An Evaluation of Three Alternative Fiscal Anchors for Canada

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Contents

Executive Summary

The current and projected fiscal policies of Canadian governments as a whole are unsustainable, with the net debt to GDP ratio steadily increasing to 131 percent in 2050 in our base case projection. While there is uncertainty about future trends in the key fiscal variables, such as the growth rate of health care spending, Canadian governments should begin to adopt fiscal anchors or rules to prevent an increasing debt-to-GDP ratio over time.

Adopting fiscal rules that contain a clear commitment to sustainable fiscal policies will help reduce the economic uncertainty that adversely affects private sector savings and investment decisions, the bias towards deficits financing public expenditures, and the adoption of pro-cyclical fiscal policies that can exacerbate the economic fluctuations. Skepticism about the usefulness of governments adopting fiscal rules is warranted because in the past the federal and provincial governments have abandoned such rules when they became binding or imposed difficult fiscal choices. However, studies by the IMF have shown that governments that have adopted fiscal rules have stronger fiscal positions and more stable fiscal policies.

In this paper, we evaluate three fiscal anchors that Canadian governments could adopt—a debt reduction target, a ceiling on the ratio of interest payments to revenues, and a balanced budget rule—balancing the primary budget either through expenditure restraint or tax increases. We simulate the adoption of these fiscal anchors using an economic model in which governments' fiscal policies affect the growth rate of the economy and the real interest rate on public debt. Each scenario has different implications for government debt ratios, economic growth rates, and real interest rates on government debt from 2025 to 2050.

We rank these alternative fiscal anchors based on their potential for providing both public and private goods and services and income transfers over the 25-year time horizon of the models. We find that achieving and then maintaining a primary budget balance through expenditure restraint is the best fiscal anchor because it would allow for both more private consumption and higher public expenditures in present value terms than any of the other fiscal anchors. Similarly, the debt target anchor would be preferred to a ceiling on the ratio of interest payments to revenues, which in turn would be preferred to balancing the primary budget through tax

increases. While this ranking of the fiscal anchors is based on the particular scenarios we have investigated, we feel that it would be robust to alternative strategies for implementing these fiscal rules.

We recognize that maintaining a primary balance raises important implementation issues. Strict adherence to a zero primary balance could lead to abrupt and wasteful increases in program spending during an economic boom when there is a surge in government revenues, or abrupt and harmful cuts in current and capital spending with a downturn in the economy and a decline in tax revenues. To avoid pro-cycle spending that would contribute to macroeconomic fluctuations, governments can adopt a rule that places a ceiling on the growth rate of their expenditures. The range of expenditures to be covered by the ceiling should be broad, covering those current and capital expenditures that the government can control in the medium term, but not include expenditures that have a cyclical component, such as unemployment insurance or social assistance payments.

Our main result—that fiscal consolidation based on expenditure restraint provides better economic outcomes than policies that rely on higher taxes—is consistent with the conclusion reached by Alesina, Favero, and Giavazzi in their pioneering study, *Austerity: When It Works and When It Doesn't*, of 200 episodes of fiscal austerity in 16 OECD countries from the 1970s to 2014. They concluded that "on average, expenditure-based adjustments have consistently much lower costs than tax-based ones…" This is a lesson that Canadian governments should heed when they consider the fiscal policies that are required to put Canada's public finances on a sustainable path in the aftermath of the COVID-19 shock.

1. Introduction

Countries around the world incurred unprecedented fiscal deficits in response to the pandemic. With the resulting increase in public sector debts, governments, international financial institutions, and think tanks have started to consider new fiscal anchors or rules that should guide governments' fiscal policies in the future. To be effective, a fiscal anchor must constrain a government's fiscal choices affecting debt, deficits, expenditures, or interest payments. A clear commitment to sustainable future fiscal policies helps reduce the economic uncertainty that adversely affects private sector savings and investment decisions. It may also reduce the bias towards financing public expenditures through deficits, which can threaten the long-term sustainability of a government's finances, or the adoption of pro-cyclical fiscal policies that can exacerbate the economic fluctuations. In some jurisdictions, a fiscal rule may help to limit a per-ceived political bias to excessive spending and taxation.

According to the IMF, fiscal rules should (a) promote long-term fiscal sustainability; (b) help stabilize economic activity by restricting pro-cyclical fiscal policies; (c) apply to fiscal variables that are under the control of the fiscal authority; (d) provide a government with reasonable options for addressing the fiscal situation when the rule is binding; and, (e) be transparent so that they can be understood by the public, are not subject to manipulation or creative accounting, are coherent, and are ap-plied to broad components of the budget.[1] Above all, Eyraud et al. (2018b: 4) stress that fiscal rules should be simple, flexible, and enforceable. The most common fiscal anchor is the ratio of a government's debt to the relevant jurisdiction's annual Gross Domestic Product (GDP). Over 70 countries have adopted a ceiling on public debt as part of their fiscal rules. The EU has recently revised and made more flexible its fiscal rules for its member countries now that all of the major economies have debt-to-GDP levels in excess of the 60 percent limit that was established in the Growth and Stability Pact in 1997 (Blanchard et al., 2021; European Commission, 2022). In Canada, prior to the pandemic, the federal government had adopted a fiscal anchor of maintaining a debt-to-GDP ratio of close to 30

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[1] See Dahlby (2021) on the selection of fiscal rules in Alberta.

percent (Canada, Department of Finance, 2019: Chart A1.11). Currently, the federal government is only committed to reducing the debt-to-GDP ratio (Department of Finance, 2022, p. 58). Alberta's government has set a goal of keeping its net debt-to-GDP ratio below 30 percent.

Skepticism about the usefulness of governments adopting fiscal rules is warranted because the federal and provincial governments have abandoned such rules when they became binding or imposed difficult fiscal choices.[2] However, studies by the IMF have shown that fiscal rules can work.[3] In its overall assessment of the efficacy of fiscal anchors, Eyraud et al. (2018b) concluded that fiscal rules are "correlated with stronger fiscal positions and more stabilizing policies" (p. 12) and that "even though fiscal rules are not a panacea, they can make a dent into the deficit bias depending on country circumstances and design features" (p. 16).

In this paper, we evaluate three fiscal anchors that Canadian governments could adopt—a debt reduction target, a ceiling on the ratio of interest payments to revenues (aka Dodge's Rule), and a balanced budget rule— using a model in which governments' fiscal policies affect the growth rate of the economy and the real interest rate on public debt. We run the model for a base case scenario in which Canadian governments' fiscal policies are unsustainable because of an ever-increasing government debt-to-GDP ratio. We then examine scenarios in which each of these fiscal anchors would be implemented to achieve a sustainable fiscal policy. Each of these fiscal anchors results in a different path for tax rates, public expenditures, government debt ratios, and economic growth rates over the 25-year period projected by our model. To rank the fiscal anchors, we compare their projected public expenditures and household consumption spending levels over this 25-year time horizon. On this basis, we conclude that balancing the primary budget through expenditure restraint is the preferred fiscal anchor because it would allow for more private consumption and higher public expenditures, in present value terms, than the other anchors. Similarly, the debt target anchor would be preferred to Dodge's Rule of keeping the ratio of interest payments to revenues below 10 percent, which in turn would be preferred to balancing the primary budget through tax increases.

The paper is organized as follows. Section 2 provides an overview of the structure of the model and a simulation of the key fiscal and economic variables in the base case. (Appendix 1 contains the model's equations. Appendix 2 describes our econometric model of the impact of fiscal variables

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[2] For example, the Alberta government has adopted and then abandoned seven different sets of fiscal rules since 1992.

