**Productivity Growth in Canada and the United States, Recent Trends and Determinants**

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**Abstract**

This paper provides a comparison of productivity growth in Canada and the United States. U.S. labour productivity growth exceeded Canadian growth from 1980 to 2010, by a margin that widened over that period. Since 2010, labour productivity growth in Canada has exceeded that in the United States. To understand the sources of these differences, the difference in the relative labour productivity growth in the two countries is decomposed into their differences in its three main components: investment in physical capital, skills upgrading and multifactor productivity (MFP) growth. The difference in aggregate labour productivity growth and its three main components in the two countries are further decomposed into their differences at the industry level. While Statistics Canada has published MFP statistics at the industry level since the early 1990s, those data have only become available recently in the United States, allowing new insights into the sources of the recent divergence in MFP growth in the two countries.

# 1    Introduction

This paper provides a comparison of productivity growth in Canada and the United States over the period from 1987 to 2016. U.S. labour productivity growth exceeded Canadian growth before the financial crisis of 2008 and 2009. After the crisis, labour productivity growth in both Canada and the United States declined. However, the decline was much smaller in Canada compared with the decline in the United States. As a result, labour productivity growth in Canada has exceeded that in the United States since 2010.

To understand the sources of these differences at the industry level, industry productivity statistics published in the two countries are used. While Statistics Canada has published multifactor productivity (MFP) statistics for the individual industries of the business sector since the early 1990s, those data have only become available recently in the United States. The main objective of paper is to trace the difference in aggregate labour productivity growth and its three main components into the contributions of individual industries. Those three components are: investment in physical capital, skills upgrading and multifactor productivity growth.

Gu and Ho (2000), Baldwin and Gu (2007), and Ho, Rao and Tang (2004) provided comparisons of industry productivity growth in Canada and the United States. The focus of those papers was on periods before the early 2000s. In this paper, those results are updated to 2016 to examine the productivity growth in the two countries over a period that is characterized by the financial crisis of 2007 and 2008, and the ensuing recovery as well as large swings of commodity crisis.

The more comparable estimates of output, capital and labour and intermediate input and productivity growth at the industry level have only became available recently. The largest changes in the data that contribute to better comparability are associated with revisions to the measure of capital input in Canada and the revisions to labour input in the U.S. The revisions to Canadian data are summarized in Baldwin et al (2014), which now use a method for estimating capital input that is similar to the US. BLS. The U.S BLS has also developed labour composition estimates at the industry level that take into account the changes in the composition of hours worked that take into account differences in the education level and experience of workers. As a result, the concept and estimation of the capital and labour inputs are more similar in the two countries than before.

Other recent work, including Tsang (2018), Baldwin and Willox (2016) has examined the recent trends in productivity growth in Canada. The focus of this paper is on the relative productivity growth in Canada and United States.

## 2    Data Sources

Productivity measures in Canada and the BLS follow the framework laid down by Jorgenson (1966); Jorgenson, Gollop and Fraumeni (1987); Jorgenson, Ho and Stiroh (2005); and Schreyer (2001). In the productivity accounts, industry-level productivity growth is estimated using detailed data on gross output and inputs, and aggregate productivity growth is estimated using industry-level data. Industry productivity accounts and aggregate productivity accounts are fully integrated; MFP growth at the aggregate level and MFP growth at the industry level are related to one another through Domar aggregation (Domar 1961).

Multifactor productivity growth in the productivity accounts is defined as output growth that is not accounted for by the growth of inputs. Multifactor productivity measures the extent to which inputs are efficiently used in the production process. Growth in MFP is often associated with technological change, organizational change, or economies of scale in addition to changes in production efficiency.

*Canadian data*

Productivity data for the business sector and individual industries in Canada are from the Canadian Productivity Accounts of Statistics Canada. Output for the total business sector is measured as value added while the output for individual industries is gross output. Gross output and intermediate inputs from Statistics Canada's supply-use tables (SUT). Value added is derived from SUT tables using double deflation. For the post-reference years (for which SUT have no data yet), the real GDP in the business sector is based on a measure of real GDP at basic prices published by the Industry Analysis Division at Statistics Canada.

Hours worked represents the total number of hours that a person devotes to work, whether paid or unpaid. Labour input is hours worked multiplied by a labour composition index. The number of hours worked is calculated as the product of the number of jobs times average hours worked, which are derived from household and establishment surveys. The labour composition index estimates the effect of shifts in the experience, education and the class of workers on the total amount of labour services provided by total hours worked (Statistics Canada 2002).

Capital service input is an estimate of the service flows derived from the stock of capital assets. The capital services measure is based on the bottom-up approach. This approach involves three steps. These are the estimation of capital stock, the aggregation of capital stock of various asset types within each

industry to estimate industry capital services, and the aggregation of capital services across industries to derive capital services in the business sector (Baldwin et al. 2015).

*U.S. data*

Productivity data for the private business sector and individual industries in the United States is from the U.S. Bureau of Labor Statistics (BLS). Output for the total business sector is value added while output for individual industries is measured by sectoral output. Sectoral output of an industry differs from gross output as sectoral output nets out the transactions of intermediate inputs between production units in the industry.  The BLS publishes MFP and related variables for the private business and private non-farm business sectors. More recently, it has also released the MFP data base for individual industries back to 1987.  For the purpose of this paper, we will focus on the productivity performance of the U.S. private business sector and compare it with the Canadian business sector.[1] The methods for constructing MFP in the U.S. private business sector are documented in BLS (1983, 1997).

The main analysis of this paper focuses on the period from 1987 to 2014 when the industry productivity data are available in both industries.

## 3    Sources of aggregate labour productivity growth

Figure 1 presents the Canada-U.S. relative labour productivity for the business sector over the period from 1961 to 2016. Canadian labour productivity growth exceeded that of the United States up to the mid-1980s. From the mid-1980s to 2010, U.S. labour productivity growth exceeded Canadian growth. The gap widened over that period, particularly for the period 2000 to 2010. After 2010, Canadian labour productivity growth exceeded that of the United States.

Both Statistics Canada and the U.S. BLS decompose labour productivity growth into three components—capital intensity, the skill level of the labour force (due to changes in labour composition) and a residual (MFP growth). The first two components (both arising from investment, one in machinery and structures, the other in training) were more similar in Canada after 1980. The third (the residual often referred to as technological progress) was larger in the United States (Baldwin and Gu, 2007).

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[1].   In the remainder of the paper, the U.S. private business sector is referred to as the U.S. business sector.

Table 1 summarizes labour productivity growth and its three main components in the Canadian and the U.S. business sector over the period from 1987 to 2016. For the period from 1987 to 2010, labour productivity growth was much slower in Canada than in the United States. Labour productivity rose at 1.30% per year in the Canadian business sector, while it increased 2.33% per year in the U. S. business sector.

The slower labour productivity growth in Canada compared with that in the United States in the period from 1987 to 2010 reflected slower MFP growth in Canada, a fact that is well documented in previous studies (e.g. Baldwin and Gu, 2007). The effects of capital deepening, skills upgrading and changes in labour composition towards more educated and more experienced workers on productivity growth were similar in the two countries.

After 2010, labour productivity growth declined in Canada and the United States. For the United States, the decline in labour productivity growth in the period from 2010 to 2016 compared with the 1987-to-2010 period was mostly attributed to weaker contributions form capital deepening effect and MFP growth (Baily and Montalbono, 2016, Manyika, et al, 2017). The weaker effect of labour composition after 2010 also contributed to the slowdown in aggregate labour productivity growth in the U.S. In contrast, for Canada, the lower labour productivity growth after 2010 was mainly due to the capital deepening effect and, to a lesser extent, the effect of labour composition. Multifactor productivity growth in Canada increased after 2010.

The slowdown in labour productivity growth after 2010 was much larger in the United States than in Canada. As a result, labour productivity in Canada's business sector increased at a faster pace than in the United States. Labour productivity increased 1.05% per year on average in Canada over this period, double the 0.51% average annual increase in the United States.

The relatively faster growth in labour productivity in Canada over this period was due to the larger increase in capital intensity in Canada. For the 2010-to-2016 period, increases in capital intensity contributed an annual average of 0.52 percentage points to labour productivity growth in Canada. By comparison, capital intensity declined in the United States, subtracting an average of 0.06 percentage points annually from U.S. labour productivity growth.

Over the same period, MFP growth was slightly lower in Canada than in the United States. Multifactor productivity contributed an annual average of 0.35 percentage points to labour productivity growth in Canada, and it contributed an annual average of 0.41 percentage points to labour productivity growth in

the United States. A similar pattern emerged for skills upgrading. In both countries, skills upgrading contributed similarly averaging about 0.2 percentage points annually to labour productivity growth.

In the rest of the paper, the two countries' respective industry productivity databases are used to examine the sources of difference in aggregate labour productivity growth and its three main components between Canada and the United States. The period for which industry productivity databases (KLEMS databases) are available for both countries is from 1987 to 2014. When a comparison of productivity growth is made for the 2010-to-2014 period, the higher labour productivity growth in the Canadian business sector is attributable to the stronger capital deepening effect and higher MFP growth in Canada.

