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A Crisis of Capital: Canadian Workers Need More Tools, Buildings and Equipment

by

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- Capital investments by businesses are crucial to prosperity: they help workers produce more – and earn more.
- After several years of increases that narrowed longstanding gaps between investment per worker in Canada and abroad, capital investments by Canadian businesses appear to have fallen sharply behind in 2015.
- Investment in the depressed mining, oil and natural gas sector is expected to fall as much as \$56,000 per worker in 2015 – a crunch that affects Western Canada particularly badly. But there are positive stories of more investment outside the energy sector.
- Policymakers should continue to focus on boosting private-sector investment. Trade liberalization, investment-friendly taxation of extractive industries and lower taxes on non-residential investment in general can help.

Business investment is critical to Canada's economic growth. In the short run, spending on new capital adds to demand, so ups and downs in investment affect the economic cycle. Much more important in the long run is the rate at which business investment adds to Canada's capital stock – the machinery and equipment workers use in their jobs, the intellectual property that a modern creative economy depends on, the structures where production takes place and the engineering infrastructure that plays a central role in a modern economy. Put simply, increased fixed investment typically means more productive and, therefore, better-paid employees.

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Unhappily, the latest figures from Statistics Canada and the Organisation for Economic Co-operation and Development (OECD) suggest that, after a relatively robust performance between 2009 and 2014, capital investment in Canada is now flagging badly. In response, all levels of Canadian government can and should liberalize trade and adjust the tax environment to boost private-sector capital investment.

Canada's Investment per Worker

New capital typically embodies the latest in global and Canadian innovation, letting each worker produce more, and raising incomes and living standards over time. The amount of new investment Canadian businesses put in place is a key indicator of future prosperity: the more investment per worker, the better the chances for higher living standards in the years to come.¹ Critically, trends in investment per worker in Canada compared to abroad shed light on how the business investment environment is developing here vis-à-vis other countries, and how prepared Canadian workers will be to compete in the future.²

For the first time since the 2008-2009 economic crisis and recession, business investment per worker in Canada is projected to fall in 2015. After putting some \$14,300 of new non-residential business investment into each worker in 2014, Canadian businesses seem likely to invest only some \$13,200 per worker this year (Table 1a).

The International Gap in Investment per Worker

How does Canada fare globally in business investment per worker? Our global comparison shows whether Canadian business investment per worker is keeping up with the rest of the developed world. We also highlight Canada's performance relative to the United States, which accounts for about one-half of total OECD investment (Table 1b).

Historically, Canadian businesses have tended to invest less per worker than their counterparts abroad. On average, Canadian workers received 82 cents of new investment for every investment dollar provided other OECD workers from 2006 to 2010. After rising to a comparative high of 90 cents in 2013, Canadian investment per worker is set to fall to 81 cents for every dollar of investment elsewhere in the OECD in 2015.

The US comparison also shows a reversal of what had been an encouraging trend. Over much of the past 10 years, investment in Canadian workers was catching up with investments in their American counterparts. After enjoying only 72 cents of new investment for every dollar garnered by US workers from 2006 to 2010, Canadian workers enjoyed 78 cents in 2012. But that measure has fallen since. Indeed, the average Canadian worker in 2015 looks likely to receive only 69 cents of new investment for every dollar enjoyed by US workers.

1 The connection between economic growth and capital accumulation goes back to Solow (1956) who maintained that a capital stock increase expands both overall output and output per worker. See Sali-i-Martin (1997) for the evidence of a strong nation-level empirical link between growth and investment, especially in equipment.

2 For earlier comparative per-worker investment studies, see Robson and Goldfarb (2004, 2006); Goldfarb and Robson (2005); Banerjee and Robson (2007, 2008); Busby and Robson (2009, 2010, 2011); Dachis and Robson (2012, 2013) and Dachis, Robson and Chesterley (2014).

