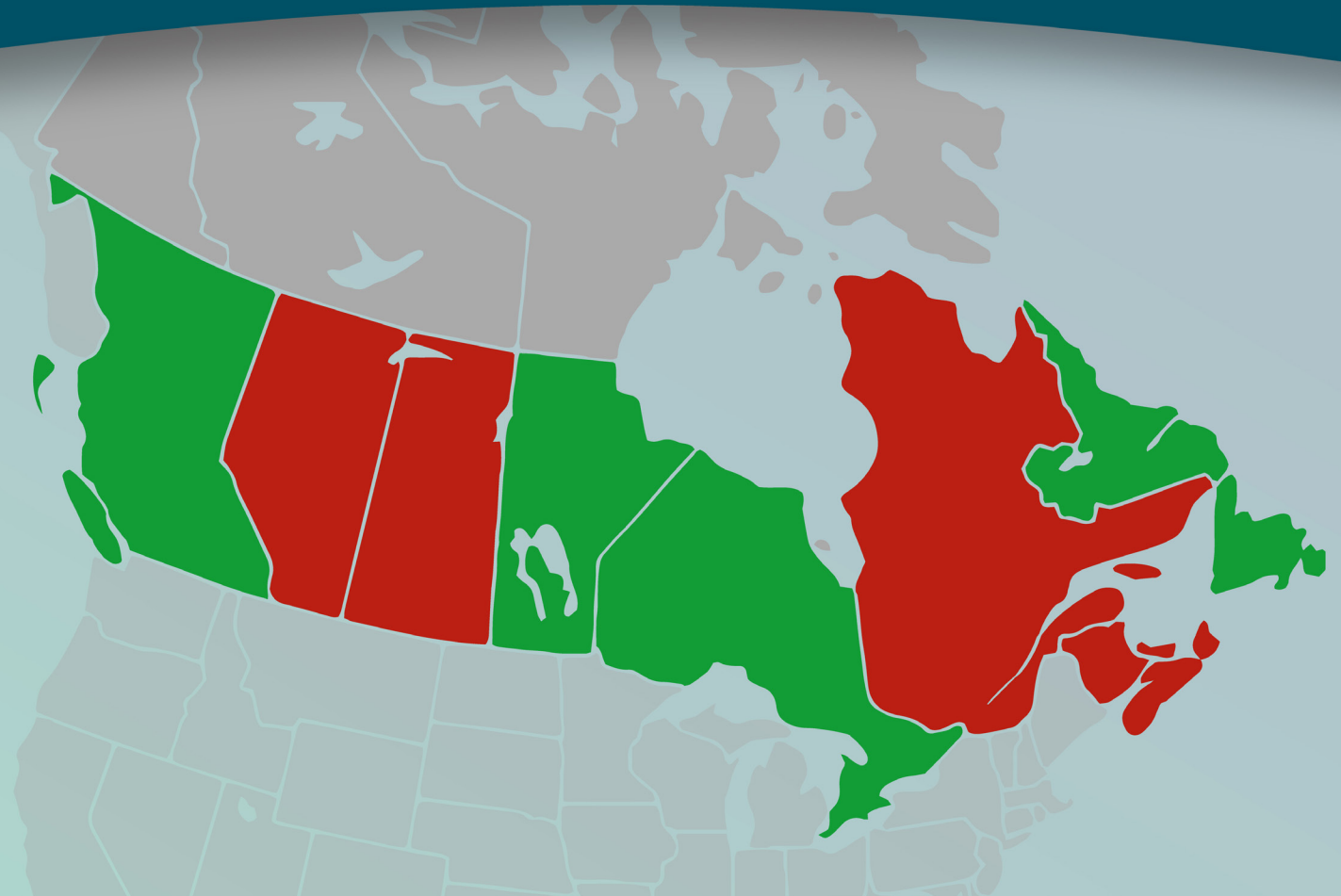


Capital Investment in Canada's Provinces

A PROVINCIAL REPORT

Steven Globerman and Joel Emes



Contents

Executive Summary / i

Introduction / 1

Overall Capital Investment Patterns / 3

Net Investment in Residential Fixed Assets / 7

Net Investment in Non-Residential Fixed Assets / 9

Evaluation of Overall Investment Performance / 11

Assessing the Data / 16

Concluding Comments / 18

Appendix: Definitions / 19

References / 21

About the authors / 23

Acknowledgments / 23

Publishing information / 24

Supporting the Fraser Institute / 25

Purpose, funding, and independence / 25

About the Fraser Institute / 26

Editorial Advisory Board / 27

Executive Summary

Previous research by the Fraser Institute has documented a substantial decline in capital investment after 2014. The decline was especially marked for business investment and, within that category, for machinery and equipment and intellectual property products (IPP). Furthermore, the decline in business investment after 2014 was not confined to the oil and gas sector. In fact, two-thirds of the 15 industries studied by Globerman and Emes (2019) experienced a decline in investment in recent years.

