FISCAL FEDERALISM AND INFRASTRUCTURE:

How has Federal and Provincial Infrastructure Spending Changed in Canada?

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Abstract

Since 2009, Canada's federal government has twice embarked on a policy of increasing federal infrastructure spending with the aim of achieving economic, social, or environmental outcomes. But the federal government is not the only player providing funding for infrastructure. In fact, in Canada, public funding for infrastructure is principally delivered by municipal and provincial governments. In recognition of this, it is a requirement of the flagship federal Investing in Canada Infrastructure Program that provinces must not use incremental funding provided by the federal government to displace funding provinces would otherwise have spent on infrastructure, although it remains unclear whether this requirement is being met. This research paper approaches the question of displacement through the theoretical framework of fiscal federalism to rationalize the federal role in providing funding for public infrastructure. Moreover, the research employs quantitative methods to assess trends in federal and provincial infrastructure spending from 2009-2019. Ultimately, there is some evidence to suggest that certain provinces have increased infrastructure spending in concert with the federal government, and there is no strong evidence to suggest that the provinces are deliberately substituting their infrastructure spending for federal funds.

Introduction

In 2016, the federal government unveiled the Investing in Canada Plan, billed as Canada's long-term infrastructure plan for $180 billion in federal funding over 12 years. The government's policy paper laid out three rationales for this new, significant ramp up of infrastructure spending by the federal level: to hasten a transition to a clean growth economy, improve socio-economic outcomes for all Canadians, and to generate long-term economic growth (Infrastructure Canada, 2018). The flagship new program under the Plan, the Investing in Canada Infrastructure Program, is a $33 billion contribution program managed by the provinces and territories and governed by bilateral agreements between the federal government and each jurisdiction. One nominal condition of the agreement is that federal funds provided through the program should not displace funding that would otherwise be committed by the provincial (or territorial) or municipal governments towards infrastructure projects. In other words, the federal government's funds, and social and economic impact, are intended to be incremental. Moreover, the Investing in Canada Infrastructure Program requires cost-sharing with provincial and municipal governments on infrastructure projects, seemingly creating new pressure on the other orders of government to keep pace with the federal government's increase in funding.

However, funding provided through this particular program forms only part of the total amount of funding that is ultimately invested in public infrastructure in Canada. Additionally, program funding for infrastructure is also only a small fraction of the federal funds which are transferred to the provinces. The provinces must balance infrastructure investment needs against competing priorities, and strike a balance within the fiscal constraints shaped by the level of taxes or borrowing a jurisdiction is able or politically willing to set. Ultimately, the provinces, for their part, retain considerable discretion with respect to capital spending on infrastructure

assets. It is therefore unclear if the federal government possesses the means to meaningfully enforce an incrementality clause.

The criticism that federal funding could merely displace subnational spending will be familiar to some as a criticism that was levied against Recovery Act infrastructure spending in the United States in the wake of the Great Recession. Indeed, this phenomenon was noted by the American Government Accountability Office (Government Accountability Office, 2004). A potentially key difference between Canadian and American federalism, however, is the degree of fiscal flexibility of provinces versus states. States are constitutionally bound to maintain budgetary balance, whereas Canadian provinces are not formally limited in this way.

The aim of this paper is to examine the incrementality issue in greater detail. Is federal infrastructure funding indeed contributing to a proportional-or-greater increase in overall public spending? Or is federal funding displacing a proportional-or-lesser amount of public spending from the other levels of government? Answering this question is empirically difficult in the absence of a counterfactual. At a minimum, this paper will examine available historical data from Statistics Canada and Canada's public accounts to identify trends in federal and provincial infrastructure spending and consider whether the available data supports the hypothesis that increasing federal investments are displacing provincial funding, or whether federal funding has no effect or a positive effect on overall public funding for infrastructure.

Relatedly, this paper also considers the implications of the displacement issue through the theoretical framework of fiscal federalism. Specifically, this paper will critically examine the theoretically optimal roles for federal, provincial, and local governments in providing funds for infrastructure projects, and consider rationales for provincial government behaviour in reaction to increases in federal infrastructure funding. For example, if there is evidence that federal

funding is displacing provincial funding for infrastructure, does the re-shuffling of fiscal burden between orders of government represent a distancing or a rapprochement with the theoretical optimum, regardless of the federal government of the day's policy priorities with respect to driving provincial investments in infrastructure. The paper will also consider whether the type of infrastructure assets and how the perceived necessity of infrastructure investment contribute towards explaining the behaviour of provincial governments in reaction to increasing federal investment.

This paper is structured in five sections. The next section will set the context for the infrastructure landscape in Canada over the period from 2009-2019 and clarify the definition of infrastructure as it pertains to this paper. The second section will examine rationales for the federal involvement in infrastructure and introduce the fiscal federalism framework. The third section will examine infrastructure spending from 2009-2019 for which data is available. This period covers a time where the federal government twice pursued a policy of ramping up federal infrastructure programming. This section will draw from federal public accounts and Statistics Canada capital expenditures data, but will also draw on historical data to set the wider context. A fourth section will analyze the data presented in section 3. This section will include a correlation analysis of federal versus provincial trends in infrastructure spending, include a discussion of how the data can be interpreted through a fiscal federalism framework, and further discuss factors that would inform spending decisions. The final section concludes.

What is infrastructure and what does the federal government fund?

Definitions of Infrastructure

When it comes to the federal government's infrastructure programs, it is not always clear if there is a consistent and intuitive definition for which assets qualify as infrastructure and which do not. Colloquially, the term infrastructure invokes roads, buildings, power grids, airports and the like. While these examples are assets that are indeed targeted by federal programs, there are examples at the margins that are less obvious. Public housing, for example, is sometimes included under the aegis of the government's infrastructure plans, but at other times public housing is treated separately. Rolling stock, such as transit busses, are frequently eligible in transit-oriented infrastructure programs despite not being fixed assets, yet intercity busses are typically not eligible. Community centres would, generally-speaking, qualify as infrastructure, but churches and other religious buildings generally would not. Understanding how policy papers, academic literature, and statistical sources use the term "infrastructure" to mean similar but not perfectly overlapping definitions is important and a precondition for proper analysis. For the purposes of this paper, some definitions to consider are outlined below.

The Investing in Canada Plan, the federal government's most recent major overarching infrastructure plan dating to 2016, defines infrastructure as "the set of basic facilities and systems required for a country, city or community to function" (Infrastructure Canada, 2018). This definition is regrettably vague for the purposes of identifying which assets are included, and the use of the term "basic" may inaccurately imply that only minimum necessities are relevant. The overall aim of the Plan targets a range of quality-of-life improvement and productivity enhancing projects beyond what might arguably be considered "basic" amenities required for "function".

Statistics Canada's definition of infrastructure, in the context of their Canadian infrastructure statistical framework, is as follows: "the physical structures and systems that support the production of goods and services and their delivery to and consumption by governments, businesses and citizens" (Statistics Canada, 2018). Notably, the Statistics Canada definition limits infrastructure to tangible assets – which is to say goods which can be used repeatedly for more than one year. The definition also ties assets to functions. In classifying assets by function, Statistics Canada relies on internationally recognized classifications systems. These classifications are fairly broad in scope. They include defense and public order and safety, for example, which are out of the scope of this paper and certainly out of the scope of the Investing in Canada Plan and past federal infrastructure programming. Nevertheless, because data from Statistics Canada will inform much of the analysis of provincial funding trends, their definition will be intended throughout this paper when referring to infrastructure unless otherwise noted.

Lastly, it is also worth discussing the related term "core public infrastructure" in the context of Statistics Canada's Core Public Infrastructure Survey (Statistics Canada, 2020). This term is specifically targeted to infrastructure assets which are publicly owned (or leased) by general, provincial, regional, or municipal government or a crown corporation. Those infrastructure assets which are included in the "core" fall into nine categories: roads; bridges and tunnels; culture, recreation and sports facilities; potable water; public transit; public social and affordable housing; solid waste; storm water; and wastewater. The inclusion of certain categories as "core infrastructure" is not universally consistent. Recreation and sport facilities for example, is considered non-core in other Statistics Canada products (Baldwin & Dixon, 2008).

Constitutional division of responsibility

Section 92 of the Constitution Act (1867) sets out exclusive powers of provincial legislatures gives provinces the power to enact laws in relation to "Local Works and Undertakings" other than three areas which fall under federal authority. The federal role is limited to works and undertakings which are interprovincial or international in nature, or works which "are before or after their Execution declared by the Parliament of Canada to be for the general Advantage of Canada or for the Advantage of Two or more of the Provinces."