[3] See Simpson and Wesley (2012) and Tapp (2013) on the impact of fiscal rules in Canada.

on economic growth in Canada, which is the source of the key parameter values our model uses.) In Section 3, we demonstrate how each of these fiscal anchors could be implemented and their impacts on debt ratios, economic growth rates, and real interest rates. Section 4 discusses our ranking of the fiscal anchors, and Section 5 summarizes our conclusions.

2. The Model and Debt Dynamics in the Base Case

We begin with a brief description of the model that we use to evaluate the fiscal anchors. (See Appendix 1 for the model's equations.) The initial values of the fiscal variables in the model are based on the values for the federal, provincial, territorial, and local (FPTL) government sector in Canada circa 2019. It is important to note that the FPTL sector does not include the Canada Pension Plan (CPP), the Quebec Pension Plan (QPP), and other social security funds that are included in the IMF's definition of "general government." We exclude the CPP and QPP because any fiscal anchors adopted by Canadian governments will generally not apply to, or incorporate the finances of, the CPP and QPP, whose fiscal parameters are based on maintaining the long-run viability of the public pension systems. We also focus on the aggregate FPTL, rather than the fiscal variables for the federal government or a particular province or territory, because we believe that it is important to consider the overall viability of public sector finances in Canada rather than focusing on any one of the 14 governments on its own.

We use the model to project the growth rate of the economy, the real interest rate on government debt, and the debt ratio of the FPTL sector from 2025 to 2050.[4] Four behavioural parameters in the model determine the impact of changes in current and capital expenditures by governments and tax rates on the growth rate of the Canadian economy. These parameter estimates are based on the econometric model of the determinants of economic growth in Canada described in Appendix 2. The model has the standard property of a neo-classical growth model in that fiscal policy shocks affect the growth rate of the economy in the short to medium term, but the economy eventually returns to its long-term potential growth rate. The econometric model indicates that a debt-financed increase in govern-

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[4] See Dahlby, Ferede, and Fuss (2022) for an overview of trends in Canadian economic growth rates, real interest rates, primary budget balances, and government debt-to-GDP ratios.
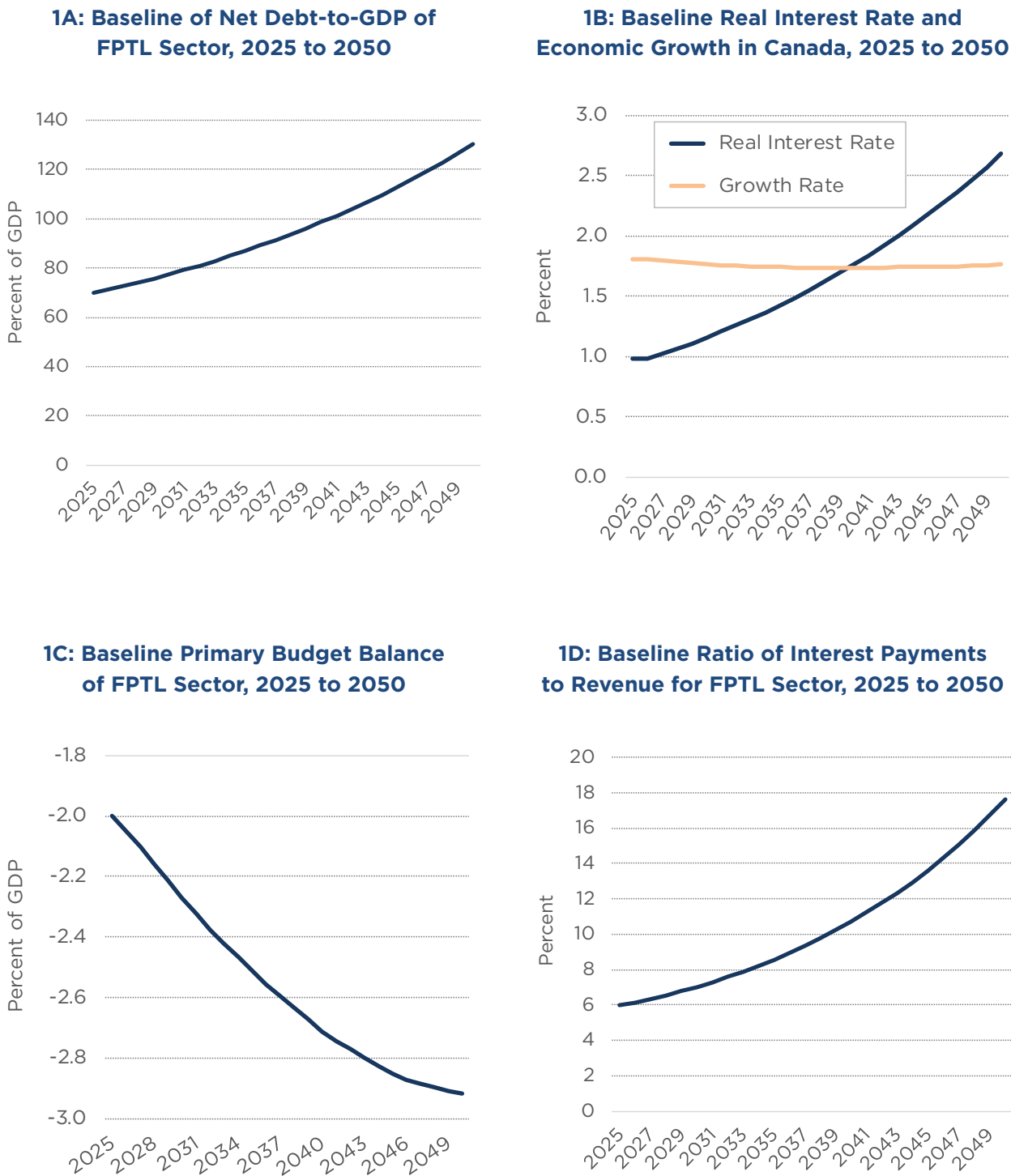
ment consumption spending reduces the growth rate of the economy, while an increase in capital spending increases the growth rate in the short to medium term. Similarly, an increase in tax rates lowers the growth rate of the economy in the short to medium term.

Another key parameter in the model is the relationship between the government debt ratio and the real interest rate on government debt. A number of econometric studies, which are reviewed by Dahlby, Ferede, and Fuss (2022), indicate that the interest rate on government debt increases as the government debt-to-GDP ratio increases. Consistent with this literature, in our model the interest rate on government debt increases by three basis points for a one percentage point increase in the FPTL debt-to-GDP ratio.

In the base case scenario, government consumption expenditures are initially 22.0 percent, government capital expenditures are 5.0 percent, and transfers to persons and businesses are 10 percent of GDP. Tax revenues are 30 percent and other revenues are 5.0 percent of GDP. This means that, initially, there is a primary budget deficit of 2.0 percent of GDP, or approximately $1,450 per capita in 2025. Government current expenditures on goods and services and capital expenditures are assumed to increase from 2025 to 2050 according to the projections in the PBO (2021) fiscal sustainability report. Initially the interest rate on government debt is about 3.0 percent and the inflation rate is 2.0 percent, implying a real interest rate on government debt of approximately 1.0 percent. The initial net debt-to-GDP ratio is 70 percent for the FPTL sector, and the ratio of interest payments on net debt to revenue is 6 percent. It is assumed that long-run annual growth rate of real GDP is 1.8 percent, which was the average private sector forecast prior to the 2020 pandemic (Canada, Department of Finance, 2019: Table A1.1). Thus, the differential between the real interest rate on government debt and the growth rate of the economy, which determines the primary fiscal balance that is required to stabilize the debt ratio, is -0.82 percent.

