

# The Canadian-Australian Business Sector Productivity Gap: A Sectoral Analysis

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**LESSONS FOR CANADA FROM DOWN UNDER**

Essay Series

## CHAPTER 2

# The Canadian-Australian Business Sector Productivity Gap: A Sectoral Analysis

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### Key points

- Is Canada's relatively poor productivity performance compared to Australia due to changes in the industry composition of the Canadian economy over time, or poor performance within certain industry sectors? Research shows within-sector effects dominate reallocation effects in determining aggregate labour productivity outcomes in the business sector for both Canada and Australia. This suggests that both economies need to focus on improving efficiencies in their business sectors to drive long-run productivity growth.
- The growth in output per worker or labour productivity growth can reflect a range of factors, including growth in the stocks of physical and human capital and changes in labour force participation, as well as technological change and changes in policies and institutions that are captured by estimates of multifactor productivity growth.
- Changes in labour productivity can also occur due to sectoral shifts in the economy. As different sectors expand or contract, they will employ more or less labour and capital. Labour and capital will have different levels of productivity when employed in different sectors and this in turn will influence the level of productivity within each sector.
- Productivity outcomes in both Canada and Australia largely reflect within-sector productivity performance rather than sectoral shifts in the output composition of the two economies.
- However, Australia has enjoyed larger productivity gains from sectoral shifts, suggesting a greater ability to reallocate labour inputs to sectors that enjoy higher productivity.

- Comparing the business sectors of the two economies between 1995 and 2019, Australia enjoyed a 0.3 percentage point annual average labour productivity growth advantage over Canada, with about half this advantage due to sector-specific productivity gains and half to the reallocation of labour to more productive industries. Specifically, Australia enjoyed a larger positive contribution to labour productivity from the mining sector attributable to within-sector gains, but also through the allocation of additional labour inputs to the more productive mining sector. The mining sector made the single largest contribution to overall Australian labour productivity growth over this period, whereas in Canada mining made only a very marginal contribution.
- This suggests Canada needs to pay close attention not only to the scope for greater efficiency gains within the industries that make up its business sector, but also to impediments to labour mobility between sectors. These impediments could include a range of factors, from labour market regulations to inflexible housing supply and barriers to new firm entry and restrictions on foreign investment.

## Introduction

The first essay in this series (Kirchner, 2022) showed how Canada has underperformed Australia in growing productivity and living standards on average from the mid-1990s onwards. The superior productivity performance of the Australian economy, particularly during the 1990s, is attributable to wide-ranging structural reforms that were implemented from the early 1980s onwards. These reforms include extensive product market deregulation, privatization, financial liberalization, and lower trade barriers. While Canada also implemented similar reforms, these reforms had a smaller productivity pay-off. This is also evident in Australia's superior position (9th place) in the Fraser Institute's economic freedom rankings, relative to Canada (14th place), suggesting Australia has done better than Canada in putting in place growth-supporting institutions and policies (Gwartney et al., 2021).

An important factor behind Australia's outperformance has been the larger share of the economy devoted to investment spending. Australia added significantly to its capital stock in recent decades, particularly in the mining sector, reflecting a terms of trade boom from the mid-2000s onwards. This increased the capital intensity of the Australian economy and boosted labour productivity. At the same time, the increase in the size of the capital stock weighed on the productivity of capital and on multifactor productivity, that is, the ratio of output to the combined input of labour and capital. Australian business investment as a share of GDP has declined

more recently, with non-mining business investment failing to pick up the slack left from the downturn in mining investment following the end of an earlier terms of trade boom. However, Australia is currently ranked as the most attractive destination for mining investment in the Fraser Institute's *Annual Survey of Mining Companies*, with Canada coming in second. This suggests Australia still enjoys an edge over Canada in attracting new investment in that sector (Yunis and Aliakbari, 2022).

As noted in the first essay, the growth in output per worker, or labour productivity growth, can reflect a range of factors, including growth in capital stock and changes in labour force participation, as well as the impact of technological change and changes in policies and institutions which are captured by estimates of multifactor productivity growth. Changes in labour productivity can also occur due to sectoral shifts in the economy. As different sectors expand or contract relative to others, they will employ more or less labour and capital and have different rates of exogenous technical change. Labour and capital will have different rates of productivity when employed in different industries and this, in turn, will affect the level and growth of productivity within those sectors.