While section 92 is only describing authorities to legislate, in practice the division of powers also informs the division of responsibility to fund. Take healthcare or education, which are both famously considered provincial jurisdiction as set out under Section 92, and which are chiefly funded through provincial budgets. Keen readers will note that the federal government does provide funding for healthcare and education through large transfers to the provincial governments known today as the Canada Health Transfer and Canada Social Transfer. However, this is indirect funding provided through a transfer mechanism rather than direct capital spending on health and education systems (Madore, 2003). Similarly, while the federal government does fund infrastructure projects across the country which neither cross borders nor are endorsed by Parliament, this funding is indirect. As we shall discuss in further detail, federal funding for otherwise provincial or municipal infrastructure is not traditionally through large unconditional transfers to the provinces. Rather, funding for essentially provincial or municipal projects is commonly routed through a series of grants and contributions programs.

Section 36 of the Constitution Act of 1982 is also relevant. It is this section (36(1)) that commits the provincial and federal governments and legislature to promoting equal opportunities for the well-being of Canadians, furthering economic development to reduce disparity in

opportunities; and providing essential public services of reasonable quality to all Canadians (Canada, 1982). With respect to public service provision, Section 36(2) commits the federal government to making equalization payments to ensure comparable levels of public services at reasonably comparable levels of taxation. Equalization payments are essentially a supplement to provincial general revenues, since receiving provinces may spend these funds however they see fit, including on infrastructure priorities.

Who owns public infrastructure in Canada?

The short answer is the vast majority of the publicly owned infrastructure assets in Canada are owned by the municipal or provincial governments. The federal government accounts for less than two percent of core public infrastructure assets, according to a report from the standing committee on Transport, Infrastructure, and Communities (Canada, 2015). The relatively small share of core public infrastructure owned federally follows a long-running trend since at least the 1960s (Canada, 2015). See Roy (2008) for an extensive analysis of trends in municipal, provincial, and federal net stock of government-owned infrastructure assets by asset class. In brief, roads and bridges make up the bulk of government-owned infrastructure, and despite increases in infrastructure investment, the overall value of the net stock of public infrastructure has not kept pace due to the preponderance of aging infrastructure.

Outline of current programs

The federal government's funding for infrastructure projects is largely funneled through a series of grants, contributions, and transfers to other levels of government or to private-sector recipients. Most of these programs are run by Infrastructure Canada, which was established as a separate federal government department by Order in Council in 2002.

Since 2016, the federal government has largely branded all infrastructure commitments under the aforementioned Investing in Canada Plan. The Plan involves dozens of programs varying in dollar-value significance, delivered through multiple departments and crown corporations. The most relevant programs and initiatives – and the most significant in terms of dollar value – are the Investing in Canada Infrastructure Program, the Canada Infrastructure Bank, and the federal Gas Tax Fund.

The federal government is also directly responsible for certain infrastructure assets, particularly international bridges, interprovincial transportation networks, pipelines, telecommunications infrastructure, ports, airports, and First Nations infrastructure on reserve. Often, these assets are managed on behalf of the federal government by crown corporations or other government business enterprises (like port and airport authorities).

The federal government's infrastructure is typically conditional and targeted towards certain asset classes or outcomes, but some programs are narrower in scope than others. Since the department was established, Infrastructure Canada has generally had at least one program open to submissions which could be considered general-purpose, funding a wide range of project types. However, there are certain assets which historically are not funded by the federal government. For example, federal infrastructure programming does not typically fund healthcare and education facilities, which are left to provinces, nor does the federal government typically fund police or fire services facilities, which are left to municipal authorities.

Investing in Canada Infrastructure Program

The Investing in Canada Infrastructure Program is a contribution program through which the government of Canada aims to deliver $33 billion in funding for infrastructure projects over

the twelve years between 2016 and 2028. The program is a cost-shared contribution program governed by individual bilateral agreements between the federal government and each province and territory. The provinces and territories deliver the program and are responsible for identifying and prioritizing projects.

Funding under the program is subdivided into different funding 'streams' with a set amount of federal money dedicated to each. In decreasing order of importance in terms of dollar amounts, these stream are: public transit; green infrastructure; rural and northern communities infrastructure; and, community, culture, and recreation infrastructure.

Infrastructure Bank

The Canada Infrastructure Bank is a crown-corporation at arms-length of government, set up to make investments in revenue-generating infrastructure projects. Created in 2017, federal funding assigned to the Bank is $35 billion over 11 years, to be allotted through a mix of loans, investments, and other financing. The Bank's aim is to attract private sector co-investment in infrastructure assets, particularly green infrastructure, clean power, public transit, trade and transportation infrastructure, and broadband internet infrastructure. While provincial or other governmental financial involvement in projects would likely be welcomed, it is not a necessary condition of the Bank's terms of investment. Moreover, because the Bank is at arms-length of government, the federal government does not have direct control over the project review and approval process.

The Gas Tax Fund

The Gas Tax Fund is a permanent infrastructure fund that transfers money from the federal government to municipalities, albeit through agreements with the provinces and

territories. Despite the name, the fund is no longer contingent on revenues from federal gas taxes since the fund was made permanent in 2008 and indexed to inflation in Budget 2013. It delivers approximately $2 billion to municipalities each year for infrastructure needs. Unlike other programs, the Gas Tax Fund is billed as a permanent ongoing fixture in the federal government's arsenal of infrastructure funding mechanisms, intended to provide a reliable source of federal funding to municipalities for infrastructure. While the funding is technically provided from the federal government to provinces and territories, who in turn disburse funding to municipalities on a largely per-capita basis, there are no cost-share requirements on the provinces or territories.

Other Infrastructure Canada programs

The federal government has also launched other programs of lesser financial significance that warrant a brief mention. These include the $2 billion Disaster Mitigation and Adaptation Fund, a national competitive program launched in 2018 targeted at large-scale infrastructure projects that address climate-related natural hazards. The Federation of Canadian Municipalities delivers an asset management program and a climate innovation program, collectively accounting for $185 million in federal commitments. The federal government also launched a competitive program Smart Cities Challenge to encourage innovation, data, and technology.

Smaller programs like these and past small-scale infrastructure programs are generally aimed towards narrower objectives or specific outcomes. As a group, they are difficult to characterize. In some cases there are typical federal cost-sharing limits, for example under the Disaster Mitigation and Adaptation Fund, but in other cases federal funding is not contingent on other orders of government co-investing. Ultimately, these smaller programs are unlikely to be sufficiently significant to drive trends in provincial infrastructure investment overall.

Other departments' programs

There are also federal infrastructure-related programs specific to indigenous communities in Canada. These programs are somewhat outside the scope of the research of this paper because federal responsibility for indigenous affairs is bound by treaties and agreements, and so the dynamics of fiscal federalism at the federal-provincial level cannot be assumed to be transposable in these circumstances. Despite indigenous affairs' status as a largely federal responsibility, provinces do contribute to infrastructure on First Nation, Métis, and Inuit communities. A closer examination of trends in indigenous communities, and a theoretical analysis of the relative efficiency of federal or provincial governments in provision of services and capital spending in indigenous communities could be a future area of research.

The Investing in Canada Plan includes programs delivered by more departments than just Infrastructure Canada. Other departments responsible for delivering programs under the Plan include: Canadian Heritage; the Canada Mortgage and Housing Corporation; Crown-Indigenous Relations and Northern Affairs Canada; Employment and Social Development Canada; Environment and Climate Change Canada; Health Canada; Indigenous Services Canada; Innovation, Science and Economic Development; Natural Resources Canada; Parks Canada; Public Health Agency of Canada; Transport Canada; and the regional development agencies.

Generally, the programs delivered under the other departments are smaller in significance compared to the programming delivered under Infrastructure Canada. Moreover, these programs are typically focussed on particular asset classes. Canada Mortgage and Housing Corporation programs included in the Plan, for example, are focused on social housing and support shelters. Similarly to the smaller programs delivered through Infrastructure Canada, these programs are ultimately unlikely to be sufficiently significant to drive the broad trends in provincial

infrastructure investment, but may be important in informing provincial decisions regarding investment in particular categories.

Outline of major historical programs since 2009

Infrastructure investments in 2009 were made in the context of a global economic downturn. The 2009 federal budget, titled Canada's Economic Action Plan, sought to stimulate the economy in part through new investments in infrastructure with a particular emphasis on projects that were ready to proceed in the immediate term. One of the main instruments for the government's infrastructure stimulus efforts was the $4 billion Infrastructure Stimulus Fund. In 2009, ongoing infrastructure programs also continued to provide federal funding for projects, notably the Building Canada Fund first established in 2007. In 2014, the federal government introduced the New Building Canada Fund in order to continue federal investments in a broad range of infrastructure projects.

The Infrastructure Stimulus Fund

The Infrastructure Stimulus Fund was a relatively short-running program, aiming to allocate all funding within two fiscal years as part of stimulus efforts. The program provided cost-shared funding of up to fifty percent for provincial and territorial assets and 33 percent for municipal assets. The fund was dedicated to water and wastewater infrastructure, public transit, roads, and culture, recreation, and community infrastructure.

