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THE STRUCTURE AND PRESENTATION OF PROVINCIAL BUDGETS[†]

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SUMMARY

Provincial governments seem to consider it only natural to finance public infrastructure using debt. There is a standard arsenal of arguments used to justify the practice, to the point where there are scarcely any political voices willing to dissent from the tradition. Financing a bridge or school with debt is like a family buying a house, goes one common rationalization, or like a business taking out a loan for equipment. Others argue that infrastructure investment can stimulate the economy and pays for itself over time. Another justification insists that it is only fair for future generations to shoulder some of the burden of infrastructure purchased today, since they will continue to enjoy it after living generations are gone. Still another holds that debt financing infrastructure offers the necessary smoothing of the tax rate over time.

These arguments are widely repeated and accepted as these arguments are, but under closer scrutiny they hold almost no water at all. On the contrary, the economic analysis casts doubts on financing infrastructure using debt. If provinces want to build more roads, bridges, schools, airports, hospitals, and other infrastructure, they would do taxpayers a much bigger favour by financing it through current income.

Building a government hospital is not the same as a couple taking out a home mortgage; that couple cannot increase its revenues the way a government can through higher taxes, and that couple has an earning life cycle (rising until the earners are in their mid-50s, and then declining until their income is largely comprised of public and private pensions and savings). Businesses primarily fund new investments using retained earnings; their use of debt is motivated largely by tax incentives that allow interest deductibility. Neither of these are reasonable comparisons for a government's financing rationale.

The fiscal stimulus argument is weak to begin with, as the timing of infrastructure spending is often too slow to be effective during a recession. It is a particularly so in Alberta, where unemployment rates are low and skilled labour is already at a shortage. And the idea that it is somehow fair to saddle future generations with paying for infrastructure they did not vote to build is problematic and permits current generations the ability to be more reckless than they might otherwise. But more to the point, most of the benefits of infrastructure is enjoyed by the generations who are living when it is built; less than 20 per cent of its utility accrues to unborn generations. Furthermore, the tax-smoothing argument implies that taxes should be increased (or other current spending cut) to finance an infrastructure program so that the present value of fiscal surpluses cover the debt incurred in financing construction — the key to satisfying the condition of debt solvency.

Some infrastructure does "pay for itself" — when user fees or tolls are applied — and in those cases debt financing can be justified. But this almost never happens. Despite claims to the contrary, the cost of a school or a hospital can never be recouped in the higher productivity and wealth it might bring to the jurisdiction, since income taxes (particularly in Alberta) are so low. Therefore, when a province announces that it plans to build things, it should also indicate how it will raise the necessary funding to pay for it, rather than borrowing.

This is not a message that provincial politicians will want to hear; indeed, their entire budgeting model — based on accrual accounting and capital budgeting — is predicated on the assumption that infrastructure is an asset rather than an expense, despite the fact that maintenance costs make every infrastructure project an ongoing obligation. This model — in part the result of balanced-budget rules — is the primary reason why the public finds provincial budgets to be notoriously incomprehensible. The self-imposed balanced-budget rules adopted by provincial governments are often only a symbolic gesture. If provincial governments want to be truly accountable to taxpayers, they should be prepared to finance a significant portion of the actual upfront cost of infrastructure out of current revenues and provide a more transparent cash-based accounting of revenues and expenditures in their budgets.

[†] We would like to thank Paul Boothe and an anonymous referee for their comments on an earlier draft of this paper.

1. INTRODUCTION

Budgets are the major annual policy documents of Canadian governments. They show a government's recent financial performance: the amounts of revenue raised from taxes, transfers from other levels of government, and other sources such as fees and resource revenues; and their expenditures on the broad range of services that governments provide, such as health care, education, social services and provisions for infrastructure spending. They indicate the change in the government's net debt: the amounts that governments will have to borrow to finance the gap between current spending and current revenues—or more rarely, but importantly in the Alberta context—the increase in the government's net financial assets, which can be used to finance spending in the future. The budget documents also show the government's plans and projections for the coming year. The allocation of future spending shows the government's policy priorities and often serves as the platform for announcing new spending initiatives, tax policy changes, and other initiatives. In short, the budgets of Canadian governments are important policy documents and provide a key opportunity for Canadians to review the performance of their governments and their plans for the future.

In this paper, we examine the structure and presentation of the Canadian provincial governments' budgets, with a particular focus on the Alberta government's budget. We focus on the provincial governments' budgets because the provincial governments play a key role in the Canadian fiscal system. They provide important public programs: health care, education, and social services. They directly provide, or help to finance, most of the public infrastructure in Canada. Another important reason for analyzing provincial budgets is the growing disconnect between the numbers that are presented in the budgets and the general public's understanding of the state of provincial finances. It seems that broad segments of the public, and even those who take the trouble to read the documents and listen to commentaries on it in the media, are confused by the way the numbers are presented and are not confident that the numbers adequately reflect their government's true fiscal position.[1] A loss of trust and confidence in a government's financial reporting represents a major blow to the credibility of a finance minister and his or her government.

With this perspective in mind, we examine some of the key questions concerning the presentation and reporting concepts used in provincial budgets. Some of the key questions that we address are:

- Should provincial budgets be divided into an operational component, a capital spending component, and savings component?
- Should the operating budget record cash expenditures or expenses, where the latter is current outlays plus amortization of the stock of capital assets?
- To what extent should spending on capital assets be financed by borrowing?
- How should the provincial deficit be calculated?
- Should deficits and debt be restricted by legislation?
- Is there a need for a fiscal council to report to the public, through the provincial legislature, on the province's finances?

Of course, our approach to these issues is informed by our professional backgrounds; we are economists and therefore we are concerned with the budget as an economic document, as opposed to a political statement or a purely accounting exercise.

[1] See, for example, Kelly McParland, "Ontario budget hocus pocus makes $1-billion in debt magically disappear," *National Post*, September 22, 2014.

In Section 2, we discuss the strengths and weakness of the accrual accounting frameworks that provincial governments have adopted in Canada. In Section 3, we review the need for and the actual performance of balanced-budget fiscal rules that have been adopted by Canadian provincial governments. Section 4 deals with a key issue: To what extent should public infrastructure spending be debt financed? After presenting an overview of the trends in public sector investment by provincial governments, especially Alberta, since 1981, we then examine the main arguments for debt financing public-sector capital spending. We do not think that any of these arguments—private sector examples, fiscal stimulus, intergenerational fairness and tax smoothing—provides a strong basis for fully financing infrastructure spending by debt. The final section of the paper contains our conclusions and recommendations on provincial budgeting.

2. ACCRUAL ACCOUNTING AND CAPITAL BUDGETING

Accrual accounting and capital budgeting have become the standard for financial reporting in the public sector in Canada.[2] Under accrual accounting, public capital is treated as an asset and depreciated over its service life, and the government's fiscal position is indicated by its net operating balance — i.e., the difference between revenues and expense. The latter includes compensation for public employees, current expenditures on goods and services, interest payments on debt, transfer payments to households and firms, and depreciation of fixed capital. Expenditures on non-financial assets, such as public infrastructure, are not included in expense and do not contribute to the net operating balance in the current year. A government's net operating balance will appear to be larger, or its deficit will appear to be smaller, than its deficit on a cash accounting basis to the extent that current investment expenditures exceed amortization of existing capital stocks.

One of the motivations for the adoption of accrual accounting has been the introduction of balanced-budget fiscal rules. When these rules are applied to cash deficits, capital expenditures must be financed from current revenues rather than through borrowing. This creates a mismatch between the short-run tax costs and long-term benefits of capital projects under a cash-accounting balanced-budget fiscal rule and a concern that governments—particularly those with overriding short-run electoral objectives—may under-invest in public capital, relative to spending on current programs and transfers. Indeed, there is evidence in some countries that fiscal rules targeting the cash balance have led to fiscal adjustments that fall disproportionately on capital rather than operating spending.[3]

While accrual accounting solves the mismatch problem that arises under a cash balance rule, it gives governments considerable leeway to operate within a balanced-budget fiscal rule, which may lead to excessive borrowing, the substitution of capital expenditures for current spending in the budget, the simple relabelling of current expenditures as capital, or some combination of the three.[4]

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[2] We will use accrual accounting and capital budgeting to refer to all budgeting and accounting procedures of government that treat capital expenditures differently from operating expenditures for the purpose of defining and measuring the fiscal balance.

[3] Poterba found that U.S. states with separate capital budgets spent more on capital projects than did similar states that used cash budgeting, but there is no difference in the level of non-capital spending in the two groups: James M. Poterba, "Capital Budgets, Borrowing Rules and State Capital Spending," *Journal of Public Economics* 56 (1995): 165-187. For more on the international experience concerning the impact of balanced-budget rules on infrastructure spending, see William Easterly, Timothy Irwin and Luis Servén, "Walking up the down escalator: Public investment and fiscal stability," *The World Bank Research Observer* 23, 1 (2008): 39.

[4] For a comparison of the expenditure and debt dynamics under cash- and accrual-accounting regimes with balanced-budget fiscal rules, see Paul Boothe, "Accounting Regimes and Fiscal Rules" (Paper presented at the Banca d'Italia Fiscal Policy Workshop, Perugia, April 2004), Available at SSRN 2040784 and http://www.bancaditalia.it/studiricerche/convegni/atti/publ_debt/session2/315-332_boothe.pdf.

Many public-finance economists argue that accrual accounting and capital budgeting are apt to do more harm to public decision-making than good. They involve accounting distinctions that have little economic meaning, are prone to abuse by opportunistic governments, and may often reduce rather than enhance transparency in government. For all these reasons, a focus on the cash budget as a unitary indicator of the state of public finances has much to recommend it. If balanced-budget fiscal rules are the motivation for adopting an accrual-accounting/capital-budgeting format, and this leads to significant and dangerous distortions in fiscal policies, then one can question whether fiscal rules should be adopted in the first place. Consequently, it is best to first consider the pros and cons of cash versus accrual accounting before considering whether governments should adopt fiscal rules concerning balanced budgets and what form those rules should take.

Pros and Cons of Cash Accounting

One of main advantages of a cash accounting framework for evaluating the fiscal position of a government is that the long-run solvency condition for a government depends on its current and future primary surpluses, i.e., the balance between its total revenues and its total expenditures, excluding net interest payments or income. The solvency condition can be stated in a number of ways, but in its simplest form the present value of a government's current and future primary surpluses has to be greater than or equal to its public debt.[5] Of course, the projected primary surplus must be feasible in the sense that the government will be able to raise the revenues to cover its projected program expenditures, and this will depend on the taxable capacity of the economy. If the present value of current and projected future primary surpluses is less than the public debt, then the government is running the equivalent of a Ponzi scheme—such as that run by Bernie Madoff—and eventually it will not be able to borrow more funds. Then it will either have to default on its debt or, in the case of national governments, increase the money supply and reduce through inflation the real value of domestically held debt. The importance of the primary surplus as an indicator of debt sustainability is one of the reasons why analysts of public sector finances in South American countries, such as Brazil, pay particular attention to the government's primary surpluses relative to GDP. The long-run fiscal sustainability conditions are also very relevant for Canadian provincial governments in view of the IMF's and Parliamentary Budget Office's projections of the increases in provincial governments' net-debt-to-GDP ratios in coming decades.[6]

It is also important to emphasize that public sector solvency is not closely related to a government's net worth—the difference between its assets, both financial and non-financial, and its liabilities. Few government non-financial assets are marketable, so the book value of assets backed by debt is not a good measure of a government's ability to repay the debt. Even for marketable assets, the focus on net worth has the potential to create incentives for privatization, P3s, and other off-book ownership arrangements for reasons that have nothing to do with their economic desirability. Accounting systems that focus on measuring the change in the net worth of a government can provide misleading information about its solvency. Furthermore, the goal of maximizing net worth, although an appropriate objective in private sector decision-making, should not be the basis for fiscal decision-making in the public sector.

