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# Tooling Up: Canada Needs More Robust Capital Investment

*After many years of relatively robust performance, business investment in Canada has slipped badly since mid-decade. Investment per worker in Canada is now 30 percent lower than the OECD average, and 40 percent lower than in the United States. Weak capital spending is a threat to Canada's future prosperity – one all levels of government should address.*

William B.P. Robson, Jeremy Kronick  
and Jacob Kim

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## ABOUT THE AUTHORS

### **WILLIAM B.P. ROBSON**

is President and Chief Executive Officer, C.D. Howe Institute.

### **JEREMY KRONICK**

is Associate Director, Research, at the C.D. Howe Institute.

### **JACOB KIM**

is a Researcher at the C.D. Howe Institute.

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*Daniel Schwanen*  
*Vice President, Research*

## THE STUDY IN BRIEF

Capital investment that adds to Canada's stock of machinery, buildings, engineering infrastructure and intellectual property boosts the economy, and equips Canadian workers to raise their output and earn higher incomes in the future. Unhappily, after many years of relatively robust performance, business investment in Canada has slipped badly since mid-decade.

The latest figures from Statistics Canada and the Organisation for Economic Co-operation and Development (OECD) suggest that Canadian businesses will invest about \$13,900 per worker in 2018. By contrast, businesses across the OECD will invest about \$19,700 per worker, and businesses in the United States will invest about \$23,200 per worker. That means that for every dollar of new capital enjoyed by the typical OECD worker this year, her or his Canadian counterpart will enjoy only 71 cents. And for every dollar of new capital enjoyed by the typical US worker, Canadian counterparts will enjoy a dismal 60 cents.

Notwithstanding a major decline after oil prices fell in 2014, investment per worker in Alberta, Saskatchewan, and Newfoundland and Labrador remains relatively strong – better than average investment per worker abroad. In the remaining provinces, however, investment is anemic. In Ontario and Quebec, investment per worker is running below \$10,000 annually, and in the Maritime provinces, it is running below \$8,000 annually. In 2018, workers in these provinces will benefit from less than 50 cents for every dollar invested per worker in the OECD as a whole, and less than 40 cents for every dollar invested per worker in the United States.

One of the most troubling features of Canada's lacklustre investment performance is low spending on new machinery and equipment (M&E) – a category of spending that appears particularly important for spurring economy-wide productivity. About a decade ago, fixed capital investment on M&E and structures – non-residential buildings and engineering – was similar in value, but lately, spending on M&E has been only about half the spending on structures. This weakness in M&E investment contrasts sharply with robust US M&E investment, which is likely to accelerate after capital-spending-friendly US tax changes.

This far into an expansion, with many other measures showing little slack in the economy, deficient demand is an unlikely suspect to explain weak investment. Bottlenecks getting energy resources to market are a problem. Taxation is a likely culprit, with other countries improving their tax competitiveness and Canada struggling with a particular burden in its business property taxes. In Ontario, relentlessly rising electricity prices hurt the climate for investment. Trade uncertainty is likely also a factor, inducing businesses not to invest, or to invest in the US in preference to Canada. The particular importance of asset-based lending in financing M&E investment suggests that policies to improve access to capital in that sector might help.

Weak capital spending is a threat to Canada's future prosperity – one all levels of Canadian government should address. More competitive tax rates, internal and international trade liberalization, and removing frictions that impede the raising of capital can all help Canadian businesses equip their workers better to compete and thrive.

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## Private sector investment that boosts Canada's stock of machinery, buildings, engineering infrastructure and intellectual property is critical to economic growth.

In the short run, it boosts demand for products and services, adding to gross domestic product and creating jobs. Over time, it equips Canadian workers to raise their output, generating higher wages, better returns on savings and tax revenues to finance public programs.

Unhappily, the latest Statistics Canada and the Organisation for Economic Co-operation and Development (OECD) figures show that Canada's business investment performance, relative to our competitors – which had improved for many years prior to mid-decade – has collapsed. The world economy is on an upswing and business investment should be taking off. Elsewhere, it is. But not in Canada.

Looking at broad categories of capital, one of the most troubling features of Canada's lacklustre performance is that spending on machinery and equipment (M&E) is particularly weak. Some studies suggest that M&E spending is particularly important for spurring economy-wide productivity.<sup>1</sup> About a decade ago, fixed capital investment on M&E and structures – non-residential buildings and engineering – was similar in value: in 2006, Canadian business spent \$103 billion on structures and \$95 billion on M&E. By 2017, however, capital construction spending was \$155 billion while M&E spending was only about half that amount,

\$81 billion. Although all private-sector investment has presumably passed similar productivity and profitability tests, the relative weakness of M&E investment raises special concerns. Canadian weakness in M&E investment contrasts strongly with a much more robust US performance.

Many factors influence business investment, and the list of potential explanations and remedies for Canada's weakness is correspondingly long. This far into an economic expansion, with many other measures showing little slack, deficient demand is an unlikely suspect. Taxation, though, is probably a factor: in Canada, business property taxes are high from coast to coast (Found and Tomlinson 2017), and US corporate tax changes are making investment more attractive south of the border. Trade uncertainty is likely also a factor, inducing businesses not to invest, or to invest in the US in preference to Canada.

Energy and electricity prices also merit a look: a decade ago, Ontario enjoyed a significant price advantage compared with our neighbours to the south. That is no longer the case. Policies focusing disproportionately on small firms are likely hindering Canada's relative performance in intellectual property investment. And, as we explore below, financing options may also matter: businesses that cannot finance investment from their own

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We thank a number of colleagues and external reviewers for comments and insights that improved this *Commentary*. In particular, we are grateful to Michael Rothe and his colleagues at the Canadian Finance and Leasing Association (CFLA). Former CFLA president David Powell highlighted the importance of asset-based lending in supporting business investment, and our profile of its role in financing machinery and investment reflects his advice. Responsibility for errors and for the conclusions is ours.

1 See Sala-i-Martin 2001, Rao et al. 2003, and Stewart and Atkinson 2013.



resources need access to outside saving, and asset-based finance is one channel that policy reforms could bolster.

All levels of Canadian government can – and should – examine policies that may be holding back business investment. More competitive tax rates, including quicker capital-equipment write-offs, regulatory measures that cut red tape, internal and international trade liberalization, and removing frictions that impede the raising of capital can all help Canadian businesses better equip their workers.

## CANADA'S INVESTMENT PER WORKER

Capital investment creates the machinery and equipment workers use in their jobs, the intellectual property that drives innovation, the buildings where production takes place and the engineering infrastructure that moves intermediate and final products and services to market. All of this activity increases productivity, raising output per hour worked, a key driver and predictor of incomes and living standards.<sup>2</sup> A key measure of success in broadening and deepening capital stock is business investment per worker, which allows comparisons with other countries. This measure prefigures whether Canada will succeed as a high-capital, high-productivity, high-wage economy, or languish with relatively low capital, low productivity and low wages.<sup>3</sup>

Although Canadian business investment was increasing absolutely and relatively between 2009

and 2014, the subsequent period has seen a large fall-off across much of the country. After spending some \$15,700 per worker on new non-residential business investment in 2014, businesses in 2017 invested only about \$13,300 per worker. The early indicators for 2018 – projections from the OECD and Statistics Canada's tallies for the first half of the year – suggest that Canadian investment will improve only marginally, to \$13,900 per worker.

## The International Gap in Investment per Worker

To the extent we care about Canadian competitiveness, we want to monitor Canadian business investment per worker relative to other countries (see Box 1 for details on these calculations) and especially relative to the United States, which accounts for about one-half of total OECD investment.

Historically, Canadian businesses have tended to invest less per worker than their counterparts abroad. The gap narrowed somewhat in the 2000s and early in this decade, but since 2014 it has widened markedly: in contrast to Canada's projected \$13,900 per worker in 2018, the average worker in the OECD as a whole seems likely to get \$19,700, and the average worker in the United States \$23,200 (Figure 1a).

Expressing Canada's performance relative to the OECD and the United States, we can say that throughout the 1990s and early 2000s, Canadian workers got between 70 and 84 cents of investment for every dollar enjoyed by their peers in the

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- 2 Intellectually, 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 Sala-i-Martin (1997) for the evidence of a strong nation-level empirical link between growth and investment, especially in equipment. A more recent look at the correlation between capital stock and output among countries is Caselli and Feyrer (2007). Further insights are available from Rao et al. 2003, and Stewart and Atkinson 2013.
  - 3 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); Dachis, Robson and Chesterley (2014) and Dachis, Robson and Jacobs (2015).

### Box 1: Measuring and Interpreting Investment per Worker

Our historical comparisons use international data on business capital investment in machinery and non-residential structures, and on employment from the OECD's Economic Outlook No. 103 (May 2018) database. We use the Canadian System of National Accounts (CSNA) for Canada as a whole and the provinces for investment data. We use the Labour Force Survey for Canadian employment data. The most recent CSNA data by provinces are available only up to 2016. Our figures for Canada and the provinces for 2017 and 2018 apply growth rates from Statistics Canada's Capital and Repair Expenditure Survey to CSNA non-residential business investment. This process allows for something close to consistency with the OECD, which reports gross fixed-capital formation projections for its member countries.

