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Fiscal Policy

# Beyond the Deficit:

## Generation X and Sustainable Debt

by

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The federal government has accomplished a significant measure of deficit reduction. While no date has been set for balancing the budget, reaching that state is clearly the government's intent. But a balanced budget simply means that the national debt will stop growing. Once that milestone has been reached, what then should be the long-run goal for fiscal policy?

This study makes the case that a target level for a sustainable ratio of debt to gross domestic product (GDP) would be 25 percent. This target is based on the strong likelihood that interest rates will continue to exceed the rate of growth of GDP, on the increasing reluctance of investors to lend to borrowers who are already in debt, on the federal government's inability to ignore negative political reaction to high taxes, low program spending rates and high interest payments to foreigners, and on the widespread attitude that living standards of future generations, who will have to cope with the dramatic aging of the population, should not be reduced to make transfers toward well-to-do elderly Canadians, who constitute the most favored generation of this century.

There are compelling reasons for reaching this sustainable debt-to-GDP ratio within 20 years — a major challenge since the ratio is now at 75 percent. To accomplish this task, a prolonged and quite dramatic fiscal retrenchment must be maintained — one that involves balancing the budget within three years and then running a surplus of roughly 2 percent of GDP per year for a full decade. This is a daunting prospect, but only if this task is pursued will Canadians be in a position to use fiscal policy in any significant way to cushion the hardship that will accompany the 10 percent reduction in the labor force participation rate that is coming as the baby boom generation ages.

## *Main Findings of the Commentary*

- It is a high ratio of debt to gross domestic product (GDP) — not a high deficit-to-GDP ratio — that reduces living standards. As a result, the debate on fiscal policy should now focus on what level of debt is appropriate and sustainable.
- A high debt-to-GDP ratio can lead to several undesirable outcomes:
  - a risk premium added to Canadian interest rates, which lowers investment and living standards;
  - a low level of government services per dollar of taxes levied — since revenue must be used to cover debt-service costs to foreigners;
  - a high level of structural unemployment, caused by the high taxes that are made necessary by debt-service obligations; and
  - an inability to use fiscal policy to cushion society from major disruptions such as the 10 percent reduction in the labor force participation rate that is coming as the baby boom generation ages.
- The quantitative dimension of these and other aspects of debt imply that an appropriate target for the federal debt-to-GDP ratio is 25 percent.
- The federal debt-to-GDP ratio has increased from the sustainable level to 75 percent over the past 20 years; in the process, there has been a significant redistribution from "generation X" *toward* the most fortunate generation of this century.
- In full equilibrium, the debt-to-GDP ratio must equal the deficit-to-GDP ratio divided by the nominal GDP growth rate. Thus, for a growth rate of 4 percent, a deficit-to-GDP ratio of 1 percent is needed eventually to reach the sustainable debt level of 25 percent.
- It is likely that the federal government will reach a 1 percent deficit-to-GDP ratio in fiscal year 1998/99, but settling for a 1 percent ratio thereafter will bring down the debt-to-GDP ratio much too slowly. The debt-to-GDP ratio must be pushed back down to 25 percent within 20 years if the spending excesses of the past 20 years are to be put behind us in time to allow fiscal policy to help during the period when the baby boom generation is aging and retiring. Reaching the 25 percent debt-to-GDP ratio in 20 years will require balancing the budget within three years and then running a surplus of roughly 2 percent of GDP for a decade.
- To minimize its burden, this restraint should be accomplished through spending cuts, not tax increases, since the true burden of many tax increases is passed on to unskilled labor — the least mobile factor of production. Also, since the level of structural unemployment is pushed up significantly by higher taxes, it is the young and those on lower incomes who are particularly hurt by tax increases.
- Fiscal retrenchment should be focused so that more of the costs fall on well-to-do older Canadians. If this is not done, one of the fundamental reasons for pursuing debt reduction in the first place will not be respected.

When the Chrétien Liberals took office in fall 1993, they did so with a promise to reduce the federal government's deficit (as a proportion of gross domestic product — GDP) from the 5.9 percent they had inherited to 3 percent within three years. The new government was criticized early on, both because many commentators thought that the 3 percent target was not ambitious enough and because the government's first budget, in February 1994, did not contain sufficient retrenchment for the interim target to be met.

As we approach the 1996 budget, however, neither criticism can be fairly made. Finance Minister Paul Martin's second budget, in February 1995, did indeed bring the deficit-to-GDP ratio onto the government's intended path, and there is now little doubt that it will meet the 3 percent target in just over a year's time. And its announcement of a more ambitious target now means that the criticism of insufficient fiscal retrenchment is no longer relevant: last December, Finance Minister Martin indicated that the next step on the government's rolling target policy would be a 2 percent target, to be reached in fiscal year 1997/98. However, while the minister assured that the budget would be balanced eventually, he did not commit to a target date for this outcome.

Whatever one thinks about the finance minister's argument that specific targets for the more distant future are of little value since they lack credibility, it seems clear that government policy will continue to be framed in terms of *some* target deficit-to-GDP ratio. The auditor general, however, criticized this policy focus in his most recent annual report:

> To date, discussions about fiscal policy have focussed on deficit reduction and balanced budgets. They have not given enough consideration to....how annual budgets fit into a longer-term vision for sustainable debt.[1]

My purpose in this *Commentary* is to try to meet the challenge posed by the auditor general. I begin by investigating whether economic growth makes it possible for government debt to be used to make *every* generation better off or whether it can only transfer economic well- being from one generation to another. I conclude that, since there is no reasonable prospect for economic growth rates to exceed interest rates, debt policy inevitably must involve winners and losers among generations. Thus, there can be no such thing as an "optimal" debt-to-GDP ratio. Nevertheless, one can identify the level of debt that seems consistent with widespread attitudes about equity.

I argue that, to achieve an appropriate and, therefore, sustainable level of debt, fiscal policy must be designed to:

- maintain a stable debt-to-GDP ratio;
- avoid high interest rates;
- generate sufficient political support for the policy to be maintained;
- support society's priorities concerning intergenerational equity;
- support society's goals concerning income distribution within each generation; and
- promote economic efficiency.

These considerations lead to a target federal debt-to-GDP ratio of 25 percent — roughly equal to the postwar low that Canada experienced in the early 1970s. This sustainable debt level can be achieved by maintaining a target deficit-to-GDP ratio of 1 percent. But since the debt-to-GDP ratio responds to a reduction in the deficit-to-GDP ratio with such a long lag, the sustainability criteria suggest that we must push the target deficit-to-GDP ratio below 1 percent — indeed, to something approaching a *surplus* of 2 percent for ten years — in order to reach a sustainable debt level in time to deal with the challenge of a dramatically aging Canadian society over the next 40 years.

Both equity and efficiency considerations suggest that the bulk of this fiscal retrenchment should take place on the expenditure side of the government's ledger. That said, care must be taken to avoid drastic cuts to programs that are especially helpful to the young. After all, one of the main reasons debt reduc-

tion is important is that it will remove some of the burden that will be borne by this generation as labor force participation rates fall over the decades ahead.

It is worth emphasizing that all of the simulations I present below involve a constant tax-to-GDP ratio. As a result, the tax revenue that is freed up as interest payment obligations shrink is used to finance government spending programs. Furthermore, since the simulations value program spending on a par with private consumption, I avoid basing my recommendations on the presumption that a smaller government would be good.

## Economic Growth and Government Debt

Through their spending programs, governments provide both investment goods and consumption goods. In itself, government debt is not a problem if it used to cover the costs of investment goods and if, over the years, the flow of benefits from these goods provides the material resources to cover the interest payments on the debt. Indeed, most people would agree that it is equitable for future generations to share in the financing of lasting assets from which they are receiving a share of the benefits. In recent years, however, only a very small fraction of Canadian federal government spending has been on investment goods; hence, this discussion focuses on current consumption goods.