Table 1a: Non-residential Business Investment per Worker, Compared to OECD and US, 2006-2015

Region	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015F	Annualized Growth (2006-2014)	Year-over-Year Change (2014/15)
<i>Canadian dollars; nearest hundred</i>											<i>percent</i>	
BC	10,000	10,300	11,200	9,800	10,500	11,400	11,900	11,200	12,000	10,900	2.3	-9.3
AB	31,300	31,300	32,900	23,000	29,300	34,000	38,000	42,700	42,600	37,000	3.9	-13.2
SK	15,100	16,500	19,900	20,900	24,600	27,400	30,200	33,400	33,400	27,900	10.4	-16.5
MB	7,600	8,200	9,400	9,000	10,500	10,300	10,900	10,800	13,300	12,700	7.2	-4.8
ON	8,700	8,600	8,800	7,900	7,900	8,500	8,700	7,600	8,000	8,100	-1.0	1.2
QC	7,500	7,900	8,100	7,400	7,300	8,100	8,900	8,300	7,600	7,400	0.2	-2.4
NB	9,400	9,300	10,800	9,200	8,400	8,400	7,400	6,900	6,200	6,500	-5.1	6.0
PEI	5,400	7,100	6,700	5,100	4,700	5,300	4,900	5,200	5,200	5,300	-0.5	1.0
NS	6,800	7,000	6,300	7,400	8,800	8,100	5,800	6,400	7,200	7,800	0.7	8.4
NL	13,200	11,200	13,500	12,300	14,300	20,500	26,800	32,500	37,200	38,100	13.8	2.4
Canada	11,500	11,700	12,400	10,500	11,500	12,800	13,800	14,000	14,300	13,200	2.8	-7.6
OECD	13,900	14,800	15,200	13,100	13,700	14,800	15,500	15,600	16,200	16,200	1.9	0.3
US	16,100	16,900	17,200	14,700	15,400	16,700	17,700	18,100	19,000	19,100	2.1	0.6

Note: 2015 numbers are forecasts. Converted to current Canadian dollars using purchasing power parities. See Box and Appendix for more details.

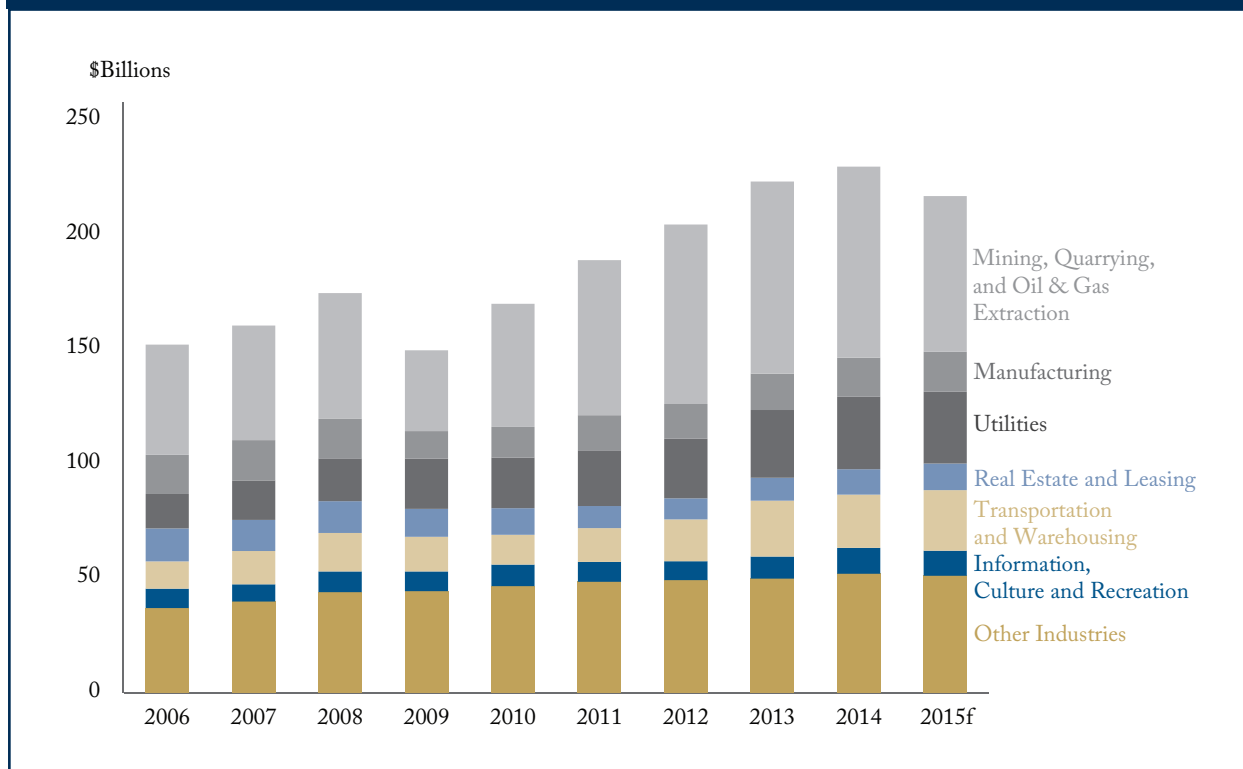
Sources: Authors' calculations from Statistics Canada and OECD.

