

# Fiscal Policy and Recessions

## The Role of Public Infrastructure Spending

Finn Poschmann

FRASER  
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## Executive summary

Governments are often encouraged to respond to economic downturns by way of discretionary spending measures intended to stimulate growth, offsetting the negative impacts of reduced private sector activity.

In recent decades, governments have placed particular emphasis on public infrastructure investment as a response to recessions.

Among the rationales for public infrastructure spending as a cyclical response is that during downturns, there is resource slack in the economy, meaning that plants and equipment, and time and human capital (people and their brains) are underused, and growth and income are lost. People's skills may atrophy, and they move or change sectors, and future growth opportunities are lost at home.

Subscribers to this view may hold that the incremental spending keeps people and other resources gainfully employed in the near term, and longer term growth and public welfare are better than otherwise. An important aspect of this view is that the public spending, accelerated or not, may also improve private sector performance; for example, better road and other transport systems help private businesses do what they do, and so improve household incomes.

There are many difficulties with this view, however. Decision making and implementation take time, and governments have difficulty responding at the same pace at which the private sector adjusts. When governments do intervene, they may compete for human and financial resources that would otherwise be put to productive use without intervention. In other words, their actions may hinder recovery rather than encourage it. And expenditure commitments by upper levels of governments may displace those that would have been made by lower levels of government anyway, limiting potential gains. Speeding up investments, even if they are economically sensible, may borrow growth from the future, with uncertain impacts on the long run growth path.

Compounding the theoretical problems, empirical data provide dubious support for the case for discretionary public investment as a response to downturns. While some studies are supportive, many from the past few decades indicate low or no short-, medium-, or long-term gains to growth from public sector infrastructure investments. Likewise, many

governments, including Canada's, operate on the assumption that a dollar of public infrastructure investment is worth more than a dollar, in the long run, to the economy. Data suggest this is not the case—and that's before accounting for the cost of the taxation required to fund public spending.

Even if the optimistic view of public infrastructure spending's economic impacts were theoretically correct, problems with choice of project (which involves politics), timing, and estimates of capital costs reduce the likelihood of success, which may explain the negative empirical findings.

Taken together, this suggests that looking to discretionary public infrastructure investments as a response to economic downturns may be a poor policy choice.

## Introduction

Is public infrastructure investment a useful tool in managing economic downturns and upturns? Put another way, ought governments seek to provide economic stimulus by investing in big capital projects during economic slowdowns or recessions?

In the wake of the 2009 recession, governments in Europe, the United States, and Canada eventually introduced budget measures intended to provide discretionary (politically directed) fiscal stimulus to the economy, with varying degrees of success.<sup>1</sup> Public infrastructure spending formed part of their responses.

As recessions are sure to return in some form, at some point, domestically or globally, it is appropriate to review the role of infrastructure in the economy when discretionary investments in that infrastructure are aimed at damping or smoothing economic downturns, with an eye to advising those making future policy decisions.<sup>2</sup>

This report discusses the potential role of public sector infrastructure spending when it is conceived as economic stimulus: what is the contribution to growth of public infrastructure spending, and what are its stabilizing features?

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<sup>1</sup> There is an extensive literature on the successfulness of these interventions, reviewed for instance in Veldhuis, Lammam, and MacIntyre (2010); see also Cross (2019) for longer term Canadian analysis, and in particular Taylor (2018) for the United States.

<sup>2</sup> Some arguments in favour of a discretionary boost to public infrastructure rest on the observation that public investment slowed in the last quarter of the 20th century, leading to a shortfall (Bazel and Mintz, 2015).

## What Do We Mean by Infrastructure, and Why Public Infrastructure as Stimulus?

In economics, much as in public discussion, we use the word infrastructure to mean, for the most part, constructed projects that make an economy work, like roads, bridges, wastewater systems, highways and airports, and constructed public facilities.<sup>3</sup> Infrastructure can be privately or publicly financed, owned or operated, and access to it, or access to infrastructure services, might either be free to all residents or available for a charge that covers some or all of the finance, construction, and operating costs, as for example in the case of some toll roads.

Public infrastructure confers public and private benefits, and that is why governments invest in it. In principle, public goods theory suggests that governments can resolve a collective action problem, such as the lack of a regional highway, which produces benefits for a community and which individual actors might not be easily able to resolve themselves.

For instance, a household or business might pay a usage-based fee for municipally-coordinated wastewater services.<sup>4</sup> The benefit to the household or business goes beyond the wastewater service—they do not have to spend time, money, or other resources on delivering their own necessary service, freeing those resources for use in other productive ways. Investment in highways—or public transit—might reduce congestion and improve transit times for users. When that happens, people and businesses have more time to do something else of value, and consumers pay less than otherwise for goods and services that are physically delivered to them.