Is it fair for the current generation, which is the only one to benefit from current consumption goods, to cover these expenditures by bequeathing debt to succeeding generations? There would be nothing controversial about doing so if it did not reduce the standard of living of those future generations. But is this possible? To answer this question, we must consider the process of economic growth.

### *Borrowing a Free Lunch*

For much of recorded history, there was no appreciable annual growth in labor productivity or in living standards. Since the latter part of the nineteenth century, however, there has been a seemingly endless stream of technological innovations. The result, in Canada's case, is that average incomes have increased by a factor of *eight* over the past 125 years (the period for which the data exist). This spectacular rise in living standards has fostered the expectation that each succeeding generation will be significantly better off than its predecessors.

But if the current generation increases the degree to which it benefits from this process by saving less and, instead, borrowing from the future, succeeding generations will either have a smaller capital stock to work with — and thus lower wages — or they will maintain the same capital stock by borrowing from foreigners, at the cost of larger ongoing interest payments. Society might be able to continue to use government debt to pass one or the other of these burdens on to generations ever farther into the future, so that no generation would *ever* suffer a loss. But even if this were impossible, some would argue that the current generation should feel no guilt about passing on its debt — after all, with economic growth such as society has experienced over the past 125 years, future generations will certainly be able to "afford it."

The problem with this attitude is that it supports *every* generation's taking *very large* amounts from future generations. When worded this way, such a policy is much less appealing (although it is still sometimes advocated).[2] As a result, the hope that perhaps no future generation will ever be hurt reappears as a question of fundamental interest. When one group can be made better off without any other group's being made worse off, economists call this situation a "free lunch." In this case, a free lunch would exist if it were possible for one generation to run a temporary deficit — by borrowing from foreigners, for example — and then roll over the resulting debt *forever* without ever having to raise taxes or cut spending, as the associated debt-service costs become an ever-smaller proportion of the growing income of future generations. Economists, ever suspicious of free lunches, look for the hidden catch.

## *The Critical Balance between Growth Rates and Interest Rates*

If a debt is never retired and all of the interest obligations are financed by further borrowing, the magnitude of the debt grows at an annual rate equal to the rate of interest that is being paid on that debt. Thus, a necessary but not sufficient condition for the ratio of government debt to GDP to shrink automatically through the ongoing process of economic growth is that the growth rate of GDP must exceed the interest rate paid on the debt.

Let us focus now on the relative magnitudes of interest rates and growth rates. As a base for the discussion, first consider a world in which uncertainty is ignored. In such a world, competition among borrowers would force governments to offer bonds that have the same rate of return as the debt instruments private firms issue to finance capital equipment. Private firms would borrow until the marginal product per unit of capital equaled the interest rate. Since profits equal the marginal product per unit of capital times the total quantity of capital, and since investment in new capital is the growth rate of the economy times the quantity of capital, the crucial comparison is between profits and investment: the free lunch requires that the marginal product per unit of capital be exceeded by the growth rate or (equivalently) that profits be exceeded by investment.[3]

The standard reference on this topic, Abel et al.,[4] finds that, in every year for every country, the aggregate level of profits exceeds the aggregate level of investment. Economists have interpreted this evidence as unquestionable support for the proposition that the underlying rate of economic growth should be taken as *less* than the marginal product per unit of capital in all policy analyses. Indeed, this has been standard practice in applied cost-benefit studies for many years — the discount rate used in calculating present values is always taken as greater than the economy's growth rate.

To this analysis, those who still believe that government debt can provide a free lunch retort that, in a world with differential risks, lenders may regard government debt as less risky than private capital. As a result, the interest rate on government bonds is less than the marginal product per unit of capital. Indeed, it is possible for the rate of return per unit of capital to exceed the GDP growth rate, while at the same time the GDP growth rate could exceed the interest rate on government bonds. In such a case, the findings of Abel et al. do not threaten the idea that one generation could benefit by issuing government debt that is never repaid, without any future generation's being made worse off.

## *Lessons from the Past*

What does the historical evidence say about the relative sizes of interest rates and growth rates? (While the comparison can be made in either real or nominal terms, I will focus on nominal values — that is, the nominal interest rate on government bonds and the nominal growth rate of GDP.)

Before about 1980, it seems that interest rates on government bonds were often (but not always) less than the economy's growth rate. A study by Ball, Elmandorf, and Mankiw,[5] examining US data since 1871, concludes that this experience is consistent with the ability (with a probability in the 80 to 90 percent range) to run temporary deficits and then roll over the resulting government debt forever. The authors conclude that the United States likely can grow its way out of a large debt problem without the need to raise taxes or cut spending, so that all generations can be made better off. But this is a "gamble" — US history over the past 125 years indicates that there is some chance that the relevant interest rates may exceed the growth rate.

Thus, critics of fiscal retrenchment can find support for their position in the possibility that a country can simply grow its way out of debt. The economist's standard metaphor is that an ongoing deficit is like termites eating one's house. Such an analogy is, however, inappropriate — it suggests that disaster is inevitable if the issue is just ignored. It would

be more appropriate to view deficits as analogous to a homeowner's decision not to buy fire insurance — if a fire never occurs (and a fire is not inevitable), the homeowner would have been better off not to have bought insurance. But the decision not to buy insurance is a gamble, since the loss will be great if a fire does occur.[6]

While critics of fiscal retrenchment can take some solace in the fire insurance analogy, a prudent reaction to this argument must acknowledge that there have been fundamental changes in the level of interest rates and growth rates since the mid-1970s. Growth rates have fallen, both because individuals now seem more comfortable with lower immigration and fertility rates and because productivity growth rates fell off dramatically some 20 years ago for reasons that are not well understood. By relying on evidence from as long ago as 1871, Ball, Elmandorf, and Mankiw implicitly assume that this productivity slowdown is a temporary phenomenon. If they are wrong, the deficit gamble is far riskier than they suggest. C.D. Howe Institute economist Bill Robson suggests further caution.[7] In presenting data on growth rates and interest rates for the past 800 years, he shows that it is only in the twentieth century (before 1980) that growth rates have exceeded interest rates.

Thus, it is imprudent to base policy on the experience of just one country (the United States) during the one period in which it was the world's growth leader. At the very least, critics of fiscal retrenchment need to explain the reasons for their confidence in extending the deficit gamble in the face of such evidence and in the absence of an explanation for the recent slowdown in productivity.

A further concern is that real interest rates may remain significantly higher than historical norms for the indefinite future. Given the integration of world capital markets and the expectation that the demand for savings will be strong in the developing markets of Asia and eastern Europe, Western governments should expect to have to pay more than before to induce lenders to accept their debt. Furthermore, even before the globalization of financial markets, lenders had begun to regard the debts of Western governments as riskier. Lenders recognize that, as debt-to-GDP ratios rise dramatically, the possibility that these governments will be tempted to inflate away some of the real value of their debt will become ever more probable.

## *Failed Alternatives to Engineer Lower Interest Rates and Faster Growth*

Despite this, some critics of debt reduction[8] call for expansionary monetary policy to help bring the debt-to GDP ratio down, in the hope that expansionary monetary policy will simultaneously lower interest rates and raise growth rates. This hope is based on a traditional model of aggregate demand determination in which prices are taken as *fixed*. In that context, more bank reserves lead to lower borrowing rates, higher investment spending by firms, and so to higher levels of economic activity and growth.

