A Comparison of Productivity Developments in Canada and Australia: Lessons for Canada

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ABSTRACT

The objective of this report is to examine the impact of public policy on Australia's productivity performance and to discuss possible lessons for Canada from this experience. To do this, the report conducts a comprehensive analysis of the productivity performance of both countries, with particular interest in determining which underlying factors can explain Australia's superior productivity growth in recent years. In addition, the report discusses the literature on the effects of public policy on Australian productivity performance since the 1990s.

AUSTRALIA AND CANADA share much in common. The countries have similar institutions based on their historical ties to the United Kingdom, enjoy high standards of living, have large natural resource sectors, accept large numbers of immigrants, and have experienced similar labour market performance. But one area where the two countries have diverged in recent years is productivity performance. Indeed, Australia has significantly outperformed Canada, with labour productivity growing at an average annual rate of 2.33 per cent in Australia since 1994 compared to only 1.31 per cent in Canada.

The objective of the article is to examine the impact of public policy on Australia's productivity performance and to discuss possible lessons for Canada from this experience. To do this, the article conducts a comprehensive analysis of the productivity performance of both countries, with particular interest in determining which underlying factors can explain Australia's superior productivity growth in recent years. It also discusses the literature on the effect of public policy on Australian productivity performance since the 1990s.

The article is organized as follows. The first section presents data on labour productivity growth in Canada and Australia at the aggregate and industry level.[2] The second section examines the drivers of labour productivity growth in Australia and Canada, with an emphasis on growth accounting and industry decomposition

1 Evan Capeluck was an economist at the Centre for the Study of Living Standards (CSLS) at the time of writing. The author would like to thank Andrew Sharpe and Alexander Murray from the CSLS, Bert Waslander, and Shiji Zhao from the Australian Productivity Commission for their comments and contributions. The author would also like to thank Matthew Calver, Jasmin Thomas, Erika Rodrigues, Nico Palesch, and Alexander Benjamin Rand for their contributions. Finally, the author would also like to thank Industry Canada for funding and Jim Stanford for comments received in his role as discussant on the paper at the 49th Canadian Economics Association Annual Meeting, May 29-May 31, 2015 at Ryerson University in Toronto, Ontario. This article is an abridged version of Capeluck (2016). Email: evancapeluck@gmail.com.

2 While this article focuses on labour productivity, Capeluck (2016) also compares Canada and Australia's capital and multifactor productivity performance at the aggregate and industry level. Australia's multifactor productivity growth exceeded that of Canada over the 1994-2013 period.

Table 1: Labour Productivity Growth and Related Measures, Compound Annual Growth Rates, Per Cent, Canada and Australia, 1994-2013

Period	Canada			Australia		
	Labour productivity	Real value added	Hours worked	Labour productivity	Real value added	Hours worked
1994-2013	1.31	2.77	1.45	2.33	3.52	1.17
1994-2000	2.16	4.80	2.57	2.95	4.23	1.24
2000-2013	0.92	1.85	0.93	2.04	3.20	1.14
2000-2008	0.88	2.19	1.30	1.79	3.47	1.65
2008-2013	0.97	1.32	0.34	2.44	2.78	0.33

Note: The estimates for Canada are for the business sector. The estimates for Australia are for the market sector.

Source: CSLS calculations based on Statistics Canada and ABS data. ABS: 5260.0.55.002. Statistics Canada: 383-0021

exercises. The impact of other factors not captured in these exercises that have been identified in the literature as contributing to productivity growth will also be discussed. The third section looks at the contribution of public policy to Australia's superior productivity performance. Finally, the fourth section summarizes the main findings and discusses the relevance and implications of the public policies adopted in Australia for Canada.

Productivity Trends

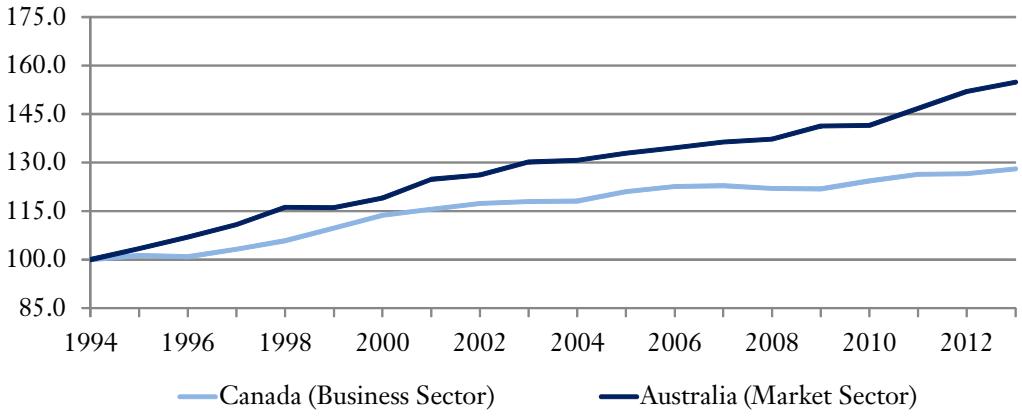
Aggregate Level

In Canada, business sector labour productivity increased at an annual rate of 1.31 per cent between 1994 and 2013, well below the growth rate exhibited by Australia (2.33 per cent) (Table 1). Australia exhibited stronger growth in total economy labour productivity than Canada in every sub-period between 1994 and 2013. For example, total economy labour productivity was 0.79 percentage point stronger in 1994-2000 and 1.12 percentage point stronger in 2000-2013. The higher growth in business sector labour productivity in Australia was attributable to both stronger real value added growth and weaker growth in total hours worked.

Both countries exhibited a significant slowdown in labour productivity growth between 1994-2000 and 2000-2013. In Australia, business sector labour productivity growth was down 0.91 percentage points from 1994-2000 to 2000-2013. The labour productivity slowdown was much more stark in Canada, with a decline of 1.25 percentage points. Labour productivity declined in both countries between these two periods because the slowdown in real value added growth was much larger than the decline in hours worked growth.

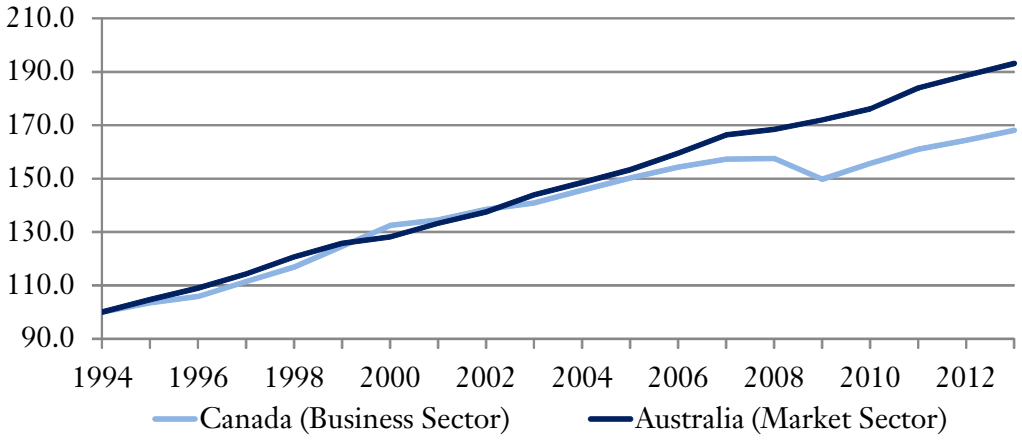
Australia outperformed Canada over the entire 1994-2013 period in terms of business sector labour productivity growth (Chart 1). In 2013, business sector labour productivity was 54.9 per cent above its 1994 level in Australia and 28.0 per cent above its 1994 level in Canada.