Building Canada Fund

The original Building Canada Fund committed $8.8 billion in federal funding over the seven years from 2007 to 2014. The Fund was divided into two main components, a Communities Component targeted at water and wastewater infrastructure and local roads in

smaller communities, and a Major Infrastructure Component targeting larger infrastructure of national or regional significance. Water and wastewater infrastructure, public transit, and the core national highway system were targeted under this component. Generally, the federal government would fund one third of projects, cost-sharing with the provincial or territorial and municipal governments who would provide the other two thirds.

New Building Canada Fund

The New Building Canada Fund was created in 2014-2015 during the final years of the then-Conservative federal government, and was intended to provide the main vehicle for future federal infrastructure commitments as the Building Canada Fund program was winding down. The New Building Canada Fund was a $14 billion fund, likewise divided into components. The National Infrastructure Component supported projects of national significance with broad benefits to economic productivity. A Provincial Territorial Infrastructure Component also sought to fund infrastructure projects of national, but also regional or local significance. This component was further subdivided into a majority portion for predominately medium and large-scale projects, and a smaller proportion dedicated to smaller-scale infrastructure projects in small communities. Again, the federal government generally cost-shared on projects on a one third basis, although on provincial projects the maximum federal contribution was 50 percent.

The Federal Role in Infrastructure

Fiscal Federalism Theory

The theory of fiscal federalism is helpful in evaluating the implications of federal and provincial division of responsibility for infrastructure financing. The basic framework of fiscal federalism was described by Oates (1972). In an “optimal” situation, consider a society where

government is responsible for the provision of certain types of infrastructure as a public good, and that infrastructure assets convey benefits to citizens over a specific geographic area. Different infrastructure assets convey benefits to different population groups – consider a local wastewater treatment facility providing benefits to the town where the system is located (and potentially those communities downstream), as opposed to a national highway network which provides benefits to travelers and businesses that rely on the network for transportation across the country.

Assuming governments have perfect information and assuming governments pursue the best interests of the population in their jurisdictions, the optimal case is one where the level of government responsible for each infrastructure asset (the public good) has jurisdiction over precisely the people who benefit, what Oates terms "perfect correspondence".

Externalities

As Oates acknowledges, the optimal scenario with perfect correspondence is not practicable in the real world. Governments provide various public goods with overlapping and varied benefits to different populations. In reality, we would expect to observe fiscal externalities, where the benefits of infrastructure assets cross boundaries. Fiscal externalities present a policy problem because while governments would be expected to pursue policies to benefit their population, governments are also expected to generally underprioritize or undervalue policies where benefits accrue outside of their jurisdiction. Consider the aforementioned example of a wastewater system that provides benefits both to a local community and to downstream communities. Consider that upgrades to the system would yield greater marginal benefits to the combined local and downstream communities than the marginal cost of the project, but the marginal cost of the project would nevertheless be greater than the

marginal benefits to the local community alone. In this hypothetical example, it is clear that it is efficient to fund the upgrades, but the project would not proceed if the local community alone is vested with the responsibility to fund the project. This is an example of the lost potential that can arise where there are positive horizontal externalities – that is, where there are benefits that would accrue to third parties who are not directly involved.

This problem would be familiar to economists as a candidate for a Coase solution (Coase, 1960), whereby municipalities could negotiate amongst themselves. Downstream communities would be willing to fund part of the cost of the project and lead to the efficient outcome. There are examples of Coase-style arrangements between municipalities in Canada, such as multi-municipality collaboration to fund recreational infrastructure, or agreements regarding wider metropolitan transit networks that cross municipal boundaries.

However, another solution to the externality problem – and a solution which is more attractive when bargaining between jurisdictions is relatively time or cost-inefficient – is for a higher level of government to subsidize the project by means of an intergovernmental grant. In the hypothetical example, the provincial or federal government would perform this role.

Another justification for federal funding for infrastructure in the framework of fiscal federalism concerns indirect fiscal externalities, which can be horizontal or vertical. Indirect fiscal externalities occur when the policies of one jurisdiction have an impact on tax revenues and expenditures of other jurisdictions. In the context of infrastructure, consider a port expansion project which benefits local industry in one province, but that also enhances productivity affecting the amount of tax revenue generated by the federal government and other provinces. This is an example of a vertical externality because of the effect on federal government revenues and of horizontal externality because of the effect on other provincial revenues. Notably,

horizontal fiscal externalities may be negative if the infrastructure asset leads to competition for labour or capital investment between jurisdictions (Keen & Marchand, 1997). Others argue that overall, horizontal fiscal externalities arising from infrastructure investment should be generally positive (Dahlby & Jackson, 2015; Boadway & Kitchen, 2015).

Again, the federal government is well-placed to subsidize infrastructure assets with fiscal externalities that impact tax revenues in other jurisdictions and federal tax revenues, since these assets would be theoretically underprioritized by individual provincial governments who would not see the full fiscal benefits of a project.

Fiscal Imbalances

In the Canadian context, the federal and provincial governments both have the ability to leverage tax revenues from most major sources – e.g. income taxes, sales taxes, payroll taxes and excise taxes. However, provinces are more limited than the federal government in their ability to raise taxes because of tax-base motility and tax-rate competition between provinces. If one province, seeking to raise revenues, increases their tax rate, the increased rate may incentivize taxpayers and firms to seek out lower cost of living or cost of business in another jurisdiction. While the same phenomenon would apply at the national level between countries, it is generally easier to move within the country than between countries.

The federal government brings in more tax revenues than it spends in direct federal programming (Rwigema, 2017), giving it room to distribute excess tax revenues through transfers to provinces. The most important of these transfers are the Canada Health Transfer, Canada Social Transfer, and Equalization programs, but specific program transfers like those

made as part of the federal government's infrastructure investments can be included in this category as well.

A related rationale for federal investment is to address horizontal fiscal imbalances between the provinces. The equalization program, a federal mechanism to provide transfers to have-not provinces to allow those provinces to maintain an acceptable level of provision of government services, is the main mechanism the federal government employs to address horizontal imbalances. However, the equalization program has been criticized for distorting the fiscal decisions of recipient provinces (Intergovernmental Fiscal Relations Commission, 2020). Dahlby and Jackson (2015) have argued that horizontal imbalances can be inferred from the variance in the marginal cost of public funds in different provinces and Jackson (2015) posits the rationale that federal investments in infrastructure should be disproportionately made in the provinces with higher marginal cost of public funds to further address horizontal fiscal imbalances between the provinces.

Pursuit of National Objectives

Another rationale, separate from the strict framework of fiscal federalism, argues that the federal government has a mandate to pursue programs that "further the economic and social union" (Boadway & Kitchen, 2015). There is a formal mechanism outlined in the Constitution that grants the federal government responsibility over projects which are "declared by the Parliament of Canada to be of general advantage to Canada or the advantage of two or more provinces" (Canada, 1867). Note that federal investment in projects with national or interprovincial advantages would also likely be justified by the previously elaborated rationales.

Aside from the constitutional mechanism, Dahlby and Jackson (2015) also consider the policy goal of economic stimulus to be a valid rationale for federal investment in otherwise provincial and municipal infrastructure projects, arguing that a nation-wide effort is likely to yield better results than piecemeal efforts by various jurisdictions.

Data

In examining historical data on federal infrastructure funding, this paper is constrained by what data is readily available and practical to access. Unfortunately, there is no currently available resource that captures all capital expenditures, grants, and transfers related specifically to infrastructure assets, disaggregated by order of government, geography, and time. However, we can make use of proxies to provide a reasonable estimate for this information for both the federal and provincial levels of government.