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. While inconsistencies in the treatment of R&D spending have been a concern in the past (Dachis, Robson, and Chesterley 2014), more consistent capitalization of this spending in the national statistics of OECD countries improves the comparability of more recent figures on intellectual property investment.

All dollar figures are in current Canadian dollars. We convert investment abroad from national currencies using the OECD's purchasing-power parity (PPP) exchange rates instead of market rates, since market rates may not reflect domestic price levels. The OECD reports PPP rates for gross fixed capital formation for 2008 only, so we derive PPP exchange rates for other years by benchmarking PPP data for overall gross domestic product to 2008.\*

While dividing investment in the business sector by employment economy-wide is open to challenge, it avoids some classification problems. 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, including the tax revenues needed to support employment in the government sector.

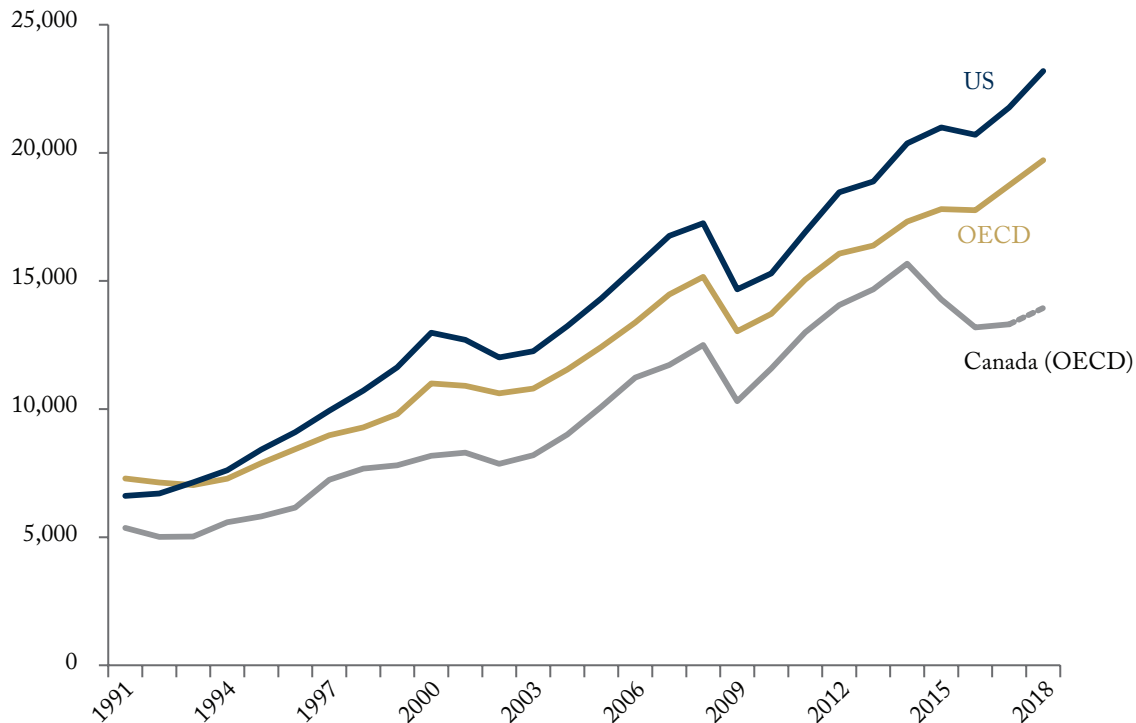
\* Statistics Canada publishes data on PPP rates for gross fixed-capital formation against the United States only. Our estimates from the OECD PPP data allow comparisons across OECD countries.

OECD as a whole, and between 63 and 73 cents for every dollar enjoyed by their US peers, (Figure 1b). This gap narrowed after the mid-2000s, particularly since Canada weathered the 2008/09 economic crisis and recession relatively well. From 2006 to 2011, Canadian workers averaged 84 cents of new investment for every investment dollar received by OECD workers. But after rising to a comparative high of 91 cents in 2014, Canadian investment per worker plummeted: in 2017, it registered a dismal 71 cents for every investment dollar elsewhere in

the OECD. Lining the 2018 first-half Canadian figures up against OECD projections suggests that 2018 will record the same dismal figure: 71 cents.

The US comparison shows an equally stark reversal of what had been an encouraging trend. During the 2000s and early in this decade, Canadian investment per worker was catching up with investment in their American counterparts. After receiving just 72 cents of new investment for every dollar enjoyed by US workers from 2006 to 2011, Canadian workers got 78 cents in 2013.

**Figure 1a: Non-residential Business Investment per Worker, Canadian Dollars, 1991-2018**



Note: 2018 numbers for Canada are based on first-half non-residential fixed investment and OECD forecasts.

Source: Authors' calculations from Statistics Canada and OECD.

But that measure has since slipped badly. In 2017, the average Canadian worker received a mere 61 cents of new investment for every dollar received by her or his US counterpart. That was the worst performance gap on record. Yet, on current trends, 2018 seems likely to set a new low: 60 cents.

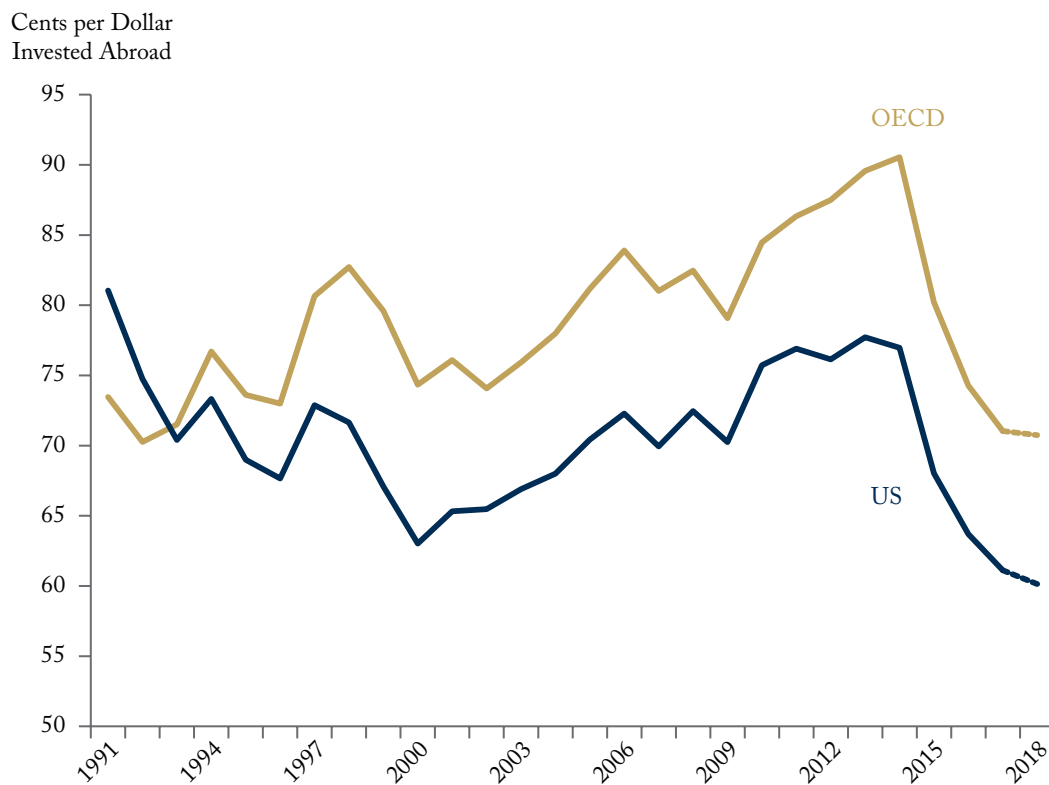
Ranked against the 17 OECD countries for which we have comparable data, Canada's 2018 per-worker investment seems likely to come in a dismal 15th. Among a subset of major advanced economies we often compare Canada to, only the United Kingdom will fare worse. France, Japan, Australia, Germany and – especially – the United States are all posting much more robust investment numbers (Figure 2).

### Per-Worker Investment by Province

Weakness in commodity prices, particularly the fall in oil prices after mid-2014, has had an outsized negative effect on business investment in some provinces (Figure 3). Per-worker investment in Alberta and Saskatchewan is down more than one third since 2014. Businesses in BC, a province that is also sensitive to commodity prices and had a middling level of investment per worker to start with, also cut back.

Manitoba, on the other hand, where investment per worker may register \$15,100 in 2018, has held up relatively well. Newfoundland and Labrador also fared better than its western oil-producing

Figure 1b: Investment per Worker: Canada versus OECD and US, 1991-2018



Source: Authors' calculations from Statistics Canada and OECD

counterparts in 2016 and 2017. Even a projected 30-percent decline in 2018 would leave per-worker investment in Newfoundland and Labrador at \$30,600 – highest among all provinces.