Chart 1: Index of Labour Productivity, Canada and Australia, 1994-2013



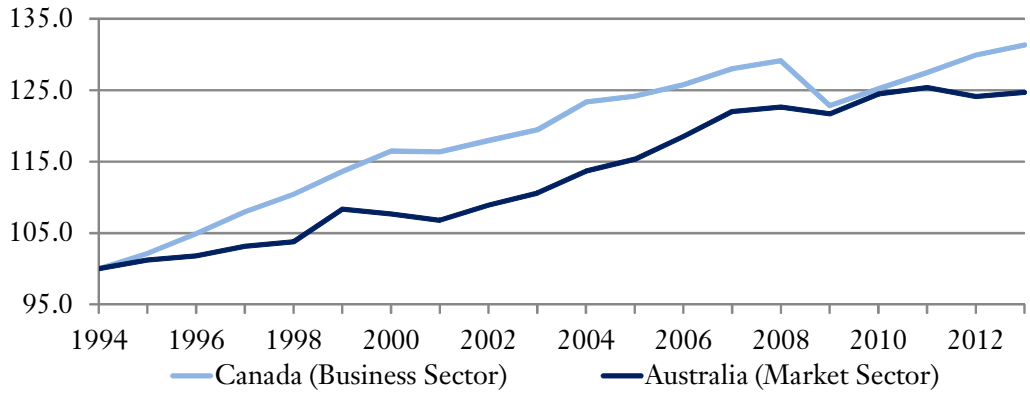
Source: CSLS calculations based on StatCan and ABS data. ABS: 5260.0.55.002 and 5204.015. StatCan: 383-0021.

Chart 2: Index of Real Value Added, Canada and Australia, 1994-2013



Source: CSLS calculations based on StatCan and ABS data. ABS: 5260.0.55.002 and 5204.015. StatCan: 383-0021

Chart 3: Index of Hours Worked, Canada and Australia, 1994-2013



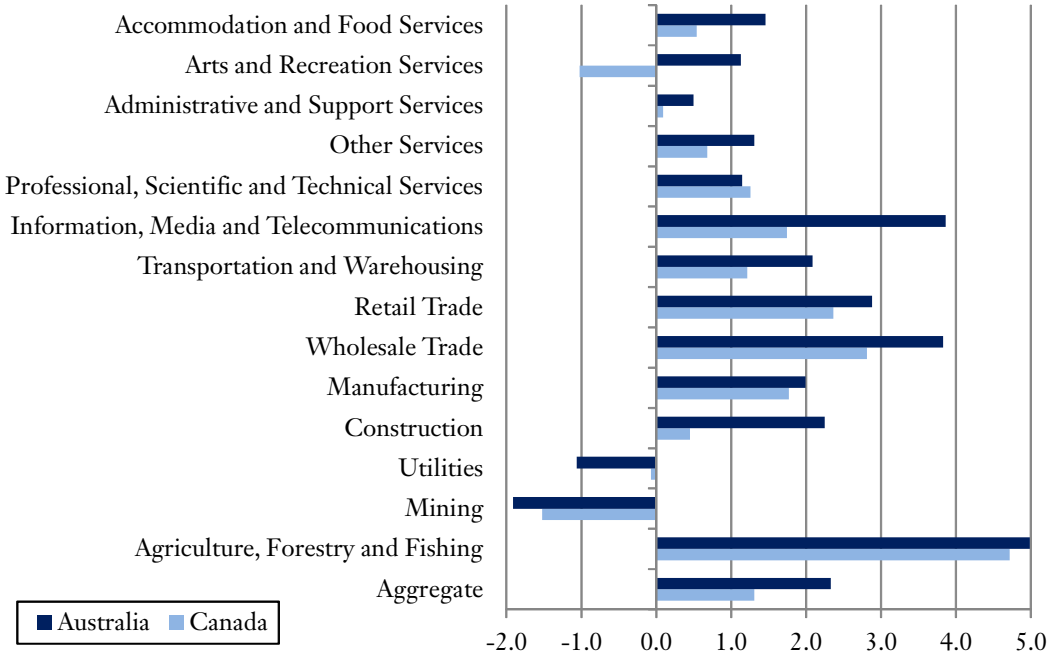
Source: CSLS calculations based on StatCan and ABS data. ABS: 5260.0.55.002 and 5204.015. StatCan: 383-0021

The weaker business sector labour productivity growth exhibited by Canada over much of the 1994-2013 period was driven by higher hours worked growth as opposed to lower real value added growth (Chart 2 and Chart 3). Canada's business sector kept pace with its Australian counterpart in terms of real value added growth from 1994 to 2006, while it surpassed its Australian counterpart in terms of growth in total hours worked. Following 2006, growth in both real value added and total hours worked slowed significantly in Canada relative to Australia, largely attributable to the 2008-09 recession.

Industry Level

Between 1994 and 2013, Australia outperformed Canada in terms of labour productivity growth in every industry except for utilities, mining, and professional and technical services (Chart 4). Some of the most striking cases were: arts and recreation services, where Australia saw labour productivity growth that was 2.15 percentage points higher than Canada; information media and telecommunications (2.12 percentage points); and construction (1.80 percentage points). In the aggregate, Australia exhibited labour productivity growth that was 1.02 percentage points higher than what was seen in Canada.

Chart 4: Labour Productivity Growth, Business/Market Sector Industries, Compound Annual Growth Rates, Per Cent, Canada and Australia, 1994-2013



Note: "Aggregate" refers to the business sector for Canada and the market sector for Australia.
Source: CSLS calculations based on Statistics Canada and ABS data. ABS: 5260.0.55.002. Statistics Canada: 383-0021.

In both countries, agriculture, forestry and fishing exhibited the strongest labour productivity performance, followed by wholesale trade and retail trade. In contrast, labour productivity growth was negative in mining and, to a lesser extent, in utilities in both countries.

The overall quality of the natural resource base can have an important effect on productivity. *Ceteris paribus*, easily accessible and high-quality natural resources will lead to lower costs and higher productivity than hard-to-reach and low-quality natural resources (Topp and Kulys, 2014; Sharpe and Waslander, 2014).[3] This could explain the negative labour productivity growth exhibited by mining and oil and gas extraction in both economies in 1994-2013. Gordon (2013) provides another possible explanation for weak MFP growth in resource-extraction industries called the "time-to-build" bias. Since there is often a gap of several years between when investment in an extraction facility begins and when production commences, there will be a period where investment is increasing with no corresponding increase in output. This would show up as negative MFP growth.

International Comparison

An international comparison of labour productivity growth rates in 2000-2014 across OECD countries suggests that the gap between Canada and Australia is due to both an weak performance in Canada and an strong performance in Australia. In fact, Australia exhibited labour productivity growth of 1.46 per cent per year in this period, 0.22 percentage point above the OECD average (1.24 per cent per year). Austra-

3 Gordon (2013) refers to this as the "low-hanging fruit" bias. Firms have an inventive to "start with the high-quality, low-cost plays and, when these are exhausted, move on to deposits that are of lower quality and are more costly." As firms move on to lower quality deposits, firms will need to employ an increasing amount of capital to produce a given level of output. This would show up as negative MFP growth.

Table 2: Sources of Labour Productivity Growth, Business/Market Sector, Compound Annual Growth Rates, Percentage Points, Canada and Australia, 1994-2013

Period	Canada				Australia			
	LP	MFP	CI	LC	LP	MFP	CI	LC
1994-2013	1.31	0.07	0.94	0.29	2.33	0.37	1.66	0.29
1994-2000	2.16	0.87	0.91	0.37	2.96	1.28	1.34	0.31
2000-2013	0.92	-0.29	0.95	0.26	2.04	-0.05	1.81	0.27
2000-2008	0.88	-0.50	1.11	0.27	1.79	-0.10	1.63	0.26
2008-2013	0.97	0.03	0.71	0.23	2.44	0.03	2.10	0.30

Note: "LP" stands for labour productivity. "CI" stands for capital intensity. "LC" stands for labour composition. The estimates for Canada are for the business sector. The estimates for Australia are for the market sector.
Source: CSLS calculations based on Statistics Canada and ABS data. ABS: 5260.0.55.002. Statistics Canada: 383-0021.

lia ranked 15th among the 37 countries included in the comparison. In contrast, labour productivity increased at an annual rate of 0.96 per cent in Canada, 0.29 percentage point below the OECD average. Canada ranked 26th among the 37 countries included in the comparison.

Explaining Divergent Productivity Trends

Growth Accounting

A good starting point for any discussion on the dynamics of productivity growth is the standard neo-classical growth accounting model. According to the framework, contributions to labour productivity growth can be broken down into three factors: 1) capital services intensity growth; 2) labour composition growth (or human capital development); and 3) multifactor productivity (MFP) growth.[4] They are often referred to as the sources of labour productivity growth. It is important to keep in mind, however, that they are (in general) only proximate causes of growth, and can be affected by several underlying factors.