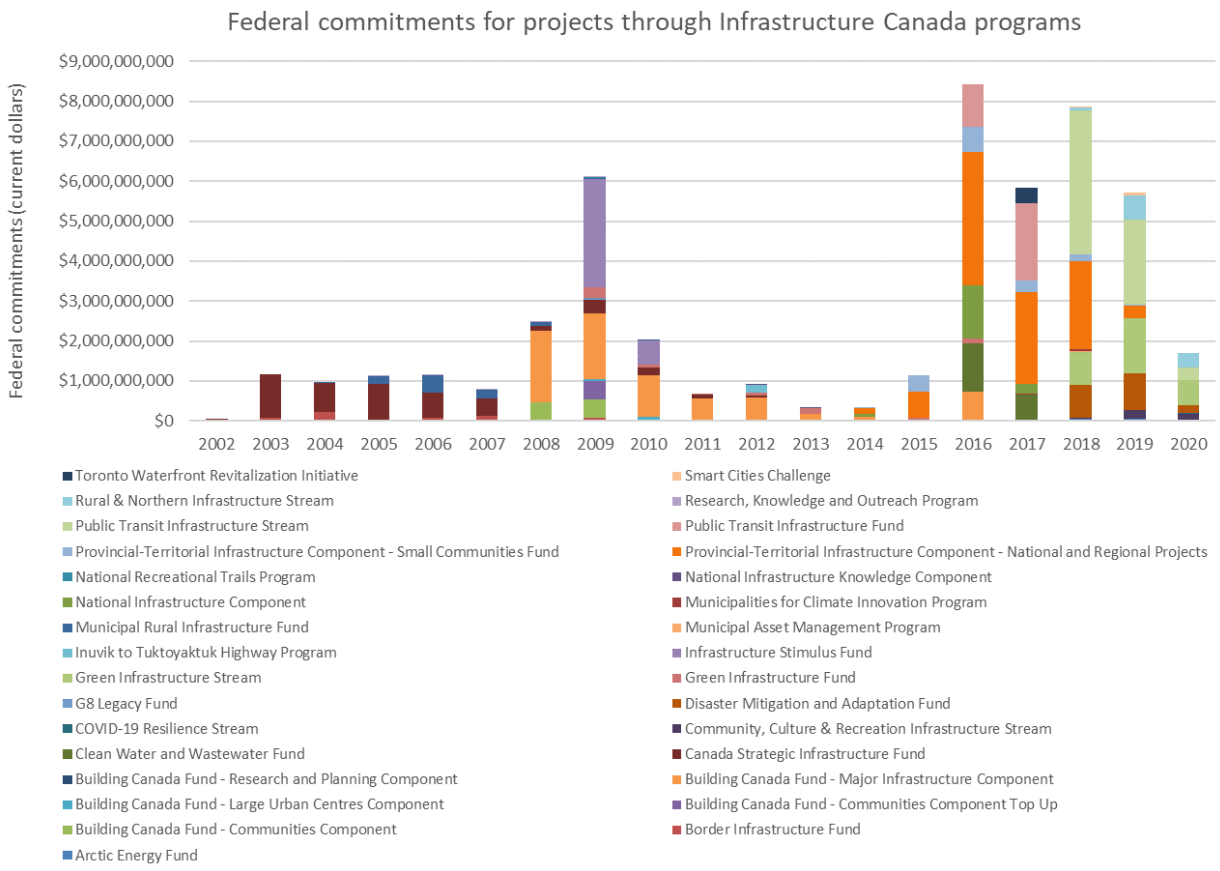
While there has been federal investment in infrastructure in some capacity since Confederation, this paper will examine data from the period from 2009 to 2019 for which Statistics Canada compiles annual data in the Infrastructure Economic Accounts for infrastructure investments in Canada. This data can be disaggregated into provincial government investment in infrastructure. Unfortunately, this is not the case for the archived data from prior to 2009 that precedes the modern iteration of the Infrastructure Economic Accounts.

The 2009-2019 decade is a particularly useful window through which to assess federal and provincial infrastructure investment trends. The period includes two occasions where the federal government's policy priorities involved measures to ramp up infrastructure spending. The first impetus came in response to the global economic recession in 2008-2009, while the second came in the wake of the change in government following the 2015 federal election. In both cases,

the ramp up in federal infrastructure spending was mainly realized through Infrastructure Canada.

Figure 1 compiles publicly available project data from all Infrastructure Canada programs by fiscal year (with the exception of project-unspecific transfer programs like the Gas Tax Fund) since the department's creation in 2002 until 2020, the last year for which data is available. The data highlights the dramatic increase in federal infrastructure commitments in 2009 and post-2015. As will be discussed further in the following section, it is important to distinguish between these data reflecting commitments, and Statistics Canada and public accounts data reflecting actual expenditures. Because the federal government typically flows funds gradually as project costs are incurred and claims are submitted. Intuitively, we would expect spikes in federal infrastructure commitments to lead 'softer' more gradual crests in the actual expenditures data as the consequences of a spike in federal investments take shape over the months and years after the commitments were approved.

Figure 1



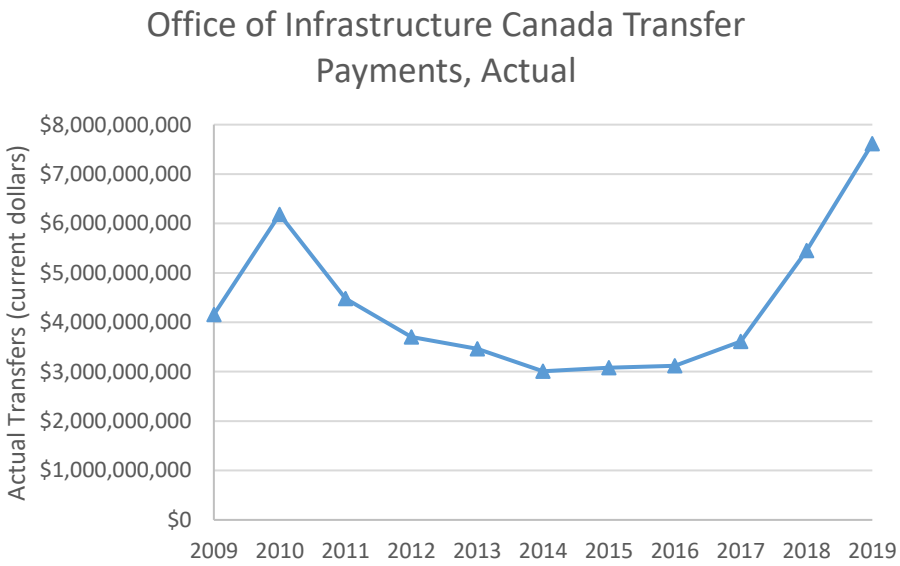
(Infrastructure Canada)

Federal actual infrastructure expenditures

Actual expenditures under the authorities of the Office of Infrastructure Canada are published yearly as part of Canada's public accounts. Expenditures in the public accounts system are sub-divided into operating, capital, and transfers payments. In this context, transfers are defined as grants, contributions, or other payments made by the federal government, which captures all of Infrastructure Canada's core programs including contributions programs and transfer payments made under agreements like the Gas Tax Fund. It should be acknowledged that not all of the federal government's infrastructure programming, including the programming

included under the aegis of the Investing in Canada Plan is delivered directly by Infrastructure Canada. However, at minimum, examining the total actual transfers made under the authorities of the Office of Infrastructure Canada serves as a reasonable proxy to characterize trends in federal infrastructure investments over the 2009-2019 period.

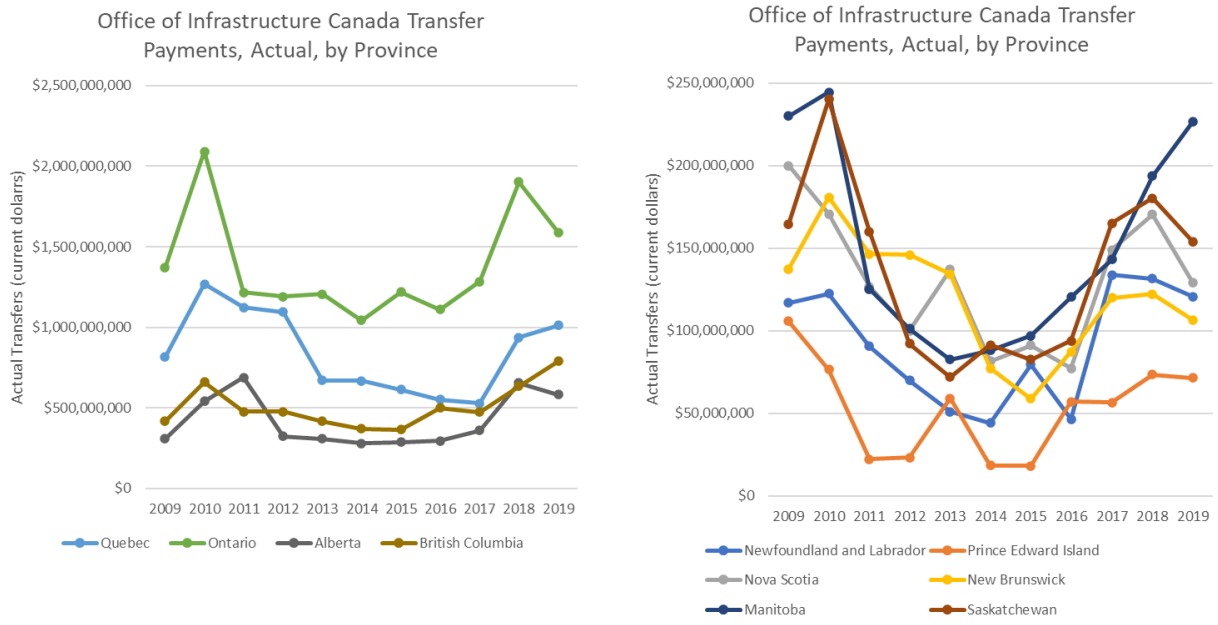
Figure 2



(Public Works and Government Services Canada)

Canada's public accounts are published yearly with several volumes. Volume III presents analysis of government expenditures and conveniently includes a disaggregation of cost-shared federal-provincial programs. Cost-shared programs make up the majority of Infrastructure Canada's programming. Noticeably absent are the transfers made under the Gas Tax Fund. Figure 3 consolidates cost-shared program information and Gas Tax Fund allocations to characterize federal investments on a per-province basis.

