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Research article

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Abstract

This paper examines the role of firm size in the widening labour productivity gap between Canada and the United States since 2000. Canada's business-sector labour productivity level declined from 83% of the U.S. level in 2002 to 73% in 2019. The gap is partly explained by Canada's higher share of small firms and their greater productivity disadvantage relative to large firms. In 2019, these two factors accounted for 60% of the 27-percentage-point productivity gap, with the remainder 40% attributable to the generally lower productivity of Canadian firms. From 2002 to 2019, both small and large Canadian firms experienced slower productivity growth than their U.S. counterparts. Large firms contributed more to the widening of the Canada–U.S. labour productivity level gap for the period from 2002 to 2019 because of significantly slower labour productivity growth among Canada's large firms. Shift-share analysis shows that the relative weak performance of large firms accounted for 0.45 percentage points of the 0.71-point Canada–U.S. productivity growth gap, while small firms accounted for 0.16 points. The remaining 0.14 percentage points of the Canada–U.S. labour productivity growth gap were attributable to the negative effect of hours shifting toward small firms with lower labour productivity levels in Canada. The findings highlight the need to boost productivity across firm sizes. Improving small firms' access to markets, financing, innovation and managerial capacity and enabling large firms to catch up to global productivity frontiers will be critical to narrowing the Canada–U.S. productivity gap.

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Section 1: Introduction

Canada's business sector has a lower level of labour productivity compared with that of the United States. Moreover, there has been a substantial divergence in labour productivity in the business sectors of Canada and the United States since 2000. As a result, Canada's labour productivity gap with the United States has widened in that period. Multiple explanations have been proposed for this growing disparity. Key among them are differences in competitive intensity—particularly in sectors such as telecommunications—as well as divergences in technological progress and innovation (Competition Bureau, 2023; Gu and Willox, 2023; Gu, 2024; Sargent, 2024). These are reflected in slower growth in capital deepening and multifactor productivity (MFP) in Canada compared with the United States.

One important contributing factor for Canada's lower labour productivity compared with the United States is the relatively larger share of small firms in Canada and the stronger productivity disadvantage faced by these firms compared with their U.S. counterparts. The prevalence of small firms and their lower productivity performance in Canada can be partly attributed to the country's smaller domestic market size, which limits opportunities for scaling up. Additional barriers include restricted access to financing, limited innovation capacity and challenges in adopting frontier technologies. Managerial ability and ambition also play roles in the limited growth potential of small Canadian firms.

Several influential studies have previously shown that firm size plays an important role in explaining the aggregate labour productivity gap between Canada and the United States (Leung and Rispoli, 2014; Baldwin, Leung and Rispoli, 2014).[1] Tang (2016) used these data to show that the deterioration in the productivity performance of large Canadian manufacturing firms relative to their U.S. counterparts was the main factor contributing to the widening Canada–U.S. labour productivity gap after 2000. However, these findings are based on data from before 2008 and thus do not reflect more recent developments. This paper updates those estimates using newly available data sources.

Since the publication of the earlier studies, new and comparable data have become available, improving the estimates of labour productivity by firm size in the two countries. In particular, the U.S. Bureau of Economic Analysis (BEA) and the Bureau of Labor Statistics (BLS) now publish the KLEMS database at the industry level, which is comparable to Canadian data. Additionally, the BEA and BLS industry productivity accounts include data on paid workers and self-employed individuals that align with industry-level productivity measures and improve the estimates of labour input by firm size in the United States. In Canada, comprehensive firm-level data on output and labour input have also been developed, covering both incorporated and unincorporated businesses.

The paper addresses two questions. First, what role do small firms play in explaining Canada's lower labour productivity relative to the United States, given their larger share and greater productivity disadvantage in Canada? Second, what are the relative contributions of small and large firms to the widening labour productivity gap between Canada and the United States since 2000?

The rest of the paper is organized as follows. Section 2 describes the data sources and estimation methodology. Section 3 presents empirical evidence on labour productivity, output and hours worked by firm size for Canada and the United States. Section 4 concludes.

1. Other studies have focused on the smaller plant size in the Canadian manufacturing sector (Baldwin, Jarmin and Tang, 2002; Tang, 2014).

Section 2: Data sources and estimation

This section largely follows the approaches outlined by Leung and Rispoli (2014) and Baldwin, Leung and Rispoli (2014).

This study focuses on the business sector. In Canada, the business sector includes all incorporated and unincorporated enterprises organized for profit that produce goods and services for sale at prices intended to at least approximate the cost of production. Government business enterprises are also included in this definition.

The objective of the analysis is to estimate labour productivity and two related components—output and hours worked—by firm size and by industry within the business sector, for both Canada and the United States. In this paper, output is measured by gross domestic product (GDP), although gross output (the total value of production) is often considered as an alternative measure. Both measures have advantages and limitations, but for the purposes of this study, GDP (or value added) is the preferred measure, since it directly links firm-level output to aggregate GDP and better reflects income and living standards.

The study examines both the levels and growth rates of labour productivity by firm size. These estimates are not published by the statistical agencies in either country. While Statistics Canada and the U.S. BLS and BEA publish aggregate data on real GDP, hours worked and labour productivity by industry, they do not provide disaggregated statistics by firm size.

Thus, the central task of this study is to disaggregate industry-level data on real GDP, hours worked and labour productivity into firm size categories for both countries.

The methodology for the United States is adapted from Kobe and Schwinn (2018). To ensure comparability, a consistent methodology is applied to the Canadian data. Several methodological considerations are important for improving the comparability of labour productivity levels and growth rates across countries:

- **Valuation of GDP:** In both Canada and the United States, GDP is valued at basic prices. For productivity comparisons, output should be measured from the producer's perspective, that is, at prices received by producers. Valuation at basic prices excludes product taxes and includes product subsidies.

- **Unit of analysis:** In both countries, the unit of analysis is the enterprise or firm, which may consist of a single establishment or a group of establishments under common ownership. The analysis compares GDP, hours worked and labour productivity by firm size and industry based on this enterprise definition, where enterprises are assigned an industry using the dominant share of their sales and employment.

- **Firm size classification:** In the United States, firm size is defined based on the employment of the ultimate parent company. The same classification method is adopted for Canada, using the employment size of the commonly controlled group of enterprises (i.e., the ultimate parent) to assign size classes. Industry classification is also based on the enterprise level.

It is important to acknowledge potential discrepancies in the industry classification between firm-level and industry-level data. Industry-level GDP, hours worked and productivity are typically constructed from establishment-level data, whereas firm-size estimates are derived from enterprise-level data. However, for the major industry sectors considered in this study, such discrepancies are expected to have only a minor impact.

Firms are classified as either small or large based on the employment level of their ultimate parent company. Specifically, firms are considered small if their ultimate parent employs 500 or fewer workers and large if the parent employs more than 500 workers.[2] This classification is constrained by the availability of U.S. data on a key component of GDP: gross operating surplus (GOS) by firm size. GOS data are available only for broad categories based on receipts from sales and other production activities. To align this with employment-based firm size, this paper uses a concordance between receipt size and employment size categories. The concordance that maps firm receipt classes to firm employment size classes is judged to be tighter when firms are grouped into two employment size categories: small firms with 500 or fewer employees and large firms with more than 500 employees. The methodology will be discussed in detail in the section below on estimating GDP by firm size for the United States.

In Canada, the following firm size classification is typically used (ISED, 2024): small businesses have 1 to 99 employees, medium-sized businesses have 100 to 499 employees and large firms have 500 or more employees. In this paper, small and medium-sized firms are combined into a single category called small firms.

The remainder of this section describes the data sources and methods used to estimate GDP, hours worked and labour productivity by firm size. The process begins with constructing estimates of nominal and real GDP and hours worked by firm size and by industry for both Canada and the United States. These estimates are then benchmarked to official aggregate industry statistics on nominal and real GDP and hours worked. Labour productivity is subsequently calculated by dividing real GDP by hours worked, disaggregated by firm size.

