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Communiqué

Ottawa should "accident-proof" its budget by cutting debt, says C.D. Howe Institute study

The federal government should set goals for long-term debt reduction, urges a *C.D. Howe Institute Commentary* released today. Failure to do so exposes Canadians to important risks, the study argues.

The study, "Accident-Proof Budgeting: Debt-Reduction Payoffs, Fiscal Credibility, and Economic Stabilization," was written by William B.P. Robson, a Senior Policy Analyst at the Institute, and William M. Scarth, Professor of Economics at McMaster University and an Adjunct Scholar of the Institute.

Robson and Scarth outline several areas of disagreement over budget priorities: whether to aim for surpluses or just balance; how rigidly to pursue fiscal targets through booms and busts; and how to choose between tax cuts and new spending as room for both opens up. They warn that paralysis in the face of these conflicts may cause policy to drift. Using a model of the Canadian economy that explicitly allows for future surprises, such as recessions and swings in interest rates, the authors argue that drifting with no explicit targets for paying down the debt exposes the federal budget and Canadians' living standards to unnecessary risks.

Much better, Robson and Scarth suggest, would be for Ottawa to set targets for surpluses that would reduce debt and interest payments over the next few years. They use their model to show that targeting surpluses would not prevent the federal government from using the budget to cushion booms and busts, but rather would allow it to do so without accidentally running deficits and adding to the federal interest burden.

Robson and Scarth also explore the merits of allocating to tax cuts more or less of the room that opens up in the budget as interest payments fall. The authors find that, even when tax cuts are assumed to have relatively modest direct effects on economic growth, they are likely to reinforce the boost that reducing federal debt will provide to Canadians' living standards. Robson and Scarth conclude that a plan that targets surpluses, is flexible in response to cycles, and favors tax cuts will serve Canadians well in the event of accidents.

Ottawa needs to take a long-term view in setting budget strategy, the authors argue, because in 15 years' time Canadians may wish to start running federal deficits again to cushion

the impact of the baby boomers' retirement on the living standards of their children and grand-children.

Robson and Scarth also note an important insight revealed by economic modeling that explicitly allows for surprises and uncertainty. Over the next few years, contrasts among various fiscal strategies are not very large compared to the uncertainties that economic cycles and other possible surprises pose — in this sense, the near-term stakes in choosing a fiscal strategy are low. Over time, however, contrasts among alternative fiscal plans grow and eventually loom large even compared to the uncertainties posed by the economy. In other words, Canadians might not care much now or even in five years' time which strategy the federal government chooses, but they will care a great deal twenty years from now. For that reason, Ottawa should extend its budget planning beyond the current two-year horizon and consider long-term outcomes carefully in choosing a fiscal plan.

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Communiqué

Selon une étude de l'Institut C.D. Howe, Ottawa devrait protéger son budget contre tout imprévu en réduisant la dette

Le gouvernement fédéral devrait établir des objectifs de réduction de la dette à long terme, soutient un *Commentaire de l'Institut C.D. Howe* publié aujourd'hui. Négliger de le faire expose la population canadienne à de grands risques.

Intitulée « Accident-Proof Budgeting: Debt-Reduction Payoffs, Fiscal Credibility and Economic Stabilization » (« Une budgétisation anti-accident : remboursement de la dette, crédibilité financière et stabilisation économique »), cette étude est rédigée par William B. P. Robson, analyste principal de politique auprès de l'Institut, et William M. Scarth, professeur d'économie à l'Université McMaster et attaché de recherche auprès de l'Institut.

MM. Robson et Scarth mentionnent plusieurs zones de désaccord quant aux priorités du budget : faut-il viser un excédent ou simplement équilibrer le budget ? faut-il à tout prix poursuivre les objectifs financiers au travers des cycles d'expansion et de ralentissement ? faut-il choisir entre les réductions d'impôt ou les nouvelles dépenses lorsque l'occasion se présente ? Les auteurs préviennent que toute paralysie face à ces problèmes entraînera la dérive des politiques. À partir des résultats produits par un modèle de l'économie canadienne qui tient compte d'événements imprévus, comme une récession ou un mouvement des taux d'intérêt, les auteurs soutiennent qu'en se laissant dériver sans objectif précis quant au remboursement de la dette, on expose le budget fédéral et le niveau de vie des Canadiens à des risques inutiles.

Il vaudrait bien mieux, affirment les auteurs, qu'Ottawa établisse des objectifs d'excédent qui serviraient au remboursement de la dette et à la réduction des paiements d'intérêts au cours des années à venir. Ils invoquent leur modèle pour indiquer que l'établissement d'excédents n'empêcherait pas le gouvernement fédéral de s'appuyer sur le budget pour amortir les répercussions des cycles d'expansion et de ralentissement, mais l'aiderait plutôt à le faire sans créer accidentellement un déficit et sans alourdir davantage le fardeau des intérêts sur la dette fédérale.

MM. Robson et Scarth se penchent également sur les mérites d'attribuer sous forme de réduction d'impôt l'amélioration découlant de paiements d'intérêts réduits. Les auteurs ont observé que même si les réductions d'impôt ont des répercussions directes relativement modestes sur la croissance économique, elles contribuent à la stimulation apportée par la réduction de la dette fédérale sur le niveau de vie des Canadiens. Ils dégagent de cette étude qu'un plan

visant les excédents, réagissant avec souplesse aux cycles économiques et favorisant les réductions d'impôt, servira bien les Canadiens en cas d'imprévu.

Ottawa doit adopter une optique à long terme dans l'établissement de sa stratégie budgétaire, soutiennent les auteurs, car au cours des quinze prochaines années, les Canadiens pourraient bien vouloir enregistrer un déficit fédéral pour amortir les répercussions de la retraite de la génération du baby-boom sur le niveau de vie de leurs enfants et de leurs petits-enfants.

MM. Robson et Scarth soulignent également une importante constatation révélée par le modèle économique qui tient compte des surprises et des incertitudes. Au cours des années à venir, les différences entre les diverses stratégies budgétaires ne sont pas très considérables par rapport aux incertitudes que posent les cycles économiques et autres surprises éventuelles — dans ce sens, les enjeux à court terme en matière de choix de stratégie budgétaire sont faibles. Par contre, les contrastes entre les différents choix de plans budgétaires s'intensifient avec le temps; leur importance s'accroît même lorsqu'on les compare aux incertitudes que pose l'économie. Autrement dit, les Canadiens pourraient ne pas trop se soucier maintenant ou même dans cinq ans de la stratégie que choisit le gouvernement fédéral, mais ils s'en soucieront beaucoup d'ici 25 ans. Pour cette raison, Ottawa devrait porter sa planification budgétaire au-delà de l'horizon actuel de deux ans et envisager avec beaucoup d'attention les résultats à long terme de tout plan budgétaire qu'il choisit.

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« Accident-Proof Budgeting: Debt-Reduction Payoffs, Fiscal Credibility, and Economic Stabilization », *Commentaire de l'Institut C.D. Howe* n° 129, par William B.P. Robson et William M. Scarth, Toronto, Institut C.D. Howe, septembre 1999, 32 p., 9 $ (les commandes sont payables d'avance et doivent comprendre les frais d'envoi, ainsi que la TPS — prière de communiquer avec l'Institut à cet effet). ISBN 0-88806-443-8.

On peut se procurer des exemplaires de cet ouvrage auprès des : Éditions Renouf ltée, 5369, chemin Canotek, Ottawa ON K1J 9J3 (librairies : 71½, rue Sparks, Ottawa ON, et 12, rue Adelaide Ouest, Toronto ON) ou encore en s'adressant directement à l'Institut C. D. Howe, 125, rue Adelaide Est, Toronto (Ontario) M5C 1L7. On peut également consulter le texte intégral de cet ouvrage dans le site Web de l'Institut.

Accident-Proof Budgeting:

Debt-Reduction Payoffs, Fiscal Credibility, and Economic Stabilization

by

William B.P. Robson
and William M. Scarth

Ottawa has refused to set out a long-term plan for reducing its burdensome debt. This reluctance likely stems from many-dimensioned disagreements: what target to choose, how resolutely to aim for it, and how to allocate new room in the budget between tax cuts and new spending. Using multiple simulations of a model of the Canadian economy that allows for the uncertainties that bedevil forecasting, we try to narrow the disagreement over these options by comparing several debt-reduction strategies over the next 20 years.

A speedy approach to lower debt yields significantly higher living standards over time, especially when the bulk of interest savings goes toward tax cuts. Our investigation suggests that a credibility-damaging return to deficits over the next five years is surprisingly likely: only more ambitious plans offer much hope of staying consistently in the black. Tempering annual budget targets in response to booms and busts can stabilize taxes and spending and make "bad news" budgets during slumps less likely. Overall, the best plan is one that is ambitious in its pace of debt reduction yet flexible in response to short-run cycles, and that favors tax cuts as interest payments fall.

Our uncertainty-based modeling yields considerable variability in outcomes under each plan. In the early years, this variability is fairly large compared with the differences in average outcomes across the plans, suggesting that the stakes in choosing among them are low. In later years, variability grows a little, but the differences among the plans grow faster. Since the stakes rise over time, Ottawa should avoid its current tendency toward drift and weigh longer-term outcomes more heavily in choosing an explicit fiscal plan.

Main Findings of the Commentary

- Recent hints that the federal government will pay down debt and cut taxes are at odds with both its 1997 election commitment to spend half of each year's fiscal dividend and the 1998 and 1999 budgets' projections of no surpluses at all.
- Ottawa's reluctance to adopt an explicit long-term debt-reduction plan likely arises from disagreement about what types of fiscal targets to choose, how rigidly to pursue them, and how to choose between tax cuts and new spending as interest obligations shrink through time.
- To see how crucial some of these choices are for Canadians' economic well-being and which of them are more "accident proof," we ran simulations of a model of the Canadian economy that incorporates many of our uncertainties about future events and about the structure of the economy. We then compared various possible plans — all of which aim to accommodate foreseeable demographic pressures by allowing, after 20 years, a return to deficits of a size consistent with a long-term debt-to-GDP ratio of 30 percent — with a "drifting" approach in which fiscal policy aims simply for balance in good times and deficits in recessions.
- In some of these choices, the stakes for longer-term living standards appear fairly high. Payoffs in the federal budget and growth in real consumption per person are consistently higher under the more ambitious surplus-seeking plans than when policy drifts.
- Our uncertainty-based approach suggests that Ottawa will have to work hard to build credibility. The drifting approach leaves the federal debt-to-GDP ratio above 30 percent after 20 years in more than 70 percent of our runs, and has virtually no chance of avoiding deficits in the near term. Only surplus-seeking approaches consistently avoid multiple deficits over the first five years.
- Allowing actual budget outcomes to swing around the annual budget targets implied by a given debt-reduction plan in response to cycles offers several advantages over more hawkish approaches. Despite Keynesian influences of the budget on demand in our model, such policies do nothing to stabilize the economy. They do, however, make tax rates and programs more stable and painful fiscal contractions during slumps less likely. If the budget responds with equal force to booms and busts, this flexibility does not harm fiscal credibility.
- In our model, the direct distorting effects of taxes are limited and government spending has a key direct role in raising living standards and private saving, yet the impact of devoting interest savings to tax cuts boosts the benefits of conscious debt reduction by roughly 50 percent.
- Near-term differences among the average outcomes of each approach are small compared with the variability around each average, but the differences — and hence the stakes involved in the choices — become more significant with time. This suggests that Ottawa should weigh long-term outcomes heavily in making its budgetary choices.