Ideally, we would like to measure productivity growth net of the effect that arises from reallocating labour (more specifically, hours worked) between sectors over time. This gives us a measure of within-sector productivity growth. Decomposing productivity growth by industry is also helpful in identifying sectors of the economy that have outperformed and underperformed in terms of their contribution to overall labour productivity growth. By identifying industries with superior or weaker productivity performance, we are better placed to identify some of the sources of weaker productivity growth and the policies that might be helping or hindering that performance.

This essay first reviews what previous researchers have found when decomposing Canada's labour productivity performance into within-sector gains and changes which are due to shifts in industry composition. It then goes on to update these previous estimates and compares them to similar estimates for Australia over the same period. The results largely confirm what previous researchers have found. In particular, Canada's poor productivity performance cannot be attributed to sectoral reallocations of labour arising from changes in the industry composition of the economy—it is mainly due to Canada's comparatively weaker within-sector productivity performance. Overall, the sectoral productivity performance of the Australian and Canadian economies looks broadly similar. However, for the period from 1995 to 2019, Australia enjoyed a larger positive contribution to labour productivity from the mining sector attributable to both within-sector gains, and to the allocation of additional labour inputs

to this relatively productive part of its economy. The mining sector makes the single largest contribution to Australian labour productivity growth over this period, whereas in Canada, mining makes only a very marginal contribution and all of this small contribution comes from a reallocation effect. Within-sector labour productivity in the Canadian mining industry actually fell slightly.

These findings may be useful to Canadian policy makers in identifying institutions and policy settings that are hindering Canada's economic performance. In particular, if within-sector effects are dominant, then policy makers should focus on promoting efficiency gains and investments in physical and human capital and on encouraging more Canadian-based firms to grow instead of remaining small. If reallocation effects are important, policy makers should focus on impediments to the reallocation of resources to more productive sectors of the Canadian economy. In the third essay, I will review where Canada stands relative to Australia on some key measures of institutional quality and policy performance in order to further identify the sources of Canada's productivity underperformance.

## **Canada's labour productivity performance: What previous research has found**

A number of researchers have previously sought to analyze Canada's labour productivity performance to identify both the sources of weakness in productivity growth and the sectors that might have contributed to that poor performance. In particular, economists at the Centre for the Study of Living Standards (CSLS) have developed a methodology for decomposing labour productivity into contributions from individual sectors of the Canadian economy, focusing on the "business sector" as defined by Statistics Canada. The broad business sector covers the whole economy less public administration, non-profit institutions, and the rental value of owner-occupied dwellings (Sharpe, 2010: 43). In Australia, the business sector is called the "market sector" by the Australian Bureau of Statistics and captures the same industries in line with international data dissemination standards.

In addition to identifying the contribution to labour productivity growth from individual sectors of the economy, the CSLS methodology allows us to identify changes in productivity due to within-sector effects and those attributable to reallocation effects. In particular, researchers have sought to address the question of whether Canada's relatively poor labour productivity performance is due to a reallocation of labour to less productive activities, that is, the reallocation of the share of hours worked between sectors that arises from changes in the industry composition of the economy.

A key question addressed by previous researchers is what Sharpe (2008) called “the paradox of market-oriented public policy.” Given that Canada also underwent extensive market-oriented reforms in 1990s, why have these reforms not yielded a stronger productivity dividend? A similar post-reform productivity puzzle has been found in New Zealand, which has also underperformed peer economies in terms of productivity growth. But around 40 percent of New Zealand’s productivity shortfall can be explained by its lack of international connectedness and limited access to large markets (de Serres, Yashiro, and Boulhol, 2014), a problem that Canada has not faced because it shares a land border and has a free trade agreement with the world’s largest economy and one of the most productive, namely, the United States. Indeed, Australia seems to be exceptional compared to these two peer economies in enjoying a strong, even if fading, productivity dividend from past reforms.

