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Should We Worry About Deficits When Interest Rates Are So Low?

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1. Introduction

Should Canadians worry about the level of government debt when interest rates are so low? My brief answer is yes. But the fiscal behavior of our government is not the problem. The problem, as Pierre Elliot Trudeau so famously put it, is that

> "Living next to the US is in some ways like sleeping with an elephant. No matter how friendly and even-tempered is the beast, if I can call it that, one is affected by every twitch and grunt."

The tail risk to Canada doesn't emanate from us: it emanates from the fiscal behavior of the elephant to our south.

There is a serious possibility that the US is on a fiscally unsustainable path. Canadian policymakers must take this possibility into account as they plan for the future. At a minimum, the government needs to increase substantially the duration of its debt. Unfortunately, quantitative easing has moved Canada in precisely the opposite direction.

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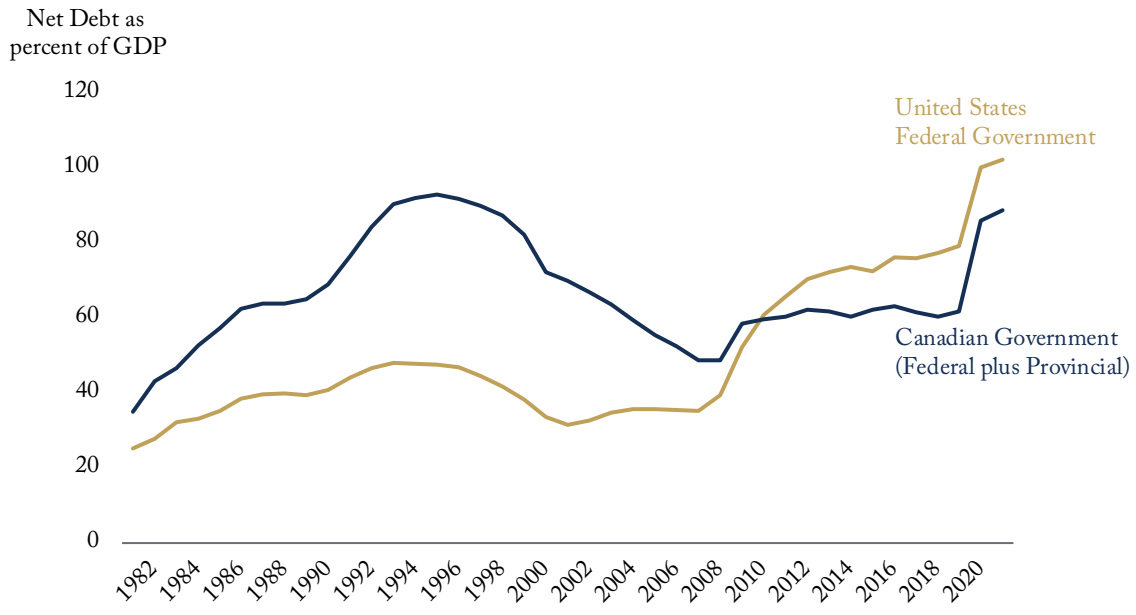
I thank Federico Puglisi for extraordinary assistance in preparing this talk. I also thank John Cochrane for his paper, r - g, that greatly influenced my thoughts on this topic and for the valuable feedback that he gave me on this paper. A technical appendix with all data sources and details of calculations is available online at: LINK.

Figure 2.1: Government Debt as a Percent of GDP



Note: Canadian Net Government debt excludes Pension Net Financial Assets.
Sources: See data and sources in online Technical Appendix.