Between 1994 and 2013, labour productivity growth in Canada and in Australia was driven by capital intensity, representing over 70 per cent of growth in each country (Table 2). However, the next largest contributor to labour productivity in Australia was MFP (15.8 per cent), while it was labour composition in Canada (22.4 per cent). It is important to note that the disparity in the contribution of capital intensity between Canada and Australia was quite large, at 0.72 percentage points, accounting for 71.1 per cent of the overall gap in labour productivity growth between the two countries. The remaining 28.8 per cent of the overall gap was due to higher MFP growth in Australia compared to Canada, while Canada's higher labour composition growth contributed a negligibly to the overall gap.

When broken down into sub-periods, Australia shows higher values for each component in almost every breakdown. The only exceptions are labour composition in the period 1994-2000 and 2000-2008, as well as MFP growth in 2008-2013. A larger contribution from capital intensity growth was consistently the main driver of the stronger labour productivity growth rate of Australia across the sub-periods.

Industry Decomposition

Aggregate labour productivity growth reflects the productivity performance of each constituent part as well as changes in the composition of the economy. The aggregate labour productivity level is (approximately) the weighted average of sectoral labour productivity levels, with the

4 See Capeluck (2016) for a detailed discussion of these factors.

Table 3: Decomposition of Aggregate Labour Productivity Growth, Canada and Australia, 1994-2013

	Canada				Australia			
	Aggregate	WSE	RLE	RGE	Aggregate	WSE	RLE	RGE
Percentage Point Contribution to Aggregate Labour Productivity Growth								
1994-2013	1.31	1.25	0.28	-0.22	2.33	1.94	0.76	-0.37
1994-2000	2.16	2.33	-0.10	-0.07	2.95	3.29	-0.10	-0.23
2000-2013	0.92	0.78	0.34	-0.21	2.04	1.46	1.37	-0.78
Percentage Contribution to Aggregate Labour Productivity Growth								
1994-2013	100.0	95.1	21.5	-16.5	100.0	83.2	32.5	-15.8
1994-2000	100.0	107.5	-4.4	-3.1	100.0	111.2	-3.5	-7.7
2000-2013	100.0	85.4	37.4	-22.8	100.0	71.5	67.0	-38.5

Note: "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: CSLS calculations based on Statistics Canada and ABS data. Statistics Canada: 383-0029 and 383-0021. ABS: 5204.005, 6291.0.55.003 and 5260.0.55.002.

weights being equal to each sector's labour input share.

Using the framework developed by Sharpe and Thomson (2010), we can determine the industry contributions to aggregate labour productivity growth in Canada and Australia.[5] In the framework, the absolute change in aggregate real labour productivity between two periods is (approximately) equal to the sum of the three components:

- the within-sector effect (WSE) measures the contribution to aggregate productivity growth due solely to the productivity increase experienced by individual sectors;
- the reallocation level effect (RLE) captures the contribution to aggregate labour productivity growth from labour movements from sectors with below-average labour productivity levels to sectors with above-average labour productivity levels; and
- the reallocation growth effect (RGE) captures the contribution to aggregate labour productivity growth from labour movements from sectors with below-average labour productivity growth to sectors with above-average labour productivity growth.

Table 4: Decomposition of Absolute Difference in Aggregate Labour Productivity Growth Between Australia and Canada, 1994-2013

	Aggregate	WSE	RLE	RGE
Absolute Difference in Growth Rates (Percentage Points)				
1994-2013	1.02	0.69	0.48	-0.15
1994-2000	0.79	0.96	-0.01	-0.16
2000-2013	1.12	0.67	1.02	-0.58
Share of Absolute Difference (Per Cent)				
1994-2013	100.0	68.0	46.8	-14.8
1994-2000	100.0	121.2	-0.8	-20.4
2000-2013	100.0	60.1	91.2	-51.3

Note: "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: CSLS calculations based on Statistics Canada and ABS data. Statistics Canada: 383-0029 and 383-0021. ABS: 5204.005, 6291.0.55.003 and 5260.0.55.002.

We will now present industry contributions to aggregate labour productivity growth broken down into the above-noted effects in Canada and Australia for 1994-2013. This period is broken down into two sub-periods: 1994-2000 and 2000-2013.

Within-sector effects contributed the most to aggregate labour productivity growth in both countries in 1994-2013 (Table 3). In 1994-2000, within-sector effects accounted for all of the

5 Refer to Capeluck (2016) for a detailed discussion of the decomposition framework.

Table 5: Industry Contributions to Aggregate Labour Productivity Growth, Canada, 1994-2013

	Aggregate	WSE	RLE	RGE
Percentage Point Contribution to Aggregate Labour Productivity Growth				
Business sector	1.31	1.25	0.28	-0.22
Agriculture, forestry, fishing and hunting	0.20	0.17	0.08	-0.04
Mining and oil and gas extraction	-0.01	-0.16	0.23	-0.07
Utilities	-0.01	0.00	0.00	0.00
Construction	0.01	0.04	0.00	-0.03
Manufacturing	0.33	0.37	-0.01	-0.04
Wholesale trade	0.19	0.19	0.00	0.00
Retail trade	0.18	0.17	0.01	0.00
Transportation and warehousing	0.06	0.07	0.00	0.00
Information and cultural industries	0.08	0.06	0.01	0.00
Finance, insurance, real estate and rental and leasing	0.25	0.23	0.01	0.01
Professional, scientific and technical services	0.05	0.07	-0.01	0.00
Administrative and support, waste management and remediation services	-0.05	0.00	-0.03	-0.03
Arts, entertainment and recreation	-0.02	-0.01	-0.01	-0.01
Accommodation and food services	0.02	0.02	0.00	0.00
Other private services	0.03	0.04	-0.01	0.00
Percentage Contribution to the Business Sector Total				
Business sector	100.0	100.0	100.0	100.0
Agriculture, forestry, fishing and hunting	15.6	13.3	29.1	19.9
Mining and oil and gas extraction	-0.6	-13.2	82.2	34.3
Utilities	-0.4	-0.2	-1.2	-0.1
Construction	0.5	3.0	-1.1	12.9
Manufacturing	24.8	29.8	-2.8	17.3
Wholesale trade	14.6	15.5	0.4	1.2
Retail trade	13.5	13.3	3.9	-0.3
Transportation and warehousing	5.0	5.3	-0.4	0.2
Information and cultural industries	5.9	5.1	3.1	-2.3
Finance, insurance, real estate and rental and leasing	19.2	18.7	4.6	-2.3
Professional, scientific and technical services	3.7	5.3	-4.4	2.2
Administrative and support, waste management and remediation services	-4.0	0.2	-10.2	11.9
Arts, entertainment and recreation	-1.8	-0.7	-2.1	4.1
Accommodation and food services	1.5	1.4	0.8	-0.4
Other private services	2.5	3.2	-1.8	1.4

Note: "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: CSLS calculations based on Statistics Canada and ABS data. Statistics Canada: 383-0029 and 383-0021. ABS: 5204.005, 6291.0.55.003 and 5260.0.55.002.

aggregate labour productivity growth, contributing 2.33 percentage points (or 107.5 per cent) in Canada and 3.29 percentage points (or 111.2 per cent) in Australia. The reallocation effects negatively contributed to aggregate labour productivity growth in both countries in 1994-2000.