Table 1b: Non-residential Business Investment per Worker, Relative to OECD and US, 2006-2015

Region	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015F	Average: 2006-2010	Average: 2011-2015
<i>Relative to OECD (OECD average = 100)</i>												
BC	72	70	74	75	77	77	77	72	74	67	73	73
AB	225	211	216	176	214	230	245	274	263	228	209	248
SK	109	111	131	160	180	185	195	214	206	172	137	194
MB	55	55	62	69	77	70	70	69	82	78	63	74
ON	63	58	58	60	58	57	56	49	49	50	59	52
QC	54	53	53	56	53	55	57	53	47	46	54	51
NB	68	63	71	70	61	57	48	44	38	40	67	45
PEI	39	48	44	39	34	36	32	33	32	33	41	33
NS	49	47	41	56	64	55	37	41	44	48	51	45
NL	95	76	89	94	104	139	173	208	230	235	91	198
Canada	83	79	82	80	84	86	89	90	88	81	82	87
<i>Relative to US (US = 100)</i>												
BC	62	61	65	67	68	68	67	62	63	57	65	63
AB	194	185	191	156	190	204	215	236	224	194	184	215
SK	94	98	116	142	160	164	171	185	176	146	121	168
MB	47	49	55	61	68	62	62	60	70	66	56	64
ON	54	51	51	54	51	51	49	42	42	42	52	45
QC	47	47	47	50	47	49	50	46	40	39	48	45
NB	58	55	63	63	55	50	42	38	33	34	59	39
PEI	34	42	39	35	31	32	28	29	27	28	36	29
NS	42	41	37	50	57	49	33	35	38	41	45	39
NL	82	66	78	84	93	123	151	180	196	199	81	171
Canada	71	69	72	71	75	77	78	77	75	69	72	75

Sources: Authors' calculations from data in Table 1a.

Figure 1: Total Capital Spending in Canada, by Industry



Sources: Authors' calculations from Statistics Canada series 029-0045. This measure of industry-level investment excludes intellectual property investment. However, intellectual property is part of the Statistics Canada data we use in Tables 1a and 1b.

A Cross-province Comparison

In Canada itself, the worst per-worker investment news is in the West. After a year of flat investment growth in Alberta and Saskatchewan in 2014, the recent plunge in commodity prices, particularly for oil, is expected to cut per-worker investment by more than 10 percent in these provinces in 2015. After reaching record levels in 2014, investment per worker in British Columbia and Manitoba also looks set for dramatic drops in 2015.

More happily, total capital investment in Newfoundland and Labrador is expected to be higher in 2015 than it was in 2014, showing more resilience to lower oil prices than in the western provinces.

Workers elsewhere in Canada suffer from anemic capital investment relative to their global peers. Per-worker investment in central Canada and the Maritimes is shockingly low: from 28 cents to 50 cents for every dollar invested elsewhere in the OECD and in the United States.