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<sup>3</sup> Sometimes the word infrastructure is intended to include systems that provide services, like education, or social infrastructure, which refers to cultural norms, practices, and laws that steer the economy and behaviour; the discussion here is limited to the physical sort. The distinction might also be framed as hard versus soft infrastructure.

<sup>4</sup> It is not necessary that the municipality or other government own or operate the facilities or service; in this case it is the coordination function that provides the benefit.



Private households and firms make private infrastructure investment decisions based on their own needs and expected returns. Public infrastructure provides benefits to and perhaps increases the productivity of both the private household and business sectors (Gu and MacDonald, 2009).

## Infrastructure, growth and stimulus

Physical infrastructure, on the condition that it is the right thing in the right place at the right time, contributes to economic growth by helping people and businesses do the things they want to do.

This is why public infrastructure is often recommended as a response to economic slowdowns: government spending provides an immediate boost to current economic activity as measured by output statistics, and has long-term productive value, so by assumption is a good thing to encourage in a downturn. Put otherwise, if the investment seems a good thing to do anyway, why not do it when the economy could use a boost?

The questions then become how much public infrastructure contributes to growth (i.e., is it worth it?) and can the investment be timely and so relevant to the business cycle. Underlying these questions is the insight (or assumption) that for discretionary public infrastructure spending to be valuable economically, it should encourage growth in the near and medium term.

Arithmetically, capital spending on infrastructure is part of our standard expenditure-based national income and product accounting system. Gross domestic product (GDP), equals the sum of spending on consumption, plus investment, plus exports, less imports. Consumption and investment can be divided among households, business, and the government sector. So, for example, increases in either private or public real investment as a matter of arithmetic increase measured gross domestic product; how much these increases affect GDP depends on how big a share of expenditure they occupy in the first place and the impact these increases have on other sectors.

When public and private investment comprise a very large share of the economy, as in some developing countries where capital investment might be 20 to 40 percent of the economy and where the investments improve productivity, the returns on investment can be very high, on the order of 10 to 15 percent per year (Harberger, 2009).<sup>5</sup> Using US data, Aschauer (1989) presented surprisingly high estimates of gains from public infrastructure investment—productivity growth of 0.3 to 0.4 percent—

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<sup>5</sup> Harberger (2009) reports even higher public returns on investment in some Central American countries during growth phases (personal communication with author).

large enough to imply that public investments pay for themselves in short order.<sup>6</sup>

We know that investment is key to economic growth. However, whether we can show that public infrastructure investment can give a positive kick to growth by enhancing productivity is a tougher question.

In a linear regression model seeking to associate infrastructure investment with capital or labour productivity improvements (growth in real output per hour worked), we find no relationship at all. However, in a fuller model, Gu and MacDonald (2009) report that between 1962 and 2006, private sector capital investment contributed about 1.3 percent annually to labour productivity growth, and public infrastructure contributed 0.2 percentage points, which accounted for 9 percent of labour productivity growth over the period.

Gu and MacDonald also reported that public infrastructure's contribution to labour productivity growth was 0.3 to 0.4 percentage points from 1962 to 1973, but 0.1 percentage points after 1980. Furthermore, and central to the introductory points in this paper, they estimated that public sector infrastructure contributed 0.2 percentage points per annum to business sector multi-factor productivity growth, a measure that seeks to capture the efficiency of all inputs used in production.