As noted in the first essay, Arsenault and Sharpe attributed Canada’s productivity underperformance on labour productivity growth in part to upward pressure on the Canadian dollar exchange rate due to a positive terms of trade shock from the mid-2000s, but Australia experienced essentially the same shock, taking the Australian dollar to record highs against the US dollar in 2011 relative to the post-float period starting in December 1983. The same authors expected that Canada’s underperformance relative to US productivity growth would lead to Canada enjoying catch-up growth in future, with Canadian productivity “likely to revert to its 1973-2000 trend” (2008: 14). This was a reasonable expectation based on the standard theory of economic growth, which predicts catch-up growth relative to leading economies. But subsequent productivity growth in Canada has not borne out this prediction. The authors attributed the growing Canadian-US productivity gap “to developments south of the 49th parallel and not to developments in this country [Canada]” (2008: 37). But this still begs the question as to what peer economies are doing relative to Canada that might give rise to a superior productivity performance over time.

More recently, Sharpe (2010) investigated whether “sectoral reallocations of labour can explain Canada’s abysmal productivity performance.” Sharpe’s research developed a methodology for addressing this question, the same methodology employed in this paper. The methodology decomposes changes in labour productivity into three effects: a *within-sector effect* that captures the change in labour productivity within a sector; a *reallocation level effect* that indicates whether changes in the hours share have favoured sectors with above- or below-average productivity levels; and a *reallocation growth effect* which is the sum of the product of the absolute change in the share of hours worked and the absolute change in the

labour productivity level for each of the sectors in the economy relative to the average change across all sectors.

The reallocation growth effect has an interpretation similar to Baumol's cost disease (Baumol, de Ferranti, Malach, Pablos-Mendez, Tabish, and Wu, 2012). A negative reallocation growth effect at the aggregate level means that labour is moving to sectors characterized by smaller absolute increases in labour productivity. As we shall see, the reallocation growth effect subtracts equally from both Canadian and Australian labour productivity on average. Thus, Baumol's cost disease cannot explain Canada's relative underperformance, even if it is a factor in Canada's absolute performance.

Employing this methodology, Sharpe (2010: 46) found that a fall in labour productivity in manufacturing accounted for all of the slowdown in Canadian business sector productivity growth between 2000 and 2007 relative to the stronger growth seen between 1973 and 2000 and that this was overwhelmingly due to within-sector rather than reallocation effects. Reallocation effects were significant for the mining sector (which includes oil and gas), where a rising employment share in an already very high productivity sector offset the falling productivity level of that sector.

Capeluck (2016) subsequently used the CSLS methodology to explicitly compare Canada's productivity performance with Australia's over the period 1994 to 2013, as well as some sub-periods (see table 1).

Capeluck found that within-sector effects were the main contributor to the overall labour productivity differential between Australia and Canada. In particular, 0.69 percentage points of the 1.02 percentage point annual average labour productivity differential over the period 1994 to 2013 was due to within-sector effects. Australia also enjoyed a 0.48 percentage point advantage from the reallocation level effect (2016: 51). In other words, Australia was able to get a larger boost to labour productivity by reallocating labour between different sectors of the economy. Most notably, Australia reallocated more labour to mining relative to Canada, accounting for 17 percent of the overall labour productivity differential. This offset the within-sector decline in labour productivity in the mining sector seen in both economies. Both economies suffered a similar productivity penalty from Baumol's cost disease over the period 1994 to 2013, although Australia suffered a larger penalty from this effect between 2000 and 2013.

## **Updated business sector labour productivity estimates for Canada and Australia**

In this section, we update previous CSLS analyses to include data up until 2019, reflecting current data availability. It should be noted that the global

**Table 1: Decomposition of Aggregate Labour Productivity Growth, Canada and Australia, 1994-2013****Percentage Point Contribution to Aggregate Labour Productivity Growth**

	Canada				Australia			
	Aggregate	WSE	RLE	RGE	Aggregate	WSE	RLE	RGE
1994-2013	1.31	1.25	0.28	-0.22	2.33	1.94	0.76	-0.37
1994-2000	2.16	2.33	-0.1	-0.07	2.95	3.29	-0.1	-0.23
2000-2013	0.92	0.78	0.34	-0.21	2.04	1.46	1.37	-0.78

**Absolute Difference in Growth Rates (Percentage Points) (Australia less Canada)**

	Canada			
	Aggregate	WSE	RLE	RGE
1994-2013	1.02	0.69	0.48	-0.15
1994-2000	0.79	0.96	0.00	-0.16
2000-2013	1.12	0.68	1.03	-0.57

Notes: “WSE” stands for “within-sector effect.” “RLE” stands for “reallocation level effect.” “RGE” stands for “reallocation growth effect.” “Aggregate” refers to the business sector for Canada and the market sector for Australia.