The research summarized in Globerman and Emes (2019) focused on capital expenditures at the national level. This study examines investment patterns at the level of the individual provinces and disaggregates investment into net capital expenditures on residential and non-residential assets. The study examines differences across provinces in net capital expenditures from 1990 to 2018, paying particular attention to how patterns of provincial investment behaviour changed when comparing the pre- and post-2014 periods.

The study finds that over the full period (1990-2018), there was substantial variation across provinces in the average annual rate of growth of investment in total net fixed assets (residential plus non-residential). A comparison of the pre-2014 and post-2014 periods identifies a particularly notable change. Specifically, after enjoying well above-average investment performance prior to 2014, Alberta's investment performance has been well below average since then. Newfoundland & Labrador exhibit the opposite timing pattern. Saskatchewan experienced a substantial decline in its relative overall investment performance after 2014, while Ontario enjoyed an increase in its relative performance in the most recent period. This pattern is consistent with the dramatic shifts in global and North American energy markets and the related fall-off in oil and gas investment in Alberta and Saskatchewan post-2014, alongside the growth of the utilities sector in Newfoundland & Labrador and the financial, insurance, and real estate sectors in Ontario.

When looking at specific asset categories, the dramatic decline in Alberta's relative investment performance post-2014 primarily reflects a sharp drop-off in non-residential, i.e., business investment. Interestingly, the annual average growth rate of investment in residential assets in Al-

berta remained above the national average after 2014. Indeed, and unlike the case for the growth rates of total net fixed assets, relative provincial performances with respect to the annual growth of net residential fixed asset investment were relatively constant from 1990 to 2018.

Given significant differences across provinces in relative growth rates for total net fixed assets, the modest differences in the relative growth rates for net residential assets suggest that investment in non-residential net assets is where the main differences across provinces are found. And the data show that this is indeed the case. In particular, Alberta experienced the fastest relative average annual growth in the net stock of non-residential assets among all provinces from 1990 to 2014, whereas it posted the next-to-slowest average annual growth rate in these assets from 2014 to 2018. Conversely, Ontario ranked eighth in average annual growth in non-residential net assets from 1990 to 2014, while it recorded the third fastest growth rate from 2014 to 2018.

British Columbia was exceptional in that it experienced sustained above-average growth in total net assets, as well as in both the net residential and net non-residential asset categories. Conversely, Quebec and the Atlantic Provinces consistently experienced below average performances in average annual growth rates for each asset category as well as for total net assets over the entire sample period.

Introduction

Previous research has documented a substantial decline in capital investment in Canada after 2014 (Globerman and Press, 2018). The slowdown in capital investment in recent years was especially marked for business investment and, within that category, for investment in machinery and equipment and intellectual property (IP) products.¹ Business investment's share of total Canadian fixed investment declined over the post-2014 period. Conversely, the share of total capital investment accounted for by residential housing was higher after 2014 than in any other five-year period since 1970.

While investment in housing clearly has economic benefits, productivity growth is primarily linked to investments in non-residential (business) assets, especially machinery and equipment and IPP. In this regard, Mollins and St-Amant (2019) have a noteworthy finding: that a relatively slow rate of investment growth in information and communications technology (ICT) has been a major determinant of Canada's subdued productivity growth post the 2008-2009 recession.

The decline in overall capital investment since 2014 is particularly noteworthy since this was a period when there was no significant recession in Canada. Furthermore, the declines in business investment, particularly in the machinery and equipment and IP products categories, are likely to have substantial negative consequences for the Canadian economy in the future, as these asset categories are especially important contributors to productivity growth.

Other research (Globerman and Emes, 2019) reports that the decline in business investment after 2014 was not confined to the oil and gas sector. While the mining industry (which includes the oil and gas sector) saw the largest relative decrease in capital investment from 2014 to 2017, about two-thirds of the 15 industries studied recorded a decline in investment over that period. Hence, the marked decline in capital investment

¹ Leslie Preston from TD Economics (2019) notes that Canada has persistently lagged the US in IPP investment, but the situation has worsened in recent years. In 2018, investment in IPP as a share of gross fixed capital formation was almost 27 percent for the US and around 12.5 percent for Canada. Robson (2019) discusses Canada's weak performance in investing in machinery and equipment compared to the US and other developed countries.

in Canada in recent years has been widespread, albeit uneven, across the country's various business sectors.