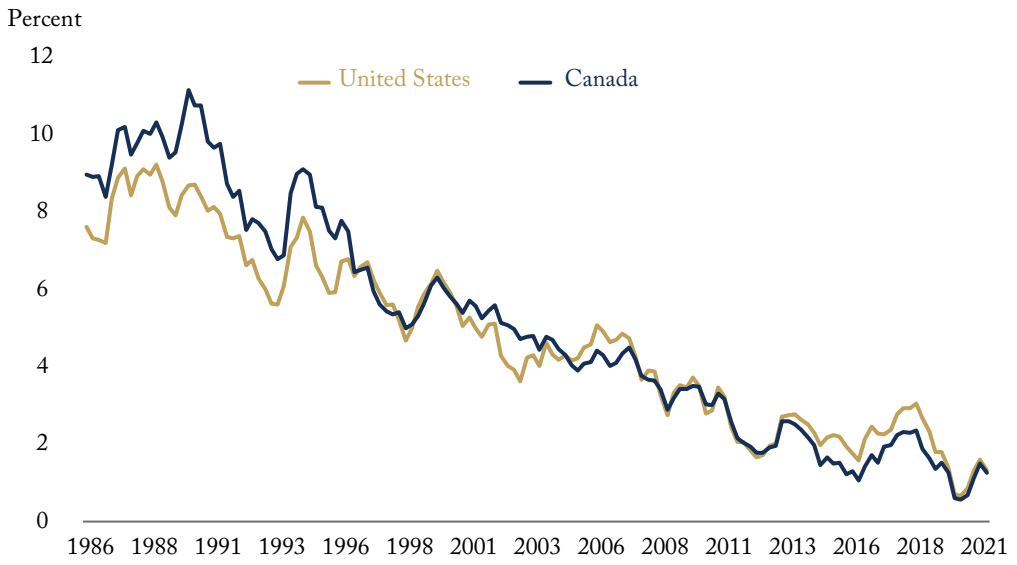
2. BACKGROUND

Government debt levels have risen to historically high levels in all major industrialized countries, including Canada. Figure 2.1 shows that in the US, the ratio of federal government debt to GDP will rise from roughly 30 percent in the early 1980s to about 100 percent by the end of 2021. The pattern for the ratio of Canadian net government debt to GDP is more complicated. But that ratio should soon breach the 90 percent barrier, a fact that not so long ago would have caused panic on Bay Street and in seminar rooms across Canada.

Even as government debt levels have risen, there has been a *secular* decline in nominal and real interest rates. That decline is manifest across virtually all industrialized countries and for both private- and public-sector debt at all points along the yield curve.

Figure 2.2 displays quarterly benchmark 10-year Canadian and US government bond yields from the mid-1980s to now. Despite some twists and turns, these rates have steadily declined, falling from roughly 10 percent to about 1 percent in the Canadian case. Real (inflation corrected) long-term bond yields exhibit a similar pattern, with Canadian yields now close to zero and US yields that are negative.

Figure 2.2: Nominal Interest Rates on Federal Government Debt



Note: Benchmark Government Bond Yields , 10 Year Maturity, are here displayed. Data are at quarterly frequency.
Sources: See data and sources in online Technical Appendix.

3. Indicators of Fiscal Sustainability

In a world of low interest rates, what indicators should we look at when assessing the fiscal sustainability of government debt? The traditional canary in the coal mine is the ratio of debt-to-GDP. Unfortunately, as both the data and the Rogoff and Reinhardt (2010) 90 percent debacle taught us, no magic number signals fiscal doom.

But surely, we should worry about scenarios in which the ratio of government debt to GDP is exploding. After all, there must be *some* ratio of debt to GDP that is sustainable, at least for a politically feasible future budget surplus. If nothing else, high values of the ratio of debt-to-GDP expose a country like Canada, and maybe even the US, to *doom-loop* dynamics. If markets anticipate a crisis coming, they charge higher interest rates on government debt. Higher rates mean higher debt service, which leads the debt to explode even faster, leading to a crisis. Depending on the country in question, a doom-loop crisis could involve a loss of central bank independence, high inflation rates, a depreciated currency and, in the most extreme of circumstances, sovereign default.

A New Canary in the Coal Mine

Fuhrman and Summers (2020) argue that lower interest rates require new measures of a country's fiscal situation. The fundamental problem with the debt-to-GDP metric is that debt is a stock variable that doesn't need to be repaid immediately, while GDP is a flow variable that is measured over a discrete period of time. The point is that the ratio of debt to GDP ignores the fact that debt can be repaid over time from a flow of current and future GDPs.

The mismatch of stocks and flows in the debt-to-GDP metric is particularly important in an era of low interest rates. At interest rates prevailing in 1992, a country with a 60 percent debt-to-GDP ratio paid about 5 percent of GDP in interest. Today, Japan with 177 percent debt-to-GDP ratio, will pay about 0.2 percent in interest. The US, with a 100 percent debt-to-GDP ratio, will pay about 2.0 percent of GDP in interest.

In designing a new metric for fiscal sustainability, one could adopt a stock-stock perspective that compares government debt to the present value of GDP. This metric captures the idea that a fall in interest rates raises the present value of current and future flows of GDP. That rise makes a given debt level more manageable. Unfortunately, in practice, the stock-stock perspective isn't workable. The reason is that it requires reliably forecasting growth and interest rates into the indefinite future, something that is clearly beyond our ability.

An alternative approach to measuring fiscal sustainability is a flow-flow perspective that considers the cost of servicing government debt relative to income. One flow-flow measure is the ratio of *nominal* interest payments to GDP. This measure is analogous to the metric used by banks to qualify consumers for a mortgage (mortgage payment relative to income). Fuhrman and Summers (2020) argue that we should use the ratio of *real* interest payments to GDP as our fiscal sustainability metric. This measure corresponds to nominal interest payments as a share of GDP *minus* the debt that is inflated away each year.

As with the ratio of debt to GDP, there is no magic upper bound for the ratio of real interest payments to GDP. But certainly, we want to avoid paths where this ratio is exploding. Fuhrman and Summers argue that in practice we should adjust fiscal policy when the ratio hits 2 percent for a prolonged period of time.