Source: Capeluck (2016): 51.

COVID-19 pandemic beginning in 2020 introduces considerable volatility and distortions to both labour inputs and sectoral outputs, making a clear read on very recent productivity trends more difficult. For example, the pandemic increased measured productivity in the Australian economy in its early stages because of compositional shifts in output. Low productivity service industries were shut-down during the pandemic, while high productivity sectors like mining were less affected. It should be noted that data revisions will affect the comparability of the estimates reported below to those reported by Capeluck and others. The sample periods are also different.

Table 2 shows the updated estimates.

The first line of table 2 is comparable to the first line of table 1 as calculated by Capeluck, but with six additional years of data through to 2019. Compared to Capeluck’s estimates, the addition of data from 2013 to 2019 sees a significant decline in Australia’s market sector labour productivity growth, from 2.33 percent to 1.6 percent, consistent with the recent slowdown in Australian productivity highlighted in the first essay. Australia’s labour productivity lead vis-à-vis Canada for the period as a whole



**Table 2: Decomposition of Aggregate Labour Productivity Growth, Canada and Australia, 1994-2019**

**Percentage Point Contribution to Aggregate Labour Productivity Growth**

	Canada				Australia			
	Aggregate	WSE	RLE	RGE	Aggregate	WSE	RLE	RGE
1995-2019	1.29	1.37	0.11	-0.20	1.60	1.54	0.26	-0.21
1995-2000	2.53	2.81	-0.18	-0.10	2.84	3.37	-0.12	-0.21
2000-2009	0.67	0.50	0.31	-0.13	1.32	1.06	0.55	-0.29
2010-2019	1.22	1.50	-0.19	-0.10	1.02	0.96	0.02	0.03

**Absolute Difference in Growth Rates (Percentage Points) (Australia less Canada)**

	Canada			
	Aggregate	WSE	RLE	RGE
1995-2019	0.31	0.17	0.15	-0.01
1995-2000	0.31	0.56	0.06	-0.11
2000-2009	0.65	0.56	0.24	-0.16
2010-2019	-0.20	-0.54	0.21	0.13

Notes and sources: see Table 1. Note that StatCan publication reference numbers have changed from those reported by Capeluck, see the StatCan web site for concordance.

declines to just 0.3 percentage points, although is nearly 0.7 percentage points for the 2000s. In the most recent decade, Australia's labour productivity has slightly lagged Canada's.

Australia's within-sector productivity lead within the business sector for the whole period declines from the 0.7 percentage points found by Capeluck to just under 0.2 percentage points with the addition of more recent data. Australia enjoys a lead of around 0.6 percentage points from the mid-1990s through to the end of the 2000s, but lags by 0.5 percentage points in the most recent decade. Reallocation effects at the aggregate level are a mixed bag for both economies over the decades, but Australia consistently outperforms Canada in terms of this factor's contribution to productivity growth. Baumol's cost disease is a quantitatively similar drag on productivity for both economies, but less of a drag for Australia in the most recent decade, a change on Capeluck's findings.

These aggregate results for the business or market sector of the two economies are consistent with those found by earlier authors in showing

that within-sector effects dominate reallocation effects in determining aggregate labour productivity outcomes in the business sector for both Canada and Australia. This suggests that both economies need to focus on improving efficiencies in their business sectors to drive long-run productivity growth. At the same time, Australia enjoys a relative productivity boost through the reallocation of labour to more productive sectors of its economy. This suggests Canada could improve its relative labour productivity performance by removing impediments to labour mobility and strengthening the entrepreneurial environment to encourage new firm entry and investment in protected sectors of its economy.

## **Labour productivity growth by sector: Canada and Australia compared**

The decomposition of labour productivity growth in tables 1 and 2 can also be performed for the various sectors that make up the business or market sectors of the two economies. These sectors are broadly aligned in terms of their definitions, although it should be noted that these are still aggregations of developments at the sub-sector and firm level and so abstract from more micro level productivity trends.

Table 3 shows industry contributions to labour productivity growth in the business sector in Canada from 1995 to 2019.