But when prices are *flexible*, one must distinguish between real and nominal interest rates. The liquidity effect of expansionary monetary policy still puts initial downward pressure on interest rates, but once the higher inflation that accompanies any significant and sustained monetary expansion is observed, borrowers and lenders learn to *anticipate* that inflation, and an inflation premium is built into nominal interest rates. Except for an initial adjustment period, then, the inflation effect dominates the liquidity effect. While there is a temporary drop in the real interest rate and a temporary rise in the real growth rate, the lasting effect of expansionary monetary policy is a proportionate rise in *both* the nominal interest rate and the nominal growth rate.[9] In short, this policy simply leads to inflation without any fundamental easing of the "unpleasant arithmetic" concerning a country's inability simply to grow its way out of debt.

This confusion between nominal and real interest rates is precisely the policy error that the Bank of Canada made in the early 1970s

— an error that the Bank has admitted in subsequent Annual Reports. Critics of Bank policy need to better understand both this earlier episode and the limitations the Bank faces if it attempts to set real interest rates that are different from those prevailing in an integrated world financial market.

For the indefinite future, then, it would be prudent to accept that the interest rate on government bonds will exceed the economy's growth rate, and that there is no free lunch associated with government debt. If the current generation wishes to increase its welfare through deficits and the provision of consumption goods by government, it can do so only by decreasing the welfare of future generations. Ultimately, one's view of fiscal retrenchment depends, at least in part, on the generation for which one wishes to act as an advocate.

## *Costs and Benefits: Choosing among Generations*

For some government initiatives — such as investing in infrastructure or education, coping with a severe economic depression, or financing a war — most reasonable people would agree that at least some of the cost, in the form of government debt, should be passed on to future generations. Indeed, prior to the mid-1970s, much of Canada's debt fell into this category. In the late 1920s, the federal debt-to-GDP ratio was about 45 percent, but the Great Depression and the Second World War caused the ratio to rise to 110 percent. No one argued in this case that deficit financing was wrong. Rather, it seemed quite appropriate to transfer from future generations to those who had sacrificed in depression and war for the sake of the welfare and freedom of those who were to follow.

By the early 1970s, the federal government had worked the debt-to-GDP ratio down to less than 25 percent, mainly by running surpluses and by enjoying the fruits of the postwar boom, a rare period during which growth rates exceeded interest rates. The 1930–45 period was seen as unique and, it was thought, government debt would never again rise to such high levels. During the 1970–95 period, however, the debt-to-GDP ratio was run back up to 75 percent even in the absence of a significant list of lasting investments or a compelling need to favor current generations.

Demographer and economist David Foot argues convincingly that the generation that entered the labor force in the early 1950s is the most fortunate in this century.[10] Too young to fight in the Second World War and fewer in number than the generations that came before or after, these "depression babies" were able to progress rapidly in their careers with relatively less competition, to buy houses at pre-baby-boom prices, and to draw from the Canada Pension Plan (CPP) amounts far in excess of their contributions.

In contrast, those belonging to "generation X" face stiff competition in the markets for both jobs and houses. Thus, it now seems particularly inappropriate to make further transfers, via fiscal policy as it has operated over the past 20 years or so, away from that generation and toward the generation that has been the most favored of this century. As it is, those in the later stages of the baby boom are destined to be hit hard. Over the next 40 years, the ratio of the labor force to the total population is expected to fall by 10 percent; accordingly, the general standard of living for those alive in 40 years' time will be 10 percent lower than it would have been without this unevenness in the demographics.[11] The magnitude of this effect is even greater if one takes into account other factors, such as particularly high health care costs for the elderly and the need for CPP reform.

I suspect that many Canadians' sense of equity would lead them to agree that further transfers to the higher-income subset of the fortunate "depression babies" generation would be unfair. This may explain the widespread political support for deficit reduction today. If so, it is surprising that so much of the fiscal retrenchment that has occurred thus far has been in the area of support for the young — parts of the welfare, unemployment insurance, and education budgets — when there has been

such limited support for cutting payments to higher-income older Canadians.

But how far should fiscal retrenchment go? Inevitably, this question is partly an ethical one: How much of a transfer to the current young is "enough"? But part of the debate revolves around technical issues as well. For example, is there a level of debt that so disrupts lender confidence or so impairs general economic efficiency that such considerations may become as important as questions of intergenerational equity? To discuss these considerations in an integrated way, we need to have some idea of the magnitude of all dimensions of the issue.

## A Stable Debt-to-GDP Ratio

The first step in evaluating the sustainability of alternative fiscal policy rules is to review the fundamental but often overlooked distinction between the deficit and the debt.[12] Put simply, the *deficit* is the annual increase in the accumulated *debt*. The auditor general is correct when he stresses that it is a high debt-to-GDP ratio — because of the cost of servicing the debt — not a high deficit-to-GDP ratio, that reduces living standards.[13] This statement is directly applicable when the debt is foreign owned. In that case, foreigners have lent funds to Canadians to make it possible for the domestically employed capital stock to be maintained despite a previous reduction in national saving. The burden of the debt is the ongoing interest obligation to foreigners. Where there has been no foreign borrowing, there are no ongoing interest payments from domestic residents (as a group) to anyone else. In that case, the burden of the debt is the foregone income that follows from the fact that reduced national saving has led to a smaller capital stock for domestic labor to work with. Formal analyses of both closed and small open economy models show that welfare effects are the same in these two settings. This reasoning has led some commentators to argue that fiscal policy should be implemented via a numerical debt-to-GDP-ratio target, without any reference to a specific deficit-to-GDP-ratio target.[14]

The overall budget deficit is the sum of the primary deficit and the interest payments made on the pre-existing debt. The primary deficit is the excess of what the government spends on its programs over the tax revenue it collects. The national debt is the sum of all previous deficits, since the debt increases every year by an amount equal to that year's overall deficit. Thus, while numerous targeting strategies are possible, I focus on governments that choose to target the primary deficit-to-GDP ratio, the overall deficit-to-GDP ratio, or the debt-to-GDP ratio.

### *The Arithmetic of Deficits and Debt*

Consider first a policy that balances the primary budget — that is, one that uses current tax revenue to cover program spending fully. While perhaps not intended at the outset, this is the policy followed by the Mulroney government during the 1984–92 period. In order to finance interest payments on the existing debt, however, the Mulroney government had to resort to new bond issues, which caused the overall debt to soar. With the debt growing at an annual rate equal to the rate of interest paid on pre-existing debt, and with that rate of interest exceeding the GDP growth rate, the debt-to-GDP ratio had to follow an explosive path during this period.[15] Thus, a fiscal policy that consists of just balancing the primary deficit is *not* sustainable, and it is a good thing that the current Liberal government has not continued with it. (Incidentally, the fiscal policy of the pre-Mulroney Liberal governments was even more unsustainable than was the Conservative approach — the Trudeau Liberals did not even balance the primary deficit, so debt grew at a *faster* annual rate than the rate of interest.)

Now consider a policy that balances the overall deficit. In this case, since the quantity of debt stays constant, then as long as nominal GDP grows at all the debt-to-GDP ratio must fall. Eventually, as GDP grows over *many* years, it will become so much larger than the original fixed level of debt that the debt-to-GDP ratio

must approach zero. In principle, then, as long as the overall deficit is balanced, any pre-existing level of debt is sustainable.

The discussion can be extended to cases in which the deficit-to-GDP ratio is fixed at any value — not just zero. It turns out that, as is explained in the appendix, as long as the average nominal GDP growth rate is any positive number, the debt-to-GDP ratio eventually must converge to a constant value. When this outcome has been reached, the growth in debt will equal the GDP growth rate, and the debt-to-GDP ratio must equal the ratio of the deficit-to-GDP ratio to the GDP growth rate.[16]

## *Picking Targets: What Works*

Three conclusions follow from this proportional relationship between the debt-to-GDP and deficit-to-GDP ratios. First, as far as avoiding the vicious circle of an ever-rising debt-to-GDP ratio is concerned, *any* level for that ratio can be sustained as long as the corresponding deficit-to-GDP ratio is systematically targeted.