3.1 On the Importance of r – g

Regardless of which canary we focus on, a critical determinant of debt sustainability is the interest rate on government debt r, minus the growth rate of GDP, g. To see why, suppose, as is currently the case, that r is less than g, and will remain that way indefinitely. We consider two scenarios under this assumption.[1]

3.1.1 Scenario 1

Suppose that the government borrows a large amount of money, to finance expenditures associated with the COVID crisis or a social investment. The government then rolls over the debt, borrowing new money to pay principal and interest on the debt.

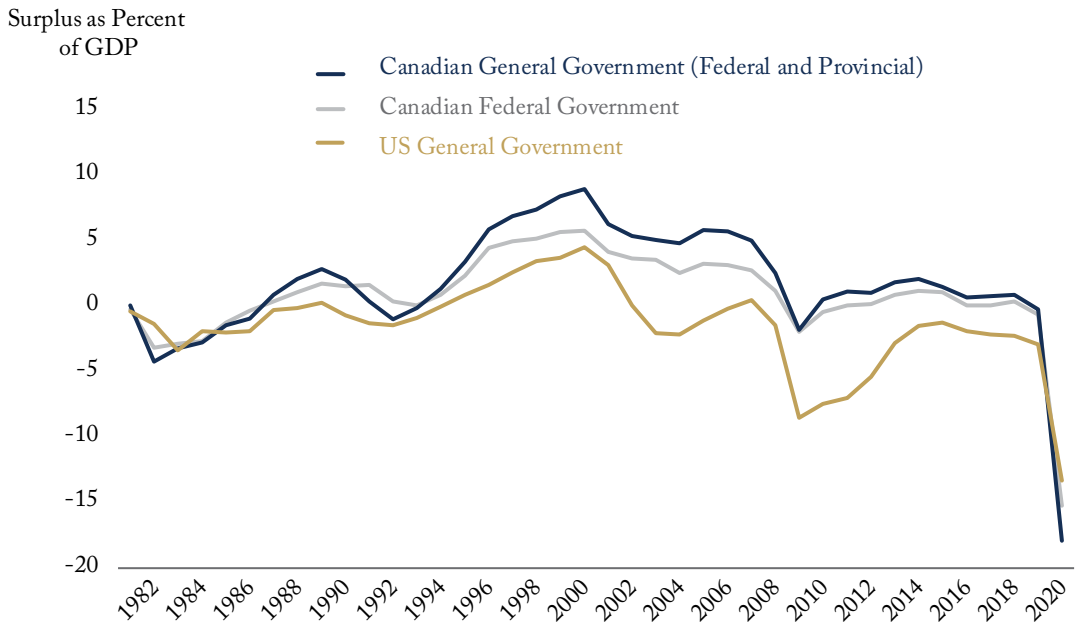
In this scenario, government debt grows at the rate r. If GDP grows at a rate g that is higher than r, then the ratio of debt to GDP slowly declines at rate r - g. Under these happy circumstances, the government *never* has to repay what it borrowed, say by raising future taxes or lowering future government spending.

3.1.2 Scenario 2

Imagine that the government starts with some positive debt-to-GDP ratio. If r is less than g, then the government can run a primary deficit (a negative primary surplus) *forever* without affecting the size of the debt to GDP ratio. The size of that negative primary surplus is equal to r - g times the initial ratio of debt to GDP. For example, the current ratio of US debt to GDP is 100 percent. Suppose that from

1 The scenarios considered here are the same as those initially analyzed by Cochrane (2021) for United States.

Figure 4.1: Primary Government Budget Surpluses as a Ratio of GDP



Note: Primary Budget Surplus is defined as Government Revenue net of Expenditure excluding Debt Servicing Costs. Data are at quarterly frequency.
Sources: See data and sources in online Technical Appendix.

now on r - g was equal to -1 percent. Then the US could run a primary deficit equal to 1 percent of GDP *forever* without affecting the ratio of debt to GDP.

3.1.3 On the empirical relevance of scenarios 1 and 2

Should the previous scenarios make us sanguine about the fiscal outlook for Canada and the US? The first scenario entertains zero future primary surpluses while r<g whittles down the ratio of debt-to-GDP. A one-time expansion of COVID-related debt in Canada might be thought of in these terms because Canada was running small net surpluses in the twenty years before COVID. In contrast, the US was running large primary deficits before COVID and, by all accounts, will continue to do so after COVID. The second scenario contemplates, for a given value of r - g, a perpetual deficit that doesn't raise debt to GDP.