Since the research summarized above focused on capital expenditures at the national level, it is useful to consider whether the investment experience has been similar across provinces in recent years. This study examines the behaviour of capital investment (both residential and non-residential) across the various provinces. The purpose is to identify the extent to which individual provinces differ in their investment performance after 1990, with particular attention to the post-2014 period. While we do not attempt to explain the observed differences in any detail, we do highlight the influence that different mixes of industries have on the provincial investment patterns identified.

The essay proceeds as follows. The next section reports overall investment performance for each province over three separate sub-periods, including 2014 to 2018.² The two sections that follow look at net investment in residential and non-residential assets, respectively, to identify whether differences across provinces in the compound annual growth rate in investment are consistent across these two broad asset categories. The section after that summarizes and compares the investment growth in the individual provinces in each capital asset category, while the penultimate section offers a partial explanation of the patterns summarized in previous sections based on the industrial compositions of the provinces. The final section provides concluding comments.

² The data are available only through 2018.

Overall Capital Investment Patterns

Our analysis covers the period from 1990 to 2018. While data are available for earlier years, our primary focus is on whether the recent decline in capital investment at the national level is broadly similar across individual provinces. Since the sample period includes the recessions of 1990-1991 and 2008-2009, as well as the post-2009 economic recovery, we believe that the almost 30-year sample period is both sufficiently long and inclusive of major business cycles to provide a reliable picture of the investment performance of individual provinces.

We start by examining the broadest measure of capital investment behaviour, i.e., the change in the end-year net stock of residential and non-residential assets in 2012 constant prices (henceforth called net capital stock).³ We present the compound annual growth rate (CAGR) in this broad measure of capital investment for 3 separate periods: 1990-2018, 1990-2014, and 2014-2018. Since studies cited earlier identify 2014 as the start of a serious decline in capital expenditures at the national level, it is informative to distinguish investment behaviour at the provincial level pre- and post-2014 to identify whether the individual provinces differed in their investment experiences in those periods. Furthermore, since we are interested in the relative performance of individual provinces, we standardize the growth of capital expenditures in the provinces by the growth of capital expenditures at the national level.

Table 1 reports the compound annual growth rates (CAGR) in our broad measure of net investment in each province and for Canada between the beginning and end years for our three initial sample periods. Several relationships are obvious from the data. First, there is substantial variation in overall capital investment across provinces, both over the longer-run and from 2014 to 2018. In particular, over the full 1990 to 2018 period, total net capital stock⁴ increased at a faster rate in four provinces

³ All data presented in this paper are based on “geometric end-year net stock” in 2012 constant dollars. We use the term “investment” to describe change in this measure to make the text easier to follow.

⁴ Total net capital stock consists of fixed residential plus fixed non-residential capital

Table 1: Percent Change in Net Capital Stock, based on 2012 Constant Prices

	1990-2018	1990-2014	2014-2018
Canada	2.5%	2.6%	1.9%
Newfoundland & Labrador	3.1%	2.9%	4.2%
Prince Edward Island	2.3%	2.4%	1.9%
Nova Scotia	1.5%	1.6%	1.3%
New Brunswick	1.8%	2.0%	0.7%
Quebec	1.9%	1.9%	1.4%
Ontario	2.1%	2.1%	2.2%
Manitoba	2.0%	1.9%	2.9%
Saskatchewan	2.6%	2.8%	1.6%
Alberta	3.7%	4.2%	1.0%
British Columbia	3.3%	3.3%	3.1%

Note: Fixed Residential and Fixed Non-Residential, geometric end-year.

Sources: Statistics Canada Table 36-10-0099-01 and Table 36-10-0096-01.

(Newfoundland & Labrador, Saskatchewan, Alberta, and British Columbia) than for Canada as a whole. Total net capital stock increased at a slower rate than for the country as a whole in the other six provinces—notably including Ontario and Quebec as well as the Atlantic Provinces. Second, the relative investment performance of several individual provinces look much different in the 2014-2018 period than in earlier periods. Most notably, Alberta recorded the second slowest relative growth of total net capital stock from 2014 to 2018 after posting the fastest relative growth rate from 1990 to 2014.⁵ Conversely, Manitoba's overall investment performance in relative terms improved substantially when comparing 2014-2018 to the pre-2014 period.

Table 2 further identifies the relative investment performance of the individual provinces during the various sample periods. The data in Table 2 are index values created by dividing each province's CAGR in the net

(both using geometric depreciation and reported in 2012 constant prices). The appendix lists additional definitions.