The federal government's long-term fiscal strategy is up in the air. During the 1997 election campaign, the Liberal Party committed itself to spending half of any projected budget surpluses. Since then, several ministers have indicated a desire to make tax reductions and/or the paying down of debt higher priorities. And the 1998 and 1999 budgets further clouded the issue by using tweaked forecasts to yield an artificial string of exactly balanced budgets over their two-year projection periods.

Clearly, although Ottawa's net debt still exceeds 60 percent of gross domestic product (GDP) and imposes a net interest burden not far short of $40 billion on the federal budget, the government is reluctant to set fiscal targets consistent with an explicit goal for long-term debt reduction. This reluctance is regrettable for several reasons.

To start with, Canadians have endured a long period of meager growth in real incomes. Many suggestions for addressing this problem involve tax changes that favor saving and investment. For a given size of government, however, taxing investment income less means taxing labor income more, making it harder, in the near term, for a rising tide of higher saving and investment to lift all boats. Debt reduction, by contrast, can deliver higher national saving without shifting the tax burden toward labor.

The federal government's reluctance is also regrettable because government budgets in Canada will come under powerful and persistent pressures over the coming decades. In particular, Canada faces a major demographic transition as the baby boomers retire. A recent report from the auditor general (Canada 1998) on the budgetary implications of an aging population estimates that, over the next 30 years, Canadians will have to devote an additional 3 percentage points of GDP to maintain the Canada and Quebec Pension Plans and the Old Age Security/Guaranteed Income Supplement system. In addition, if health care costs increase annually at just 1 percent more than the general rate of inflation, maintaining health care support will require another 2.6 percentage points of GDP. Taken together, these estimates indicate that 5.6 percentage points of GDP must be found in government budgets — an amount implying tax increases or cuts in other programs of some $50 billion (in today's dollars), if debt reduction does not shrink interest payments and create the flexibility for a swing into a small deficit as the pressures of the retiring baby boomers reach their peak. Other writers have pointed out that these projections ignore savings on items such as education, recreation, welfare, and employment support implied by an aging population (Denton and Spencer 1999). On the whole, however, a cautious view seems warranted: the future elderly will be better educated and healthier than today's older population (Murphy 1995), and non-demographic difficulties — such as deteriorating labor market outcomes for the less skilled — will present government budgets with compelling demands that will be easier to meet if debt reduction has created some additional room.

Finally, Ottawa's reluctance to commit to a long-term plan may be imprudent because near-term fiscal decisions have key long-term implications. There are any number of possible values for the future debt burden and as many paths to get there. There is also more than one way to approach the annual budget targets implied by a given program, ranging from hawkish attempts to hit an exact amount each year to approaches that let the balance swing above or below the target depending on the state of the economy. And there is the question of what to do as a shrinking debt burden creates new room in the budget: should tax cuts or should spending increases get first call on the new money? In view of the compounding power of interest payments and economic growth over time, the outcomes of the next few budgets

may greatly affect Canadians' living standards over the long haul.

This *Commentary* tries to advance the budgetary debate by separating the various dimensions of disagreement over fiscal strategy. We use a model of the Canadian economy that explicitly allows for some of the uncertainties that bedevil fiscal planning by incorporating different growth and interest rate surprises, as well as different values for some key economic relationships, in multiple forecast runs. We look at the results of a variety of approaches: more and less energetic attempts to get the debt down, greater and lesser determination to hit specific annual fiscal targets, and different proclivities when it comes to distributing the budget payoff in tax cuts or spending increases. This approach adds some nuances to the results of simpler investigations of Canada's fiscal choices, as well as yielding some surprises.

When it comes to how ambitious the federal government should be in trying to pay down debt over the next few years, our model confirms that extra effort in this regard means more short-term pain, but larger gains after a shorter wait, than less ambitious alternatives. Our modeling suggests that a return to deficits over the next five years is surprisingly likely under many fiscal approaches: only programs that actively seek surpluses over the next few years hold out hope of maintaining credibility by keeping the budget in the black. Along with the greater short-term pain, this insurance against a return to deficits is purchased at the additional price of greater volatility in the government's budget itself. Although some of this variability in the budget arises from the room that debt reduction opens up for tax cuts and spending increases, in general it suggests that these programs involve more political effort than less ambitious or passive approaches to fiscal policy.

As for the hawkishness with which Ottawa should pursue annual budget targets, our modeling supports a flexible approach that lets the budget balance swing in response to short-term cycles in the economy. Although we do not find that this approach stabilizes the economy, as traditional Keynesian analysis would predict, it can buffer the effects of economic cycles on taxes and programs. As long as this flexibility in the face of cycles is symmetric, responding with equal vigor to booms and busts, it hampers neither the longer-term lowering of debt nor the credibility of the program.

As for the best way to use the room that opens up in the budget as interest payments fall and the need to run surpluses or even balanced budgets declines, we find that reflecting a large share of this extra room in tax cuts rather than new spending can boost productivity growth and living standards during the transition period. Despite our deliberate attempt to avoid exaggerating the negative effects of taxes in our model and our inclusion of economic benefits from government spending beyond what is usual in economic modeling, the rewards from tax cutting are consistently positive, and grow over time.

This sort of exercise cannot resolve broader debates over how visible and intrusive the federal government should be in national life, nor about the weight policymakers should give the welfare of future Canadians in making decisions today. It can, however, help to untangle the different dimensions in the debate over federal budget priorities — demonstrating, for example, that there is nothing inconsistent in allowing short-run cyclical variations in the budget balance while undertaking ambitious debt reduction and tax cuts over the longer term. We hope that these results will help narrow the range of disagreement about the ends and means of federal debt reduction, and thus help Canada move forward in this vital area.

The Dimensions of the Debate

The notion that the obscurity in the federal government's fiscal strategy arises from actual

and feared fights is persuasive because these conflicts have several dimensions. Everything — the long-term objective, the appropriate approach to annual budget targets, the relative emphasis to give tax cuts versus new spending — is open to debate. Let us look at each in turn.

The Ultimate Debt Target

The consensus — at the rhetorical level at least — that a lower debt-to-GDP ratio is a good thing breaks down over whether it is worth aiming for a lower ratio than economic growth by itself can be expected to produce. Suppose the dollar value of federal debt in 15 years' time — the point at which demographic pressures will begin to push hard, making a return to persistent deficits tempting — were unchanged from the level (some $572.6 billion) likely to prevail at the end of the current fiscal year. If economic growth over that period averaged just over 4 percent annually in nominal terms,[1] the debt ratio would stand at a little under 33 percent. Several commentators, looking forward to tax cuts or new spending in the near term, have implicitly or explicitly advocated this course, seeing balanced budgets in the coming years as a sufficiently ambitious target.[2]

The contrasting case for a more ambitious effort to reduce the debt closely resembles the case for deficit control with which Canadians have been familar since the early 1980s. Lower debt would reduce the exposure of programs and taxes to swings in interest rates. It would enhance fiscal flexibility in the face of challenges, the looming retirement of the baby boomers being a critical example.[3] It could raise living standards in the interim by reducing Canada's net foreign debt and the related flow of interest and dividend payments abroad and by reducing the need to finance government interest payments with taxes that discourage work, saving, and above-ground activity. Finally, aiming for a more ambitious target — so soon after a time when Canada's

fiscal woes were intense enough to provoke talk of a debt crisis — may increase lender confidence in the country's longer-term prospects, lowering interest costs both for the federal government and for other borrowers. On the basis of these considerations, a more ambitious target is preferable.[4]

Another point of contrast between plans with surpluses near the outset and those without them is their credibility. Plans that aim simply for budget balances during the critical early years are more likely to produce deficits as a result of slumps in the economy or jumps in interest rates. Plans that aim for surpluses in the early years, by contrast, would fare better on the credibility front in the near term.

Fiscal Targets and Stability

Suppose Ottawa arrived at a set of annual targets consistent with a longer-term strategy that received general support. A further problem arises: might those targets lock fiscal policy into an inflexible stance, unable to react to economic slumps and booms?

The Keynesian view — that fiscal policy should help smooth economic cycles, running deficits to boost demand when actual output is below the economy's sustainable capacity and running surpluses when it is above — influenced fiscal policy heavily in the immediate postwar period, but has since fallen from favor. Its tarnished reputation owes something to the failure of policymakers in Canada and elsewhere actually to run surpluses during booms. It also owes something to economists' growing attention to dynamic effects — a rise in the debt-to-GDP ratio can boost demand in the short run, but working it back down can dampen demand later and so prolong recessions.[5] And finally, there has been growing recognition of the role that monetary policy — in concert with, or independently of, fiscal policy — can play in stabilization.[6]

Even if accommodating economic cycles with swings in the annual budget balance does not smooth the variability of output much, there is still a case for letting booms and busts push the balance temporarily off the targets dictated by fiscal considerations. As consumers of government-provided goods and services, as transfer recipients, and as taxpayers, citizens find life more predictable if governments are not constantly changing their programs and taxes with every economic blip. Automatic stabilizers such as employment insurance, if they are allowed to operate, can also help spread the dislocations produced by economic cycles more evenly across individuals. The desire for freedom to stabilize may also inhibit the laying out of a longer-term fiscal plan.

Distributing the Fiscal Dividend

A final major possible reason for the federal government's reluctance to show surpluses may be a wish to put off confrontation between big spenders and tax cutters. There are difficult equity considerations, as well as crude political calculations, in choosing where, and in what quantity, to direct the extra money freed up in the budget as the debt-to-GDP ratio falls; there are also key economic issues involved. Taxes change prices and rewards. Income taxes make work and saving less attractive. Consumption taxes discourage spending on the taxed items. Both encourage gray- and black-market activity. The size of these impacts is uncertain: different taxes have different effects, and the effects of one may depend on what others are being levied and at what rates. Different spending programs may worsen or alleviate these effects. All in all, there is reason to think that well-chosen tax relief might add to the level — or perhaps even the growth rate — of Canadian living standards, but there is no guarantee that any particular tax cut Ottawa might choose would do so.