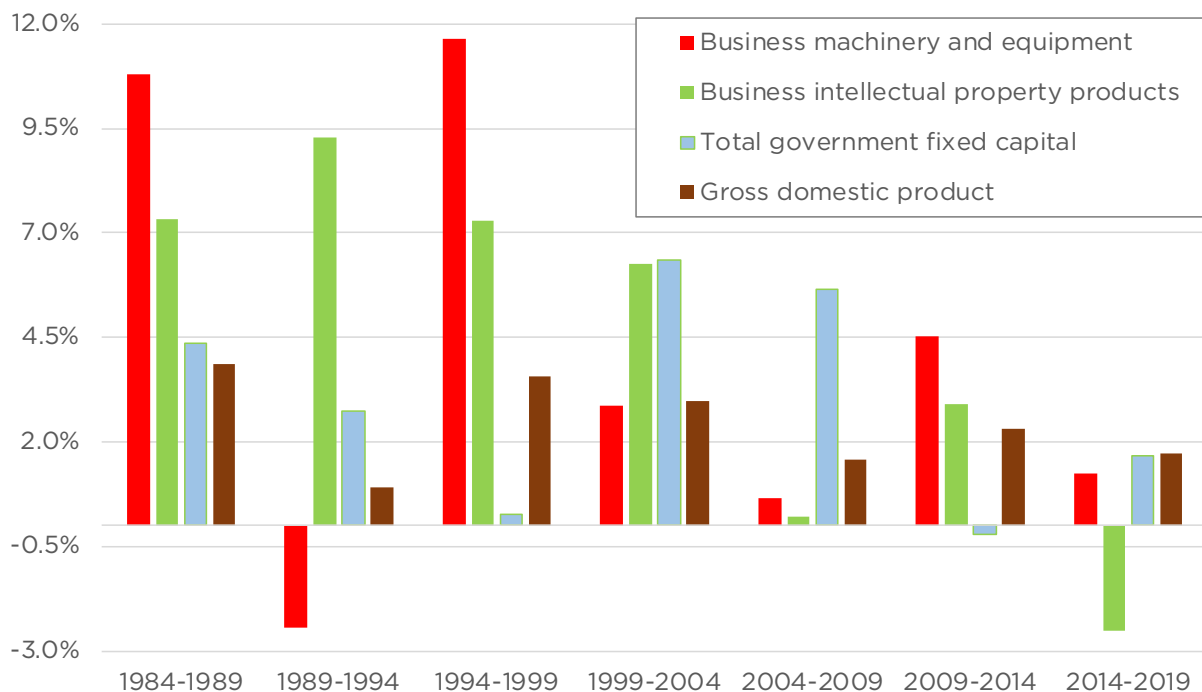
The investment returns discussed above would arise from improvements to private sector productivity. The timing and nature of the investment matters when it comes to delivering that productivity, and Gu and MacDonald's results indicate that public infrastructure investment in Canada provided significant gains to productivity from the mid-twentieth century to the 1970s, but little thereafter. The implication is that, for example, Canada's extensive investments in highway construction, like the US's interstate highway project beginning after mid-century, delivered a significant boost to productivity, but one not apparently matched by more recent investments.<sup>7</sup>

Patterns in investment are in part cyclical, and as in figure 1, easy to see when broken into five-year growth rates. Slumps in business investment are clearly associated with downturns—slow or negative output growth—at the outset of the 1990s and in 2009; public infra-

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<sup>6</sup> Aschauer's findings were extensively challenged—and defended. The debate is discussed in Gramlich (1994). Indeed, there is extensive debate on the role of infrastructure, such as discussed in Lamman and MacIntyre (2017).

<sup>7</sup> While Harchaoui et al. (2003) indicate that "a \$1.00 increase in the net capital stock generates approximately 17 cents of 'cost saving' producer benefits per year," over the 1961-2000 period, they also report, analogous to Gu and MacDonald, that public infrastructure capital productivity grew at 1.3 percent during the 1970s, 1.0 percent annually in the 1980s, and 0.6 percent in the 1990s.

**Figure 1: Annual Investment and Output Growth Rates, Five Year Periods**

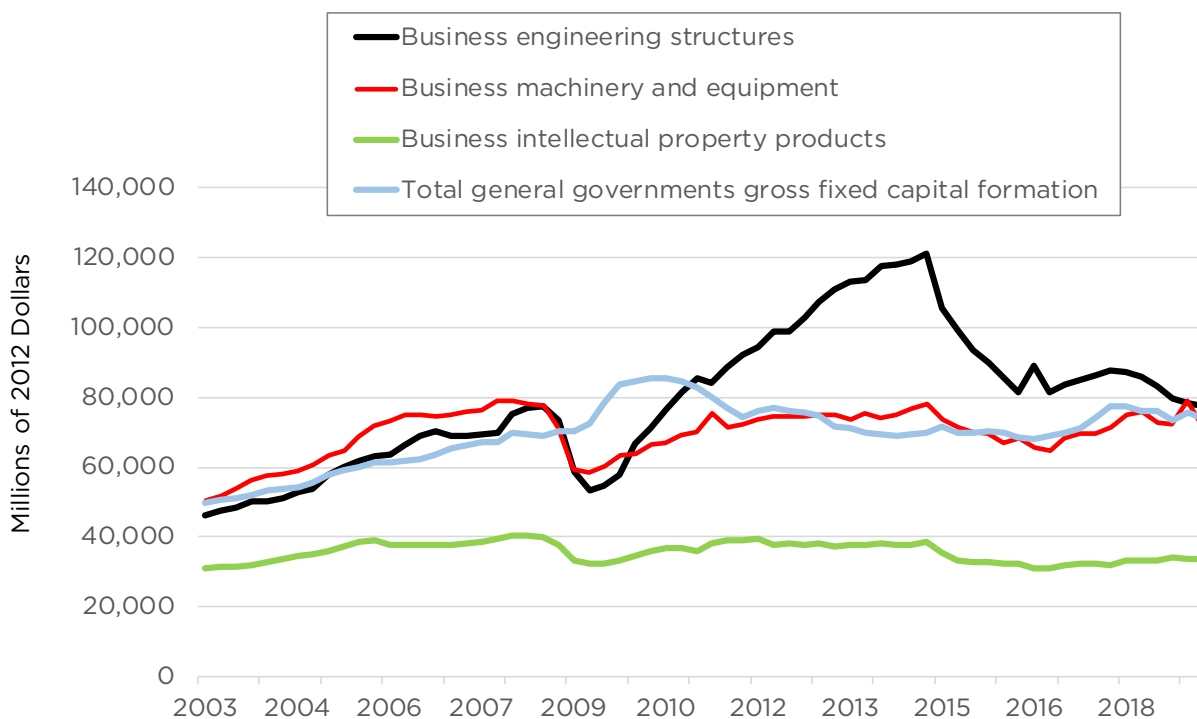
Source: CANSIM table 36-10-0108-01, author's calculations.

structure investment follows a less clear historical pattern relative to the business cycle.