Measurement of gross domestic product by firm size

GDP at the industry level in both the Canadian and U.S. systems of national accounts is defined as the sum of gross value added by all resident producer units. Resident producer units can be either incorporated or unincorporated. The GDP of an industry is therefore the sum of the GDP of incorporated and unincorporated businesses. For productivity measurement, GDP in both countries is valued at basic prices, reflecting the value of output from the producer's perspective—excluding taxes on products and including subsidies.

The following two subsections describe how GDP by firm size and industry was derived for the period from 2002 to 2021 for industries within the business sector for Canada and the United States.

Under the income approach, value added captures the total compensation received by the primary inputs to production—capital and labour—and it is the sum of the following components:[3]

- compensation of paid employees, for both incorporated and unincorporated businesses
- GOS and net indirect taxes (i.e., indirect taxes minus subsidies) for incorporated businesses or the compensation of capital
- mixed income for unincorporated businesses.

2. This classification of firm size is used by Kobe and Schwinn (2018) to measure the contribution of small firms to GDP in the United States.
3. Value added can also be measured using two alternative approaches: the expenditure approach, which sums total expenditures on output, and the production approach, which measures the difference between industry output and the cost of intermediate inputs.

In Canada, all three components of GDP are available by industry, with mixed income further disaggregated to labour and capital compensation. For the United States, industry-level value-added data are obtained from the KLEMS productivity accounts, which are also accessible through EU KLEMS (Bontadini et al., 2023). These data disaggregate value added into labour compensation and capital compensation, with mixed income of unincorporated businesses further divided into the labour compensation of self-employed workers and the capital compensation attributable to the unincorporated business.

To derive GDP by firm size, these components of industry-level value added are allocated across firm size classes using supplementary data sources for each country. The next section discusses the methodology used for this allocation.

Gross domestic product by firm size for Canada

The primary data source used to estimate GDP by firm size for Canada is the National Accounts Longitudinal Microdata File (NALMF). This dataset covers both incorporated and unincorporated businesses. It includes income statement information from the General Index of Financial Information, which is submitted with T2 Corporation Income Tax Return filings for incorporated businesses, and data from T1 General Income Tax and Benefit Return filings for unincorporated businesses.

The T2 tax files provide information on GOS and net taxes on production for incorporated firms, and T1 tax files provide information on mixed income for unincorporated firms—all disaggregated by firm size.[4]

In addition, the NALMF incorporates data from T4 Statement of Remuneration Paid slips, which report employee compensation for incorporated and unincorporated firms with employees. These data are used to estimate the compensation of paid employees by firm size.

Nominal GDP by firm size is calculated as the sum of GOS, mixed income and employee compensation for each size class. These estimates of nominal GDP by firm size are then benchmarked to the nominal GDP at basic prices at the industry level. Finally, nominal GDP is deflated using industry-specific GDP deflators to obtain real GDP by firm size and industry.[5]

Gross domestic product by firm size for the United States

The methodology for estimating GDP by firm size at the industry level follows the approach developed by Kobe (2007) and Kobe and Schwinn (2018). Two data sources are used to allocate the components of GDP (the compensation of capital and the compensation of labour) by firm size within each industry: the Statistics of U.S. Businesses (SUSB) program from the U.S. Census Bureau and Statistics of Income (SOI) data from the Internal Revenue Service (IRS).

The SUSB program provides a tabulation of payroll and job counts by firm employment size, industry and legal form of organization. This dataset covers all firms in the private sector, including corporations, non-corporate enterprises and non-profit institutions. It includes all paid workers for those businesses but excludes self-employed individuals. The sum of payroll by firm size in an industry is then benchmarked

4. In the data, the mixed income of unincorporated businesses is classified entirely under small firms with 500 or fewer workers. This is consistent with the classification of hours worked by self-employed workers or owners of unincorporated businesses under small firms for estimating hours worked by firm size.
5. The approach for estimating GDP by firm size in this paper differs from that used by Leung and Rispoli (2014). In their study, the components of GDP by firm size were benchmarked to the corresponding industry-level components of GDP from the KLEMS database.

to the labour compensation component of the GDP in the industry from the KLEMS industry database for the United States.

The IRS's SOI data provide tabulations of receipts and GOS by revenue size class and industry. The SOI Integrated Business Dataset includes data on corporations (C and S corporations), partnerships and nonfarm sole proprietorships. These data are used to estimate GOS by firm size for both incorporated and unincorporated businesses.

Because the SOI data for partnerships and nonfarm sole proprietorships are not available by firm size, they are grouped as small businesses. For corporations, GOS is available by revenue class but must be converted into employment size classes. This conversion follows the concordance methodology developed by Kobe (2007) and Kobe and Schwinn (2018), using the SUSB data. The SUSB database includes receipts categorized both by employment size and by revenue size (every five years), allowing the mapping of revenue classes to employment classes. Receipt size categories whose cumulative shares of receipts align with those of small firms (based on employment size) are classified as small firms.

The sum of GOS by firm size in an industry, derived from the SOI, is benchmarked to the capital compensation component of GDP in that industry from the U.S. KLEMS database.

Finally, nominal GDP by firm size is then calculated as the sum of labour and capital compensation by firm size. Nominal GDP by firm size is deflated using the industry GDP deflator to obtain real GDP by firm size.

There are limitations to this estimation of GDP by firm size in the U.S. industries.

First, the payroll of paid workers by firm size includes those of non-profit institutions. However, non-profit institutions are excluded from the industry-level KLEMS productivity data for the United States. This may affect the estimates of GDP by firm size in industries where non-profit institutions are significant, such as North American Industry Classification System (NAICS) code 81, other services (except public administration)—particularly NAICS code 813, religious, grant-making, civic, and professional and similar organizations.

Second, for the GOS of unincorporated businesses, it is measured as mixed income. Ideally, mixed income should be split between capital and labour compensation by firm size before being benchmarked to capital and labour compensation from the KLEMS database.

Third, the GOS of unincorporated businesses in the agriculture sector is not available from the IRS's SOI data. Only the GOS of incorporated businesses is available. This may lead to an underestimation of GDP by small firms in the agriculture sector.

Measurement of labour input by firm size

Labour input in this paper is measured in terms of hours worked. In the official productivity programs of both Canada and the United States, hours worked are estimated at the industry level but are not disaggregated by firm size.

This section outlines the data sources and methodology used to estimate hours worked by firm size for both Canada and the United States.

Canadian labour input by firm size

The estimation of labour input by firm size is carried out in several steps. First, the number of jobs is estimated separately for paid workers in incorporated and unincorporated businesses by firm size, as well as for owners of unincorporated businesses (who are classified as self-employed in the national accounts). Second, average hours worked per job are estimated for each of these groups. The product of jobs and hours per job yields total hours worked by firm size and industry for each period. All estimates are subsequently benchmarked to industry-level hours worked from the official labour productivity accounts.

For paid workers, the number of jobs by firm size is derived from PD7 payroll files in the NALMF, which include payroll records issued to employees of both incorporated and unincorporated firms. Average hours worked per job by firm size are estimated using data from the Labour Force Survey. This adjustment accounts for the possibility that average hours worked may vary across firm size classes—small firms may have longer or shorter average hours compared with large firms, depending on the industry.[6]

Multiplying the number of jobs by the average hours worked per job gives the total hours worked by firm size at the industry level. The sum of hours worked across all firm size classes is then benchmarked to the industry-level totals for paid employees published by Statistics Canada's labour productivity program.

For self-employed workers—defined as owners of unincorporated businesses—the number of jobs, average hours worked per job and total hours worked are all estimated directly from the Labour Force Survey. These estimates are available in Statistics Canada's labour productivity program. In this paper, all unincorporated businesses are classified as small firms.

U.S. labour input by firm size

U.S. hours worked by firm size were estimated using a methodology similar to the one employed for Canada. The approach consists of several steps.