Figure 1 shows the trajectories of the debt-to-GDP ratio, the economic growth rate, the real interest rate on government debt, the ratio of interest payments to revenues, and the primary budget balance over the 25-year period in our base case scenario. Program expenditures increase from 37.0 percent of GDP to 37.9 percent, based on the projected increases in expenditures in the PBO (2021) fiscal sustainability report. With the increase in deficit-financed government expenditures, the annual growth rate of the Canadian economy declines from 1.80 percent to 1.74 percent from 2033 to 2046 before slightly recovering to 1.76 by 2050. Government revenue is fixed at 35.0 percent of GDP, and the primary deficit increases from 2.0 percent to 2.9 percent of GDP. As a result, the debt-to-GDP ratio

Figure 1: Base Case Fiscal and Economic Trends

1A: Baseline of Net Debt-to-GDP of FPTL Sector, 2025 to 2050

1B: Baseline Real Interest Rate and Economic Growth in Canada, 2025 to 2050

1C: Baseline Primary Budget Balance of FPTL Sector, 2025 to 2050

1D: Baseline Ratio of Interest Payments to Revenue for FPTL Sector, 2025 to 2050

Sources: PBO (2021); calculations by authors.

increases from 70 percent to 131 percent. With the increase in the debt-to-GDP ratio, the real interest rate on government debt increases from 0.98 percent to 2.7 percent. As a result, the gap between the economic growth rate and the interest rate declines, and after 2040 the interest rate on government debt exceeds the growth rate of the economy, which also contributes to the rapid increase in the debt-to-GDP ratio. Finally, the ratio of interest payments to government revenues increases because of higher interest rates and higher debt-to-GDP ratios and exceeds 10 percent after 2039.

The fiscal policy of the FPTL sector is unsustainable in the base case scenario because the debt ratio is constantly increasing. This conclusion is consistent with the results of the PBO (2021) fiscal sustainability report and also with Laurin and Drummond's (2021) projections of the increase in federal and provincial governments' net debt.[5] While there is uncertainty about future trends in the key fiscal variables, our base case scenario means that Canadian governments need to adopt new fiscal policies to prevent an increasing debt-to-GDP ratio over time. In the following section, we consider three alternative fiscal anchors designed to prevent explosive growth in the public debt.

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[5] See also Tombe (2022) for a fiscal sustainability simulation tool on the Finances of the Nation website. The Parliamentary Budget Officer's 2022 report contains a more optimistic fiscal outlook than its 2021 report based on recent budget plans which have improved "the medium-term outlook for provincial and territorial government own-source revenues" PBO (2022: 5). We feel that a more sanguine long-term fiscal outlook is not justified based on one year of more optimistic revenue projections and continue to use the PBO's 2021 expenditure projections from 2025 to 2050 in our scenarios where applicable.

3. Analysis of Alternative Fiscal Anchors

Three commonly proposed fiscal anchors in the public finance literature are (1) a target debt-to-GDP ratio, (2) a debt payment-to-revenue ratio, and (3) a balanced budget. A fourth fiscal anchor, a government program expenditure growth rate rule, can be used in conjunction with the other rules. In this section, we demonstrate how each of these fiscal anchors could be implemented and their impacts on the debt-to-GDP ratio, economic growth rates, and real interest rates based on the model described in the previous section.

A target debt-to-GDP ratio

Prior to the pandemic, the federal government had effectively adopted a fiscal anchor of maintaining a debt-to-GDP ratio of close to 30 percent. In response to the pandemic-related deficits, some economists, such as Lester (2021) and Robson et al. (2022), have advocated fiscal policies that would return the federal net debt-to-GDP ratio to pre-pandemic levels.

In this section, we investigate the impact of adopting a debt target as a fiscal anchor. Four policy choices need to be made in selecting a reduction in the debt ratio as a fiscal anchor. One is the target ratio. As noted, in the initial equilibrium, the FPTL net debt-to-GDP ratio is projected to reach 70 percent in 2025. The increase in the debt-to-GDP ratio resulting from the pandemic was approximately 20 percentage points. Accordingly, we simulate a scenario in which the FPTL sector has a target debt-to-GDP ratio of 50 percent. A second key policy choice is how rapidly to bring the debt-to-GDP ratio down to the target level. Given that we are simulating a 20-percentage point reduction in the debt-to-GDP ratio, we assume that the debt target is to be achieved within 10 years. A third policy choice is whether the adjustment will be through a tax increase, an expenditure reduction, or some combination of these two measures. In the scenario summarized below, we assume that all of the fiscal adjustment occurs on

the expenditure side of the budget and that the tax-to-GDP ratio remains fixed at its initial value of 30 percent. A fourth key policy choice is whether the government cuts consumption spending, capital spending, or both. In this scenario, we assume that FPTL sector governments cut consumption and capital expenditures in the same proportion, even though institutional constraints, such as union contracts, and the desire to protect key public services, such as health, education, and social services, often tilt the political calculus in favour of capital spending cuts where the consequences are longer-term but less obvious to the public.

Given the relentless increases in the debt-to-GDP ratio in the base case scenario, a relatively large initial increase in the primary budget balance is needed to bend down the debt ratio curve. In this scenario, program expenditures decline from 37 percent of GDP in 2025 to 31.25 percent in 2030. (This is a very large, and perhaps unrealistic, fiscal adjustment over a relatively short time.) As a result, the primary budget balance switches from a deficit of two percent of GDP to a primary surplus in 2030 of 3.75 percent of GDP. Following this period of expenditure restraint, the program expenditure-to-GDP ratio gradually increases to its long-run value of 35.71 percent, which is consistent with maintaining the debt ratio at 50 percent of GDP.[6]

Figure 2 shows the time paths of the debt-to-GDP ratio, the economic growth rate and real interest rate, the primary budget surplus, and the ratio of interest payments to revenues from adopting this public expenditure restraint policy. As indicated in figure 2, the debt-to-GDP ratio is lowered to 50 percent within 10 years and maintained at that level thereafter. With the reduction in debt-financed expenditures, the Canadian economic growth rate increases by almost one percentage point in 2031, before returning to its long-run value of 1.8 percent. The decline in the debt-to-GDP ratio after 2028 results in a gradual decline in the real interest rate on government debt from 0.98 percent to 0.38 percent when the debt ratio hits 50 percent. With the decline in the real interest rate on government debt, the difference between the real interest rate and the economic growth rate approaches -1.4 percent, which means that the 50 percent debt ratio can be maintained with an ongoing primary budget deficit of -0.71 percent of GDP. The declines in interest rates and in the debt-to-GDP ratio lower the ratio of interest payments to revenue from 6.0 percent to 3.41 percent.

It is worth repeating that while the particular fiscal policy adopted in this scenario to obtain a 20-percentage point reduction in the debt-to-GDP ratio is not the only one that could achieve that goal, a sharp initial

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[6] This would return the program expenditure ratio close to the average from 1990 to 2019. Calculations by the authors are based on Statistics Canada Table 10-10-0015-01.