Elsewhere in Canada, workers suffer from anemic capital investment relative to their global peers. In 2018, per-worker investment across the Maritimes is expected to be very low: from 28 cents to 39 cents for every dollar invested elsewhere in the OECD and in the United States respectively (Tables 1a and 1b). New Brunswick's relative investment figures are at their lowest level in a decade, down more than 35 percent since 2010. Ontario's per-worker tally is just 46 cents per dollar invested in the average OECD worker and a mere 39 cents for the average US worker. The comparable numbers in Quebec are

even worse: 42 cents for every dollar enjoyed by the average OECD worker and 36 cents when measured against the United States.

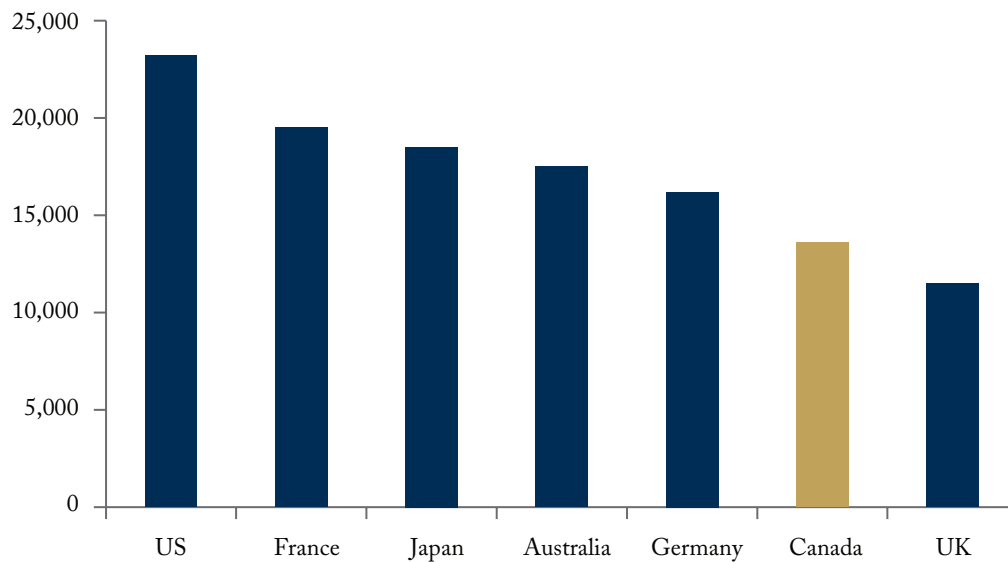
Meanwhile, Ontario's per-worker investment relative to OECD and the United States has fallen by 19 percent since 2015. Similarly, Quebec's investment relative to both the OECD and the United States has fallen by 22 and 23 percent respectively compared to 2013.

## PER-WORKER INVESTMENT BY INDUSTRY

Not surprisingly, part of the story behind Canada's relative decline is trouble in natural resource industries. Investment per worker in mining, oil and

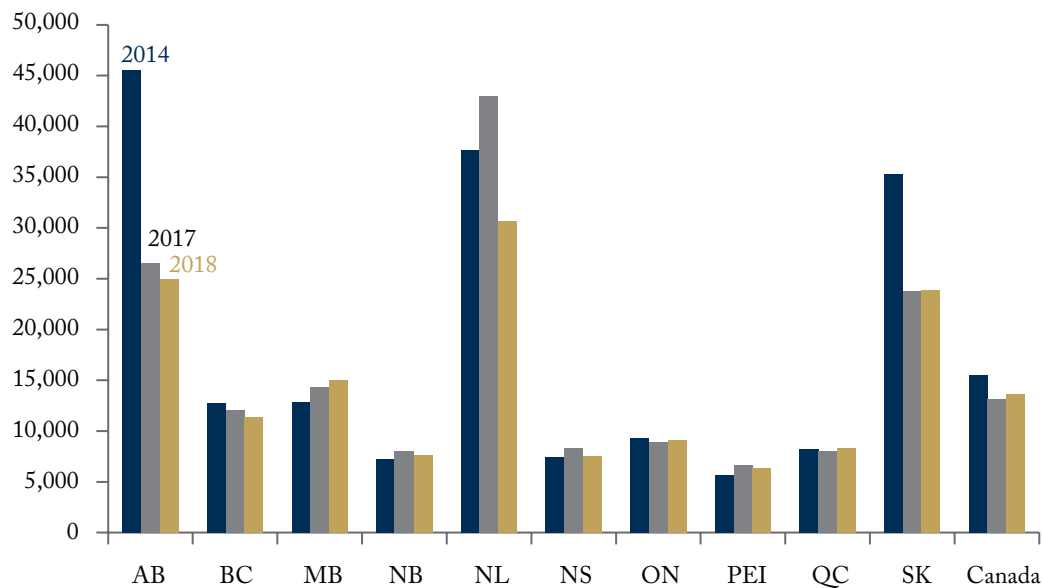


**Figure 2: Investment per Worker in Selected OECD Countries, Canadian Dollars, 2018**



Source: Authors' calculations from Statistics Canada and OECD.

**Figure 3: Investment per Worker by Province, Canadian Dollars**



Note: 2017 and 2018 numbers are estimates and forecasts based on Statistics Canada's Annual Capital and Repair Expenditures Survey (CAPEX).

Source: Authors' calculations from CAPEX and the National Economic Account (NEA).

Table 1a: Non-residential Business Investment per Worker, Compared to OECD and US, 2006-2018

Region	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017E	2018F	Annualized growth (2006-2018)	Change (2017-2018)
	Dollars; nearest hundred													percent	
BC	10,000	10,300	11,200	9,800	10,500	11,400	11,900	11,600	12,800	11,500	10,600	12,000	11,400	1.1	-5.2
AB	31,300	31,300	32,900	23,000	29,300	34,000	38,000	42,800	45,500	35,000	29,500	26,600	25,000	-1.9	-6.0
SK	15,100	16,500	19,900	20,900	24,600	27,400	30,200	32,800	35,300	28,500	24,000	23,800	23,900	3.9	0.6
MB	7,600	8,200	9,400	9,000	10,500	10,300	10,900	11,200	12,800	13,400	13,800	14,400	15,100	5.9	4.8
ON	8,700	8,600	8,800	7,900	7,900	8,500	8,700	8,100	9,300	10,200	9,500	9,000	9,100	0.4	1.4
QC	7,500	7,900	8,100	7,400	7,300	8,100	8,900	8,800	8,200	8,200	8,400	8,000	8,300	0.8	3.1
NB	9,400	9,300	10,800	9,200	8,400	8,400	7,400	7,300	7,200	7,800	7,500	8,000	7,700	-1.6	-4.2
PEI	5,400	7,100	6,700	5,100	4,700	5,300	4,900	5,700	5,700	5,300	5,800	6,700	6,400	1.4	-4.9
NS	6,800	7,000	6,300	7,400	8,800	8,100	5,800	6,600	7,500	7,800	8,700	8,400	7,500	0.8	-10.2
NL	13,200	11,200	13,500	12,300	14,300	20,500	26,800	34,700	37,600	39,300	48,700	43,000	30,600	7.3	-28.8
Canada	11,200	11,700	12,500	10,300	11,600	13,000	14,100	14,700	15,700	14,300	13,200	13,300	13,900	1.8	4.1
OECD	13,400	14,500	15,200	13,000	13,700	15,100	16,100	16,400	17,300	17,800	17,800	18,700	19,700	3.3	5.2
US	15,500	16,800	17,300	14,700	15,300	16,900	18,500	18,900	20,400	21,000	20,700	21,800	23,200	3.4	6.5

Note: 2017 numbers are estimates. 2018 numbers are forecast. Converted to current Canadian dollars using purchasing power parities. The OECD figure includes all countries for which we have comparable data: besides Canada, we include Australia, Belgium, Denmark, Finland, France, Germany, Iceland, Japan, Korea, the Netherlands, New Zealand, Norway, Sweden, Switzerland, the United Kingdom and the US. See Box 1 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, 2006-2018

Region	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017E	2018F	Average 2006- 2011	Average 2012- 2018
Relative to OECD (OECD average = 100)															
BC	75	71	74	75	77	75	74	71	74	65	60	64	58	74	66
AB	234	216	216	177	214	225	236	261	263	197	166	142	127	214	199
SK	113	114	131	161	180	181	188	200	204	160	135	127	121	147	162
MB	57	57	62	69	77	68	68	68	74	75	78	77	77	65	74
ON	65	59	58	61	58	56	54	49	54	57	53	48	46	59	52
QC	56	54	53	57	53	54	55	54	47	46	47	43	42	55	48
NB	70	64	71	71	61	56	46	45	42	44	42	43	39	66	43
PEI	40	49	44	39	34	35	30	35	33	30	33	36	32	40	33
NS	51	48	41	57	64	54	36	40	43	44	49	45	38	53	42
NL	99	77	89	95	104	136	166	212	217	221	274	230	155	100	211
Canada	84	81	82	79	84	86	87	90	91	80	74	71	71	83	81
Relative to US (US = 100)															
BC	65	61	65	67	69	67	64	61	63	55	51	55	49	65	57
AB	202	186	190	156	192	201	205	226	223	167	143	122	108	185	171
SK	97	98	115	142	161	162	163	174	173	136	116	109	103	123	139
MB	49	49	54	61	69	61	59	59	63	64	67	66	65	56	63
ON	56	51	51	54	52	50	47	43	46	49	46	41	39	53	44
QC	48	47	47	50	48	48	48	47	40	39	41	37	36	48	41
NB	61	55	62	63	55	50	40	39	35	37	36	37	33	59	37
PEI	35	42	39	35	31	31	26	30	28	25	28	31	28	36	28
NS	44	42	36	50	58	48	31	35	37	37	42	39	32	46	36
NL	85	67	78	84	93	121	145	184	184	187	235	197	132	81	181
Canada	72	70	72	70	76	77	76	78	77	68	64	61	60	72	69

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

gas extraction peaked at nearly \$300,000 per worker in 2014, but it has since been on a steady decline, largely due to the crash in oil prices. For 2018, this figure is set to drop to \$164,000 (Table 2).