Figure 3



(Public Works and Government Services Canada; Infrastructure Canada)

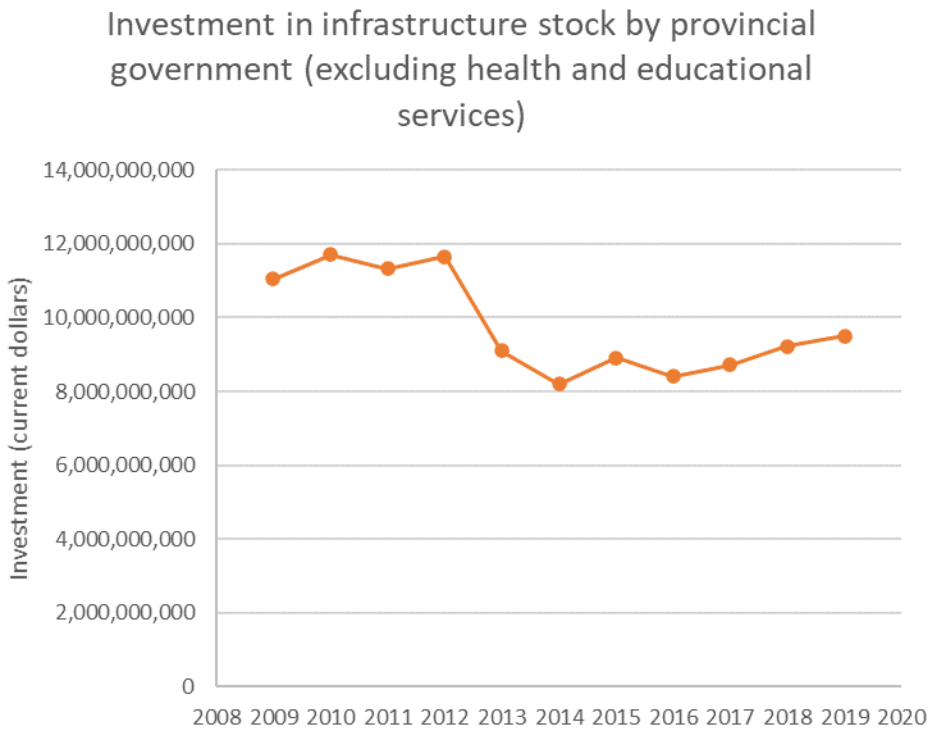
Provincial actual expenditures

A comparable approach to gauging the provincial level using provincial public accounts is challenging owing to the unique arrangements in the way each province distributes public infrastructure spending. Provincial governments' infrastructure delivery functions are dispersed more broadly among provincial departments, and each province has particular structures in place with municipal governments, provincial crown corporations, agencies and other parties.

To assess provincial infrastructure spending, we turn to Statistics Canada. Statistics Canada publishes a variety of products capturing economy-wide data and investment data by category. However, we can reasonably characterize investments by the provincial level of government in the infrastructure economic accounts. Another approach, taken by the Parliamentary Budget Office for certain provinces in a recent update on the Investing in Canada

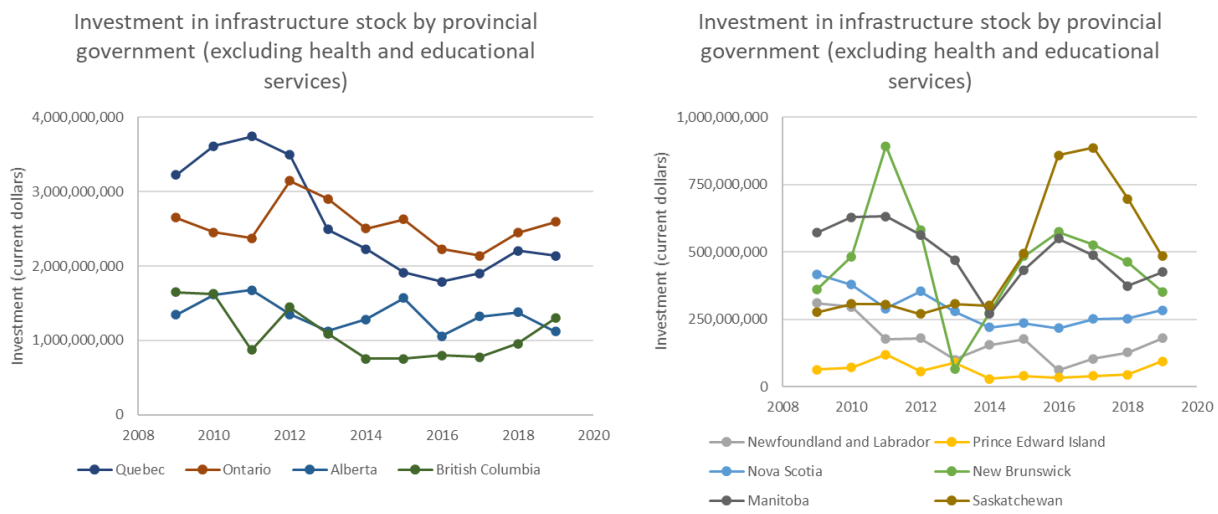
Plan, was to use non-residential tangible asset capital expenditures as a proxy to estimate trends at the provincial level (Parliamentary Budget Officer, 2019). An assumption is being made that other capital assets – for example vehicles – are relatively constant and/or negligible compared to capital expenditures in infrastructure assets by government. Figure 4 presents the aggregate provincial data. Because the aggregate provincial data may mask considerable variability between provinces, figure 5 expands the provincial data to assess each province individually.

Figure 4



(Statistics Canada)

Figure 5

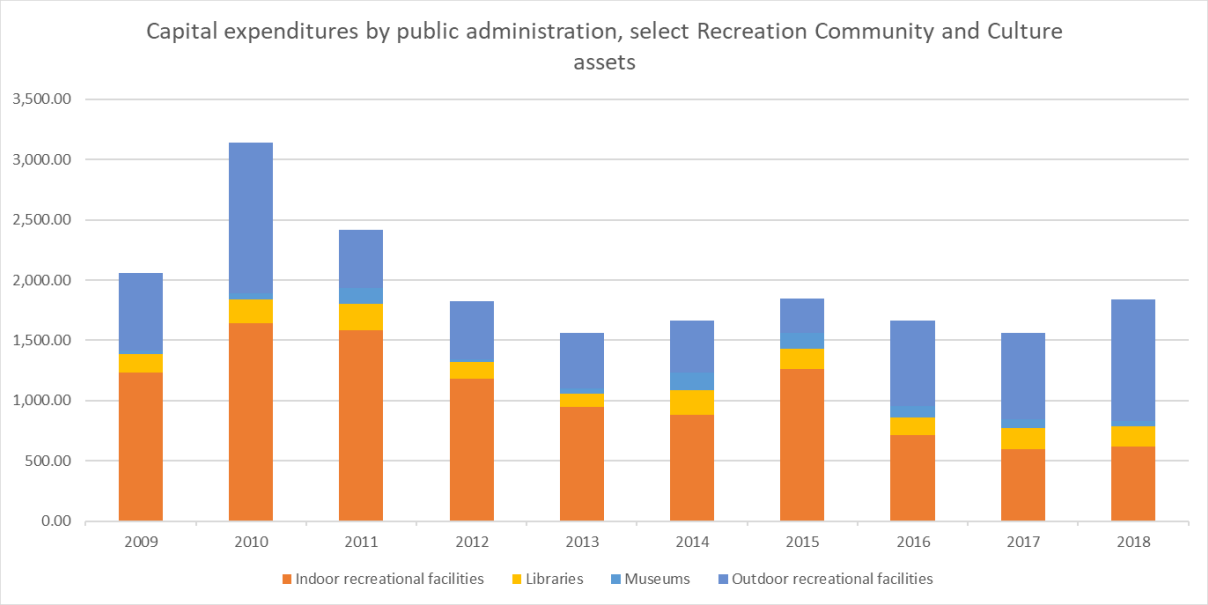


(Statistics Canada)

The infrastructure economic accounts also provide data disaggregated by asset function. This provides useful insight into trends related to specific categories, to better understand where governments are putting their investments and where investment has eased off during the 2009-2019 period.