Second, as far as eventual outcomes are concerned, it does not matter whether the government sets the deficit-to-GDP ratio and the accounting identity determines the debt-to-GDP ratio (as under current government policy) or whether the government sets the debt-to-GDP ratio and the accounting identity determines the deficit-to-GDP ratio (as suggested by those who want policy to target directly a numerical value for the debt-to-GDP ratio). One policy is just as sustainable as the other. Given that a policy phrased in terms of a target deficit-to-GDP ratio is now in place, and that it allows us to reach the same endpoint as the corresponding target debt-to-GDP ratio, it seems advisable to leave the deficit-to-GDP ratio as the item to be targeted on a year-by-year basis.

Third, other suggestions that have appeared recently in the debate on these issues have ignored this proportional relationship between full-equilibrium debt and deficit ratios. For example, the Fraser Institute's Robin Richardson suggests both a statutory law precluding budget deficits and a specified date for Canada's "debt freedom year."[17] The first of these suggestions involves stipulating that the deficit-to-GDP ratio be less than or equal to zero. In full equilibrium, we have noted that the debt-to-GDP ratio must converge to the deficit-to-GDP ratio times the inverse of the GDP growth rate. Thus, a zero deficit-to-GDP ratio will indeed deliver the "debt freedom year." But, as explained in the appendix, the speed of adjustment to full equilibrium depends on the growth rate of GDP. Indeed, the time it takes for just one-half of the full adjustment to take place (following a once-and-for-all reduction in the deficit-to-GDP ratio) is a number of years equal to one over the annual growth rate of GDP. For a nominal GDP growth rate of 4 percent per year, that period is 25 years. Policymakers cannot just decree values for all three items — the deficit-to-GDP ratio, the debt-to-GDP ratio, and the GDP growth rate. If we pick the deficit-to-GDP ratio, the accumulation identity determines the debt-to-GDP ratio, and the underlying growth rate determines the time frame involved. The only direct way to control the value of the nominal growth rate is to choose a particular inflation rate: the adjustment period can be shortened by choosing higher inflation. Thus, by choosing a particularly ambitious date for the "debt freedom year," internal consistency forces one to opt for a high inflation rate. It is unlikely, however, that many analysts would be comfortable with contaminating the design of sustainable fiscal policy with such a reversal of recent efforts on the inflation policy front. One payoff of this analysis, then, is that it allows us to be aware of, and therefore to avoid inadvertently forcing ourselves to confront, such a tradeoff.

To recap, if all one means by the sustainability of government debt is that one can avoid the vicious circle of an ever-rising debt-to-GDP ratio, then *any* level for that ratio can be achieved and sustained as long as the corresponding *overall* deficit-to-GDP ratio (not the primary deficit-to-GDP ratio) is systematically targeted.

## Avoiding Higher Interest Rates

The analysis in the previous section involved the implicit assumption that the level of interest rates is given, no matter what the level of a country's debt. Many analysts believe that this is a poor assumption — that, instead, a high debt-to-GDP ratio leads lenders to demand and receive a risk premium in the form of higher interest rates. Thus, any assessment of alternative target values for the deficit-to-GDP ratio must consider the associated levels of both the government-debt-to-GDP ratio and the country's foreign-debt-to-GDP ratio, and then compare these measures with the experience of other countries and the guidelines that bond-rating agencies and other institutions use. As far as this section of the *Commentary* is concerned, then, the sustainability of government debt means a level that is acceptable to lenders without the need for a significant risk premium.

### *How We Got There: A Simulation*

To assess the implications of alternative fiscal policies for the foreign-debt-to-GDP ratio, one must focus on another accumulation identity. This one stipulates that the level of foreign debt increases each year by the excess of what Canadians pay for both imports and net interest payments to foreigners over the receipts Canadians earn from exports. To simulate this relationship in a model, one needs to specify how domestic residents make decisions concerning imports and saving and, in particular, how these decisions are affected by the levels of government and foreign debt. (See the appendix for standard specifications and representative parameter values.)

One reassuring thing about the simulation model presented here is that it can be used to replicate the experience of the past 20 years fairly accurately. For example, consider a scenario in which there is a growth rate of 4 percent, an interest rate of 7 percent, and a federal tax-to-GDP ratio of 16.7 percent, and in which the government starts out with a program spending ratio of 15.95 percent, a deficit-to-GDP ratio of 1 percent, and a debt-to-GDP ratio of 25 percent. These values reflect recent experience, particularly the federal debt-to-GDP ratio of the early 1970s. They also represent a full equilibrium that repeats indefinitely unless some change is introduced. Suppose, for example, that the deficit-to-GDP ratio is increased to 5 percent for a 20-year period (very close to what the federal government averaged between the early 1970s and the early 1990s). Then if the level of program spending is adjusted year by year to maintain the 5 percent deficit-to-GDP-ratio target, the model generates increases in both the government debt-to-GDP ratio and the foreign-debt-to-GDP ratio to just about what the Liberals inherited in 1993. Thus, while the simulation model is highly simplified, it is quite accurate for the key aggregates that concern us here.[18]

### *Looking Forward: Some Further Simulations*

As just noted, a plausible assumption for average nominal GDP growth into the future is 4 percent per year — a value which results from 3.0 percent real growth plus 1.0 percent inflation, or 2.5 percent real growth and 1.5 percent inflation. Thus, 1/0.04, or 25, is the factor of proportionality used to relate the full-equilibrium debt-to-GDP and deficit-to-GDP ratios shown in Table 1, which summarizes the long-run implications of three possible values for the deficit-to-GDP ratio: 1 percent, 3 percent, and 5 percent.

The table shows that maintaining a 5 percent deficit-to-GDP ratio indefinitely is unsustainable. At that level, the government-debt-to-GDP ratio reaches 125 percent, which is far beyond normal bounds — beyond, for example, the 60 percent limit which the European Union requires of new entrants. Also, since Canada's current foreign-debt-to-GDP ratio of 44 percent is already more than three times higher than that of Italy, the next most indebted major industrialized country, there is no way that lenders would accept a tripling of

**Table 1:** ***Some Implications of Alternative Deficit-to-GDP Ratio Targets***

| Deficit to GDP | Important Ratios: Government Debt to GDP | Foreign Debt to GDP | Interest Payments to Tax | Shortfall in Living Standards |
|---|---|---|---|---|
| | | *(percent)* | | |
| 1 | 25 | 0 | 4 | 0 |
| 3 | 75 | 66 | 10 | 2 |
| 5 | 125 | 133 | 26 | 4 |

Source: Author's calculations (see appendix).

this indebtedness (to 133 percent) without imposing a significant risk premium.

The middle row in Table 1 illustrates some of the long-run implications of indefinitely maintaining a deficit-to-GDP ratio of 3 percent — which has been the Liberal government's interim target. This is presented since critics of deficit reduction argue that further fiscal retrenchment is inappropriate. Yet even this lower deficit-to-GDP ratio target means that the government-debt-to-GDP ratio eventually would settle at 75 percent — beyond the 60 percent which European Union "rules" state as the maximum allowed. Moreover, the European target concerns *total* public sector debt — if, in Canada's case, the debt of the provinces were added to the total, the Canadian data would look even worse. In addition, the table shows that the foreign-debt-to-GDP ratio would be 66 percent, or 50 percent higher than it is today, if the 3 percent deficit-to-GDP ratio target were maintained indefinitely. By international standards, one must question the sustainability of this level of debt.