While Canada's relatively large fossil fuel sector makes its troubles more significant for national investment than in other countries, there is more to our relatively weak performance than a downturn in that sector. Indeed, investment in oil and gas extraction actually held up on the northern side of the Canada-US border relatively well after 2014. Although we do not have comparable data for 2017 and 2018, Canadian investment in oil and gas narrowed a previous gap with the United States after 2009, and even surpassed the US per-worker total in 2016 (Figure 4).

However, after 2014, Canada's per-worker investment in other sectors declined relative to the United States. In 2016, investment per worker in all sectors except the oil industry stood at only 57 cents per dollar invested in the United States, declining from 66 cents in 2010 (also shown in Figure 4).

## INVESTMENT BY TYPE OF CAPITAL

Further insight into the nature and potential implications of Canada's disappointing business investment comes from analysis of capital formation's three main components: structures, such as non-residential buildings and engineering infrastructure; machinery and equipment; and intellectual property (IP). As noted already, investment in structures – albeit with ups and downs, largely reflecting the ups and downs of the fossil-fuel sector – is well above its (nominal dollar) levels of the mid-2000s. By contrast, M&E and IP investment are quite flat (Figure 5).

Although the relative importance of fossil fuels to the Canadian economy affects the growth profile of spending on structures in the two countries, both the United States and Canada have seen increases since 2006. While US spending on M&E has also risen since 2006, M&E spending in Canada is once again flat (Figures 6a and 6b).<sup>4</sup> This is a troubling fact: many economists have concluded that M&E spending not only passes the profitability test of the firms that undertake it, but appears to have positive spillovers that enhance productivity in the broader economy (see Sala-i-Martin 2001, Rao et al. 2003, and Stewart and Atkinson 2013).

Rising US spending versus flat spending in Canada is also the story of IP capital investment (Figure 6c). For the past 12 years, Canada's per-worker spending on IP products has been stuck at just \$2,000 while similar US investment, less than \$4,000 in 2006, is set to reach \$7,000 per worker in 2018.

## REASONS FOR CANADA'S WEAK INVESTMENT

Many factors affect business investment, and many potential culprits lie behind Canada's weak performance. As a resource-oriented economy, Canada will typically experience relatively strong business investment when prices for fossil fuels, other minerals, forest products and food are relatively high. However, other factors are more within the scope of public policy to influence.

### Obstacles to Fossil Fuel Investment

As almost daily headlines demonstrate, Canada's fossil fuel industry faces particular challenges,

4 Industry data (Statistics Canada Table 34-10-0035-01) show that among the four largest M&E capital spending components – manufacturing, oil and gas, real estate and transportation – only transportation has positively contributed to business investment over the last decade, with manufacturing and real estate lagging in the crisis years (and after), and oil and gas experiencing a large hit following the oil-price collapse.

**Table 2: Non-residential Business Investment per Worker by Industry, 2013-2018**

Industry	2013	2014	2015	2016	2017	2018
	<i>Canadian dollars</i>					
Agriculture, forestry, fishing and hunting	16,600	17,700	18,400	18,000	18,700	18,800
Mining, quarrying, and oil and gas extraction	279,400	294,100	220,100	182,700	177,700	164,300
Utilities	219,400	227,700	230,100	224,700	243,000	251,900
Construction	4,500	4,600	4,400	4,300	4,400	4,400
Manufacturing	9,200	10,500	10,900	9,700	8,700	9,100
Wholesale trade	6,100	6,500	5,600	5,100	5,100	5,100
Retail trade	3,700	3,100	3,000	3,100	2,900	2,900
Transportation and warehousing	27,600	29,500	32,200	30,600	32,000	31,200
Finance and insurance	4,100	4,500	5,900	4,500	4,700	4,600
Real estate and leasing	32,100	35,300	32,700	40,000	37,700	38,900
Professional, scientific and technical services	1,600	2,100	2,000	2,000	1,800	1,600
Educational services	6,300	6,400	6,900	7,500	8,800	9,000
Health care and social assistance	4,000	3,900	4,000	3,600	3,600	3,400
Information, culture and recreation	12,600	15,600	17,900	18,000	17,700	17,800
Accommodation and food services	3,100	3,500	3,700	3,300	2,800	2,800
Other services	1,500	1,700	1,700	1,600	1,200	1,300

Source: Authors' calculations from Statistics Canada's Annual Capital and Repair Expenditures Survey (CAPEX).

especially bottlenecks getting products to market. As a result, BC and Alberta are experiencing their lowest levels of investment per worker, relative to both US and OECD peers, in more than a decade.

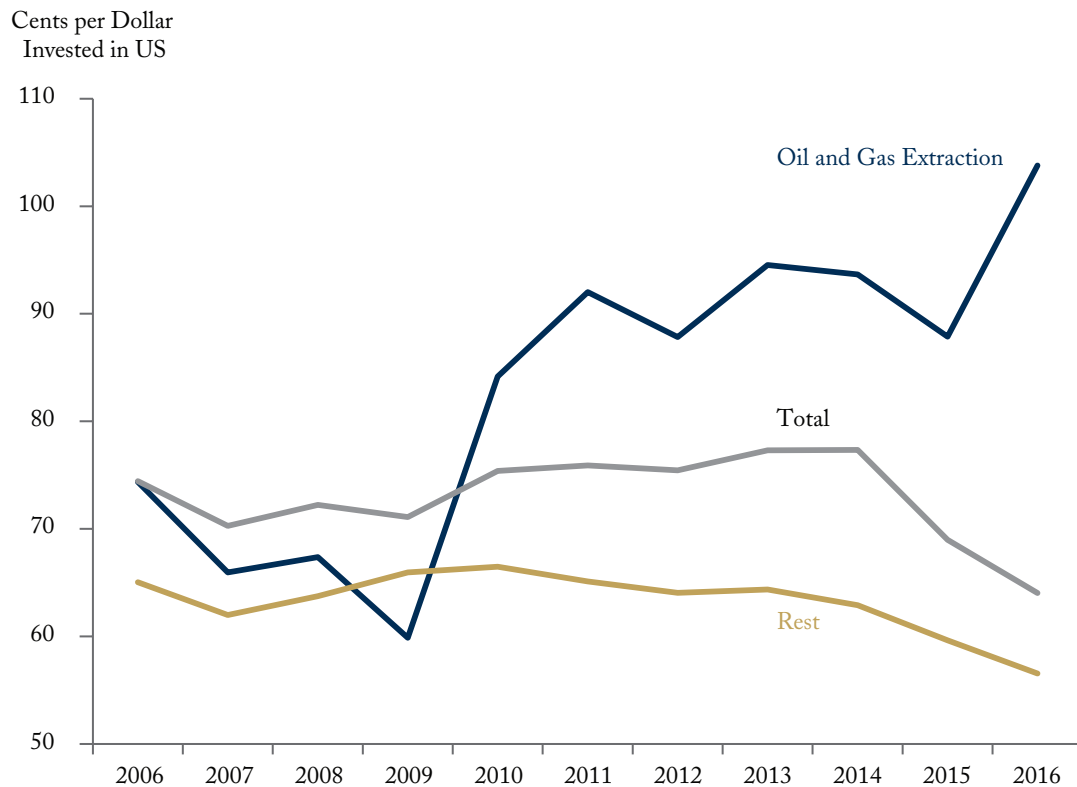
The start of major energy investments, such as liquefied natural gas (LNG) export facilities and a major pipeline for oil, would boost the numbers in those provinces – with smaller but still significant benefits in Saskatchewan and provinces that supply those industries. Facilitating those investments means overcoming misplaced concerns

about greenhouse gas emissions since building LNG export facilities and pipelines for oil exports are compatible with nationwide plans to reduce greenhouse gases. Indeed, Coleman and Jordaan (2016) show that Canadian LNG exports can lower global greenhouse gas emissions if they displace higher-emitting power sources abroad, while Shaffer and Tombe (2016) show that blocking pipelines is a costly way to reduce emissions.

A recent C.D. Howe Institute study calculated that policy-induced costs for producers of



Figure 4: Investment per Worker: Canada versus US, by Sector, 2006-2016



Source: Authors' calculations from the US Bureau of Economic Analysis, US Bureau of Labor Statistics, and Statistics Canada; refer to Box 2 for detailed explanation.