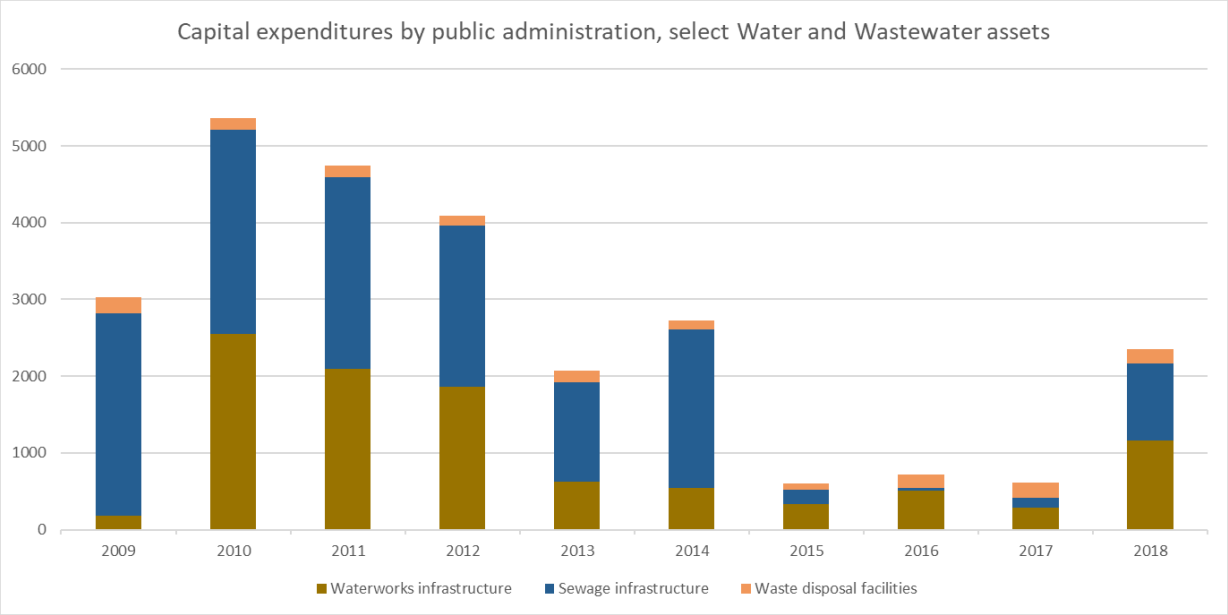
Capital expenditures for specific infrastructure assets provides an informative look at overall trends in investment in specific assets – see figures 6 though 8. The assets included fall under general categories of recreation, community and cultural assets, water and wastewater projects, and transportation assets. While the expenditures represented in these figures should not be interpreted as a complete accounting of all public investments that fall under each general category, at minimum we can identify a subset of assets classes which pertain to general categories targeted by the federal government's infrastructure programs. Asset-specific data from 2019 were not available at time of writing.

Figure 6



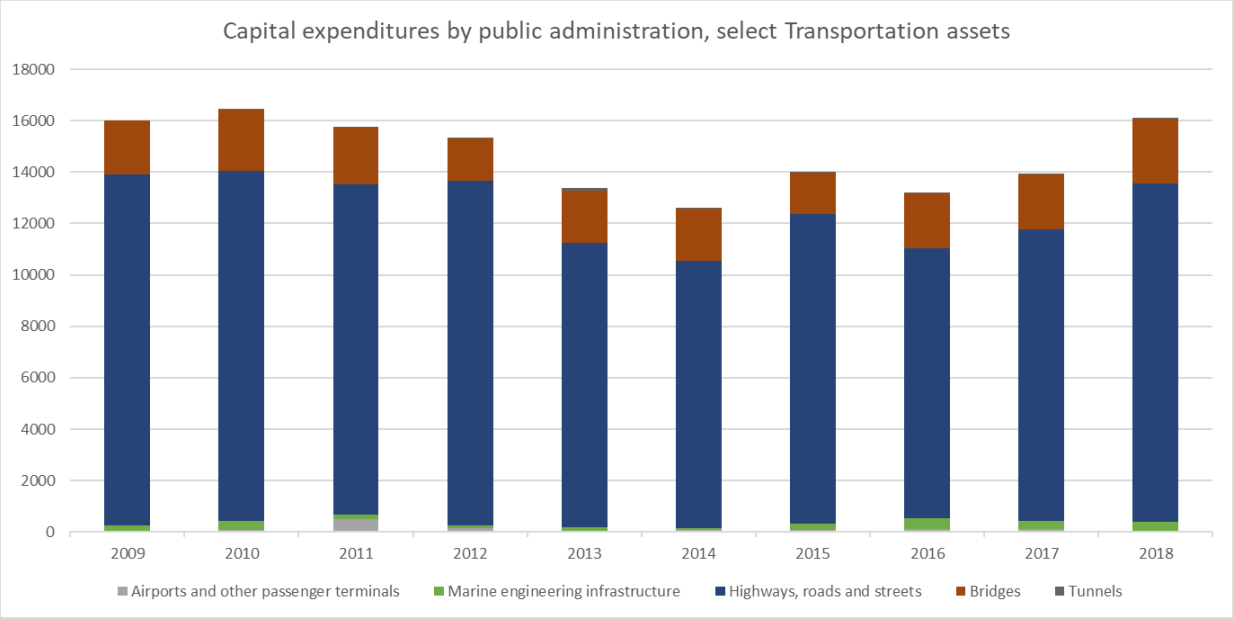
(Statistics Canada)

Figure 7



(Statistics Canada)

Figure 8



(Statistics Canada)

Parliamentary Budget Office Report

The Parliamentary Budget Office released an Infrastructure Update in March 2019, which examined progress on the Investing in Canada Plan and the pace of provincial and municipal investments (Parliamentary Budget Officer, 2019). The Parliamentary Budget Office report examined spending data for three years from 2016 to 2019 and was specifically focussed on assessing the incremental impact of the Investing in Canada Plan since the plan's inception in 2016.

In brief, the report's findings concluded that federal investments in infrastructure probably displaced provincial funding. In contrast, the report also found that municipalities spent more than budgeted on infrastructure projects. Caution is particularly warranted on the second finding, since the Parliamentary Budget Office considered only a select sample of large

municipalities as opposed to the municipal level of government as a whole. Despite the conclusion that federal funding is probably displacing provincial investments in infrastructure, the report acknowledges that provincial capital spending did increase with federal investments in the assessed time period. The conclusion is based upon comparing provincial capital expenditures against a 'benchmark' level derived by the Parliamentary Budget Office based on provincial budgets and capital plans.

While the Parliamentary Budget Office report is a useful tool of comparison, there are limitations with the approach taken. Notably, the report focuses on a narrow window – three years, only two of which are years since the creation of the Investing in Canada Plan. Moreover, the report offers one aggregate benchmark for the provinces instead of addressing the provinces separately. Therefore it is unclear if the report's conclusion that federal spending has probably displaced provincial spending is true of all provinces or only of some, although the report does imply that this conclusion was driven primarily by Ontario. The report notes that the discrepancy between planned and actual capital spending was most significant in Ontario, followed by British Columbia, Quebec, and Alberta.

Analysis

Trends in Federal and Provincial Investments

The trend over 2009-2019 was of two sizeable increases in federal government commitments for infrastructure expenditures, confirmed in the Infrastructure Canada project data and reflected in the public accounts data for actual transfers. Not unexpectedly, Infrastructure Canada transfer payments peak in 2010, the year after federal commitments peaked in 2009. Similarly, transfers in the post-2016 Investing in Canada Plan era start to increase in earnest in

2017 and 2018, after the major increase in commitments in 2016. These trends are in line with expectations that transfers would follow commitments, given the latency period involved in setting up and incurring costs for infrastructure projects, and the fact that larger projects which are planned over several fiscal years will continue to be accounted for in public accounts as costs are incurred and claims are filed.

The gap between when infrastructure commitments are made and when construction begins – and the impacts of economic activity associated with that construction materialize – have led some to question the limits of infrastructure investment as a tool of economic stimulus in times of recession (de Rugy & Mitchell, 2017). While the effectiveness of infrastructure as a stimulus tool is not the central research question posed in this section, it is relevant insofar as latency undermining stimulus efforts could compound with the issue of displacement.

In examining the slope of the trendline for provincial infrastructure funding, the trendline appears generally negative but with a modest increase since the launch of the new infrastructure programming under the Investing in Canada Plan. At first glance, while 2019 federal transfers have regained the heights of 2009, provincial investments remain lower than 2009 levels, suggesting there is *prima facie* evidence for displacement.