I conclude that, of the options presented in Table 1, only the 1 percent deficit-to GDP ratio target — with a corresponding government-debt-to-GDP ratio of 25 percent and a foreign-debt-to-GDP ratio of zero — would be sustainable without Canada's having to accept higher interest rates. Since each percentage point increase in interest rates heralds a loss of about 3 percent of GDP *each* year, this is an important consideration.[19]

## Maintaining Political Support

Thus far, I have interpreted sustainability by asking two questions: Can the policy that is followed avoid outright instability? Would that policy make the debt-to-GDP ratio and the foreign-debt-to-GDP ratio settle at levels that are unacceptable to lenders without a significant risk premium? But another perspective is also important for judging sustainability: Would such a policy lead to a shortfall of program spending below taxes collected that is so large as to be politically unsustainable?

Turning again to Table 1, the pursuit of a target deficit-to-GDP ratio of 5 percent would allow the federal government to use only three dollars out of every four collected to provide programs — an outcome that has contributed to the widespread support for fiscal retrenchment in recent years. Such a policy does not seem to be politically sustainable. Yet a 3 percent deficit-to-GDP ratio would allow nine out of every ten tax dollars to be spent on programs — an outcome which, in my view, is politically sustainable.

It is important to note, however, that shifting targets from a 5 percent deficit-to-GDP ratio to something lower involves pulling down the level of debt at a *very* slow pace. For example, suppose the government were to

move to a balanced budget over a five-year period (during which the deficit-to-GDP ratio would move down by one percentage point each year) and then hold to a balanced budget indefinitely. Even though the debt-to-GDP ratio eventually would fall from 75 percent to zero, it would still be at the 40 percent mark after 20 years (ignoring the possibility of recessions during the adjustment period). Also, the ratio of interest payments to taxes collected would rise from 26 percent to 32 percent over the first five years, then fall to 18 percent, but only after 20 years. Thus, once the question of timing is considered, a lower deficit-to-GDP ratio than the one that is acceptable in the longer term is needed to achieve anything approaching the intended debt-to-GDP ratio within a couple of decades. But while this is necessary to achieve political sustainability, there is a daunting challenge in the short run in the form of a temporary rise in the ratio of interest payment obligations to taxes collected.

## Intergenerational Equity

As mentioned in the earlier discussion of economic growth, an important dimension of political sustainability is whether fiscal retrenchment can improve the living standards of future generations sufficiently for voters to feel that there has been an adequate reversal of the cross-generational redistribution that has taken place over the past 20 years toward the most fortunate generation of this century.

Table 1 shows that reducing the deficit-to-GDP ratio from 5 percent to 1 percent eventually would raise living standards by 4 percent of GDP over what they otherwise would have been. At today's values, that improvement would mean over $30 billion annually, or a $4,300 increase in the annual income of a four-person family *every* year. This would be a significant increase in living standards but, as Figures 1 and 2 indicate, not nearly enough to offset the reduction in living standards that will accompany the aging of the baby boom generation. Reducing the deficit-to-GDP ratio to 3 percent would raise future living standards by an even smaller 2 percent of GDP, and lead to an unsustainable debt-to-GDP ratio of 75 percent.

### *Costs and Benefits: How Long and How Large?*

Figures 1 and 2 go beyond full-equilibrium outcomes to show the implications of alternative fiscal policies for living standards over time. Living standards are measured as the sum of private consumption and government program spending on goods and services as a proportion of GDP. The figures show living standards as the deviation from the ongoing trend that each fiscal policy causes. As a basis for comparison, each figure starts the model economy off in its first year, 1975, in full equilibrium with deficit-to-GDP and debt-to-GDP ratios of 1 percent and 25 percent, respectively. Then, to simulate the government overspending of the past 20 years, the deficit-to-GDP ratio is increased to 5 percent for the next 20 years, while the tax-to-GDP ratio is kept constant.

In Figure 1 — which assumes that no demographic changes cause changes in living standards — the implication of this scenario for living standards over a 60-year period is indicated by the solid line. Initially, living standards increase by 4 percent, but this improvement lasts for just 20 years. By 1995, the higher interest payments on the debt leave less room in the government's budget for program spending, and the higher debt-service obligations to foreigners reduce private consumption. Both of these depressing effects remain, and the outcome (as indicated in Table 1) is a *permanent* 4 percent reduction in living standards — significant long-term pain for short-term gain.

Beyond 1995, Figure 1 shows the implications of alternative measures to limit these long-term losses through fiscal retrenchment. The continuation of the solid line shows what happens if the government reduces the deficit-to-GDP ratio by one percentage point per year, eventually balancing its budget and keeping it balanced into the indefinite future. The dotted line shows the implications of a less ambitious

**Figure 1:** ***Effects of Alternative Fiscal Policies on Living Standards***

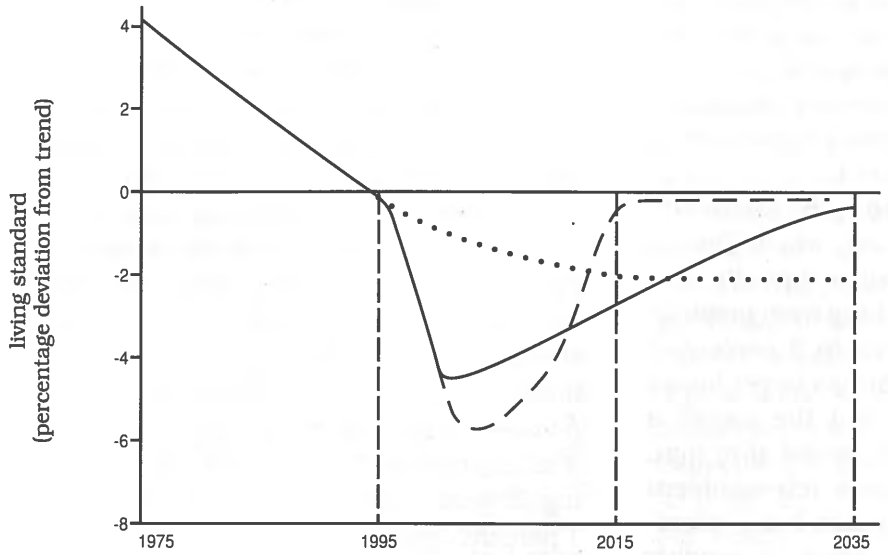
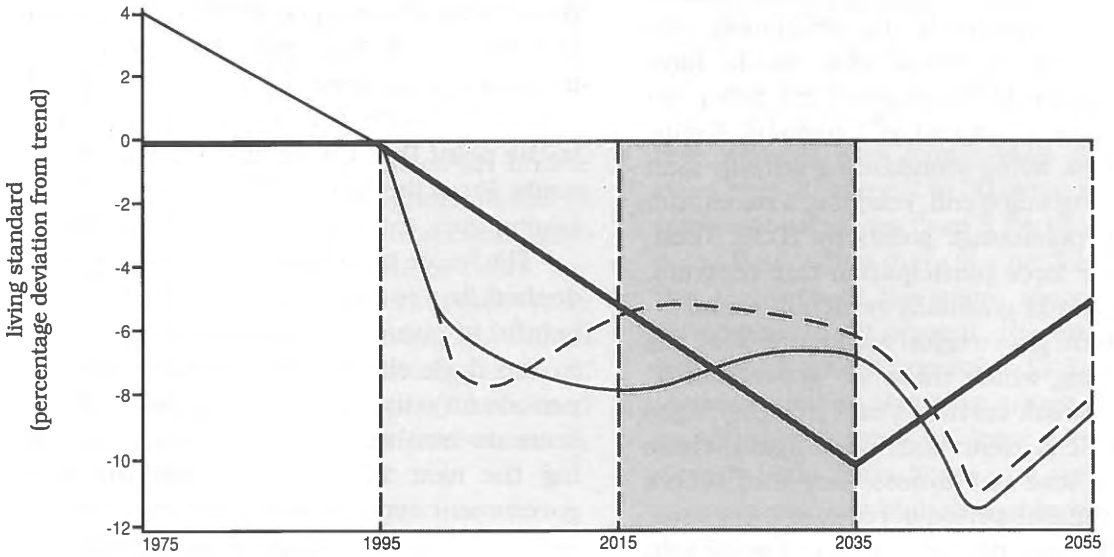



**Figure 2:** ***Effects of Alternative Fiscal Policies and Demographic Trends on Living Standards***



policy of moving down to and then staying with a 3 percent deficit-to-GDP ratio. The dashed line shows what happens if a more ambitious policy is pursued. In this case, the deficit-to-GDP ratio is again reduced by one percentage point per year until a surplus of 2 percent is reached and then run for ten years; thereafter, the government reverts to the original deficit-to-GDP ratio target of 1 percent.