Figure 2: Lowering the Debt Ratio by 20 Percentage Points in 10 Years
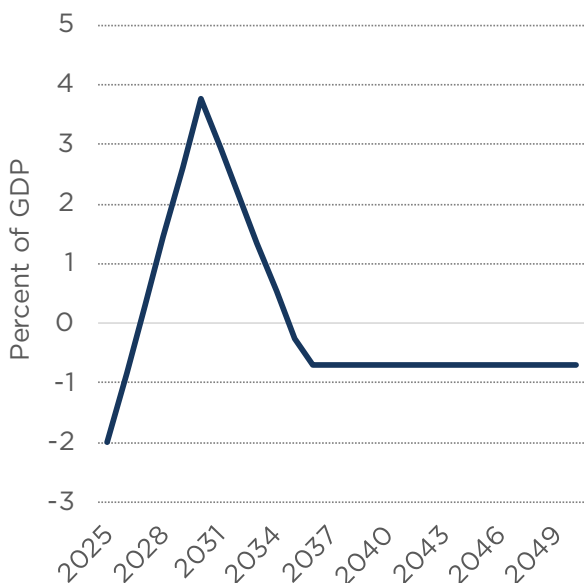
2A: Trajectory of Net Debt-to-GDP of FPTL Sector Using the Target Debt-to-GDP Fiscal Anchor, 2025 to 2050
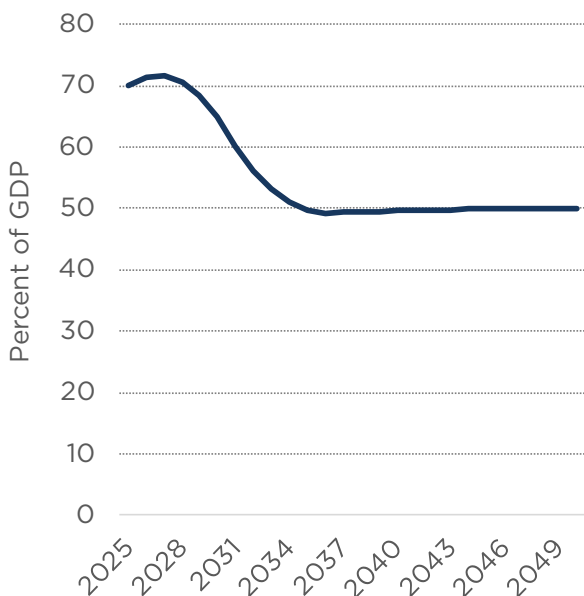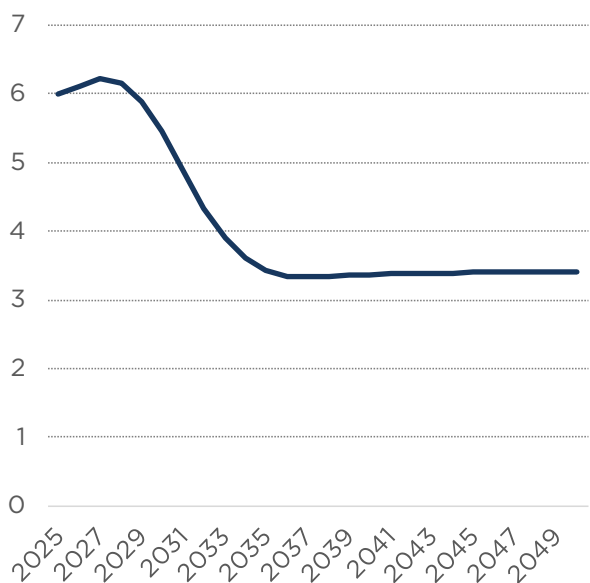
2B: Real Interest Rate and Economic Growth in Canada, 2025 to 2050, Using Target Debt-to-GDP Fiscal Anchor
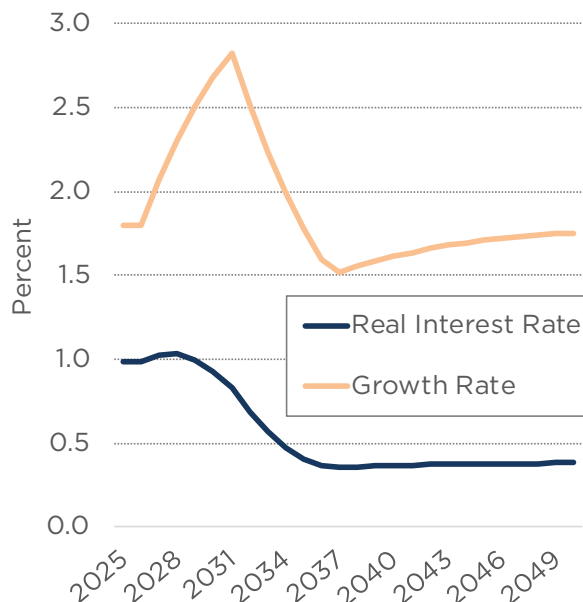
2C: Primary Budget Balance of FPTL Sector Using Target Debt-to-GDP Fiscal Anchor, 2025 to 2050

2D: Ratio of Interest Payments to Revenues of FPTL Sector Using Target Debt-to-GDP Fiscal Anchor, 2025 to 2050

Source: Calculations by authors.

reduction in the public expenditure-to-GDP ratio is a necessary feature of any expenditure restraint program, given the unsustainable increase in the debt-to-GDP ratio in the base case scenario.

A threshold ratio of interest payments to revenues

As a fiscal anchor or "guard rail" for the federal government, David Dodge (2020) has proposed keeping the ratio of interest payments to revenues below 10 percent. Recall that in our base case scenario, the interest payment ratio for the FPTL sector would exceed this ceiling in 2039, and that it would continue to increase after that. In this section, we simulate a policy of implementing what we will call the Dodge Rule.[7] An important policy choice that needs to be made to implement the Dodge Rule is the interest payment-to-revenue ratio that would trigger a policy response to prevent the ratio from exceeding the 10 percent ceiling. In our simulation, we assume that when the ratio of interest payments to revenues reaches 8.0 percent, governments adopt measures to keep the ratio from exceeding the 10 percent ceiling recommended by Mr. Dodge. A natural and perhaps the only possible policy response to the prospect of breaching the ceiling would be to increase the denominator of the ratio, i.e., revenues, because the numerator, interest payments, are largely beyond a government's control in the short to medium term. The Dodge Rule thus implies that the fiscal policy adjustments to prevent the interest payment ratio from exceeding ceiling would involve tax increases, rather than expenditure restraint.

The implementation of the Dodge Rule is based on a sequence of annual tax rises, starting in 2034, that would raise the tax-to-GDP ratio from 30 percent to 33.6 percent in 2038. The higher tax revenues would be sufficient to return the interest payment ratio back to 8.0 percent in 2050. Figure 3 shows the impact of this sequence of tax increases on the other key fiscal and economic variables. Note that the debt-to-GDP ratio initially increases and approaches 90 percent because the fiscal policy adjustment is delayed until the interest payment ratio hits 8.0 percent. However, with the tax increases starting in 2034, the primary budget balance rapidly increases, from a deficit of 2.4 percent of GDP to a surplus that is close to one percent of GDP, and the debt-to-GDP ratio is on a downward trajectory by 2050. The tax rate increases have an adverse impact on the economic growth rate, which declines from 1.74 in 2034 to 0.10 percent in 2039 before recovering to 1.41 percent by 2050. The large gap between the

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[7] One concern about using an interest payment ratio as a fiscal anchor, especially for a provincial government such as Alberta, is that year-to-year revenue fluctuations could temporarily push the ratio above a 10 percent ceiling.

Figure 3: Adopting the Dodge Rule on the Ratio of Interest Payments to Revenues

3A: Net Debt-to-GDP of FPTL Sector Using Dodge Rule, 2025 to 2050

3B: Real Interest Rate and Economic Growth Using Dodge Rule, 2025 to 2050

3C: Primary Budget Balance of FPTL Sector Using Dodge Rule, 2025 to 2050

3D: Ratio of Interest Payments to Revenue of FPTL Sector Using Dodge Rule, 2025 to 2050

Source: Calculations by authors.

real interest rate and the economic growth rate that emerges after 2035 means that even with a primary surplus of close to 1 percent of GDP, the debt-to-GDP ratio declines only very slowly.