### Looking at recent Canadian data

After the 2008-2009 recession, Canadian government fixed investment showed a clearly discretionary boost, beginning after the end of the second quarter of 2009 and trailing off by the end of 2011. Contemporaneously with the recession—in part driving it—business investment in engineering structures and machinery and equipment dropped sharply (see figure 2). Business spending on engineering structures rebounded, however, in 2009, and peaked in 2014, driven primarily by energy and resource markets.

More recently, in the past two years in Canada by way of example, total government investment in fixed capital (a national accounting proxy for public infrastructure) has run at about 3.7 percent of annual GDP, while business investment in machinery and equipment has been 3.6 per-

**Figure 2: Fixed Capital Investment, Selected Items, Annual Rates**

Source: CANSIM table 36-10-0108-01, author's calculations.

cent, plus 1.6 percent going to business intellectual property (see table 1 for five-year averages for different investment categories).<sup>8</sup>

How much, over the past half century, have these investments contributed to growth in Canadian output? Machinery and equipment are important to growth (table 2 and appendix), as measured by the relationship between current quarter investment growth and GDP growth in the next quarter. Investment in new housing has a big impact as well. Intellectual property contributes a lot compared to its expenditure share, which may not be surprising given the importance of technological change. What might be surprising is the relatively small growth contribution of public fixed capital (infrastructure), and its lack of statistical significance. And the growth impacts of any of these and other investment inputs are difficult

<sup>8</sup> Businesses also spent 5.5 percent of GDP on non-residential buildings and engineering structures, which are necessary and important investments, but with weak statistical connections to economic growth. While intellectual property is not often considered as investment in infrastructure, logic and data say that it needs to appear in a growth decomposition that includes other investments.

**Table 1: Capital Investment Share of GDP, Five Year Averages**

	2004-2019	2009-2014	2014-2019
Business sector non-residential structures	5.5%	6.5%	6.1%
Business sector non-residential buildings	1.6%	1.5%	1.5%
Business sector engineering structures	3.9%	4.9%	4.6%
Business sector machinery and equipment	4.2%	3.9%	3.6%
Business sector intellectual property	2.2%	2.1%	1.7%
Total general government	3.8%	4.3%	3.6%

Source: CANSIM table 36-10-0108-01, author's calculations.

to uncover in a linear regression model, as discussed in Gu and MacDonald (2009), even when testing for the impact on future growth of current investments.<sup>9</sup>

How economic output responds to an investment stimulus, which is what these data represent, can be expressed as a multiplier, as in: How much does GDP increase in dollars for an incremental dollar of capital investment? The third column of table 2 shows multiplier estimates calibrated to recent investment shares using the growth impacts from the second column.

Broadly speaking, business investment in physical capital and intellectual property has a meaningful impact on growth, but aggregate government fixed capital investment has not clearly affected growth in recent decades.<sup>10</sup> A dollar invested in private sector machinery and equipment has a high short- to medium-term multiplier, as might be expected, given such investment puts tools in the hands of people with goods and services to readily sell. The multiplier associated with public capital investment is low, at 0.7 in this estimate, compared to the 1.4 expenditure multiplier estimate used by the Department of Finance (2016, table A2.1), but well within the range discussed elsewhere in the literature, such as Ramey

<sup>9</sup> A lagged model reduces the impact of the accounting problem—that capital spending both affects growth and is included in our definition of the growth (output) measure.

<sup>10</sup> Note that these results are ordinary least squares correlations, as opposed to coefficients in a general equilibrium model that accounted for investments in other forms of capital, labour market conditions and monetary and financial conditions.

**Table 2: Investment and Growth, 1961-2019**

<b>A one percentage point increase in investment in...</b>	<b>...is associated with next quarter GDP growth of:</b>	<b>...and an implied short-run multiplier of:</b>
Business residential structures	0.12% <sup>a</sup>	1.7
Business non-residential structures	0.00% <sup>b</sup>	0.1
Business sector machinery and equipment	0.08% <sup>a</sup>	2.3
Business sector intellectual property	0.05% <sup>a</sup>	2.8
General government gross fixed capital	0.03% <sup>b</sup>	0.7

<sup>a</sup> Statistically significant at the 1 per cent level

<sup>b</sup> Not statistically significant

Source: CANSIM table 36-10-0108-01, author's calculations.