Concerns about the long-run viability of its financial position is one of the reasons why the Norwegian government presents its finances using a cash accounting framework rather than an accrual accounting framework. See Box 1 for a table showing the Norwegian government's 2014 budget and the transfers to and from its petroleum revenue savings fund, the Government Pension Fund Global. As will be explained in more detail below, an accrual accounting framework can obscure the long-run trend in a government's net financial position. For governments that are recipients of non-renewable resource

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[5] For a derivation and explanation of the debt sustainability condition, see Canada. Parliamentary Budget Officer, *Federal Balanced Budget Legislation: Context, Impact and Design* (2014), http://www.pbo-dpb.gc.ca/files/files/BalBudLeg_EN.pdf.

[6] International Monetary Fund, *Canada*, IMF Country Report 14, 27 (2014), 49; Canada. Parliamentary Budget Officer, *Fiscal Sustainability Report 2014* (2014), http://www.pbo-dpb.gc.ca/files/files/FSR_2014.pdf.

revenues, such as Norway and Alberta, it is important have an accounting system that has the accumulation of net financial assets as a key indicator of the government's fiscal position.

A second advantage of measuring a government's fiscal balance using its cash balance is that this provides a measure of the net impact of the government on the current resources of the economy and its net fiscal stimulus to the economy. For example, a government that is running a primary deficit during a period when the unemployment rate is low may cause the economy to overheat and drive up costs for the private sector. Including the government's capital expenditures in the measure of its fiscal balance provides a better measure of the government's impact on resources available to the private sector than does the net operating balance. It can indicate whether or not the government's policy is helping to stabilize the economy or is displacing private sector activities, such as private construction.

One problem with a cash accounting framework is that current expenditures can provide benefits that extend into the future. Even in the absence of rules regarding balanced budgets, this may bias decision-making against spending on infrastructure and other activities with long-lived benefits. A second problem is that, under a cash accounting framework, the future costs of an undertaking or a transaction, such as the future pension payment obligations in hiring a public employee, are not included in the current expenditures, whereas under an accrual accounting framework they are, in principle, included at the time of the commitment. However, in many instances the cash accounting system could be modified to take into account future costs, such as allocating funds to a public-employee pension fund to reflect future obligations. A third problem is that under a cash accounting framework, a government may be able to delay payments to the providers of goods and services in order to reduce the size of its cash deficit in the current fiscal year if, for example, it is going into an election. While such manipulations are serious, they will generally only affect allocation of deficits between adjacent fiscal years and will not generate or hide cumulative long-term fiscal problems. Also, large and consistent manipulations of the timing of cash flows would be spotted by the auditor general and should be noted in that officer's annual report.

Pros and Cons of Accrual Accounting

The objective of accrual accounting in the public sector is "to make the true cost of government more transparent" and to improve decision-making because "managers should be responsible for all costs associated with the outcomes and/or outputs produced, not just the immediate cash outlays."[7] It is claimed that accrual accounting can result in better public decision-making when, for example, the government has to decide whether to buy or lease equipment or a building. Accrual accounting also focuses more attention than a cash accounting framework on the public sector's stock of capital and the costs of maintaining the capital stock.

However, the accrual accounting framework also has many shortcomings from a public policy perspective. Blöndal notes that accrual accounting "introduces a great deal of technical complexity into budgeting, thus making it less transparent and less understandable."[8] The Alberta government's recent quarterly budget update is a good example of ambiguity and a lack of transparency. On page 5 of the *First Quarter Fiscal Update and Economic Statement*, in a table summarizing the government's fiscal plan, three lines are labelled "Operational Surplus / (Deficit)," "Change in Net Assets {Surplus / (Deficit)}" and "Surplus / (Deficit)." All of these figures are positive, indicating surpluses, while further down the table, "Change in Net Financial Assets" is negative, indicating a cash deficit.[9] Given the multiplicity of definitions of "Surplus and Deficit" used by the provincial government, while at

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7 Jón R. Blöndal, "Issues in Accrual Budgeting," *OECD Journal on Budgeting* 4, 1 (2004): 45.

8 ibid., 107.

9 The change in net financial assets is equal to the cash surplus or deficit in the absence of changes in the market value of financial assets and liabilities.

the same time net financial assets are declining, and in the absence of any attempt to provide a simple explanations, glossaries, and accounting identities, it is no wonder that the public is highly skeptical of the provincial government's claims that it is running a budget surplus.

While the ability to manipulate the budget balance exists under cash accounting, this mainly concerns the timing of recording expenditures and revenues; accrual accounting also offers governments the opportunity to manipulate the recorded budget through the adoption of depreciation rates, valuation of assets and liabilities, adjustments for tax receivables and doubtful debts, and recognition of changes to pension funds returns and liabilities. These have the potential for misrepresenting the long-run financial viability of a government. As Paul Boothe has documented,[10] the adoption of a capital budgeting framework by the Alberta government after the province was formed in 1905, was at least partially responsible for its financial problems and ultimately the default on its debt in the 1930s.[11]

There is also a great deal of arbitrariness, and therefore room for manipulation, in determining what constitutes a capital expenditure in an accrual-accounting/capital-budgeting framework. As is frequently pointed out, employing teachers provides long-term benefits to a community by increasing the stock of human capital embodied in its labour force, but only physical investments in school buildings and equipment are treated as capital expenditures under a conventional capital budgeting framework.

Perhaps most important in the Alberta context is the inconsistent treatment of non-renewable resource revenues. While expenditures on physical capital assets are included in the capital budget, and only the depreciation of the public-sector capital stock is included in the operating budget, non-renewable resource revenues are fully included in revenues of the operating budget. Clearly "bonuses and sales of Crown leases" should be considered asset sales and excluded from operating budget revenues. Royalties from non-renewable resources can also be considered the sale of an asset, or the conversion of an asset in the ground into a financial asset, and on this basis they should not be included as the operating budget revenues under an accrual accounting framework.[12]

As a side note, during the recent election campaign in Brazil, Marina Silva's economic advisor announced that, if elected, a Silva government would bring the budget back into balance without resorting to the Brazilian government's "creative accounting" by "using a one-off signing bonus from the sale of oilfields to balance the budget."[13] In Alberta, using the revenues from the sale of oil and gas leases and other non-renewable resource revenues to balance the operating budget is not regarded as "creative accounting"—it is "standard accounting."

How non-renewable resource revenues should be treated in either a cash- or accrual-accounting framework is problematic and requires a discussion of the role of a resource revenue savings fund. This topic is treated briefly in the concluding section to this paper, as well as in more detail in van den Bremer and van der Ploeg.[14]

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10 Paul Boothe, "Capital Budgeting in the Public Sector: Lesson from Alberta's History," in *Capital Budgeting in the Public Sector*, ed. Jack M. Mintz and Ross S. Preston (Kingston, Ont.: Queen's University, John Deutsch Institute for the Study of Economic Policy, 1993), 98-111.

11 See Appendix 1 for an example of how a zero-net-operating balanced-budget rule implies increasing tax rates when there is a surge in public infrastructure spending, holding other government expenditures constant, and that the present value of the current and future primary surpluses is less than the debt incurred to finance the infrastructure spending.

12 According to the IMF, "The disposal of a nonfinancial asset by sale or barter is not revenue because it has no effect on net worth. Rather, it changes the composition of the balance sheet by exchanging one asset (the nonfinancial asset) for another (the proceeds of the sale)." International Monetary Fund, *Government Finance Statistics Manual 2014* (Washington, D.C., 2014).

13 Joe Leahy, "Silva to Seek Trade Deals for Brazil," *Financial Times*, September 24, 2014, http://www.ft.com/intl/cms/s/0/622680a8-43de-11e4-8abd-00144feabdc0.html?siteedition=intl#axzz3GeOMWKx0.

14 Ton van den Bremer and Rick van der Ploeg, "Digging Deep For The Heritage Fund: Why The Right Fund For Alberta Pays Dividends Long After Oil Is Gone," University of Calgary School of Public Policy Research Paper 7, 32 (October 2014).

Although it is argued by its proponents that accrual accounting provides a better measure of the cost of government services than does a cash accounting framework, for economists the only meaningful measure of cost is opportunity cost—that is, the value of the resources that the society has given up in providing current government services. The accrual accounting framework will not reflect the true (i.e., opportunity) cost of government services unless amortization expense is based on the current replacement cost of public sector capital.[15] However, the Alberta government uses historical costs to calculate amortization expense, which means that figures for operating expense do not reflect the opportunity cost of the resources that the province uses in providing services to Albertans.

Expense will only measure the opportunity cost of public services if it reflects the interest income that was foregone in making the public sector capital investments. Interest payments on debt could equal the foregone return from investing in the public sector stock of capital if all public sector capital (and only public sector capital) was debt financed, but as will be argued in Section 4, debt financing all capital expenditures is in most cases neither equitable from an intergenerational fairness perspective, nor efficient from a tax policy perspective.

Finally, in an assessment of accrual budgeting practices and performance by the provinces and the federal government in Canada, Christine notes that "although accrual accounting has been adopted for capital budgeting purposes, cash remains an important basis for legislative decision making and communications purposes."[16] The use of accrual accounting in budget documents can therefore be confusing for legislators and may undermine the legislature's role in reviewing and approving budget appropriations.

Our overall assessment of the strengths and weaknesses of cash- and accrual-accounting frameworks, which is summarized in Table 1, tends to favour a cash accounting framework. However, it seems unlikely that Alberta or any other provincial government is going to abandon accrual accounting in the near future. But, even with the current budgeting framework, there is scope for providing a simpler presentation of the provincial government's financial and economic position in budget documents.

TABLE 1 ASSESSMENT OF THE STRENGTHS AND WEAKNESSES OF CASH AND ACCRUAL ACCOUNTING

	Cash Accounting	Accrual Accounting
Comprehension by the general public	☺	X
Consistent with budget appropriations	☺	X
Implementation costs	☺	X
Comprehensive measures of assets and liabilities	X	☺
"Lease versus buy" decision-making by government officials	X	☺
Transparency (e.g., classification and recognition of revenues and costs)	☺	X
Measurement of the government's impact on the economy	☺	X
Potential for misrepresentation of the government's fiscal position	X Short-term	X Long-term

[15] The IMF *Government Finance Statistics Manual 2014* states that "Consumption of fixed capital should reflect underlying resource costs and relative demands at the time the production takes place. It should therefore be calculated using the actual or estimated prices and equivalent costs of the rentals of fixed assets prevailing at that time and not at the times the goods were originally acquired." International Monetary Fund, *Government Finance*, 126.

[16] Terry Christine, *Accrual Budgeting by Canadian Federal, Provincial, and Territorial Governments* (Canadian Institute of Chartered Accountants, 2009), 16.

3. FISCAL RULES CONCERNING BALANCED BUDGETS

As previously noted, one of the reasons for the adoption of accrual accounting in the public sector has been governments' adoption of balanced-budget rules. These rules can unduly constrain infrastructure spending if applied to the cash balance; adopting accrual accounting and applying the balanced-budget rule to the net operating balance allows the government to continue to finance public infrastructure with debt and to run a cash deficit. In this section, we provide a very brief overview of the issues concerning the adoption of balanced-budget fiscal rules in the context of an accrual-accounting/capital-budgeting framework. For a comprehensive discussion of the issues that arise with the implementation of balanced-budget rules, see Portes and Wren-Lewis and the Parliamentary Budget Office.[17]

What is the rationale for a government adopting a balanced-budget rule? According to Tapp, fiscal rules "help to correct policy-makers' distorted incentives, strengthen policy-makers' commitment to socially optimal policies, and improve fiscal policy communications."[18] The first point means that fiscal rules can prevent the misuse of fiscal policy to achieve short-term political gains, such as by increasing spending or lowering taxes just before an election. Fiscal rules may also help a finance minister impose fiscal discipline on spending ministries. In the Alberta context, the second reason for adopting fiscal rules is to constrain the government's use of volatile and transitory non-renewable resource revenues to fund current expenditures. The third argument is that a fiscal rule is a prominent way of highlighting a government's intention with regard to its fiscal policies.