## 4    Sources of labour productivity growth at the industry level

Output in the Canadian industry productivity database is measured as gross output while it is measured as sectoral output in the United States. Sectoral output differs from gross output because sectoral output of an industry removes the transaction between establishments within the industry while gross output does not. This will bias the comparison in favour of the United States. But it will not affect its contribution to aggregate productivity growth, a property of the Domar aggregation.

Labour productivity growth at the industry level is defined as gross output (or sectoral output) per unit of hours worked. The growth in labour productivity can be composed into the contributions from capital deepening, labour compositional change, intermediate input deepening, and MFP growth. Tables 2 and 3 present the sources of labour productivity growth by industry for Canada and the United States over the period from 1987 to 2010. For both Canada the United States, the largest contributor to labour productivity growth is the intermediate input deepening, reflecting the trends towards sourcing of intermediate inputs from domestic industries and abroad. The capital deepening is an important contributor to labour productivity growth. The shifts of workers towards higher education levels and more experience also made a significant contributor to labour productivity growth in both countries. Multifactor productivity growth was an important contributor to labour productivity growth in the United States on average , but it made a much smaller average contribution to labour productivity growth in Canada.

Tables 4 and 5 present the sources of labour productivity growth by industry for Canada and the United States over the period between 2010 and 2014. For both Canada and the United States, intermediate input deepening remained the most important contributor to labour productivity growth.

The capital deepening effect and MFP growth made a positive contribution to labour productivity growth on average in Canadian industries. But, the capital deepening effect and MFP growth made a negative

contribution to labour productivity growth in the U.S. industries after 2010. The decline in both the capital deepening effect and MFP in the United States after the financial crisis has been well documented in previous studies (e.g., Baily, et al., 2017).

For the period between 1987 and 2010, labour productivity growth, capital deepening, intermediate input deepening and MFP are statistically significantly correlated across industries between Canada and the United States. For both countries, the industries with relatively high capital deepening effect and MFP growth are those industries that are either producers of information and communication goods and services (ICT) and intensive users of ICT. This suggests that similar demand, investment, technology, and innovation factors are contributing to the growth of those industries in both countries. For example, previous studies found that MFP growth is associated with investment in information and communication technologies, and offshoring (Ho, Rao and Tang, 2004)

For the period after 2010, MFP growth, capital deepening and intermediate input deepening are not correlated across industries in the two countries. The Canadian industries with relatively higher MFP growth and input deepening differ from those industries in the United States. This may reflect the difference in the adjustment of the industries in the two countries to emerging technologies such as digitalization, robots, internet of things or the difference in the adoption of digital technologies and associated changes in business innovation in the two countries (citations?).

## 5    Industry contribution to aggregate labour productivity growth in Canada and United States

This section presents an examination of the industry contribution to Canada –U. S. differences in aggregate labour productivity growth and its three main components: capital deepening, labour composition and MFP growth in two periods, 1987 to 2010 and 2010 to 2014. It will use the industry productivity database that is presented in section 4. The section focuses on the industry contributions to the two most important differences in aggregate labour productivity growth in the two countries identified in section 3 by addressing two main questions.

First, for the period from 1987 to 2010, agregate labour productivity growth in the business sector was slower in Canada compared with that in the U.S. The relatively slower growth in Canada's aggregate labour productivity was mainly due to the relatively slower MFP growth in Canada. The section asks the question: which industries contributed to the relatively slower labour and MFP growth in Canada in the period from 1987 to 2010?

Second, for the period from 2010 to 2014, aggregate labour productivity growth was higher in Canada compared with that in the U.S. The relatively faster growth in Canada's labour productivity was mainly due to the relatively higher capital deepening effect and higher multifactor growth in Canada. This section asks: which industries contributed to the relatively higher labour and MFP growth, and higher capital deepening effect in Canada in the period from 2010 to 2014.

The contributions of industries to aggregate labour productivity growth and its components are measured using the direct industry aggregation approach used by Jorgenson, Ho, Samuels, and Stiroh (2007) and Fleck et. al. (2014) and Gu (2018). In this approach, aggregate value-added labour productivity growth is the share-weighted growth of industry value-added labour productivity growth, where the weights used are calculated as the industry shares of nominal value added. The contribution of industry capital deepening, labour compositional changes and MFP growth to aggregate value-added labour productivity growth is the Domar-weighted contribution. Each industry's Domar weight is the ratio of the industry's current-dollar gross or sectoral output to aggregate current-dollar value added. The industry's contribution to aggregate MFP growth is the industry's MFP growth multiplied by its Domar weight. The contribution of industry intermediate input deepening cancels out.

The sum of industry contributions may differ from aggregate value-added labour productivity growth and its three main components. The difference reflects the reallocation of capital input, labour input and value added output across industries. The difference is small except for industry contributions to aggregate labour and multifactor productivity growth for the U.S. over the period 2010 to 2014. For that period, the reallocation of output and capital input across industries made a significant contribution to aggregate labour productivity growth in the United States and each contributed about 0.2 pps to aggregate labour productivity growth. For a rich discussion on this issue see Reinsdorf, Marshall (2015), Baldwin and Willox (2016), Balk, Bert M. (2014), de Avillez, Ricardo (2012), Nordhaus (2001) and Stiroh (2002), Tang and Wang (2004) and Sharpe (2010), and Diewert (2010).

Table 6 presents a comparison of the contribution to aggregate labour productivity growth by industry for Canada and the United States for the period from 1987 to 2010. Over that period, labour productivity growth in the Canadian business sector was slower in Canada than that in the U.S. Most Canadian industries contributed to Canada's lower labour productivity growth. The largest contributors to slower labour productivity growth include: computer and electronic products, information and culture industries, finance and insurance, utilities, professional services, retail and wholesale trade. Those industries are mostly all related to the production and use of ICT. When industries are classified into three main groups: ICT producing industries, ICT using industries and non-ICT industries, shown in Figure 2, ICT producing

industries and ICT using industries each accounted for 0.5 percentage points of the overall lower labour productivity growth in Canada. Non-ICT industries accounted for 0.3 percentage points.[2]

Tables 7, 8 and 9 present industry contributions to the aggregate capital deepening effect, aggregate labour compositional changes and aggregate MFP growth by industry for Canada and the United States for the period from 1987 to 2010. Figures 3, 4 and 5 aggregate the industry contributions into contributions from three main industry groups: ICT producing industries, ICT using industries and non-ICT industries.

The ICT producing and ICT using industries contributed to relatively the lower aggregate capital deepening effect in Canada for the period from 1987 to 2010, which was partly offset by the positive contribution from higher capital deepening effect from non-ICT industries such as oil and gas and mining extraction industries.

The difference in aggregate labour composition was small in the two countries during the period from 1987 to 2010, which is a result of positive contribution from half of the Canadian industries being offset by negative contribution of the remaining half of the industries.

Most Canadian industries contributed to the relatively lower MFP growth in Canada for the period from 1987 to 2010. The industries that made the largest contributions to the slower MFP growth in Canada were similar to those that contributed to slower aggregate labour productivity growth. Those industries include computer and electronic products, oil and gas, retail trade, transportation and warehousing, and wholesale trade. ICT producing industries and ICT using industries each accounted for 0.4 percentage points of the overall lower MFP growth in Canada. Non-ICT industries accounted for 0.3 percentage points.

Table 10 presents industry contributions to aggregate labour productivity growth for Canada and the United States for the period from 2010 to 2014. Tables 11, 12 and 13 present industry contributions to aggregate capital deepening effect, labour compositional changes and MFP growth. For the period from 2010 to 2014, most Canadian industries had higher labour productivity growth, capital deepening effects and MFP growth than their U.S. counterparts. The Canada's relatively better performance in capital deepening and MFP growth occurred in both ICT and non-ICT industries.

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[2] The classification of industries to ICT producing and ICT using industries are adopted from Jorgenson, Ho and Samuels (2010). The ICT producing industry is defined as computer and electronic product manufacturing industry. The ICT using industries consist of construction, machinery, wholesale and retail, transportation, information and culture, finance and insurance, and professional service.

## 6    Potential Explanations for Canada –U.S. Differences in Productivity Growth

This section provides a discussion of some potential explanations for Canada –U.S difference in productivity growth since the mid-1980s: the deteriorating labour productivity performance in Canada relative to that in the United States over the period from 1987 to 2010 and the improving labour productivity performance in Canada relative to that in the United States after 2010.

The previous studies examined the declining labour productivity growth in the United States since 2004, especially after 2009. There are three main explanations for the declining productivity growth in the United States (Baily and Montalbano, 2017, Manyika et al. 2017, Sharpe 2017). The first explanation focuses on the mismeasurement of output, inputs and productivity in the new digital economy. Gross domestic product and productivity is increasingly difficult to measure, as it fails to capture capital input arising from intangible capital and digital technologies and to capture the benefits of intangibles and digital technologies in output measure. The second explanation focuses on the impact of technological innovation. On one hand, digital technologies (mobile technology, the internet, and clouding computing) are unlikely to  have as big effect on productivity growth compared with previous innovations such as internal combustion engine and electricity (Gordon, 2016) . On the other hand, the new digital economy has yet to generate gains in productivity (van Ark, 2017). This explanation is sometimes referred to the Solow paradox redux (Manyika et al. 2017). The third explanation focuses on the rise of secular stagnation and the impact of the weak demand on business investment and other productivity-enhancing business innovations after the financial crisis. The shortage of demand and investment opportunities are having negative effect on investment and capital deepening, a key driver of productivity growth. In an environment characterized with weak demand, businesses have less incentive to investment in capital and other innovation activities.