It begins by estimating the number of jobs held by paid workers in both incorporated and unincorporated businesses by firm size and industry. These job counts are derived from tabulations from the SUSB program of the U.S. Census Bureau, which covers all private sector industries, including corporations, non-corporate enterprises and non-profit institutions.[7]

The next step involves estimating average hours worked per job by firm size and industry. Data on usual hours worked for paid workers by firm size are obtained from the March Annual Social and Economic Supplement of the U.S. Current Population Survey. These usual hours worked are multiplied by the number of jobs by firm size to calculate total hours worked at the industry level for each firm size category.

The sum of hours worked across firm size classes is then benchmarked to the total industry-level hours worked for paid workers, as reported in the KLEMS industry productivity database.

6. The results from the Labour Force Survey indicate that hours worked per job were similar between small and large firms in Canada. Therefore, it is assumed that hours worked per job are the same for both types of firms in Canada. The same assumption is applied to the United States.
7. Ideally, job counts of paid workers in non-profit institutions should be excluded, since the industry-level data on hours worked include only incorporated and unincorporated businesses. This may affect the estimates by firm size for industries where non-profit institutions play an important role, such as NAICS 813, religious, grant-making, civic, and professional and similar organizations.

Hours worked for self-employed workers are also taken from the KLEMS industry productivity accounts. As with the GDP allocation for unincorporated businesses, all hours worked by self-employed individuals are attributed to small firms in this paper.

Section 3: Empirical evidence

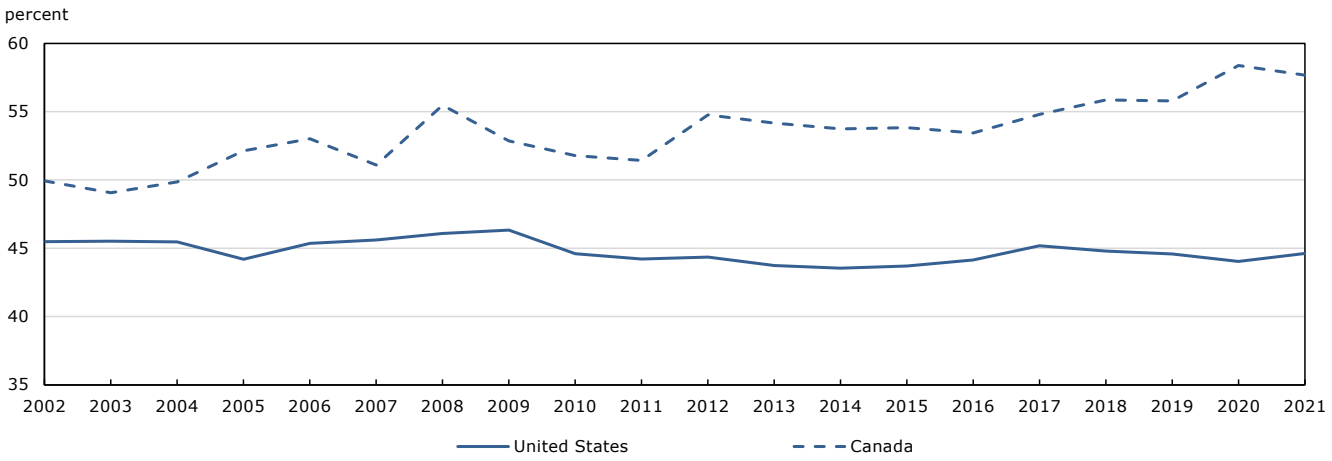
This section begins by presenting empirical evidence on the share of small firms and relative labour productivity by firm size in the total business sectors of Canada and the United States. It then examines these patterns within a more detailed industry sector. Finally, the section analyzes the role of small firms in explaining the productivity divergence between the two countries after 2000, as well as the relatively lower labour productivity level in Canada's business sector compared with that of the United States.

The empirical analysis focuses on the period from 2002 to 2021, during which comparable estimates for both countries are available. However, the discussion on labour productivity will be restricted to 2002 to 2019, excluding 2020 and 2021 to avoid distortions caused by the COVID-19 pandemic, since the effects observed in those two years are likely temporary and do not represent the underlying trend.

Empirical evidence for the total business sector

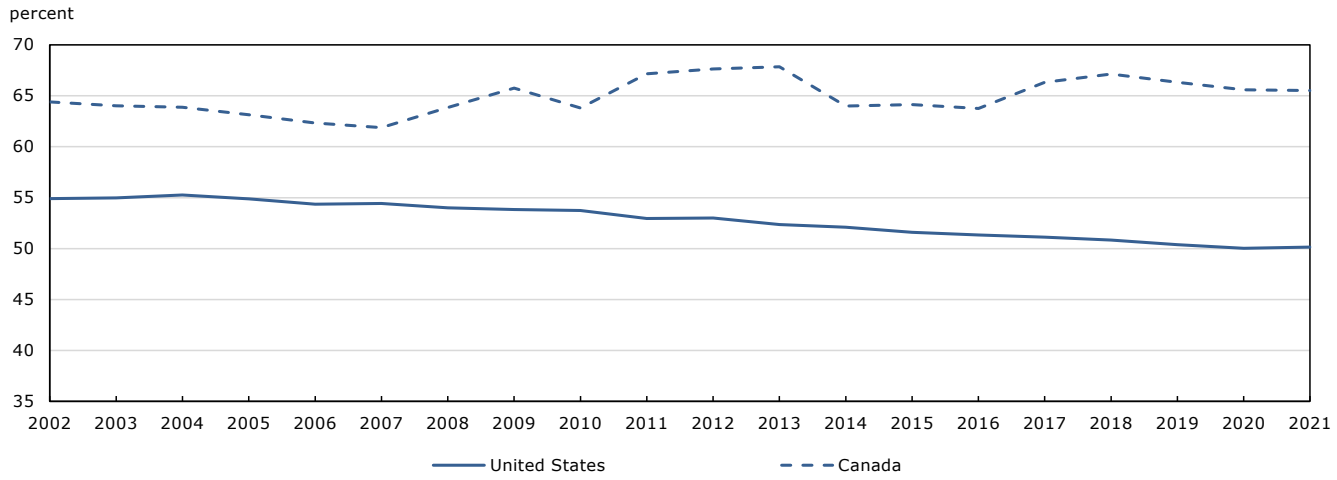
Charts 1 and 2 present the share of small firms in nominal gross output and hours worked in Canada and the United States from 2002 to 2021. The results show that small firms play a relatively larger role in Canada than in the United States, especially when labour input (hours worked) rather than GDP is considered. In 2021, small firms in Canada generated 58% of business sector GDP, compared with 45% in the United States. The share of hours worked by small firms was 66% in Canada, while it was 50% in the United States. This suggests that the relative productivity of small firms compared with large firms is lower in Canada than in the United States. These findings are consistent with earlier evidence presented by Leung and Rispoli (2014) and Baldwin, Leung and Rispoli (2014), who documented the predominance of small firms in Canada after 2008.

Chart 1
Percentage share of small firms in gross domestic product in Canada and the United States, 2002 to 2021



Source: Statistics Canada, authors' calculations.

Chart 2
Percentage share of small firms in hours worked in Canada and the United States, 2002 to 2021



Source: Statistics Canada, authors' calculations.