There is a large literature on the fiscal effects of balanced-budget rules based on the experience of U.S. state governments and European governments. These studies generally find that the rules have had some impact on constraining spending and reducing deficits, although deviations from the rules are common, with them becoming a major issue in the EU given the slow economic recovery in Spain, France and Italy and their large and persistent budget deficits. There are only a few studies of the impact of fiscal rules on the fiscal behaviour of the Canadian provinces and those studies come to different conclusions.

Simpson and Wesley conducted a panel spline regression analysis of the impact of balanced-budget legislation (BBL) on real per capita revenues and expenditures over the period 1989–2009 of seven Canadian provinces that had adopted balanced-budget legislation between 1995 and 2002.[19] They found that, except in British Columbia, "expenditure growth has increased after the enactment of BBL, and in the majority of cases (Alberta, Saskatchewan, Manitoba, and New Brunswick), it has outstripped the increase in revenue growth."[20] Simpson and Wesley concluded that "the evidence rejects the hypothesis that BBL has restrained expenditure growth relative to revenue growth" and that "Alberta, Saskatchewan, and Manitoba showed strong increases in program expenditure growth relative to own source revenues after the passage of BBL in 1995."[21]

More supportive evidence of the effects of balanced-budget legislation by Canadian provinces has recently been published by Tapp.[22] Using a pooled regression model of provincial government budget balances over the period 1984 to 2007, he found that fiscal rules "raised budget balances by between 0.8 and 1.2 ppts [percentage points] of GDP on average and lowered net debt to GDP by 1.4 ppts on

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17 Jonathan Portes and Simon Wren-Lewis, "Issues in the Design of Fiscal Policy Rules," NIESR Discussion Paper 11865 (London: National Institute of Economic and Social Research, 2014); Parliamentary Budget Officer, *Federal Balanced*.

18 Stephen Tapp, "The Use and Effectiveness of Fiscal Rules in Canadian Provinces," *Canadian Public Policy* 39 (2013): 47.

19 W. Simpson and J. Wesley "Effective Tool or Effectively Hollow? Balanced Budget Legislation in Western Canada," *Canadian Public Policy* 38, 3 (2012): 291-313.

20 ibid., 300-301.

21 ibid., 301-302.

22 Tapp, "The Use."

average."[23] Tapp also found that the adoption of balanced-budget rules was influenced by the provinces' finances, with provinces with stronger fiscal positions more likely to adopt fiscal rules.[24] He concluded that the frequent changes in fiscal rules "suggests that they are probably best viewed as a medium-term anchor or policy objective to guide expectations of the government's fiscal policy approach." The frequent changes in the budgeting rules in Alberta, documented by Kneebone,[25] are hardly consistent with such rules being robust mechanisms for constraining the Alberta government's fiscal decisions. See Box 2 for balanced-budget legislation in Alberta.

In Alberta, the most important fiscal rules should revolve around the allocation of non-renewable resource revenues to the Alberta Heritage Savings Trust Fund, an intergenerational savings fund, and the Contingency Account, a fiscal stabilization fund.[26] The Alberta Heritage Savings Trust Fund has played only a very limited role in saving the resource revenues of the province of Alberta because the province has only saved a small percentage (less than 10 per cent) of its resource revenues in the form of financial assets. Also, the government of Alberta has recently reverted to the questionable policy of earmarking portions of the fund for expenditures on economic and social development, rather than using it as an investment fund to earn income to support general expenditures in the future. Dahlby and Hojjati[27] conclude that, with its low rate of savings and the vacillating policy of using the Heritage fund to finance special projects or sectors, Alberta's experience shows many of the pitfalls that other jurisdictions around the world would do well to avoid.

We need to rethink the non-renewable resource revenue savings strategy in Alberta. Van den Bremer and van der Ploeg have outlined a resource revenue savings model that deserves serious consideration for adoption in Alberta.[28] We will not go into the details of their model and proposal, except to note that it is premised on the idea that the savings strategy should be based on the notion that Alberta has "below-ground" wealth in the form of oil and gas resources and "above-ground" wealth in the form of financial assets, and that the receipt of resource revenues is the transformation of a below-ground asset into an above-ground asset. In their model of an optimal intergenerational savings fund, all non-renewable resource revenues would be transferred to an intergenerational fund (such as the Heritage Fund) and then invested in financial assets. Returns on the financial assets would support a "resource dividend" that would be allocated to a provincial general revenue fund to support current and capital spending. Adopting the appropriate savings policy would mean that the "resource dividend" would provide the same level of support for public expenditures, as a percentage of GDP, for current and future generations. They also advocate the adoption of a stabilization fund that would help to smooth expenditures and revenues in light of the volatility of non-renewable resource revenues. The details of the van den Bremer and van der Ploeg proposal are not presented here, but Figure 1 indicates in simple terms the revenue and expenditure flows under their model.

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23 ibid., 53.

24 ibid., 62.

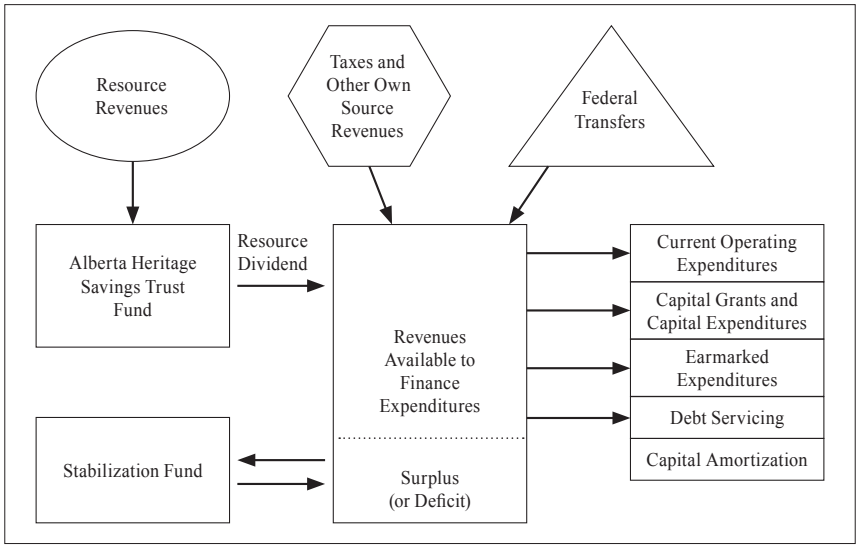
25 Ron Kneebone, "From Famine to Feast: The Evolution of Budgeting Rules in Alberta," *Canadian Tax Journal* 54, 3 (2006): 657-73, http://www.ctf.ca/ctfweb/Documents/PDF/2006ctj/2006ctj3-kneebone.pdf.

26 The current Contingency Account was formerly known as the Sustainability Fund. For a history of the policies regarding the resource revenue savings strategy, see Bev Dahlby and Niloo Hojjati, "The Challenge of Saving Natural Resources Revenues: An Overview of the Alberta Heritage Savings Trust Fund," *Some Fiscal Parameters of the Investment Climate in Select Countries of Eurasia*, Special Report, 19th Annual Edition (Washington, D.C.: International Tax and Investment Center, 2014).

27 Dahlby and Hojjati, "The Challenge."

28 van den Bremer and van der Ploeg, "Digging Deep."

FIGURE 1 A SCHEMA FOR RESOURCE AND OTHER REVENUE FLOWS FOR THE GOVERNMENT OF ALBERTA



4. DEBT FINANCING PUBLIC INFRASTRUCTURE SPENDING

In this section, we consider whether governments should adopt a budget framework with a separate capital budget embedded within an accrual accounting framework. As noted by Wen, the main rationale for adopting a capital budgeting framework is the notion that a government's capital spending should be financed at least in part by borrowing, whereas current operating expenditures (or expense), should be financed out of current revenues.[29]

In discussing the debt financing of public infrastructure, it is useful to distinguish between three types of investments:[30]

- Projects that generate revenues through user fees, such airports and water works;
- Projects that do not have user fees, but generate additional tax revenues because they increase private sector productivity, such as schools and non-tolled highways;
- Projects that do not, directly or indirectly, generate additional revenues, but yield positive social benefits, such as hospitals, public parks, and environmental projects.

The first type of project can be "self-liquidating" in the sense that the present value of the stream of user fees will be greater than or equal to the cost of the project.[31] Debt financing of these projects is warranted and not controversial. Indeed, provision of public infrastructure would be greatly improved with greater use of user fees in pricing and financing public infrastructure.[32] In Alberta, much of the infrastructure that is provided by the public sector in other provinces or countries—electric power utilities and

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29 Jean-Francois Wen, "Capital Budgeting and Fiscal Sustainability in British Columbia" (Vancouver, B.C.: Fraser Institute, 2014), 6, http://www.fraserinstitute.org/research-news/display.aspx?id=21456.

30 See Easterly, Irwin and Servén, "Walking up," 42.

31 See Jack M. Mintz and Michael Smart, "Incentives for Public Investment under Fiscal Rules," World Bank Policy Research Working Paper 3860 (Washington, D.C.: World Bank, 2006).

32 See Philip Bazel and Jack Mintz, "The Free Ride is Over: Why Cities, and Citizens Must Start Paying for Much-Needed Infrastructure," University of Calgary School of Public Policy Research Paper 7, 14 (May 2014).

communications systems—is provided by the private sector, and in the areas where the provincial government is responsible for investing in infrastructure, such as the highway system, it has failed to adopt tolling as a way of generating revenues and paying for infrastructure. Consequently, it is the debt financing of the second and third types of projects that is the main concern of this paper.

There is a large body of empirical evidence that indicates that public sector infrastructure increases private sector productivity, output and incomes, although there is a wide range of estimates of the return on public infrastructure investments.[33] Some infrastructure investments are essential to the functioning of the economy, while others can be white elephants. Average returns are of little relevance in evaluating public infrastructure—individual projects need to be assessed on their own merits. That said, transportation facilities, schools, and university buildings will tend to increase the private sector output, which will generate additional tax revenue at existing tax rates. Does this justify debt financing such projects because they will be "self-financing"? In general, the answer is no. First, in most cases the rate of increase in private sector output has to be very high for a public investment to be self-financing through the additional tax revenues that it will generate. [34] In part, this is because the marginal tax rate on private sector incomes by provincial governments is relatively low, which is especially true in Alberta with its relatively low personal and corporate income tax rates and no provincial sales tax. A second reason is that expenditures on public infrastructure may reduce or drive out private investment spending, especially in an economy where the construction sector is booming. In this case, the net impact on public tax revenues may be zero or even negative because of the foregone tax revenues from displaced private sector investment. Consequently, it is generally a good practice to ignore the "self-financing through additional tax revenues" argument in assessing the merits of debt financing the second type of infrastructure investment.

The third type of project can be financed through some combination of current tax revenues and borrowing. The choice of finance is discussed in more detail below, but here we should note that many types of infrastructure spending will entail increases in current expenditures—new hospitals have to be staffed and new schools have to be heated and cleaned. These additional future current expenditures associated with new infrastructure need to be taken into account in making the financing decision.[35]

With this background, we begin with a brief overview of provincial public sector investment rates and public sector capital-output ratios (PSCO), and then turn to the question of whether, or to what extent, a government's capital expenditures should be debt financed?