In contrast, while within-sector effects remained the main driver of aggregate productivity growth in 2000-2013, the contribution of the reallocation effects were quite large. In 2000-2013, the contributions of within-sector effects to the aggregate labour productivity were notably lower, at 0.78 percentage point (or 85.4 per cent) in Canada and 1.46 percentage points (or 71.5 per cent) in Australia. The reallocation effects contributed 0.13 percentage points (or 14.6 per cent) in Canada and 0.58 percentage

Table 6: Industry Contributions to Aggregate Labour Productivity Growth, Australia, 1994-2013

	Aggregate	WSE	RLE	RGE
Percentage Point Contribution to Aggregate Labour Productivity Growth				
Market sector	2.33	1.94	0.76	-0.37
Agriculture, forestry and fishing	0.27	0.22	0.07	-0.02
Mining	0.16	-0.13	0.56	-0.26
Electricity, gas, water and waste services	-0.02	-0.05	0.05	-0.02
Construction	0.16	0.20	-0.02	-0.01
Manufacturing	0.40	0.32	0.04	0.04
Wholesale trade	0.25	0.27	0.01	-0.03
Retail trade	0.20	0.19	0.01	0.00
Transport, postal and warehousing	0.14	0.14	0.00	0.00
Information, media and telecommunications	0.15	0.17	-0.01	-0.02
Financial and insurance services	0.40	0.37	0.01	0.01
Rental, hiring and real estate services	0.04	0.02	0.02	-0.01
Professional, scientific and technical services	0.04	0.08	0.00	-0.05
Administrative and support services	0.02	0.02	0.01	-0.01
Arts and recreation services	0.00	0.01	0.00	-0.01
Accommodation and food services	0.06	0.06	0.00	0.00
Other services	0.06	0.04	0.01	0.01
Percentage Contribution to the MarketSector Total				
Market sector	100.0	100.0	100.0	100.0
Agriculture, forestry and fishing	11.7	11.5	8.8	4.6
Mining	7.1	-6.8	73.8	71.8
Electricity, gas, water and waste services	-1.0	-2.6	6.1	5.7
Construction	7.0	10.1	-2.5	3.7
Manufacturing	17.0	16.4	4.7	-11.6
Wholesale trade	10.7	14.0	1.1	8.5
Retail trade	8.7	9.7	1.3	-1.1
Transport, postal and warehousing	5.9	7.2	0.0	0.4
Information, media and telecommunications	6.5	9.0	-0.8	4.8
Financial and insurance services	17.1	19.3	1.4	-4.0
Rental, hiring and real estate services	1.6	1.2	2.9	1.8
Professional, scientific and technical services	1.6	4.2	0.6	13.1
Administrative and support services	0.9	1.1	1.7	3.2
Arts and recreation services	0.1	0.6	-0.5	1.6
Accommodation and food services	2.8	3.0	0.5	-0.9
Other services	2.4	2.2	0.9	-1.7

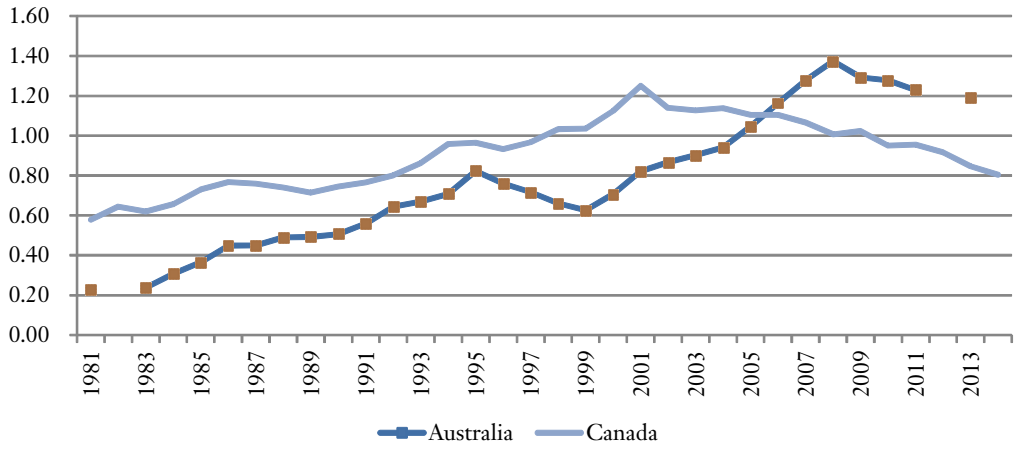
Note: "WSE" stands for "within-sector effect." "RLE" stands for "reallocation level effect." "RGE" stands for "reallocation growth effect." "Aggregate" refers to the business sector for Canada and the market sector for Australia.

Source: CSLS calculations based on Statistics Canada and ABS data. Statistics Canada: 383-0029 and 383-0021. ABS: 5204.005, 6291.0.55.003 and 5260.0.55.002.

points (or 28.5 per cent) in Australia. However, this masks the fact that reallocation growth effects negatively contributed to aggregate labour productivity growth in both countries, which was more than compensated for by a strong positive contribution from reallocation level effects.

Table 4 decomposes the absolute difference in aggregate labour productivity growth between Australia and Canada for 1994-2000 and 2000-2013. In 1994-2000, aggregate labour productivity growth in Australia was 0.79 percentage points higher than in Canada. The larger contribution from within-sector effects in Australia

Chart 5: BERD as a Per Cent of GDP, Canada and Australia, 1986-2010



Source: CSLS calculations based on OECD data.

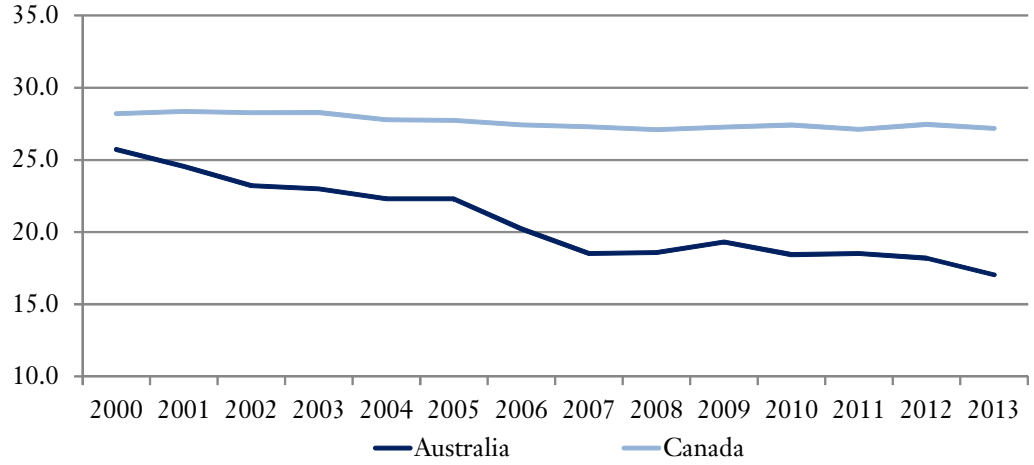
compared to Canada accounted for the entire gap in aggregate labour productivity growth between these countries in 1994-2000, at 0.96 percentage points (or 121.2 per cent). The reallocation effects negatively contributed to the gap.

The gap in aggregate labour productivity growth was even higher in 2000-2013, at 1.12 percentage points. The difference in within-sector effects between Australia and Canada only accounted for 0.67 percentage points (or 60.1 per cent) of the gap in aggregate labour productivity growth between these countries in 2000-2013. This implies that the reallocation effects accounted for 0.45 percentage points (or 39.9 per cent) to the overall gap in this period. In particular, Australia experienced a significantly larger contribution from the reallocation level effects than Canada in 2000-2013 (with a gap of 1.02 percentage points), which was more than enough to compensate for the fact that the reallocation growth effects were more of a drag on aggregate labour productivity in Australia compared to Canada.

Table 5 and Table 6 provide a detailed breakdown of industry contributions to aggregate labour productivity in Canada and Australia for the 1994-2013 period. Finance, insurance, real estate and renting and leasing contributed 0.19 percentage point (or 23.5 per cent) to the overall 1.02 percentage point gap in labour productivity growth between Australia and Canada in 1994-2013. This was wholly related to a stronger within-sector effect in Australia compared to Canada. Mining and oil and gas extraction ranked second, accounting for 0.17 percentage points (or 16.9 per cent) of this gap. In particular, mining and oil and gas extraction contributed 0.16 percentage points to labour productivity growth in Australia, while it contributed -0.01 percentage points in Canada. This was entirely due to a larger contribution of reallocation effects related to mining in Australia, which accounted for 0.14 percentage point (or 13.6 per cent) of the gap in aggregate labour productivity growth. Construction made the third largest contribution to the overall gap with 0.16 percentage point (or 15.4 per cent).