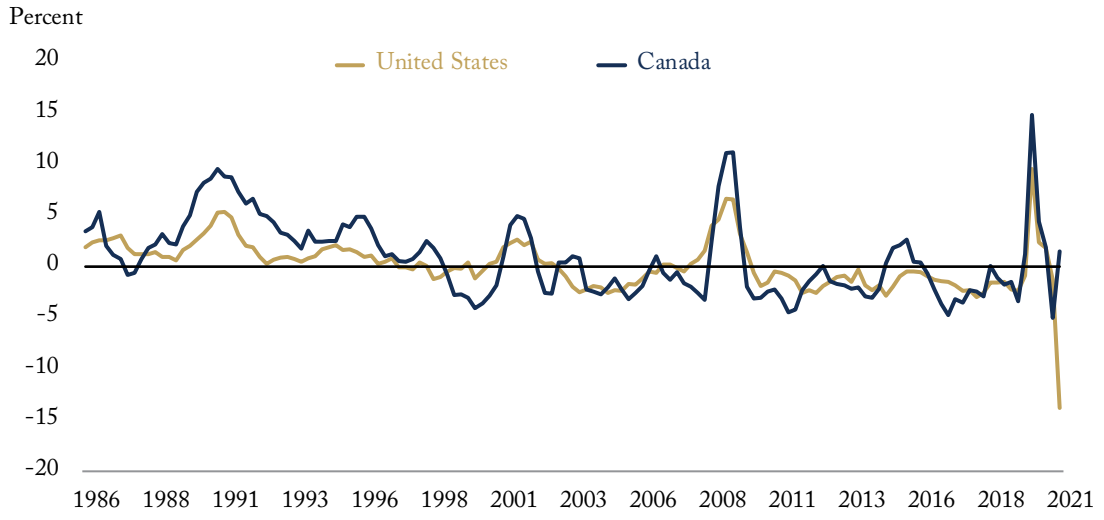
Unfortunately, when viewed against the background of the data, the leeway provided by the actual value of r - g is simply not large enough to make us sanguine about fiscal sustainability in the US.

4. The Data on Budget Deficits and r - g

Figure 4.1 displays primary government budget surpluses for Canada and the US.

Note that prior to COVID, Canada was a model fiscal rectitude, consistently running primary budget *surpluses* from the early 1990s until 2019. Over the same time period, the US was running large - sometimes breathtakingly large – primary *deficits* (negative surpluses). For example, over the period 2000-2019, the average value of the primary government surplus in Canada was 2.9 percent. In contrast the average value of the primary government

Figure 4.2: The Evolution of r - g



Note: r and g entail respectively the yield on the benchmark 10Y Federal Government Benchmark Bond and the growth rate of nominal GDP. Data are at quarterly frequency (average over the quarter).
Sources: See data and sources in online Technical Appendix.

surplus in the US was -2.05 percent.

As can be seen from Figure 4.2, r - g in Canada and the US are highly correlated. Also, note that (r - g) declined after 2000, with the decline particularly pronounced for Canada. But while the average value of (r - g) is negative after 2000, it's *no sure thing*.

Average value of (r - g)

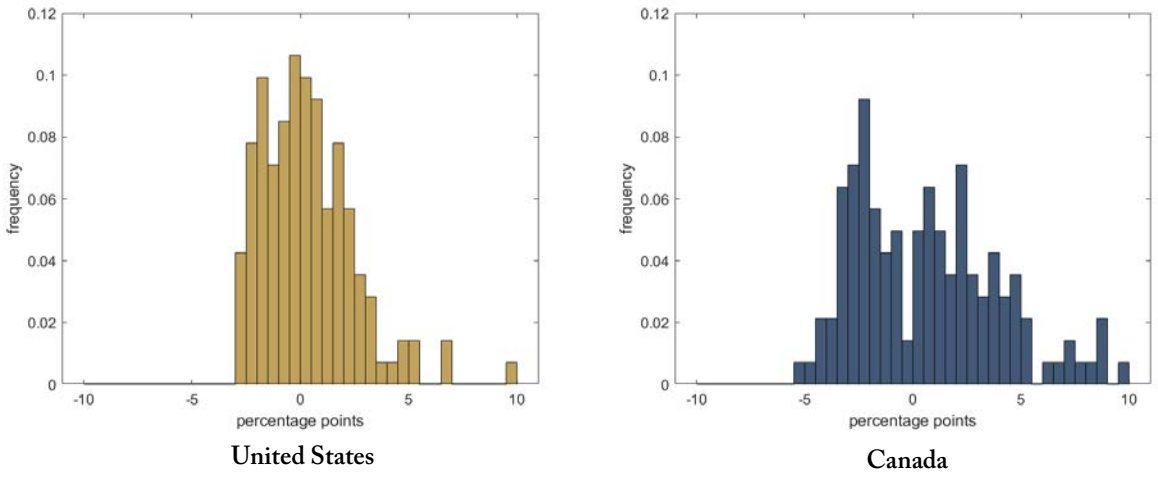
	Canada	US
1986-2000	3.17	1.44
2000-2020	-0.83	-0.55

Figure 4.3 displays histograms of the quarterly values of r - g for Canada and the United States. Consistent with these figures, the percent of time periods that (r - g) is positive in Canada and the US is 28.08 percent and 27.5 percent, respectively. The percent of time periods that (r - g) is larger than 1.5 percent in Canada and the US is 15.0 percent and 13.8 percent.