Trends in Public Sector Investment

We begin by describing the trends in capital expenditures and the public sector capital stocks in the provinces to put the recent increase in capital expenditures in perspective. The focus of our attention is on Alberta because the need to increase public infrastructure spending in Alberta has become a prominent public policy issue.

Figure 2 shows the trend in the ratio of total public sector investment in Alberta to provincial gross domestic product (GDP) from 1981 to 2012. These figures reflect capital expenditures by all levels of government—federal, provincial and municipal—and by aboriginal public administrations. Over this period, capital expenditure on public administration by the provincial government and on education averaged 54 per cent of the total capital expenditures, while local and municipal governments' share averaged 35 per cent. Thus, almost 90 per cent of public sector capital spending in Alberta was

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[33] See Luis Servén, "Fiscal Discipline, Public Investment and Growth," in *Fiscal Policy, Stabilization, and Growth: Prudence or Abstinence?* ed. G. Perry, L. Servén and R. Suescún, (Washington, D.C.: World Bank, 2007), 213-214.

[34] See Easterly Irwin and Servén, "Walking up," 43.

[35] See Appendix 2 for an illustration of the impact of the increase in operating costs on debt financing infrastructure.

undertaken by the provincial-local government sector. Of course, the federal government has been involved, especially in recent years, in helping to finance some provincial and local government infrastructure spending, but these figures reveal the importance of provincial government infrastructure spending. In addition, the province plays a key role in helping to finance local and municipal government spending in Alberta.

Figure 2 shows that total public sector investment spending peaked at 5.5 per cent of provincial GDP in 1982, followed by a long gradual decline to 1.7 per cent in the 1996–98 period. Since 1998, the investment ratio has increased, and most recently it peaked at 3.7 per cent in 2009, before declining to just under three per cent in 2012. The very high public sector investment ratio in the early 1980s was part of the Lougheed administration's "province-building" policies. While these expenditures helped to provide needed infrastructure in a province that had experienced rapid growth in the 1970s, the rate of infrastructure spending was also based on predictions of future growth that proved overly optimistic in light of the decline in world oil prices starting in the mid-1980s. It will also be recalled that much of this infrastructure spending had a low social return—for example, the building of rural hospitals, many of which were ultimately closed or converted to other uses—and it contributed to the heavy dependence of the Alberta economy on the construction sector, which magnified the downturn that the province experienced when oil prices fell and private construction projects were cancelled. Thus, one should not look at the early 1980s as the "Golden Age of Public Sector Investment." It is possible to have too much of good thing, including public sector investment. (Other countries, such as Japan in the 1990s and now China, may have experienced excessive rates of debt-financed public infrastructure spending.[36]) The purpose of this section is not to determine what the optimal public sector investment rate should be, but rather the degree to which any level of capital spending should be financed by debt.

The long downward trend in the public sector investment ratio from 1983 to 1998 was in part a needed readjustment to the slower growth that the province experienced after the mid-1980s, but it was also the result of fiscal austerity measures that the provincial government implemented in response to the downturn in tax and non-renewable resource revenues and the budget deficits that the provincial government experienced in the 10-year period, 1985–1995.

The upturn in public sector investment since 1998 has been the product of the province's improved fiscal situation, following the spending cuts of the Klein-Dinning era and, since 2000, higher non-renewable resource revenues. The rapid growth rates that the province has experienced in the last 15 years has led to calls for more schools, expanded municipal water-treatment facilities, highways, roads, and mass-transit facilities.[37] Accommodating these demands for increased spending within a general commitment to balancing the budget has been a major challenge for the government.

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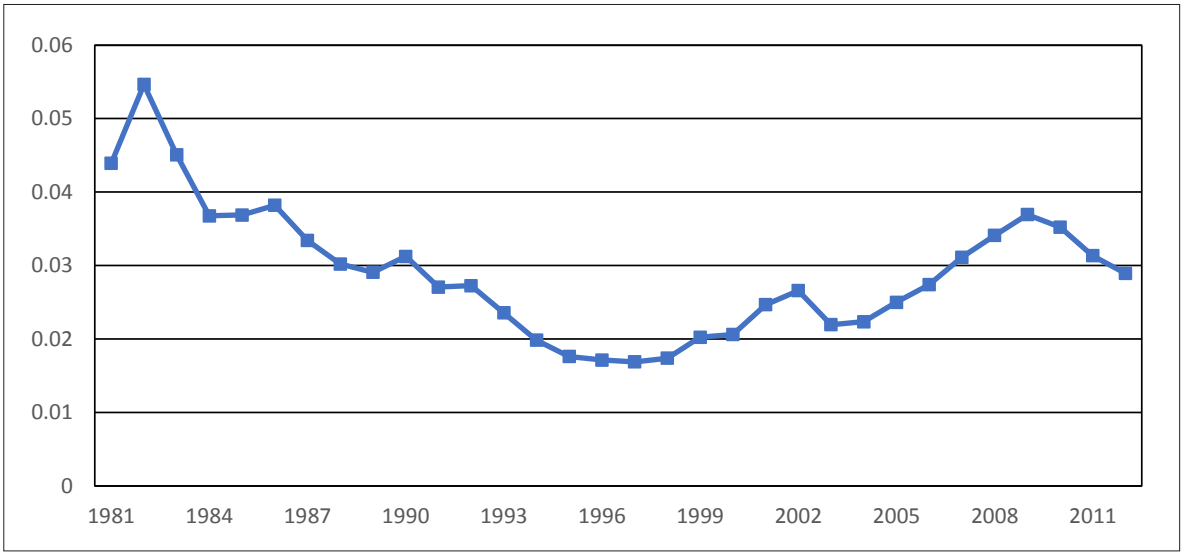
[36] See International Monetary Fund, "Is it Time for an Infrastructure Push? The Macroeconomic Effects of Public Investment," *World Economic Outlook: Legacies, Clouds, Uncertainties* (Washington, D.C.: October 2014), Box 3.1, 103-104, on whether Japan's debt-financed public expenditures contributed to its long period of slow growth.

[37] Premier Jim Prentice has pledged $2 billion in school construction. See James Wood and Chris Varcoe, "Prentice Pledges $2B in New Schools Amid Byelection Battle" *Calgary Herald*, October 8, 2014, http://www.calgaryherald.com/news/alberta/Prentice+pledges+schools+amid+byelection+battle+video/10274538/story.html.

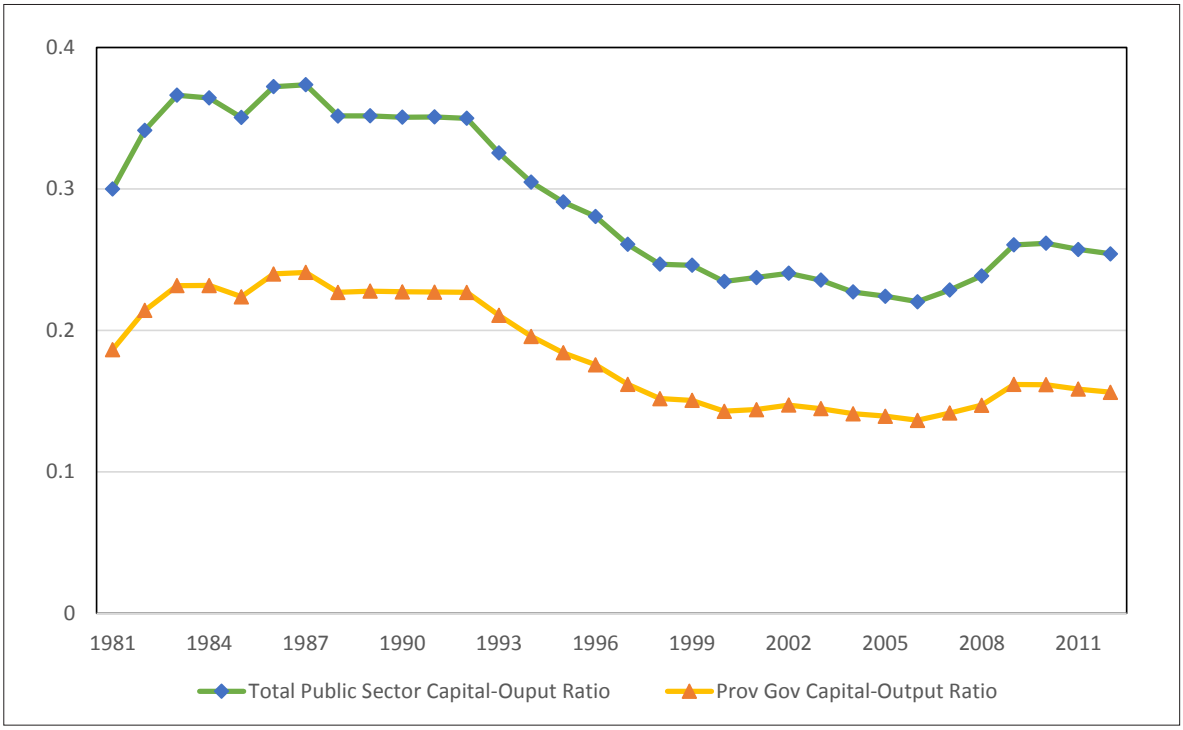
FIGURE 2 THE PUBLIC SECTOR INVESTMENT RATIO IN ALBERTA, 1981 TO 2012



Calculations based on data in CANSIM 031-0002 and 384-0038.

As Figure 3 shows, the trend in the ratio of the stock of public sector capital to GDP follows, in broad terms, the trend in the ratio of public sector investment spending to GDP, with the exception that the public sector capital-output ratio was relatively constant in the 1980s, before declining in the early 1990s. The lag in the decline in the PSCO ratio, compared to the decline in the public sector investment ratio, was due to the much slower average growth rate that the province experienced from the mid-1980s. Similarly, the uptick in the PSCO did not occur until 2006, in spite of the rising investment rate after 1998, because of the faster rate of economic growth that the province was experiencing. The figure shows the total PSCO ratio, as well as the provincial PSCO ratio, which we define as the sum of the provincial public-administration, education, health-care and social-services capital stocks. The "gap" between the two lines is mainly the local and municipal governments' PSCO ratio. By 2012, both the total PSCO ratio and the provincial PSCO ratio had levelled off at 0.254 and 0.156 respectively.

FIGURE 3 PUBLIC SECTOR CAPITAL-OUTPUT RATIOS IN ALBERTA, 1981 TO 2012



Calculations based on data in CANSIM 031-0002 and 384-0038.

The pressures to increase investment in public infrastructure and the problems in financing it are not unique to Alberta. In other provinces, such as Ontario, major infrastructure spending programs are underway, with spending that is largely financed by provincial government borrowing. Figure 4 shows the provincial governments' PSCO ratios in 10-year intervals since 1982. Three aspects of the trends in PSCO ratios stand out. First, all of the provincial governments' PSCO ratios declined between 1982 and 2002, with the largest reductions in the four Atlantic provinces.[38] Second, between 2002 and 2012, the provincial PSCO ratios increased in all provinces except Saskatchewan. A third point that the figure illustrates is that the PSCO ratios are higher in the provinces with relatively small populations. The average provincial PSCO ratio in the four largest provinces—B.C., Alberta, Ontario and Quebec—is 0.19, whereas the average in the other six provinces is 0.26. This suggests that there may be economies of scale in the provision of public infrastructure, which would imply that small provinces have to spend more each year, relative to GDP, to maintain their public infrastructure. This is a topic that warrants further investigation because it might imply, for example, that federal infrastructure grant programs should be more generous toward the smaller provinces.