Labour productivity growth also declined Canada after the financial crisis. But the decline was not as large as that in the United States. As a result, labour productivity growth was higher in Canada than in the United States over the period after 2010. Are the three explanations for slower productivity growth in the United States less important for Canada?

The mismeasurement of productivity growth is not found to be an important explanation for the slow productivity growth in both Canada and the United States. For example, Gu (2018) and Baldwin et al. (2018) found that the measurement issue may lead to a change in labour productivity by 0.1 or 0.2 percentage points, similar to the findings reported for the U.S. (Byrne et al. 2017).

The Solow paradox redux appears to be an important explanation for the slowdown in productivity growth in the U.S., as MFP growth that is commonly associated with innovation and technological progress declined in the U.S. after 2010. In contrast to the U.S., MFP growth increased in Canada after 2010. Multifactor productivity growth in Canada was essentially zero for 1987 to 2010 period, but it posted a growth rate of 0.4% per cent year for the period from 2010 to 2016.

The last explanation for the U.S. productivity slowdown focuses on the rise of secular stagnation and the impact of the weak demand on investment and MFP growth. Output growth was faster in the Canada than in the United States after the financial crisis (as shown in Figure 6). Is it possible that the stronger demand in Canada either from international trade or domestic economies has led to a higher capital deepening effect and higher MFP growth in Canadian industries?

When examining the relative slow productivity growth in Canada compared with that in the U.S. after 2000, Rao and Li (2013) found that that most of the post-2000 slowdown in business sector labour productivity growth was a result of weak demand growth in Canada, which impacted productivity directly by reducing economies of scale and scope and indirectly by affecting key productivity drivers such as investment and R&D.

To examine the role of weak demand on capital deepening and MFP growth, Canada-US difference in capital deepening and MFP growth was regressed on the difference in output growth across industries in the two periods 1987 to 2010 and 2010 to 2014. The change in labour composition is also included to examine the effect of skill upgrading and human capital on investment in physical capital and MFP growth. The results are presented in Table 14. The estimation results suggest that output growth is positively associated with MFP growth and capital deepening effects. The stronger output growth in the period from 2010 to 2014 was found to be associated with larger capital deepening effects and higher MFP growth in Canadian industries. The slower output growth in the period from 1987 to 2010 is associated with lower MFP growth and a lower capital deepening effect in Canadian industries in the that period, a finding that is consistent with that in Rao and Li (2013).

## 7    Conclusions

This paper provides a comparison of productivity growth in Canada and the United States for the period after 1987. The main findings are as follows.

First, for the period from 1987 to 2010, labour productivity growth was slower in Canada compared with that in the U.S. Slower growth in Canada's labour productivity was mainly due to the relatively slower MFP growth in Canada.

Most Canadian industries contributed to relatively lower MFP growth in Canada between 1987 and 2010. The industries that made the largest contributions include computer and electronic products, oil and gas, retail trade, transportation and warehousing, and wholesale trade. ICT producing industries and ICT using industries each accounted for 0.4 percentage points of the overall lower MFP growth in Canada. No-ICT industries accounted for 0.3 percentage points.

Second, for the period from 2010 to 2014, labour productivity growth was higher in Canada compared with that in the U.S. The relatively faster growth in Canada's labour productivity was mainly due to the relatively higher capital deepening effect and higher MFP growth in Canada.

Most Canadian industries had higher labour productivity growth, capital deepening effects and MFP growth than their U.S. counterparts for the between 2010 and 2014. The Canada's better performance in capital deepening and productivity growth occurred in both ICT and non-ICT industries.

The larger capital deepening effects and higher MFP growth in Canadian industries compared with those in U.S. industries were found to be associated with stronger output growth and demand in Canadian industries. The relatively stronger demand in Canadian industries has led to higher capital deepening effects and higher MFP growth compared with those in U.S. industries.

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**Table 1: Sources of labour productivity growth in the business sector, Canada and the United States**

|  | 1987-2010 | 2010-2016 | 2010-2014 |
|---|---|---|---|
| Canada |  |  |  |
| Labour productivity growth | 1.30 | 1.05 | 1.53 |
| Contribution of capital intensity | 0.98 | 0.52 | 0.65 |
| Contribution of labour composition | 0.34 | 0.18 | 0.14 |
| Multifactor productivity growth | -0.02 | 0.35 | 0.75 |
|  |  |  |  |
| United States |  |  |  |
| Labour productivity growth | 2.33 | 0.51 | 0.50 |
| Contribution of capital intensity | 0.98 | -0.06 | -0.16 |
| Contribution of labour composition | 0.30 | 0.16 | 0.17 |
| Multifactor productivity growth | 1.05 | 0.41 | 0.49 |
|  |  |  |  |
| Canada minus the United States |  |  |  |
| Labour productivity growth | -1.03 | 0.54 | 1.04 |
| Contribution of capital intensity | 0.00 | 0.58 | 0.81 |
| Contribution of labour composition | 0.04 | 0.01 | -0.03 |
| Multifactor productivity growth | -1.07 | -0.06 | 0.26 |

**Table 2. Sources of labour productivity growth in Canadian industries, 1987 to 2010**

| Industry | LP | capital deepen | labour compositn | Interm. deepening | MFP |
|---|---|---|---|---|---|
| Crop and animal production | 4.50 | 0.38 | 0.11 | 2.88 | 1.13 |
| Forestry, Fishing, and Related | 2.03 | 0.32 | -0.05 | 1.15 | 0.62 |
| Oil and gas extraction | 0.50 | 1.04 | 0.06 | 1.02 | -1.62 |
| Mining (exc. Oil & gas extraction) | 0.46 | 0.71 | 0.10 | 0.62 | -0.98 |
| Support activities for mining, oil & gas | 0.34 | 0.33 | 0.06 | 0.34 | -0.39 |
| Utilities | 0.39 | 0.18 | 0.11 | 0.50 | -0.40 |
| Construction | 0.45 | 0.10 | 0.08 | 0.41 | -0.15 |
| Food, Beverage and Tobacco | 1.21 | 0.16 | 0.07 | 1.19 | -0.21 |
| Textile and textile products | 1.42 | 0.19 | 0.09 | 0.93 | 0.21 |
| Clothing, Leather and allied products | 1.64 | 0.39 | 0.12 | 0.94 | 0.19 |
| Paper | 2.70 | 0.35 | 0.10 | 1.63 | 0.61 |
| Printing and related | 2.95 | 0.25 | 0.11 | 1.95 | 0.63 |
| Petroleum and coal products | 0.75 | 0.39 | 0.20 | 0.55 | -0.40 |
| Chemical manufacturing | 0.40 | 0.08 | 0.03 | 0.19 | 0.09 |
| Plastics and rubber products | 1.93 | 0.23 | 0.09 | 1.11 | 0.50 |
| Wood products | 1.79 | 0.19 | 0.16 | 0.97 | 0.46 |
| Non-metallic mineral products | 1.68 | 0.39 | 0.04 | 1.12 | 0.13 |
| Primary metal | 4.14 | 0.25 | 0.08 | 3.23 | 0.58 |
| Fabricated metal products | 0.49 | 0.05 | 0.12 | 0.14 | 0.19 |
| Machinery | 2.11 | 0.33 | 0.19 | 1.27 | 0.32 |
| Computer and electronic products | 6.65 | 0.56 | 0.22 | 4.70 | 1.16 |
| Electrical equipment | 2.28 | 0.38 | 0.17 | 1.45 | 0.28 |
| Transportation equipment | 3.26 | 0.32 | 0.09 | 2.51 | 0.33 |
| Furniture and related products | 1.83 | 0.26 | 0.12 | 1.09 | 0.36 |
| Miscellaneous manufacturing | 2.30 | 0.30 | 0.10 | 1.42 | 0.49 |
| Wholesale trade | 3.16 | 0.78 | 0.20 | 1.32 | 0.86 |
| Retail trade | 2.43 | 0.55 | 0.23 | 1.08 | 0.57 |
| Transportation and warehousing | 1.33 | 0.53 | 0.14 | 0.75 | -0.08 |
| Information and cultural industries | 2.92 | 1.13 | 0.11 | 1.46 | 0.22 |
| Finance and insurance | 1.26 | 0.63 | 0.13 | 0.53 | -0.04 |
| Professional service | 1.62 | 0.71 | 0.20 | 1.26 | -0.55 |
| Administration, waste management | 1.10 | 0.69 | 0.15 | 0.98 | -0.72 |
| Educational services | 0.50 | 0.18 | 0.68 | -0.72 | 0.37 |
| Health care and social assistance | 0.33 | 0.19 | 0.01 | 0.86 | -0.74 |
| Arts, entertainment and recreation | 0.56 | 0.50 | 0.19 | 1.02 | -1.16 |
| Accommodation and food services | 1.04 | 0.10 | 0.16 | 0.91 | -0.12 |
| Other services | 1.81 | 0.42 | 0.14 | 1.45 | -0.20 |
| Average | 1.79 | 0.39 | 0.13 | 1.20 | 0.07 |