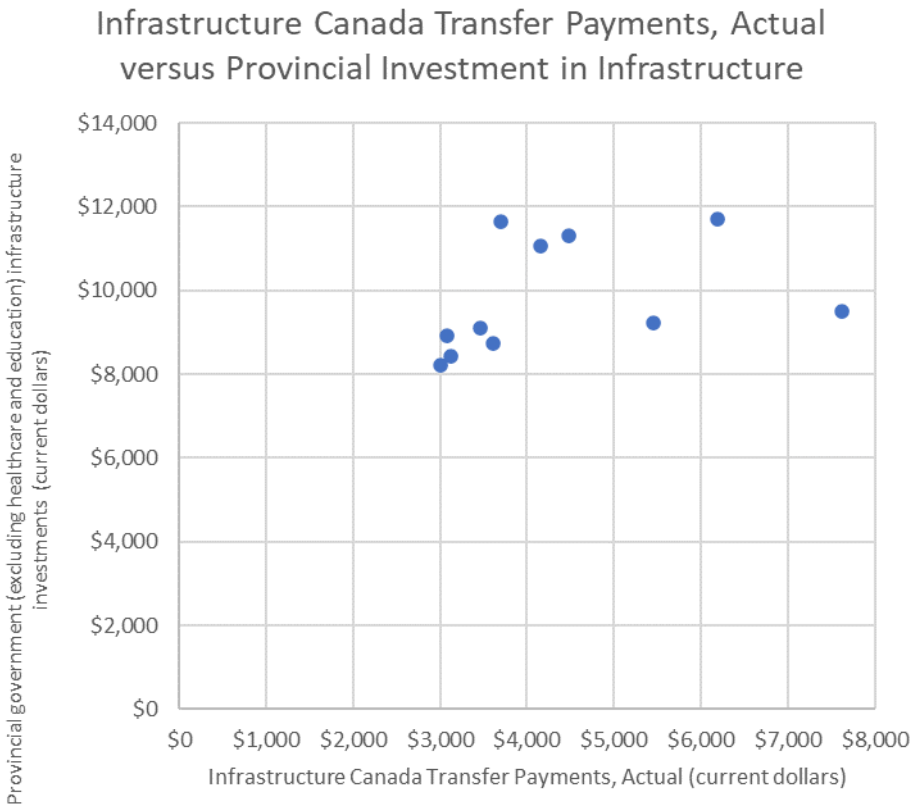
In order to explore further, we can perform a Pearson correlation analysis to test the strength and direction of a correlation between federal infrastructure transfers and provincial infrastructure investments. Briefly, I will discuss the expectations and implications of the correlation test for establishing or disproving evidence of a displacement phenomenon. Because the federal government is typically an equal one-third or one-half cost-sharing partner with the provincial government on infrastructure projects, the provinces are implied to be providing funds in parallel. However, the level of provincial funding which can be attributable to joint provincial-

federal investments will not be equal to the federal level, since part of the amount of federal transfers is comprised of the Gas Tax Fund and other programs which have no cost-sharing obligations on the provinces. In other words, there is a plausible reason why we could expect to see a correlation between federal and provincial infrastructure funding, but, if we assume the null hypothesis is correct - where there is no displacement of provincial funds, there is reason to believe that the change in federal funding will not be exactly proportional to the change in provincial funding. Therefore, assuming there is no displacement, we would anticipate at least a moderate positive correlation between the variables, but not necessarily a perfect correlation.

The unknown variable in this context is the collective decision of the provinces with regards to the infrastructure funding they pursue independently of the federal government. Provinces could be scaling back their own infrastructure investments at a pace that exceeds the increases attributable to provincial cost-sharing on jointly funded projects. Alternatively, they might be scaling back infrastructure investments, but not at a pace that outstrips increases related to cost-sharing. In the first case, a correlation analysis would yield a negative correlation, while in the second scenario, a weak positive correlation is expected.

Conducting the Pearson correlation test indicates a moderate positive correlation, $r = 0.35$, $p = 0.31$. A scatterplot summarizes the results in figure 9:

Figure 9



The results of the correlation test suggest moderate correlation, which was in line with expectations in the scenario where the provinces are not displacing funds. However, the p-value signifies that this result is not statistically significant ($p > 0.05$) The p-value is partially reflecting that there are relatively few data point in the series. With access to reliable data over a longer period of time, a more robust correlation analysis might be attempted.

Correlation analysis can also be conducted on federal and provincial data for each provincial jurisdiction. In aggregate, the effect of provincial displacement or non-displacement may be muddied by different jurisdictions taking different spending decisions. It is possible that some provinces may be scaling back their infrastructure investments while others are forging ahead. Therefore, we should expect that the analysis for each province would produce a more

insightful result. There are also interesting research questions that stem from this approach. Canada's provinces, not unlike subnational jurisdictions in other federal countries, exhibit significant differences between them. The smallest by population and geographic area, Prince Edward Island, has fewer citizens than individual cities in the larger provinces. From a fiscal federalism framework perspective, we might expect that the smaller jurisdictions are more closely attuned to the interests of their comparatively fewer citizens. Infrastructure needs of different provinces differ as well. For example, the larger jurisdictions with large metropolitan areas are more apt locations for major public transit projects, while the maritime provinces would have greater use for coastal infrastructure. It is therefore possible that the federal government's infrastructure priorities may dovetail differently with jurisdictions across the country, and partially inform provincial decisions with respect to their level of infrastructure funding. Figure 10 compiles correlation coefficients and p-values for each province.

Figure 10

Province	Pearson r	p-value
Newfoundland and Labrador	0.42	0.23
Prince Edward Island	0.10	0.78
Nova Scotia	0.66	0.04
New Brunswick	0.17	0.63
Quebec	0.80	0.01
Ontario	-0.13	0.72
Manitoba	0.27	0.45
Saskatchewan	0.04	0.92
Alberta	0.40	0.25
British Columbia	0.37	0.29

The correlation analysis on individual provinces returns more nuanced results. At the two extremes are the two largest provinces. Ontario had a weak negative correlation, albeit this was not statistically significant, while the second largest province, Quebec, exhibited strong positive correlation that was significant. The only other statistically significant correlation was in Nova Scotia, which was also a strong correlation. This trend does not extend to the other smaller provinces, however. Saskatchewan, Prince Edward Island, and New Brunswick all had weak positive correlation, none of which were statistically significant.

Caution must be applied in interpreting these results. One possible complication is the timing of the end of the fiscal calendar year. Large lump sum payments, such as the Gas Tax Fund, are not necessarily transferred on the same day to all provinces. As a result, circumstance may lead some payments to accumulate within one fiscal year, giving the illusion of wide variation in year-over-year funding. Another limiting factor is the relatively limited number of data points in the series with which to conduct a correlation analysis.

Ultimately, the correlation analysis does not categorically support or refute evidence for displacement of provincial funds for the provinces considered collectively. On an individual basis, Quebec and Nova Scotia in particular correlate strongly with the federal transfers, suggesting these provinces are not displacing their provincial infrastructure commitments.

As a point of comparison, the negative correlation in Ontario may dovetail with the Parliamentary Budget Office report which noted that the difference in Ontario between planned and actual provincial capital expenditures was the greatest. However, these are different observations – the Parliamentary Budget Office report noting a change in planned expenditures, and the analysis performed here examining actual expenditures and finding a possible (albeit

statistically insignificant) negative correlation with federal investments in Ontario over the 2009-2019 period.

Roy (2008) examines trends in public infrastructure with a wider historical lens, specifically from 1961 to 2005, and characterizes a gradual decline in the provincial stock of capital since the 1980s, at a time when local government stock is continuing to increase and federal stock gradually remains flat. While the correlation analysis and evaluation of trends from 2009-2019 may provide insight into provincial reaction to spikes in federal commitments for infrastructure in the short term, the time period examined is insufficient to characterize long term trends. If provinces are gradually divesting themselves of infrastructure stock in favour of municipal governments, for example, we might naturally expect displacement owing to the reshuffling of infrastructure ownership between the orders of government.

Asset-specific data, despite consolidating all sources of public administration capital expenditures, provides insight into the overall success of federal additional investments in moving overall public investment in support of specific assets of priority for the federal government for which data are available. The trendline for selected asset classes falling under recreation, community and cultural projects has declined overall compared to the heights of 2010, which again is informed by the additional stimulus funds made available at that time. If considering the years immediately after 2009 as anomalies, then capital expenditures on the select assets has remained relatively stable, with noteworthy increases in outdoor recreational facilities, but decreases in indoor facilities. Because federal investments since 2016 ramped up investments in community culture and recreation projects, an increase in overall public capital expenditures would have been expected. The trends should be interpreted with caution, however, since the assets singled-out in the available statistics do not represent the totality of assets that

would be eligible under the umbrella of the federal government's community culture and recreation programming.

Regarding water and wastewater assets, overall public investment has declined relative to the beginning of the 2010s, but there is a notable spike in expenditures in 2018. The latter observation would align with expectations of increasing investment in the assets including through federal infrastructure programming targeting water and wastewater assets.