[38] The IMF indicates that the decline in infrastructure has occurred throughout the developed and developing world. International Monetary Fund, *Government Finance*.

FIGURE 4 PROVINCIAL CAPITAL-OUTPUT RATIOS

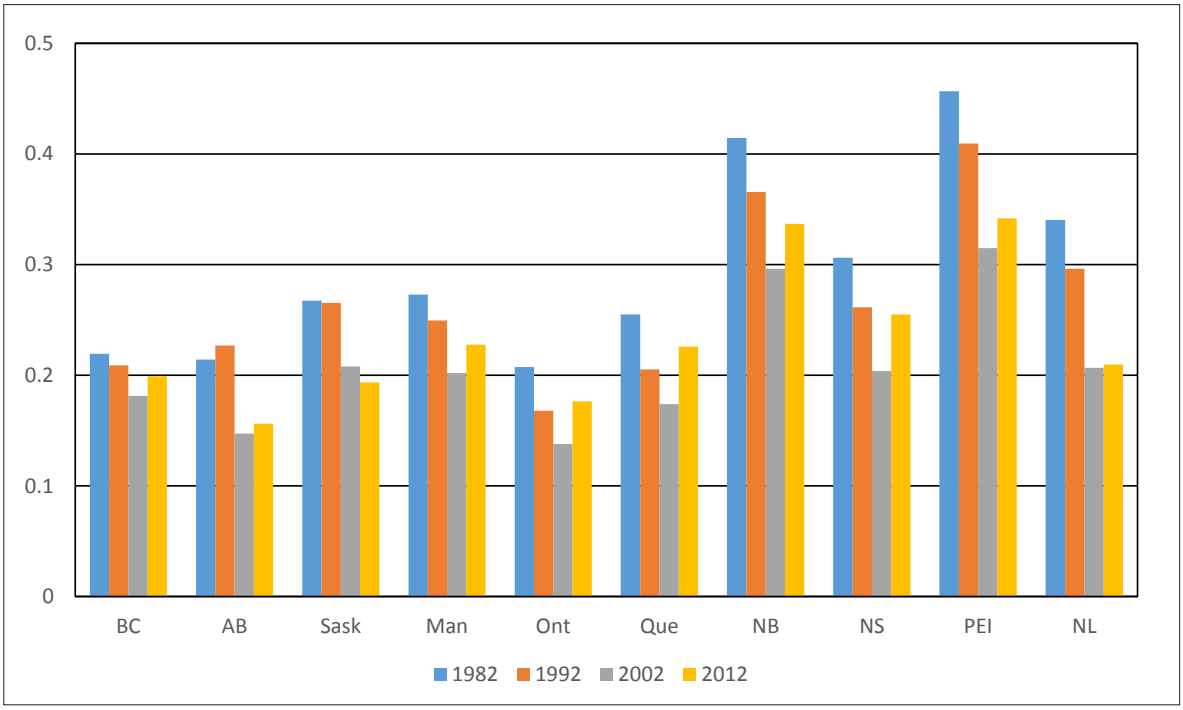
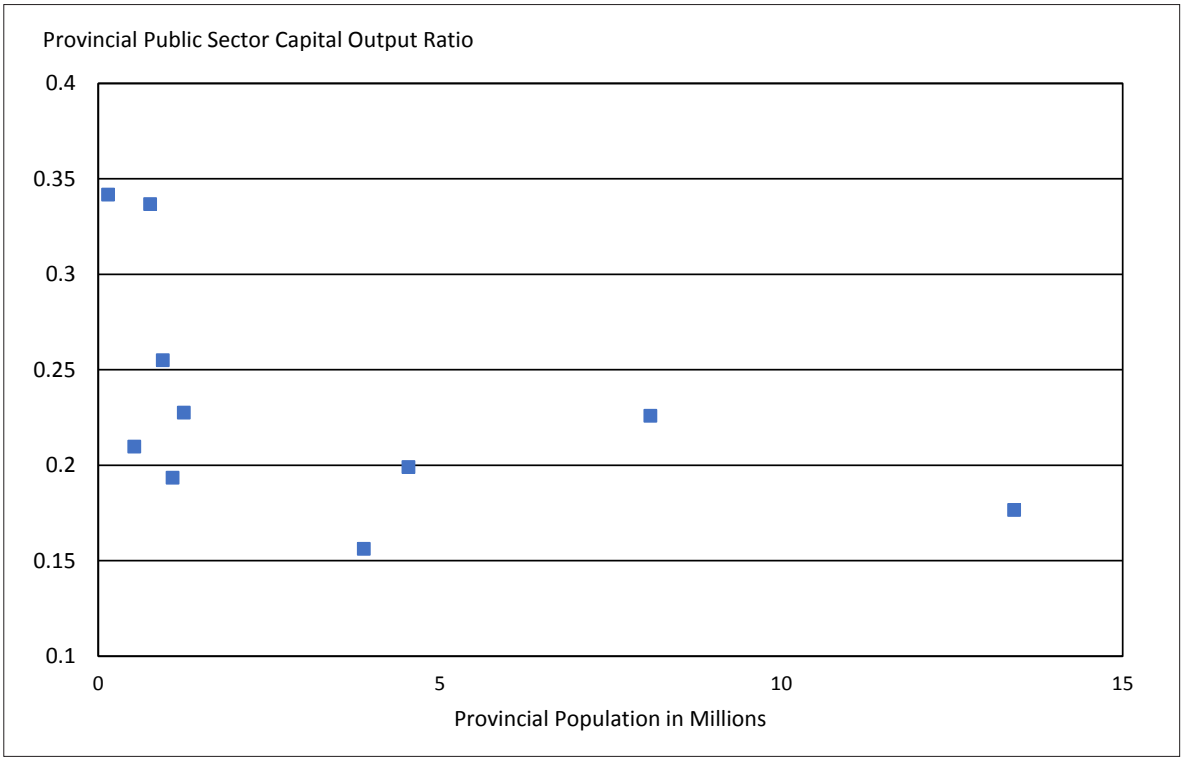


FIGURE 5 PROVINCIAL PUBLIC SECTOR CAPITAL-OUTPUT RATIOS VERSUS PROVINCIAL POPULATIONS IN 2012



Analogies with Private Sector Borrowing

The case for debt financing public infrastructure is sometimes justified by appealing to analogies to a household's purchase of a house or a private firm's financing of capital equipment. Some proponents of debt financing public sector capital expenditures point out that young households typically take out mortgages to purchase their homes. Usually their current incomes are not large enough to purchase a home, given other necessary expenditures on food, clothing and transportation. Instead of delaying the purchase of a home and saving enough to purchase one outright, they borrow to purchase a home that fits their current and future needs, and they pay off the mortgage over time as their incomes increase. While some elements of this analogy have relevance for financing public sector investments, such as the "consumption smoothing" aspect of borrowing to purchase housing, there are many differences that make the analogy far from a convincing case for public sector debt financing. First, households rarely have the ability or option to increase their current incomes—say, by working more hours—that governments have. Although painful and politically difficult in most situations, governments usually can raise additional revenues through higher taxes to finance investment expenditures if they were required to. Therefore, the option of financing capital expenditures out of current income, rather than borrowing, has more relevance for governments than for households. A second difference is the life cycle of a typical household, which may initially have a low, but rising income—peaking in the adults' 50s—followed by a retirement period, in which members are dependent on public and private pension incomes and savings to finance consumption. While societies age and their governments have to confront the fiscal problems that arise from an aging population, the size of these effects is on a different scale than the effects of aging on income and expenditures for an individual household. A third major difference is that one of the attractions of borrowing to finance the purchase of housing, even in the absence of the tax deductibility of mortgage interest payments, is that the return to this form of saving—the implicit income from owner-occupied housing and capital gains from the sale of a principal residence—is not subject to income taxation. There is no equivalent "tax" incentive for governments to borrow to finance capital expenditures.

Using the analogy of private firms' borrowing to purchase capital equipment to justify government borrowing to finance public infrastructure is also misleading. First, the primary source of funding for new investments by established firms is retained earning—that is, current income—rather than debt. Second, firms often prefer debt financing capital expenditures to issuing new equity because of the deductibility of interest payments under the corporate income tax. The tax incentive that the private sector has to issue debt to finance capital has no counterpart in the public sector. For these reasons, debt financing capital expenditures by the private sector does not provide a firm basis for justifying public debt policies.

Going beyond the analogies to the private sector, the three arguments that economists have employed to justify debt financing of public infrastructure are based on the need for fiscal stimulus, intergenerational fairness, and tax-rate smoothing.

Fiscal Stimulus

In an economy with unemployed resources and infrastructure bottlenecks, debt-financed infrastructure can boost the total output directly through increases in private sector output and indirectly through demand-side stimulation without increasing the debt-to-GDP ratio. The IMF argues that these conditions exist in the southern EU countries and many emerging market countries.[39] While debt-financing fiscal

[39] International Monetary Fund, "Is it Time." Martin Wolf and Laurence Summers also advocate debt-financed public infrastructure spending in the EU and the U.S. See Martin Wolf "Fiscal policy should not be decided by simplistic rules" *Financial Times* (October 16, 2014) and Laurence Summers "Why public investment really is a free lunch" *Financial Times* (October 6, 2014).

stimulus can be justified when an economy slips into a deep recession,[40] this argument has not been relevant in Alberta in recent years because of a low unemployment rate, skilled-labour shortages and high levels of private construction activity. The case may be stronger in other provinces that have higher rates of unemployment, but problems of timing the fiscal stimulus that occurs with large multi-year infrastructure projects remains a major drawback.

Intergenerational Fairness

One argument frequently made for debt financing infrastructure is that future generations will benefit from current infrastructure spending.[41] The rationale is based on the benefit principle: that individuals should contribute to the cost of public services in proportion to their share of the benefits. Infrastructure projects typically provide long-term benefits, and debt financing infrastructure spending means that future generations will bear part of the cost of current infrastructure spending because they will have to pay taxes to fund interest payments on that debt.

But as Mintz and Smart, and Smart, have argued,[42] the intergenerational argument is problematic. First, future generations do not have an opportunity to vote on current spending proposals, and existing generations can make financing decisions without taking into account net benefits and costs imposed on future generations. In other words, there is a danger that intergenerational-equity arguments can be abused and used as a rationale for excessive debt financing.

Second, even if the benefit principle is the motivation, the intergenerational distribution of burden from debt financing infrastructure is difficult to determine because it depends on whether debt is held domestically or externally, and on the extent to which current generations regard government debt as net wealth.

Third, it is difficult to determine the distribution of the benefits from infrastructure spending across current and future generations. The numerical example in Box 3 illustrates the distribution of the benefits among different cohorts and future unborn generations based on the current age distribution in Alberta and assumptions about the depreciation rate on infrastructure, and the discount rate that individuals apply to the benefits from a public sector investment and the population growth rate in the future.[43] In this very simple example, over 80 per cent of the benefits of current infrastructure spending accrue to people who are alive at the time when the investment is made. Less than 20 per cent of the benefits accrue to future generations (not yet born). This means that the main equity issue is the distribution of the benefits among the cohorts that are alive at the time the investment is made. In this example, an individual who is 65 will only receive 91.3 per cent of the benefits from an infrastructure investment that an 18-year-old would receive. However, the distribution of the province's tax burden is unlikely to distribute the costs of the infrastructure across age groups in this proportion. And, as already pointed out, the distribution of the burden from the debt financing of the public investment is also difficult to determine. Hence, intergenerational equity is a very ambiguous basis on which to justify debt financing of investment.

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[40] For an analysis of the gain from fiscal stimulus during the Great Recession in Canada and other OECD countries, see Bev Dahlby, *The Marginal Cost of Public Funds* (Cambridge, Mass.: MIT Press, 2008).