⁵ The dramatic relative slowdown in overall net investment in Alberta undoubtedly reflects to some extent the substantially reduced profitability of the oil and gas sector in the province, which will be discussed in more detail in a later section.

Table 2: Index Values for Net Capital Stock, based on 2012 Constant Prices

	1990-2018	1990-2014	2014-2018
Canada	100.0	100.0	100.0
Newfoundland & Labrador	123.4	111.1	224.3
Prince Edward Island	93.7	93.0	99.3
Nova Scotia	61.9	60.9	70.4
New Brunswick	73.5	78.0	36.3
Quebec	74.8	74.6	75.6
Ontario	83.6	79.4	117.8
Manitoba	81.3	72.9	150.4
Saskatchewan	105.1	107.6	84.8
Alberta	149.7	161.8	52.6
British Columbia	132.8	128.8	165.7

Note: Fixed Residential and Fixed Non-Residential, geometric end-year.

Sources: Calculations based on Table 1.

capital stock by the percentage change for Canada as a whole between the beginning and end years of each sample period.⁶ The dramatic increase in the relative investment performance of Newfoundland & Labrador⁷ from 2014 to 2018 is evident from the data, as is the major deterioration in the relative investment performance of Alberta. Ontario's relative investment performance improved substantially and almost mirrors Saskatchewan's declining relative performance. The diverging relative investment experiences of the individual provinces between the pre- and post-2014 periods is underscored by the calculated Spearman rank-order correlation coefficient between the second and third columns of table 2. This statistic measures how closely the rank order of provinces for the period 1990-2014 matches the rank order for the 2014-2018 period. A value of 1.0 would indicate a perfect correspondence. A value of 0 would indicate essentially no correspondence. In fact, the calculated rank order correlation coeffi-

⁶ The index values for Canada are therefore equal to 100.

⁷ Newfoundland & Labrador's non-residential geometric end-year net stock increased by \$13.3 billion (26 percent) between 2014 and 2018. The bulk of this change was in engineering construction in the conventional oil and gas extraction sector (\$5.4 billion) and engineering construction in utilities (\$7.3 billion).

cient equals .236, which suggests that the relative investment performance of individual provinces after 2014 was substantially different from their longer-run experience.

It is certainly possible that the overall investment performance of the individual provinces differs from their performance in individual investment categories, i.e., fixed net residential assets and fixed net non-residential assets. As noted earlier, the latter includes machinery and equipment and IP products, which are more closely tied to productivity growth than are investments in residential housing. Hence, it is informative to replicate tables 1 and 2 for fixed net residential assets and fixed net non-residential assets, respectively.

Net Investment in Residential Fixed Assets

Table 3 reports the percentage change in the net stock of fixed residential capital in 2012 constant prices over the three periods reported in tables 1 and 2. As with the growth of the total net capital stock, there is substantial variation across provinces in the growth of residential capital assets. Over the full 1990 to 2018 period, total residential capital investment increased at an above-average pace in three provinces (Prince Edward Island, Alberta, and British Columbia). Two of these provinces (Alberta and British Columbia) also experienced above-average growth rates for the overall net capital stock.

Table 3: Percent Change in Net Capital Stock (Fixed Residential), based on 2012 Constant Prices

	1990-2018	1990-2014	2014-2018
Canada	2.8%	2.8%	2.8%
Newfoundland & Labrador	2.3%	2.6%	1.1%
Prince Edward Island	3.0%	2.9%	3.3%
Nova Scotia	2.5%	2.6%	2.1%
New Brunswick	2.7%	2.8%	1.6%
Quebec	2.3%	2.3%	2.1%
Ontario	2.5%	2.5%	2.6%
Manitoba	2.1%	2.0%	2.9%
Saskatchewan	1.9%	1.9%	2.3%
Alberta	3.7%	3.8%	3.2%
British Columbia	4.6%	4.6%	4.7%

Note: Geometric end-year.

Source: Statistics Canada Table 36-10-0099-01.

Table 4: Index Values for Net Capital Stock (Fixed Residential), based on 2012 Constant Prices

	1990-2018	1990-2014	2014-2018
Canada	100.0	100.0	100.0
Newfoundland & Labrador	83.5	90.9	38.6
Prince Edward Island	105.6	103.5	118.7
Nova Scotia	89.7	91.9	76.1
New Brunswick	94.5	100.8	56.6
Quebec	82.1	83.3	75.0
Ontario	90.3	89.7	93.6
Manitoba	75.0	70.5	102.5
Saskatchewan	68.2	66.1	80.7
Alberta	132.4	135.4	113.9
British Columbia	163.0	161.9	169.6

Note: Geometric end-year.