In terms of contributions to labour productivity growth in Canada, the financial sector makes the largest contribution, with these gains overwhelmingly due to within-sector effects. An important caveat here is that outputs in the financial sector are typically imputed and therefore poorly measured in most economies. The mining sector makes a negligible contribution to labour productivity for the period as a whole, although it makes a stronger contribution in the most recent decade 2010-2019, contributing 0.2 percentage points to the 1.22 percent gain in labour productivity over this period (see the appendix for a breakdown by decade). Consistent with the results obtained by Sharpe (2010), a weaker within-sector productivity performance by manufacturing is implicated in the overall Canadian productivity slowdown relative to earlier decades.

Table 4 shows industry contributions to labour productivity growth for the market sector in Australia from 1995 to 2019.

Like Canada, the financial sector makes a significant positive contribution of 0.26 percentage points to overall productivity growth in Australia over this period, overwhelmingly due to within-sector gains. However, in Australia, the mining sector makes a similar contribution to that of the financial sector, contributing 0.3 percentage points to the overall 1.6

**Table 3: Industry Contributions to Aggregate Labour Productivity Growth, Canada, 1995-2019**

	Aggregate	WSE	RLE	RGE
Business sector (1)	1.29	1.37	0.11	-0.20
Agriculture, forestry, fishing and hunting	0.19	0.19	0.06	-0.06
Mining and oil and gas extraction	0.04	-0.04	0.11	-0.02
Utilities	0.00	0.02	-0.02	0.00
Construction	-0.02	0.02	-0.01	-0.03
Manufacturing	0.27	0.27	0.02	-0.01
Wholesale trade	0.15	0.15	0.01	-0.01
Retail trade	0.14	0.12	0.01	0.00
Transportation and warehousing	0.05	0.06	0.00	0.00
Information and cultural industries	0.07	0.06	0.00	0.00
Finance, insurance, real estate and renting and leasing (2)	0.41	0.43	-0.01	-0.01
Professional, scientific and technical services	0.02	0.04	-0.01	-0.02
Administrative and support, waste management and remediation services	-0.03	0.01	-0.02	-0.02
Arts, entertainment and recreation	-0.02	-0.01	0.00	-0.01
Accommodation and food services	0.02	0.02	0.00	0.00
Other private services (3)	0.00	0.02	-0.02	-0.01

Notes:

(1) The business sector covers the whole economy less public administration, non-profit institutions and the rental value of owner-occupied dwellings.

(2) This combines the North American Industry Classification System (NAICS) codes 52-53 with the exception of owner-occupied dwellings industry.

(3) This combines parts of the North American Industry Classification System (NAICS) codes 61, 62, 81.

Sources: Statistics Canada 2022a, 2022b, 2022c, and calculations by authors.

percent gain in labour productivity. This contribution is roughly equally split between within-sector gains and a positive reallocation level effect from share of hours worked in the sector. This suggests Australia has been successful in moving labour into this sector to take advantage of its high levels of productivity relative to other sectors.

For the period from 2000 to 2009 (see the appendix for breakdown by decade), mining made very little contribution to labour productivity growth in Australia, with a decline of the within-sector contribution offset by a positive contribution via the reallocation level effect. This is consistent with the terms of trade and mining investment boom leading to a

**Table 4: Industry Contributions to Aggregate Labour Productivity Growth, Australia, 1995-2019**

	Aggregate	WSE	RLE	RGE
Market Sector	1.60	1.54	0.26	-0.21
Agriculture, forestry and fishing	0.15	0.13	0.04	-0.01
Mining	0.30	0.12	0.14	0.05
Manufacturing	0.23	0.29	-0.01	-0.04
Electricity, gas, water and waste services	0.00	0.02	-0.02	0.00
Construction	0.06	0.04	0.04	-0.03
Wholesale trade	0.10	0.11	0.00	0.00
Retail trade	0.11	0.11	0.00	0.00
Accommodation and food services	0.06	0.05	0.01	0.00
Transport, postal and warehousing	0.12	0.13	0.00	0.00
Information media and telecommunications	0.09	0.12	0.00	-0.02
Financial and insurance services	0.26	0.35	-0.03	-0.06
Rental, hiring and real estate services	0.03	0.02	0.02	0.00
Professional, scientific and technical services	0.06	0.04	0.04	-0.02
Administrative and support services	-0.02	-0.02	0.05	-0.06
Arts and recreation services	0.04	0.02	0.01	0.00
Other services	0.00	0.01	-0.01	-0.01