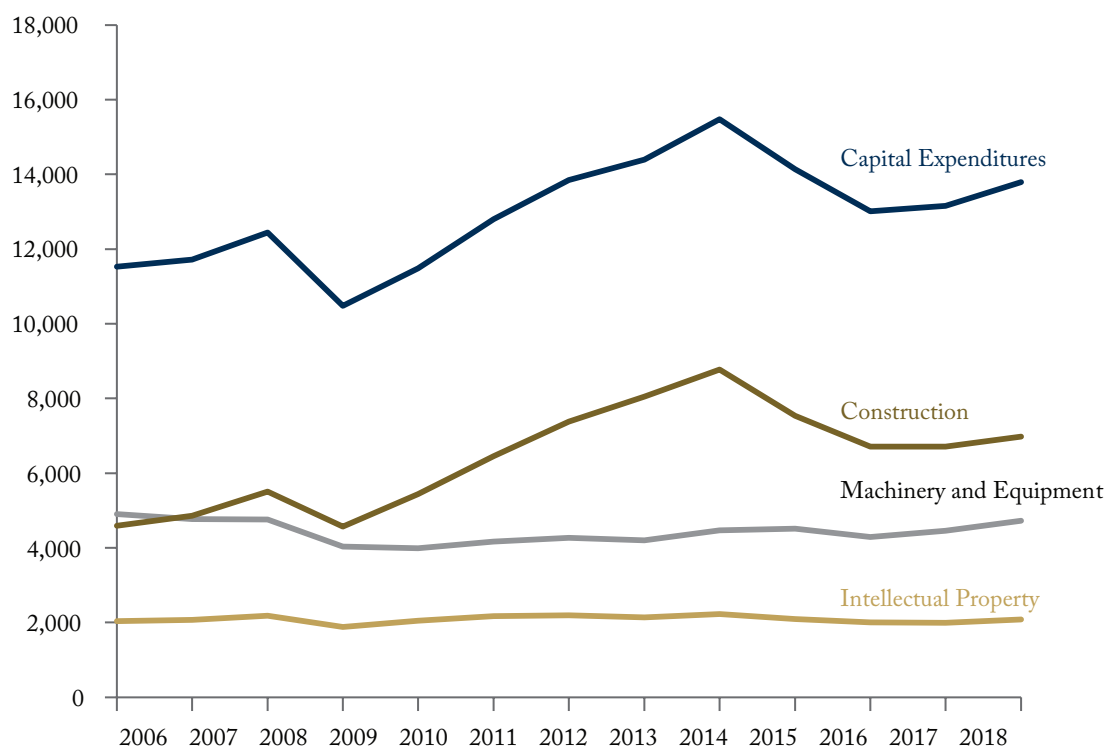
conventional oil in Alberta and Saskatchewan – property taxes, other taxes and royalties, and pipeline delays – are double those faced by their counterparts in Texas and more than triple those in North Dakota and Pennsylvania (see Table 3). Pipeline delays are the single most important factor behind this uncompetitive situation. The legal and political complications of achieving more certainty with regard to both regulatory outcomes and the ability of companies to operate once they have approval are considerable. Nevertheless, the importance of this sector to Canada's prosperity is great enough to warrant particular mention here.

### Uncompetitive Taxation

Investment rises and falls with the strength of the economy – but with a significant current account deficit, inflation on target and the Bank of Canada raising interest rates, deficient domestic demand is an unlikely suspect for chronic investment weakness. A likelier culprit is onerous taxation.

After improving its relative attractiveness to private investment through cuts to corporate income tax rates and the conversion of sales taxes to value-added taxes in many provinces, Canada has lost ground internationally. Other countries, particularly the United States, are lowering their

**Figure 5: Canadian Business Investment per Worker, by Type of Capital, Canadian Dollars**



Source: Statistics Canada's National Economic Account (NEA). 2018 numbers is the average Q1 and Q2 seasonally adjusted at annual rates.

corporate income taxes even more, while some Canadian provinces have raised theirs. One highly regarded comparison of effective tax rates on incremental investment (the marginal effective tax rate, or METR) shows Canada to be the 12<sup>th</sup> worst imposer of METRs among 34 OECD countries in 2017, a deterioration from 14<sup>th</sup> worst in 2010 (Bazel, Mintz and Thompson 2018). The 2018 US tax reform will further erode Canada's position: The combination of lower US corporate income-tax rates and accelerated write-offs will cut its METR by almost half, from 34.6 percent to 18.8 percent.

Conceptual and data difficulties complicate international property tax comparisons, but business property taxes at the municipal and provincial levels drive a further wedge between the potential returns

on new projects and those investors actually realize. That wedge varies across the country, but there is one constant – it is large everywhere (Found and Tomlinson 2017). These and other policies often steer investment away from businesses and into residential construction, where the tax burden is lower. Non-harmonized retail sales taxes between federal and provincial levels of government and land-transfer taxes also discourage capital spending in some parts of the country.

There is a strong negative relationship between the tax burden on a potential dollar of investment – the METR – and provincial investment per worker (Dachis and Robson 2013) (Figure 7). Even after controlling for the relative share of investment in each province that comes from mining, oil and

Figure 6a: Construction Capital Spending per Worker: Canada versus the US, Canadian Dollars

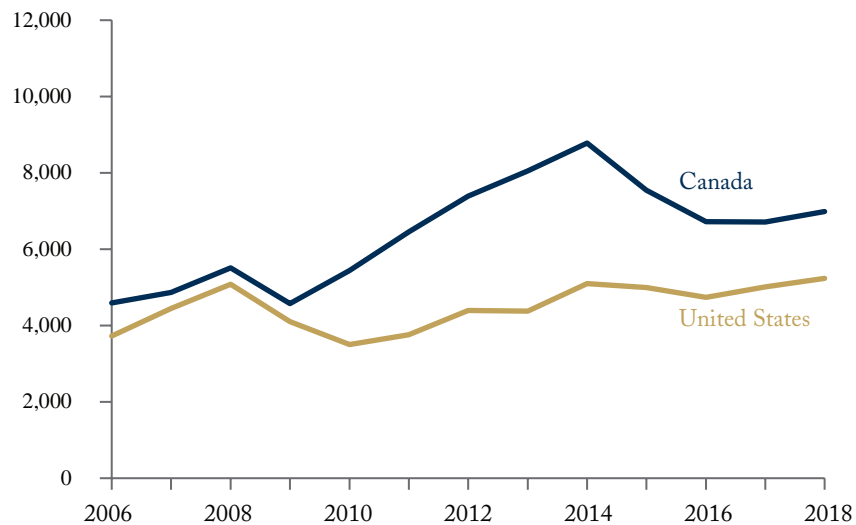
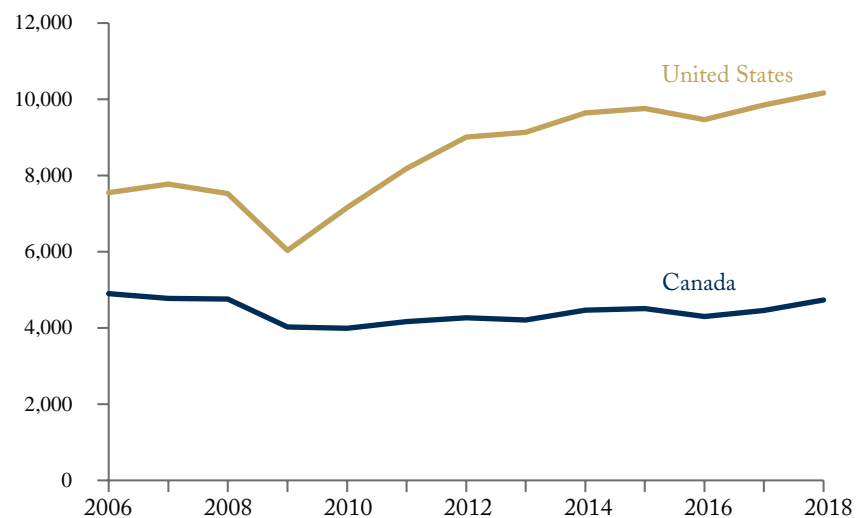
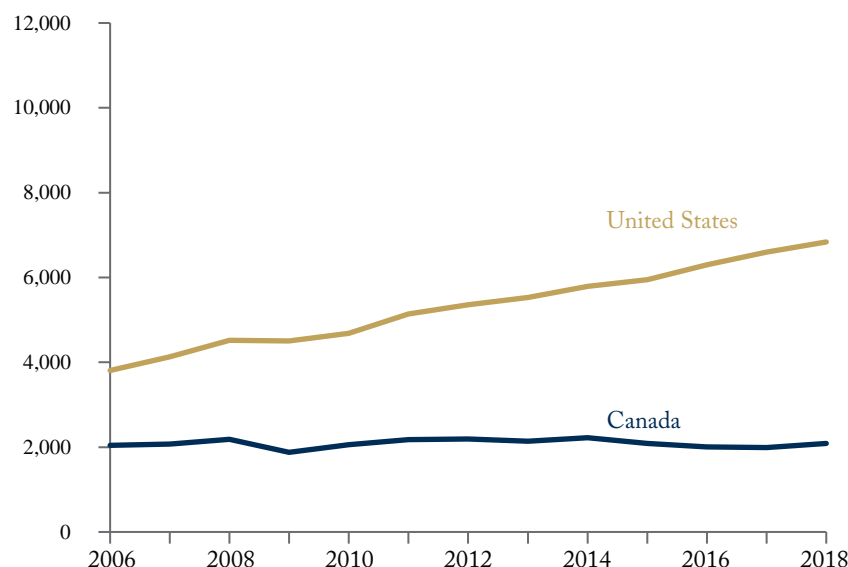


Figure 6b: M&E Capital Spending per Worker: Canada versus the US, Canadian Dollars



Source: Statistics Canada's National Economic Account (NEA) for Canadian figures. 2018 numbers are Q1 and Q2 averages US investment data from the Bureau of Economic Analysis. 2018 number is the average of Q1 and Q2 seasonally adjusted at annual rates.