[41] Parliamentary Budget Officer, *Federal Balanced*, 10.

[42] Mintz and Smart, "Incentives for"; Michael Smart, "Capital budgeting and fiscal rules: A public economics perspective" (Working paper prepared for the Financial Investment Planning and Advisory Commission, 2007).

[43] All individuals are assumed to derive the same benefit from the public expenditure on the facility and that benefit declines over time because of depreciation at 7.5 per cent per year. All individuals are assumed to discount the stream of annual benefits that they receive from the project at rate of 4.5 per cent per year.

Tax-Rate Smoothing and Optimal Debt Financing

The basic idea underlying the tax-rate-smoothing rationale for debt financing capital spending is that, if a government is faced with the need to increase capital expenditures over a relatively short time period and still maintain a balanced budget, then a significant increase in tax rates would be required in the short term, followed by a reduction in tax rates when the rate of investment spending returns to a "normal" level. (Alternatively, the budget could be balanced with a sharp reduction in other areas of government spending during the surge in capital spending, but this would lead to service disruptions and other inefficiencies.) Taxes affect decisions to work, save and invest. Higher tax rates distort these economic decisions resulting in the loss of output and a decline in real incomes. The economic loss (also known as excess burden or deadweight loss) imposed by the tax system increases with tax rates. Therefore, in financing a given stream of expenditures, the economic loss imposed by the tax system is minimized when the government imposes a constant tax rate over time.[44] When there is a need to finance a surge in government spending—either to fight a war or to finance a major increase in the stock of public capital—it is most efficient to adopt a constant tax rate over time, which implies financing some or all of the surge in capital spending by borrowing. Typically, this will mean that the government will run a primary deficit during the surge in capital spending and a primary surplus when the rate of capital spending returns to its normal level. Indeed, for the government's fiscal policy to be sustainable, the present value of the current primary deficit and the future primary surpluses must be equal to the debt that is issued in order to finance the surge in spending.

Does a tax-smoothing model of optimal fiscal policy justify the debt financing of the current increase in infrastructure spending? In Appendix 2, we derive a formula for the proportion of capital expenditures that should be debt financed that is consistent with tax smoothing and satisfies the debt-solvency condition, i.e., that the present value of the government's primary surpluses is equal to (or exceeds) the amount of debt incurred in financing the investment expenditures. The model indicates that the optimal amount of debt financing depends on several key parameters: the interest rate on government debt; the growth rate of the economy; the rate at which public sector capital depreciates; and the rate of investment required to increase the public sector capital stock to a new, higher steady-state level. It also depends on future trends in operating expenditures and other sources of revenues (such as non-renewable resource revenues) and the extent to which a higher level of capital stock implies higher operating costs (hospitals have to be staffed, schools have to be heated, etc.)

The top line in Figure 6, labeled b_1, shows the optimal debt-financing ratios if a given percentage increase in the public sector capital-output ratio is to be achieved in one year. For example, if a 15 per cent increase in the public sector capital-output ratio is to be achieved in one year, then 54.4 per cent of the capital expenditure should be financed by debt. In general, the rate of debt financing increases with the percentage increase in the desired public sector capital-output ratio, but it is always much lower than 100 per cent debt financing even when the percentage increase in the capital-output ratio reaches very high (and probably infeasible) levels. More realistic scenarios involve gradual increases in the capital-output ratios over several years. For illustrative purposes, the figure shows the optimal debt-financing ratio if the given percentage increases in the public sector capital-output ratios are achieved over a six-year period. In this case, a 15 per cent increase in the public sector capital-output ratio over a six-year period would be consistent with only 8.8 per cent of the capital investment financed by debt. In other words, most of the capital expenditures in this case would have to be financed by some combination of increased taxes and cuts in other government expenditures. The second scenario is relevant for examining Alberta's fiscal policies because, as further described in Appendix 2, the provincial public sector capital-output ratio in Alberta increased by 14.7 per cent over the six-year period 2006–12. Thus, the model indicates that only a small proportion of the recent surge in provincial infrastructure spending should have been debt financed based on the tax-smoothing condition.

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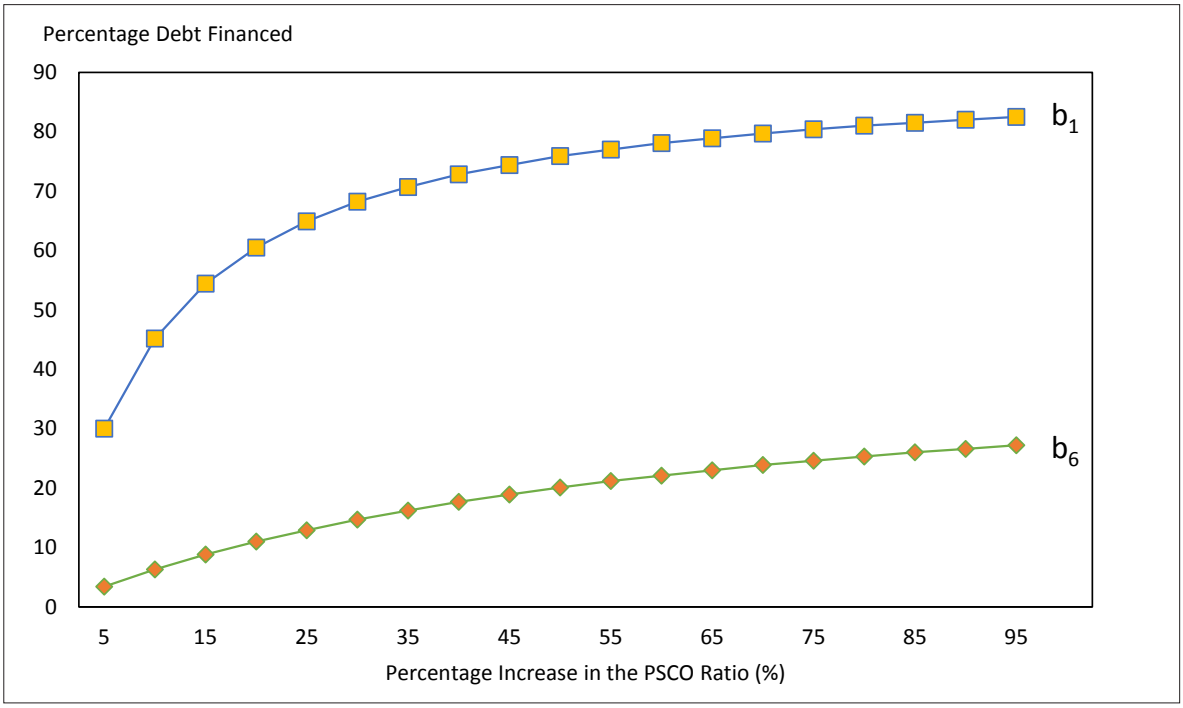
[44] See Robert J. Barro, "On the Determination of Public Debt," *Journal of Political Economy* 87 (1979): 940-971; and Dahlby, *The Marginal*, 217-221.

FIGURE 6 DEBT FINANCING PUBLIC INFRASTRUCTURE



5. CONCLUSIONS AND RECOMMENDATIONS

Budget documents are part of an information system that should provide the basis for the key fiscal decisions that are made by the government, and for informing the public about the government's plans, their impact on the private sector and the state of the government's finances. In any organization as large and complex as a provincial government, one particular way of organizing the budgetary data will never provide an adequate basis for informing the key decisions and their long-run implications. Although a government or a finance minister may want to adopt one particular approach, a variety of perspectives should be presented. Hence there is a need for bodies outside of government—think tanks, university researchers, and perhaps a fiscal council—to be able to convey, in different terms and perhaps in less technical language, alternative ways of representing the budget and the government's financial position.

Our overall assessment of the strengths and weaknesses of cash- and accrual-accounting frameworks favours a cash accounting framework for presenting the fiscal information in a provincial budget. However, it seems unlikely that Alberta or any other provincial government is going to abandon accrual accounting in the near future. But, even with the current budgeting framework, there is scope for providing a simpler presentation of a provincial government's financial and economic position in budget documents.

For most provincial governments, the most important fiscal indicator is its primary surplus or deficit because this is the key determinant of the government's fiscal sustainability. However, for a province such as Alberta, which receives significant non-renewable and volatile resource revenues, the most important fiscal indicator is the change in its net financial assets, because this indicates whether it is saving an adequate amount of these revenues for the future. In addition to the primary surplus and change in net financial assets, provincial governments should provide other summary measures of their fiscal position in their budget documents, along with plain-language definitions and simple explanations of their relevance in measuring the government's past performance and future plans. Such measures

would include the net operating balance, cash deficit or surplus, net debt or net financial assets, and capital expenditures. In appendices to the budget, these fiscal indicators should be presented in dollars per capita and as a percentage of provincial GDP as well as in millions of dollars. Current and projected values of these fiscal indicators should be presented along with historical value over the previous 10 to 20 years.

The main rationale for adopting a capital budgeting framework is the notion that a government's capital spending should be financed in large part by borrowing. However, after reviewing the main arguments for debt financing infrastructure spending—"the private sector does it," "it provides needed fiscal stimulus and is self-financing," "it promotes intergenerational equity," or "it is consistent with smoothing the tax rate over time"— we find that none of these arguments provides a strong basis for borrowing to finance infrastructure that is not "self-liquidating" (that is, it generates user fees that are sufficient, over time, to pay for the capital expenditures). Since the majority of public infrastructure spending is not self-liquidating, most public infrastructure spending should be financed mainly out of current income. This implies that when a province ramps up its infrastructure spending, it should be indicating how is going to finance that spending with higher taxes or reductions in other areas of spending. This is not a message that most provincial governments will want to hear.

The need for and the effectiveness of fiscal rules are highly contentious topics. However, in the Alberta context, it is clear that some fiscal rules regarding the savings rate from non-renewable resource revenues is essential. While the Alberta government has adopted such rules, the government has frequently altered them, and there has been little public analysis of a long-run fiscal plan for saving resource revenues. One exception was the Alberta Financial Investment and Planning Advisory Commission proposal that was presented to the government of Alberta in 2007, but it was largely ignored. The paper by van den Bremer and van der Ploeg sets out a comprehensive framework for establishing an intergenerational savings fund and a fiscal stabilization fund.[45] The implementation of that framework, which would see all of the non-renewable resource revenues deposited in the intergenerational savings fund once a stabilization fund was established, would require that adoption of rules concerning the size of the resource dividend that would flow from the intergenerational fund into the government's general revenue fund to finance current and capital expenditures. These rules determining the size of the resource dividend would need to be subject to public scrutiny and periodically revised in light of new information concerning the future flows of resource revenues, population and GDP growth rates, and returns on financial assets. We believe that an important role could be played by a fiscal council, composed of individuals with experience in the province's fiscal situation—such as former senior civil servants, academics, and ex-politicians including ex-finance ministers—supported by a small permanent secretariat. The fiscal council would provide advice to the government, but most importantly to the people of Alberta, on the how the intergenerational fund would operate and the size of the resource dividend that would finance provincial government spending over the next five years. While there is undoubtedly little appetite for replicating the Parliamentary Budget Office in an Alberta context, serious consideration should be given to the adoption of a new institution, such as a fiscal council, which would provide advice to the provincial government on the fiscal rules that would constrict the government's fiscal decisions, and would provide an ongoing and independent source of information for the Alberta public on the fiscal policies of the government and fiscal situation of the province.

[45] van den Bremer and van der Ploeg, "Digging Deep."