Even though mining and oil and gas extraction exhibited strongly negative labour productivity growth in both countries, its contribution to aggregate labour productivity growth was negative 0.01 percentage points in Canada and 0.16 percentage points in Australia, as the real-

Chart 6: Trade Union Density, Per Cent, 2000-2013



Note: According to the OECD, "trade union density corresponds to the ratio of wage and salary earners that are trade union members, divided by the total number of wage and salary earners."
Source: CSLS calculations based on OECD data.

location level effect was large enough to offset negative values for the within-sector effect and the reallocation growth effect in both economies. The larger contribution of mining and oil and gas extraction to aggregate labour productivity growth in Australia is entirely due to the fact that Australia experienced a much greater increase in the share of mining and oil and gas extraction in total hours worked than Canada.

Differences in the structure of the mining and oil and gas extraction industry may partially explain why Australia experienced a much larger increase in the industry's share of total hours worked. For instance, in 2013, coal and iron mining together accounted for 58.3 per cent of the industry's real output in Australia compared to 2.8 per cent in Canada. In addition, oil and gas extraction accounted for 73.3 per cent of real output in the industry in Canada, well above the equivalent share in Australia (21.4 per cent).

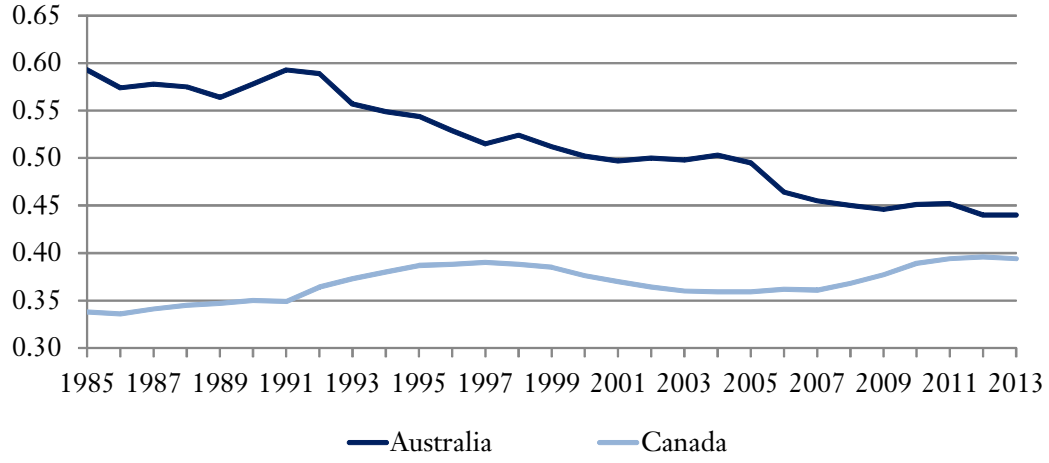
Productivity Drivers

Aside from the proximate explanations related to growth accounting and inter-industry shifts, there are several deeper explanations for the divergence in labour productivity between Australia and Canada in 1994-2013. Indeed, the gap in labour productivity growth between Australia and Canada reflects a gap between these countries in many of the drivers of labour productivity growth.

Innovation

Although it is difficult to measure the amount of technological diffusion and development occurring in an economy, R&D expenditure acts as a (somewhat) reliable indicator. We are particularly interested in business expenditure on R&D (BERD) as a percentage of GDP because BERD is the largest component of R&D expenditure and because BERD is closely linked with productivity in the business sector (which is the focus of this article). BERD as a share of GDP was higher than in Canada than in Australia between 1981 and 2005 (Chart 5). After 2005, Canada's BERD as a share of GDP continued the decline it began in 2001, while Australia's BERD as a per cent of GDP continued the rise it had begun in 1999. Australia's BERD as a share of GDP only began to trend downward in 2008, seven years after Canada's BERD as a per cent of GDP started its downward movement. More-

Chart 7: Minimum Wage Relative to Mean Wage of Full Time Workers, Canada and Australia, Ratio, 1985-2013



Source: CSLS calculations based on OECD data.

over, Australia's share of BERD in GDP increased 426 per cent between 1986 and 2013, compared to only a much smaller increase in Canada (46 per cent). Australia's large increase actually pushed its BERD share of GDP higher than that of Canada in 2006. Relative to other OECD countries in 2011, Australia's share of BERD in GDP ranked thirteenth out of thirty-two, while Canada's ranked twenty-first.

Labour Market Regulation

Employment Protection Legislation

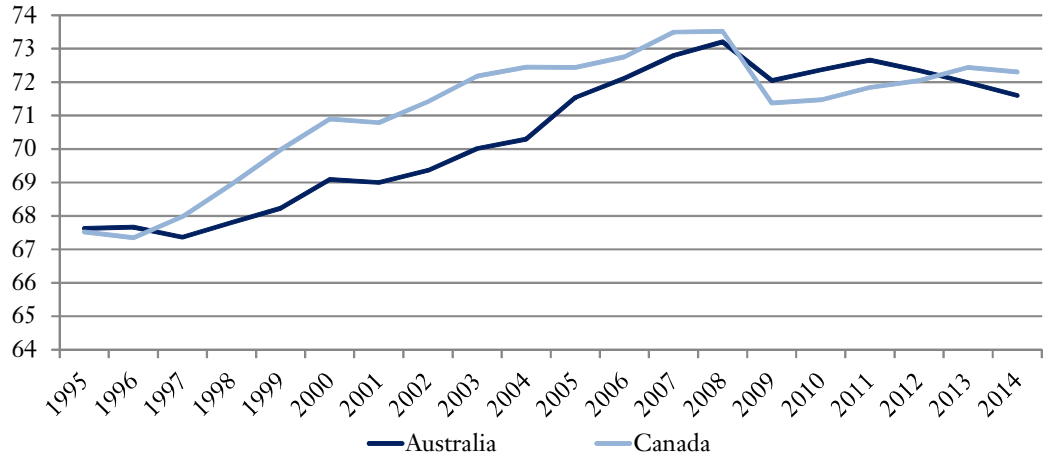
As measured by the OECD, employment protection legislation in Canada and Australia results in roughly the same level of protection for individual workers and the collective. Both countries rank within the top 10 OECD countries measured in the category of legislation designed for the protection of permanent workers against individual and collective dismissal, which can involve procedural inconveniences, notice periods, severance pay, and the difficulty of dismissal for individual workers and delays, costs or notification procedures required for collective dismissal.

Unionization

Trade union density, which corresponds to the share of wage and salary earners that are trade union members (whenever possible adjusted for non-active and self-employed members), has seen two very different paths be taken in Canada and Australia (Chart 6). While Canada's trade union density has remained essentially unchanged since 2000 (28.2 per cent in 2000 compared to 27.1 per cent in 2013), Australia's has seen a marked decline from levels comparable to Canada's in 2000 (25.7 per cent) to levels significantly below Canada's in 2013 (17.0 per cent).

Despite their lower rates of unionization, Australia has a unique "awards" system that imposes collective agreement-like minimum wages and other conditions on certain occupations and industries. Australia's unique awards system and its higher minimum wage suggest that its labour market is more regulated, in total, than Canada's despite lower rates of union membership. While trade union membership is quite low in Australia, a significant share of employees had their wages determined by collective agreements and the awards system. In

Chart 8: Employment Rates, Canada and Australia, Per Cent, 1995-2014



Source: CSLS calculations based on OECD data.

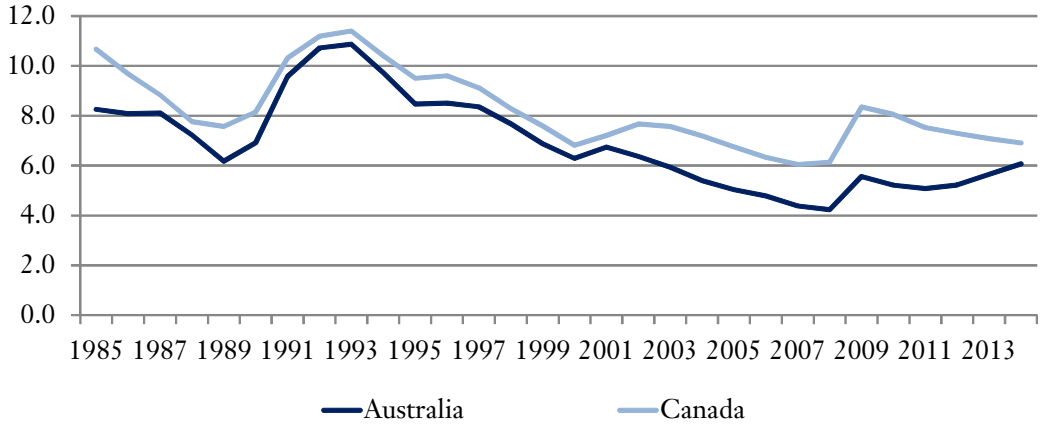
2010, 43 per cent of employees had their wages set by collective agreements, while 15 per cent had their pay set by 'awards only.'[6]

Minimum Wages

Increasing minimum wages can increase labour productivity through three main channels.