**Table 3. Sources of labour productivity growth in U.S. industries, 1987 to 2010**

| Industry | LP | capital deepen | labour compositn | Interm. deepening | MFP |
|---|---|---|---|---|---|
| Crop and animal production | 2.71 | 0.42 | 0.04 | 0.55 | 1.71 |
| Forestry, Fishing, and Related | 0.03 | 0.18 | 0.27 | -0.04 | -0.38 |
| Oil and gas extraction | 0.92 | 0.10 | 0.00 | 0.54 | 0.28 |
| Mining (exc. Oil & gas extraction) | 1.97 | 0.37 | 0.04 | 0.03 | 1.53 |
| Support activities for mining, oil & gas | 1.78 | -0.65 | -0.15 | 0.32 | 2.27 |
| Utilities | 2.93 | 1.10 | 0.06 | 0.82 | 0.96 |
| Construction | -0.66 | 0.22 | 0.15 | -0.12 | -0.91 |
| Food, Beverage and Tobacco | 1.05 | 0.23 | 0.06 | 0.92 | -0.15 |
| Textile and textile products | 2.55 | 0.30 | 0.13 | 1.39 | 0.73 |
| Clothing, Leather and allied products | -0.35 | 0.48 | 0.71 | -3.06 | 1.52 |
| Paper | 1.28 | 0.16 | 0.18 | 0.89 | 0.06 |
| Printing and related | 1.90 | 0.49 | 0.10 | 1.32 | 0.00 |
| Petroleum and coal products | 1.26 | 0.33 | 0.13 | -0.01 | 0.81 |
| Chemical manufacturing | 2.75 | 0.35 | 0.05 | 1.10 | 1.24 |
| Plastics and rubber products | 2.05 | 1.54 | 0.08 | 0.71 | -0.29 |
| Wood products | 2.14 | 0.43 | 0.17 | 1.02 | 0.52 |
| Non-metallic mineral products | 0.86 | 0.35 | 0.07 | 0.51 | -0.07 |
| Primary metal | 3.01 | 0.20 | 0.11 | 2.24 | 0.46 |
| Fabricated metal products | 1.38 | 0.29 | 0.13 | 0.97 | 0.00 |
| Machinery | 2.46 | 0.49 | 0.17 | 2.12 | -0.32 |
| Computer and electronic products | 10.51 | 1.23 | 0.29 | 0.66 | 8.33 |
| Electrical equipment | 2.43 | 0.70 | 0.19 | 2.47 | -0.93 |
| Transportation equipment | 3.03 | 0.50 | 0.16 | 2.19 | 0.19 |
| Furniture and related products | 1.65 | 0.40 | 0.22 | 1.10 | -0.07 |
| Miscellaneous manufacturing | 2.89 | 0.69 | 0.28 | 1.01 | 0.91 |
| Wholesale trade | 3.42 | 0.72 | 0.18 | 0.90 | 1.62 |
| Retail trade | 2.64 | 0.58 | 0.15 | 0.59 | 1.34 |
| Transportation and warehousing | 1.54 | 0.08 | 0.13 | 0.20 | 1.13 |
| Information and cultural industries | 4.50 | 1.80 | 0.15 | 1.51 | 1.04 |
| Finance and insurance | 2.52 | 1.21 | 0.16 | 0.92 | 0.23 |
| Professional service | 1.75 | 0.48 | 0.26 | 0.87 | 0.14 |
| Administration, waste management | 1.84 | 0.29 | 0.28 | 0.79 | 0.48 |
| Educational services | -2.88 | -0.23 | 0.04 | -2.40 | -0.29 |
| Health care and social assistance | -0.16 | 0.05 | -0.08 | 0.57 | -0.70 |
| Arts, entertainment and recreation | 1.88 | 0.25 | 0.18 | 1.38 | 0.07 |
| Accommodation and food services | 2.03 | 0.58 | 0.09 | 0.46 | 0.91 |
| Other services | 1.10 | 0.10 | 0.06 | 1.31 | -0.38 |
| Average | 1.97 | 0.45 | 0.14 | 0.72 | 0.65 |

**Table 4. Sources of labour productivity growth in Canadian industries, 2010 to 2014**

| Industry | LP | capital deepen | labour compositn | Interm. deepening | MFP |
|---|---|---|---|---|---|
| Crop and animal production | -3.13 | -0.48 | 0.30 | -2.68 | -0.27 |
| Forestry, Fishing, and Related | -2.11 | -0.47 | 0.05 | -1.35 | -0.34 |
| Oil and gas extraction | 5.94 | 3.15 | -0.01 | 3.10 | -0.30 |
| Mining (exc. Oil & gas extraction) | -3.55 | 1.33 | 0.04 | -0.72 | -4.20 |
| Support activities for mining, oil & gas | 2.67 | 0.81 | 0.08 | 0.83 | 0.96 |
| Utilities | 4.03 | 3.64 | 0.03 | 0.93 | -0.56 |
| Construction | -1.91 | -0.05 | 0.03 | -1.34 | -0.55 |
| Food, Beverage and Tobacco | 2.39 | 0.15 | 0.14 | 1.82 | 0.28 |
| Textile and textile products | -0.79 | -0.44 | -0.22 | -0.35 | 0.23 |
| Clothing, Leather and allied products | 2.49 | 0.59 | 0.14 | 0.84 | 0.92 |
| Paper | 3.57 | -0.31 | -0.02 | 2.36 | 1.55 |
| Printing and related | -0.95 | -0.27 | -0.07 | -0.61 | 0.01 |
| Petroleum and coal products | 0.46 | -0.15 | 0.04 | 0.36 | 0.21 |
| Chemical manufacturing | 4.97 | 0.64 | -0.02 | 3.99 | 0.36 |
| Plastics and rubber products | 1.56 | -0.25 | 0.01 | 0.94 | 0.85 |
| Wood products | 2.47 | -0.09 | -0.03 | 1.41 | 1.17 |
| Non-metallic mineral products | 1.40 | 0.05 | 0.19 | 0.86 | 0.30 |
| Primary metal | 3.23 | 0.53 | -0.01 | 2.67 | 0.04 |
| Fabricated metal products | 2.01 | -0.31 | -0.02 | 0.83 | 1.50 |
| Machinery | 3.37 | -0.04 | 0.02 | 1.79 | 1.60 |
| Computer and electronic products | 2.67 | 0.88 | -0.12 | 1.65 | 0.26 |
| Electrical equipment | 1.22 | 0.57 | 0.04 | 0.67 | -0.06 |
| Transportation equipment | 0.35 | -0.58 | 0.00 | 0.30 | 0.63 |
| Furniture and related products | 1.98 | -0.18 | -0.13 | 1.31 | 0.98 |
| Miscellaneous manufacturing | 2.14 | 0.43 | 0.10 | 1.84 | -0.23 |
| Wholesale trade | 3.00 | 0.93 | 0.15 | 0.93 | 1.00 |
| Retail trade | 1.43 | 0.20 | 0.07 | 0.78 | 0.39 |
| Transportation and warehousing | 2.96 | 1.24 | -0.04 | 1.44 | 0.33 |
| Information and cultural industries | 0.55 | -0.02 | 0.07 | 0.22 | 0.29 |
| Finance and insurance | 1.25 | -0.29 | 0.13 | 0.38 | 1.02 |
| Professional service | 2.55 | 0.43 | 0.18 | 0.96 | 0.97 |
| Administration, waste management | 1.32 | 0.65 | 0.12 | 0.22 | 0.34 |
| Educational services | -0.90 | -0.60 | 0.15 | -0.29 | -0.16 |
| Health care and social assistance | 1.58 | 0.42 | 0.15 | 0.73 | 0.29 |
| Arts, entertainment and recreation | 1.06 | 0.53 | -0.17 | 0.25 | 0.45 |
| Accommodation and food services | 0.50 | -0.03 | 0.08 | -0.08 | 0.53 |
| Other services | 2.52 | 0.11 | 0.16 | 0.72 | 1.54 |
| Average | 1.47 | 0.34 | 0.04 | 0.75 | 0.33 |