Total Capital Spending by Industry

Capital spending by industry sector has also changed over time, reflecting shifts in the Canadian economy (Figure 1). For example, capital spending in manufacturing has stayed flat at \$17 billion per year since 2006, lowering its share of total investment as other sectors have grown. Investment in commercial real estate and

leasing has also fallen, from \$14 billion in 2006 to a forecast \$11 billion in 2015, and more steeply as a share of economy-wide investment.

Meanwhile, investment in mining and oil and natural gas extraction seems likely to be some \$16 billion lower in 2015 than it was in 2014. This depressing Statistics Canada figure reinforces a similarly gloomy Canadian Association of Petroleum Producers forecast of a \$23 billion drop in western Canadian oil and natural gas investment for the year.³

Many factors affect investment per worker in different industries. In all places and at all times, some industries, such as power generation, tend to be more capital intensive than others, such as personal services. To get a sense of how workers in different sectors are faring with respect to new capital investment, we rank industries by their relative increases in per-worker spending over the last decade (Table 2). These trends can shed light on where capital investments have been made – or not – highlighting the potential for future productivity and income gains from better tools for workers.

Agriculture, forestry, fishing and hunting, which Statistics Canada groups together, top the list: these industries have more than doubled their capital expenditures since 2006, growing at an annual average of 12 percent, giving their workers the largest boost in per-worker capital of any sector in Canada. Transportation and warehousing also perform well in this ranking, as do utilities, which have both high and growing capital spending per worker on top of a growing labour force.

After a large increase over the last decade, the oil and natural gas sector is seeing a massive drop in investment per worker – worse than 20 percent – in 2015. However, the worst decline since 2006, an average drop of 3.4 percent per year, has been in the commercial real estate and leasing industry.

Providing Better Tools for all Canadian Workers

What lessons can be drawn from the recent booms and busts in investment per worker? One is that economies do not grow uniformly like dough leavened by yeast, but rather unevenly like mushrooms in a forest (Howitt 2015). Businesses and industries respond differently to new markets, new technologies, and new threats. So no single sector leads in capital spending per worker, or productivity growth, for very long stretches of time. The surge in per-worker investment in agriculture and other primary industries we have discussed above shows that a sector with little reputation for innovation is becoming far more capital intensive – a promising sign for the Canadians it employs.

Turning to a sector suffering setbacks, mining, quarrying, along with oil and natural gas extraction, is having an outsized impact on national investment figures. Much of the oil and natural gas investment boom was driven by new technology enabling the cost-effective exploitation of the oil sands. More recently, investment is shifting, notably to technology that makes shale oil and natural gas recoverable.

Meanwhile, government policy continues to affect sectoral, provincial and national investment. Trade agreements and regulatory measures that encourage movement of goods, services, saving and people across

3 Statistics Canada estimates are from the CAPEX survey, as used in Figure 1. For the statement by the Canadian Association of Petroleum Producers, see <http://www.capp.ca/media/news-releases/increased-access-to-markets-remains-critical-despite-recent-oil-price-decline>.

Table 2: Industry Ranking by Change in Capital Spending per Worker, 2006 to 2015

Industry	2006	2014	2015F	Annualized Change (2006-2014)	Year-over- Year Change (2014-2015)
	<i>Per worker</i>			<i>percent</i>	
Agriculture, Forestry, Fishing and Hunting	7,400	18,300	18,400	12.0	0.5
Utilities	123,200	231,100	225,300	8.2	-2.5
Transportation and Warehousing	14,900	25,900	28,900	7.2	11.6
Accommodation and Food Services	2,200	3,500	3,500	6.0	0.0
Business, Building and Other Support Services	2,300	3,500	3,500	5.4	0.0
Mining, Quarrying, and Oil & Gas extraction	196,100	271,400	215,500	4.1	-20.6
Public Administration	26,100	34,400	35,000	3.5	1.7
Information, Culture and Recreation	11,500	14,900	14,500	3.3	-2.7
Manufacturing	8,100	10,000	10,300	2.7	3.0
Health Care and Social Assistance	3,800	4,600	3,900	2.4	-15.2
Educational Services	5,800	6,800	7,300	2.0	7.4
Wholesale Trade	5,500	6,400	6,500	1.9	1.6
Construction	4,000	4,600	4,500	1.8	-2.2
Professional, Scientific and Technical Services	1,700	1,900	1,500	1.4	-21.1
Other Services	1,300	1,400	1,400	0.9	0.0
Retail Trade	3,100	2,800	3,000	-1.3	7.1
Real Estate and Leasing	48,200	36,400	38,900	-3.4	6.9