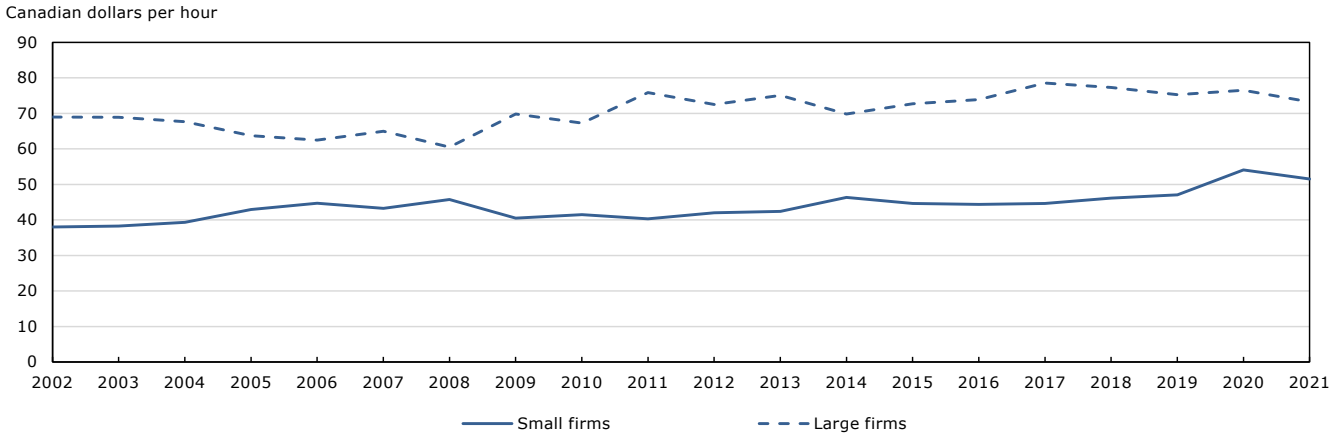
From 2002 to 2021, small firms increased their importance in Canada's business sector, while no such change occurred in the United States. The growing role of small firms in Canada is most evident when measured by their share of GDP, which rose from 50% in 2002 to 58% in 2021. In contrast, in the United States, the share of small firms in GDP remained largely unchanged at about 45% in both 2002 and 2021.

When measured by their share of hours worked, the importance of small firms in Canada began to increase after 2007, following a decline from 2002 to 2007, from 62% in 2007 to 66% in 2021. In the United States, however, the share of small firms in hours worked declined over the entire period, from 55% in 2002 to 50% in 2021.

For the period from 2002 to 2008, the estimates can be compared with those of Leung and Rispoli (2014). The shares of GDP and hours worked are generally consistent, except for the share of hours worked by firm size in Canada. Leung and Rispoli (2014) reported that small firms accounted for 71% of hours worked in 2008, while this paper estimates the figure at 64%. This discrepancy likely arises from differences in data sources; the current estimates are based on more comprehensive firm-level data that include both incorporated and unincorporated businesses, developed after the earlier study.

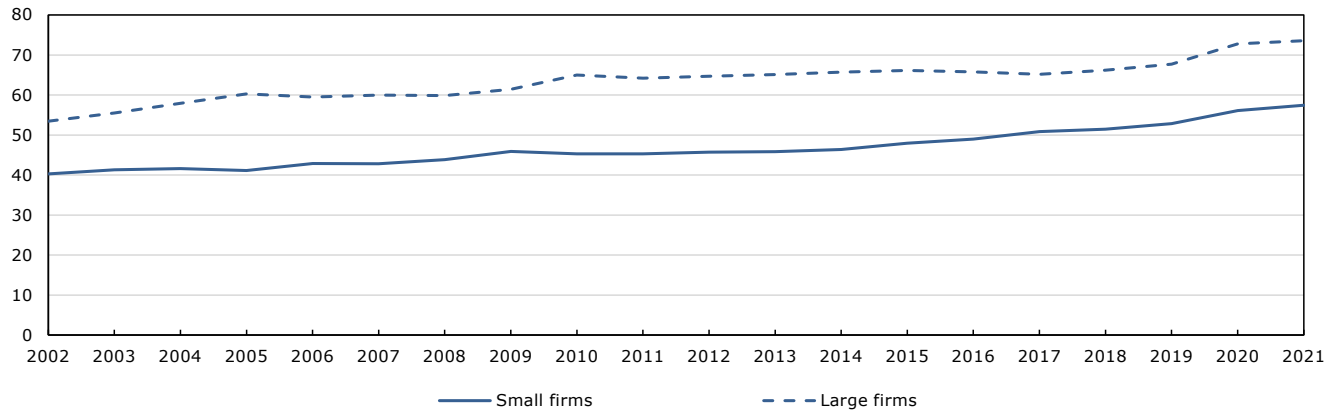
Charts 3 and 4 show labour productivity levels by firm size in Canada and the United States from 2002 to 2021, measured in domestic currency at 2017 prices. Large firms consistently outperform small firms in productivity in both countries. The relatively higher productivity of large firms is often attributed to their ability to scale up through access to larger markets, investment in skills and education, adoption of advanced technologies, innovation, and improved business practices.

Chart 3
Labour productivity by firm size in Canada, measured in Canadian dollars per hour worked (2017 prices), 2002 to 2021



Source: Statistics Canada, authors' calculations.

Chart 4
Labour productivity by firm size in the United States, measured in U.S. dollars per hour worked (2017 prices), 2002 to 2021

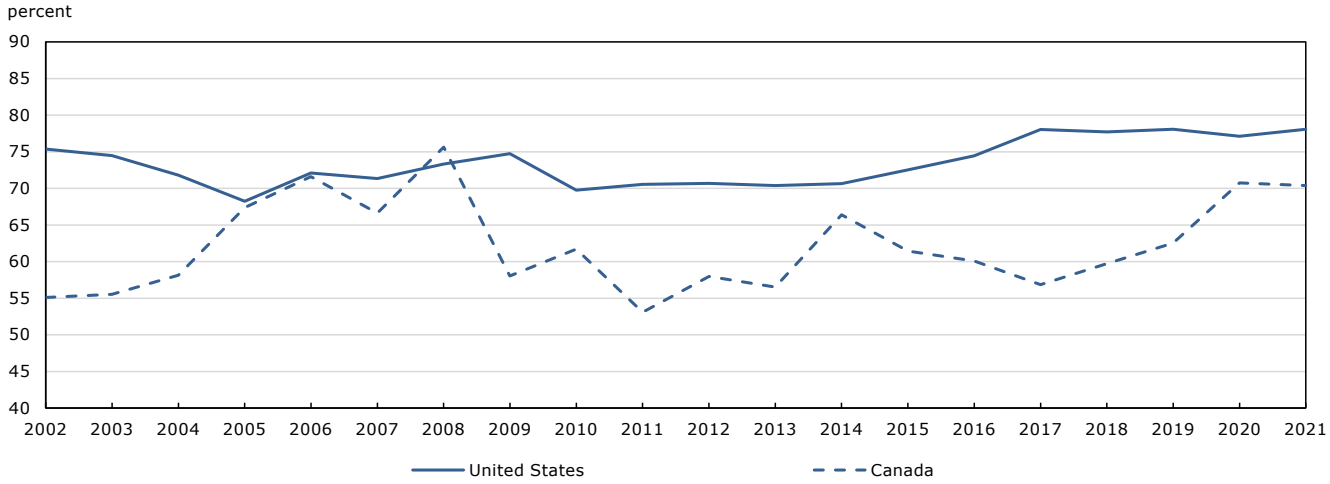


Source: Statistics Canada, authors' calculations.

In 2019, Canadian labour productivity, measured as GDP per hour worked, was CAN$75 per hour in large firms versus CAN$47 per hour in small firms (Chart 3). Small firms' productivity was about 63% that of large firms. Similarly, in the United States, large firms had productivity of US$68 per hour, compared with US$53 per hour for small firms (Chart 4), with small firms being roughly 78% as productive as large firms. Thus, the productivity gap between small and large firms is greater in Canada than in the United States.

Chart 5 illustrates the relative productivity disadvantage of small firms compared with large firms from 2002 to 2021. The larger productivity gap between small and large firms in Canada persists throughout almost all years, except during the 2007 2008/2009 financial crisis. During those years, the productivity disadvantage of small firms was similar in both countries.