5. What Could Go Wrong?

It is entirely possible that r - g will remain low and the Canadian and US governments run reasonably balanced budgets in the future. There are many optimists out there who emphasize the likelihood of such a Halcyon fiscal future. On that basis, they council us to drastically expand spending without clear plans for financing ramped up expenditures. I want to focus on what could go wrong and what actions we might take as partial insurance against that eventuality.

Figure 4.3: The Distribution of r - g for Canada and the US



Note: r and g entail respectively the yield on the benchmark 10Y Federal Government Benchmark Bond and the growth rate of nominal GDP. Data are at quarterly frequency.
Sources: See data and sources in online Technical Appendix.

Abstracting from seignorage revenues, the ratio of net government debt to GDP, d_t, evolves according to the difference equation:

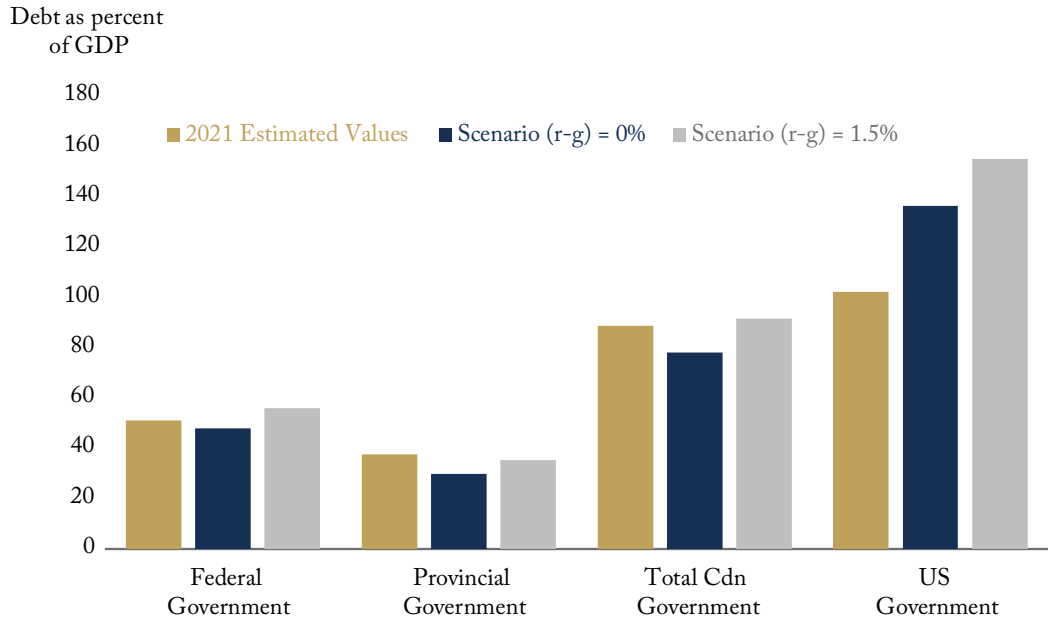
$$d_{t+1} = d_t \frac{1 + r_t}{1 + g_t} + \frac{s_t}{1 + g_t}$$

Here g_t represents the growth rate of GDP between time t and time t+1, r_t denotes the interest rate on government debt at time t, and s_t represents the net time t primary deficit of the government as a ratio of GDP. According to this equation, other things equal, a higher interest rate drives up future debt-to-GDP ratios, and a higher growth of GDP drives down future debt-to-GDP ratios.

Consider the following historical budget-based scenario. Suppose that, for ten years, starting from current debt levels, the primary budget deficit in Canada was equal to -1.06 percent of GDP, its average value between 2010 and 2019. If (r - g) was zero over that period, then the ratio of total debt to GDP would moderately *decline* to a bit under 80 percent. On the other hand, if (r - g) was equal to 1.5 percent, that ratio would rise at a moderate rate over time, hitting roughly 90 percent after ten years.

The results of the analog scenario for the US are much more alarming. The average value of the primary budget deficit in the US between 2010 and 2019 was 3.42 percent. If (r - g) was zero over that period, then the ratio of total debt to GDP would rise from 100 percent to almost 140 percent. On the other hand, if (r - g) was equal to 1.5 percent, that ratio of debt to GDP would rise rapidly and be almost 160 percent within ten years. To put these numbers in perspective, recall that the ratio of debt to GDP in the US after WWII was roughly 115 percent.

Figure 5.1: Historical-budget Based Net Debt Scenarios



Sources: See data and sources in online Technical Appendix.