**Figure 6c: IP Capital Spending per Worker: Canada versus the US, Canadian Dollars**



Source: Statistics Canada's National Economic Account (NEA) for Canadian figures. US investment data from the Bureau of Economic Analysis. 2018 number is the average of Q1 and Q2 seasonally adjusted at annual rates.

natural gas investment, a one-percentage-point increase in the provincial METR is associated with 1- to 2-percent lower total investment per worker.

### Obstacles to International and Interprovincial Trade

Trade agreements and regulatory measures that heighten competitive pressures and opportunities and that encourage movement of goods, services, saving and people across borders can spur investment and productivity. For example, capital investment has a strong link with Canada's exports to world markets (Caranci, Preston, and Saldarelli 2015). Although the medium-term outlook for trade with the United States is murky, Canada can pursue liberalization with other partners and drop its own barriers to imports and internal trade.

### Uncompetitive Electricity Prices

Steadily increasing electricity prices are also a potential reason for reduced capital investment in some provinces. In 2006, electricity in Ontario was about 40 percent cheaper than in New York, which helped attract and retain businesses. That advantage is gone. Even if policy changes provide temporary relief, businesses making investments that will last decades will view future electricity-cost escalation as one less reason to invest in Ontario. Fundamental reform of the Ontario electricity market that focuses on improving competition is required to reduce the cost of generation (Dachis 2016). Meanwhile, Ontario's predicament should give caution to Alberta as it reforms its electricity market. Clearly, Alberta should not follow the Ontario model of long-term contracts and should

**Table 3: Total Policy-induced Cost to Natural Gas and Oil Wells**

Policy-induced Cost	Alberta	British Columbia	Saskatchewan	Texas	North Dakota	Colorado	Pennsylvania
	Natural Gas Well (C\$ thousands)						
Taxes and royalties	133	109		139		120	98
Private royalties				76		56	51
Property and local taxes	58	42		88		45	
Emissions costs		13					
Total cost	191	164		304		221	150
	Oil Well (C\$ thousands)						
Taxes and royalties	134		125	140	136	120	
Private royalties			76	65	57		
Property and local taxes	58		56	166		45	
Emissions costs	1		2				
Pipeline delays	581		581				
Total cost	773		764	383	202	222	

Source: Dachis 2018a.

instead focus on a competitive market for electricity generation (Shaffer 2016).

### Obstacles to Investment in Intellectual Property

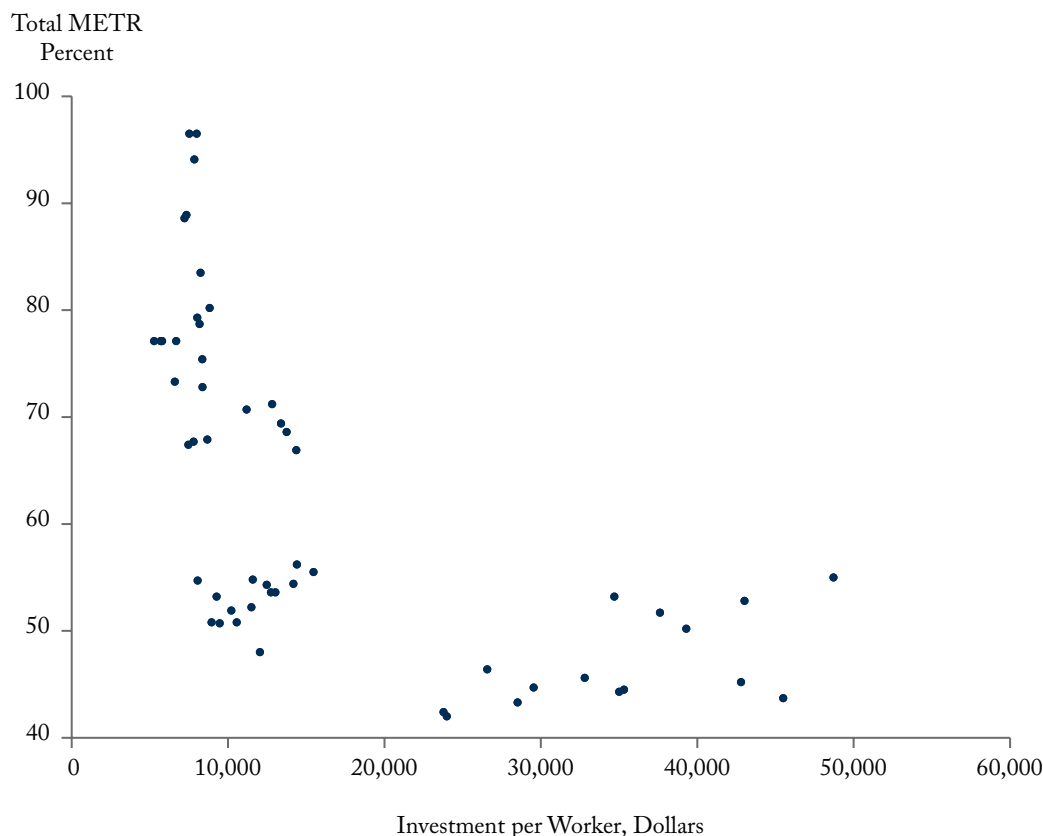
Canada's stagnant IP capital spending may be an alarming signal that we have settled into

a low-innovation equilibrium.<sup>5</sup> In Canada, most IP spending is concentrated in research and development (R&D), which has been the traditional target of policymakers. But the correlations between firm growth and size on the one hand, and more robust IP investment on the other, suggests that this focus may be misplaced.

5 Nicholson (2016) argues that Canadian businesses are rationally under-innovating, as it is cheaper and easier to rely on American innovation. As a result, he maintains Canadian businesses have been able to prosper in a low-innovation equilibrium.



**Figure 7: Total Investment per Worker versus Total Marginal Effective Tax Rate in Canadian Provinces, 2013-2017**



Source: Dachis 2018b. Each point represents a province in a given year.

Innovation policy should focus on firm growth. R&D increases with firm size, which explains over half of intra-industry variation in absolute R&D activity (ab Iowerth, 2005). Unfortunately, the current policy regime focuses mainly on small businesses. The Small Business Deduction cuts corporate income tax for all small Canadian-owned businesses while the Scientific Research and Experimental Development program awards an enhanced tax credit rate to small Canadian-owned businesses conducting R&D. Such preferential tax treatments conditional on firm size act as a barrier to growth (Howitt 2015, Chen and Mintz 2011). Instead, preferential tax treatment should be given

to young firms who are more likely to generate robust growth (Robson et al 2017).

It has often been pointed out that Canada struggles with commercializing innovation. Canada's high METR on production (McKenzie and Sershun 2010) discourages commercialization and, therefore, reduces R&D spending. Lowering taxes on income from IP, often known as a "patent box" regime, could incentivize more R&D.

## INVESTMENT FINANCING

Availability of capital – the ease with which people with attractive potential projects can access the

funds needed to finance them – is a topic that often arises in discussions of Canada's investment performance. Might the channels through which savings gets converted into new fixed capital be relevant in understanding why capital spending, particularly M&E spending, has been conspicuously weak over the past decade?

### Internal Funding

For most businesses, the readiest source of capital investment is internal funds – retained earnings plus non-cash costs (mainly depreciation). Business investment is strongly correlated with internal funds, both because profitability and opportunities for productive capital spending vary with the business cycle and because healthy cash flow is a signal for, and an enabler of, investment (Figure 8).

For much of the 2000s, and again after the 2008 financial crisis, when many businesses stocked up liquid assets to insure against another downturn, Canadian businesses invested somewhat less than the funds they were generating indicated they could. In more recent years, however, internally generated funds and investment have been more closely aligned. As long as the economy continues to move ahead, this correlation suggests that business investment should pick up. But achieving a level of investment more in line with what is happening in other OECD countries and the United States will require more than just internal funds: a net increase in external financing will also be needed.

### External Funding

External financing of capital investment occurs through many channels. A business can issue new shares, fixed-income instruments or other securities. It can borrow from a financial institution through a loan, line of credit or even a credit card. For new

capital assets, especially M&E, another important option is asset-based financing, such as a lease, loan, conditional sales contract or line of credit through which the financing company owns the asset until the customer purchases it outright or returns it. One can think of many advantages for businesses from leasing versus owning capital assets including, but not limited to, lower upfront expenses, constantly using up-to-date machinery and equipment, and the flexibility it provides to add or reduce capacity in the face of swings in demand.