While other ways of implementing the Dodge Rule could be envisaged, any implementation would involve tax increases when a threshold is crossed, followed by a prolonged period of slower economic growth given that higher taxes have an adverse impact on the GDP growth rate.

A balanced budget rule

Balancing the budget and eliminating the deficit are frequently advocated as fiscal anchors. However, there is often ambiguity concerning this type of anchor because proponents usually are not clear which concept of fiscal balance they would implement. In many countries, such as Brazil and Mexico, balancing the budget means a zero primary deficit, i.e., revenues equal government consumption and capital spending. In other words, interest payments on the debt are not included in the calculation of the deficit. However, in Canada, since the advent of accrual accounting, balancing the budget usually means that revenues equal government consumption spending, transfer payments to people and businesses, amortization of capital assets, and interest payments on debt, i.e., government capital expenditures are not included in the deficit calculation. Finally, for some analysts balancing the budget means revenues equal government consumption and capital expenditures, transfers, and interest payments on debt. See Dahlby (2021) for a discussion of these different balanced budget concepts and their implications for fiscal policies and debt-to-GDP ratios.

In this section, we consider the implications of eliminating the primary deficit over a five-year period, and then maintaining a primary balance, with either expenditure restraint or tax increases. In the expenditure restraint scenario, current program spending is reduced from 37 percent of GDP to 35 percent in 2030, while FPTL sector revenues are held constant at 35 percent of GDP over the period.[8] In the tax increase scenario, program expenditures rise based on the PBO (2021) report. Revenues climb from 35 percent of GDP to 37.3 percent in 2030 in order to eliminate the primary deficit, after which revenues then increase at the same rate as expenditures so as to maintain a balanced primary budget.

Figure 4 shows the trends in the key fiscal and economic variables with these alternative approaches to eliminating the FPTL primary deficit. There is an obvious and dramatic difference in the policies' impacts on the

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[8] In this scenario, capital expenditures and transfers are maintained at 5 percent and 10 percent of GDP respectively.

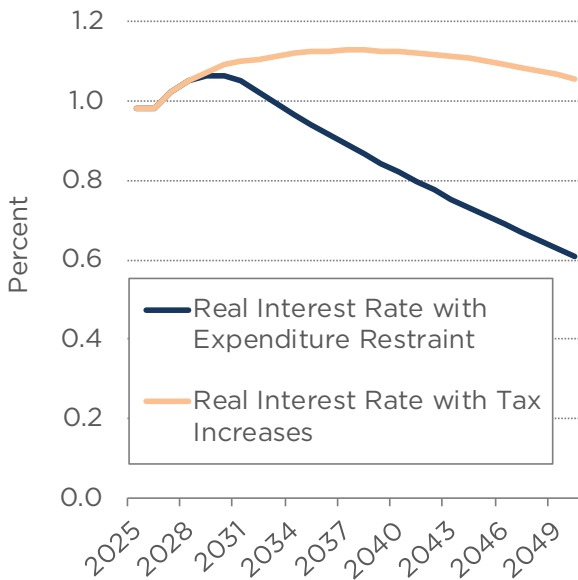## Figure 4: Balancing the Primary Budget with Expenditure Restraint (ER) or Tax Increases (TI)

4A: Net Debt-to-GDP Ratios of FPTL Sector Under Primary Budget Balance Fiscal Anchors, 2025 to 2050
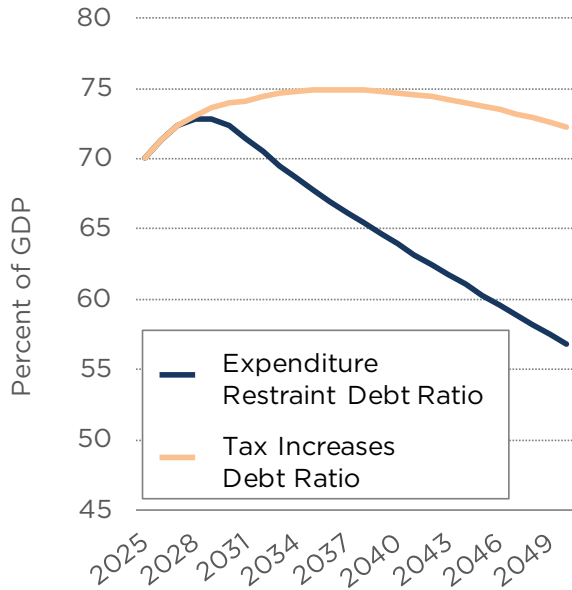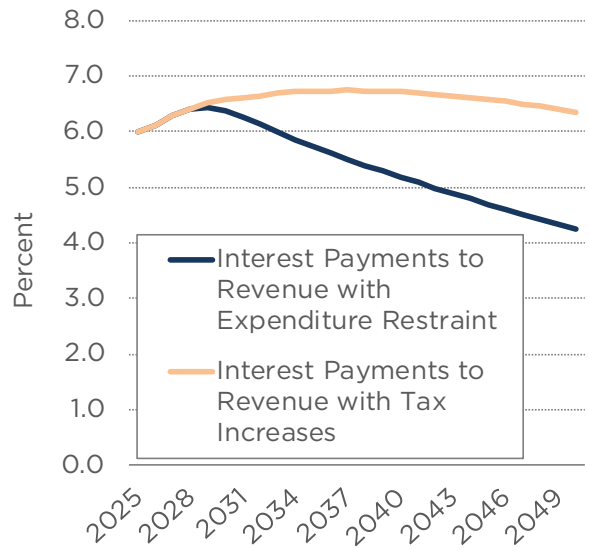