6. The Fiscal-Alarm Frontier

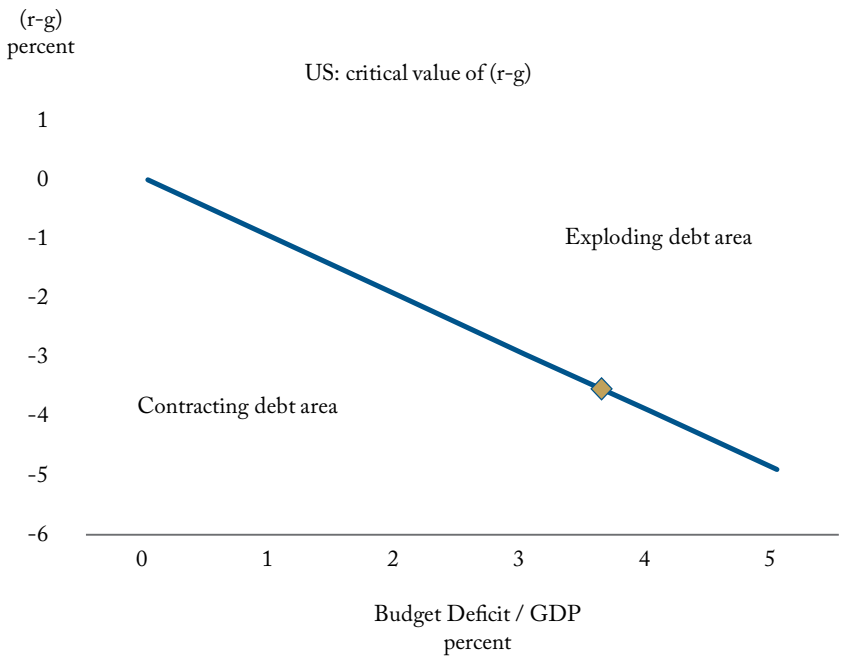
Each of us has our own views about how large government deficits will be in the post-pandemic era and what values for (r - g) are plausible over the next decade. So it would be useful to know the answer to the following question. Given an assumed value for future deficits in the next decade, what is the maximum value of (r - g) such that the ratio of debt-to-GDP ratio doesn't explode? The fiscal-alarm frontier is a graph of the pairs of (r - g) and future deficits that are the answers to this question.

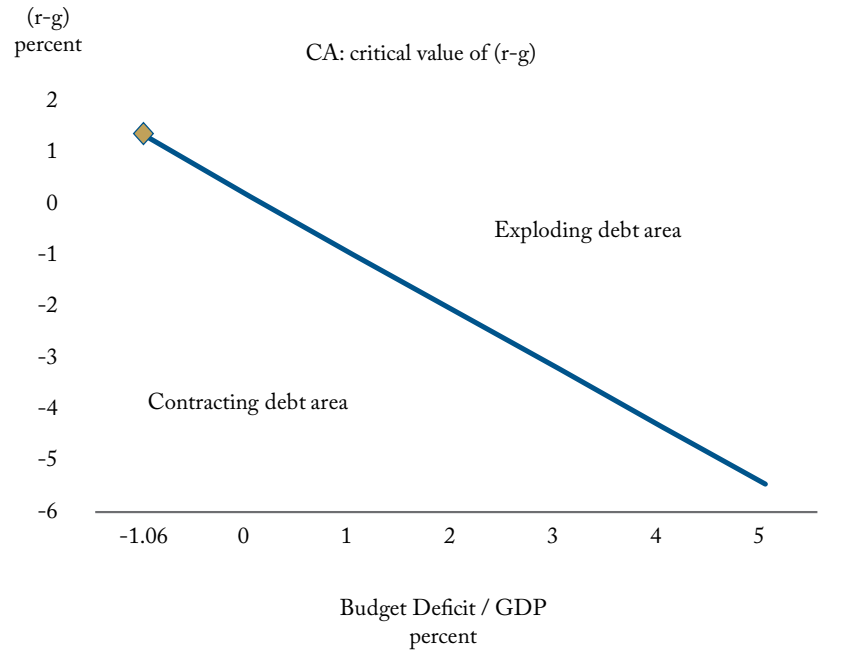
From 2010 to 2019, Canada ran, on average, a negative deficit (a positive surplus) equal to -1.06 percent of GDP. The gold diamond for Canada is located at that value. According to the frontier, that (r - g) could go as high as about 1.1 percent before debt-to-GDP starts to explode. Smaller surpluses (larger deficits) require lower values of r - g to keep the debt-to-GDP ratio from exploding.

From 2010 to 2019, the US ran, on average, a deficit of about 3.42 percent of GDP. The gold diamond for the US is located at that value. The frontier indicates that the negative spread between (r - g) must be larger than -3.5 percent to prevent the ratio of debt to GDP from exploding.