Sources: Australian Bureau of Statistics 2022a (table 6), 2022b; and calculations by authors.

reallocation of labour to the sector, but with a reduction of within-sector productivity during the investment phase of the boom, which saw long lead times before increased investment would lead to increased output in the Australian mining sector. In the most recent decade from 2010-2019, mining accounts for 0.4 percentage points of the 1.02 increase in Australian productivity growth. This is consistent with the story Capeluck tells, in which a share of the productivity lead enjoyed by Australia reflected its ability to reallocate labour to the mining sector, as well as outright productivity gains in that relatively large industry sector.

## Conclusion

Overall, the analysis presented here is consistent with the findings of earlier authors who have investigated the sources of Canada's poor productivity performance relative to peer economies, including Australia.

Productivity outcomes in both economies largely reflect within-sector productivity performance, rather than sectoral shifts in the composition of the two economies as proxied by the share of hours worked in each sector. Canada's relative underperformance cannot be attributed to changes in the industry composition of its economy. Australia, by contrast, has enjoyed larger productivity gains from the reallocation level effect, suggesting a greater ability to reallocate labour inputs to sectors where they enjoy higher productivity. This suggests Canada needs to pay close attention not only to the scope for greater efficiency gains in its business sector, but also to impediments to labour mobility between different sectors of the Canadian economy. These impediments could include a range of factors, from labour market regulation to inflexible housing supply and barriers to new firm entry and growth.

While the labour productivity growth differential has narrowed in Canada's favour in the most recent decade, Canada still needs to catch up on its historical productivity shortfall relative to Australia. Australia has struggled to maintain its earlier performance in terms of business investment and productivity, as the political impetus for further economic reform has diminished relative to the 1980s and 1990s. But that narrowing in no way alleviates the burden on Canada to accelerate efforts to improve its lackluster productivity performance.

The Australian Treasury's most recent Intergenerational Report projects average labour productivity growth for Australia over the next 40 years at 1.5 percent, based on historical averages (Australia, 2021). By contrast, the Canadian Department of Finance reviewed its long-term labour productivity assumption in 2018, deciding to leave it at 1.2 percent per year, which is based on a historical average taken over the period 1970-2017 (Canada, Department of Finance, 2018). If these official projections for the two economies based on historical experience were to be realized, Canada would continue to lag Australian productivity growth by 0.3 percentage points per annum on average in future decades, the same productivity deficit this report has found for their business sectors for the period from the mid-1990s through to 2019. Other factors being equal, Canada's economic growth would then continue to lag that in Australia, giving rise to a widening gap in relative living standards.

Future growth in productivity is not just a technical assumption, it is also a policy choice. Both economies need to aim for higher productivity growth rates, but Canada's historical productivity deficit suggests it has the larger reform task and can learn important lessons from how Australia has fostered higher productivity growth. The next essay in this series will examine how Australia and Canada differ in terms of measures of institutional quality and policy settings conducive to higher productivity growth.

## APPENDIX: Decomposition of Aggregate Labour Productivity Growth in the Business Sector for Canada and Australia over Different Decades

**Table A1: Industry Contributions to Aggregate Labour Productivity Growth, Australia, 1995-2000**

### Percentage Point Contribution to Aggregate Labour Productivity Growth

	Aggregate	WSE	RLE	RGE
Market Sector	2.84	3.37	-0.12	-0.41
Agriculture, forestry and fishing	0.40	0.37	0.04	-0.02
Mining	0.28	0.49	-0.17	-0.04
Manufacturing	0.65	0.73	-0.03	-0.05
Electricity, gas, water and waste services	0.08	0.26	-0.14	-0.04
Construction	0.10	0.06	0.05	-0.01
Wholesale trade	0.04	0.04	0.01	-0.01
Retail trade	0.03	0.08	-0.04	-0.01
Accommodation and food services	0.11	0.12	-0.01	0.00
Transport, postal and warehousing	0.26	0.28	-0.01	-0.01
Information media and telecommunications	0.12	0.12	0.00	0.00
Financial and insurance services	0.58	0.80	-0.13	-0.10
Rental, hiring and real estate services	0.06	0.04	0.01	0.00
Professional, scientific and technical services	0.01	-0.03	0.09	-0.05
Administrative and support services	-0.04	-0.11	0.15	-0.08
Arts and recreation services	0.13	0.06	0.07	0.01
Other services	0.04	0.05	-0.01	0.00

Sources: Australian Bureau of Statistics 2022a (table 6), 2022b, and calculations by authors.