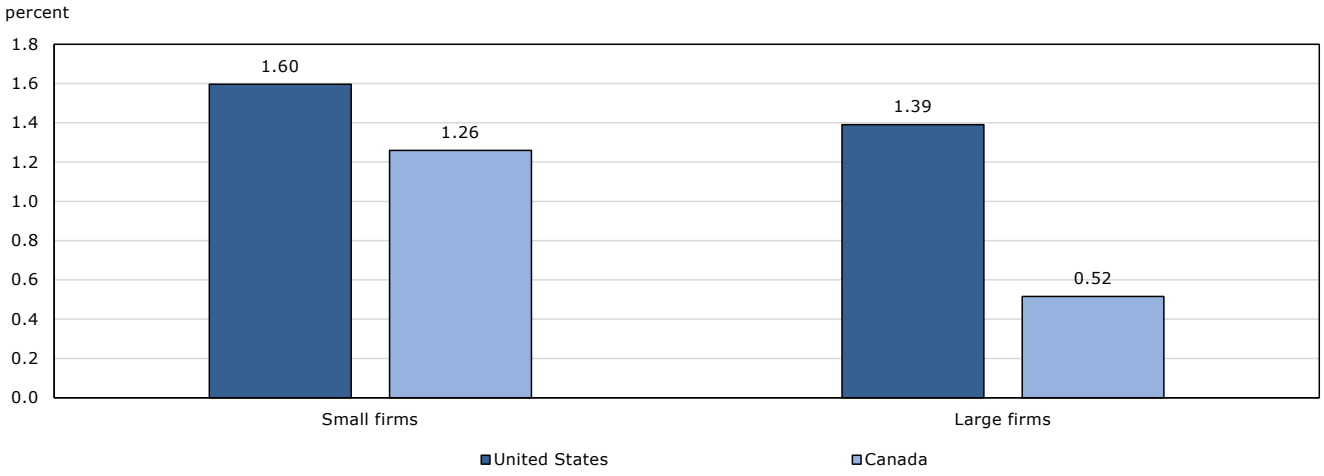
Chart 5
Relative labour productivity: Small versus large firms in Canada and the United States, 2002 to 2021



Source: Statistics Canada, authors' calculations.

Over time, there was a slight decline in this productivity disadvantage of small firms for both countries, since small firms experienced higher labour productivity growth than large firms, which is shown in Chart 6. In Canada, small firms experienced 1.3% annual growth in labour productivity from 2002 to 2019, while large firms grew at 0.5% per year over the same period. In the United States, small firms experienced 1.6% annual labour productivity growth, compared with 1.4% for large firms. This led to a modest narrowing of the productivity gap between small and large firms over the period. It is also worth noting that both small and large firms in Canada had slower labour productivity growth than their counterparts in the United States.

Chart 6
Annual labour productivity growth by firm size in Canada and the United States, 2002 to 2019



Source: Statistics Canada, authors' calculations.

The estimated productivity disadvantage for small firms in Canada is smaller in this study compared with that in the study by Leung and Rispoli (2014). Here, small firms' productivity is about 60% that of large firms, whereas the earlier study found it to be around 50%. This difference is likely because of variations in the estimated share of hours worked by small firms between the two studies.

The Canada–U.S. comparison in this paper focused on two classifications—small firms (fewer than 500 employees) and large firms (500 or more employees)—due to data constraints in the U.S. estimates. For Canada, however, small firms can be further disaggregated into two more commonly used categories: those with fewer than 100 employees (small) and those with 100 to 499 employees (medium).

When this breakdown is applied, the rising importance of firms with fewer than 500 employees in Canada is evident in both categories of small firms defined in this paper. The share of firms with fewer than 100 employees in nominal GDP increased from 37% in 2002 to 42% in 2021—an increase of 5 percentage points. Over the same period, the share of firms with 100 to 499 employees rose from 13% to 15%, a 2-percentage-point increase. Measured by hours worked, both categories also saw increases after 2007: for firms with fewer than 100 employees, the share rose from 50% in 2007 to 51% in 2021, while for firms with 100 to 499 employees, the share increased from 12% to 14%.

The labour productivity disadvantage of small firms relative to large firms is observed in both small-firm categories. Labour productivity is highest among large firms, followed by firms with 100 to 499 employees, and lowest among firms with fewer than 100 employees. In 2019, labour productivity among firms with fewer than 100 employees was $45 per hour worked—about 60% of the level recorded by large firms ($75 per hour worked). In that same year, firms with 100 to 499 employees recorded labour productivity of $56 per hour worked—about 73% of the large-firm level.

Between 2002 and 2019, the labour productivity gap between small and large firms narrowed only among firms with fewer than 100 employees. Labour productivity for this group increased by an average of 1.5% per year. By contrast, productivity growth for medium-sized firms (100 to 499 employees) and for large firms (500 or more employees) averaged 0.5% per year over the same period.

Empirical evidence for major industry sectors

This section presents empirical evidence on the share of small firms and labour productivity levels by firm size at a detailed industry level. The analysis focuses on two years, 2002 and 2019; a comparison between these years is more appropriate given that estimates for 2020 and 2021 were affected by the largely transitory impacts of the pandemic.

Table 1 shows the share of small firms in nominal GDP by industry for Canada and the United States, while Table 2 presents the corresponding shares of hours worked by industry for both countries.

Table 1
Percentage share of small firms in gross domestic product by industry in Canada and the United States, 2002 and 2019

	Canada		United States		Canada over the United States	
	2002	2019	2002	2019	2002	2019
	percent					
Agriculture, forestry, fishing and hunting	94.28	96.03	72.72	85.33	1.30	1.13
Mining	20.59	44.63	45.79	53.48	0.45	0.83
Utilities	6.88	7.80	11.36	16.39	0.61	0.48
Construction	85.44	89.14	79.78	79.13	1.07	1.13
Manufacturing	36.85	39.38	28.32	27.48	1.30	1.43
Wholesale and retail trade	62.73	63.18	48.38	38.18	1.30	1.65
Transportation and warehousing	41.61	46.39	42.31	41.36	0.98	1.12
Information	15.56	28.36	18.11	30.37	0.86	0.93
Finance, insurance and real estate	39.03	28.37	28.91	32.57	1.35	0.87
Professional services	70.15	75.69	69.05	61.43	1.02	1.23
Administrative services	62.49	68.29	46.39	46.09	1.35	1.48
Educational services	92.03	90.76	44.71	44.41	2.06	2.04
Health care and social assistance	83.27	91.57	53.69	45.04	1.55	2.03
Arts, entertainment and recreation	51.35	63.64	72.05	72.67	0.71	0.88
Accommodation and food services	79.29	79.28	53.67	56.22	1.48	1.41
Other services	88.68	89.19	80.97	82.38	1.10	1.08
Business sector	49.94	55.78	45.49	44.58	1.10	1.25

Source: Statistics Canada, authors' calculations.

Table 2
Percentage share of small firms in hours worked by industry in Canada and the United States, 2002 and 2019

	Canada		United States		Canada over the United States	
	2002	2019	2002	2019	2002	2019
	percent					
Agriculture, forestry, fishing and hunting	97.96	94.67	84.68	91.91	1.16	1.03
Mining	38.57	41.08	44.87	44.53	0.86	0.92
Utilities	8.34	7.37	18.69	18.23	0.45	0.40
Construction	92.31	89.34	87.44	83.04	1.06	1.08
Manufacturing	53.91	57.89	43.20	42.45	1.25	1.36
Wholesale and retail trade	66.77	65.67	51.30	41.99	1.30	1.56
Transportation and warehousing	47.24	57.12	46.92	38.83	1.01	1.47
Information	34.82	47.45	29.75	31.09	1.17	1.53
Finance, insurance and real estate	41.10	30.88	28.76	24.95	1.43	1.24
Professional services	54.99	60.80	68.35	60.68	0.80	1.00
Administrative services	68.56	63.61	44.93	35.03	1.53	1.82
Educational services	95.33	94.07	49.44	47.57	1.93	1.98
Health care and social assistance	64.65	87.93	51.95	45.63	1.24	1.93
Arts, entertainment and recreation	77.43	68.23	71.63	67.20	1.08	1.02
Accommodation and food services	85.88	84.86	61.95	60.56	1.39	1.40
Other services	86.18	91.68	87.08	85.87	0.99	1.07
Business sector	64.39	66.32	54.90	50.39	1.17	1.32

Source: Statistics Canada, authors' calculations.