Notes: The North American Industry Classification System codes used here are at the two-digit level, enabling consistent industry classifications of data for both capital expenditure and the Labour Force Survey. Due to a series break in 2013, we do not include data on the finance and insurance industry.

Source: Statistics Canada (2015) and authors' calculations.

borders, and heighten competitive pressures and opportunities, can raise investment and productivity. For example, capital investment has a strong link with Canada's exports to world markets (Caranci, Preston, and Saldarelli 2015).

Fiscal measures matter as well. As Boadway and Dachis (2015) show, several provinces have resource-extraction tax regimes that unintentionally discourage many new investments. Their regimes could better reflect international best practices in tax design – in particular, replacing gross-revenue royalties that do not take

Box 1: A Measure of Investment for 2015 Onwards

Our historical comparisons use data on business capital investment in machinery and non-residential structures, and on employment, from the OECD's Economic Outlook No. 97 (June 2015) database for countries abroad. We use the Canadian System of National Accounts (CSNA) for Canada as a whole and the provinces. The most recent CSNA data are only available up to 2014. To get a forecast for 2015, we use Canadian investment data from Statistic Canada's Capital and Repair Expenditure Survey (CAPEX). We apply the growth rate of these capital expenditures to CSNA non-residential business investment numbers (which also include intellectual property investments; for a discussion of investment in intangible assets, see Baldwin et al. (2009)). This process allows for something close to consistency with the OECD, which reports gross fixed-capital formation for its member countries. The 2015 forecasts are subject to change, particularly at the provincial level. Updated data for 2014 show that Statistics Canada's survey of investment intentions gave misleading signals about growth and declines, notably in Quebec, British Columbia and in the three Maritime provinces.

The OECD and Statistics Canada investment numbers include private businesses and government business enterprises functioning in a commercial environment. Not all the data are available for all OECD countries throughout the period: besides Canada, our figures include Australia, Belgium, Denmark, Finland, France, Germany, Iceland, Japan, Korea, the Netherlands, New Zealand, Norway, Sweden, Switzerland, the United Kingdom and the US (See Appendix for country-specific comparisons). Many OECD countries are increasingly reporting R&D spending in a consistent way, which ameliorates a longstanding concern with our comparisons (see Dachis, Robson and Chesterley 2014).

All dollar figures are in current Canadian dollars. We convert investment abroad into Canadian dollars using the OECD's purchasing-power parity (PPP) exchange rates. The OECD reports PPP rates for gross fixed capital formation for 2008 only. We then splice OECD PPP data for overall gross domestic product to the 2008 base to bring gross fixed capital formation PPP rates forward to 2015. The purchasing-power adjustment allows more meaningful comparisons of the “bang-per-buck” spending in different countries than using market exchange rates since – especially at any point in time – market rates may not reflect relative domestic price levels.

Per-worker amounts are based on total employment from the Labour Force Survey for Canada and similar total employment figures abroad. While dividing business investment by total employment is open to challenge, it avoids some classification problems; i.e., in some jurisdictions, workers in government business enterprises are included in the public sector while others place them in the private sector. Our method also lets us focus on the impact of investment that has met a market test for which there is a stronger presumption that it will raise productivity and future earnings.

account of the cost of operations, with modern cash-flow taxes that better reflect the cumulative costs oil and natural gas companies face during extraction and production.

Taxes that discourage investment in other sectors also need attention. Business property taxes at the municipal and provincial levels typically take the largest single tax bite out of new investment, with huge differences across the country (Found, Tomlinson and Dachis 2015). These and other policies often favor investment in residential properties as opposed to business plant and equipment. Non-harmonized retail sales taxes and land-transfer taxes also discourage capital spending in some jurisdictions.