As is evident from Figure 1, the intermediate fiscal retrenchment policy, which Ottawa now appears to be following, eventually cuts the longer-term losses resulting from previous overspending from 4 percent to 2 percent of GDP. Fiscal retrenchment brings larger losses during the next 20 years, but the payoff is smaller losses in the 20-year period after that. But only the more ambitious retrenchment policy has the potential to return living standards during the 2015–35 period to roughly what they would have been without the overspending of the 1975–95 period. From the intergenerational equity point of view, then, only this policy is acceptable.

## *The Impact of an Aging Population*

Figure 2, in contrast to Figure 1, adds coming demographic changes to the simulation. The *thick* solid line indicates what would have happened to living standards if the deficit-to-GDP ratio had remained at 1 percent. Beginning in 1995, living standards gradually sink below the ongoing trend, reaching a maximum drop of 10 percentage points by 2035. Then, as the labor force participation rate recovers, living standards gradually return to trend.

The dark gray region in Figure 2 is the period during which those in "generation X" are in their peak earning years (roughly, ages 45 to 65). It is clear that, once again, these people will lose out unless they and others living during this period of reduced labor force participation are not helped. One way to help is to use fiscal policy to transfer resources from the two lightly shaded time periods on either side. (It is no longer possible to make transfers from the 1975–95 period; indeed, this important opportunity has been squandered, with the costs imposed on those living in the 1995–2015 period being accentuated as a result — but that is history.)

Figure 2 also shows the modifications in living standards that follow from two of the scenarios that were presented in Figure 1 — "actual government policy" and the "more ambitious policy" — over the 1975–2015 period. It is assumed that one of the purposes of fiscal retrenchment now is to make it possible to provide some assistance to those living during the 2015–55 period. With this in mind, the simulations consider a gradual and steady increase in the deficit-to-GDP ratio so that it reaches 8 percent in the peak year of the demographic problem. Finally, in the remaining 20 years, the deficit-to-GDP ratio drops to 1 percent over the first seven years and is then maintained indefinitely.

The scenario involving "actual government policy" augmented by some deficit spending during the 2015–35 period is shown by the *thin* solid line in Figure 2. Although this policy pushes the foreign-debt-to-GDP ratio up to a peak of 65 percent in 2040 and forces living standards down significantly thereafter, rather little help is actually provided during this crucial 20-year period. Thus, this simulation illustrates that even the significant retrenchment involved in this "actual" policy scenario is insufficient to repair public finances to the point that the desired transfers can be made. From the standpoint of intergenerational equity, then, this scenario is not sustainable.

The "more ambitious" policy, shown by the dashed line in Figure 2, appears to be more helpful in successfully transferring resources to the dark shaded period from those time periods on either side. The reason is that this scenario involves enough retrenchment during the next 20 years to leave the federal government approximately where it would have been had it never embarked on the overspending of the past 20 years. With public finances repaired "in time," Canada can afford a fairly major initiative. From an intergenerational equity standpoint, it appears that only debt poli-

cies that are "more ambitious" than balancing the budget can be viewed as sustainable.

The "more ambitious" scenario does, however, have some unappealing features. First, the foreign-debt-to-GDP ratio would rise from a trough of just 8 percent in 2015 to a peak of 57 percent in 2040. Second, the ratio of interest payments to taxes would peak at a discouraging 41 percent in 2001. Thus, while the "more ambitious" scenario (combined with a major expansionary initiative 20 years from now) scores well in terms of consistency with intergenerational equity objectives, it scores more poorly on political sustainability during the early years and on straining the tolerance of lenders to do without a significant risk premium. Perhaps the best way to react to this mixed set of outcomes would be to opt for a debt reduction policy that is a little less ambitious than the one examined here, but more ambitious than the one the government seems to be following. Then, in the later years, a slightly less ambitious expansionary initiative should be tried.

The fundamental point is that the federal government's deficits and debt are being reduced too slowly to permit a significant transfer of living standards back to "generation X." What is needed is a more ambitious fiscal retrenchment that ensures that some of the costs of this transfer are borne by those higher-income earners who belong to this century's more fortunate generations — and that includes taking care not to place an undue share of spending cuts on programs aimed at today's younger generations. The federal government must now move, without delay, beyond its current interim deficit-to-GDP ratio target and, in the interests of intergenerational fairness, ensure that an increasing portion of the spending cuts are made to programs aimed at older Canadians who are at the less needy end of the income scale.

## Income Distribution within Each Generation

As noted earlier, all of the simulations reported in this *Commentary* assume that, since tax rates stay constant, the size of the government sector does not have to be scaled back as a by-product of the effort to reach a sustainable debt-to-GDP ratio. Rather, fiscal retrenchment is accomplished by temporarily cutting program spending, then gradually allowing it to increase — even above its original level — as room in the budget is created by falling interest payment obligations.

Beyond the simple consideration that Canadians will not tolerate tax increases, there are two reasons for making adjustments on the expenditure side of the budget. First, it is difficult to make taxes stick on mobile factors of production when their owners can switch to jurisdictions with lower taxes, and when that happens the tax burden shifts to the more "captive" inputs into the production process. For example, since capital is internationally mobile, the aggressive taxing of capital employed in Canada simply induces "footloose" firms to take operations elsewhere. The domestic labor force then becomes less productive since it is left with less capital to work with. In the end, labor suffers in the form of lower wages. The least mobile factor is unskilled labor, so tax increases, however designed, tend to land on the group that is least able to pay.

The second consideration is that a tax's undesirable effects increase more quickly than the increase in the tax itself. For example, as explained in the appendix, when the overall tax rate (federal plus junior-level governments) rises from 20 percent to 30 percent, the unemployment rate rises from 5 percent to 6.5 percent. Then, when there is a further increase in the tax rate of the same magnitude, from 30 percent to 40 percent, the unemployment rate rises from 6.5 percent to 11.2 percent. The increase in involuntary unemployment is roughly three times as great when taxes are already high. Thus, those who are particularly concerned about high unemployment and the unequal distribution of incomes cannot ignore this pernicious effect of high taxes. The fact that Canada's overall tax-to-GDP ratio has already increased by six percentage points in the past 15 years means that this problem is

already starting to matter a great deal. To avoid the costly effect of higher taxes on unemployment and, therefore, to avoid a particularly undesirable redistribution of income within any one generation, fiscal retrenchment is better accomplished on the expenditure side of the budget. The sustainability of any debt-to-GDP ratio target can be enhanced by maintaining this principle.[20]

## Efficiency Aspects of Government Debt

Thus far in the analysis, I have argued that government debt can be justified on equity grounds. That is, it seems fair that future generations should share the costs of current investment goods from which they will benefit, and debt is one mechanism through which they can contribute. Moreover, part of the burden of particularly costly events — such as depression, war, or the demographic disruptions caused by aging baby boomers — should be transferred to future generations through debt. Can debt be justified, however, even if *no* weight is put on intergenerational equity considerations? The answer is "yes," since government debt affects economic efficiency as well as equity.