The fiscal-alarm frontier reveals a stark asymmetry between Canada and the United States. Canada could run moderate budget deficits of about 1 percent of GDP, as long as (r - g) stays close to its post-2000 average value of -0.83. The US can't behave as it has for the last twenty years without serious risk to its fiscal situation. Suppose that r - g was -0.55 percent, its average value between 2000 and 2019. Then the US would have to lower the government budget deficit to about 0.5 percent to keep the debt from

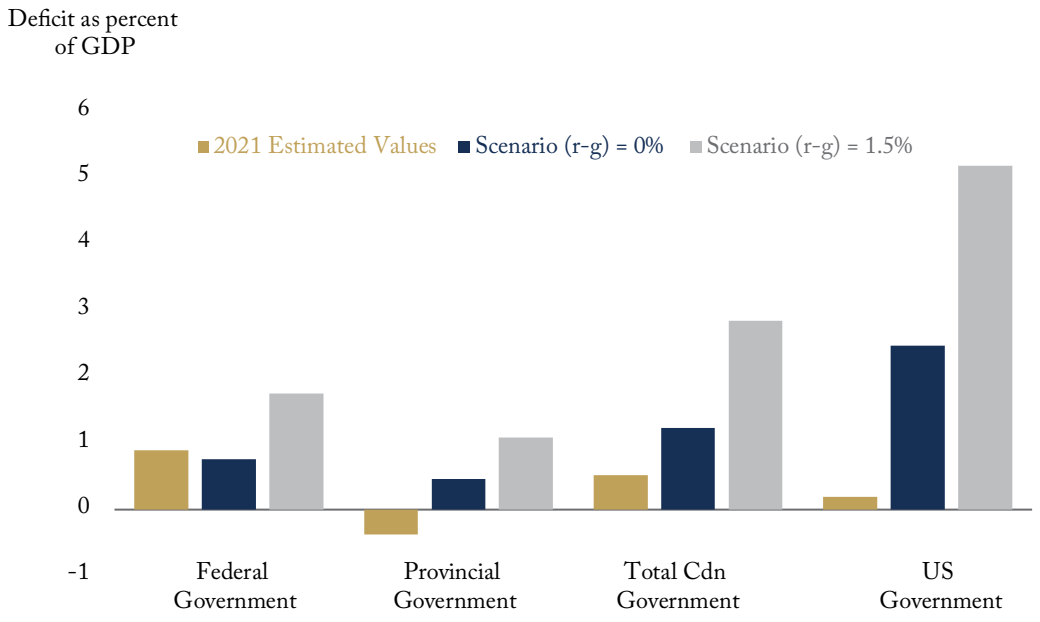
Figure 6.1: Fiscal-alarm Frontiers, Canada and the US





Sources: See data and sources in online Technical Appendix.

Figure 6.2: Ratio of Net Interest Rate Payments to GDP



Sources: See data and sources in online Technical Appendix.

exploding. Such a moderate deficit amounts to a large change relative to its average value between 2000 and 2019 (2.05 percent).

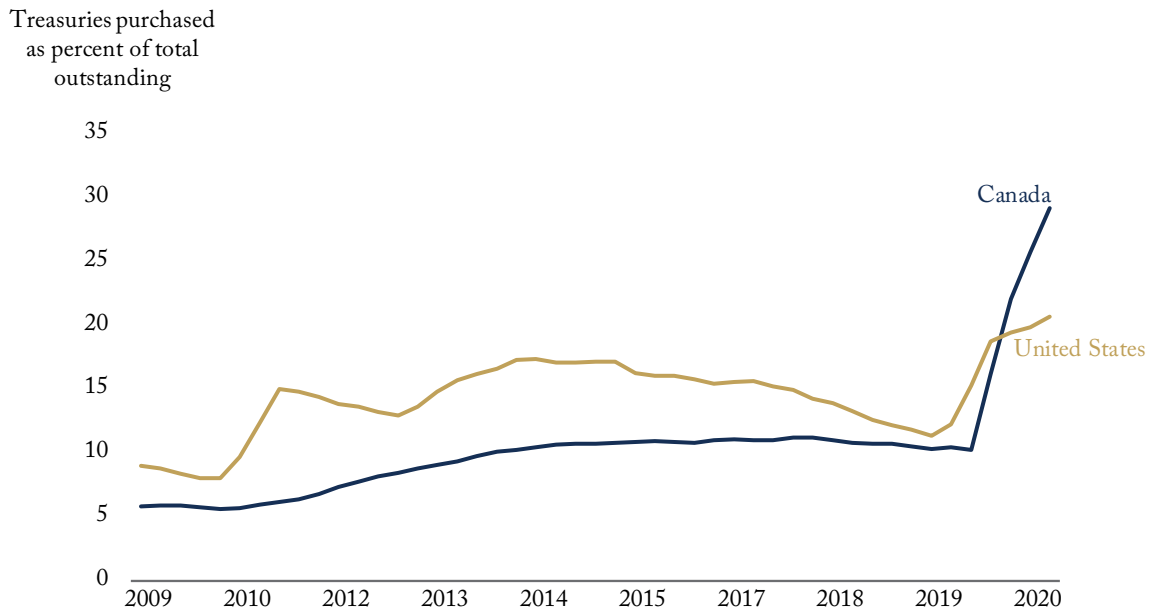
The asymmetry between the countries becomes even larger if we take *pension surpluses* into account. Canada's pension plans are in surplus. In the US, total state pension plan funding deficits exceed 1.3 trillion dollars.