APPENDIX 1

THE FISCAL DYNAMICS OF A ZERO-NET-OPERATING BALANCED-BUDGET RULE

The following numerical example illustrates the dynamics of key fiscal variables under a zero-net-operating balanced-budget rule. Suppose in year zero, the public sector capital-output ratio, k, is 15 per cent of GDP. In all previous periods, capital has been financed by debt and the debt-to-GDP ratio, b, is also 15 per cent. Suppose the interest rate on public debt, ρ, is 4.5 per cent and the depreciation rate of the capital stock, δ, is 7.5 per cent. The government has been maintaining the capital stock and therefore the initial investment rate, i, is equal to 0.075 x 15 or 1.125 per cent of GDP. Finally, assume that the current expenditures on goods and services, g, is 10 per cent of GDP and this remains constant over time. The net operating balance is zero with a tax rate, τ, equal to g + δk + ρb or 11.8 per cent of GDP. The government's primary surplus, ps = τ – g – i, is 0.675 per cent of GDP. Note that in the initial situation the present value of the government's current and future primary surpluses is 0.675/0.045 or 15 per cent of GDP, which is equal to the government's debt ratio. Therefore, in the initial situation the government's fiscal variables satisfy the solvency condition that the present value of its primary surpluses is equal to debt.

Now suppose the government wishes to increase the public sector capital-output ratio from 15 per cent of GDP to 20 per cent of GDP. To do this, it sets net investment rate equal to 40 per cent of the gap between the desired capital-output ratio and the current capital output. The investment ratio in year t is determined by the equation:

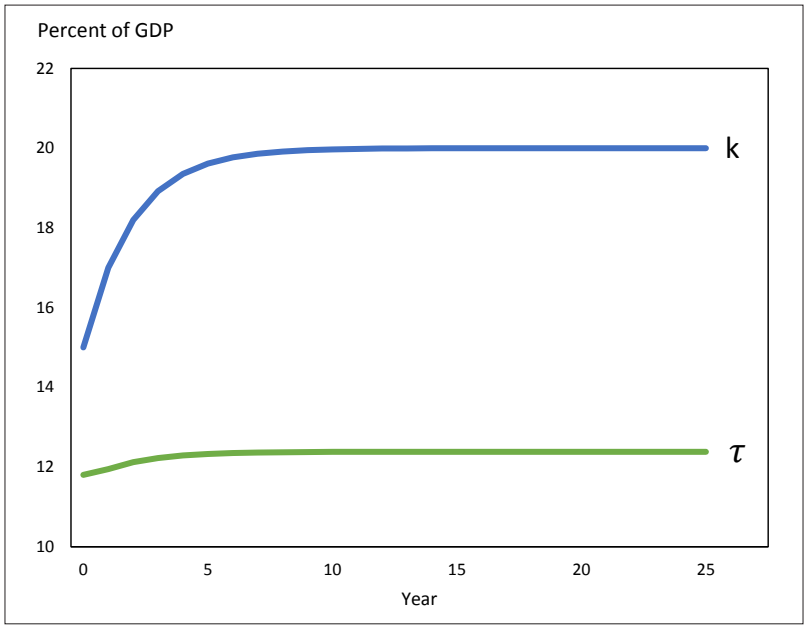
$$i_t = \delta k_{t-1} + 0.4(20 - k_{t-1})$$

Figure 7 shows the time path of the investment rate and the capital stock under this investment plan. The investment rate initially increases to 3.125 per cent of GDP and then gradually declines to 0.075 x 20 or 1.5 per cent of GDP. If the government maintains a zero operating balance in each year, the tax rate will slowly increase from 11.8 per cent of GDP to 12.4 per cent of GDP as depreciation and interest payments on the debt used to finance the investment expenditures increases. The long-run increase in the tax burden is (ρ + δ)Δk, where Δk is the increase in the steady-state capital-output ratio.

The figure also shows that with the zero net operating balance, the primary surplus initially becomes a primary deficit, but then slowly increases and reaches 0.9 per cent of GDP in the long run. Because the primary surpluses are initially negative and only slowly approach 0.9 per cent of GDP, the present value of current and projected primary surpluses under the zero-net-operating balanced-budget rule is less than the value of the government's debt. Thus the government's solvency condition is not satisfied under the zero-net-operating balanced-budget rule.

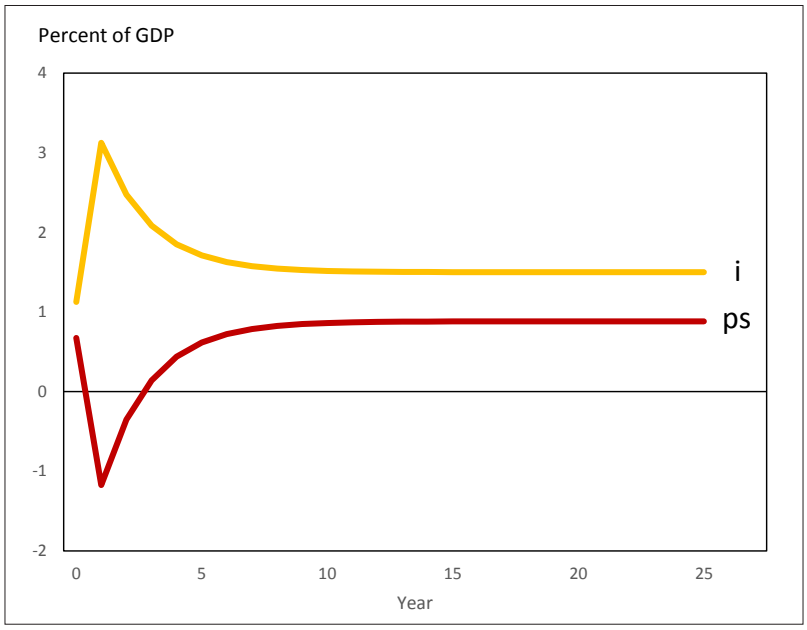
Another important point that this example illustrates is that when a government undertakes an increase in the investment rate to raise the capital-output ratio, the tax rate will have to gradually increase over time, assuming that other operating expenditures remain constant, if it follows a zero-net-operating balanced-budget rule. As discussed in the text, this is inconsistent with the "tax-smoothing" version of the optimal tax policy to finance a given stream of expenditures.

FIGURE 7A



k is the public sector capital output ratio
t is the tax rate

FIGURE 7B



i is the investment rate
ps is the primary surplus

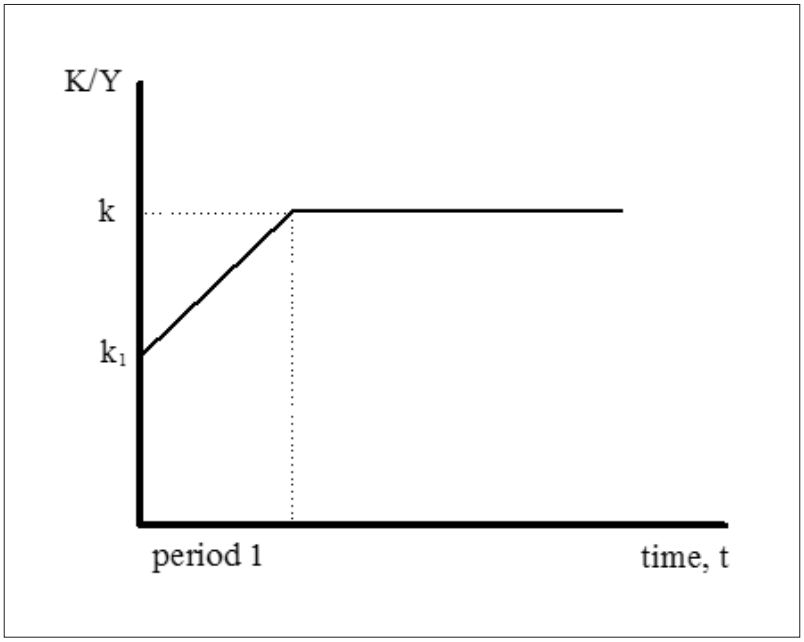
APPENDIX 2

TAX SMOOTHING AND DEBT FINANCING PUBLIC INFRASTRUCTURE INVESTMENTS

In this appendix, we develop a simple a model of the debt financing of a public sector investment program that is consistent with the tax-smoothing condition. Figure 8 illustrates the basic framework that we use to analyze debt financing of a public infrastructure program. In the initial period, labelled period 1, the stock of public infrastructure is K_1. Let Y_1 be total output of the economy in period 1. The ratio of the initial public sector capital stock to output is $k_1 = K_1/Y_1$.

The government plans to increase the ratio of the public sector capital stock to output to $k > k_1$ by the end of period 1. It will be convenient to think of each period as n years long, where for example n = 5.

FIGURE 8



The government's budget constraint in period 1 is:

$$\tau_1 \cdot Y_1 + \theta_1 \cdot Y_1 = G_1 + c \cdot K_1 + b \cdot \rho \cdot I_1 + (1 - b) \cdot I_1$$

where:

τ_1 is the tax rate in period 1, expressed as a proportion of total output;

θ_1 is the ratio of non-tax revenues (intergovernmental grants, user fees, resource revenues, etc.) to output;

G_1 is current expenditures not associated with public infrastructure, e.g., transfers to individuals and businesses;

$c \cdot K_1$ is operating expenditures associated with the capital stock (e.g., staffing of hospitals, snow removal from roads and streets);

I_1 is gross public investment in period 1;

b is the fraction of the gross public investment in period 1 that is financed by debt;

ρ is the interest rate on public debt.

The budget constraint in each future period, t = 2, 3, …, is:

$$\tau_t \cdot Y_t + \theta_t \cdot Y_t = G_t + c \cdot K_t + b \cdot \rho \cdot I_1 + I_t$$

In each future period, the government will pay $b\rho I_1$ as interest payments on the public debt incurred in period 1. Future gross investment expenditures will be financed out of current revenues.

The public sector's stock of capital changes over time according to the equation:

$$K_t = (1 - \delta) \cdot K_{t-1} + I_{t-1}$$

where δ is the rate of depreciation of the capital stock. We assume that total output grows at a constant rate γ. The investment rate, i = I/Y, that is required to maintain a constant public sector capital-output ratio equal to k is:

$$i = (\gamma + \delta) \cdot k$$

The gross investment rate in period 1, $i_1 = I_1/Y_1$, is:

$$i_1 = (1 + \gamma) \cdot \left(k - k_1\right) + (\gamma + \delta) \cdot k_1$$

The first term on the right-hand side is the investment needed to increase the net capital stock, the second term is the investment needed to maintain the existing capital-output ratio because of depreciation and growth.

We assume that the ratio of current expenditures to output, G_t/Y_t, will be constant in the future and equal to g. We also assume that the ratio of non-tax revenues to output will be a constant, θ, in future periods. Finally, we assume the government minimizes the deadweight loss of financing its current and future expenditures by adopting a constant tax rate, $\tau = \tau_1 = \tau_t$. This is the tax-smoothing condition, which under certain conditions is consistent with minimizing the deadweight loss from financing public expenditures.

The primary surplus of a government is the difference between the government's total revenues and its non-interest expenditures. Debt financing of the investment program will be sustainable if the present value of the primary surpluses of the government are equal to, or greater than, the debt that is incurred in period 1. Let the primary surplus in period 1 be $P_1 = \sigma_1 Y_1$ where:

$$\sigma_1 = \tau + \theta_1 - g_1 - c \cdot k_1 - i_1$$

The primary surplus in each future period will be $P_t = \sigma Y_t$ where:

$$\sigma = \tau + \theta - g - (c + \gamma + \delta) \cdot k$$

In most situations, in order to increase the capital-output ratio in period 1, the primary surplus in period 1 will be negative; i.e., the government will have a primary deficit, and the government will run a positive primary surplus in future years to finance its debt. That is, we expect $\sigma_1 < 0$ and $\sigma > 0$.

