developed European countries, including Luxembourg (-0.03 percent), the Netherlands (0.59 percent), Norway (0.61 percent), Spain (0.71 percent), and Belgium (0.77 percent), and was within 0.14 percentage points of the rates for Finland (0.92 percent), New Zealand (0.96 percent), and Switzerland (0.99 percent). From this perspective, Canada’s aggregate productivity performance may not be as dire as is sometimes claimed.
- Canada’s aggregate productivity performance relative to that of the United States for the 2000-2022 period appears to be much less dismal for the total economy than for the business sector. The gap between the productivity growth rate for total economy output per hour between the two countries was

**FIGURE 3 Average Annual Percentage Change in Growth of Total Economy Output per Hour, OECD Countries, 2000-2022**



Source: Organisation for Economic Co-operation and Development, OECD.Stat, “Growth in GDP per Capita, Productivity and ULC” ([https://stats.oecd.org/Index.aspx?DataSetCode=PDB\\_GR](https://stats.oecd.org/Index.aspx?DataSetCode=PDB_GR)).



0.43 percentage points (1.28 percent versus 0.85 percent), compared to 0.97 points (1.83 percent versus 0.86 percent) for the business sector (figure 1).

## INDUSTRY PRODUCTIVITY TRENDS

Productivity growth differs considerably by industry since the conditions that favour such growth at the industry level vary greatly. These factors include the pace of technological progress, the ability to mechanize production (that is, to substitute capital for labour), and public policies affecting the industry. Table 2 provides estimates of growth rates for annual output per hour worked for industries in the business sector—specifically, industries producing goods and services, and 16 two-digit NAICS industries—for the 1961-1981, 1981-2000, and 2000-2019 cyclically neutral periods. The following observations are noted:

- In the 2000-2019 period, the fastest productivity growth rates were found in agriculture, forestry, fishing, and hunting at 3.7 percent per year, nearly four times the business sector average of 0.96 percent. Other industries with growth rates well above average were wholesale trade (2.36 percent); information and cultural industries (1.83 percent); retail trade (1.77 percent); and finance, insurance, real estate, and renting and leasing (1.74 percent).
- Among the industries with the highest productivity growth rates in 2000-2019, only 1 of the 5 goods industries was included, compared to 4 of the 11 service industries. As a result, productivity in the goods industries grew at a slower pace than in the service industries (0.79 percent versus 1.27 percent). This is a reversal of the situation in the 1961-1981 and 1981-2000 periods, when productivity growth in the goods sector exceeded that in the services sector.
- The key drag on productivity growth in the goods sector in 2000-2019 was mining and oil and gas extraction, where output per hour fell by 1.16 percent per year. This development is likely explained by high commodity prices, which led to the exploitation of more marginal, higher-cost resources.
- Despite the superior performance of service industries compared to goods industries, many service industries had weak productivity growth in 2000-2019. These included arts, entertainment, and recreation (0.17 percent per year); other private services (0.57 percent); accommodation and food services (0.58 percent); and professional, scientific, and technical services (0.58 percent).
- Output per hour in the construction sector advanced by only 0.20 percent per year from 2000 to 2019—approximately one-fifth of the aggregate (business sector) labour productivity growth rate. Faster productivity growth in this sector, everything else being equal, would have reduced the unit labour cost in residential and non-residential construction, and would have resulted in lower prices for new housing. In other words, the poor productivity performance in construction has contributed somewhat to the housing affordability crisis in this country.
- Manufacturing is the key source of exports in Canada's economy, and its productivity is especially important for the country's international competitiveness.

**TABLE 2 Growth in Labour Productivity (Output per Hour Worked) in the Business Sector and in Specific Industries, Canada, 1961-2019**

	1961-1981	1981-2000	2000-2019	Change between 1981-2000 and 2000-2019
	<i>percent</i>			
Business sector (aggregate) . . . . .	2.85	1.72	0.96	-0.76
Goods industries (aggregate) . . . . .	3.60	2.48	0.79	-1.69
Agriculture, forestry, fishing, and hunting . . . . .	3.98	2.61	3.71	1.10
Mining and oil and gas extraction . . . . .	0.72	2.44	-1.16	-3.59
Utilities . . . . .	3.82	1.19	0.63	-0.56
Construction . . . . .	2.17	0.08	0.20	0.12
Manufacturing . . . . .	3.56	3.28	0.88	-2.40
Service industries (aggregate) . . . . .	2.18	1.40	1.27	-0.13
Wholesale trade . . . . .	2.18	3.44	2.36	-1.08
Retail trade . . . . .	2.87	2.22	1.77	-0.45
Transportation and warehousing . . . . .	3.64	1.48	0.82	-0.66
Information and cultural industries . . . . .	5.48	2.17	1.83	-0.34
Finance, insurance, real estate, and renting and leasing . . . . .	0.26	1.76	1.74	-0.02
Professional, scientific, and technical services . . . . .	0.80	0.91	0.58	-0.33
Other services (except public administration) <sup>a</sup> . . . . .	0.98	-0.15		
Administrative and support, waste management, and remediation services . . . . .	-1.39	-0.04	0.70	0.73
Arts, entertainment, and recreation . . . . .	1.28	-2.15	0.17	2.32
Accommodation and food services . . . . .	0.08	-0.69	0.58	1.27
Other private services . . . . .	2.01	-0.10	0.57	0.67