4B: Economic Growth Under Primary Budget Balance Fiscal Anchors, 2025 to 2050
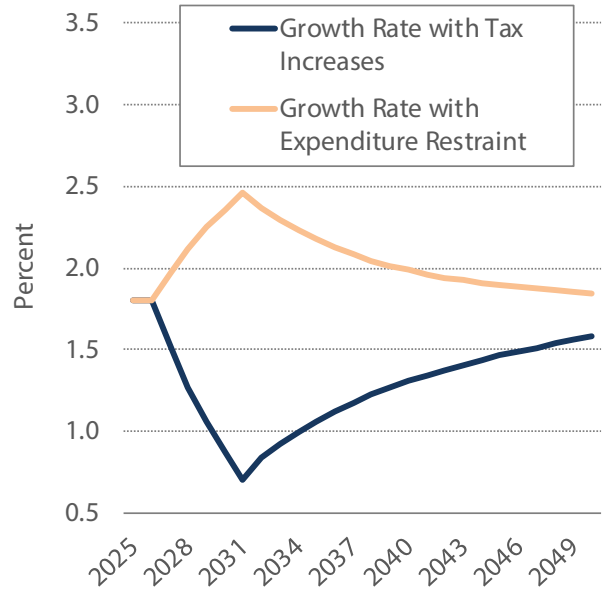
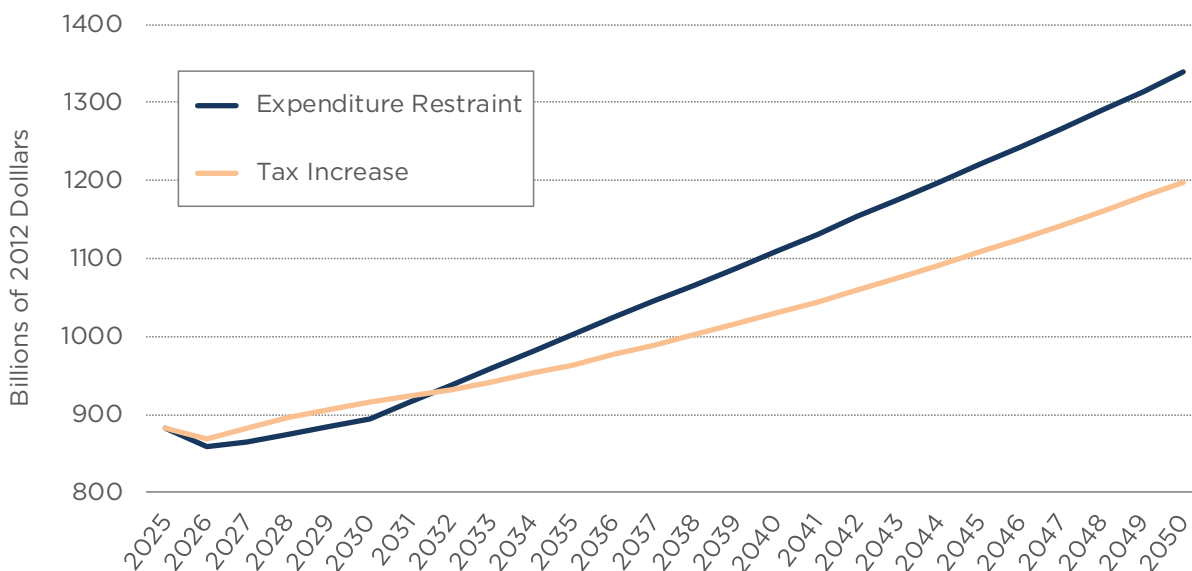### 4C: Real Interest Rates Under Primary Budget Balanced Fiscal Anchors, 2025 to 2050

4D: Ratio of Interest Payments to Revenue of FPTL Sector Under Primary Budget Balance Fiscal Anchors, 2025 to 2050

Source: Calculations by authors.

Figure 5: Public Expenditures Under Expenditure Restraint and Tax Increases

Source: Calculations by authors.

growth rate. Under the expenditure restraint scenario, the annual economic growth rate increases to 2.46 percent in 2031 before slowly declining and approaching the long-run growth rate of 1.8 percent. With the tax increase scenario, the annual economic growth rate plunges to 0.71 percent in 2031 before recovering to only 1.58 percent in 2050. Even though the primary budget balances are the same under the two policy scenarios, faster economic growth under the expenditure restraint scenario results in a significant reduction in the debt-to-GDP ratio to 56.8 percent in 2050, while the debt ratio is still above its initial level by 2050 with the tax increase scenario. The difference in the trajectories of the debt-to-GDP ratios results in lower real interest rates and lower ratios of interest payments to revenues with the expenditure restraint policy.

The model indicates that aggregate output will be higher with the policy of eliminating the primary deficit via expenditure restraint, which allows households to have higher levels of private consumption. While the ratio of program expenditures to GDP is lower under the expenditure restraint scenario, GDP is also higher. Figure 5 shows that real total public expenditures are only lower under the expenditure restraint policy from 2026 to 2031 and subsequently exceed the level of public expenditures under the tax increase scenario. Paradoxically, balancing the budget through expenditure restraint, rather than tax increases, leads to higher

levels of public expenditures in the medium to long term, because the faster rate of economic growth raises the economy's capacity to provide and pay for public services.

4. Ranking the Fiscal Anchors

In the previous section, we analyzed the economic and fiscal impacts of adopting one of three fiscal anchors—a debt-to-GDP reduction target, a ceiling on the ratio of interest payments to revenues, and a balanced budget rule—with two alternative ways of implementing a balanced primary budget. Each has different implications for government debt ratios, economic growth rates, and real interest rates on government debt over a 25-year period.

Which fiscal anchor should policy makers choose? While we note that the IMF, in Eyraud et al. (2018a), has proposed a broad framework for evaluating different fiscal anchors, we have adopted a relatively simple and yet fundamental criterion based on Canadians' desire to have high levels of expenditure on both public and private goods and services, as well as income supports for the social safety net. Our approach is to compare the fiscal anchors' potential for providing both public and private goods and services and income transfers over the 25-year time horizon of the models. We calculate annual household private consumption expenditures as 56 percent of projected annual GDP under each scenario.[9] Similarly, we calculate annual public expenditures based on its GDP ratio and its projected annual GDP under each scenario. In figure 6, we plot the present values of the annual public expenditures and private consumption spending, based on a discount rate of 0.98 percent, for each fiscal anchor. It is immediately clear that balancing the primary budget through expenditure restraint is, according to our criterion, the preferred fiscal anchor, because it would allow for both more private consumption and higher public expenditures in present value terms than any of the other fiscal anchors. Similarly, the debt target anchor would be preferred to Dodge's Rule, which in turn would be preferred to balancing the primary budget through tax increases. While this ranking of the fiscal anchors is based on the particular scenarios we have investigated, we feel that it would be robust to alternative strategies for implementing these fiscal rules.

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[9] This was the average ratio of household final consumption expenditure to GDP from 2015 to 2019.

Figure 6: Present Value of Public Expenditures and Household Consumption Under Alternative Fiscal Anchors (in 2012$ trillions)
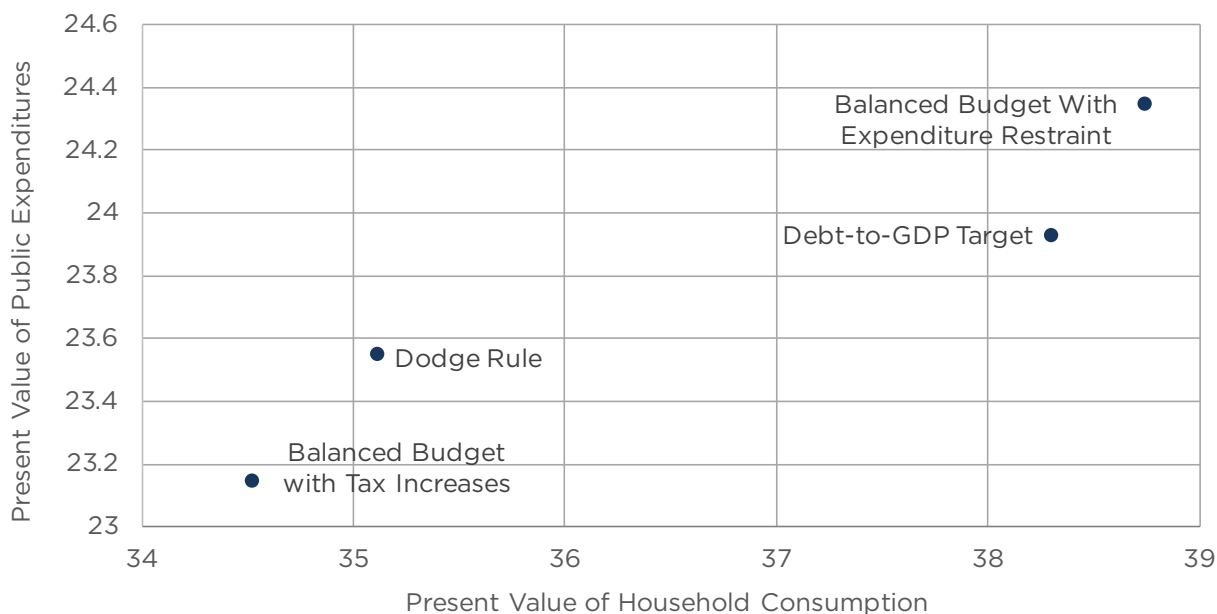
Source: Calculations by authors.