Lastly, regarding transportation assets, a similar trendline is observed where investments declined since the years immediately post-2009, with a new increase observable since 2016. Also notable is that the vast majority of capital expenditures on transportation network infrastructure – which in this case, can be considered to be relatively comprehensively represented by the selected assets (with the omission of railways) – are on roads, streets, and highways.

Limitations of a Fiscal Federalism framework

Assume that the federal government increases its investments in infrastructure to the point where the federal government is overspending on infrastructure. In this scenario, we would expect provincial governments to react by diverting provincial funds to other priorities. In the fiscal federalism framework, where governments are assumed to govern in the best interests of the population of their jurisdiction, the provincial government can "free-ride" off the federal government's overinvestment and use funds it would otherwise have committed to infrastructure on reducing taxes, paying down debt, or spending on other programs.

Now assume the opposite scenario where the federal government increases its investments but still underspends relative to an "optimal" level of federal spending within the

fiscal federalism framework. In this scenario, provincial governments would be expected to maintain the pace of their own investments.

The federal government in reality does not base the rate of its subsidy for infrastructure projects on the basis of marginal costs and benefits to the actors involved. Although fiscal federalism theory suggests such an approach would be efficient, real governments do not have perfect knowledge of costs and benefits, and there is also a cost in time and resources to pursue better information which must be taken into account. Typically, federal government contributions to infrastructure projects are based on the 50-50 cost-share model with provinces or a 33-33-33 cost-share model between all three levels of government. While federal commitments do not necessarily need to be 50 or 33 percent – projects can and are on occasion funded through cost-share models where the federal contribution is less – provinces and municipalities have few incentives not to pursue the maximum amount of federal contribution on offer. In the fiscal federalism framework, these cost-sharing models are sub-optimal, but do have the advantage of being easy and predictable, which removes additional costs of needing to bargain on cost-sharing arrangements for each and every project.

The provinces, for their part, have made recent and repeated calls for additional federal funding for infrastructure (The Council of the Federation, 2020), suggesting there is appetite from lower orders of government for additional federal spending. In the fiscal federalism framework, this could be interpreted as provinces bargaining with the federal government over contributions to infrastructure.

In the Canadian system, the federal government does not have strong leverage to affect overall capital spending on infrastructure, since the federal government neither owns significant portions of the country's public infrastructure, nor does it possess a legal constitutional

mechanism to direct provincial infrastructure spending. The federal government does have limited influence through spending power and cost-shared contribution programs. However, the federal government cannot realistically guarantee or compel provinces not to reduce capital spending on other infrastructure projects and programs, or to reduce capital spending on targeted infrastructure asset classes over the long term.

As such, while the federal government may seek to achieve positive economic and social outcomes through investments in infrastructure, it cannot assume that the full weight of its investment will be felt in wider context. It may be more appropriate for the federal government to consider that its investments will be counterbalanced by underinvestment in other asset classes that are not a federal priority by the other levels of government.

It is also worth noting that while provincial decisions with respect to infrastructure have recently been made in the context of the federal government increasing investment, the opposite situation may also occur. A federal government wishing to reduce cost-shared investments in infrastructure may not necessarily see a counterbalancing increase in investment from the other levels of government.

Policy Implications

The following are policy considerations for the federal government on how to move forward, in broad terms, with its approach to infrastructure financing in the Canadian federal context, assuming sustained federal interest in pursuing infrastructure spending to support economic and social outcomes.

One option at the federal government's disposal, which requires relatively little additional effort, is to acknowledge the limits on the federal government's ability to catalyze provincial

investments in infrastructure and adjust expectations accordingly. In this scenario, little would change from a program design perspective, although clauses formally obliging provinces or municipalities maintain current levels of spending would be unnecessary.

The federal government's policy plan under this scenario would not assume that economic and social impacts of federal funding are entirely incremental. Federal policy planning would recognize that federal investments in certain categories risks putting fiscal pressure on provincial and municipal jurisdictions to make cuts or reduce investments in categories where the federal government is not cost-sharing.

In one version of this scenario, the federal government might come to strategically use fiscal pressures to press provincial or municipal funding towards the federal government's infrastructure priorities. Such a strategy is, however, greatly limited. Despite recent increases in federal investments in infrastructure, federal funding is still relatively small compared to the amounts committed by provincial and municipal governments. Moreover, provinces and municipalities will retain a great deal of agency to direct capital spending according to their own priorities.

Conclusion

A key component of the federal government's 2016 infrastructure plans is a co-commitment by provincial governments to maintain pace and co-invest on infrastructure projects to maximize the influence of federal dollars in pursuit of social and economic goals. Incrementality clauses such as those included in bilateral agreements between the federal and provincial governments that govern the Investing in Canada Infrastructure Program ostensibly oblige provinces to maintain their commitments. However, the very existence of such clauses

suggest that there is some concern from the federal government's perspective that in the absence of the clause, the lower orders of government would use federal funding to displace their own.

It is dubious, however, that the federal government would be in a position to fulsomely ensure against provincial displacement. For one, the majority of public infrastructure assets are owned by municipal or provincial governments, with only a fraction owned by the federal government. Moreover, federal financing for infrastructure is only a fraction of overall capital investments in public infrastructure made by all three orders of government. While provinces do have access to most major tax bases and wide discretion to tax or borrow to finance provincial priorities, the provinces ultimately must balance investments in capital infrastructure with other competing priorities. There is therefore *prima facie* support for the hypothesis that provinces would readily take advantage of federal investment capital to displace provincial funding.

Several intriguing questions arise: is there evidence that displacement is occurring during times of increasing federal infrastructure spending? Conversely, is the opposite effect be observed, where federal money stimulates or incentivizes additional spending at the provincial level? Lastly – and regardless of what the federal government's policy preference may be – does the effect of federal spending one way or the other matter from a theoretical perspective?

This paper has sought to share insight on these issues by examining statistical data and fiscal federalism theory. Statistics Canada's Infrastructure economic accounts data generally support the conclusion that federal investments are not precipitating sweeping declines in provincial infrastructure investments between 2009-2019. The trend during these years is of modest increases during periods where federal spending is also increasing.

Several caveats apply to the conclusion drawn here. Merely because provincial infrastructure investments are increasing over the period is not conclusive evidence that the effect of provincial 'displacement' of federal funds is zero. Nor is it credible evidence of a federal 'multiplier' effect spurring greater investments by other orders of government.

The longer-term trend in terms of the stock of infrastructure capital assets by provincial and federal governments is one of stagnation and eventual decline since the 1960s (Roy, 2008), while stock owned by municipal investments has continued increasing apace over the same period. While outside the scope of this paper, further research could consider the fuller breadth of public infrastructure financing over the longer term.

Correlation analysis suggests that collectively, provincial investments are not working against federal investments in infrastructure, with the caveat that the moderate positive correlation computed was not statistically significant. On an individual provincial basis, a fuller picture of provincial trends is noticeable. Some provinces, namely Quebec and Nova Scotia, had strong positive correlations with federal infrastructure transfers that were statistically significant. This suggests that these provinces are not displacing funds to supplant provincial infrastructure spending with federal infrastructure dollars. That only two provinces were in this category suggests that there is variability between provinces.

This paper also examined current arrangements through a fiscal federalism framework. Three rationales were developed for federal investment in infrastructure – to correct for externalities, to address fiscal imbalances, and to pursue national objectives. In the classical fiscal federalism framework, governments are expected to be concerned with the needs of the populations within their jurisdiction and underprioritize populations without, leading to socially inefficient outcomes.

However, current arrangements do not lend themselves well to the fiscal federalism framework's optimal scenario. The federal government provides infrastructure funding for general-purpose infrastructure according to cost-sharing models that are not rooted in an assessment of marginal costs and benefits, but on traditional even splits between levels of government. While suboptimal from a fiscal federalism perspective, the cost-sharing approach does confer advantages in terms of ease and simplicity, cutting down on bargaining costs.

Finally, this paper considered the implications of fiscal federalism theory on the seriousness of displacement of provincial funds by federal funds for the provision of public infrastructure. Ultimately, concern for displacement of provincial funds is not in keeping with theoretical rationales for a federal role in infrastructure, with the possible exception of the pursuit of certain national objectives such as fiscal stimulus, because, although stimulus is more appropriately managed at the federal level, the overall national objective is facilitated through provincial coordination. Nevertheless, the national objective rationale should not give *carte blanche* to federal governments to rationalize directing provincial infrastructure investments. In comparison to economic stimulus measures, where urgency and boldness are inherent to the objective, the social and economic objectives of the more recent 2016 federal infrastructure plan are generational. Lastly, as a matter of course, it is not practicable to oblige co-investment over the long-term. In the Canadian context, the provincial level of government retains considerable agency with respect to deciding their own fiscal policies.

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