**Table A2: Industry Contributions to Aggregate Labour Productivity Growth, Australia, 2000-2009**

**Percentage Point Contribution to Aggregate Labour Productivity Growth**

	<b>Aggregate</b>	<b>WSE</b>	<b>RLE</b>	<b>RGE</b>
Market Sector	1.32	1.06	0.55	-0.29
Agriculture, forestry and fishing	0.19	0.19	0.03	-0.03
Mining	0.07	-0.25	0.44	-0.12
Manufacturing	0.16	0.23	-0.04	-0.02
Electricity, gas, water and waste services	-0.01	0.00	-0.01	0.00
Construction	0.09	0.05	0.06	-0.02
Wholesale trade	0.14	0.14	0.00	-0.01
Retail trade	0.15	0.15	0.00	0.00
Accommodation and food services	0.09	0.06	0.03	0.00
Transport, postal and warehousing	0.14	0.14	0.00	0.00
Information media and telecommunications	0.08	0.11	-0.01	-0.01
Financial and insurance services	0.29	0.36	-0.04	-0.02
Rental, hiring and real estate services	-0.05	-0.07	0.04	-0.02
Professional, scientific and technical services	-0.03	-0.03	0.03	-0.03
Administrative and support services	-0.06	-0.06	0.02	-0.02
Arts and recreation services	0.00	0.02	-0.02	0.00
Other services	0.05	0.03	0.02	0.00

Sources: Australian Bureau of Statistics 2022a (table 6), 2022b, and calculations by authors.

**Table A3: Industry Contributions to Aggregate Labour Productivity Growth, Australia, 2010-2019**

**Percentage Point Contribution to Aggregate Labour Productivity Growth**

	<b>Aggregate</b>	<b>WSE</b>	<b>RLE</b>	<b>RGE</b>
Market Sector	1.02	0.96	0.02	0.03
Agriculture, forestry and fishing	-0.01	-0.02	0.00	0.01
Mining	0.41	0.31	0.08	0.03
Manufacturing	0.00	0.03	-0.04	0.01
Electricity, gas, water and waste services	-0.02	-0.01	-0.01	0.00
Construction	0.01	0.01	0.00	0.00
Wholesale trade	0.09	0.10	0.00	-0.01
Retail trade	0.11	0.09	0.02	0.00
Accommodation and food services	0.03	0.02	0.00	0.00
Transport, postal and warehousing	0.04	0.05	0.00	0.00
Information media and telecommunications	0.08	0.10	-0.01	-0.01
Financial and insurance services	0.07	0.08	-0.01	0.00
Rental, hiring and real estate services	0.07	0.06	0.01	0.00
Professional, scientific and technical services	0.11	0.11	0.00	0.00
Administrative and support services	0.04	0.04	0.00	0.00
Arts and recreation services	0.02	0.02	0.01	0.00
Other services	-0.04	-0.01	-0.03	0.00

Sources: Australian Bureau of Statistics 2022a (table 6), 2022b, and calculations by authors.



**Table A4: Industry Contributions to Aggregate Labour Productivity Growth, Canada, 1990-1999**

**Percentage Point Contribution to Aggregate Labour Productivity Growth**

	Aggregate	WSE	RLE	RGE
Business sector (1)	1.77	2.15	-0.20	-0.18
Agriculture, forestry, fishing and hunting	0.17	0.09	0.08	0.01
Mining and oil and gas extraction	0.17	0.38	-0.15	-0.06
Utilities	0.02	0.07	-0.04	-0.01
Construction	-0.02	-0.03	-0.02	0.03
Manufacturing	0.71	0.71	0.04	-0.04
Wholesale trade	0.12	0.13	-0.02	0.00
Retail trade	0.18	0.14	0.03	0.00
Transportation and warehousing	0.00	0.01	-0.01	-0.01
Information and cultural industries	0.06	0.05	0.01	0.00
Finance, insurance, real estate and renting and leasing (2)	0.59	0.66	-0.04	-0.02
Professional, scientific and technical services	0.02	0.04	0.00	-0.02
Administrative and support, waste management and remediation services	-0.08	-0.02	-0.04	-0.03
Arts, entertainment and recreation	-0.04	-0.02	0.00	-0.02
Accommodation and food services	-0.02	-0.01	-0.01	0.00
Other private services (3)	-0.11	-0.05	-0.03	-0.03

Notes:

(1) The business sector covers the whole economy less public administration, non-profit institutions and the rental value of owner-occupied dwellings.