Achieving a primary balance through expenditure restraint is our preferred way of achieving a sustainable fiscal policy. However, we recognize that maintaining a primary balance raises important implementation issues. Strict adherence to a zero primary balance could lead to abrupt and wasteful increases in program spending during an economic boom when there is a surge in government revenues, or abrupt and harmful cuts in current and capital spending with a downturn in the economy and a decline in tax revenues. To avoid pro-cycle spending that would contribute to macroeconomic fluctuations, some governments cyclically adjust revenues in determining the annual expenditures that would be consistent with overall fiscal balance. However, adjusting fiscal policies to the business cycle is a complex technical exercise, and in the EU, cyclical adjustments of the fiscal balance have resulted in excessive deficits. Accordingly, the IMF advises governments to adopt a rule that places a ceiling on the growth rate of their expenditures. The range of expenditures to be covered by the ceiling should be broad, covering those current and capital expenditures that the government can control in the medium term but not include expenditures that have a cyclical component, such as unemployment insurance or social assistance payments.

Finally, while our analysis and recommendations have applied to the fiscal policies of the combined federal, provincial, territorial, and local government sector, we recognize that Canadian governments exercise, and jealously guard, their independence in setting their fiscal policies. Nonetheless, we feel that it is important to consider whether the government sector as a whole is sustainable and what types of policies would be most conducive to achieving it. Our hope is that the policy insights developed in this paper will stimulate discussion of the policies that individual governments should adopt.

5. Conclusion

Collectively, the fiscal policies of Canada's governments are unsustainable. To prevent an ever-increasing debt-to-GDP ratio, Canadian governments need to adopt fiscal rules or anchors that will rein in future budget deficits. In this paper, we have examined the impacts of adopting three commonly proposed fiscal anchors, using a model that considers how governments' tax and expenditure policies affect the growth rate of the economy and the real interest rate on the accumulated public debt. We find that fiscal policies that stabilize the governments' debt-to-GDP ratios through expenditure restraint are superior to fiscal policies that rely on increasing tax rates because they lead to higher levels of both private consumption and public expenditures in the long run.

Our most important result—that fiscal consolidation based on expenditure restraint provides better economic outcomes than policies that rely on higher taxes—is consistent with the conclusion that Alesina, Favero, and Giavazzi reached in their pioneering 2019 book, *Austerity: When It Works and When It Doesn't.* Their assessment was based on an evaluation of the impacts of 200 episodes of fiscal austerity in 16 OECD countries from the 1970s to 2014. Alesina, Favero, and Giavazzi (2019b) concluded that "on average, expenditure-based adjustments have consistently much lower costs than tax-based ones…" (p. 155), and that "the anti-austerity argument—namely, that the latter creates large recessions and is self-defeating because it does not reduce the debt/GDP ratio—applies only to tax-based austerity, not to expenditure-based austerity" (p. 153). This is a lesson that Canadian governments should heed when they contemplate the fiscal policies that are required to put Canada's public finances on a sustainable path in the aftermath of the COVID-19 shock. Adopting robust fiscal anchors will be crucial for all levels of government in Canada.

Appendix 1: The Equations of the Model

The model determines the trajectories of the debt-to-GDP ratio, the economic growth rate, and the interest rate on public debt, given increases government current or capital spending or an increase in tax rates. The equations of the model and the definitions of the variables are shown below:

$$\begin{bmatrix} b_{t+1} \\ g_{t+1} \\ r_{t+1} \end{bmatrix} = \begin{bmatrix} \dfrac{\left(1+r_t+i+i\cdot r_t\right)\cdot b_t+\phi 0+\chi 0+\sum_{h=0}^{t}\Delta\chi_{t-h}+\kappa 0+\sum_{h=0}^{t}\Delta\kappa_{t-h}-\left(\tau 0+\sum_{h=0}^{t}\Delta\tau_{t-h}\right)}{(1+i)\cdot\left(1+g_t\right)} \\ g_0+\alpha\chi\cdot\left(\sum_{h=0}^{t}((1+\alpha y)^h)\cdot\Delta\chi_{t-h}\right)+\alpha\kappa\cdot\left(\sum_{h=0}^{t}((1+\alpha y)^h)\cdot\Delta\kappa_{t-h}\right)+\alpha\tau\cdot\left(\sum_{h=0}^{t}((1+\alpha y)^h)\cdot\Delta\tau_{t-h}\right) \\ \varepsilon\cdot b_t+z \end{bmatrix}$$

where:
b_t is the debt to GDP ratio in year t
r_t is the real interest rate on the public debt in year t
g_t is growth rate of real GDP in year t
i is the rate of inflation, assumed constant
$\phi 0$ is the ratio of government transfers to people and businesses to GDP
$\chi 0$ is the initial ratio of government consumption spending to GDP
$\Delta\chi_t$ is the change in the ratio of government consumption spending to
        GDP in year t
$\kappa 0$ is the initial ratio of government capital spending to GDP
$\Delta\kappa_t$ is the change in the ratio of government capital spending to GDP
        in year t
$\tau 0$ is the initial ratio of government revenue to GDP
$\Delta\tau_t$ is the change in the ratio of government revenue to GDP in year t
$g0$ is the long-term growth rate of GDP
αy is the convergence coefficient after a fiscal shock
$\alpha\chi$ is the effect of a change in the ratio of government consumption
        spending on the growth rate of GDP

$\alpha\kappa$ is the effect of a change in the ratio of government capital spending on the growth rate of GDP

$\alpha\tau$ is the effect of a change in tax revenue on the growth rate of GDP

ε is the rate of increase in the interest rate on government debt as the debt to GDP ratio increases

z is a parameter that fixes the initial real interest rate.

The model determines the trajectories of the debt-to-GDP ratio, b, the growth rate, g, and the real interest rate on public debt, r, given the ratios of government consumption expenditures, χ, government capital expenditures, κ, or government revenues, τ, to GDP. It is assumed that the ratio of government transfers to people and businesses to GDP, ϕ, is constant.

Appendix 2: Econometric Model of the Effects of Government Spending and Taxation on Economic Growth

In this appendix, we present our empirical estimation of the effects of government current and capital spending on the economic growth rate. For brevity, we limit our discussion to our key empirical estimates. We employ an empirical methodology that is commonly used in similar previous studies such as Kneller et al. (1999), Bleaney et al. (2001), Ferede and Dahlby (2012), Dahlby and Ferede (2021), and others. The empirical analysis uses panel data from the 10 Canadian provinces from 1981 to 2020. As is common in similar economic growth studies, we use five-year average period values. That is, we have eight five-year interval periods for all the ten provinces (i.e., 1981-1985, 1986-1990, 1991-1995, 1996-2000, 2001-2005, 2006-2010, 2011-2015, and 2016-2020). The summary statistics for the key variables of interest are shown in table A1.

Table A1: Summary Statistics of Key Variables, 1981-2020

Variable	Mean	Standard deviation	Minimum	Maximum
Growth rate of real per capita GDP	0.0111	0.0122	-0.0156	0.0488
Log of initial real per capita GDP	10.6352	0.3035	9.9745	11.3165
Public investment-to-GDP ratio	0.0413	0.0103	0.0215	0.0693
Government consumption to GDP ratio	0.2504	0.0605	0.1399	0.3822
Grants-to-GDP ratio	0.0671	0.0405	0.0138	0.1655
Own tax revenue-to-GDP ratio	0.1001	0.0304	0.0364	0.1494
Other own tax revenue-to-GDP ratio	0.0633	0.0277	0.0240	0.1517
Population growth rate	0.0076	0.0075	-0.0143	0.0279
US GDP growth rate	0.0255	0.0106	0.0100	0.0431
Export commodity price	0.0303	0.0665	-0.0739	0.1854

Note: The total number of observations is 80.