(2011) and implied in Taylor (2018), and matches the range used by the US Congressional Budget Office (CBO, 2012). This estimate is also higher than the fiscal multiplier estimates used earlier in the OECD and those and others reported in Dahlby (2009).

More disaggregated capital expenditure data (see appendix), using a specification that allows for variable lags in the growth response to investment, and for the impact of past growth on current investment, suggest high growth impacts for business sector investment in new construction and renovations, and machinery and equipment, and positive results for mineral exploration and evaluation, and for research and development. Disaggregated government fixed capital investments show no statistically significant impacts, other than a few minor purchase categories that are associated with negative output growth.

Having established that infrastructure investment at least has the capacity to increase economic growth and productivity, the next question is the extent to which discretionary public investment decisions can smooth the peaks and troughs of economic cycles.

The underlying assumption, from a standard macroeconomic policy starting point, is that overall growth trajectories are better when peaks and troughs are shaved, including through policy decisions, and that therefore a discretionary response is preferred.<sup>11</sup>

<sup>11</sup> The literature on discretionary infrastructure spending's role in economic

From a down-to-earth perspective, the key rationale for infrastructure spending as a cyclical response is that during downturns, there is resource slack in the economy, meaning plant and equipment, time and human capital (people and their brains) are underused, and growth and income are lost. What's more, people's skills may atrophy, and they move or change sectors, and future growth opportunities are lost at home.

Subscribers to this view may hold that the incremental spending keeps people and other resources gainfully employed in the near term, and the longer term growth and public welfare trajectories are improved. This is easy to picture in the hypothetical example of skilled labour and heavy equipment being temporarily deployed in a public construction project. It would not be safe, however, as a guiding assumption. A downturn might properly be viewed as the result of an economic shock for which the appropriate response is a restructuring, a reallocation of human and other resources to different and more highly valued activities. On this view, an attempt to maintain prior reallocations would hinder rather than boost recovery.

There is empirical evidence (such as Owyang et al. (2013) and Christiano (2011), and which are cited in Canada, Department of Finance (2016)) that government spending during downturns generates higher growth than at other times.

There is also substantive evidence that government expenditures are no more productive, with respect to economic growth, during downturns than at other times. Such evidence is presented in Ramey (2011) and notably Ramey and Zubairi (2018) who, in formal terms, "estimate multipliers that are below unity irrespective of the amount of slack in the economy," as with the results above. Among the reasons are that big infrastructure investments are by definition lumpy, and can distort local labor markets and private sector resource allocation. Big pushes in investment, when accelerated by policy, are also "borrowed" from the future when they would have happened anyway, and this is why we may see negative, and later, growth responses in some investment categories and in models such as those reviewed in Taylor (2018).

In this vein, Alesina and Ardagna (2010) report that, empirically, tax reductions are more likely to encourage growth than are expansions in government spending, and that the "benefit of infrastructure projects which have 'long and variable lags' is much more questionable" (p. 15).

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stabilization, as opposed to its contributions to productivity, is scant; most literature, as in Murchison and Robbins (2003) and van den Noord (2000), addresses changes in the cyclical and structural fiscal balances of government across the business cycle, and attempts to address the stabilizing impact, if any, of those balances.

## Infrastructure and Timing—The Biggest Question

Irrespective of how good for growth public investments in infrastructure are—or assuming that they are productive and notwithstanding data suggesting otherwise—the issue is whether governments can make timely, productive infrastructure investments.

There is little evidence that they are good at it. As framed by Bergh (2015), while automatic responses to the business cycle such as the stabilization features of tax and benefit systems might be expensive, governments need little information to implement them, and government cash transfers to households have reasonably well known results. Discretionary responses in the form of infrastructure projects are also expensive, but they require a lot of information to have a reasonable likelihood of success, and governments are unlikely to have such information, and there are, in any case, lags in decision making and in implementation.

In US and Canadian responses to the 2009 recession, government stimulus plans featured or promised swift investment in “shovel-ready” public infrastructure projects, meaning projects that governments knew something about and were ready to act on. Both governments found, however, that doing so was extremely difficult.

Problems that arose included coordination among the federal, provincial (state), and local governments in project identification and selection, and reaching intergovernmental agreements on financing shares. Normal delays in permitting, environmental assessments, and approvals necessarily slowed the start of projects (Grabell, 2012). Municipalities in particular found themselves pinched—while higher level government funding was available for particular time windows, the approval and application process could lead to missed deadlines.

Despite these obstacles, Canadian government fixed capital spending increased by about \$15 billion (20 percent) over the last quarter of 2009 after the economy had turned upward and the first quarter of 2010, before dropping back over the next two years. As figure 1 indicates, the aggregate growth in public infrastructure investment over 2009 to 2014 was negative.