**Table 5. Sources of labour productivity growth in U.S. industries, 2010 to 2014**

| Industry | LP | capital deepen | labour compositn | Interm. deepening | MFP |
|---|---|---|---|---|---|
| Crop and animal production | -0.30 | 0.87 | -0.04 | 0.19 | -1.33 |
| Forestry, Fishing, and Related | 0.92 | 0.55 | -0.63 | 0.03 | 0.96 |
| Oil and gas extraction | 1.30 | -5.04 | 0.07 | -1.76 | 8.04 |
| Mining (exc. Oil & gas extraction) | 1.10 | 1.86 | 0.08 | 3.34 | -4.18 |
| Support activities for mining, oil & gas | 5.39 | -1.73 | -0.03 | 4.24 | 2.91 |
| Utilities | -1.11 | 0.73 | 0.06 | -1.19 | -0.71 |
| Construction | -0.76 | -0.32 | 0.01 | -0.26 | -0.18 |
| Food, Beverage and Tobacco | -0.81 | 0.13 | 0.05 | -0.40 | -0.60 |
| Textile and textile products | 2.00 | -0.13 | 0.21 | 0.75 | 1.18 |
| Clothing, Leather and allied products | -0.49 | -0.03 | 0.49 | 14.29 | -15.24 |
| Paper | 0.32 | -0.24 | 0.02 | 1.12 | -0.59 |
| Printing and related | 1.95 | 0.10 | 0.01 | 1.71 | 0.13 |
| Petroleum and coal products | 1.14 | -0.10 | 0.01 | 0.38 | 0.85 |
| Chemical manufacturing | -0.50 | 0.04 | 0.01 | -0.89 | 0.34 |
| Plastics and rubber products | -0.54 | 0.93 | -0.02 | 2.13 | -3.58 |
| Wood products | -0.28 | -0.26 | 0.09 | 1.14 | -1.25 |
| Non-metallic mineral products | 1.93 | -0.12 | -0.39 | 0.97 | 1.47 |
| Primary metal | 0.24 | -0.30 | 0.17 | -0.12 | 0.50 |
| Fabricated metal products | -0.52 | -0.36 | -0.02 | 0.97 | -1.12 |
| Machinery | 0.66 | -0.24 | 0.04 | 1.23 | -0.37 |
| Computer and electronic products | -0.08 | 0.71 | 0.09 | -0.10 | -0.78 |
| Electrical equipment | 0.73 | -0.28 | 0.03 | 1.20 | -0.22 |
| Transportation equipment | 2.15 | -0.47 | -0.14 | 1.43 | 1.33 |
| Furniture and related products | 0.19 | -0.30 | -0.10 | 1.24 | -0.65 |
| Miscellaneous manufacturing | -2.21 | 0.01 | -0.30 | 0.11 | -2.02 |
| Wholesale trade | 1.95 | 0.16 | 0.04 | 1.30 | 0.45 |
| Retail trade | 1.64 | 0.05 | 0.06 | 1.21 | 0.32 |
| Transportation and warehousing | 0.21 | -0.27 | 0.06 | 0.68 | -0.27 |
| Information and cultural industries | 4.46 | 1.19 | 0.23 | 2.82 | 0.22 |
| Finance and insurance | 1.19 | -0.06 | 0.20 | 0.10 | 0.95 |
| Professional service | 0.62 | -0.25 | -0.10 | 0.32 | 0.64 |
| Administration, waste management | 0.44 | 0.01 | 1.80 | 1.02 | -2.39 |
| Educational services | -1.71 | 0.23 | 0.08 | -0.60 | -1.42 |
| Health care and social assistance | 0.42 | -0.01 | 0.14 | 0.61 | -0.32 |
| Arts, entertainment and recreation | 0.08 | -0.37 | 0.13 | 0.03 | 0.30 |
| Accommodation and food services | 2.55 | -0.36 | 0.11 | 1.43 | 1.38 |
| Other services | 1.27 | -0.02 | -0.02 | 1.40 | -0.10 |
| Average | 0.69 | -0.10 | 0.07 | 1.14 | -0.42 |

**Table 6. Contributions to aggregate labour productivity growth by industry in Canada and the United States, 1987-2010, (sorted by Canada – US difference)**

| Industry | Canada | U.S. | Canada - U.S. |
|---|---|---|---|
| Computer and electronic products | 0.05 | 0.52 | -0.48 |
| Information and cultural industries | 0.09 | 0.27 | -0.17 |
| Finance and insurance | 0.19 | 0.35 | -0.16 |
| Utilities | -0.01 | 0.13 | -0.13 |
| Professional service | 0.04 | 0.14 | -0.10 |
| Retail trade | 0.15 | 0.25 | -0.09 |
| Wholesale trade | 0.20 | 0.26 | -0.07 |
| Chemical manufacturing | 0.00 | 0.07 | -0.06 |
| Administration, waste management | 0.01 | 0.06 | -0.05 |
| Plastics and rubber products | 0.04 | 0.08 | -0.05 |
| Oil and gas extraction | -0.04 | 0.01 | -0.04 |
| Transportation and warehousing | 0.06 | 0.10 | -0.04 |
| Clothing, Leather and allied products | 0.01 | 0.03 | -0.02 |
| Miscellaneous manufacturing | 0.01 | 0.03 | -0.02 |
| Mining (exc. Oil & gas extraction) | 0.00 | 0.02 | -0.02 |
| Arts, entertainment and recreation | -0.01 | 0.01 | -0.01 |
| Petroleum and coal products | 0.00 | 0.02 | -0.01 |
| Accommodation and food services | 0.01 | 0.02 | -0.01 |
| Textile and textile products | 0.00 | 0.01 | -0.01 |
| Wood products | 0.02 | 0.02 | -0.01 |
| Support activities for mining, oil & gas | 0.00 | 0.01 | -0.01 |
| Fabricated metal products | 0.01 | 0.01 | 0.00 |
| Furniture and related products | 0.01 | 0.00 | 0.00 |
| Crop and animal production | 0.09 | 0.08 | 0.00 |
| Non-metallic mineral products | 0.01 | 0.00 | 0.01 |
| Machinery | 0.02 | 0.01 | 0.01 |
| Transportation equipment | 0.08 | 0.07 | 0.01 |
| Electrical equipment | 0.01 | 0.00 | 0.01 |
| Educational services | 0.00 | -0.01 | 0.01 |
| Food, Beverage and Tobacco | 0.02 | 0.01 | 0.01 |
| Forestry, Fishing, and Related | 0.02 | 0.00 | 0.02 |
| Paper | 0.03 | 0.00 | 0.02 |
| Other services | 0.01 | -0.01 | 0.03 |
| Primary metal | 0.05 | 0.02 | 0.03 |
| Printing and related | 0.04 | 0.01 | 0.03 |
| Health care and social assistance | -0.02 | -0.08 | 0.06 |
| Construction | 0.01 | -0.06 | 0.08 |
| | | | |
| SUM | 1.23 | 2.46 | -1.24 |

**Table 7. Contributions to aggregate capital deepening by industry in Canada and the United States, 1987-2010, (sorted by Canada – US difference)**

| Industry | Canada | U.S. | Canada - U.S. |
|---|---|---|---|
| Finance and insurance | 0.16 | 0.25 | -0.09 |
| Plastics and rubber products | 0.01 | 0.10 | -0.08 |
| Information and cultural industries | 0.08 | 0.15 | -0.08 |
| Utilities | 0.01 | 0.07 | -0.06 |
| Computer and electronic products | 0.01 | 0.06 | -0.05 |
| Chemical manufacturing | 0.00 | 0.02 | -0.01 |
| Retail trade | 0.06 | 0.07 | -0.01 |
| Professional service | 0.06 | 0.08 | -0.01 |
| Machinery | 0.01 | 0.02 | -0.01 |
| Fabricated metal products | 0.00 | 0.01 | -0.01 |
| Transportation equipment | 0.03 | 0.04 | -0.01 |
| Miscellaneous manufacturing | 0.00 | 0.01 | -0.01 |
| Electrical equipment | 0.01 | 0.01 | -0.01 |
| Wood products | 0.00 | 0.01 | -0.01 |
| Construction | 0.02 | 0.03 | 0.00 |
| Accommodation and food services | 0.01 | 0.01 | 0.00 |
| Food, Beverage and Tobacco | 0.02 | 0.02 | 0.00 |
| Textile and textile products | 0.00 | 0.00 | 0.00 |
| Clothing, Leather and allied products | 0.00 | 0.01 | 0.00 |
| Furniture and related products | 0.00 | 0.00 | 0.00 |
| Petroleum and coal products | 0.00 | 0.00 | 0.00 |
| Printing and related | 0.01 | 0.01 | 0.00 |
| Non-metallic mineral products | 0.01 | 0.00 | 0.00 |
| Health care and social assistance | 0.01 | 0.01 | 0.00 |
| Educational services | 0.00 | 0.00 | 0.00 |
| Arts, entertainment and recreation | 0.01 | 0.00 | 0.00 |
| Crop and animal production | 0.02 | 0.01 | 0.00 |
| Forestry, Fishing, and Related | 0.01 | 0.00 | 0.01 |
| Wholesale trade | 0.08 | 0.08 | 0.01 |
| Paper | 0.01 | 0.00 | 0.01 |
| Support activities for mining, oil & gas | 0.01 | 0.00 | 0.01 |
| Other services | 0.01 | 0.00 | 0.01 |
| Primary metal | 0.01 | 0.00 | 0.01 |
| Administration, waste management | 0.03 | 0.01 | 0.02 |
| Mining (exc. Oil & gas extraction) | 0.02 | 0.00 | 0.02 |
| Transportation and warehousing | 0.06 | 0.01 | 0.06 |
| Oil and gas extraction | 0.08 | 0.00 | 0.08 |
| | | | |
| SUM | 0.89 | 1.10 | -0.22 |