a Estimates of “Other services” are not available for the 2000-2019 period.

Source: Calculations by the Centre for the Study of Living Standards, based on Statistics Canada table 36-10-0208-01 (formerly CANSIM table 383-0021), “Multifactor Productivity, Value-Added, Capital Input and Labour Input in the Aggregate Business Sector and Major Sub-Sectors, by Industry,” April 18, 2023.

Historically, productivity in manufacturing has considerably exceeded that of the total economy. However, manufacturing in the 2000-2019 period experienced labour productivity growth slightly below the aggregate growth rate, at 0.88 percent per year.

- Aggregate labour productivity growth fell off by 0.76 percentage points between 1981-2000 and 2000-2019. The slowdown was almost entirely attributable to the goods sector, in which the fall-off was 1.69 percentage points, compared to only 0.13 points in the services sector. The largest decline was in

mining and oil and gas extraction, at 3.59 points, and in manufacturing, at 2.40 points. These two industries largely account for slower productivity growth in Canada since 2000.

- While six service industries had slower productivity growth after 2000, four enjoyed a pickup in productivity growth: arts, entertainment, and recreation (increasing by 2.32 percentage points between 1981-2000 and 2000-2019); accommodation and food services (increasing by 1.27 points); administrative and support, waste management, and remediation services (increasing by 0.73 points); and other private services (increasing by 0.67 points).

## PRODUCTIVITY GROWTH BY PROVINCE AND TERRITORY

The variation in productivity growth rates among Canada's provinces and territories is much smaller than the variation among industries. This is because the provinces and territories tend to have similar, though not identical, industrial structures. Table 3 provides annual growth rates for business sector output per hour for the 2000-2022 period and subperiods. Some observations are highlighted below:

- Between 2000 and 2022, among the provinces, Manitoba had the highest rate of business sector productivity growth, at 1.36 percent per year, and Alberta had the lowest, at 0.68 percent. With productivity growth in Canada at 0.92 percent, Manitoba was 0.44 points or 48 percent above the national average, while Alberta was 0.24 points or 26 percent below the national average. These are very small differences compared to industry productivity differentials.<sup>15</sup>
- Over shorter periods, there is much more variation among provinces in productivity growth. In 2000-2008, labour productivity in Newfoundland and Labrador advanced at an average annual rate of 5.02 percent as offshore oil production came on stream and dramatically boosted real output growth. In contrast, output per hour barely rose in Alberta (0.18 percent per year). While high energy prices made it profitable to allocate large quantities of capital and labour to investment in the Alberta oil sands, more inputs were required to extract a barrel of oil as output increased.
- In 2008-2019, with the completion of offshore oil developments and the decline in oil production in the latter part of the period, labour productivity in Newfoundland and Labrador turned negative, falling by 0.67 percent per year. In contrast, declining oil prices boosted productivity growth in Alberta to 1.37 percent per year.
- In the three years since 2019, pandemic and cyclical influences have been the dominant influence on productivity growth. Consequently, it is difficult to identify long-term trends.

15 The territories have much greater variation in productivity growth than the provinces. In these small northern economies, the opening or closing of one mining operation in the territory can have major effects on its real GDP and productivity.