**Table 3: “Investing in Canada” Planned and Actual Allocations (\$ millions)**

	Planned for:			
	2016-17	2017-18	Future years	Future years' share of total
<b>2016 Fall Economic Statement Allocation Total</b>	<b>\$3,885</b>	<b>\$6,268</b>	<b>\$4,245</b>	<b>29.5%</b>
Public Transit	\$852	\$1,696	\$852	25.1%
Green Infrastructure	\$874	\$1,562	\$2,621	51.8%
Social Infrastructure	\$1,643	\$1,679	\$119	3.5%
Post-Secondary	\$500	\$1,250	\$250	12.5%
Rural Broadband	\$6	\$81	\$413	82.6%
<b>2018 Budget Allocation Total</b>	<b>\$2,794</b>	<b>\$3,759</b>	<b>\$7,845</b>	<b>54.5%</b>
Public Transit	\$45	\$210	\$3,145	92.5%
Green Infrastructure	\$356	\$773	\$3,928	77.7%
Social Infrastructure	\$1,643	\$1,694	\$109	3.2%
Post-Secondary	\$749	\$1,001	\$250	12.5%
Rural Broadband	\$6	\$81	\$413	82.6%

Source: Canada, Department of Finance, 2016, 2017, 2018; Parliamentary Budget Officer, 2018.

The delivery issues have continued, in the context of a fresh and longer-term public infrastructure financing plan, the “Investing in Canada Plan,” introduced by Ottawa in the 2016 federal budget (Canada, Department of Finance, 2016).

At the time the plan was introduced, first-phase spending (over two years) was intended to come to \$10.2 billion. The Parliamentary Budget Officer (2018) subsequently reported that, as of the first quarter of 2018, only about half the budget had been allocated to specific projects; the 2018 federal budget deferred \$3.6 billion of the total to later years.

The delays identified above were significant (see table 3). When spending plans were detailed in 2016, the share of the investment plan that was intended to be spent after the first two years was less than 30 percent; by the time of the 2018 budget, the deferred share had risen to more than 54 percent. Notable in the data is the fact that what can be called soft

investments (or spending) were readily implemented, while the harder categories, such as “green” investments or public transit, were not.

Such delays are typical. In the United States, for instance, signs of the last recession began to emerge in 2007, and a federal stimulus plan was agreed in late 2009, with spending beginning in earnest in 2010; at early stages, only small shares of authorized allocations were spent (Congressional Budget Office, 2010).

In turn, a slow pacing of spending on infrastructure undermines its economic rationale. Specifically, if the spending is aimed at absorbing slack resources and so better to build long-term growth, then it must occur while there is economic slack. If the spending is delayed, on the other hand, it takes place when the economy may be starting to turn upward through natural adjustment mechanisms. When this happens, the government’s purchases of human and physical capital inputs competes with the private sector’s, driving up resource prices and hindering recovery.

## Intergovernmental coordination issues—displacement

The delays mentioned above arise because, as the Parliamentary Budget Officer put it (2018), “the federal government can only spend money as fast as provincial and municipal governments can invest it.” This is an inter-jurisdictional coordination issue common to federal states, such as the US and Canada.

When multiple levels of government are involved in financing, issues apart from delay may also arise. Regarding the Investing in Canada Plan, the Parliamentary Budget Officer (2019) recently reported that while municipalities had responded to the federal initiative in financing and approving related public infrastructure, provincial governments had drawn back.

In other words, relative to a planning baseline, the provinces taken together spent less, rather than more, on public investment, as federal financing in part displaced their otherwise expected investment intentions. Specifically, over the course of 2016-17, after the federal plans were outlined in *Budget 2016*, provincial capital spending plans for the year decreased by about \$4 billion, a large amount relative to the scheduled increase in in-year federal contributions. The US Congressional Budget Office also recently reported that about one-third of incremental federal spending on infrastructure is offset by decreases in state and local financing thereof (CBO, 2018: 4).

Taylor (2018), analyzing the macroeconomic results of the public infrastructure portion of the 2009 US stimulus initiative, likewise

reported a shift in finances among government levels, net increases in infrastructure spending that were too small to have had significant impact on growth and, similarly, to have had no detectable impact on the larger economy.

This shifting of expenditure is not a small matter. Similar to the PBO's recent findings from Canada, Cogan and Taylor (2010) explain that in the US:

From the 1<sup>st</sup> quarter of 2009 to the second quarter of 2010, state and local governments received a total of \$137 billion in [federal infrastructure] grants. During this period, these governments reduced their rate of borrowing compared to [prior years] by \$105 billion... [Had the state and local governments maintained their prior level], they would still have been able to finance a \$20 billion increase in non-purchase expenditures over the period without relying [on federal grants]. (p. 14)

To the extent that federal spending on or contributions for infrastructure projects displace spending commitments on the part of lower levels of government, the potential net impact is reduced.