There is a strong negative relationship between marginal effective taxes on investment and provincial investment per worker (Dachis and Robson 2013).⁴ Even after controlling for the relative share of investment in each province that comes from mining, oil, and natural gas investment, a one-percentage-point increase in the provincial marginal investment tax rate is associated with 1-to-2 percent lower total investment per worker. Although the Maritimes' demographic outlook for fewer workers may be causing companies to pull back on investment, the high tax burdens there are also possible culprits.

Conclusion

It is normal for investment per worker to rise and fall in various sectors and regions, as economic cycles favour some businesses more than others. What is particularly discouraging about collapsing per-worker investment in Canada in 2015 is the decisive break with a trend of improvement relative to other OECD and US workers since the mid-2000s. Policymakers should ensure that Canadians are poised to take full advantage of the new investment world on the other side of the investment crash. Ensuring international opportunities, smarter taxes on resources and less punishing taxes on other business investments can all help ensure that Canadian workers are better equipped in the future.

⁴ As calculated in Found, Dachis and Tomlinson (2013) for the largest municipality in each province.

Appendix: Investment per Worker in OECD countries

In Appendix Table A1, we show the major OECD country per-worker figures in Canadian dollars. This allows interested readers to make international comparisons of OECD investment to Canada directly. To showcase the slight variations in investment levels depending on the data source, we include the Canadian investment levels as provided by the OECD in Table A1, as well as our estimates from various Statistics Canada data.

Table A1: Investment per Worker in OECD Countries, 2006-2015

Country	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015F	Annualized Growth (2006-2014)
<i>Canadian dollars; nearest hundred</i>											<i>percent</i>
Australia	16,500	17,700	18,000	17,500	16,800	18,700	21,200	20,500	19,600	18,600	2.2
Belgium	19,500	20,400	21,700	19,800	19,600	21,000	20,900	20,700	22,300	22,300	1.7
Denmark	13,400	13,900	14,700	12,800	12,700	12,400	12,500	13,000	13,100	13,400	-0.3
Finland	12,500	14,700	15,900	13,800	12,900	13,700	13,200	12,100	11,400	11,100	-1.1
France	13,200	14,200	15,000	13,300	14,000	15,100	15,100	15,100	15,600	15,500	2.1
Germany	11,900	12,700	13,300	11,100	11,900	12,900	12,600	12,300	12,600	12,800	0.7
Iceland	18,200	13,000	9,900	4,800	4,600	5,700	6,000	5,400	6,100	6,700	-12.8
Japan	11,200	12,100	12,400	10,600	11,200	12,400	13,300	13,400	13,800	13,800	2.6
Korea	17,000	18,200	18,200	16,400	18,400	18,600	18,300	18,300	19,000	19,400	1.4
Netherlands	11,000	11,900	12,900	11,200	11,200	13,200	12,500	12,300	13,000	13,400	2.1
New Zealand	6,700	7,300	7,400	5,900	6,000	6,800	7,800	8,200	8,600	9,200	3.2
Norway	21,600	24,000	24,200	20,800	19,100	20,300	22,100	22,900	22,700	21,300	0.6
Sweden	14,400	15,900	16,800	13,900	14,400	15,500	16,000	15,700	16,300	16,700	1.6
Switzerland	19,400	21,200	21,900	19,400	20,600	22,600	23,800	24,500	25,100	24,900	3.3
UK	9,700	10,100	10,500	8,800	8,800	9,300	9,700	10,100	10,600	10,800	1.1
US	16,100	16,900	17,200	14,700	15,400	16,700	17,700	18,100	19,000	19,100	2.1
Canada (StatsCan)	11,500	11,700	12,400	10,500	11,500	12,800	13,800	14,000	14,300	13,200	2.8
Canada (OECD)	11,700	11,800	12,100	9,800	11,000	12,100	12,800	12,800	12,800	12,000	1.1

Source: Authors' calculations from OECD and Statistics Canada data.

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