On the spending side, some tricky economic questions also arise, along with more straightforward "pork barrel" issues. Increases or cuts in government spending may affect private decisions. Some spending involves transfer payments that, being largely spent by the recipients, lower national saving and (through time) potential output and the government's tax base. But other spending is on goods and services that add to Canadians' well-being and, to the extent it permits households to spend less on private goods and services, may give national saving a partially offsetting boost.

All these considerations complicate the debate over how to distribute the payoff from debt reduction. Without clearly defined rewards, it is natural that the program will look less attractive.

Drifting by Default

What if paralysis on these issues carries the day? Under such circumstances, it seems likely that — in line with the formal presentation in the last budget, which showed only zeros despite a healthy economy — the federal government would not target surpluses at all, and would react to the prospect of an untargeted surplus by boosting spending late in the fiscal year in order to eliminate it. The result could be a budgetary bottom line that fluctuated between rough balance when the economy is strong and deficits when it is weak.[7]

Since it does not even target a balanced budget over the full economic cycle, this approach makes future values of the debt ratio unknowable: they will depend on the frequency and depth of future downturns and the sensitivity of the federal budget balance to those downturns. When it comes to the long term, then, this policy is one of drifting. On average, the debt burden will likely fall, but the resulting improvements in the primary balance will be relatively slow and uncertain. We explore the implications of drifting for Canadian living standards, for fiscal credibility, and

for economic stability — the criteria just used in discussing the various dimensions of the fiscal debate — in more detail later, but their broad outlines are easy to see.

The drifting approach leaves more room early on for good-news budgets — some tax cuts or spending hikes. By holding out little promise of large, sustained cuts in the drain of interest payments on the budget, however, it limits the prospects for bigger tax cuts or spending increases later on.

Drifting obviously does nothing to build fiscal credibility. It makes no promises about the long-term sustainability of fiscal policy, since it leaves core spending programs exposed to setbacks on the debt and interest-costs front. And it guarantees the re-emergence, probably sooner rather than later, of deficits.

The flip side of these characteristics is that the drifting approach insulates the budget not only from targets inspired by a desire for lower debt, but also from fluctuations arising from one-half (the upswing) of the business cycle, thus offering greater year-to-year stability in tax rates and spending than its more demanding alternatives. In addition to the fact that the drifting approach describes federal policy during the 1970s and 1980s reasonably closely and is consistent with the bottom lines in the 1998 and 1999 budgets, which projected exact budget balances despite a rapidly growing economy, its less politically demanding character is a good reason to take it seriously as a possible outcome of the fiscal debate.

Modeling the Options

Disagreements over budget priorities arise from different sources. They occur partly from intractable differences of opinion over the proper role of the federal government in Canadian life and from differing degrees of willingness to postpone gratification. But disagreements over targets, paths, annual balances, and how to distribute the dividend also arise from, and are worsened by, gaps in our knowledge about the future and the structure of the economy.

Taking explicit account of some of these latter uncertainties may allow us to disentangle some of the dimensions of the debate and thus narrow the range of disagreement over fiscal priorities. Accordingly, we now turn to a modeling exercise to see not only the implications of drifting or choosing a debt-reduction approach under the "average" circumstances of a standard economic projection, but also how "accident proof" different budget approaches may be when things do not turn out quite as expected, and whether the stakes involved in the various choices differ in important ways.

The Basic Model

Our tool for this investigation is a simple model of the Canadian economy calibrated to produce a steady state resembling Canada's situation in 1997. (The model is described in detail in the appendix; we give a quick overview of its main features here.) Since the model is designed to explore the impact of changes in the federal budget on the economy and of the changes in the economy on the federal budget, federal budgetary decisionmaking is one of its key features.

The model contemplates several types of rules for federal budgetmaking. At the outset, the government chooses a set of annual budget targets consistent with its longer-term views on debt reduction. Then, as each year's budget is made, there is a further choice: either aim for the previously decided target, an approach usefully thought of as the policy desired by a faction of fiscal hawks, or allow the economic cycle to push the bottom line off the target, an approach attractive to a stabilizing faction.[8]

Having chosen its desired budget balance, the federal government then projects its debt-servicing costs on the basis of expected interest rates and its expected average net debt out-

standing during the year. Subtracting this amount from the total balance yields the desired primary balance for the year. The expected movement toward deficit (surplus) in the primary balance from the previous year is then divided into lower (higher) taxes and higher (lower) program spending, with the shares of each depending on the outcome of a debate between a faction of tax cutters and a faction of big spenders.

In the model, Ottawa affects the economy in a number of ways. Its transfers add to the income households (and provincial and local governments) use to buy goods and services. It provides goods and services directly — adding to the well-being of households and allowing them to spend somewhat less on private consumption.[9] Federal taxes reduce household and business cashflow and distort the labor market. Changes in the budget balance stimulate or depress overall demand and, therefore, output. And changes in the level of federal debt influence interest rates.

Such a model makes it possible, in principle, to examine the outcome of different choices made along the dimensions outlined above: different paths for the annual budget balance; differing degrees of hawkishness and flexibility in setting annual targets; and different proclivities for lowering taxes or raising spending when room opens up in the federal budget.

Adding Uncertainty

The normal practice with such models is to run single forecasts. Such "point" forecasts, however, convey a misleading sense of certainty. We know that the economy will be subject to surprises over the coming years, and we are also uncertain about some of the economy's characteristics. These uncertainties make it hard to know how seriously to take differences in point-forecast results. What is more interesting

is to ask how likely it is that a given approach will achieve or avoid various key outcomes, and to look at the degree of overlap among the distributions of outcomes under the various approaches to judge the importance of pursuing one as opposed to another.

Accordingly, we ran 1,000 forecasts of the economy and the budget under each approach, with each run incorporating its own set of possible economic disturbances and its own set of values for key economic parameters about which we are uncertain.[10] We generated random numbers to create both time series for the disturbances and values for the parameters used in each run.

Our model contains two "flavors" of disturbances. First, we produced a business cycle by making actual output cycle around the economy's productive potential: the period from peak to peak is six years on average but varies, with a standard deviation of one year, from run to run.[11] Consistent with recent economic growth and the declining unemployment rate, we assumed that Canada was currently on the upswing of this curve and that the economy will pass through capacity output during 1999 and be running above potential in 2000.[12] Second, we added temporary disturbances, "noise," to both output and interest rates.[13]

Our choices for the size of these disturbances were guided by history. The median standard deviation of interest rates over a 30-year simulation period under a drifting approach is 1.2 percentage points — lower than the 3.0 percentage point standard deviation of the average of three-month and ten-year rates recorded since the mid-1950s, but equal to the standard deviation of this measure since inflation targeting began in 1991. And the median standard deviation of annual changes in real output is 1.8 percentage points — lower than the 2.4 percentage points figure recorded since the mid-1950s, but consistent with the degree to which the lower interest rate volatility af-

fects output volatility in the model. (The standard deviation of annual changes in real output since 1991 has actually been somewhat lower: 1.2 percentage points.[14]) A variety of combinations of values for these cycles and shocks could have produced this volatility in output and interest rates, but our conclusions about the merits of different fiscal approaches do not seem very sensitive to the particular choice we made — except in one respect that we emphasize below.

We also explicitly allowed for our uncertainty about some characteristics of the economy by making key relationships in the model vary from run to run. The following key parameters describing economic behavior were drawn for each run: the effect of taxes on productivity; the impact on output of changes in the primary balance and interest rates; the dependence of inflation on the output gap; and the effect of the ratios of foreign and government debt to GDP on interest rates. (The appendix presents the values we used for means and standard deviations for these parameters and our reasons for each.) We were thus able to test the robustness of our results in the event that the world differs from our assumptions in a single point forecast.

Payoffs, Credibility, and Economic Volatility

This model gave us a tool with which to evaluate a number of possible fiscal approaches in an uncertain world and to see how high the stakes are in some of the choices Ottawa faces.

The Drifting Approach

We start by saying more about the consequences of failing to adopt any particular set of targets for the budget's bottom line. Suppose that, over the next 15 years, policy drifts as described above: the federal government targets a balanced budget when the economy is strong

and deficits (of 0.4 of a percentage point of GDP for every percentage point that output is below potential) when it is weak. After 15 years, demographic pressure moves the baseline target in five equal annual steps from zero to a deficit of just over 1.2 percent of GDP, which is consistent (if nominal growth averages just over 4 percent annually) with a long-term debt ratio of 30 percent of GDP. The government continues to aim exactly at each of those annual targets when the economy is strong and to slip below them when the economy is weak. Suppose further that, in line with the promises in "Red Book II," the government allocates one-quarter of each year's expected change in the primary balance to tax cuts, with the rest flowing through to new spending. Running 1,000 simulations with our model yields some average values for key outcomes related to living standards, credibility, and volatility, along with measures of variability around these outcomes (Table 1).

Budget Payoffs

One convenient measure of the reward of debt reduction is the payoff in the federal government's primary balance: the balance between taxes and program spending. Movements in the primary balance from surplus toward deficit mean that there is room for lower taxes or higher spending — good-news budgets. The average outcome of the drifting strategy after five years — somewhat surprisingly, given its apparent attractiveness as a way of avoiding short-term pain — is a payoff of only 1 percent of GDP.[15] This average result is principally due to our model's tendency to produce interest rate increases in the early years as the economy returns to capacity and inflation approaches the Bank of Canada's 2 percent target. Given the comparatively slow progress on reducing the debt ratio under the drifting approach, these interest rate increases feed through into debt-service costs, limiting the improvement in the primary balance.

Table 1:   *Simulation Outcomes — Drifting Approach*

	Average/Share	**Standard Deviation**
Budget flexibility		
Median payoff after 5 years *(% of GDP)*	1.0	0.4
Median payoff after 10 years *(% of GDP)*	1.9	0.4
Median payoff after 15 years *(% of GDP)*	2.4	0.3
Median payoff after 20 years *(% of GDP)*	3.8	0.3
Living standards		
Median change in real consumption per person after 5 years *(%)*	4.8	1.6
Median change in real consumption per person after 10 years *(%)*	8.5	1.8
Median change in real consumption per person after 15 years *(%)*	12.3	1.9
Median change in real consumption per person after 20 years *(%)*	16.8	1.9
Credibility		
Median debt ratio by year 15 *(%)*	−32.9	1.7
Median debt ratio by year 20 *(%)*	−30.9	1.6
Mean number of deficits in first 5 years	2.6	0.8
Share of runs with one or no deficits in first 5 years *(%)*	7	n.a.
Mean number of deficits in first 10 years	5.7	1.1
Share of runs with one or no deficits in first 10 years *(%)*	0	n.a.
Volatility		
Median volatility of economy *(standard deviation of annual changes)*	1.8	0.3
Median volatility of budget *(standard deviation of primary ratio)*	1.3	0.1
Mean number of fiscal contractions in a recession	1.5	1.1
Share of runs with one or no fiscal contractions in a recession *(%)*	54	n.a.

n.a = not applicable.