**Table 8. Contributions to aggregate labour composition by industry in Canada and the United States, 1987-2010, (sorted by Canada – US difference)**

| Industry | Canada | U.S. | Canada - U.S. |
|---|---|---|---|
| Professional service | 0.018 | 0.041 | -0.023 |
| Computer and electronic products | 0.004 | 0.014 | -0.009 |
| Administration, waste management | 0.007 | 0.014 | -0.007 |
| Clothing, Leather and allied products | 0.001 | 0.008 | -0.006 |
| Information and cultural industries | 0.008 | 0.013 | -0.005 |
| Miscellaneous manufacturing | 0.001 | 0.004 | -0.003 |
| Transportation equipment | 0.009 | 0.012 | -0.003 |
| Forestry, Fishing, and Related | -0.001 | 0.001 | -0.002 |
| Machinery | 0.005 | 0.006 | -0.001 |
| Chemical manufacturing | 0.002 | 0.003 | -0.001 |
| Textile and textile products | 0.001 | 0.001 | -0.001 |
| Fabricated metal products | 0.004 | 0.004 | -0.001 |
| Furniture and related products | 0.001 | 0.002 | -0.001 |
| Electrical equipment | 0.002 | 0.003 | -0.001 |
| Plastics and rubber products | 0.005 | 0.005 | 0.000 |
| Non-metallic mineral products | 0.001 | 0.001 | 0.000 |
| Wood products | 0.004 | 0.004 | 0.000 |
| Arts, entertainment and recreation | 0.003 | 0.003 | 0.000 |
| Construction | 0.019 | 0.018 | 0.000 |
| Finance and insurance | 0.034 | 0.034 | 0.000 |
| Petroleum and coal products | 0.002 | 0.002 | 0.001 |
| Paper | 0.003 | 0.002 | 0.001 |
| Utilities | 0.005 | 0.004 | 0.001 |
| Educational services | 0.002 | 0.001 | 0.001 |
| Other services | 0.004 | 0.003 | 0.002 |
| Support activities for mining, oil & gas | 0.001 | -0.001 | 0.002 |
| Primary metal | 0.004 | 0.003 | 0.002 |
| Wholesale trade | 0.021 | 0.019 | 0.002 |
| Food, Beverage and Tobacco | 0.007 | 0.005 | 0.002 |
| Printing and related | 0.005 | 0.002 | 0.003 |
| Mining (exc. Oil & gas extraction) | 0.003 | 0.000 | 0.003 |
| Crop and animal production | 0.006 | 0.001 | 0.004 |
| Oil and gas extraction | 0.005 | 0.000 | 0.005 |
| Retail trade | 0.025 | 0.019 | 0.007 |
| Transportation and warehousing | 0.016 | 0.009 | 0.007 |
| Accommodation and food services | 0.009 | 0.001 | 0.008 |
| Health care and social assistance | 0.001 | -0.009 | 0.010 |
| | | | |
| SUM | 0.246 | 0.250 | -0.004 |

**Table 9. Contributions to aggregate multifactor productivity growth by industry in Canada and the United States, 1987-2010, (sorted by Canada – US difference)**

| Industry | Canada | U.S. | Canada - U.S. |
|---|---|---|---|
| Computer and electronic products | 0.02 | 0.39 | -0.37 |
| Oil and gas extraction | -0.12 | 0.01 | -0.13 |
| Retail trade | 0.06 | 0.17 | -0.11 |
| Transportation and warehousing | -0.01 | 0.08 | -0.09 |
| Wholesale trade | 0.09 | 0.17 | -0.08 |
| Utilities | -0.02 | 0.06 | -0.08 |
| Information and cultural industries | 0.02 | 0.09 | -0.07 |
| Professional service | -0.05 | 0.02 | -0.07 |
| Finance and insurance | -0.01 | 0.05 | -0.06 |
| Administration, waste management | -0.03 | 0.02 | -0.06 |
| Chemical manufacturing | 0.00 | 0.06 | -0.06 |
| Mining (exc. Oil & gas extraction) | -0.03 | 0.01 | -0.05 |
| Accommodation and food services | -0.01 | 0.01 | -0.02 |
| Arts, entertainment and recreation | -0.02 | 0.00 | -0.02 |
| Support activities for mining, oil & gas | -0.01 | 0.01 | -0.02 |
| Petroleum and coal products | 0.00 | 0.01 | -0.02 |
| Clothing, Leather and allied products | 0.00 | 0.02 | -0.01 |
| Miscellaneous manufacturing | 0.01 | 0.01 | -0.01 |
| Food, Beverage and Tobacco | -0.02 | -0.01 | -0.01 |
| Textile and textile products | 0.00 | 0.01 | -0.01 |
| Crop and animal production | 0.06 | 0.06 | 0.00 |
| Wood products | 0.01 | 0.01 | 0.00 |
| Non-metallic mineral products | 0.00 | 0.00 | 0.00 |
| Educational services | 0.00 | 0.00 | 0.00 |
| Furniture and related products | 0.00 | 0.00 | 0.00 |
| Fabricated metal products | 0.01 | 0.00 | 0.01 |
| Other services | -0.01 | -0.02 | 0.01 |
| Forestry, Fishing, and Related | 0.01 | 0.00 | 0.01 |
| Paper | 0.02 | 0.00 | 0.02 |
| Transportation equipment | 0.03 | 0.01 | 0.02 |
| Electrical equipment | 0.00 | -0.01 | 0.02 |
| Machinery | 0.01 | -0.01 | 0.02 |
| Primary metal | 0.03 | 0.01 | 0.02 |
| Printing and related | 0.03 | 0.00 | 0.03 |
| Plastics and rubber products | 0.03 | -0.02 | 0.04 |
| Health care and social assistance | -0.03 | -0.08 | 0.05 |
| Construction | -0.03 | -0.11 | 0.08 |
| | | | |
| SUM | 0.04 | 1.04 | -0.99 |

**Table 10. Contributions to aggregate labour productivity growth by industry in Canada and the United States, 2010-2014, (sorted by Canada – US difference)**

| Industry | Canada | U.S. | Canada - U.S. |
|---|---|---|---|
| Information and cultural industries | 0.03 | 0.16 | -0.14 |
| Construction | -0.16 | -0.05 | -0.11 |
| Mining (exc. Oil & gas extraction) | -0.08 | -0.02 | -0.06 |
| Transportation equipment | 0.00 | 0.04 | -0.04 |
| Printing and related | -0.01 | 0.00 | -0.01 |
| Forestry, Fishing, and Related | -0.01 | 0.00 | -0.01 |
| Crop and animal production | -0.02 | -0.01 | -0.01 |
| Textile and textile products | 0.00 | 0.01 | -0.01 |
| Petroleum and coal products | 0.00 | 0.01 | 0.00 |
| Finance and insurance | 0.24 | 0.24 | 0.00 |
| Non-metallic mineral products | 0.01 | 0.01 | 0.00 |
| Electrical equipment | 0.00 | -0.01 | 0.01 |
| Furniture and related products | 0.01 | -0.01 | 0.01 |
| Arts, entertainment and recreation | 0.01 | 0.00 | 0.01 |
| Computer and electronic products | 0.01 | 0.00 | 0.01 |
| Accommodation and food services | 0.03 | 0.02 | 0.02 |
| Educational services | 0.00 | -0.02 | 0.02 |
| Retail trade | 0.07 | 0.05 | 0.02 |
| Primary metal | 0.03 | 0.01 | 0.02 |
| Paper | 0.02 | -0.01 | 0.03 |
| Clothing, Leather and allied products | 0.00 | -0.03 | 0.03 |
| Chemical manufacturing | 0.06 | 0.03 | 0.03 |
| Support activities for mining, oil & gas | 0.04 | 0.01 | 0.03 |
| Miscellaneous manufacturing | 0.00 | -0.03 | 0.03 |
| Wood products | 0.02 | -0.03 | 0.05 |
| Machinery | 0.04 | -0.02 | 0.06 |
| Other services | 0.06 | -0.01 | 0.07 |
| Food, Beverage and Tobacco | 0.04 | -0.03 | 0.07 |
| Fabricated metal products | 0.03 | -0.04 | 0.07 |
| Health care and social assistance | 0.05 | -0.03 | 0.07 |
| Administration, waste management | 0.07 | -0.04 | 0.10 |
| Utilities | 0.12 | 0.01 | 0.11 |
| Professional service | 0.20 | 0.06 | 0.14 |
| Wholesale trade | 0.24 | 0.07 | 0.16 |
| Transportation and warehousing | 0.15 | -0.04 | 0.18 |
| Plastics and rubber products | 0.03 | -0.17 | 0.20 |
| Oil and gas extraction | 0.34 | 0.07 | 0.27 |
| SUM | 1.68 | 0.23 | 1.44 |