Source: Authors' computation using data obtained from Statistics Canada CANSIM database and Department of Finance Fiscal Reference Tables.

As in Kneller et al. (1999), Bleaney et al. (2001), Lee and Gordon (2005), Ferede and Dahlby (2012), Dahlby and Ferede (2021), and others, our empirical model is based on a standard neoclassical growth model and explicitly considers the government budget constraint. The specification for the growth regression takes the following form:

$$\Delta \ln Y_{it} = \alpha_0 + \alpha_y \ln Y_{it-1} + \alpha_c GovCur_{it} + \alpha_p GovCap_{it} + \alpha' Z_t + \eta_i + \varepsilon_{it} \qquad (1)$$

where lnY_{it-1} is the log of initial real per capita GDP of province i in year t, ΔlnY_{it} is the per capita GDP growth rate, $GovCur$ is the government current spending-to-GDP ratio, $GovCap$ is the public investment-to-GDP ratio, and Z denotes a vector of other control variables and ε_{it} is the error term. The time-invariant unobserved province-specific effects are captured by η_i. In our analysis, the control variables (Z) include population growth rate, the US growth rate interacted with provincial GDP share, and export price. We also include provincial own-source tax revenue-to-GDP ratio, other own-source revenue-to-GDP ratio, and grants-to-GDP ratio as additional fiscal variables. Note that since we exclude the provincial deficit-to-GDP ratio from our analysis, the coefficients show the economic growth rate effects of deficit-financed increases in government spending.

In equation 1, we are interested in the coefficients of government spending, α_c and α_p. As many previous studies indicate that while a deficit-financed increase in government current spending deters the economic growth rate, higher public investment encourages growth. If this is indeed the case, we expect $\alpha_c < 0$ and $\alpha_p > 0$. As discussed in the previous studies, since the model is a dynamic panel (due to the inclusion of the lagged initial per capita GDP), instrumental variable estimation methods are appropriate for such an empirical specification. Consequently, we employ the two-stage least squares (2SLS) estimation method in our empirical analysis. The regression results are presented in table A2.

In this appendix, we focus our discussion on the coefficient estimates of government current spending and public investment-to-GDP ratios, as these are our key variables of interest. We begin in column 1 by estimating the provincial economic growth rate on the log of the initial per capita GDP, population growth rate, and the different components of the provincial budget constraint. As is common in the literature, we treat the initial per capita GDP as endogenous. The results indicate that the coefficient of government current spending is negative and statistically significant. The result suggests that a one percent increase in the government current spending-to-GDP ratio is associated with about a 0.46 percent reduction in the provincial economic growth rate. The coefficient of public investment is positive as expected, but it is statistically insignificant.

Table A2: The Effects of Government Spending and Taxation on Economic Growth, 1981-2020

	(1) 2SLS	(2) 2SLS	(3) 2SLS	(4) 2SLS	(5) Fuller
Log of initial GDP per capita	-0.163***	-0.193***	-0.143***	-0.130***	-0.135***
	(0.053)	(0.048)	(0.047)	(0.042)	(0.049)
Public investment-to-GDP ratio	0.290	1.129**	0.753*	0.622*	0.723*
	(0.365)	(0.527)	(0.407)	(0.363)	(0.439)
Government current spending-to-GDP ratio	-0.460***	-0.660***	-0.503***	-0.426***	-0.453***
	(0.118)	(0.144)	(0.143)	(0.136)	(0.158)
Own tax revenue-to-GDP ratio	-0.414	-0.644*	-0.614**	-0.585**	-0.617**
	(0.253)	(0.385)	(0.303)	(0.264)	(0.313)
Other own revenue-to-GDP ratio	-0.288*	-0.397***	-0.329**	-0.305**	-0.318**
	(0.156)	(0.146)	(0.146)	(0.142)	(0.148)
Grants-to-GDP ratio	-0.286**	-0.326***	-0.156	-0.154	-0.155
	(0.127)	(0.125)	(0.179)	(0.180)	(0.186)
Population growth rate	-0.067***	-0.078***	-0.065***	-0.061***	-0.062***
	(0.010)	(0.012)	(0.014)	(0.012)	(0.013)
US growth rate			0.317*	0.363**	0.369**
			(0.185)	(0.169)	(0.177)
Export Commodity price				0.010	0.010
				(0.013)	(0.014)
Constant	1.687***	2.028***	1.494***	1.347***	1.406**
	(0.594)	(0.539)	(0.525)	(0.467)	(0.547)
Over id (p-value)	0.486	0.206	0.250	0.215	0.236
Observations	60	60	60	60	60
Adjusted R2	0.776	0.698	0.749	0.760	0.750

Notes: Figures in parentheses are heteroskedasticity and autocorrelation robust standard errors. All regressions include provincial fixed effects and province-specific time trends. Significance levels are shown by * for 10 percent, ** for five percent, and *** for one percent. The dependent variable is the growth rate of real per capita GDP. In all regressions, the initial real per capita GDP is instrumented with its first and second period lagged values. In columns (2) through (5), government current spending and own tax revenue are instrumented with their own one and two period lagged values, respectively. Public investment to GDP ratio is also instrumented with its one and two-period lagged values.

In column 2, in addition to the log of initial per capita GDP, we treat government current spending, public investment to GDP, and own tax revenue ratios as endogenous. The coefficient estimates are now higher in absolute value, suggesting that the results can be biased if the potential endogeneity of these variables is not properly addressed. We continue our empirical analysis in column 3 by including the US growth rate as an additional control variable following Ferede and Dahlby (2012) and Dahlby and Ferede (2021). The results indicate that, as expected, public investment and government current spending-to-GDP ratios have statistically significant positive and negative effects, respectively. The coefficient of the own tax revenue-to-GDP ratio is also negative and statistically significant suggesting that many of the provincial taxes are distortionary and they have adverse economic effects.

In column 4, we include the commodity price index of the principal exports of Canadian provinces as an additional control variable to capture the effects of global events on the economy. As column 4 includes all the relevant control variables, this is our main empirical model. The results show that the coefficient of government current spending and public investment to GDP ratios are -0.426 and 0.622, respectively, and they are statistically significant. The coefficient estimates suggest that a one percent deficit-financed increase in the government current spending-to-GDP ratio is associated with about 0.43 percent reduction in the economic growth rate. Similarly, the results imply that a one percent deficit-financed increase in the public investment-to-GDP ratio is related to about a 0.62 percent increase in the economic growth rate. The coefficient of the own tax revenue-to-GDP ratio is -0.585 and it is also statistically significant. These coefficient estimates of our key variables of interest are well within the range of values that previous similar studies obtained.

Note also that the Hansen test of overidentification supports the validity of the instruments used. Further, to check if our empirical model is influenced by the presence of weak instruments, we use an alternative instrumental estimation method. To do so, we employ the Fuller (1977) maximum likelihood estimation method in column 5. This estimation method is robust to the presence of potential problems of weak instruments. The coefficients of our key variables of interest remain statistically significant, with their respective signs suggesting the robustness of our main empirical model of column 4. Thus, in the simulation analysis, we use the coefficient estimates of column 4 to analyze the effects of public debt on the economy.

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