The multiple-run approach suggests a fair amount of uncertainty around these average outcomes. One convenient way to express this variability is to show the standard deviation of the results. When outcomes or observations are normally distributed, in the familiar bell-shaped curve, about two-thirds of them will be within one standard deviation of the mean, and about 95 percent of them will be within two standard deviations. In the case of the payoff after 5 years, the 0.4 of a percentage point of GDP figure for the standard deviation of the runs means that in only about 1 percent of the runs is the payoff in the primary balance after five years negative.

As time passes, the drifting strategy shows increasing payoffs because, although the government runs deficits on average, they are small enough that economic growth lowers the ratio of interest costs to GDP, creating some room for good-news budgets. After 15 years, when demographic pressure is about to start pushing the baseline target toward deficits, the median payoff is 2.4 percentage points of GDP. At the end of 20 years, when the baseline target (before the impact of slumps that push it below target) for the budget balance is just over 1.2 percent of GDP, the additional room in the primary balance created by the move to deficit pushes the median payoff to 3.8 percent of

GDP. Since the auditor general's report identified 5.6 percentage points of new room in government budgets as a minimally prudent target for a 30-year time frame, and since two-thirds of that can be taken as a basic benchmark for a 20-year horizon, we see that the drifting strategy can just meet this goal — but the uncertainties around this number indicate a significant chance of falling short.

Living Standards

Focusing on the payoff in the federal government's primary balance gives a sense of the direct impact of taxes and spending on Canadian incomes and the political opportunities that go with them. Another broader view of the pains and gains of the different fiscal approaches that takes account of indirect effects of fiscal policy on Canadian living standards is available from changes in real consumption. With a note of caution that these results may be more sensitive to our model's design than were the budget payoffs, we now turn to the evolution of consumption per person under a drifting policy.

On their face, these figures show a happy situation: consumption per person grows over all four time horizons shown — 5, 10, 15, and 20 years — thanks to ongoing productivity growth. While the variability of these outcomes increases as we look further ahead (indicated by the increasing figure for the standard deviations of these results), the dispersion is too small to offer any significant chance that consumption will decline.

Credibility

As noted earlier, the credibility of any debt-reduction plan has two elements. First, there is the likelihood, as seen from the present, that the plan will be sustainable, allowing for the budget pressures that demographic changes will produce as the baby boomers retire. Second, there is the question of whether unpleas-

ant surprises will push the budget back into deficit, causing doubts about the federal government's prudence and possibly causing an adverse reaction among lenders.

As for the long-term outlook, the drifting approach does tend to produce a decline in the debt-to-GDP ratio over time. By the end of 15 years, when the government will likely want room to start running persistent deficits, the median debt ratio in the 1,000 runs is just under 33 percent. By year 20, the median debt ratio is close to the 30 percent level consistent with the baseline target, although it actually surpasses that figure in fewer than 30 percent of the runs.

Over the shorter run, however, when the government's fiscal credibility will depend on avoiding deficits, the asymmetrical response of the drifting approach to fluctuations in the economy yields a very poor performance. Over the first five years (fiscal years 2000/01 through 2004/05), the mean number of deficits in all the model runs is 2.6, and in only 7 percent of the runs does the government register no deficits or only one. The results over ten years are also poor: the mean outcome is 5.1 deficits — deficits in fully half the years — and the number of runs in which the government runs no deficits or only one is negligible.

Volatility

Finally, we turn to the extent of disruption to Canadians' lives that the drifting approach to government debt might imply. As already noted, our model produces a standard deviation of annual growth rates of 1.8 percentage points under a drifting approach, so this measure of economic volatility serves here only as a reference point for comparison with more fiscally active approaches.[16]

Aside from overall economic volatility, bad-news budgets when the economy is weak are particularly awkward, since such budgets are likely to cut into the income support provided to those hurt by the slump. Looking at

the number of movements of the primary balance toward surplus by more than a threshold amount — one-quarter of a percent of GDP, or a bit more than $2 billion in today's money — when the economy is below capacity reveals one of drifting's key attractions. Since a below-capacity economy is the only thing to which it responds in a conscious way, the drifting approach is generally good at avoiding fiscal contractions in that situation: there are only 1.5 on average over the 20-year forecast period, and more than half of the runs have only one such event or none.

Finally, regardless of the budget's effects on the volatility of overall GDP or awkwardly timed bad-news budgets, policymakers may dislike frequent adjustments to hit bottom-line targets if taxpayers and program beneficiaries prefer stability. In a sense, the relatively passive drifting approach shows up as politically attractive, since the average year-to-year deviation of the primary balance is only 1.3 percentage points of GDP — considerably below the historical average of 2.4 percent. This stability is a mixed blessing in another sense, however. It reflects the federal government's inability to do much in the way of either tax cuts or spending increases under an approach that yields relatively little scope for either, thanks to an interest burden that is generally higher than it would be under more ambitious approaches.

The Debt-Reduction Approaches

So the drifting approach has both attractive and unattractive features. On the one hand, it is politically undemanding and offers a reasonable prospect of budgetary payoffs and rising living standards; on the other, it risks setbacks on both the deficit and debt fronts, and limits the prospects for good-news budgets or higher living standards over the longer term by its continued exposure to high debt

and high interest costs. It is hard to say much more than this until we use this benchmark to compare the possible results of some approaches to fiscal policy that give higher priority to a healthy bottom line.

The principal choices we examine are paths for the annual budget balance that emphasize debt reduction in the early years or simply aim for balance. The former strategy has three phases: it aims at budget surpluses of 1 percent of GDP for the first six fiscal years (2000/01 through 2005/06); it then moves in equal annual steps to balance in 2015; finally, over the following five years, it moves in equal steps to the deficit of just over 1.2 percent of GDP that is consistent with maintaining a 30 percent ratio of debt to GDP indefinitely. The latter strategy involves aiming simply for budget balance for the next 15 fiscal years (2000/01 through 2015/16) and then, as with the more aggressive strategy, moving in equal steps to the deficit that is consistent with a 30 percent debt ratio.

For each of these strategies, there are two additional dimensions of choice: first, whether to modify each year's target in response to economic cycles; and second, whether to reflect the bulk of each year's expected change in the primary balance in taxes or in program spending. We model the principal choice with alternative sets of annual targets for the budget balance — one chosen by a surplus-seeking government and one chosen by a balance-seeking government. The next choice, whether to allow stabilizers to work, we model by allowing, or not, each year's budget balance to deviate from the target by an amount equal to the expected output gap during the year times the budget's sensitivity to the output gap (which we set at 0.4 of a percentage point of GDP in the primary balance for every 1 percentage point of potential output). The third, between tax cutters and big spenders, we model by reflecting either 80 percent or 20 percent of the expected change in the primary bal-

Table 2a: *Average Payoff after Five Years*

	Surplus Seeker		Balance Seeker	
	Average	Standard Deviation	Average	Standard Deviation
(% of GDP)				
Fiscal hawk				
Tax cutter	0.3	0.4	0.8	0.4
Big spender	0.3	0.4	0.9	0.4
Stabilizer				
Tax cutter	0.4	0.4	1.0	0.5
Big spender	0.4	0.4	1.0	0.4

Table 2b: *Proportion of Runs Outperforming the Drifting Approach after Five Years*

	Surplus Seeker	Balance Seeker
(percent)		
Fiscal hawk		
Tax cutter	3	31
Big spender	2	32
Stabilizer		
Tax cutter	7	49
Big spender	7	48

ance in changes in tax rates, with changes in program spending picking up the rest.[17]

When it comes to the size and timing of the rewards from debt reduction, this exercise adds some nuances to our views of the relative merits of different approaches.

Budget Payoffs

Looking at the payoffs in the primary balance — the scope for tax cuts or spending increases — after five years we see, not surprisingly, that plans with explicit annual fiscal targets generally require more early bad-news budgets than drifting does. Most involve relaxations of the primary balance smaller than the drifter's 1 percent of GDP (Table 2a). In particular, the plans with surpluses early on require postponing gratification; they allow relaxations in the

primary balance of only 0.3 to 0.4 percent of GDP. Even in an uncertain world, the chances of a larger payoff from a surplus-seeking approach than from drifting are very low (Table 2b).

The fact that the differences among the median outcomes of many of these approaches are not large compared with their standard deviations means that their distributions overlap significantly. The balance-targeting approaches, for example, produce outcomes in much the same range as the drifter does.[18] In other words, when it comes to the payoff five years later, the stakes involved in drifting rather than seeking budget balance are low.

After 10 years, the average payoffs under various approaches converge (see Table A-2 in the appendix for a full set of results for the various scenarios). And after 15 years, the balance has shifted in favor of the surplus-seeking approaches, which show the largest average payoffs (Table 3a) and offer solid odds — over 90 percent — of achieving a larger payoff than drifting does (Table 3b). The balance-seeking plans, by contrast, offer about the same amount of room for good-news budgets as drifting does.

Other dimensions of the choice among approaches yield few stark contrasts when it comes to budget payoffs. Good-news budgets are not appreciably more common under tax-cutting governments than under big spenders, and the differences between payoffs under fiscal hawks who stick to their annual budget targets regardless of the economic cycle and under stabilizers are also quite insignificant.

Living Standards

Despite its obvious relevance for a government eager to deliver good-news budgets, the payoff in Ottawa's primary balance gives a far-from-complete picture of the implications of different fiscal approaches for Canadian living standards. As noted earlier, for that more

Table 3a: *Average Payoff after 15 Years*

	Surplus Seeker		Balance Seeker	
	Average	Standard Deviation	Average	Standard Deviation
(% of GDP)				
Fiscal hawk				
Tax cutter	2.8	0.3	2.3	0.3
Big spender	2.8	0.3	2.3	0.3
Stabilizer				
Tax cutter	2.9	0.4	2.4	0.4
Big spender	2.4	0.4	2.3	0.4

Table 3b: *Proportion of Runs Outperforming the Drifting Approach after 15 Years*

	Surplus Seeker	Balance Seeker
(percent)		
Fiscal hawk		
Tax cutter	97	47
Big spender	97	46
Stabilizer		
Tax cutter	90	49
Big spender	92	48

to expect, this comparison suggests that the stakes involved in annual targets rather than drifting may be lower for the population generally than they look from Parliament Hill. After only five years, even the surplus-seeking approaches yield real consumption per person superior to that under drifting roughly one-third of the time.