### *Project selection, investment decisions, and financing*

Aside from the “if” and “when” aspects of public infrastructure investment, there is still the question of “what.”

For a private for-profit firm, this is an easy question in principle. Among a range of potential investments, the manager ranks them in order of net present value or return on investment, and selects projects to proceed in that rank order until the available capital has run out (or the cost of raising new capital exceeds the return on investment on the marginal project). Doing the ranking requires many data inputs, assumptions about capital costs, time-to-delivery and market demand for the resulting product or service, yet the principle is simple.

The rank order of projects is unaffected by the source of financing—debt, equity, or working capital—and normally not affected by the cost of capital, other things being equal, although the cost of capital (and available management capacity) will limit the number of projects selected.

The last point is important. When the cost of financial capital is low—when interest rates are low—governments may be tempted to borrow heavily to invest in physical capital because money is cheap. To do so would be a mistake in most cases, because the cost of money does not affect the order in which one might choose projects; a lower projected cost of capital cannot make one potential investment better economically than

another unless other assumptions are changed as well. Further, if a public investment project does not have a positive impact on private sector productivity at one cost of capital, it will not do so under another.

Another wrinkle is that in establishing whether a project's expected returns exceed the public cost of capital, analysts may mistake the government's market borrowing rate as the cost of capital. The public cost of capital, however, is the market borrowing rate plus the economic cost of taxation, and it does not much matter, from a financial analysis perspective, whether one believes that that cost is incurred immediately or in the future. A current rule of thumb for Canada is that if the government borrowing rate is 3.2 percent, then its cost of capital is about 4.0 percent (see Bazel and Mintz, 2015, for a derivation). Using this cost-of-funds approach, Dahlby (2009: 9) reports that for "a productivity-enhancing infrastructure project, the present value of the increase in labour productivity must be at least 61 cents for each dollar spent on infrastructure."

Further, the decision inputs and process for public infrastructure projects are more complex than straightforward financial analysis suggests.

In the first instance, the output or services provided by public infrastructure are often non-priced, or not delivered through market mechanisms. Second, for the reasons discussed above, a practical analysis of the costs and benefits includes private returns to public infrastructure, including impacts on labour and capital productivity, which are difficult to estimate.

Finally, and irrespective of the timing, the choice of discretionary investment projects necessarily includes a political component; political factors are naturally suspect, and this may be the decisive factor in effectiveness or lack thereof. The obvious concern is the normal political economy question: projects that are selected will be of interest to project proponents, including responsible government agencies, and the political actors within them and to whom they are responsible.

This will affect the economic usefulness of public infrastructure projects in a way that goes beyond timing. For example, public transit projects are often politically popular, and might reduce congestion costs as discussed elsewhere. From a growth perspective, however, they may be less useful, in that they focus on moving people from one place to another, as opposed to goods and resources that feed into the market economy.

Even for a superficially sound project, the role of project proponents in providing data inputs, and those proponents' self-interest, may lead to unfortunate choices. Analysis from Flyvbjerg et al., (2003, 2007) suggests that irrespective of project type, region, or timeframe, the cost estimates used as decision inputs are misleading; overwhelmingly it is safe to assume that a project will be very late and much over budget.

## Institutions in practice: The example of the Canada Infrastructure Bank

The 2017 federal budget launched the Canada Infrastructure Bank (the CIB), intended “to ensure that funds can begin to be invested in a timely manner,” to leverage, “the expertise and capital of the private sector,” and to strategically “be responsible for investing at least \$35 billion over 11 years” (Canada, Department of Finance, 2017).

The government statement’s mention of leverage refers to the fact that providing public low-cost project financing reduces the risk for and encourages the participation of private sector managers and project proponents, as well as financing. One significant risk, however, is that because private sector investors will seek risk-adjusted returns on equity (or else they would choose different projects in which to participate), governments may take on risk on behalf of taxpayers that is incommensurate with the benefit of private sector financing and management (Poschmann, 2003; Vining et al., 2005).

Nonetheless, the mechanism was intended to give the government some distance from investment decisions.

The independence part of the concept was troubled from the start, owing to governance issues (Poschmann, 2017), and in particular the government’s role in appointing the chief executive and the board of the CIB. Under the CIB Act, members of the board, the chairperson, and the Chief Executive Officer serve “at pleasure” of federal cabinet, meaning that a disapproving responsible minister or the prime minister may reshuffle the CIB board at will. Moreover, the finance minister of the day, Bill Morneau, insisted on a cabinet say in project choices and approvals (Curry, 2017).

The CIB has faced criticism for these and other reasons (Moore, 2019; Curry, 2019). For example, early choices for loan funding commitments were regional public transit networks around Montreal and Toronto, a feasibility study on VIA Rail service expansion,<sup>12</sup> and other minor initiatives.