Source: Calculations based on table 3.

Interestingly, while Alberta saw a noticeable relative slowdown in its growth of net capital stock between 2014 and 2018, its growth rate for the residential net capital asset stock over the same period was higher than for Canada as a whole. In addition to above-average growth rates in British Columbia and Prince Edward Island, the growth rate for residential asset investment for Manitoba was slightly above the national average.

Unlike the case of total net capital stock growth rates, the relative provincial performance of the growth of net residential capital investment was relatively constant over the sample period. This stability is underscored by the data reported in table 4. The data are index values created by dividing each province's percentage growth in fixed net residential capital investment by the percentage growth for Canada as a whole for each of the three sample sub-periods.

The relative consistency over time in the underlying residential asset investment experiences of the individual provinces is emphasized by the calculated Spearman rank-order correlation coefficients between the second and third columns of table 4. This Spearman correlation coefficient equals .442, which is significantly higher than the previously reported Spearman correlation coefficient calculated for the index values for the growth of net capital stock between 1990-2014 and 2014-2018.

Net Investment in Non-Residential Fixed Assets

Finally, tables 5 and 6 report comparable data to that summarized in tables 3 and 4, only for non-residential net fixed assets in constant dollars. Given the fact, noted above, that there is substantial consistency in the relative performances of provinces in the context of residential capital asset growth rates but less so in the case of total capital asset growth rates, one would expect significant inconsistencies over time in investment growth rates across provinces in non-residential fixed assets. This expectation is confirmed by the calculated Spearman rank-order correlation coefficient between columns 2 and 3 in table 6. This coefficient is an estimate of how closely the provinces rank in their relative growth rates of non-residential net fixed assets when comparing the 1990-2014 and 2014-2018 periods.

Table 5: Percent Change in Net Capital Stock (Fixed Non-Residential), based on 2012 Constant Prices

	1990-2018	1990-2014	2014-2018
Canada	2.2%	2.4%	1.1%
Newfoundland & Labrador	3.5%	3.1%	6.0%
Prince Edward Island	1.7%	1.9%	0.2%
Nova Scotia	0.6%	0.7%	0.4%
New Brunswick	1.2%	1.4%	-0.1%
Quebec	1.3%	1.5%	0.6%
Ontario	1.5%	1.5%	1.7%
Manitoba	2.0%	1.8%	2.8%
Saskatchewan	3.0%	3.3%	1.3%
Alberta	3.7%	4.4%	0.1%
British Columbia	2.3%	2.4%	1.5%

Note: Geometric end-year.

Source: Statistics Canada Table 36-10-0096-01.

The calculated Spearman coefficient equals .164, indicating little correspondence between recent and earlier years in the performance of individual provinces on investments in fixed non-residential assets.

Alberta exhibits the largest change in relative investment performance between the two periods. From 1990 to 2014, Alberta had the fastest relative growth rate in the stock of net non-residential assets among the provinces, but had the next-to-slowest growth rate from 2014 to 2018. Conversely, Ontario ranked eighth among the ten provinces in the growth of net non-residential assets from 1990 to 2014, but experienced the third fastest growth rate from 2014 to 2018. Manitoba also experienced a significant relative improvement in its investment in net non-residential fixed assets between the two periods.

Table 6: Index Values for Net Capital Stock (Fixed Non-Residential), based on 2012 Constant Prices

	1990-2018	1990-2014	2014-2018
Canada	100.0	100.0	100.0
Newfoundland & Labrador	157.9	128.3	563.1
Prince Edward Island	76.0	80.0	21.8
Nova Scotia	29.1	28.3	39.9
New Brunswick	54.0	58.9	-11.6
Quebec	60.6	61.0	53.8
Ontario	67.8	61.0	158.7
Manitoba	88.9	75.6	268.5
Saskatchewan	136.7	137.7	122.9
Alberta	169.3	181.5	8.8
British Columbia	103.7	100.8	142.9

Note: Geometric end-year.

Source: Calculations based on table 5.

Evaluation of Overall Investment Performance

Given differences across the provinces in capital investment performance across the two asset categories as well as in the aggregate of the two asset categories, it is useful to bring the preceding information together as we do in tables 7 to 9, which report index values discussed earlier showing how the growth rates of total, residential, and non-residential net investments, respectively, compare across individual provinces for the full sample period, as well as for the two sub-sample periods. Tables 10-12 identify the rank orders of the individual provinces with respect to their investment growth rates relative to the country's growth rate for each of the asset investment categories and for each of the sample periods.⁸

The data in tables 10-12 support several observations.