First, by increasing minimum wages, there is a substitution effect between capital and labour. Employers will choose to employ capital instead of labour at the minimum wage. Second, by increasing minimum wages, the average quality of labour can be increased through the composition effect. In particular, when minimum wages increase, low-skilled labour flows out of the labour market, thereby increasing the skill composition of the employed. Third, by increasing minimum wages, x-inefficiency is decreased. X-inefficiency is the difference between the efficient business behaviour implied by economic theory and the business behaviour that is

Chart 9: Unemployment Rates, Canada and Australia, Per Cent, 1985-2014



Source: CSLS calculations based on OECD data.

6 See Capeluck (2016) for discussion of Australia's national employment regulations.

observed in practice. When minimum wages increase, x-inefficiency will decrease because a business will begin to employ its previously unused capacity or shed excess capacity.

Australia's minimum wage relative to the mean wage of full-time workers was higher than Canada's for every year between 1985 and 2013 (Chart 7). In 1985, Australia's relative was 0.59, while Canada's relative was 0.34, resulting in a gap between Canada and Australia of 0.25. By 2013, Australia's relative had decreased to 0.44, while Canada's relative had increased to 0.39, resulting in a much smaller gap of 0.05. The majority (75 per cent) of the change in the gap was driven by the decrease in Australia's relative.

As seen before, minimum wages may have had an effect on capital deepening, since Australia's pace of capital deepening was much faster than Canada's pace of capital deepening between 1994 and 2013.

Increasing minimum wages, as discussed above, can lead to a substitution effect and a composition effect, both of which may reduce the employment rate below what could prevail with a lower minimum wage. In Australia, minimum wages are higher than in Canada. These higher minimum wages may have had an effect on the gap between Australia and Canada's employment rates between 1995 and 2008, but the impact appears to be minimal (Chart 8). The largest gaps between Canada's employment rate and Australia's employment rate were seen in the early-2000s, but these gaps were at most only 2.2 percentage points.

The resulting substitution and composition effects from an increase in the minimum wage may also increase the unemployment rate above what would prevail with a lower minimum wage. In Australia, since minimum wages are higher than in Canada, we might expect unemployment rates to be adversely affected, but contrary to expectations, unemployment rates in Australia were consistently lower than those in Canada between 1985 and 2014 (Chart 9).

Table 7: Product Market Regulation Indicator and Sub-Indices, Canada and Australia, 2013 (0 to 6)

	1998	2003	2008	2013
Product market regulation				
Australia	1.72	1.34	1.46	1.29
Canada	1.91	1.64	1.53	1.42
State control				
Australia	2.28	1.59	2.21	1.99
Canada	2.15	2.08	1.96	1.92
Barriers to entrepreneurship				
Australia	1.94	1.76	1.65	1.69
Canada	1.82	1.44	1.36	1.34
Barriers to trade and investment				
Australia	0.95	0.67	0.53	0.19
Canada	1.75	1.40	1.27	1.01

Source: CSLS calculations based on OECD data.

Product Market Regulation

In 2013, product market regulations appear to be more restrictive in Canada than in Australia, although this is highly subject to the weights applied to state control, barriers to entrepreneurship, and barriers to trade and investment. With equal weighting, Canada's product market regulations receive a score of 1.42 out of 6, which is slightly stricter than Australia's product market regulations score of 1.29 out of 6, where 0 is the least restrictive and 6 is the most restrictive (Table 7).

Canada's stricter regulatory policy is entirely driven by barriers to trade and investment, where Canada receives a score of 1.01 while Australia receives a score of 0.19. Australia and Canada have similar levels of state control (1.99 and 1.92, respectively) and Australia's barriers to entrepreneurship are stricter than Canada's (1.69 versus 1.34).

When compared to Australia over the past fifteen years, Canada had stricter product market regulation in each year examined; however, Canada's score out of 6 has been falling, indicating that product market regulation is becoming

less restrictive over the years. When comparing Australia and Canada, the greatest difference in product market regulation, according to the OECD indicator, was seen in 2003, while the smallest difference occurred in 2008. Relative to other OECD countries in 2013, Canada ranked seventeenth out of thirty-three, while Australia ranked eighth.

Macroeconomic Environment

Economists and policy makers have traditionally analyzed labour productivity through supply-side variables such as investment, innovation and human capital. Most have neglected the direct effects from the demand side. Without sufficient demand, productivity cannot grow even with strong supply-side variables. In addition, an economic crisis linked to inadequate demand can have negative effects on the supply-side potential of the economy through reduced investment and R&D (Summers, 2014). It is important to examine whether different demand conditions can explain the gap in labour productivity growth between Canada and Australia because of the heavy reliance of both economies on exports – an important source of aggregate demand and hence productivity growth.

The slowdown in output growth in both Australia and Canada between 1994-2000 and 2000-2013 was related to the decline in international export growth. While export growth was quite similar in both countries in 1994-2000, it was significantly stronger in Australia than in Canada in 2000-2013. This may explain the increase in gap in labour productivity growth between 1994-2000 and 2000-2013. While Australia's exports increased 2.9 per cent per year in 2000-2013, Canada's exports grew merely 0.24 per cent per year.

The divergence between the two countries in terms of export performance was largely related to geography: Australia's exports benefited from its proximity to China which grew rapidly throughout this period, while Canadian exports were afflicted by weak growth in domestic demand in its neighbour and closest trading partner, the United States, both before and especially following the 2008 global financial crisis. China's share of Australian exports rose from 4.2 per cent in 1995 to 23.5 per cent, while China's share of Canadian exports only rose from 1.3 per cent in 1995 to 4.4 per cent in 2009.

As previously mentioned, weaker demand conditions in Canada compared to Australia led to an increase in the gap in output growth from 1994-2000 to 2000-2013, and this development was associated with an increase in the gap in labour productivity growth. This is not a mere correlation, but rather a causal relationship, with slower output growth leading to slower productivity growth.

The proposition that labour productivity growth is a function of output growth is known as "Verdoorn's law," named after a Dutch economist who originally formulated the relationship in the 1950s. His empirical results showed that there was a strong positive association between output growth and labour productivity growth. Kaldor (1966) also posited such a relationship, showing that a 1 per cent increase in output led to an increase in labour productivity of approximately 0.5 per cent.

The statistical relationship between output growth and labour productivity growth could in principle run in either direction. It is indeed possible that a change in supply-side conditions, such as a technological shock, could raise or lower potential productivity growth and thereby increase or decrease actual output and labour productivity growth. However, the empirical evidence presented in this report provides limited support to such a supply-side productivity effect in the short- to medium-term.