**Table 11. Contributions to aggregate capital deepening by industry in Canada and the United States, 2010-2014, (sorted by Canada – US difference)**

| Industry | Canada | U.S. | Canada - U.S. |
|---|---|---|---|
| Information and cultural industries | 0.00 | 0.12 | -0.12 |
| Plastics and rubber products | -0.01 | 0.06 | -0.07 |
| Finance and insurance | -0.08 | -0.01 | -0.07 |
| Crop and animal production | -0.02 | 0.03 | -0.05 |
| Transportation equipment | -0.05 | -0.03 | -0.02 |
| Computer and electronic products | 0.01 | 0.02 | -0.01 |
| Forestry, Fishing, and Related | -0.01 | 0.00 | -0.01 |
| Printing and related | -0.01 | 0.00 | -0.01 |
| Educational services | 0.00 | 0.00 | -0.01 |
| Paper | -0.01 | 0.00 | 0.00 |
| Textile and textile products | 0.00 | 0.00 | 0.00 |
| Petroleum and coal products | 0.00 | 0.00 | 0.00 |
| Furniture and related products | 0.00 | 0.00 | 0.00 |
| Clothing, Leather and allied products | 0.00 | 0.00 | 0.00 |
| Non-metallic mineral products | 0.00 | 0.00 | 0.00 |
| Fabricated metal products | -0.01 | -0.01 | 0.00 |
| Wood products | 0.00 | 0.00 | 0.00 |
| Food, Beverage and Tobacco | 0.01 | 0.01 | 0.00 |
| Miscellaneous manufacturing | 0.00 | 0.00 | 0.00 |
| Accommodation and food services | 0.00 | -0.01 | 0.00 |
| Other services | 0.00 | 0.00 | 0.00 |
| Machinery | 0.00 | -0.01 | 0.01 |
| Electrical equipment | 0.00 | 0.00 | 0.01 |
| Retail trade | 0.02 | 0.01 | 0.02 |
| Arts, entertainment and recreation | 0.01 | -0.01 | 0.02 |
| Construction | -0.01 | -0.03 | 0.02 |
| Health care and social assistance | 0.02 | 0.00 | 0.02 |
| Mining (exc. Oil & gas extraction) | 0.04 | 0.02 | 0.03 |
| Primary metal | 0.03 | -0.01 | 0.03 |
| Support activities for mining, oil & gas | 0.02 | -0.02 | 0.03 |
| Chemical manufacturing | 0.04 | 0.00 | 0.04 |
| Administration, waste management | 0.04 | 0.00 | 0.04 |
| Wholesale trade | 0.11 | 0.02 | 0.09 |
| Professional service | 0.05 | -0.05 | 0.10 |
| Utilities | 0.14 | 0.04 | 0.10 |
| Transportation and warehousing | 0.15 | -0.02 | 0.17 |
| Oil and gas extraction | 0.35 | -0.13 | 0.48 |
| | | | |
| SUM | 0.84 | -0.03 | 0.87 |

**Table 12. Contributions to aggregate labour composition by industry in Canada and the United States, 2010-2014, (sorted by Canada – US difference)**

| Industry | Canada | U.S. | Canada - U.S. |
|---|---|---|---|
| Administration, waste management | 0.007 | 0.120 | -0.113 |
| Information and cultural industries | 0.005 | 0.023 | -0.018 |
| Health care and social assistance | 0.008 | 0.020 | -0.012 |
| Finance and insurance | 0.035 | 0.044 | -0.009 |
| Transportation and warehousing | -0.004 | 0.004 | -0.009 |
| Arts, entertainment and recreation | -0.003 | 0.002 | -0.005 |
| Computer and electronic products | -0.002 | 0.003 | -0.004 |
| Primary metal | 0.000 | 0.003 | -0.004 |
| Oil and gas extraction | -0.001 | 0.002 | -0.002 |
| Wood products | -0.001 | 0.002 | -0.002 |
| Utilities | 0.001 | 0.003 | -0.002 |
| Chemical manufacturing | -0.001 | 0.001 | -0.002 |
| Printing and related | -0.001 | 0.000 | -0.002 |
| Textile and textile products | -0.001 | 0.001 | -0.002 |
| Paper | 0.000 | 0.000 | -0.001 |
| Educational services | 0.001 | 0.001 | -0.001 |
| Furniture and related products | -0.001 | -0.001 | -0.001 |
| Machinery | 0.001 | 0.001 | 0.000 |
| Clothing, Leather and allied products | 0.000 | 0.001 | 0.000 |
| Retail trade | 0.007 | 0.008 | 0.000 |
| Fabricated metal products | 0.000 | 0.000 | 0.000 |
| Electrical equipment | 0.000 | 0.000 | 0.000 |
| Petroleum and coal products | 0.000 | 0.000 | 0.000 |
| Mining (exc. Oil & gas extraction) | 0.001 | 0.001 | 0.001 |
| Plastics and rubber products | 0.001 | -0.001 | 0.001 |
| Support activities for mining, oil & gas | 0.002 | 0.000 | 0.002 |
| Accommodation and food services | 0.005 | 0.002 | 0.003 |
| Forestry, Fishing, and Related | 0.001 | -0.002 | 0.003 |
| Miscellaneous manufacturing | 0.001 | -0.004 | 0.005 |
| Non-metallic mineral products | 0.002 | -0.003 | 0.006 |
| Other services | 0.005 | -0.001 | 0.006 |
| Construction | 0.008 | 0.001 | 0.008 |
| Food, Beverage and Tobacco | 0.011 | 0.004 | 0.008 |
| Transportation equipment | 0.000 | -0.009 | 0.009 |
| Wholesale trade | 0.017 | 0.004 | 0.012 |
| Crop and animal production | 0.013 | -0.001 | 0.015 |
| Professional service | 0.022 | -0.019 | 0.041 |
| | | | |
| SUM | 0.139 | 0.209 | -0.069 |

**Table 13. Contributions to aggregate multifactor productivity growth by industry in Canada and the United States, 2010-2014, (sorted by Canada – US difference)**

| Industry | Canada | U.S. | Canada - U.S. |
|---|---|---|---|
| Oil and gas extraction | -0.03 | 0.21 | -0.25 |
| Construction | -0.13 | -0.02 | -0.11 |
| Mining (exc. Oil & gas extraction) | -0.13 | -0.04 | -0.09 |
| Transportation equipment | 0.05 | 0.08 | -0.03 |
| Non-metallic mineral products | 0.00 | 0.01 | -0.01 |
| Forestry, Fishing, and Related | 0.00 | 0.00 | -0.01 |
| Primary metal | 0.00 | 0.01 | -0.01 |
| Professional service | 0.12 | 0.12 | -0.01 |
| Support activities for mining, oil & gas | 0.02 | 0.03 | -0.01 |
| Textile and textile products | 0.00 | 0.01 | 0.00 |
| Petroleum and coal products | 0.00 | 0.01 | 0.00 |
| Printing and related | 0.00 | 0.00 | 0.00 |
| Information and cultural industries | 0.02 | 0.02 | 0.00 |
| Chemical manufacturing | 0.02 | 0.02 | 0.00 |
| Electrical equipment | 0.00 | 0.00 | 0.00 |
| Arts, entertainment and recreation | 0.01 | 0.01 | 0.00 |
| Retail trade | 0.04 | 0.04 | 0.01 |
| Accommodation and food services | 0.03 | 0.02 | 0.01 |
| Furniture and related products | 0.01 | 0.00 | 0.01 |
| Utilities | -0.02 | -0.04 | 0.01 |
| Educational services | 0.00 | -0.02 | 0.02 |
| Miscellaneous manufacturing | 0.00 | -0.03 | 0.02 |
| Clothing, Leather and allied products | 0.00 | -0.02 | 0.03 |
| Computer and electronic products | 0.00 | -0.02 | 0.03 |
| Crop and animal production | -0.01 | -0.04 | 0.03 |
| Paper | 0.03 | 0.00 | 0.03 |
| Wood products | 0.02 | -0.02 | 0.05 |
| Machinery | 0.04 | -0.01 | 0.05 |
| Other services | 0.05 | 0.00 | 0.06 |
| Transportation and warehousing | 0.04 | -0.02 | 0.06 |
| Health care and social assistance | 0.02 | -0.04 | 0.06 |
| Food, Beverage and Tobacco | 0.02 | -0.04 | 0.06 |
| Wholesale trade | 0.12 | 0.05 | 0.07 |
| Finance and insurance | 0.28 | 0.21 | 0.07 |
| Fabricated metal products | 0.04 | -0.03 | 0.07 |
| Administration, waste management | 0.02 | -0.16 | 0.18 |
| Plastics and rubber products | 0.04 | -0.22 | 0.25 |
| | | | |
| SUM | 0.72 | 0.07 | 0.65 |

**Table 14, Regression results on the effects of output growth**

| | MFP growth | | Capital deepening | |
|---|---|---|---|---|
| | 1 | 2 | 3 | 4 |
| Output growth | 0.195** | 0.166** | 0.036 | 0.048 |
| | (3.002) | (2.676) | (1.126) | (1.614) |
| Labour compositional change | | -0.34 | | 0.09 |
| | | (-0.639) | | (0.349) |
| Labour compositional change x output growth | | 0.482* | | 0.240* |
| | | (2.039) | | (2.107) |
| Dummy for 2010-14 | 1.109** | 1.028*** | 0.264** | 0.259* |
| | (3.984) | (3.89) | (1.991) | (2.031) |
| Constant | -0.487* | -0.462* | -0.073 | -0.073 |
| | (-2.596) | (-2.605) | (-0.816) | (-0.850) |
| No. of Obs. | 74 | 74 | 73 | 74 |
| adj R2 | 0.187 | 0.249 | 0.03 | 0.098 |

Note: One asterisk denotes statistical significance at 5% level and two asterisks denotes statistical significance at 1% level.