Across almost all industries, the share of small firms is larger in Canada than in the United States, with the exception of the mining and utilities sectors. In these two sectors, small firms play a less significant role in Canada compared with the United States, and large firms have a relatively higher presence in Canada.[8]

Table 3 reports labour productivity levels by firm size at the industry level for Canada, and Table 4 provides similar data for the United States. Generally, small firms are less productive than large firms across most industries. However, in some service sectors—such as professional services—and in mining and utilities, small firms are as productive as, or even more productive than, large firms in both countries.

Table 3
Labour productivity levels by firm size in Canadian industries (Canadian dollars per hour worked, 2017 prices)

	Small firms		Large firms		Small firms over large	
	2002	2019	2002	2019	2002	2019
Agriculture, forestry, fishing and hunting	23.85	53.59	69.40	39.31	0.34	1.36
Mining	194.96	314.53	472.14	272.06	0.41	1.16
Utilities	149.36	213.57	183.75	200.77	0.81	1.06
Construction	47.23	49.16	96.66	50.20	0.49	0.98
Manufacturing	36.93	42.89	74.01	90.74	0.50	0.47
Wholesale and retail trade	28.77	39.66	34.35	44.22	0.84	0.90
Transportation and warehousing	35.81	37.72	45.00	58.06	0.80	0.65
Information	37.93	61.67	109.96	140.63	0.34	0.44
Finance, insurance and real estate	71.00	88.57	77.41	99.89	0.92	0.89
Professional services	62.34	66.41	32.41	33.07	1.92	2.01
Administrative services	28.56	36.31	37.39	29.48	0.76	1.23
Educational services	18.86	22.09	33.28	35.66	0.57	0.62
Health care and social assistance	62.55	46.02	22.99	30.85	2.72	1.49
Arts, entertainment and recreation	19.07	28.41	61.98	34.87	0.31	0.81
Accommodation and food services	19.31	19.89	30.69	29.14	0.63	0.68
Other services	21.53	24.52	17.14	32.74	1.26	0.75
Business sector	38.00	47.07	68.94	75.26	0.55	0.63

Source: Statistics Canada, authors' calculations.

8. In arts, entertainment and recreation, the share of hours worked by small firms was lower in Canada, but their share of GDP was similar in both countries.

Table 4
Labour productivity levels by firm size in U.S. industries (U.S. dollars per hour worked, 2017 prices)

	Small firms		Large firms		Small firms over large	
	2002	2019	2002	2019	2002	2019
Agriculture, forestry, fishing and hunting	25.75	38.51	53.40	75.20	0.48	0.51
Mining	236.46	328.40	227.85	229.31	1.04	1.43
Utilities	69.98	119.51	125.51	135.91	0.56	0.88
Construction	40.72	38.14	71.84	49.26	0.57	0.77
Manufacturing	32.83	52.01	63.20	101.24	0.52	0.51
Wholesale and retail trade	35.56	46.36	39.98	54.34	0.89	0.85
Transportation and warehousing	38.52	50.96	46.42	45.86	0.83	1.11
Information	35.80	175.63	68.59	181.63	0.52	0.97
Finance, insurance and real estate	83.52	127.25	82.91	87.55	1.01	1.45
Professional services	77.64	83.27	75.16	80.67	1.03	1.03
Administrative services	32.48	55.87	30.62	35.23	1.06	1.59
Educational services	30.22	33.28	36.55	37.81	0.83	0.88
Health care and social assistance	38.55	43.08	35.95	44.11	1.07	0.98
Arts, entertainment and recreation	40.86	55.64	40.02	42.88	1.02	1.30
Accommodation and food services	21.33	22.35	29.97	26.73	0.71	0.84
Other services	33.52	33.25	53.08	43.20	0.63	0.77
Business sector	40.29	52.84	53.45	67.69	0.75	0.78

Source: Statistics Canada, authors' calculations.

Finally, Table 5 compares the productivity disadvantage of small firms relative to large firms between Canada and the United States. While Canadian firms are generally less productive than their U.S. counterparts across both small and large firm categories in nearly all industries, the relative productivity gap (i.e., the disadvantage faced by small firms) is not uniform. In health care and social assistance, professional services, utilities, and construction, the productivity disadvantage of small firms is actually smaller in Canada than in the United States in 2019.

Table 5
Relative labour productivity of small vs. large firms by industry in Canada and the United States, 2002 and 2019 (percentage points)

	Canada		United States		Canada over the United States	
	2002	2019	2002	2019	2002	2019
			percentage points			
Agriculture, forestry, fishing and hunting	34.37	136.32	48.22	51.21	0.71	2.66
Mining	41.29	115.61	103.78	143.21	0.40	0.81
Utilities	81.28	106.38	55.76	87.93	1.46	1.21
Construction	48.86	97.94	56.69	77.42	0.86	1.26
Manufacturing	49.89	47.27	51.94	51.37	0.96	0.92
Wholesale and retail trade	83.75	89.71	88.96	85.32	0.94	1.05
Transportation and warehousing	79.58	64.97	82.99	111.12	0.96	0.58
Information	34.50	43.85	52.20	96.70	0.66	0.45
Finance, insurance and real estate	91.72	88.67	100.73	145.34	0.91	0.61
Professional services	192.38	200.79	103.30	103.21	1.86	1.95
Administrative services	76.37	123.19	106.06	158.59	0.72	0.78
Educational services	56.66	61.95	82.68	88.04	0.69	0.70
Health care and social assistance	272.13	149.21	107.24	97.66	2.54	1.53
Arts, entertainment and recreation	30.78	81.49	102.11	129.76	0.30	0.63
Accommodation and food services	62.91	68.27	71.16	83.62	0.88	0.82
Other services	125.61	74.88	63.15	76.95	1.99	0.97
Business sector	55.12	62.54	75.38	78.07	0.73	0.80

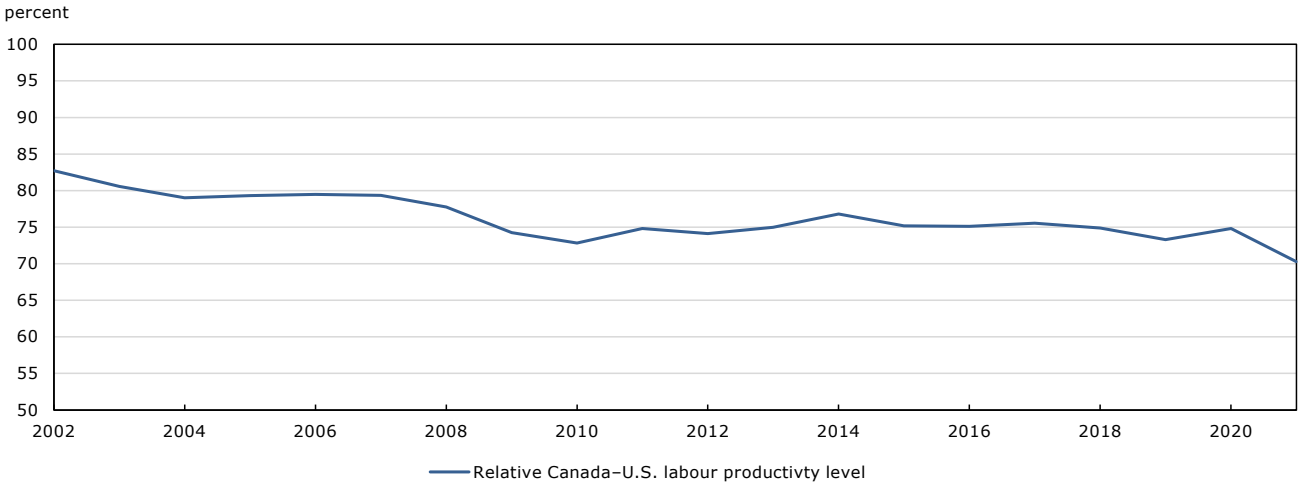
Source: Statistics Canada, authors' calculations.