As time goes by, the performance of the various approaches in raising consumption changes and the contrasts among them become starker. After 15 years, average consumption under the fiscal-targeting plans is quite consistently higher than the 12.3 percent median increase achieved when policy drifts (Table 5a). The additions to national saving under the surplus-seeking plans and the boosts to output provided by tax cuts make those approaches stand out as likelier to raise living

general question, real consumption per person (Table 4a) is a better measure. Although the contrast is nowhere near as strong as it is when primary-balance payoffs are under investigation, the balance-seeking programs appear more attractive than the surplus-seeking ones over five years. The drifting approach, which achieves on average a 4.8 percent gain in consumption over this short time-frame, again (and not surprisingly) looks relatively good.

As Table 1 showed, thanks to ongoing productivity growth, runs in which consumption drops are very rare; therefore, looking at the likelihood of a positive result under the various approaches does not yield interesting contrasts. Instead, we looked at the likelihood that consumption growth under each debt-reduction approach will be greater than when policy drifts (Table 4b). As the large standard deviations around the results would lead one

Table 4a: *Average Change in Real per Capita Consumption after Five Years*

	Surplus Seeker		Balance Seeker	
	Average	Standard Deviation	Average	Standard Deviation
(percent)				
Fiscal hawk				
Tax cutter	3.9	1.8	4.7	1.7
Big spender	3.8	1.7	4.5	1.7
Stabilizer				
Tax cutter	3.9	1.7	4.9	1.6
Big spender	3.9	1.7	4.6	1.7

Table 4b: *Proportion of Runs Outperforming the Drifting Approach after Five Years*

	Surplus Seeker	Balance Seeker
(percent)		
Fiscal hawk		
Tax cutter	33	48
Big spender	32	44
Stabilizer		
Tax cutter	33	52
Big spender	32	47

Table 5a: *Average Change in Real per Capita Consumption after 15 Years*

	Surplus Seeker		Balance Seeker	
	Average	Standard Deviation	Average	Standard Deviation
	(percent)			
Fiscal hawk				
Tax cutter	13.5	1.9	12.9	1.9
Big spender	13.0	1.9	12.2	1.8
Stabilizer				
Tax cutter	13.4	1.9	12.7	1.9
Big spender	12.9	1.8	12.4	1.9

Table 5b: *Proportion of Runs Outperforming the Drifting Approach after 15 Years*

	Surplus Seeker	Balance Seeker
	(percent)	
Fiscal hawk		
Tax cutter	72	62
Big spender	64	49
Stabilizer		
Tax cutter	72	57
Big spender	64	52

standards than drifting or following less ambitious and bigger-spending approaches.

The standard deviations around these results also grow over time, as variations in the shocks affecting the model cumulate and differences in the parameters have more time to make their effects felt. Even as the results under each approach become more dispersed, however, the differences among the mean outcomes grow sufficiently to suggest that the stakes involved in some of the choices are high. Plans aiming only for budget balance that devote the bulk of their growing fiscal room to spending outperform the drifter only about half the time, compared with nearly three-quarters for surplus-seeking plans that favor tax cuts (Table 5b), and these differences are wider yet by the end of the 20-year period (Table A-2 in the appendix).
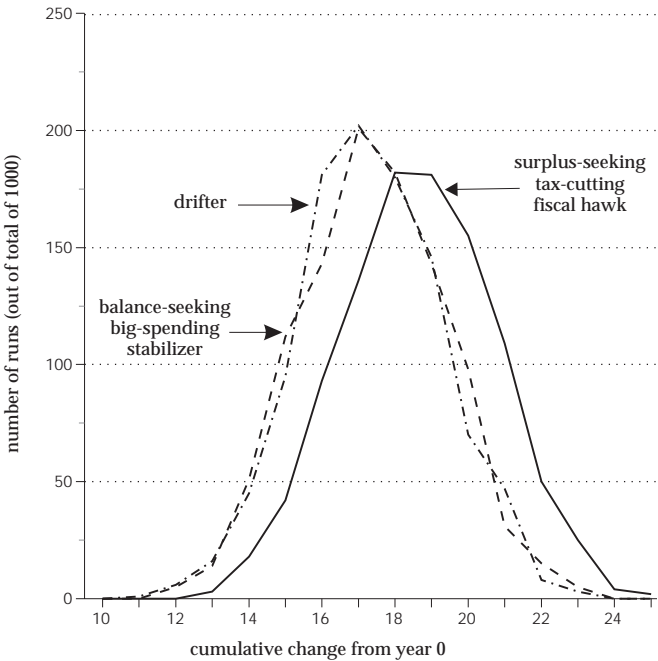
To make the point about overlap among outcomes more concrete, Figure 1 shows the full distribution of 20-year outcomes for three strategies: the drifting approach, the balance-seeking approach as implemented by big-spending stabilizers, and the surplus-seeking approach as implemented by tax-cutting fiscal hawks. After 20 years, average Canadians would care relatively little whether the government had chosen to opt for budget balance rather than drifting. Despite the slightly better average performance under balancing, the overlap between the two sets of outcomes is virtually complete. Although the overlap between the balancing and surplus approaches is also substantial, the outcomes under the surplus-seeking approach are sufficiently better that no reasonable person, if offered a choice as to which of these worlds to inhabit, would be indifferent.

Credibility

With regard to long-term credibility, the fiscal-targeting plans by definition aim at a lower debt burden and a concomitant increase in the room in the federal budget available for other initiatives. Looking at the debt burden after 15 years, the targeting plans, not surprisingly, produce lower debt ratios than drifting — virtually without exception in the case of the surplus-seeking plans, and about 90 percent of the time in the case of the balancing plans. In this sense, the targeting plans would be seen in advance to put fiscal policy on a firmer footing to face rising demographic pressures, lessening fears of long-term unsustainability.

The contrast between the various approaches is starker in the short run (Table 6a shows the mean number of deficits recorded during the first five years under each of the approaches; Table 6b shows the proportion of runs showing one or no deficits).[19] The balance-seeking plans implemented by fiscal hawks barely do better than the drifting ap-

Figure 1: *Change in Real Consumption per Person after 20 years (Distribution of Outcomes)*

outcomes under the various approaches are very small compared with the standard deviations of the outcomes within each one, signaling that the overlap among the approaches is enormous. In no case does the share of runs outperforming the drifting strategy (in the sense of yielding greater stability in output) differ from 50 percent by more than 8 percentage points (see the appendix).

As noted earlier, a more sensitive issue is likely to be bad-news budgets — restrictive moves in fiscal policy — when the economy is in a slump. Here, not surprisingly, the fiscal-hawk approaches look more difficult: they yield, on average, about two awkwardly timed bad-news budgets over the 20-year projection period (Table 7a). The stabilizing approaches, by

proach when it comes to avoiding multiple deficits during the first five years. On the other hand, thanks to the upswing that dominates this initial period in most of our model runs, the balance-seeking plans implemented by stabilizers do much better, and the surplus-seeking plans are uniformly successful, recording one or no deficits in virtually every instance. Extending the critical period to the first ten years, none of the balance-seeking plans performs very well at avoiding multiple deficits; the surplus-seeking plans, on the other hand, continue to perform very well (These results are shown in the appendix.)

Volatility

Finally, how disruptive might the debt-reduction approaches be, relative both to the drifting approach and to each other?

Looking first at the standard deviation of annual changes in output across all the runs for each approach, we find little to choose among them. The differences in the average

Table 6a: *Average Number of Deficits in the First Five Years*

	Surplus Seeker		Balance Seeker	
	Average	**Standard Deviation**	**Average**	**Standard Deviation**
	(number)			
Fiscal hawk				
Tax cutter	0.0	0.1	2.4	0.7
Big spender	0.0	0.1	2.3	0.7
Stabilizer				
Tax cutter	0.0	0.1	1.4	0.8
Big spender	0.0	0.1	1.3	0.8

Table 6b: *Proportion of Runs Showing One or No Deficits in the First Five Years*

	Surplus Seeker	Balance Seeker
	(percent)	
Fiscal hawk		
Tax cutter	100	9
Big spender	100	13
Stabilizer		
Tax cutter	100	60
Big spender	100	63

Table 7a: *Average Number of Fiscal Contractions in a Recession*

	Surplus Seeker		Balance Seeker	
	Average	**Standard Deviation**	**Average**	**Standard Deviation**
	(number)			
Fiscal hawk				
Tax cutter	1.8	1.2	2.2	1.3
Big spender	1.8	1.2	2.1	1.2
Stabilizer				
Tax cutter	1.1	1.0	1.3	1.1
Big spender	1.1	1.0	1.2	1.1

Table 7b: *Proportion of Runs Showing No Fiscal Contractions in a Recession*

	Surplus Seeker	Balance Seeker
	(percent)	
Fiscal hawk		
Tax cutter	44	32
Big spender	45	34
Stabilizer		
Tax cutter	69	62
Big spender	69	64

contrast, not only do better than the hawkish ones but also surpass the drifting approach, which, failing to move into surplus when times are good, has less room to move when times get tougher. A different view of the issue — the likelihood of avoiding this awkward outcome (Table 7b) — confirms the advantage of the stabilizing approach in this regard.

Finally, both policymakers and many citizens may prefer stability in the budget itself. To give a sense of how the approaches stack up in that sense, Table 8 shows the volatility of the federal government's primary balance (the standard deviation of the ratio of the primary balance to potential GDP). A quick glance suggests that none of these approaches implies anything tremendously disruptive. They generally contrast very favorably with the 2.4 per-

centage point volatility of the ratio of the primary balance to (actual) GDP recorded during the postwar period. All the debt-reduction approaches do, however, require more budget adjustments than does drifting.

Comparing the debt-reduction approaches to each other also reveals a contrast between the balance-seeking and surplus-seeking approaches. The gap between the average volatility for balance-seeking approaches (1.3 percentage points) and that for surplus-seeking approaches (1.7 to 1.8 percentage points) is large compared with the standard deviations of these outcomes, signaling negligible overlap. Not surprisingly, the surplus-seeking approaches are more challenging in this sense. Interestingly, even the balance-seeking approaches do not yield a less volatile primary balance than drifting. This result highlights the fact that larger annual adjustments in the primary balance represent, in part, the widening room for good-news budgets as the debt ratio comes down, a phenomenon that is muted when policy drifts.

An Assessment

It would be naive to expect this sort of modeling to deliver a clear-cut verdict about Ottawa's appropriate fiscal strategy over the next 20 years. Some disagreements — between peo-

Table 8: *Average Volatility of the Budget*

	Surplus Seeker		Balance Seeker	
	Average	**Standard Deviation**	**Average**	**Standard Deviation**
	(standard deviation of primary ratio)			
Fiscal hawk				
Tax cutter	1.7	0.1	1.3	0.1
Big spender	1.7	0.1	1.3	0.1
Stabilizer				
Tax cutter	1.8	0.1	1.3	0.1
Big spender	1.8	0.1	1.3	0.1

ple with short time horizons and those with long time horizons, for example — can thrive even when they agree completely about the evidence. Moreover, as the discussions of payoffs, living standards, credibility, and volatility in this *Commentary* highlight, different fiscal approaches score better or worse depending on the criteria used to judge them. And this modeling exercise says nothing directly about how to weight those criteria.