The best way to appreciate efficiency issues is to consider an economy which consists of infinitely long-lived individuals, so as to avoid being distracted by the problem of generational transfers. If such a person has access to credit markets which permit borrowing right up to the limit imposed by the individual's solvency, then the optimal government-debt-to-GDP level is negative. A negative debt allows the government to finance necessary spending programs via the interest earned on its assets, without having to rely on taxes. Taxes distort economic decisions and generate inefficient outcomes, such as a high level of involuntary unemployment (as discussed in the previous section). If there are no distortions to the signals imparted by the price system — other than those that would be introduced by taxes — then taxes should not be introduced.

But there *are* other distortions, since some markets — such as credit markets — are incomplete. Individuals face borrowing limits because there is no way that full collateral can be offered to secure a loan based only on an individual's expected future labor income. However, if individuals can use a liquid asset such as government bonds as collateral, these borrowing constraints can be relaxed. It is possible for this benefit of debt (the lessening of incomplete market distortions) to be bigger than the cost of debt (the imposition of tax-induced distortions).

In one recent study examining this tradeoff in a simulation model calibrated to illustrate the US economy, S. Rao Aiyagari and Ellen McGrattan of the Federal Reserve Bank of Minneapolis conclude that the optimal debt-to-GDP ratio is 60 percent and, for some parameter sets, they recommend an even higher ratio.[21] They conclude that the widespread concern about public debt levels may be misplaced, although they do admit that the loss in living standards that follows from wide departures from this calculated optimum is extremely small. I regard their optimal debt-to-GDP ratio estimate to be biased on the high side, since unemployment does not occur in their model. As noted in the previous section, one of the major distortions caused by taxes is an increase in the full-equilibrium level of unemployment. By excluding this effect from their model, Aiyagari and McGrattan underestimate the cost of debt (since they underestimate the cost of the taxes that must be levied to pay the interest on debt). Given this bias, and their estimate that the magnitude of the net efficiency effect is so small, I conclude that efficiency considerations lead to no compelling reason to move away from a debt-to-GDP ratio of around 25 percent as the appropriate long-run target.

## Conclusions

Canada's auditor general has argued that fiscal policy be based on a clearly defended target value for the debt-to-GDP ratio. I agree, since it is a high debt-to-GDP ratio, not a high

deficit-to-GDP ratio, that is the fundamental reducer of living standards. But since these two measures are linked by an accumulation identity — which, in the long run, ensures that the debt-to-GDP ratio is proportional to the deficit-to-GDP ratio — the same policy can be implemented by focusing on a numerical target for either the deficit or the debt. Given this fact, and that a policy phrased in terms of a deficit target is now firmly in place, it seems best to proceed as we are.

The simulations presented in this *Commentary* show that the length of time required for something close to full adjustment following any change in deficit policy is very long. As a result, in the short run, there can be a big difference between a rigid target for the deficit-to-GDP ratio and one for the debt-to-GDP ratio. Targeting the deficit-to-GDP ratio allows swings in the debt-to-GDP ratio that can be large and long lasting. But the simulations also show that such a policy can adjust for this effect by "overshooting" — that is, by setting a more stringent target for the deficit-to-GDP ratio (than is intended as the long-run outcome) during a period of fiscal retrenchment.

In summary, to determine the level of debt that is both appropriate and sustainable, I have posed six questions in this *Commentary*:

- What targeting strategy is needed to avoid an ever-rising debt-to-GDP ratio? Answer: the policy the federal government is now following.
- What is the maximum debt-to-GDP ratio that can prevent a significant risk premium from being built into Canadian interest rates? Answer: 60 percent.
- What is the maximum debt-to-GDP ratio that is consistent with at least 90 percent of taxes being used for programs, not interest payments? Answer: 75 percent.
- What can the maximum debt-to-GDP ratio be in 20 years' time if Canada is to reverse the intergenerational transfers that have been implemented over the past 20 years and to be able to use fiscal policy to cushion the negative effects of the aging baby boom generation? Answer: 25 percent.
- What method of deficit reduction is most consistent with equity objectives and low unemployment? Answer: spending cuts on programs aimed at well-to-do older Canadians, rather than tax increases.
- What value of the debt-to-GDP ratio can best minimize inefficiencies and distortions in the economy? Answer: 25 percent.

Since all these questions represent important considerations, my strategy has been to pick a target value for the debt-to-GDP ratio that meets as many of these sustainability criteria as possible. What emerges is a sustainable debt-to-GDP ratio of 25 percent.

The important supplementary question is: How long can we afford to spend in reaching this target? Answer: 20 years. The simulations show, however, that current government pol-

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icy will take 32 years to reach the target. Thus, to make it within the 20-year time frame, a rather dramatic fiscal retrenchment is required — one that involves balancing the budget within three years and then running a surplus of roughly 2 percent of GDP per year for a full decade. The longer we take to get the job done, the longer this severe austerity period will have to last. And to postpone it indefinitely would be inconsistent with widely held views on intergenerational equity.

# Appendix

## *The Simulation Model*

The following equations define the relationship between deficits and debt:

$$d = (g - t) + rb,$$

$$\Delta b = d - nb,$$

where $d$, $g$, $t$, and $b$ stand for the ratios of the deficit, government program spending, taxes, and the stock of government bonds to GDP, and $r$ and $n$ denote the interest rate paid on government bonds and the GDP growth rate.

Numerous targeting strategies are possible. For example, policy could fix the primary-deficit-to-GDP ratio $(g - t)$, the overall-deficit-to-GDP ratio $(d)$, or the debt-to-GDP ratio $(b)$. The two equations above then determine whichever of the two variables is *not* fixed by policy.

Fixing $(g - t)$ is examined by eliminating $d$ from the two equations by substitution:

$$\Delta b = (g - t) + (r - n)b.$$

With $(g - t)$ at zero, this equation states that the debt-to-GDP ratio *must* forever increase as long as the interest rate exceeds the GDP growth rate, so this fiscal policy is unsustainable. Fixing $d$ at some pre-assigned target path can be considered by focusing solely on the second equation. Any positive value of $n$ ensures stability, so $b$ must converge eventually to $b = d/n$, and the speed of adjustment is proportional to $n$. As far as avoiding outright instability is concerned, then, *any* exogenous deficit-to-GDP ratio policy is sustainable.

The following three equations define the remainder of the model:

$$x = 1 - c - i - g,$$

$$\Delta f = (r - n)f - x,$$

$$c + g = a(1 - rf - t + rb + g).$$

The new notation is defined as follows: $c$, $i$, and $x$ stand for the ratios of private consumption spending, investment spending, and net exports to GDP; $f$ is the ratio of the level of foreign debt to GDP; and $a$ stands for the fraction of disposable income that is allocated to consumption activity.

The first of the new relationships is the national output identity, while the second is the nation's asset accumulation identity with the rest of the world (which stems from the fact that the level of foreign debt must increase whenever existing interest payment obligations exceed the proceeds from net exports). The third equation is a standard consumption function. It assumes that households value government programs on a par with private consumption, so that disposable income is gross national product (GDP minus foreign debt-service payments, measured in ratio form to GDP as $1 - rf$) minus taxes $(t)$ plus transfer payments (in cash form $(rb)$ and in kind $(g)$).