A similar story emerges if we consider the two countries using Fuhrman and Summers (2020) preferred metric, the ratio of real net interest payments to GDP. Given my time constraints, I will only present the historical-based budget scenario.

For Canada, if r - g is zero, the ratio of real interest rate payments to GDP stays well below 2 percent. But if (r - g) rises to 1.5 percent, the ratio would rise to 2.8 percent, requiring adjustments to fiscal policy. In sharp contrast, the US would significantly exceed the 2 percent Fuhrman-Summers threshold, even if (r - g) was zero for the decade. On the other hand, if (r - g) was equal to 1.5 percent, the ratio of real net interest payments to GDP would exceed 5 percent within ten years. That is a recipe for a crisis.

The previous calculations provide some reason for Canadians to be optimistic about their fiscal future. Fundamentally they imply that if post-COVID fiscal policy looks anything like pre-COVID policy, Canada won't hit the fiscal-alarm frontier as long as (r - g) is less than 1.5 percent. In any event, Canada could adjust fiscal targets in response to moderate, slow-moving changes in (r - g). But these comforting conclusions miss a critical point: it's not enough for Canada to be ok. For better or worse, *Canada needs the US to be ok*.

Figure 8.1: Quantitative Easing – Central Banks Hold More Government Debt



Sources: See data and sources in online Technical Appendix.

7. The Elephant in the Room

Canada is a medium-sized, open economy whose average, long-term real interest rates are primarily determined outside its borders. In addition, the growth rate of real GDP in Canada is heavily affected by developments in the United States. In principle, the US could fix its fiscal problems. After all, the US collects only 31 percent of GDP in general revenue, well below the OECD average of 37 percent. So, the fiscal capacity is there. The question is: does the US have the political capacity to fix its fiscal problems? I see no indication whatsoever that it does. If anything, the signs point in the other direction.

We cannot dismiss the possibility that markets might, at some point, conclude that the US is on an unsustainable fiscal path. In that event, US r will jump up and, in the chaos that ensues, US g will fall. Almost certainly, such a crisis would lead to a rise in benchmark Canadian interest rates and a fall in the growth rate of Canada GDP.

I don't know how high r - g would go in such a scenario, but one cannot rule out values well in excess of 1.5 percent. This is a scenario that Canadians must take seriously.

8. Insurance and Quantitative Easing

What, if anything, can Canada do to minimize the damage from such a scenario? At a minimum, it can buy some insurance by lengthening the duration of government debt. For example, suppose you were taking out a mortgage and saw that long-term rates were incredibly low. Would you take out a variable rate mortgage, especially if you were worried about a

possible rise in rates? Of course not: you would lock in low, long-term rates. In this spirit, the Canadian government should lengthen the maturity of its debt structure, locking in historically low rates on government debt. Canada and the US are doing just the opposite.

Quantitative easing is a policy where a central bank buys government bonds and other government-guaranteed securities at the long end of the yield curve. The central bank pays for those assets by issuing short-term reserves to banks. The magnitude of these programs is unprecedented. Figure 8.1 shows that the Fed has purchased over 20 percent of government bonds, overwhelmingly at the medium and longer end of the yield curve. The Bank of Canada has outdone the Fed and bought almost 30 percent of government bonds. The net effect of these `swaps' is to substantially lower the duration of outstanding government debt.

The federal government owns the Bank of Canada. So, to assess the duration of government debt, we need to consolidate the balance sheets of the Department of Finance and the Bank of Canada. Doing so, it becomes clear that when the Bank of Canada substitutes short-term bank reserves for longer-term debt, the government, as a whole, is shortening the duration of its liabilities.

While there may be advantages to quantitative easing during a crisis, it makes no sense to shorten the maturity of government debt when debt levels and tail risk from US fiscal policy are so high. At a minimum, this consideration should be part of ongoing discussions about the speed with which the Bank of Canada winds down its quantitative easing program.

9. Conclusion

Canadians *should* worry about the level of government debt level even though interest rates are so low. The fundamental concern is that the US *may* be on a fiscally unsustainable path. It is possible that US will put its fiscal house in order. But it might not. Responsible leadership must take the latter possibility into account. Even if we can't completely ensure ourselves against a fiscal crisis in the US, the Canadian government should revert to its virtuous pre-COVID fiscal policy.

Such virtue does not dictate the scope of Canada's social investments. The scale of the government and how it is financed are logically distinct matters.

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