First, Alberta has clearly suffered a dramatic reversal of fortune in recent years in its relative investment growth performance. Specifically, after being the top-performing province in total net fixed asset growth from 1990 to 2014, the province's performance declined such that it exceeded only New Brunswick over the more recent 2014 to 2018 period. The collapse of investment growth in Alberta was especially marked for non-residential net fixed assets. In fact, Alberta continued to enjoy above-average investment growth in residential net fixed assets.

A second observation is that British Columbia enjoyed sustained above-average investment growth performance over the full sample period, 1990 to 2018, as well as during the recent 2014 to 2018 period. The province's above-average investment growth performance is especially marked in the case of residential assets, where it was consistently the top performing province. This finding is consistent with BC's relatively strong population growth rate over most of the period examined in this study.

A third observation is that Quebec and the Atlantic Provinces, with the exception of Newfoundland & Labrador, consistently underperformed the nation as a whole in investment growth. The latter province actually enjoyed above-average total investment growth over the full 1990 to 2018

⁸ The shading in tables 10 to 12 separate provinces exhibiting above-average investment growth performance from those exhibiting below-average performance.

Table 7: Index Values for Provincial Investment Growth 1990-2018, based on 2012 Constant Prices

	Total	Residential	Non-Residential
Canada	100.0	100.0	100.0
Newfoundland & Labrador	123.4	83.5	157.9
Prince Edward Island	93.7	105.6	76.0
Nova Scotia	61.9	89.7	29.1
New Brunswick	73.5	94.5	54.0
Quebec	74.8	82.1	60.6
Ontario	83.6	90.3	67.8
Manitoba	81.3	75.0	88.9
Saskatchewan	105.1	68.2	136.7
Alberta	149.7	132.4	169.3
British Columbia	132.8	163.0	103.7

Source: Calculations based on tables 2, 4, and 6.

Table 8: Index Values for Provincial Investment Growth 1990-2014, based on 2012 Constant Prices

	Total	Residential	Non-Residential
Canada	100.0	100.0	100.0
Alberta	161.8	135.4	181.5
British Columbia	128.8	161.9	100.8
Newfoundland & Labrador	111.1	90.9	128.3
Saskatchewan	107.6	66.1	137.7
Prince Edward Island	93.0	103.5	80.0
Ontario	79.4	89.7	61.0
New Brunswick	78.0	100.8	58.9
Quebec	74.6	83.3	61.0
Manitoba	72.9	70.5	75.6
Nova Scotia	60.9	91.9	28.3

Source: Calculations based on tables 2, 4, and 6.

Table 9: Index Values for Provincial Investment Growth 2014-2018, based on 2012 Constant Prices

	Total	Residential	Non-Residential
Canada	100.0	100.0	100.0
Newfoundland & Labrador	224.3	38.6	563.1
British Columbia	165.7	169.6	142.9
Manitoba	150.4	102.5	268.5
Ontario	117.8	93.6	158.7
Prince Edward Island	99.3	118.7	21.8
Saskatchewan	84.8	80.7	122.9
Quebec	75.6	75.0	53.8
Nova Scotia	70.4	76.1	39.9
Alberta	52.6	113.9	8.8
New Brunswick	36.3	56.6	-11.6

Source: Calculations based on tables 2, 4, and 6.

Table 10: Rank Order of Index Values for Investment Growth: Total Net Assets

	1990 - 2018	1990 - 2014	2014 - 2018
1	Alberta	Alberta	Newfoundland and Labrador
2	British Columbia	British Columbia	British Columbia
3	Newfoundland and Labrador	Newfoundland and Labrador	Manitoba
4	Saskatchewan	Saskatchewan	Ontario
5	Prince Edward Island	Prince Edward Island	Prince Edward Island
6	Ontario	Ontario	Saskatchewan
7	Manitoba	New Brunswick	Quebec
8	Quebec	Quebec	Nova Scotia
9	New Brunswick	Manitoba	Alberta
10	Nova Scotia	Nova Scotia	New Brunswick

Table 11: Rank Order of Index Values for Investment Growth: Residential Net Assets

	1990 - 2018	1990 - 2014	2014 - 2018
1	British Columbia	British Columbia	British Columbia
2	Alberta	Alberta	Prince Edward Island
3	Prince Edward Island	Prince Edward Island	Alberta
4	New Brunswick	New Brunswick	Manitoba
5	Ontario	Nova Scotia	Ontario
6	Nova Scotia	Newfoundland & Labrador	Saskatchewan
7	Newfoundland & Labrador	Ontario	Nova Scotia
8	Quebec	Quebec	Quebec
9	Manitoba	Manitoba	New Brunswick
10	Saskatchewan	Saskatchewan	Newfoundland & Labrador