Reviewing the Options

What modeling can do, however, is give a sense of how effective, or otherwise, a given approach may be in achieving a chosen goal. An exercise that explicitly allows for uncertainty about the future of the economy, moreover, can help establish how high the stakes are in making a choice. In the hope that we are in a position to narrow the range of disagreement, then, we turn to a review of some of our findings, highlighting the approaches that seem to perform well by the various criteria, canvassing a few of the tradeoffs, and warning about results that may be sensitive to idiosyncracies in our model.

Fiscal Targets and Debt Reduction

With regard to fiscal targets, one would expect that pursuing more ambitious debt reduction by running surpluses in the early years of a program would yield more short-term pain and more long-term gain than pursuing either simple budget balance, or no particular target at all. Despite the fact that all our plans converge to the same debt ratio — 30 percent — in the longer term, our results are consistent with this expectation. The contrast between the balance-seeking plans and drifting, on the other hand, is very muted when it comes to both payoffs in the budget itself and changes in consumption, with the explicit targeting ap-

proach only pulling ahead after year 15, when the balance seeker moves to the deficit consistent with a long-term debt ratio of 30 percent.

One feature of our results suggests that the long-term outcomes — those that show the surplus-seeking strategy in the best light — should command more attention. The overlap among the results, which is substantial after five years (when drifting is somewhat more appealing) and virtually complete after ten years (when the appeal of the debt-targeting strategies has caught up), diminishes steadily after that, since the differences among the average outcomes (as measured by medians or means) expand more rapidly than the distribution of outcomes (as measured by the standard deviations) spreads out. In short, the stakes involved in the choices rise over time: Canadians will care a good deal more in 20 years' time which choices were made than they will in 10 years' time.

As for credibility, one does not need an economic model to discover that surplus-seeking plans convey a more reassuring message about commitment to reduce debt. What is striking about our results, however, is the stark contrast among the approaches when it comes to avoiding a return to deficits over the next five to ten years. Only the surplus-seeking approaches offer a decent chance of avoiding multiple deficits at a time when fiscal credibility may still be fragile.

With regard to volatility, the surplus-seeking plans require more dramatic fluctuations in the federal government's budget. Our model does not suggest, however, that more volatile programs and taxes would mean more volatility in output.

Fiscal Targets and Stability

Consistent with our discussion of Keynesian effects at the outset, our results do not show that allowing the budget balance to fluctuate around a chosen set of annual fiscal targets as

the economy goes through cycles does anything to mitigate those cycles. Despite our building a traditional Keynesian-style fiscal multiplier into the model, the path of output is not consistently smoother under the more stability-oriented approaches. Not surprisingly, our results show that tempering annual targets in accordance with the cycle does slightly increase the volatility of the primary balance — though this effect is very small — and that stabilizing governments are much likelier to avoid fiscal contractions in recessions. In addition, the stabilizing plans register well on the credibility front, "making hay while the sun shines" and thereby avoiding deficits during the first few years when the economy is strong. These results suggest that, as long as the stabilizing approach is symmetrical, concessions by fiscal hawks to their more stability-oriented colleagues might help reach consensus without putting longer-term considerations of fiscal health at risk.

Distributing the Fiscal Dividend

As for the final choice — whether to distribute the bulk of the fiscal dividend as tax cuts or as new spending — our outcomes for living standards favor tax cuts. For example, after 20 years, the increase in living standards is 8 percent larger in the case of a surplus-seeking government that favors tax cuts and stabilization, compared with drifting. The size of this effect is hardly overwhelming, but nor is it trivial, and it must be remembered that both strategies converge to essentially the same debt ratio: 30 percent. Moreover, while it allows for the fact that taxes distort the labor market and depress business cash flow, our model neglects other distortions, such as those arising from taxing capital income, and it allows for a positive impact of government spending on living standards and private saving of a kind that is unusual in economic models.[20] But the superiority of tax-cutting approaches in raising liv-

ing standards is consistent regardless of the other choices under consideration, and it rises over time: the further out into the future we look, the more Canadians are likely to care which choice is made.

Closing Thoughts

The prospect of lower public debt in Canada is attractive for many reasons, including raising national saving without shifting the tax burden toward wage earners and preparing for the aging baby-boom bulge. Despite some encouraging comments, however, the federal government may yet come no closer to explicit fiscal targets than an artificial string of zeros in short-term budget projections. Some reasons

for this potential failure are disagreements along a number of dimensions — among them, whether to target surpluses, how doggedly to pursue annual budget targets, and how to balance tax cuts against more spending as room for both opens up.

This *Commentary* has tried to reduce some of the uncertainties around these questions by a multiple-run approach to modeling outcomes under different annual targets, different approaches to them, and different options for tax cutting versus spending. Our criteria for evaluating these outcomes fall under three broad headings: payoffs, credibility, and stability.

Overall, the results are not surprising: near-term budget surpluses mean more short-term pain, but a shorter wait for long-term gain and higher credibility, both *ex ante* and *ex post*. Giving automatic fiscal stabilizers more room to operate makes little difference to the volatility of output but — if they are allowed to operate as strongly when the economy is booming as when it is slumping — this strategy should not hurt fiscal credibility, and should help avoid fiscal contractions during slumps. Our results also support paying out a significant share of the interest savings from debt re-

duction in tax cuts to boost productivity growth and living standards during the transition period.

Resolution of broader debates over the merits of a more visible and intrusive role for Ottawa in national life, or over the relative weight to put on the shorter and longer terms in policymaking, requires advice of a kind we are unable to give here. We do think, however, that results even from a simple model help indicate how best to frame fiscal targets to raise living standards, enhance federal fiscal credibility, and avoid disruption to Canadians' lives. We have tried to emphasize that there are several different dimensions of disagreement in debate in this area, and that there is no inconsistency in an approach that encourages short-run swings in the budget balance in response to economic cycles while aiming to reduce both debt and taxes over the longer term. Narrowing the range of disagreement — partly through emphasizing the different dimensions of the issue and partly through simulations that explicitly allow for gaps in our knowledge — seems a useful contribution toward moving Canada forward on this important project.

Appendix:
The Simulation Model

This appendix describes the discrete-time model used for our simulations.

The Supply Side

Aggregate supply is determined by the effective labor force — calculated from an exogenously determined population of labor force age, which grows at a rate of 1.5 percent annually, multiplied by an index of tax distortions, and by a productivity index that grows at a rate of 0.5 percent annually — combined with the capital stock in a standard Cobb-Douglas production function, with weights of 0.76 and 0.24.

The index of tax distortions involves a parameter relating the percentage point increase (decrease) in the effective labor force to the percentage point decrease (increase) in tax rates. The mean value for this parameter is 0.3, a number consistent with both an equilibrium analysis of the labor market and the analysis of involuntary unemployment by Scarth and Jackson (1998).[21] We set the standard deviation for this parameter at 0.1, which implies that, while we are unsure about its precise value, we are "99 percent sure" that it is positive.

Household and Business Spending

Household consumption — or, more properly, the consumption of households and all non-federal governments together — is a fixed proportion of the sum of national income (output minus net factor payments to foreigners), interest on federal government debt, and transfer payments less taxes, minus the one-half of federal consumption spending assumed to substitute for private consumption. (We discuss the underlying values for the key coeffi-

cients in this and other demand-side equations in the section on fluctuations in output below.)

A standard partial-adjustment model determines firms' investment in new capital. Firms that are not constrained by cash flow set their desired capital stock by comparing the marginal product of the previous year's capital stock (given the previous year's effective labor force) with the gross rental cost of new equipment (the interest rate plus depreciation of 4 percent annually). The gap between that desired stock and the existing capital stock closes at a rate of 25 percent annually.

The Foreign Sector

Net foreign demand for domestically produced goods and services is determined by the terms of trade and national income. The balance of factor payments — interest and dividend income to and from foreigners — is the level of net foreign assets outstanding during the year (the average of the previous year's year-end figure and the current year's figure) times the interest rate. The goods and services balance and this factor income balance determine changes in net foreign assets.

The Federal Government

The federal government levies taxes on a base made up of national income, interest on federal debt, and federal transfers, minus exemptions that we define in aggregate as equal to 25 percentage points of potential output. This last feature produces federal revenues that are procyclical, rising (or falling) as a proportion of output when output is above (or below) potential.

The government sets the tax rate at the beginning of each year according to a formula that reflects an exogenously determined pro-

portion — 80 percent in the case of the tax cutter; 20 percent in the case of the big spender — of the expected change in the primary balance in that year.[22]

The equation describing the government's budget target is a function of two arguments. One is the fiscal hawks' desired balance: the exogenously set target for the total budget balance, expressed as a ratio of GDP. The other is the stabilizers' desired balance: the amount by which the budget would deviate from zero as a result of the action of automatic stabilizers in the presence of the expected output gap during the year, a relationship that we set at 0.4 percent of GDP in the budget for every percentage point of gap. (In a rather crude compromise between expectations that are purely backward looking and those that are model consistent, the government projects growth by assuming that one-third of the output gap that existed in the previous year will disappear during the year.) Only the former argument operates in the "fiscal hawk" runs; both operate in the "stabilizer" runs.

Program spending is determined residually to achieve the desired budget balance in the light of expected taxes (the tax rate multiplied by the previous year's tax base applied to this year's expected GDP) and expected net interest costs (this year's expected average debt level times the expected effective debt-servicing rate, which is calculated on the assumption that the prevailing interest rate in the upcoming year will be the same as that in the previous year). Thirty percent of program spending goes on goods and services, the rest goes on transfers.

Fluctuations in Output

Aggregate output fluctuates around the level dictated by supply according to an output gap function with five arguments:

- an exogenous cycle, a sine wave whose peak-to-peak period has a mean of six years

and a standard deviation of one year, and whose amplitude has a mean of 1.5 percentage points and a standard deviation of 0.25 percent;

- exogenous noise, with a mean of zero and a standard deviation of 1.25 percentage points;[23]

- changes in the federal government's primary balance;

- the interest rate; and

- the terms of trade.

We chose values for the coefficients for the last three arguments by referring to a standard, partial-adjustment theory of aggregate demand:

$$Y_t - Y_{t-1} = a_1(D_t - Y_{t-1});$$

$$D_t = a_2(Y_t - T_t) + (1 - a_3(1 - a_2))G_t + [a_4Y_t - a_5r_t] + \{a_6R_t - a_7Y_t\}.$$

Y, D, G, T, r, and R denote, respectively, real output, long-run demand, government spending on goods and services, taxes net of transfer payments, the real interest rate, and the terms of trade. Time periods are indicated by subscripts. Coefficient a_1 is the partial adjustment coefficient. Demand is the sum of consumption (by both the private sector and the government), investment, and net exports; these final two expenditure components are captured by the terms in square brackets and round braces, respectively.