A more likely scenario is one that runs from changes in demand conditions to changes in

Table 8: Summary of Drivers and their Potential Impact on the Gap in Labour Productivity Growth

Driver	Impact	Reasoning
Capital intensity	Significant	Capital intensity grew 1.66 per cent per year in Australia in 1994-2013 compared to 0.94 per cent per year in Canada, accounting for 71 per cent of the gap in labour productivity growth. Australia had higher investment in structures, M&E and ICT. This likely increased productivity through supply-side channels and reflected the better macroeconomic environment in Australia.
Human capital	Insignificant	In 1994-2013, the contribution of changes in labour composition to labour productivity growth was the same in both countries, at 0.29 per cent per year. Therefore, it is unlikely that differences in human capital accumulation contributed to the gap.
Innovation	Unlikely	We did not find significant evidence that differences in innovation can explain the labour productivity gap. While BERD intensity was higher in Canada than in Australia over much of the period, growth in BERD has been much more rapid in Australia than in Canada, particularly since 2000.
Inter-industry shifts	Significant	Inter-industry shifts explain a significant portion of gap in labour productivity growth. In fact, they accounted for 32 per cent of the gap in 1994-2013. Most importantly, Australia reallocated more labour to mining, which alone accounted for 17 per cent of the gap.
Quality of the stock of natural resources	Unlikely	Both countries exhibited negative labour productivity growth in mining driven by significant declines in MFP. This likely reflected increased difficulty in extracting natural resources in both countries. However, we found no evidence that differences in the quality of the natural resource stock have significantly contributed to the gap.
Macroeconomic environment	Likely	Stronger export growth may explain Australia's stronger productivity performance in 2000-2013. Exports grew 2.94 per cent per year in Australia in 2000-2013, compared to 0.24 per cent per year in Canada. A better macroeconomic environment associated with solid export growth improves labour productivity growth as suggested by Verdoorn's law. In contrast, both countries exhibited similar growth in exports in 1994-2000.
Microeconomic environment	Likely	According to the OECD, Australia has lower product market regulation and fewer barriers to trade and investment than Canada. This may, in part, explain the stronger labour productivity growth of Australia. However, Canada has slightly less labour market regulation (overall) than Australia.

labour productivity. A number of explanations have been advanced to explain why weak demand growth could have negative effects on labour productivity growth. These explanations include less spreading of overhead costs and fewer static and dynamic economies of scale. Weak demand is also bad for profits, which reduces both investment and R&D, key drivers of productivity growth. The situation reverses itself when demand is strong.

As Spiro (2013) sums it up nicely, even with strong supply-side variables such as human capital or better capital equipment in an economy, the potential of these variables cannot be realized if there is insufficient demand. The highly-educated workforce will seek employment in low-productivity sectors, such as retail or food services, because the demand is not there to create high-productivity jobs. Capital equipment will sit idle because there is no need to produce large amounts of output. In addition, businesses that do not sell enough output cannot justify investing in more, newer and better capital. The lack of ability to deploy human capital and physical capital into high-productivity sectors diminishes the cost competitiveness of an economy. This loss of cost competitiveness relative to other economies can further reduce output growth, which reduces labour productivity growth even more, thereby creating a vicious cycle.

Rao and Li (2013) further the argument made by Spiro that a slowdown in demand can negatively affect the accumulation of physical and human capital, causing a slowdown in productivity growth. This slowdown leads to a loss of cost competitiveness, reducing demand and exacerbating the decrease of capital accumulation; thus, creating a vicious cycle. In addition, Rao and Li used panel data to show "93 per cent

of the fall in average labour productivity growth in Canada between the periods of 1981 to 2000 and 2000 to 2012 can be attributed to the drop in real GDP growth." In addition, they showed the fall in internal and external demand impacts key labour productivity growth drivers such as R&D spending and M&E investments.

Key Points

This section has focused on investigating the possible reasons behind the gap in labour productivity between Australia and Canada in 1994-2013. Based on the evidence provided throughout this section, the gap in labour productivity growth between Australia and Canada is reflected by a gap between these countries in many of the drivers of labour productivity growth.

With respect to the supply-side drivers of labour productivity growth, Australia outperformed Canada in terms of capital intensity growth, growth in BERD intensity, product market regulation, and barriers to trade and investment. A simple growth accounting exercise showed that capital deepening accounted for 71 per cent of the gap in labour productivity growth in this period. The remainder was accounted for by MFP. Australia surpassed Canada in terms of investment intensity and investment growth for structures, M&E and ICT.

Australia also exhibited more rapid growth in BERD, although its BERD intensity was still lower than Canada's over much of the observed period. More notably, Australia has significantly less product market regulation than Canada according to the OECD, as well as fewer barriers to trade and investment. This may, in part, explain the stronger labour productivity growth of Australia. Many economists attribute Australia's rapid productivity growth in the late-1990s to deregulation and the reduction of barriers to trade and investment.

In contrast, we found no evidence that differences in human capital accumulation contributed to the labour productivity growth gap. The growth accounting exercise found that the contribution of changes in labour composition to labour productivity growth was the same in both countries in 1994-2013, at 0.29 per cent per year. Therefore, it is unlikely that differences in human capital accumulation contributed to the gap.

There is little evidence that differences in labour market regulation contributed to the gap in labour productivity growth. While the intensity of union membership was quite steady in Canada over the observed period, it steadily declined in Australia. Although unionization has been on the decline in Australia, the share of the population covered by collective agreements has increased, and industry- and occupation-specific minimum wages and terms of employment are determined in Australia's unique "awards" system. Furthermore, according to the OECD Canada has slightly less labour market regulation (overall) than Australia.

In the previous section, we found that inter-industry shifts explain a significant portion of gap in labour productivity growth. In fact, they accounted for 32 per cent of the gap in 1994-2013. Most importantly, Australia reallocated more labour to mining, which alone accounted for 17 per cent of the gap. This occurred because the mining sector's share of total hours worked increased much more in Australia than in Canada.

The labour productivity gap in recent years seems to have been driven by the macroeconomic environment. With respect to the demand-side drivers of the gap in labour productivity growth, stronger export growth likely explains part of Australia's stronger productivity performance in 2000-2013. Exports grew 2.94 per cent per year in Australia in 2000-2013, compared to 0.24 per cent per year in Canada. A

better macroeconomic environment associated with solid export growth improves labour productivity growth, as suggested by Verdoorn's law. In contrast, both countries exhibited similar growth in exports in 1994-2000.

Lower unemployment rates, as well as other changes that point to an increase in labour market tightness, can have a positive impact on labour productivity growth through labour scarcity. This can spur additional investment in labour-saving capital. It is unclear whether this factor has contributed to the gap in labour productivity growth. Despite the lower unemployment rate experienced by Australia, alternative indicators (e.g., the incidence of discouraged searchers and involuntary part-time workers) suggest that Australia's labour market was actually less tight than Canada's during this period. There is also a risk that methodological differences between Statistics Canada and the ABS limit comparisons of these indicators.

Theoretically, an increase in the minimum wage should have a similar effect on labour productivity growth to an increase in labour market tightness. Australia's minimum wage was higher than Canada's throughout the observed period. However, the minimum wage has fallen relative to mean and median wages over time in Australia, while it has increased relative to mean and median wages in Canada. It is therefore unlikely that Australia's higher minimum wage contributed to their superior labour productivity performance.

The Impact of Public Policy on Australian Productivity Growth

Productivity Boom in the 1990s: The Role of Microeconomic Reforms

Australia exhibited weak productivity growth before the 1990s, especially compared to Japan, the United States and other advanced economies in Europe (Parham, 2002). In response, successive Australian governments implemented a series of reforms to rectify the situation from the mid-1980s to the late 1990s. A great deal of research has been conducted on the impact of these reforms on productivity growth in Australia. In particular, it is widely believed that they explain the surge in productivity in the mid- to late-1990s. According to the standard narrative, which is frequently maintained by the Productivity Commission and other researchers, much of the improved productivity performance came from an unlocking of the supply-side potential of the Australian economy related to these reforms.

The reforms were wide-ranging and ambitious. They have had both macro and micro dimensions, although the focus of the literature is largely on the role of microeconomic reforms. More specifically, the reforms included the introduction of financial deregulation, privatization of government enterprises, the introduction of enterprise-level wage bargaining and individual employment contracts, reduced tariffs, tax reform, a dramatic shift in macroeconomic policy, and a new competition policy.

In theory, microeconomic reforms should improve productivity performance through three key mechanisms: 1) by making the economy more flexible so that scarce resources are directed to more productive uses; 2) by improving the efficiency of the economy through greater international and domestic competition; and 3) by making the business culture more focused on pursuing opportunities to expand in both foreign and domestic markets.

Broadly speaking, there are two sorts of evidence of the impact of microeconomic reforms on productivity performance: 1) aggregate-level evidence, which attempts to quantify the impact of these reforms on the productivity performance of the total economy; and 2) industry-level evidence, which tries to estimate the effect

of microeconomic reforms on the productivity performance of specific industries. We first discuss the aggregate-level evidence, and then turn our attention to industry-level evidence.

Much of the evidence on the effects of microeconomic reforms in Australia applied general equilibrium models to simulate the effects of these reforms. However, these studies are quite old and were often conducted before the implementation of reforms in order to forecast their impact.