The role of firm size for Canada–U.S. labour productivity performance

Labour productivity growth has been much lower in Canada than in the United States since 2000 (see, for example, Gu and Willox [2023]). Consequently, Canada's labour productivity gap relative to the United States widened over this period. This section examines the role of firm size in explaining the Canada–U.S. labour productivity difference, focusing on both productivity levels and growth. It asks two questions. First, what is the role of small firms in explaining Canada's lower labour productivity relative to the United States? Second, what are the relative contributions of small and large firms to the widening labour productivity gap between Canada and the United States after 2002? The analysis of labour productivity focuses on the period from 2002 to 2019, since the years after 2019 were affected by the pandemic and may not reflect the underlying trend in productivity performance.

Chart 7 shows the relative labour productivity level between Canada and the United States for the business sector. This relative productivity is calculated by comparing the volume of output per hour worked in Canada with that in the United States. The estimates are derived as the ratio of nominal GDP per hour worked in the two countries, adjusted by a relative price index or purchasing power parity (PPP) that reflects the relative prices of output. The PPPs used are from 1999 and sourced from Baldwin, Gu and Yan (2008). These PPPs are consistent with the basic-price concept of output for the benchmark year 1999 and are projected forward using the relative movements of business-sector GDP deflators for Canada and the United States.

Chart 7
Relative labour productivity levels in the business sector: Canada vs. United States, 2002 to 2021



Source: Statistics Canada, authors' calculations.

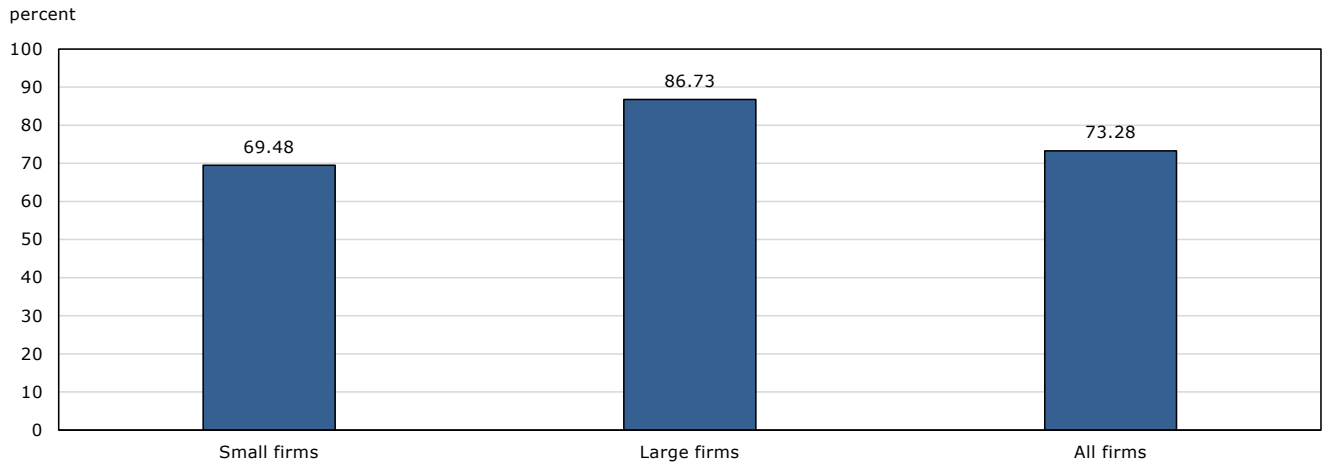
In 2002, labour productivity in Canada's business sector was approximately 83% of that in the United States. By 2019, this gap had widened, with Canadian productivity declining to about 73% of U.S. levels because of relatively slower productivity growth.

To address the question of how small firms contribute to Canada's relatively lower labour productivity compared with the United States, this paper builds on the work of Baldwin, Leung and Rispoli (2014) (2014), which analyzed the role of firm size in the Canada–U.S. productivity level difference from 2002 to 2008. In that paper, the contribution of small firms to the Canada–U.S. labour productivity gap is broken down into two main questions:

- How much of the gap is because Canada has a larger share of small firms?
- How much is because small Canadian firms experience a relatively greater productivity disadvantage compared with large firms?

Chart 8 shows the labour productivity level gap between Canada and the United States for the total business sector and by firm size. In 2019, Canada's labour productivity was 73% of the U.S. level, reflecting a 27-percentage-point gap. The gap was wider among small firms: small Canadian firms operated at 70% of the U.S. productivity level—a 30-percentage-point gap—while large firms in Canada reached 87% of the U.S. level, resulting in a 13-percentage-point gap.

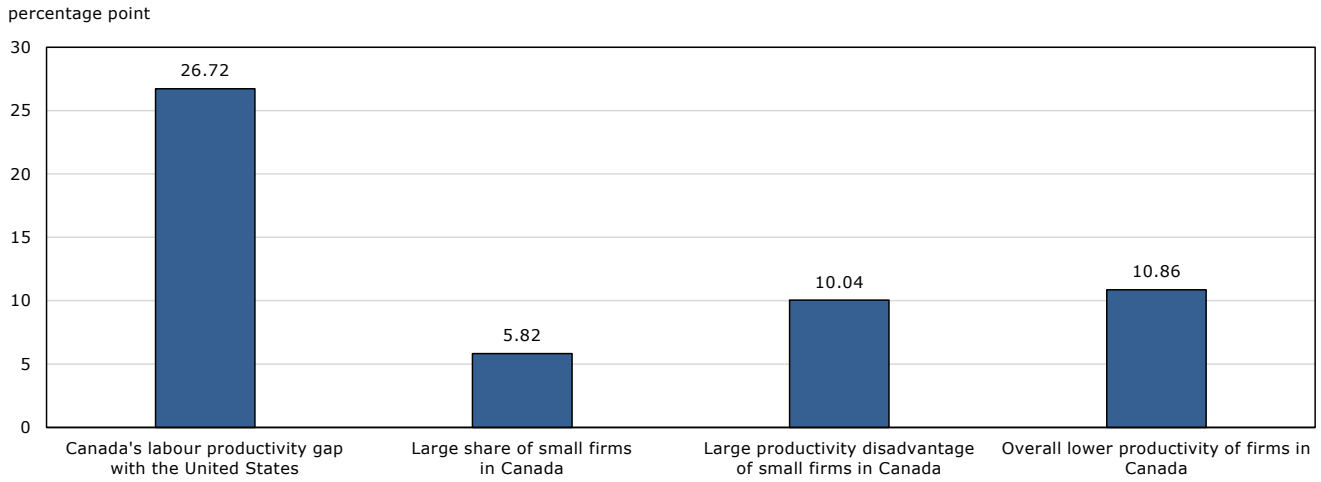
Chart 8
Relative labour productivity levels by firm size: Canada vs. United States, business sector, 2019



Source: Statistics Canada, authors' calculations.

Chart 9 decomposes this overall productivity gap, attributing it to two main factors: Canada's higher share of small firms and the greater productivity shortfall among those firms. If Canada had the same firm size distribution as the United States in 2019, its aggregate labour productivity would be about 6 percentage points higher. In other words, the relatively large share of small firms in Canada accounts for approximately 6 percentage points—or 22%—of the 27-point productivity gap.

Chart 9
Contribution of small firms to the Canada–U.S. labour productivity gap in 2019



Source: Statistics Canada, authors' calculations.

The second component of the role of small firms in the Canada–U.S. labour productivity gap is estimated by applying the U.S. ratio of small to large firm productivity to small Canadian firms to estimate a hypothetical productivity level. This shows that Canada's relatively larger productivity disadvantage of small firms accounts for about 10 percentage points, or roughly 38%, of the 27-point gap in 2019.

Overall, the combination of a larger share of small firms and their stronger productivity disadvantage in Canada accounts for 60% of the Canada–U.S. labour productivity gap.

To examine the contributions of small and large firms to the widening Canada–U.S. labour productivity gap from 2002 to 2019, or to Canada's relatively lower labour productivity growth during that period, a standard shift-share analysis proposed by Stiroh (2002) is used.

A country's labour productivity growth can be expressed as the weighted average of productivity growth across small and large firms, plus a reallocation term that captures the effect of shifting hours worked toward firms with higher labour productivity levels (Stiroh, 2002).