**TABLE 3 Growth in Labour Productivity (Output per Hour Worked) in the Business Sector, Canada and the Provinces and Territories, 2000-2022**

	2000-2008	2008-2019	2019-2022	2000-2022
	<i>percent</i>			
Canada .....	1.00	1.05	0.23	0.92
Newfoundland and Labrador .....	5.02	-0.67	-2.04	1.17
Prince Edward Island .....	1.12	0.77	1.69	1.03
Nova Scotia .....	0.49	1.11	0.24	0.76
New Brunswick .....	1.11	0.57	1.30	0.87
Quebec .....	0.95	0.99	0.65	0.93
Ontario .....	0.67	0.99	0.12	0.75
Manitoba .....	1.96	1.42	-0.44	1.36
Saskatchewan .....	1.51	0.89	0.63	1.08
Alberta .....	0.18	1.37	-0.50	0.68
British Columbia .....	1.28	1.04	1.04	1.13
Yukon .....	4.80	0.02	12.33	3.35
Northwest Territories .....	3.16	-0.51	-2.78	0.49
Nunavut .....	0.86	0.62	8.36	1.73

Source: Calculations by the Centre for the Study of Living Standards, based on Statistics Canada table 36-10-0480-01 (formerly CANSIM table 383-0033), "Labour Productivity and Related Measures by Business Sector Industry and by Non-Commercial Activity Consistent with the Industry Accounts," May 19, 2023.

## SOURCES OF LABOUR PRODUCTIVITY GROWTH

The workhorse framework for analyzing the sources of output and labour productivity growth is growth accounting, which decomposes labour productivity growth into contributions from TFP (MFP) growth, capital intensity growth, and labour quality improvements. This section provides estimates based on official Statistics Canada growth accounting data to identify the drivers of labour productivity growth in the business sector in Canada. Table 4 provides estimates for the cyclically neutral periods of 1961-1981, 1981-2000, 2000-2008, 2008-2019, and 2000-2019 periods. Data are also provided for the 2019-2021 period, but pandemic and cyclical factors during these two years mean that the estimates should be treated with caution. Several observations can be made:

- The absolute and relative contributions of MFP growth to labour productivity growth have fallen significantly over time. From 1961 to 1981, MFP contributed 0.97 percentage points to labour productivity growth or 34.0 percent of the total. In the 1981-2000 period, this contribution fell to 0.4 points or 26.6 percent. After 2000, the contribution of MFP turned negative at -0.09 percentage points in 2000-2019, or -9.7 percent of labour productivity growth. In other words, a key distinguishing feature of Canada's productivity performance has been the evaporation or disappearance of MFP growth. Unfortunately, this development tells us less about the reason for slower productivity growth

**TABLE 4 Sources of Canadian Business Sector Labour Productivity Growth, 1961-2021**

Panel A Absolute contributions (percentage points per year)						
	1961-1981	1981-2000	2000-2019	2000-2008	2008-2019	2019-2021
Labour productivity growth . . . . .	2.85	1.63	0.91	0.86	1.03	1.09
Multifactor productivity growth . . . . .	0.97	0.43	-0.09	-0.54	0.24	-0.71
Contribution from capital intensity . . . . .	1.33	0.83	0.79	1.13	0.54	1.57
Contribution from labour quality . . . . .	0.53	0.36	0.26	0.28	0.25	0.22
Total contributions . . . . .	2.82	1.63	0.96	0.87	1.03	1.08

Panel B Relative contributions (percent)						
	1961-1981	1981-2000	2000-2019	2000-2008	2008-2019	2019-2021
Labour productivity growth . . . . .	100.0	100.0	100.0	100.0	100.0	100.0
Multifactor productivity growth . . . . .	34.0	26.6	-9.7	-63.3	23.7	-65.4
Contribution from capital intensity . . . . .	46.6	50.6	86.4	131.5	52.2	143.9
Contribution from labour quality . . . . .	18.5	22.3	28.5	32.3	23.8	20.1
Total contributions . . . . .	99.1	99.5	105.2	100.5	99.7	98.6

Source: Calculations by the Centre for the Study of Living Standards, based on Statistics Canada table 36-10-0208-01 (formerly CANSIM table 383-0021), “Multifactor Productivity, Value-Added, Capital Input and Labour Input in the Aggregate Business Sector and Major Sub-Sectors, by Industry,” April 18, 2023.

than might be expected. MFP is a residual calculated after the effect of changes in capital intensity and labour quality have been accounted for. In many ways, it is a measure of our ignorance and can reflect the impact of many factors, including measurement errors, technological progress, economies of scale, capacity utilization, and government policies such as regulation.