Many economists are critical of such a simple consumption function, in which current spending is proportional to current income. It is thought that individuals are not so liquidity constrained that they must limit cur-

rent spending by current income. The alternative approach involves households' planning in a multiyear context — basing current consumption on the present value of the entire stream of expected future income. In an earlier *Commentary*, I used such a model — which involves formal optimization by households over an expected planning horizon of 50 years, and explicit aggregation in an overlapping generations setting. Even with such a small departure from an infinitely long-lived agent model, I obtained numerical results very similar to those reported here.[22] It is these similarities which justify the simpler specification I use in this study.

Since my focus is on long-run sustainability issues, I abstract from business cycles and take the interest rate and the growth rate to be constant. By not letting the growth rate fall temporarily in the face of fiscal retrenchment, I underestimate slightly the time it takes to reach the full-equilibrium outcomes which are discussed in the text. But, by not letting fiscal retrenchment lead to the removal of a country-specific risk premium, I overestimate slightly the time required for adjustment in the foreign-debt-to-GDP ratio. Since these two simplifications introduce competing biases, it is unlikely that the simulations are misleading in any systematic way.

## *Taxes and Unemployment*

In my earlier *Commentary*,[23] I outline a specific version of a standard explanation for involuntary unemployment that is known as the efficiency-wage theory. In that framework, unemployment rises whenever the payoff from working falls relative to the support received when individuals are unemployed. Higher tax rates reduce the relative payoff from work, so that they lead to a higher level of structural unemployment. In the earlier *Commentary*, I show that the unemployment rate is determined as

$$u = h/(1 - k/(1 - j)),$$

where $u$, $k$, $j$, and $h$ stand, respectively, for the unemployment rate, the "replacement rate" involved in the unemployment insurance system, the proportional tax paid by individuals when working, and the parameter which denotes the degree to which individual productivity increases with the excess of the after-tax wage over what is available to workers if they must leave their current jobs. For the unemployment rate to be 5 percent, with a tax rate and unemployment insurance replacement rate of 20 percent and 50 percent, respectively, parameter $h$ must be 0.01875. Taking this value and the unemployment insurance parameter as fixed, we can consider the effects of a higher tax rate. When the tax rate rises from 20 percent to 30 percent, the unemployment rate rises from 5 percent to 6.5 percent. Then, when there is a further increase in the tax rate of the same magnitude, from 30 percent to 40 percent, the unemployment rate rises from 6.5 percent to 11.2 percent. The increase in the unemployment rate is roughly three times as great when taxes are already high.

## Notes

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1 Auditor General for Canada, *Report to the House of Commons, Chapter 9, Information for Parliament — Deficits and Debt: Understanding the Choices* (Ottawa: Supply and Services Canada, October 1995), p. 9-5.

2 See, for example, "The Burdensome National Debt," *The Economist*, February 10–16, 1996, p. 69.

3 Let $R$ denote the interest rate (the return per unit of capital) and $K$ the quantity of capital. Aggregate profits will then be given the return per unit of capital times the number of units of capital — that is, by $RK$. In a balanced growth process, inputs and outputs grow at the same rate, which one can denote by $n$. Thus, the percentage growth rate for capital, denoted by $\Delta K/K$, equals $n$. If $n$ is to exceed $R$ (as is required for government debt to provide a free lunch), it must be the case that $\Delta K/K$ exceeds $R$. This condition can be rewritten as $\Delta K$ exceeding $RK$ — in words, investment spending exceeding profits.

4 Andrew Abel et al., "Assessing Dynamic Efficiency: Theory and Evidence," *Review of Economic Studies* 56 (1989): 1–20.

5 Lawrence Ball, Douglas Elmandorf, and Gregory Mankiw, "The Deficit Gamble," Harvard Institute of Economic Research Discussion Paper 1710 (Cambridge, Mass., February 1995).

6 The fire insurance analogy, which is taken from ibid., is not perfect, since high deficits and debt can both raise interest rates and reduce investment (and so lower growth rates). Thus, by not buying insurance, the the homeowner might increase the probability that a fire will occur.

7 William B.P. Robson, *Putting Some Gold in the Golden Years: Fixing the Canada Pension Plan*, C.D. Howe Institute Commentary 76 (Toronto: C.D. Howe Institute, January 1996).

8 See, for example, Linda McQuaig, *Shooting the Hippo: Death by Deficit and Other Canadian Myths* (Toronto: Viking Press, 1995).

9 The rise in the interest rate can be smaller than the increase in the nominal growth rate because of what is known as the Mundell-Tobin effect, but economists regard this effect as unimportant from an empirical point of view.

10 See the review of David Foot's forthcoming book in *The Financial Post*, January 6, 1996, p. 18.

11 See Gregory Mankiw and William Scarth, *Macroeconomics: Canadian Edition* (New York: Worth, 1995), p. 106.

12 Part of this analysis draws on William Scarth, *Deficit Reduction: Costs and Benefits*, C.D. Howe Commentary 61 (Toronto: C.D. Howe Institute, June 1994). Some of the novel features here include the focus on foreign debt issues and the assumption that deficit-to-GDP-ratio targets are met through variations in government spending not variations in taxes.

13 See, for example, John B. Burbidge and William M. Scarth, "Eliminating Interest Taxation and Tariffs: The Underpinnings for Recent Canadian Policy," *Canadian Journal of Economics* 28 (1995): 437–449.

14 For example, Andrew Coyne has argued that we should "forget about the deficit....We need a new goal, beyond a balanced budget: a sustainable debt." See Coyne, "Envisioning a sustainable debt," *Globe and Mail* (Toronto), October 14, 1995, pp. D1, D5.

15 Denoting the stock of government bonds by $B$ and the interest rate paid on those bonds by $r$, this deficit-equals-debt-growth relationship can be written as $\Delta B = rB$. As a result, the percentage growth in the debt, $\Delta B/B$, equals the rate of interest.

16 If we denote the GDP growth rate by $n$, the debt-to-GDP ratio is constant when $\Delta B/B$ equals $n$. This full-equilibrium outcome can be rewritten as $(\Delta B/\text{GDP})/(B/\text{GDP}) = n$. Since the first term in brackets is the deficit ratio (call it $d$) and the second is the debt ratio (call it $b$), this policy eventually leads to a debt ratio equal to $b = d/n$.

17 Robin Richardson, "Ottawa Should Follow Provincial Lead on Balanced Budget Laws," *The Fraser Forum*, December 1995, pp. 20–21.

18 I have experimented with some alternative parameter assumptions, but the main conclusions of the *Commentary* are not affected by this sensitivity testing.

19 See Scarth, *Deficit Reduction: Costs and Benefits*.

20 One other pragmatic reason for implementing debt reduction efforts via spending cuts is that experience shows that only when retrenchment is accomplished in this fashion are the effects likely to be durable. See "It's Not What You Do...It's the Way You Do It," *The Economist*, January 20–26, 1996, p. 80.

21 S. Rao Aiyagari and Ellen R. McGrattan, "The Optimum Quantity of Debt," Federal Reserve Bank of Minneapolis Research Department Staff Report 203 (Minneapolis, November 1995).

22 See Scarth, *Deficit Reduction*. Other studies also find similar effects. See, for example, Tiff Macklem, David Rose and Robert Tetlow, "Government Debt and Deficits in Canada: A Macro Simulation Analysis," in William B.P. Robson and William M. Scarth, eds., *Deficit Reduction: What Pain, What Gain?* Policy Study 23 (Toronto: C.D. Howe Institute, 1994). In the same volume, Robson and Scarth's paper, "Debating Deficit Reduction: Economic Perspectives and Policy Choices," p. 34, explains why the empirical work supports a small departure from Ricardian equivalence.

23 Scarth, *Deficit Reduction*.