(2) This combines the North American Industry Classification System (NAICS) codes 52-53 with the exception of owner-occupied dwellings industry.

(3) This combines parts of the North American Industry Classification System (NAICS) codes 61, 62, and 81.

Sources: Statistics Canada 2022a, 2022b, and 2022c, and calculations by authors.

**Table A5: Industry Contributions to Aggregate Labour Productivity Growth, Canada, 2000-2009**

**Percentage Point Contribution to Aggregate Labour Productivity Growth**

	Aggregate	WSE	RLE	RGE
Business sector (1)	0.67	0.50	0.31	-0.13
Agriculture, forestry, fishing and hunting	0.11	0.08	0.05	-0.01
Mining and oil and gas extraction	-0.10	-0.28	0.29	-0.12
Utilities	0.00	-0.02	0.02	0.00
Construction	-0.02	0.01	-0.02	-0.01
Manufacturing	0.06	0.06	-0.01	0.01
Wholesale trade	0.11	0.11	0.01	0.00
Retail trade	0.04	0.09	-0.05	0.00
Transportation and warehousing	0.06	0.06	0.01	0.00
Information and cultural industries	0.08	0.08	0.00	0.00
Finance, insurance, real estate and renting and leasing (2)	0.31	0.22	0.07	0.01
Professional, scientific and technical services	0.01	0.02	-0.01	0.00
Administrative and support, waste management and remediation services	-0.02	0.02	-0.03	0.00
Arts, entertainment and recreation	-0.01	0.00	-0.01	0.00
Accommodation and food services	0.03	0.02	0.01	0.00
Other private services (3)	0.00	0.03	-0.03	0.00

Notes:

(1) The business sector covers the whole economy less public administration, non-profit institutions and the rental value of owner-occupied dwellings.

(2) This combines the North American Industry Classification System (NAICS) codes 52-53 with the exception of owner-occupied dwellings industry.

(3) This combines parts of the North American Industry Classification System (NAICS) codes 61, 62, and 81.

Sources: Statistics Canada 2022a, 2022b, and 2022c, and calculations by authors.

**Table A6: Industry Contributions to Aggregate Labour Productivity Growth, Canada, 2010-2019**

**Percentage Point Contribution to Aggregate Labour Productivity Growth**

	Aggregate	WSE	RLE	RGE
Business sector (1)	1.22	1.50	-0.19	-0.10
Agriculture, forestry, fishing and hunting	0.14	0.14	0.01	-0.01
Mining and oil and gas extraction	0.19	0.22	-0.03	-0.01
Utilities	0.03	0.07	-0.03	-0.01
Construction	-0.04	-0.01	-0.01	-0.01
Manufacturing	0.10	0.10	0.00	0.00
Wholesale trade	0.10	0.10	0.00	0.00
Retail trade	0.12	0.08	0.03	0.00
Transportation and warehousing	0.03	0.05	-0.01	0.00
Information and cultural industries	0.04	0.04	0.00	0.00
Finance, insurance, real estate and renting and leasing (2)	0.45	0.61	-0.11	-0.04
Professional, scientific and technical services	0.02	0.04	-0.01	-0.01
Administrative and support, waste management and remediation services	0.01	0.01	0.00	0.00
Arts, entertainment and recreation	0.00	0.00	0.00	0.00
Accommodation and food services	0.02	0.03	-0.01	0.00
Other private services (3)	0.01	0.03	-0.01	0.00

Notes:

(1) The business sector covers the whole economy less public administration, non-profit institutions and the rental value of owner-occupied dwellings.

(2) This combines the North American Industry Classification System (NAICS) codes 52-53 with the exception of owner-occupied dwellings industry.

(3) This combines parts of the North American Industry Classification System (NAICS) codes 61, 62, and 81.

Sources: Statistics Canada 2022a, 2022b, and 2022c, and calculations by authors.

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