- The most important source of labour productivity growth in all periods has been the growth of capital intensity—that is, the capital:labour ratio. This factor contributed 1.33 percentage points per year to labour productivity growth in 1961-1981, or 46.6 percent. This fell to 0.83 points in 1981-2000, but because of the greater decline in productivity growth, the relative contribution rose to 50.6 percent. The absolute contribution of capital intensity remained relatively stable at 0.79 points in 2000-2019. Again, with the fall in labour productivity growth, the relative contribution of capital intensity rose to 86.4 percent. This suggests that after 2000, investment in capital stock was sufficient to keep up with the growth of labour supply as evidenced by the fact that there was no slowdown in the growth in the capital:labour ratio (3.5 per cent per year in 1981-2000 and 2000-2019).
- The contribution of improvements in labour quality to labour productivity growth has fallen in absolute terms over time, but has increased in relative terms with slower labour productivity growth. In 1961-1981, the contribution of labour quality to labour productivity growth was 0.53 percentage points per year, or 18.5 percent. This absolute contribution fell to 0.36 points in 1981-2000, with

the relative contribution rising to 22.3 percent. Again after 2000, the contribution of labour quality to labour productivity growth fell further to 0.26 points per year, with the relative contribution rising to 28.5 percent. The decline of the absolute contribution of labour quality to labour productivity growth may be linked to the large increase in the educational attainment of the Canadian labour force, which limits the scope for further increases.

- According to official growth account estimates, labour productivity growth in Canada fell off by 0.72 percentage points between 1981-2000 and 2000-2019. The largest contribution to this slowdown was MFP, whose contribution to labour productivity growth fell by 0.52 points, accounting for 72 percent of the slowdown. As noted earlier, this finding does not provide much insight into the reasons for the slowdown. The contribution to the slowdown was only 0.10 points from labour quality and 0.04 points from capital intensity, accounting for 14 percent and 6 percent of the slowdown, respectively.

## SUMMARY AND CONCLUSION

This article has provided an overview of the basic concepts, metrics, trends, and types of analysis found in discussions of productivity in Canada. Boosting productivity growth is a major objective for Canada, and a better understanding of the productivity issue on the part of Canadians can facilitate the steps needed from both the public and the private sectors to attain this objective.

Key points made in the article are highlighted below:

- Canada is already a rich country, but it faces major challenges, including the attainment of net zero emissions by 2050 and population aging. The additional resources that accrue to society through productivity growth can greatly assist in the task of meeting these challenges.
- Canada is fortunate in having high-quality, readily accessible, detailed productivity statistics produced by Statistics Canada in a timely manner without charge. Nevertheless, there are inherent measurement problems in the estimation of productivity statistics—especially the measurement of productivity growth in the non-business sector, where output is non-marketed—and in the integration of new goods into price series for the calculation of reliable estimates of real output. Despite these challenges, which are faced by all statistical offices, most productivity analysts feel that official productivity statistics give a relatively accurate picture of productivity developments.
- Labour productivity growth in the business sector in Canada outperformed that of the United States in the 1947-1973 period, was roughly comparable in the 1973-2000 period, and lagged behind significantly after 2000. After peaking at around 93 percent of the US level in the early 1980s, the level of output per hour worked in Canada fell to 70 percent of the US level by 2022.
- Among OECD countries, Canada ranked as 28th out of 38 countries in terms of the growth rate of GDP per hour worked for the 2000-2022 period. However, this is somewhat misleading since Canada ranked 4th among the G7

countries and had a productivity growth rate very close to that of many western European countries. The OECD countries with the best productivity performance were largely countries in Eastern Europe and former developing countries that benefited from technological catchup.

- The post-2000 slowdown in business sector labour productivity growth of 0.7 percentage points (from approximately 1.7 percent per year in 1981-2000 to 1.0 percent in 2000-2019) was concentrated in the goods sector, with manufacturing, and mining and oil and gas extraction, accounting for most of the fall-off.
- Output per hour in the construction sector advanced at approximately 0.20 percent per year from 2000 to 2019—one-fifth of the aggregate labour productivity growth rate. Faster productivity growth in this sector would have reduced the unit labour cost in construction and would have resulted in lower prices for new housing. In other words, the poor productivity performance in construction has contributed somewhat to the housing affordability crisis in this country.
- Since 2000, business sector MFP growth has effectively disappeared in Canada, and this development has accounted for the lion's share of the fall-off in labour productivity growth. However, there are many factors that determine MFP, so the identification of MFP as the culprit does not greatly advance our understanding of the causes of slower productivity growth.
- There has been extreme volatility in annual productivity growth rates in Canada since 2019 as a result of the COVID-19 pandemic. It is likely, but not certain, that these adjustments to the pandemic shock have played themselves out. Looking ahead, it is uncertain, but highly desirable, that the long-term trend in labour productivity of around 1 percent over the last two decades will reassert itself.
- The absence of labour productivity growth between 2019 and 2022 has meant that hourly labour compensation growth has not been offset by productivity gains, and therefore compensation growth translated one for one into increased unit labour costs. This has been a source of inflationary pressure and has contributed to the recent surge in inflation.