**Figure 1. Labour productivity of Canada relative to the United States, Canada over the United States, 1961=100**
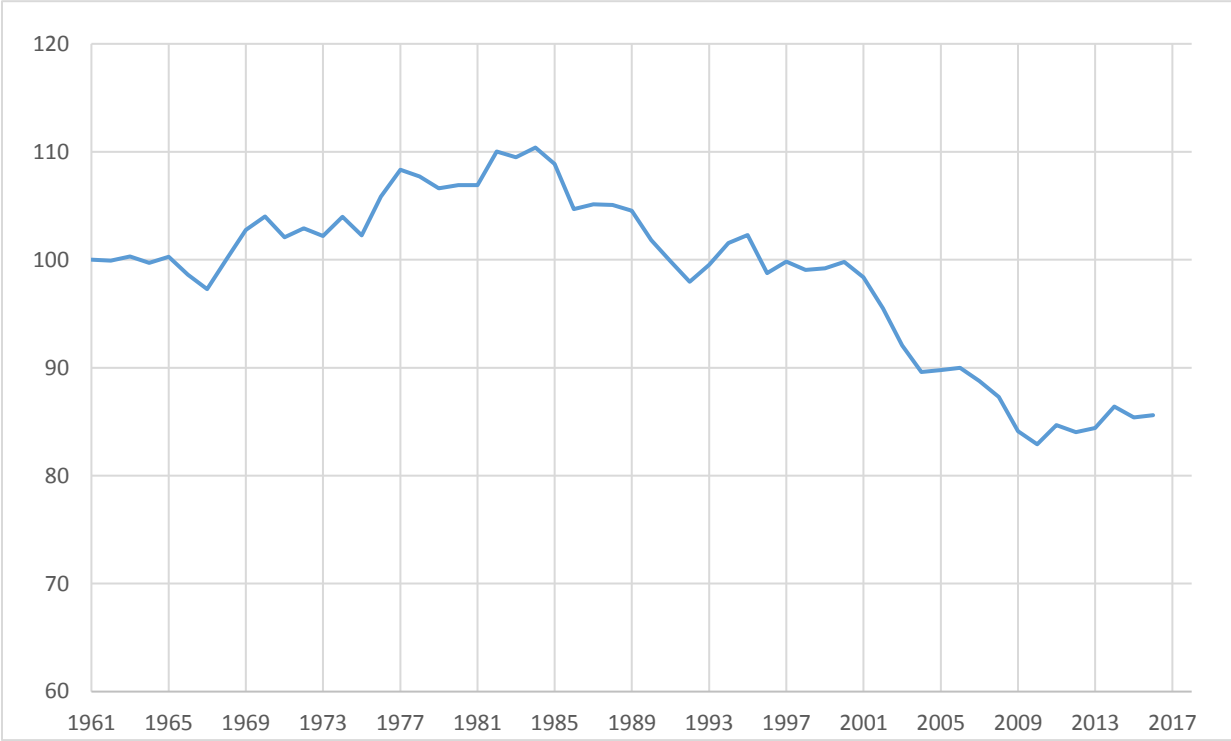
**Figure 2. Contributions of Industry Groups to Aggregate Labour Productivity Growth, Canada and the United States**
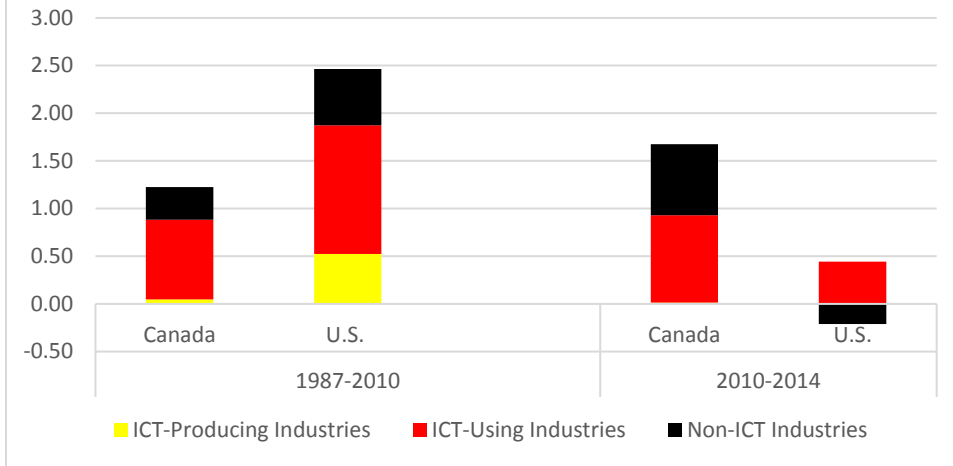
Figure 3. Contributions of Industry Groups to Aggregate Capital Deepening, Canada and the United States
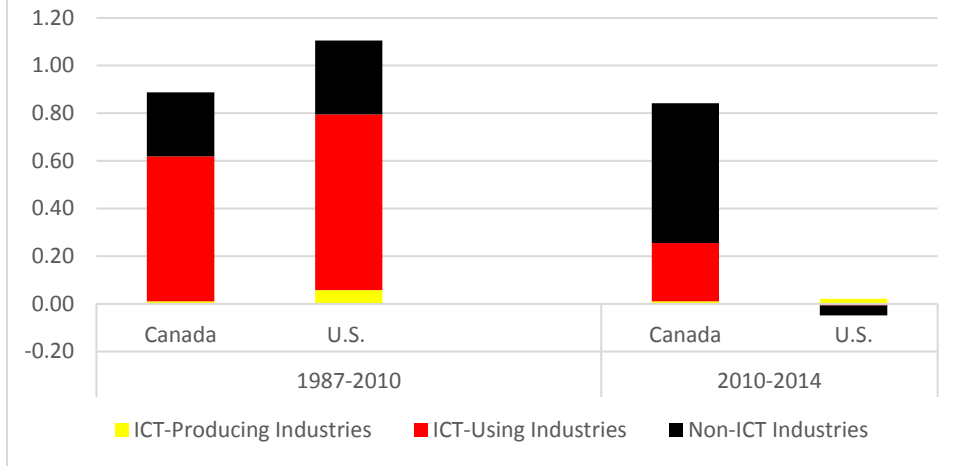
Figure 4. Contributions of Industry Groups to Aggregate Labour Composition, Canada and the United States
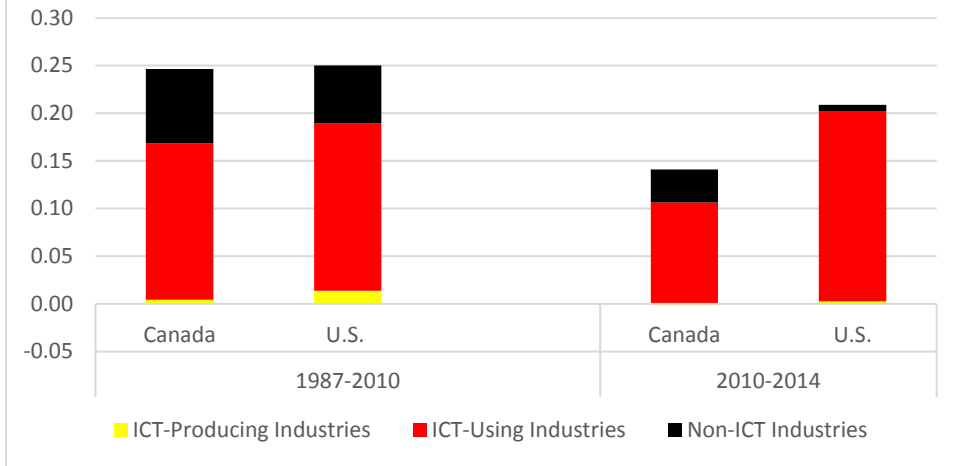
■ ICT-Producing Industries   ■ ICT-Using Industries   ■ Non-ICT Industries

Figure 5. Contributions of Industry Groups to Aggregate Multifactor Productivity Growth, Canada and the United States

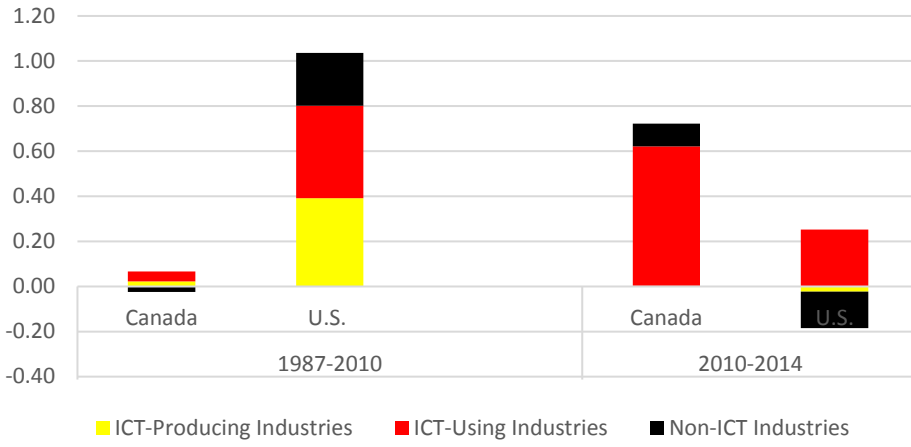ICT-Producing Industries   ICT-Using Industries   Non-ICT Industries

Figure 6. Output growth in the business sector, Canada and the United States