Table 12: Rank Order of Index Values for Investment Growth: Non-Residential Net Assets

	1990 - 2018	1990 - 2014	2014 - 2018
1	Alberta	Alberta	Newfoundland & Labrador
2	Newfoundland & Labrador	Saskatchewan	Manitoba
3	Saskatchewan	Newfoundland & Labrador	Ontario
4	British Columbia	British Columbia	British Columbia
5	Manitoba	Prince Edward Island	Saskatchewan
6	Prince Edward Island	Manitoba	Quebec
7	Ontario	Quebec	Nova Scotia
8	Quebec	Ontario	Prince Edward Island
9	New Brunswick	New Brunswick	Alberta
10	Nova Scotia	Nova Scotia	New Brunswick

period, including from 2014 to 2018. This reflects significant investment in the province's oil and gas and utilities industries.

Finally, the relative individual performance of several provinces changed over the sample period. For example, Ontario's relative total net investment growth rate was below average from 1990 to 2014, whereas it was modestly above average from 2014 to 2018. Ontario's improved relative investment growth performance primarily reflects faster relative growth in the non-residential asset category. Similarly, Manitoba's relative total investment growth rate was below average from 1990 to 2014 but improved to above average from 2014 to 2018. As in the case of Ontario, Manitoba's relative improvement was especially notable in the non-residential asset category. Conversely, Saskatchewan's relative total investment performance worsened from 2014 to 2018 compared to 1990 to 2014, with the largest influence on that deteriorating performance coming in residential assets.

Assessing the Data

While it is beyond the scope of this study to explain the differences observed in provincial net investment growth rates, several obvious points can be made. First, the deteriorating economic environment for Canada's oil and gas industry after 2014 undoubtedly is the major contributor to the relatively poor investment growth performance in Alberta, and to a lesser extent, Saskatchewan, when comparing the 2014-2018 period to the 1990-2014 period.⁹ In this regard, Globerman and Emes (2019) found that from 2014 to 2017, investment growth in the mining, quarrying, and oil and gas exploration and production sector showed the steepest decline in capital expenditures among the sample of industries studied. It is well known that this sector comprises a relatively large share of those two provincial economies. Specifically, from 2014 to 2018, mining, quarrying, and oil and gas exploration accounted for between 13 and 27 percent of Alberta's Gross Domestic Product (GDP).¹⁰ The same sector accounted for between 15 and 25 percent of Saskatchewan's GDP between 2014 and 2018. The drop in relative investment performance in these two provinces between 2014 and 2018 is, therefore, hardly surprising given the outsized importance of oil and gas exploration and production in the two provinces.

The improved relative investment growth performance of Ontario in the post-2014 period arguably reflects the importance of the finance, insurance, and real estate sector in that province. Globerman and Emes (2019) report that this sector was one of a minority of Canadian industries that experienced positive capital expenditure growth from 2014 to 2017. Indeed, this sector had the second fastest capital expenditure growth rate in the 2014 to 2018 period.¹¹ This sector accounted for around 22 percent of Ontario's provincial GDP between 2014 and 2018, with real estate ac-

⁹ For discussions of recent economic conditions surrounding Canada's upstream oil and gas sector, see Globerman and Emes (2019).

¹⁰ See Statistics Canada (2019).

¹¹ The arts, entertainment, and recreation sector had the fastest investment growth rate. However, this sector accounts for only a small portion of the GDPs of the various provinces so it is unlikely to explain much of, if at all, the differences across provinces in relative capital expenditure growth.

counting for around 13 percent of provincial GDP and finance and insurance for around 9 percent.

British Columbia's strong relative investment performance also arguably reflects the prominence of the finance, insurance, and real estate sector in that province's GDP. The sector as a whole accounted for between 23 and 24 percent of provincial GDP from 2014 to 2018. Real estate alone comprised between 17 and 18 percent of provincial GDP during that period, while finance and insurance accounted for almost 6 percent.

The above-average investment growth performance for Newfoundland & Labrador, which improved in the 2014 to 2018 period, primarily reflects the province's consistently strong relative growth in non-residential fixed assets. Of note, the province has a relatively large mining, quarrying, and oil and gas sector. The latter accounted for between 18 and 30 percent of the province's GDP in from 2014 to 2018. As noted earlier, Newfoundland & Labrador saw a relatively large investment increase in both conventional oil and gas extraction and utilities between 2014 and 2018. Although utilities make up a small share of the province's GDP, this share increased from 1.5 to 2.3 percent between 2014 and 2018. Furthermore, Newfoundland & Labrador has a relatively small finance, insurance, and real estate sector, which accounted for between 11 and 13 percent of provincial GDP between 2014 and 2018.