The present value of the government's primary surpluses will be equal to:

$$PVP = P_1 + \sum_{t=2}^{\infty} \frac{P_t}{(1+\rho)^{t-1}} = \sigma_1 \cdot Y_1 + \sigma \cdot Y_1 \cdot \sum_{t=2}^{\infty} \frac{(1+\gamma)^{t-1}}{(1+\rho)^{t-1}}$$

This expression can be simplified as:

$$PVP = \left(\sigma_1 + \beta \cdot \sigma\right) \cdot Y_1$$

where:

$$\beta = \sum_{t=2}^{\infty} \frac{(1+\gamma)^{t-1}}{(1+\rho)^{t-1}}$$

The government's debt in period 1 is:

$$B_1 = b \cdot i_1 \cdot Y_1$$

The government's fiscal policy will be sustainable if PVP = B_1 or:

$$\left(\sigma_1 + \beta \cdot \sigma\right) = b \cdot i_1$$

The fiscal sustainability condition above, along with the government's first-period budget constraint,

$$\tau + \theta_1 = g_1 + c \cdot k_1 + b \cdot \rho \cdot i_1 + (1-b) \cdot i_1$$

allows us to solve for b, the proportion of investment in period 1 that can be financed by debt, where:

$$b = \frac{\beta}{[2 + \beta - \rho \cdot (1+\beta)]} \cdot \left[1 - \frac{\left[\left(\theta - \theta_1\right) - \left(g - g_1\right) + (\gamma + \delta + c) \cdot k - c \cdot k_1\right]}{i_1}\right]$$

The terms in square brackets imply that the fraction of the first period's investment expenditure that can be financed by debt is higher:

- if i_1 is larger compared to $(\gamma + \delta)k_1$, which is the investment rate required to maintain the current capital-output ratio at k_1;
- if the current expenditure rate, $g - g_1$, will be lower in the future;
- if the non-tax revenues, $\theta - \theta_1$, will be higher in the future;
- if the operating expenditures associated with the increase in the capital stock, $c(k - k_1)$, are lower in the future.

In the case where $\theta - \theta_1 = 0$ and $g - g_1 = 0$, the formula for the optimal rate of debt financing can be simplified as:

$$b = \frac{\beta}{[2 + \beta - \rho \cdot (1 + \beta)]} \cdot \left[\frac{\Delta k \cdot (1 - \delta - c)}{[(1 + \gamma) \cdot \Delta k + (\delta + \gamma)]} \right]$$

where Δk is the proportionate rate of increase in the public sector capital-output ratio;

$$\Delta k = \frac{k - k_1}{k_1}$$

This model can be used to provide some guidance as to the amount of debt financing that the government of Alberta could undertake in financing its current capital program. The spurt of infrastructure spending over the 2007–12 period raised the provincial capital-output ratio from 0.136 to 0.156. For the purposes of illustrating the model, we will assume the government plans to maintain its capital-output ratio at 0.156 and we can calculate that the fraction of the investment expenditure in the six-year period, 2007–12, should have been financed by debt to satisfy the tax-smoothing objective. We will assume a long-term average annual growth rate for GDP in Alberta of three per cent, an annual interest rate of 4.5 per cent, and an average depreciation rate for public sector capital is 7.5 per cent. Over a six-year period, this implies that $\rho = 0.302$, $\gamma = 0.194$, and $\delta = 0.543$. Given these values and $k_1 = 0.136$ and $k = 0.156$, $\Delta k = 0.147$. Furthermore, we will assume that the will be no change in the current expenditure ratio, $g_1 = g$, or the non-tax revenue ratio, $\theta_1 = \theta$. Another important variable in these calculations is the increased spending that occurs as a result of the increase in the public sector stock of capital. To determine the sensitivity of borrowing to this calculation, we initially assume that there is no link between capital and current operating expenditures, i.e., $c = 0$. Given these values, the model indicates that only 8.6 per cent of the public investment expenditure that occurred over the six-year period should have been financed by debt in order to maintain a stable or constant tax rate in the province over time. However, an increase in public infrastructure will invariably increase operating expenditures (new hospitals have to be staffed, roads and streets cleaned, etc.). Over the period, 1981 to 2012, general government current consumption spending averaged 15 per cent of GDP in Alberta. If all of this is attributable to operating public infrastructure, then $c = 0.652$. This implies that an additional dollar of public sector capital requires an additional 65 cents in annual operating expenditures. This is undoubtedly a high estimate for the public sector as a whole, although perhaps not for hospitals. If we assume a more realistic estimate of $c = 0.20$ for the public sector as a whole, the model indicates that 4.9 per cent of the investment in the 2007–12 period should have been financed by debt to maintain a constant tax rate.

If instead of the narrow definition of the provincial government's capital-output ratio, we used the total public sector capital ratios in 2006 ($k_1 = 0.22$) and 2012 ($k = 0.254$), then the optimal rate of debt financing would be only slightly higher at nine per cent if $c = 0$ or 5.1 per cent if $c = 0.2$.

Box 1
The Norwegian Fiscal Budget and Government Pension Funds, 2014
(Billions of Norwegian Krona, NOK)

	Accounts		Estimates	
	2011	2012	2013	2014
Total revenues	1 223,5	1 290,7	1 286,0	1 295,0
1 Revenues from petroleum activties	372,2	421,1	373,9	344,1
1.1 Taxes and excise duties	209,7	232,7	206,5	186,5
1.2 Other petroleum revenues	162,6	188,4	167,4	157,6
2 Revenues other than petroleum revenues	851,3	869,6	912,0	950,9
2.1 Taxes and excise duties from Mainland Norway	777,5	807,4	855,2	896,9
2.2 Other revenues	73,7	62,2	58,8	54,0
Total expenditures	952,1	996,1	1 058,5	1 114,0
1 Expenditures on petroleum activities	21,4	25,6	30,0	30,0
2 Expenditures other than petroleum activities	930,7	970,5	1 028,5	1 084,0
Fiscal budget surplus before transfers to the Government Pension Fund Global	271,4	294,6	227,5	181,0
- Net cash flow from petroleum activities	350,8	395,5	343,9	314,1
= Non-oil surplus	-79,4	-100,9	-116,5	-133,1
+ Transfers from the Government Pension Fund Global	84,2	104,6	116,5	133,1
= Fiscal budget surplus	4,8	3,7	0,0	0,0
+ Net allocation to the Government Pension Fund Global	266,6	290,9	227,5	181,0
+ Interest earnings and dividends to the Government Pension Fund	103,0	115,3	129,4	146,6
= Surplus, fiscal budget and Government Pension Fund	374,4	409,9	356,9	327,6
Memo:				
Market value of the Government Pension Fund Global[1]	3 308	3 825	4 729	5 203
Market value of the Government Pension Fund[1]	3 437	3 970	4 882	5 366
National insurance scheme – old-age pension liabilities[1]	5 181	5 474	5 769	6 060

Source: Royal Ministry of Finance, Government of Norway, The National Budget 2014, Table 3.1, p. 9.

Note that the net cash flow from petroleum activity, which is revenues from petroleum activities minus expenditures on petroleum activities, is subtracted from total revenues to obtain the non-oil surplus, which in the 2014 budget is a deficit of 133.1 billion NOK. The fiscal budget is balanced by a transfer of 133.1 billion NOK from the Government Pension Fund Global, the petroleum revenue savings fund. This transfer is 2.8 per cent of the value of the GPFG at the end of 2013. The Norwegian government's policy is to transfer about four per cent of the GPFG to cover the non-oil surplus, but the actual transfer varies with economic conditions and returns on the fund.

Box 2
Fiscal Rules in Alberta

Alberta *Spending Control Act* 1992 (R). Superseded by *Deficit Elimination Act* Limited program spending growth for 1992–93 to 1994–95.

Deficit Elimination Act 1993. Superseded by *Fiscal Responsibility Act*
Set annual deficit limits for 1993–94 and to balance by 1996–97 and thereafter; adjustments allowed between fiscal years; required interim reporting and any ex post revenue above forecast to be used for debt reduction.

Balanced Budget and Debt Retirement Act 1995. Prohibited ex post deficits, required specific future debt repayment schedule over the 1997–2021 period at five-year increments in order to eliminate provincial net debt by 2021; interim reporting; smoothing of resource revenues.

Alberta Taxpayer Protection Act 1995. Referendum required to adopt a provincial sales tax.

Government Accountability Act 1995. Required the finance minister to prepare a consolidated budget plan and government business plan annually (with a forecasting horizon of at least three years), including major assumptions, performance indicators, and a statement of ministerial responsibility; quarterly budget progress reporting also required.

Fiscal Responsibility Act 2000. Prohibits ex post deficits; required a contingency reserve of one per cent of revenue; established Alberta Sustainability Fund.

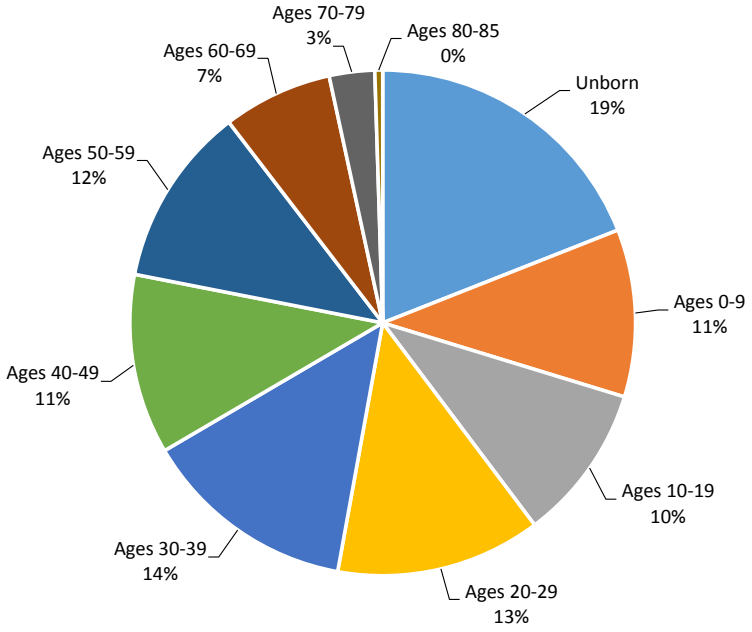
Fiscal Management Act 2013. Establishes the financial management framework of the province.

Source: Stephen Tapp, "The Use and Effectiveness of Fiscal Rules in Canadian Provinces," *Canadian Public Policy* 39 (2013): Appendix A, 63; and Alberta Treasury Board and Finance website, "Financial Legislation," http://www.finance.alberta.ca/business/budget/financial-legislation.html.

Box 3
An Example of the Age Distribution of the Benefits of a Public Infrastructure Project.

Consider a public facility that provides the same annual benefit to all individuals in a province, although benefits will decline each year at the assumed depreciation rate, 7.5 per cent a year, the average depreciation rate on public sector capital in Alberta according to Statistics Canada Cansim Table 031-0002. A once-and-for-all expenditure on the facility is made in year zero. Individuals discount the stream of benefits from the facility at 4.5 per cent per year. Life expectancy for individuals is 85 years. Thus, a 65-year-old is assumed to benefit from the facility for 20 years, while an 18-year-old will benefit for 67 years. It is assumed that the age distribution of the population is that of Alberta in 2014 based on the data in Cansim Table 051-0001, and that the population of the unborn generations will grow by two per cent each year.

Given these assumptions, it is possible to calculate the share of the total benefits received by each age cohort and all future (unborn) generations. See the figure below. The calculations indicate that 81 per cent of the benefits would accrue to individuals who are alive at the time the investment is made. Future generations would only receive 19 per cent of the benefits.



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