We cannot trace a given dollar of financing from a company or an investor/lender through to the new capital it finances. Money is fungible: businesses adjust the overall size and composition of both the asset and liability sides of their balance sheets continuously. Therefore, it is not possible to say that a given dollar from, say, a bond issue financed an increase in cash holdings, a decline in another category of debt, a dollar of new capital or something else entirely. Because asset-based financing is important for M&E spending in particular, however, we devote some extra attention to it in this section.

### Asset-Based Financing

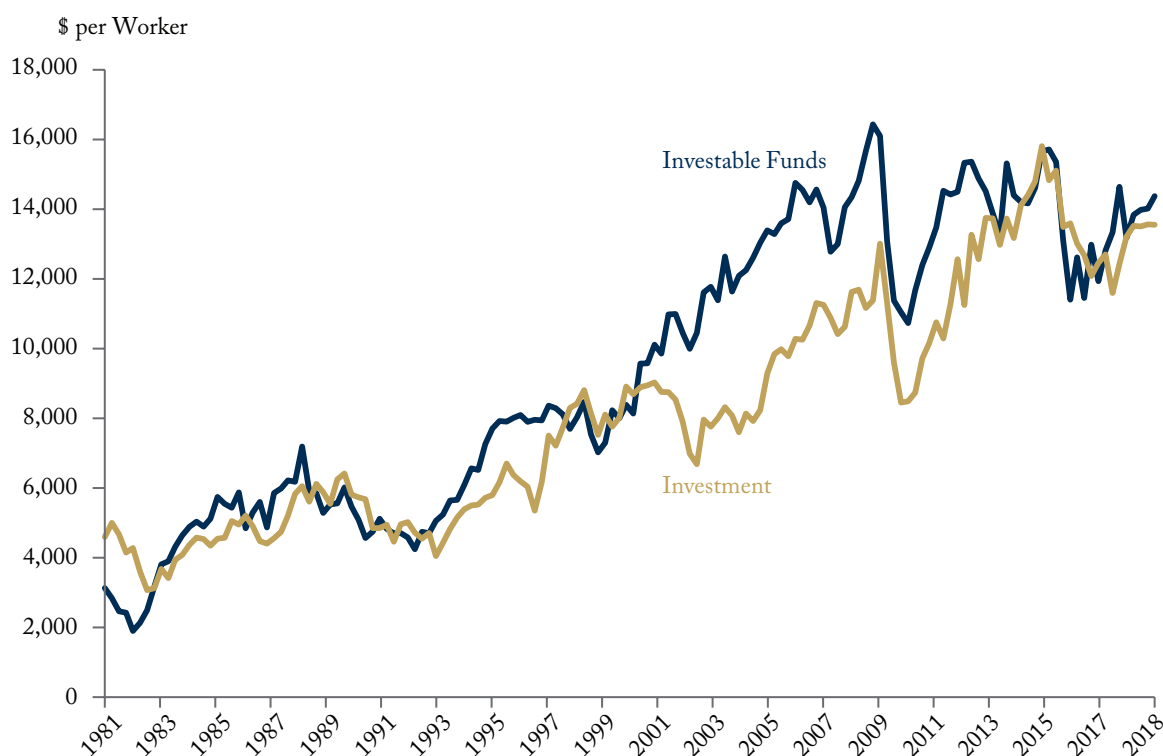
Indeed, asset-based financing appears to have supported \$33 billion – 41 percent – of the \$81 billion in total Canadian M&E capital spending in 2017.<sup>6</sup> The importance of asset-based financing also appears to have grown in recent years. In 2006, it supported about 35 percent of M&E spending, but after falling to a financial-crisis-and-recession low of 25 percent in 2009, it rose to its current 40-percent-plus level (Figure 9).

Surveys asking companies how they financed their most recent 12 months' of M&E spending in 2013, 2015 and 2017 support the finding that asset-based finance is playing a relatively larger

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6 Estimates from Quantitative Economic Decisions, Inc.

**Figure 8: Investable Funds on Hand and Investment by Canadian Businesses, 1981-2018**



Note: Investable funds on hand are net corporate saving plus consumption of fixed capital and net capital transfers. Investment is total acquisition of non-financial capital. 2018 is an estimate based on data from the first half of the year.

Source: Authors' calculations from national income and expenditure accounts and Labour Force Survey.

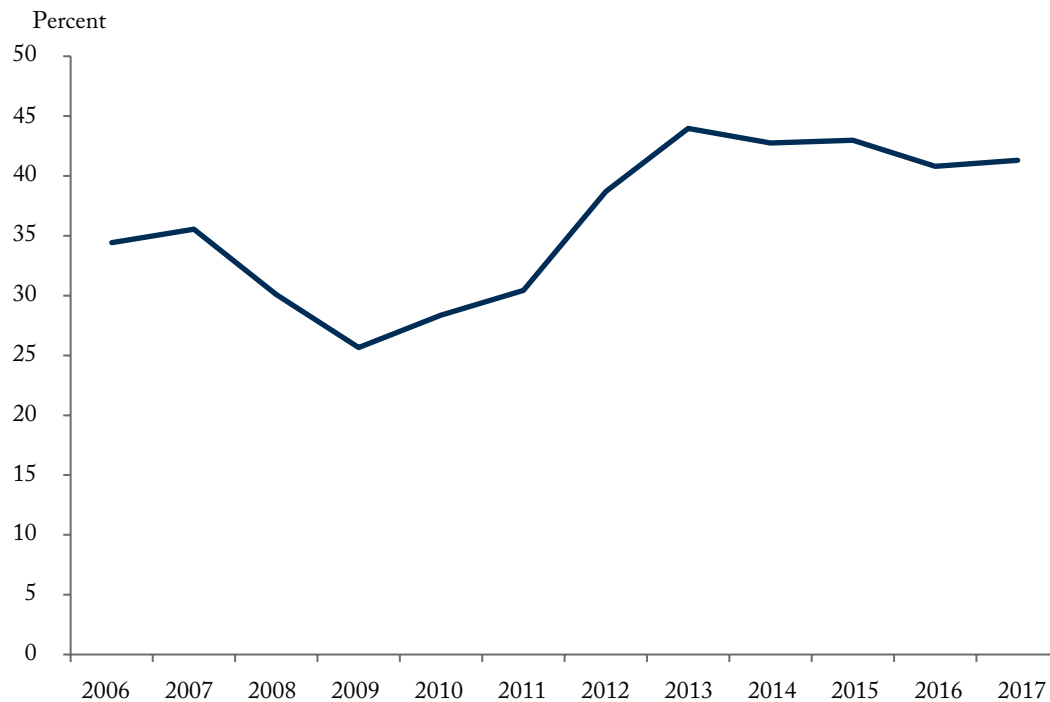
role. Fewer companies reported using internal cash, lines of credits and credit cards in these years, while the share reporting use of asset-based financing remained steady (Figure 10).

Who is providing these loans? Providers of asset-based financing include banks and credit unions, insurance companies, government agencies, the finance affiliates of manufacturers – often referred to as “captive finance companies” – and independent finance companies and vendors. In 2017, banks accounted for 42 percent of new asset-

based financing. Independent finance companies were second with 27 percent, while captive finance companies were third with 23 percent. These proportions have changed markedly since 2013: banks and independent finance companies have increased their shares by five and seven percentage points respectively, while captive finance companies' share has fallen by 13 percentage points (Table 4).

We do not have Canadian data on the sources of asset-based financing prior to 2013, but industry accounts and US data suggest that banks have

Figure 9: Share of Capital Spending on M&amp;E Financed by Asset-Based Lending



Source: Authors' calculations based on data from Quantitative Economic Decisions, Inc.

become much more important in this area since the mid-2000s.<sup>7</sup> Statistics Canada has data on overall business credit by supplier since 2011, and these numbers show bank credit outstanding rising from 53 percent to 59 percent of the total, while outstanding credit from finance companies fell from 11 percent to 10 percent.<sup>8</sup>

The recent robust lending performance of independent finance companies suggests some healthy competition in the sector. That is a good