Finally, the improved relative investment growth performance for Manitoba between 2014 and 2018, as in the case of Newfoundland & Labrador, reflects above-average growth in investment in non-residential fixed assets. The province has a small mining, quarrying, and oil and gas sector, which helped contribute to its above-average performance from 2014 to 2018—and to its below-average performance from 1990 to 2014. The above-average share of Manitoba's GDP accounted for by transportation and warehousing (between 5.8 and 6.7 percent from 2014 to 2018) also contributed to the province's relatively strong investment performance during that period since that industrial sector has enjoyed above-average growth in recent years.

Concluding Comments

In 2019, Globberman and Emes documented the collapse in capital expenditure growth in Canada across a broad set of industries. This study examines the recent relative investment performance of individual provinces against the backdrop of the longer-run trends in the country. Two provinces (Newfoundland & Labrador and British Columbia) were consistently above-average performers across the entire 1990 to 2018 period. Conversely, Quebec, New Brunswick, Nova Scotia, and Prince Edward Island were consistently below-average performers over that entire period. Alberta and, to a lesser extent, Saskatchewan experienced major reversals of fortune in the more recent period, owing primarily to the collapse of oil and natural gas prices and thus of capital investment in this large sector. After enjoying the fastest relative increase in net capital investment from 1990 to 2014, between 2014 and 2018 Alberta had the second worst performance. Saskatchewan slipped from being an above-average performer pre-2014 to a below-average performer post-2014. Finally, Ontario and Manitoba improved their positions, becoming above-average performers from 2014 to 2018 after being below-average performers prior to 2014.

There are undoubtedly various factors, specific to individual provinces, that have had an influence on the recent relative investment performance of each and that will also influence how they perform in the future. It is beyond the scope of this essay to explain the historical investment performances of the provinces; however, it seems clear that the industrial composition of individual provinces is an important contributor to each jurisdiction's overall investment performance. As noted above, this is very obvious in the cases of Alberta and Saskatchewan. The recent collapse in oil prices related to the COVID-19 pandemic as well as the current global oil price war led by Saudi Arabia and Russia, augurs poorly for the near-term recovery of investment in Alberta and Saskatchewan. To the extent that British Columbia continues to enjoy strong population growth, its relatively large real estate sector should contribute to the continued relatively strong growth in residential capital assets in the province. The same may also be the case for Ontario. Ontario may further benefit from its relatively large financial sector—a sector that could be one of the stronger industries in Canada in future given the need for escalating financial intermediation as governments increase their debt issuance in the face of soaring public sector expenditures and lower tax revenues associated with the COVID-19 epidemic.

Appendix: Definitions¹²

Fixed capital consists of assets that are used repeatedly or continuously for more than one year. The distinguishing feature of a fixed asset is not that it is durable in some physical sense, but that it may be used repeatedly or continuously over a long period of time, which is taken to be more than one year. Some goods, such as coal, may be highly durable physically but cannot be fixed assets because they can be used once only. Fixed assets include not only structures, machinery, and equipment but also land, subsoil assets, water resources, and software.

The geometric rate of depreciation (D) for an asset is calculated by taking the asset's declining balance rate (R) divided by the service life (L) of the asset. Therefore $D=R/L$ equals the geometric rate of depreciation. Estimates of consumption of fixed capital within the Canadian macro-economic accounts are derived using a geometric method of depreciation.

Total net capital stock consists of fixed residential capital plus fixed non-residential capital (both in 2012 constant prices).

Fixed residential capital

Gross fixed capital formation in residential structures is often referred to as investment in residential construction. Geometric end-year net stock (in fixed residential capital, year two) consists of geometric end-year net stock (year one) plus investment and less demolitions and geometric depreciation. Total residential assets can be broken down into: new construction, renovations, and ownership transfer costs.

Fixed non-residential capital

Geometric end-year net stock (in fixed non-residential capital, year two) consists of geometric end-year net stock (year one) plus investment and less geometric depreciation. Total non-residential assets can be broken

¹² These definitions borrow from Statistics Canada (2020c and 2020d) as well as the notes and structure in Statistics Canada (2020a and 2020b).

down into: non-residential buildings, engineering construction, machinery and equipment, and intellectual property rights.

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