In particular, aggregate labour productivity growth in a country can be written as

$$\Delta lnLP = \Sigma_{i=S,L} w_i \Delta lnLP_i + \left(\Sigma_{i=S,L} w_i \Delta lnH_i - \Delta lnH\right)$$

In this equation, Δln denotes the log difference between two years, or, equivalently, the log growth rate over two years.

According to this decomposition, the growth in aggregate labour productivity (denoted by *LP*) consists of two components. The first term captures the direct contribution of small and large firms to aggregate labour productivity growth. It is calculated as the weighted average of labour productivity growth across the two firm types. The firm type is denoted by *i*, where *i* = *S* for small firms and *i* = *L* for large firms. The weight, w_i, represents the share of firm type *i* in nominal value added, averaged over the two years. The second term on the right-hand side captures the reallocation effect of hours worked. This effect is positive when hours are reallocated toward firms with higher relative labour productivity levels. In this case, these are typically large firms.

This equation can be applied to both Canada and the United States. The difference in aggregate labour productivity growth between Canada and the United States can then be decomposed into two components: the difference in the direct contribution of small and large firms to aggregate labour productivity growth and the difference in the reallocation of hours worked between small and large firms across the two countries.

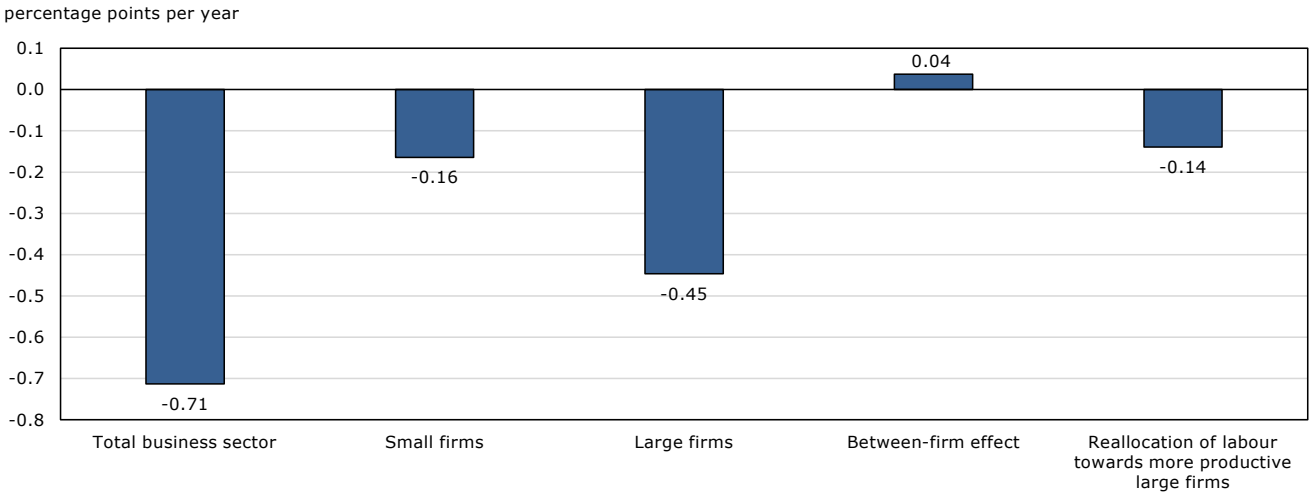
The first component can be further decomposed into two terms: (1) the within-firm-type contribution, which reflects productivity growth differences for small and large firms, holding their shares constant at the average share of small firms in nominal value added across both countries, and (2) the between-firm-type contribution, which captures differences in the share of small firms between the two countries.

Figure 6 presents a comparison of labour productivity growth for small and large firms in Canada and the United States. Both small and large firms in Canada had lower labour productivity growth than their counterparts in the United States. However, the productivity growth gap between the two countries was smaller among small firms than among large firms during the period from 2002 to 2019.

Over this period, labour productivity growth for small firms in Canada averaged 1.26% per year, compared with 1.60% per year in the United States—a gap of 0.34 percentage points. For large firms, productivity growth in Canada was 0.52% per year, while in the United States, it was 1.39% per year, resulting in a gap of 0.87 percentage points. The productivity growth of large firms in Canada is significantly lower than that of large firms in the United States.

Chart 10 presents the contributions of small and large firms to the labour productivity growth gap between Canada and the United States using the decomposition method discussed above.

Chart 10
Contribution of firm size to the Canada–U.S. labour productivity growth gap, 2002 to 2019



Source: Statistics Canada, authors' calculations.

From 2002 to 2019, labour productivity growth in Canada was 0.71 percentage points lower than in the United States. This gap reflects an average annual labour productivity growth rate of 0.84% in Canada, compared with 1.56% in the United States.

The slower labour productivity growth of small firms in Canada accounted for 0.16 percentage points of this 0.71-percentage-point gap, while the weaker productivity growth of large firms contributed 0.45 percentage points. The relatively large contribution of large firms to the Canada–U.S. labour

productivity growth difference reflects the large productivity growth gap between large firms in the two countries.

For the period from 2002 to 2019, there was a shift in hours worked toward small firms with lower productivity in Canada, which contributed negatively to aggregate labour productivity growth. In contrast, in the United States, hours worked shifted toward large firms with higher labour productivity levels, contributing positively to aggregate productivity growth. As a result, the reallocation of hours toward small firms in Canada accounted for approximately 0.14 percentage points per year of the slower productivity growth in Canada compared with the United States.

The final term of the decomposition, the between-firm-type effect, is small, contributing positively by 0.04 percentage points per year to the relative labour productivity growth difference between Canada and the United States. This positive effect reflects the higher share of small firms in Canada, combined with higher labour productivity growth among small firms compared with large firms in both countries.

Section 4: Conclusion

This study examines the role of firm size in explaining the Canada–U.S. labour productivity gap in terms of both levels and growth since 2000. Over this period, Canada experienced significantly slower labour productivity growth than the United States, widening the productivity gap between the two countries—Canada's productivity declined from 83% of the U.S. level in 2002 to 73% in 2019.

The analysis shows that this widening gap is partly attributable to differences in firm size structure and relative firm performance. Specifically, small firms in Canada not only represent a larger share of employment than in the United States but also exhibit a greater productivity disadvantage relative to large firms. In 2019, Canada's small firms operated at 70% of the productivity level of their U.S. counterparts, compared with 87% for large firms.

Decomposition results reveal the following:

- Canada's higher share of small firms accounts for roughly 6 percentage points (22%) of the 27-point productivity gap.
- The relatively greater productivity disadvantage of small Canadian firms explains about 10 percentage points (38%) of the gap.

Together, these two factors account for 60% of the Canada–U.S. labour productivity gap in 2019, with the remainder attributable to the generally lower productivity of Canadian firms.

In terms of growth, both small and large firms in Canada underperformed compared with their U.S. peers from 2002 to 2019. The productivity growth gap was more pronounced among large firms (0.87 percentage points) than among small firms (0.34 percentage points). A shift-share analysis indicates the following:

- The weaker productivity growth of large firms in Canada contributed 0.45 percentage points to the overall 0.71-percentage-point Canada–U.S. growth gap.

- The slower productivity growth of small firms contributed 0.16 percentage points.
- The increase in the share of small firms and the shift of hours worked toward small firms in Canada contributed the remaining 0.14 percentage points to the overall 0.71-percentage-point gap between Canada and the United States.

Overall, the findings highlight the importance of improving the productivity performance of both small and large firms in Canada to close the widening productivity gap with the United States. These findings suggest that enhancing the productivity of small firms—and supporting their growth through improved access to markets, financing, innovation and managerial capabilities—could be key to narrowing this gap.

The results also indicate that large firms in Canada have lower productivity than their counterparts in the United States. This gap widened over time, as large firms in Canada experienced much slower labour productivity growth compared with those in the United States. Moreover, large firms have been losing their share of the Canadian economy, especially when measured by GDP, further slowing labour productivity growth in Canada. To close this gap, large Canadian firms need to catch up to the productivity levels of large U.S. firms or global productivity frontiers and increase their share of the Canadian economy.

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