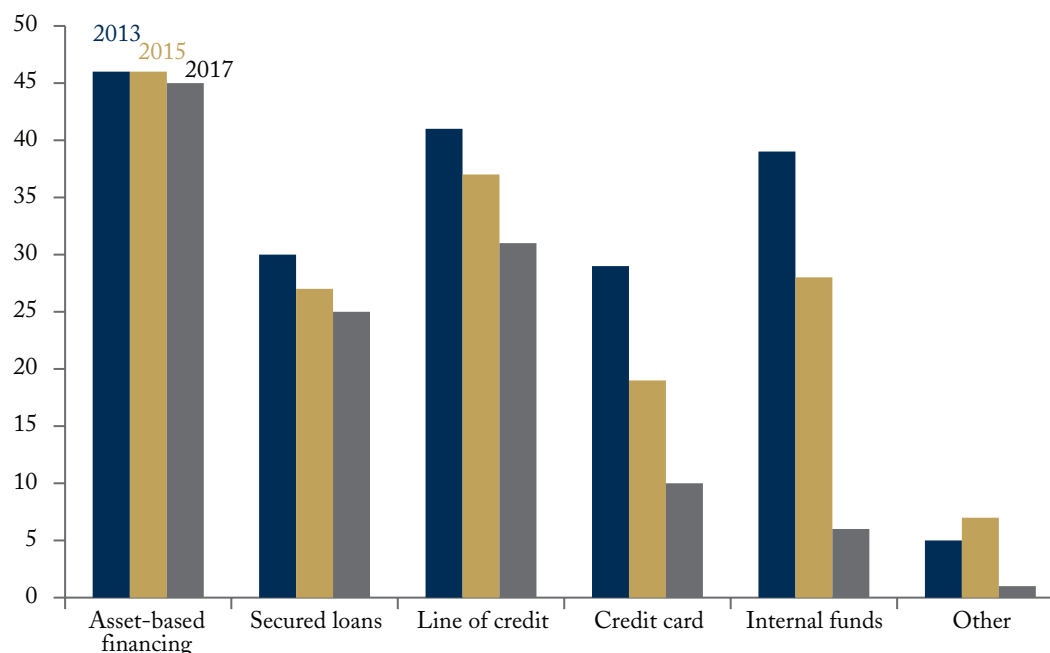
sign for M&E investment generally, since stricter regulation and capital requirements make it harder for banks to lend to small businesses.<sup>9</sup> But the collapse of the asset-backed commercial paper market during the financial crisis meant that many non-bank capital providers lost a crucial source of funding. Without the ABCP market, banks become the logical source for funding for them – potentially reducing competition in the sector as a whole.

7 Parker (2014) describes a “void in the market created when foreign-owned leasing firms retreated from Canada and smaller independent lessors withered during the 2008 credit crisis,” after which “fewer, larger players become the norm.” In the US, banks supplied 44 percent of asset-based finance in 2006, a number that rose to 69 percent by 2016, according to the ELA Survey of Industry Activity (1999-2006) and ELFA Survey of Equipment Finance Activity (2007-2017).

8 See Statistics Canada Table 33-10-0014-01.

9 Canada has one of the highest interest-rate spreads in the developed world between bank loans to SMEs and large corporations, almost a full percentage point above the OECD average (see Kronick 2018).

Figure 10: Method Used for Machinery and Equipment Spending, Percent of Companies



Source: PMG Intelligence. Respondents were asked to check all that apply.

Looking ahead, measures to support liquidity in the asset-backed market in the event of financial market stresses could improve the robustness of this funding channel. Being ready ahead of time matters because support for the financial sector from governments and the Bank of Canada typically works through banks and other major financial institutions more than asset-based lenders.<sup>10</sup>

A more ongoing issue since the financial crisis is the impact of regulations intended to reduce the riskiness and leverage of financial institutions. These changes affected banks particularly, but we have seen provincial regulators in Canada adopting capital guidelines for credit unions similar to the stricter international Basel framework adapted after the 2008 economic crisis (Hessou and Lai 2016).

<sup>10</sup> The asset-backed commercial paper crisis forced many independent providers to shut their doors or join chartered banks. This loss in market participants occurred despite the federal government allocating \$12 billion through the new Canadian Secured Credit Facility for the purchase of term asset-backed securities backed by loans and leases on vehicles and equipment. The Business Development Bank of Canada had responsibility for the program, but had little warning or experience. See Kronick (2016) for a detailed discussion on the benefits of permanent pre-defined emergency liquidity mechanisms and how to address some of their inherent costs such as moral hazard.



The implication is that it is critical to get credit-risk weights right at the international level to prevent unintended regulatory spillovers from large banks to both small/medium-sized banks, as well as to non-bank financial institutions, for which large-bank standards may not be appropriate.<sup>11</sup>

Higher-than-necessary risk-weighting raises the cost of capital, and to the extent that it affects some types of lending more than others, will distort investment decisions. Asset-based lending in particular may be less risky than many other types of lending: SME 90-day loan delinquency rates are lower for those who use asset-based finance than for those who do not.<sup>12</sup> On its face, this fact supports the case for less strict risk-weight requirements for asset-based financing.

## PROVIDING BETTER TOOLS FOR ALL CANADIAN WORKERS

Clearly, Canadian policymakers cannot control all the many factors that influence investment, but they can move many in a direction that could better equip Canadian workers in the quest to raise productivity and incomes.

Bottlenecks to infrastructure development, oil and gas pipelines in particular, need urgent attention.

So do taxes. Lower corporate income tax rates would help, but in the face of US changes, more

**Table 4: New Business Asset-Based Finance by Source, Percent**

	2013	2014	2015	2016	2017
<b>Banks</b>	37	41	44	43	42
<b>Independent Finance Companies</b>	20	19	19	23	27
<b>Captive Finance Companies</b>	36	28	19	21	23
<b>Other</b>	7	12	18	13	8
Source: Quantitative Economic Decisions, Inc.					

generous depreciation allowances are an even greater priority. Business property taxes are more damaging than people realize: provinces that levy them and municipalities alike should shift the burden of their financing to revenues that hurt investment less.

Canadian policymakers have some negotiating power to limit the extent of protectionism in the US and elsewhere. They should use it, focusing on concessions such as liberalization of supply management that would encourage investment in Canada. To the extent that access to external markets is uncertain, liberalization of trade barriers within Canada takes on greater urgency.

Action to limit the seemingly inexorable increase in electricity prices would also encourage business

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- 11 In Canada, large banks follow the internal ratings-based approach to measuring risk weights, which allows them to use their own internal models. Small and medium-sized banks use the standardized approach. The recent finalization of Basel III led the federal Office of the Superintendent of Financial Institutions (OSFI) to specify that risk-weighted assets under internal models now have to be at least 75 percent of what they would otherwise be under the standardized approach.
- 12 At the end of 2016, the 90-day loan delinquency rate for small businesses in Canada (which, in 2016, constituted 98 percent of all businesses) was 0.48 percent (OECD 2018). In contrast, PayNet data shows this number to be 0.38 percent for SMEs who used asset-based financing. At the beginning of 2007, these numbers were 0.66 percent and 0.44 percent respectively. Similarly, World Bank data show that the 90-day bank loan delinquency rate in Canada has gone from a position of strength in 2007 when compared to SME asset-based financing (0.40 percent versus 0.47 percent) to a position of weakness from 2008 on. In 2016, for example, the bank non-performing loan rate was 0.59 percent, while it was 0.39 percent for SME asset-based financing.

## Box 2: Measuring Investment per Worker by Industry – US and Canada

In Figure 4, we compare the investment per worker, broadly categorized as those in the energy industry and the rest of the economy, in Canada and the US. This cross-country comparison poses the challenge of ensuring that we are working with comparable data. Since the OECD Economic Outlook does not break down business capital investment by industry, we rely on the national data sources for these numbers.

For the US, we use the Bureau of Economic Analysis National Economic Accounts (NEA) for the non-residential private fixed-investment numbers and the Bureau of Labor Statistics Employment data. The NEA breaks down non-residential investment by industry based on the North American Industry Classification System (NAICS) codes. In particular, we broadly categorize industry as “oil and gas extraction” [NAICS code 211] and the rest. Also, total investment consists of spending on equipment, structures and IP products. In order to calculate per-worker investment, we divide investment by total employment in the given industry and apply PPP exchange rates to convert current US dollars into current Canadian dollars.

For Canada, Statistics Canada’s NEA provides comparable data on non-residential investment. However, these data do not provide industry-level information. Therefore, we use the Annual Capital and Repair Expenditures Survey, which reports spending on equipment and structures by industries, to estimate the oil industry’s share of capital expenditure. We apply this share to the NEA data on investment in equipment and structures. To estimate IP spending by industry, we use the Annual Survey of Research and Development in Canadian Industry data. Similarly, we calculate the share of the energy sector’s R&D expenditures and apply it to NEA expenditures on IP products.

The total Canadian investment per worker as a share of US investment in Figure 4 follows Figure 1b very closely, which measures the same thing with OECD data. The numbers show some divergence in the last two years, but the differences stay within two percentage-points.

to invest in Canada, generally, and in Ontario particularly.

Refocusing efforts to stimulate IP investment from small firms to growing firms with better chances of commercializing their efforts could improve Canada’s weak performance on that front.

Lastly, anemic M&E capital spending is concerning and provides an opportunity to focus the minds of policymakers on possible solutions. Faster tax write-offs would help, notably in confronting the suddenly greater attractiveness of the United States for M&E investment. Fostering a robust environment for external financing could also help: avoiding measures that hamper non-bank lenders; developing a credible, ready-to-execute plan to spread support to asset-based financing in times of financial stress; and ensuring that regulatory risk weights accurately reflect the quality of different types of lending.

## CONCLUSION

After more than a decade of catching up to international competitors, business investment per worker in Canada has suffered a major setback since 2014. Sagging business investment does not just dampen activity now, it limits future improvements in wages and living standards. Canada should reduce and restructure taxes that raise costs and squeeze returns on investment, avoid policies that raise the prices of key inputs, ensure that competition and opportunities abroad keep Canadian businesses sharp, reduce disincentives to business growth, and improve measures to ensure competitive, well-functioning markets for different types of financing. Canadian workers need better tools to increase their individual, and our collective, prosperity. Helping them get those tools is a task for all Canadian governments.

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