That these potentially politically popular choices might give rise to concerns about agency independence is unsurprising, and the chief execu-

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<sup>12</sup> The choice of regional passenger rail transport projects matches the mandate the federal government assigned to the CIB. However, and while depending on eventual usage the projects may contribute usefully from an environmental perspective, their potential contributions to growth and productivity are limited. Households and businesses that do not use the planned systems may benefit from reduced congestion and associated time and cost savings, but passenger transport cannot contribute significantly to business sector output and productivity.

tive's effort to deflect concerns over political decision making underscores the point (Snyder, 2019).

## Project decisions and politics

It might seem that it would be good for economic growth and productivity if public infrastructure decisions could be made independently of political considerations. As suggested by Flyvberg's work, the fact that decisions must be made with input and support from proponents makes it implausible that "taking out the politics" would promise better results, and there is little international evidence on whether arm's length bodies would improve on project selection. These issues stand aside from the difficulties mentioned earlier: uncertainty about project benefits and the practical reality of project delivery where multiple governments and approvals are required make easy and happy outcomes unlikely.

Even if the unlikely could be accomplished, the question of timing intervenes for the same reasons, and this reduces the likelihood of discretionary investment in public infrastructure making a significant difference in stabilizing an economy during a downturn.

## Conclusion

There is little doubt that capital investment is important to economic growth, or that private infrastructure investment improves labour and capital productivity, or that public investment might do so. Data presented here and elsewhere indicate that private investment can be a significant driver of growth; no such consensus arises regarding public infrastructure projects.

Hence there is doubt about whether public infrastructure investment can make a meaningful contribution to managing the peaks and troughs of the economic cycle. Decisions and implementation take time, and interjurisdictional issues do not help; further, upper-level government project funding seems to displace funding that might have or should have been generated anyway by lower levels of government.

Data also suggest that public investment choices in recent decades have had little impact on productivity, and little on immediate growth, on which the case for infrastructure as stimulus rests. The case for discretionary infrastructure spending boosts might be better sustained if the data from recent decades suggested that such initiatives had nonetheless been important contributors to long-run growth. Empirical support for that proposition is lacking.

## Appendix tables

**Table A1: Ordinary Least Squares GDP Growth Coefficients,  
One Quarter Lag**

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	1.889	0.148	12.745	0.000 ***
Business Residential structures	0.118	0.011	10.312	0.000 ***
Business Non-residential structures	0.004	0.015	0.287	0.775
Business Machinery and equipment	0.084	0.014	5.864	0.000 ***
Business Intellectual property products	0.047	0.013	3.590	0.000 ***
General governments gross fixed capital formation	0.025	0.018	1.359	0.176

Source: Author's calculations.



**Table A2: GDP Growth Coefficients on Detailed Capital Investment Categories, Distributed Lags, Autoregressive, Insignificant Lags Removed**

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	0.500	0.070	7.092	0.000 ***
Business residential new construction	0.055	0.009	6.283	0.000 ***
Business residential renovations	0.044	0.010	4.256	0.000 ***
Business non-residential buildings	0.018	0.012	1.585	0.115
Business engineering structures	0.008	0.012	0.678	0.499
Business machinery and equipment	0.031	0.012	2.449	0.015 **
Business mineral exploration and evaluation	0.011	0.007	1.677	0.095 *
Business research and development	0.027	0.015	1.752	0.081 *
Business software	-0.027	0.016	-1.718	0.087 *
Government residential structures	-0.004	0.004	-0.975	0.331
Government non-residential buildings	0.000	0.012	-0.040	0.968
Government engineering structures	-0.004	0.012	-0.308	0.758
Government machinery and equipment	-0.002	0.008	-0.252	0.801
Government weapons systems	0.001	0.002	0.398	0.691
Government research and development	0.011	0.016	0.695	0.488
Government software	0.003	0.014	0.191	0.849
Gross domestic product at market prices <sup>a</sup>	0.182	0.059	3.067	0.002 ***

<sup>a</sup> Lagged two quarters

\*\*\* Significant at 1 per cent level

\*\* Significant at 5 per cent level

\* Significant at 10 per cent level

Source: Author's calculations.

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## About the Author



### Finn Poschmann

**Finn Poschmann** is a Resident Scholar with the Fraser Institute focusing on a broad range of issues including taxes, government spending, capital markets, and competitiveness. Before joining the Institute, Mr. Poschmann was the President and Chief Executive Officer of the Atlantic Provinces Economic Council. Prior to that, Mr. Poschmann spent 17 years working with the CD Howe Institute, acting as Vice President of Research and Policy Analysis. Mr. Poschmann served on the Federal Advisory Panel on Canada's System of International Taxation, among other panels and task forces. He has provided expert testimony before Parliamentary committees.

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