Coefficient a_2 is the propensity to consume and a_3 the parameter that indicates the amount by which households and non-federal governments cut direct consumption as they enjoy federal spending made on their behalf.[24] Coefficients a_4 and a_5 are the income and interest-rate sensitivities of investment, and coefficients a_6 and a_7 are the exchange rate and income sensitivities of net exports. We explain below how the terms of trade relate to output, a relationship we summarize here as $R_t = a_8Y_t$. Together, these relationships imply:

$$Y_t = a_9[(a_1(1 - a_3(1 - a_2))G_t - (a_1a_2)T_t - (a_1a_5)r]$$
$$+ a_9(1 - a_1)Y_{t-1},$$

where $a_9 = 1/[1 - a_1(a_2 + a_4 + a_6a_8 - a_7)]$. Plausible values for the parameters are: $a_1 = 0.5$, $a_2 = 0.8$, $a_3 = 0.5$, $a_4 = 0.15$, $a_5 = 1.2$, $a_6 = 1.2$, $a_7 = 0.5$, $a_8 = -0.21$. These parameter values have several implications.

First, they yield overall coefficients for government spending and taxes of 0.50 and 0.44, respectively. Since these coefficients differ by only 12 percent, we assign the same coefficient of 0.5 as the mean value for the fiscal influence coefficient — the effect of a 1 percentage point change in the primary balance ratio on the growth rate of GDP. This size of response is consistent with Helliwell (1993).

The second implication of this set of parameter values is that the interest-rate influence on aggregate demand is in the −0.5 range, so we take this as the mean value for the effect of a 1 percentage point change in the interest rate on the GDP growth rate. The underlying theory of investment is

$$I = 0.2b_1[(MPK/(r + d)) - 1]K + 0.8b_2Y(l - h),$$

where I, K, MPK, d, and h represent, respectively, investment, the capital stock, the marginal product of capital, capital's depreciation rate, and the tax rate. This specification gives a 20 percent weight to the neoclassical theory of investment and a 80 percent weight to the simpler cash flow approach. We take $(r + d) = 0.1$ and $b_1 = 0.25$ as representative of results from neoclassical studies, and a Cobb-Douglas production function (with capital's share of 0.24). Finally, we assume $b_2 = 0.04$. The differential of this investment function yields $a_4 = 0.15$ and $a_5 = 1.2$.

The third implication of this summary of the determinants of aggregate demand is that the effect of a change in the terms of trade is embedded in the income-sensitivity terms, and so an additional independent specifica-

tion would be inappropriate. This feature can be explained as follows:

$$R = EP^*/P,$$

where E, P^*, and P denote, respectively, the exchange rate (the value of foreign exchange), the level of foreign prices, and the domestic GDP deflator. Using Δ to define percentage changes, this definition implies:

$$\Delta R = \Delta E + \Delta P^* - \Delta P.$$

Interest arbitrage makes exchange-rate changes reflect the interest rate differential:

$$\Delta E = b_3(i - i^*),$$

where i and i^* are the domestic and foreign interest rates. Domestic monetary policy involves an interest-rate-setting relationship that has the central bank raising (lowering) the domestic interest rate whenever the domestic inflation rate exceeds (falls below) the target inflation rate — which, at 2 percent annually, we assume is equal to the foreign inflation rate. We assume a policy-reaction function:

$$i = i^* + b_4 (\Delta P - \Delta P^*).$$

Finally, we assume a Phillips curve that relates the inflation gap to the output gap:

$$(\Delta P - \Delta P^*) = b_5 (Y - 1),$$

where, for ease of exposition here, we choose units so that the natural rate of output is equal to unity.

Combining these relationships, we have:

$$\Delta R = -(l - b_3b_4)b_5(Y - 1).$$

Reasonable parameter values are: $b_3 = 0.75$, $b_4 = 0.5$, and $b_5 = 0.33$. Thus, $\Delta R = -0.21(Y - 1)$. With

a trade price demand elasticity of 2.4 and an assumption that one-half of overall demand is sensitive to the terms of trade, we are comfortable with exchange rate and interest rate effects on demand of the same magnitude ($a_5 = a_6 = 1.2$). Buiter and Miller (1982) assume precisely this in their many simulations of small open economies.

Combining $\Delta Y = 1.2\Delta R$ and $\Delta R = -0.21$ ($Y - 1$), we have long-run demand responding to output through this channel with a coefficient of $a_6a_8 = -0.25$. Thus, the terms-of-trade effect on aggregate demand is embedded in the overall multiplier, a_9.

The illustrative parameter values given here make the net interest rate effect on aggregate demand equal to 0.67. Since both Bank of Canada research and Buiter and Miller focus on smaller values, we adjust our base value for this coefficient, $a_9a_1a_5$, downward to the Buiter-Miller baseline value of 0.5. We specify a wide standard error of 0.17, so we allow a one-in-four chance that the value of this coefficient exceeds 0.67.

The final implication of this demand specification is that the consumption and investment equations should involve lagged dependent variables with coefficients roughly equal to one-half. Our numerical simulations involve all these properties.

Inflation and Interest Rates

Changes in the aggregate price level, the GDP deflator, are a function of expected inflation, which is an average of the previous year's figure and the Bank of Canada's 2 percent target, and the previous year's output gap, which raises or lowers inflation by 0.33 of a percentage point per percentage point of gap. The slope of the short-run Phillips curve is a controversial parameter; we allow for uncertainty on this score by varying it, with a standard deviation of 0.11, in our simulations. Since the disinflation sacrifice ratio is the inverse of this slope parameter, our sensitivity testing implies that we have 67 percent assurance that the sacrifice ratio is between 2.3 and 4.5.

We assume that the central bank targets the GDP deflator. While this is not literally true in Canada, by stripping food and energy prices out of its target consumer price index, the Bank of Canada effectively removes much of the influence of import prices. As noted above, the Bank adjusts the interest rate by one-half of a percentage point for each percentage point deviation of the deflator from its 2 percent target.

In addition to the influence of monetary policy and a random noise disturbance,[25] the interest rate is determined by two premiums related to the ratios of federal debt and net foreign debt to GDP. Following Fillion (1996), we use mean values of 2 basis points — that is, every percentage point rise in either debt ratio produces a 0.02 of a percentage point rise in interest rates — for these premiums. Because there is considerable doubt about these effects, we use a standard deviation of two-thirds of a basis point in the distributions of these parameters in our model runs.

To make the model's starting point conform to 1998's reality — we estimate the average federal net interest rate at 6.4 percent in fiscal year 1998/99 — the level of world interest rates is determined residually in each run by the debt premiums drawn for that run. Thus, for example, in the event that the draws for each type of debt premium were exactly 2 percentage points, the world interest rate for that run would be 5.6 percent — that is, 6.4 minus the sum of the foreign and government debt-to-GDP ratios (almost 100 percent) times 0.02, plus 1.2 percentage points to reflect the fact that the GDP deflator in 1998 (as recorded in the fourth-quarter national accounts for that year) was 2.4 percentage points below the Bank of Canada's target of 2 percent.

Table A-1: *Parameter Distributions*

Parameter	Mean	Standard Deviation
Tax distortion	0.30	0.10
Fiscal impulse	0.50	0.17
Interest rate impulse	–0.50	0.17
Phillips curve coefficient	0.33	0.11
Foreign debt premium	2.00	0.67
Government debt premium	2.00	0.67

Ottawa refinances one-third of its debt each year at that year's interest rate. Firms borrow at the same interest rate as the government.

Distributions of Randomized Parameters

The means and standard deviations for the parameters we varied from run to run are shown in Table A-1.[26] The tax distortion shows the percenta gepoint change in the effective labor force relative to its starting level for every percentage point change in the tax burden relative to its starting level. The fiscal impulse and the interest rate impulse parameters show the per-centage point change in the output gap resulting from a 1 percentage point change in the relevant variable. The debt-premium parameters show the change in interest rates, in basis points, resulting from a 1 percentage point change in the relevant debt ratio. The distributions are normal, so approximately two-third of the draws will be within one standard deviation of the mean, and 95 percent will be within two standard deviations.

The Results

As described in the text, we ran the model 1,000 times for each of the four surplus-seeking government plans, for each of the four balance-seeking plans, and for the drifter, inserting new values for the key parameters and for the stochastic series with each run. This approach means that, along with mean outcomes under each of the approaches, we also get distributions of the outcomes, thereby allowing assessments of the degree of overlap among them and of the likelihood that each approach will pass various benchmarks. Table A-2 summarizes key outputs from all the runs, including some measures not reported in the text.