More recent studies have focused on the role of microeconomic reform in the acceleration in productivity growth in the late 1990s. The Productivity Commission (1999) argued that the acceleration in productivity growth was driven by the impact of microeconomic reforms. Many other authors have also found evidence of a positive link between microeconomic reform and the productivity upsurge at the aggregate level (Salgado, 2000; Dowrick, 2000; OECD, 2000; Wooden, 2000).

However, aggregate-level evidence of the role of microeconomic reform in Australia's 1990s productivity surge has largely relied on descriptive analysis based on trends at the aggregate level, paying attention to the time trends in productivity and their relation to significant policy changes. There are significant weaknesses with this approach. It does not provide direct evidence of a link between microeconomic reform and productivity growth.

In addition to analyzing the effect of microeconomic reform on productivity at the aggregate level, the Productivity Commission (1999) has conducted a series of detailed case studies at the industry level to look for further evidence of a relationship between reform and the productivity acceleration. In principle, a more disaggregated industry-level analysis makes it easier to examine relationships between productivity growth and the timing of reforms, as it allows researchers to account for the fact that different reforms were implemented in different industries at different times (Productivity Commission, 1999). Furthermore, given the diversity of experiences by industry (with certain industries like wholesale trade, construction, finance and insurance, and transport and storage accounting for much of the 1990s productivity upsurge), the increase in productivity growth may be more appropriately thought of as an industry-based story (or even a firm-based story) instead of an aggregate-level story.

The Productivity Commission's (1999) analysis of specific reforms and the experiences of individual firms and industries have also provided strong evidence of an association between productivity-friendly policy changes and productivity gains in some, but not all, instances. In particular, the Productivity Commission conducted case studies for three manufacturing industries and two government-sponsored enterprises. They identified microeconomic reform as a major factor affecting the productivity performance in all three manufacturing industries. Similarly, microeconomic reforms were also found to be the key determinant of an improvement in productivity growth in the two government-sponsored enterprises.

Although much of the industry-level evidence presented does potentially provide more direct evidence on the impact of reform, and overcomes some of the difficulties inherent in aggregate-level analysis, it also has its weaknesses. In particular, researchers need to know the counterfactual to effectively assess the impact of policy changes.

It is difficult to draw lessons from Australia's 1990s productivity surge for Canada. Although many studies indicate that the productivity reforms were good for productivity, we simply do not know if they only had a one-off effect or if they led to a sustained increased in Australia's productivity growth rate. In addition, there are good reasons to doubt the standard narrative –

the one supported by the Productivity Commission – that microeconomic reform was responsible for the 1990s productivity surge, particularly given that much of the evidence of this causal relationship is largely circumstantial.

Furthermore, the evidence of the impact of reforms on Australia's 1990s productivity surge generally does not distinguish between separate policies but looks at the effect of reforms as a whole. Thus, it is difficult to draw lessons for Canada, as we simply do not know which exact policies had the largest impact on productivity growth in Australia. In theory, it is possible that a few of the policy changes had a large, positive effect on productivity, while others had a negligible (or maybe even negative) effect on productivity.

The Role of the Productivity Commission

The Productivity Commission is the arm's length research and advisory body of the Australian government. Its principal role is to inform policymaking on a wide range of economic, social and environmental matters, and to advise the government on policy reforms which are in the long-term interest of Australians. As suggested by its name, a major focus of the Commission is to deepen understanding of productivity in general and Australia's productivity performance in particular, and to find ways to enhance Australia's productivity performance.

The Productivity Commission and its predecessors have been intimately involved in most of the significant reforms adopted in Australia in the past four decades. Notably, the Commission played an important role in the promotion and adoption of microeconomic reforms from the mid-1980s to the late 1990s.

Australia exhibited weak productivity growth in the 1960s, 1970s and 1980s, especially compared to Japan, the United States and other advanced economies in Europe (Parham, 2002). The growing sense of crisis roused public support for successive governments to undertake structural reforms to boost productivity growth and ameliorate other economic ailments. As a result, a series of comprehensive reforms were introduced from the mid-1980s to the late 1990s.

The Productivity Commission and its predecessors were involved in this process of reform. In particular, it played an advisory and research role. For example, it estimated the impact of microeconomic reforms such as the Hilmer report reforms prior to their implementation (Industry Commission, 1995) and after the fact in order to evaluate their effect (Productivity Commission, 1999).

The Commission has assisted reform in numerous ways. Firstly, its well-researched advice on structural reform has provided Government with impartial information that is focused on the long term welfare of the community. As noted, although governments have a large supply of information and advice, much of it may not allow for an unbiased assessment due to its self-serving or narrowly-focused nature.

Second, the Commission's analysis and recommendations to the government are advantageous since they have been created with extensive public input and feedback on a draft report. This implies that they are likely to consider all relevant details and are therefore likely to be reliable.

Third, the processes of the Commission, such as public submissions, hearings, drafts, and final reports, allow governments the chance to estimate the reactions of the community and interest groups to various approaches to policy. This is important since it has the ability to reduce the likelihood of unexpected responses which can lead to policy reversals.

Fourth, the Commission's reports can be used by governments when making the case for policy

changes, or in avoiding the pressure to initiate policy measures that may be costly.

Finally, the Commission's public inquiry processes and reporting can raise awareness of the costs of existing policies and the benefits from productivity-enhancing reforms. While this does not necessarily imply that the broader public would decide to support a given reform, it can help to galvanize or at least inform those individuals who would benefit most from the reform. The small interests who would lose the most from productivity-enhancing policy changes are likely to put up strong opposition to said changes. Even if these changes are good for the broader community, the public may not be fully aware of the benefits coming from these changes and, in turn, may not support them. By informing the broader public on the costs and benefits of certain policies, the Commission has improved the dialogue on many key issues.

Summary and Policy Recommendations

The objective of this article has been to explain why Australia outperformed Canada in terms of productivity growth over the last two decades, and to see if there are any lessons for Canada from Australia's performance. We identified five factors, a number of them interrelated, that appear to explain Australia's superior productivity performance: 1) stronger growth in capital intensity; 2) a better macroeconomic environment and (foreign) demand conditions; 3) a stronger record on innovation; 4) (somewhat) more market-oriented product market regulations; and 5) a larger positive effect of inter-industry shifts.

We also looked for lessons from Australia's 1990s productivity surge for Canada. While the productivity surge coincided with a series of microeconomic reforms, much of the evidence of a causal relationship is largely circumstantial. Furthermore, the evidence generally does not distinguish between separate policies but looks at the effect of reforms as a whole. Thus, it is difficult to draw lessons for Canada, as we simply do not know which exact policies had the largest impact on productivity growth in Australia.

Since Canada pursued many of the same policy reforms as Australia in the 1980s and 1990s, such as trade liberalization, the loosening of labour and product market regulations and the adoption of a new monetary policy framework, it is unclear where Canadian policymakers should draw lessons from the Australian experience. One plausible area for further deregulation is the product market, as OECD data suggests that product market regulations are significantly more restrictive in Canada. The supply management system for dairy and poultry products is one clear example of where Australia has loosened product market regulations further than Canada.

The analysis in this report does give rise to a few potential lessons for Canada. These are as follows:

- Australia has greatly benefited from impressive export growth to the huge and fast growing Chinese market. Canada's main market, on the other hand, is the slow growing United States. Given the importance of demand growth for both output and productivity advance, Canada should focus greater attention on emerging markets where there is significant potential for growth in exports.
- Australia has been very successful in increasing its BERD intensity, Canada not so much. Given the great similarities between the two countries, Canada should closely examine the specific public policies that Australia has implemented to boost BERD intensity to determine if any could be adopted in this country.
- Australia has been aggressive in reducing product market regulation, Canada less so. Canada is in the middle of the pack among OECD countries in terms of product regulation, and

therefore has room to move to a less restrictive policy regime. The greatest potential for productivity gains in the product market regulation area for Canada is the gradual phasing out of marketing boards, especially for dairy products. The Australian experience offers much insight in this regard.

• Canada lacks a governmental organization that focuses on productivity issues, the role played by the Productivity Commission in Australia. Given the positive implications for government revenues of even small increases in productivity, the costs of such an organization would be very small relative to the benefits. The federal government should establish an organization that would play a similar role to the Australian Productivity Commission in championing the productivity issue.

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