	Drifter		Surplus Seeker							
			Fiscal Hawk				Stabilizer			
			Tax Cutter		Big Spender		Tax Cutter		Big Spender	
	Avg/ Share	SD	Avg/ Share	SD	Avg/ Share	SD	Avg/ Share	SD	Avg/ Share	SD
Budget flexibility										
Median payoff after 5 years *(% of GDP)*	1.0	0.4	0.3	0.4	0.3	0.4	0.4	0.4	0.4	0.4
Share of runs outperforming drifter *(%)*	n.a.	n.a.	3	n.a.	2	n.a.	7	n.a.	7	n.a.
Median payoff after 10 years *(% of GDP)*	1.9	0.4	1.8	0.3	1.8	0.3	1.9	0.4	1.9	0.4
Share of runs outperforming drifter *(%)*	n.a.	n.a.	48	n.a.	46	n.a.	50	n.a.	50	n.a.
Median payoff after 15 years *(% of GDP)*	2.4	0.3	2.8	0.3	2.8	0.3	2.9	0.4	2.9	0.4
Share of runs outperforming drifter *(%)*	n.a.	n.a.	97	n.a.	97	n.a.	90	n.a.	92	n.a.
Median payoff after 20 years *(% of GDP)*	3.8	0.3	4.2	0.3	4.2	0.3	4.2	0.4	4.2	0.4
Share of runs outperforming drifter *(%)*	n.a.	n.a.	93	n.a.	93	n.a.	87	n.a.	88	n.a.
Living standards										
Median change in real cons/person after 5 years *(%)*	4.8	1.6	3.9	1.8	3.8	1.7	3.9	1.7	3.9	1.7
Share of runs outperforming drifter *(%)*	n.a.	n.a.	33	n.a.	32	n.a.	33	n.a.	32	n.a.
Median change in real cons/person after 10 years *(%)*	8.5	1.8	8.7	1.8	8.5	1.8	8.7	1.8	8.5	1.8
Share of runs outperforming drifter *(%)*	n.a.	n.a.	52	n.a.	47	n.a.	52	n.a.	48	n.a.
Median change in real cons/person after 15 years *(%)*	12.3	1.9	13.5	1.9	13.0	1.9	13.4	1.9	12.9	1.8
Share of runs outperforming drifter *(%)*	n.a.	n.a.	72	n.a.	64	n.a.	72	n.a.	64	n.a.
Median change in real cons/person after 20 years *(%)*	16.8	1.9	18.1	2.0	17.3	2.0	18.1	1.9	17.2	2.0
Share of runs outperforming drifter *(%)*	n.a.	n.a.	74	n.a.	62	n.a.	73	n.a.	58	n.a.
Credibility										
Median debt ratio by year 15 *(%)*	32.9	1.7	24.1	1.0	24.1	1.0	23.1	2.1	22.9	1.9
Share of runs outperforming drifter *(%)*	n.a.	n.a.	100	n.a.	100	n.a.	100	n.a.	100	n.a.
Median debt ratio by year 20 *(%)*	30.9	1.6	23.0	1.0	22.9	1.0	22.0	2.0	21.9	1.9
Mean number of deficits in first 5 years	2.6	0.8	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.1
Share of runs with one or no deficits in first 5 years *(%)*	7	n.a.	100	n.a.	100	n.a.	100	n.a.	100	n.a.
Mean number of deficits in first 10 years	5.1	1.1	0.0	0.2	0.0	0.2	0.0	0.2	0.0	0.2
Share of runs with one or no deficits in first 10 years *(%)*	0	n.a.	100	n.a.	100	n.a.	100	n.a.	100	n.a.
Volatility										
Median volatility of output *(SD of annual changes)*	1.8	0.3	1.8	0.3	1.8	0.3	1.9	0.3	1.9	0.3
Share of runs outperforming drifter *(%)*	n.a.	n.a.	50	n.a.	50	n.a.	42	n.a.	42	n.a.
Median volatility of budget *(SD of primary ratio)*	1.3	0.1	1.7	0.1	1.7	0.1	1.8	0.1	1.8	0.1
Share of runs outperforming drifter *(%)*	n.a.	n.a.	0	n.a.	0	n.a.	0	n.a.	0	n.a.
Mean number of fiscal contractions in a recession	1.5	1.1	1.8	1.2	1.8	1.2	1.1	1.0	1.1	1.0
Share of runs with one or no such contractions *(%)*	54	n.a.	44	n.a.	45	n.a.	69	n.a.	69	n.a.

	Balance Seeker							
	Fiscal Hawk				Stabilizer			
	Tax Cutter		Big Spender		Tax Cutter		Big Spender	
	Avg/ Share	SD	Avg/ Share	SD	Avg/ Share	SD	Avg/ Share	SD
Budget flexibility								
Median payoff after 5 years *(% of GDP)*	0.8	0.4	0.9	0.4	1.0	0.5	1.0	0.4
Share of runs outperforming drifter *(%)*	31	n.a.	32	n.a.	49	n.a.	48	n.a.
Median payoff after 10 years *(% of GDP)*	1.8	0.4	1.8	0.4	1.8	0.4	1.8	0.4
Share of runs outperforming drifter *(%)*	39	n.a.	40	n.a.	45	n.a.	44	n.a.
Median payoff after 15 years *(% of GDP)*	2.3	0.3	2.3	0.3	2.4	0.4	2.3	0.4
Share of runs outperforming drifter *(%)*	47	n.a.	46	n.a.	49	n.a.	48	n.a.
Median payoff after 20 years *(% of GDP)*	3.8	0.3	3.7	0.3	3.8	0.4	3.8	0.4
Share of runs outperforming drifter *(%)*	50	n.a.	46	n.a.	53	n.a.	51	n.a.
Living standards								
Median change in real cons/person after 5 years *(%)*	4.7	1.7	4.5	1.7	4.9	1.6	4.6	1.7
Share of runs outperforming drifter *(%)*	48	n.a.	44	n.a.	52	n.a.	47	n.a.
Median change in real cons/person after 10 years *(%)*	8.9	1.8	8.4	1.8	8.7	1.8	8.6	1.8
Share of runs outperforming drifter *(%)*	55	n.a.	45	n.a.	51	n.a.	49	n.a.
Median change in real cons/person after 15 years *(%)*	12.9	1.9	12.2	1.8	12.7	1.9	12.4	1.9
Share of runs outperforming drifter *(%)*	62	n.a.	49	n.a.	57	n.a.	52	n.a.
Median change in real cons/person after 20 years *(%)*	17.6	2.0	16.8	2.1	17.4	2.0	16.9	2.0
Share of runs outperforming drifter *(%)*	64	n.a.	51	n.a.	61	n.a.	52	n.a.
Credibility								
Median debt ratio by year 15 *(%)*	31.3	1.2	31.3	1.2	30.4	2.2	30.3	2.1
Share of runs outperforming drifter *(%)*	92	n.a.	90	n.a.	89	n.a.	89	n.a.
Median debt ratio by year 20 *(%)*	28.9	1.1	28.7	1.2	28.0	2.1	27.9	2.1
Mean number of deficits in first 5 years	2.4	0.7	2.3	0.7	1.4	0.8	1.3	0.8
Share of runs with one or no deficits in first 5 years *(%)*	9	n.a.	13	n.a.	60	n.a.	63	n.a.
Mean number of deficits in first 10 years	4.2	0.9	4.1	1.0	3.1	1.2	3.0	1.3
Share of runs with one or no deficits in first 10 years *(%)*	0	n.a.	0	n.a.	9	n.a.	11	n.a.
Volatility								
Median volatility of output *(SD of annual changes)*	1.8	0.3	1.8	0.3	1.8	0.3	1.9	0.3
Share of runs outperforming drifter *(%)*	47	n.a.	53	n.a.	46	n.a.	42	n.a.
Median volatility of budget *(SD of primary ratio)*	1.3	0.1	1.3	0.1	1.3	0.1	1.3	0.1
Share of runs outperforming drifter *(%)*	39	n.a.	39	n.a.	19	n.a.	19	n.a.
Mean number of fiscal contractions in a recession	2.2	1.3	2.1	1.2	1.3	1.1	1.2	1.1
Share of runs with one or no such contractions *(%)*	32	n.a.	34	n.a.	62	n.a.	64	n.a.

SD = Standard deviation.

Notes

1 Annual growth of the working-age population of 1.5 percent, plus 0.5 percent productivity growth, plus 2 percent inflation, would yield an annual growth rate of just under 4.05 percent.

2 Among those explicitly advocating no surpluses are Mendelson (1998) and Ruggeri (1998). Dodge (1998) advocates a debt target that involves no surpluses beyond what is required to maintain a small annual contingency fund.

3 The objective of insulating living standards from the drop this retirement bulge would otherwise cause suggests a debt target of around 20 percent of GDP. See Scarth and Jackson (1998) and Oreopoulos and Vaillancourt (1998).

4 As we recommended in Robson and Scarth (1997).

5 Gorbet and Helliwell (1971), among others, conclude that many automatic stabilizers could be more appropriately relabeled *destabilizers*.

6 For a recent exploration of the respective roles of monetary and fiscal stabilization, see Scarth (1998). This analysis shows that, within a standard rational-expectations framework and an aggregate demand specification consistent with intertemporal optimization, rigid annual budget-balance targets can increase both short-term employment and price-level stability. While the rigid approach to fiscal policy makes fiscal policy pro-cyclical, this negative effect can be outweighed by two positive ones: the debt ratio is more stable with rigid fiscal policy, and the long-term prospect for keeping inflation on target is enhanced. With rational expectations, this latter effect causes an adjustment in the short-term monetary policy reaction function that is stabilizing. We do not pursue the possibility of monetary fiscal coordination in this *Commentary* since it seems impractical at present in Canada. A central bank with well-established credibility is likely to be reluctant to coordinate more explicitly with a fiscal authority that has yet to solidify such credibility.

7 Although we are concerned about such a strategy emerging by default, it has been explicitly advocated, at least at the provincial level, by the leader of the Ontario New Democratic Party in a speech in Hamilton on May 24, 1998.

8 This passive approach to stabilization differs from an active attempt to bring demand in line with supply by introducing discretionary changes in the primary balance from year to year. Simulations parallel to those described in this *Commentary* with active, rather than passive, stabilization produced fiscal outcomes far more dispersed than those reported here, along with a more volatile economy. These results are consistent with earlier studies on this subject (see Baumol 1961), despite important differences in specification. Our analysis incorporates a number of recent developments in macroeconomics, and it concerns an open, not closed, economy.

9 Spending on national parks and public infrastructure, for example, is clearly a partial substitute for private spending.

10 Robson (1994) takes a similar multiple-forecast approach to assessing probabilities of nearer-term outcomes under various fiscal strategies.

11 We used a sine wave in autonomous spending to produce this cycle. While it is more common to specify a second-order autoregressive disturbance process, the sine curve allowed us to describe the mean and standard deviation of the length of each cycle in a more straightforward fashion, without affecting the results.

12 We tempered the cycle in the early years of our simulations, nudging the excess demand in our output gap down slightly in 2000 and 2001 and reducing the excess supply in the gap in 2002 and 2003, so as to bring the model's results (in simulations where the annual noise in output is suppressed) in line with the consensus private sector forecast. Standard analyses of fiscal built-in stability avoid this messy issue of "start-up" years. A common practice is to compare model economies under different policy regimes over some unspecified period of time (see, for example, Hostland and Matier [1999]). Our approach reflects the high weight inevitably given to conditions in the start-up years in actual fiscal policy decisionmaking.

13 Output deviates from the path otherwise indicated by productive capacity and the sine-wave cycle by an amount with a mean of zero and a standard deviation of 1.25 percentage points annually. Interest rates vary around the level indicated by the interest rate premiums outlined below by an annual amount with a mean of zero and a standard deviation of 50 basis points. The model does not allow the interest rate to drop below 1 percent. The model's first projection year is 1999 but, since most of 1999 is already "in the bag," we suppressed the shocks for that year and started them in 2000.

14 Boothe and Reid (1998) estimate a simple autoregressive model to obtain standard deviations for the first differences of output (3.4 percent) and interest rates (1.27 percent), and then add constant terms reflecting

their judgment about the long-term growth rate for output and the long-term level of interest rates. They also estimate the covariance between output and interest rates, which is appropriate in their astructural approach. In our case, the covariances among the endogenous variables are generated by the structure of the model. A combination approach is followed by Black, Macklem, and Rose (1997). These authors estimate the covariance among six variables — including consumption, investment, and interest rates — in an unstructured vector autoregression. They then insert this error structure in a structural model, but do not vary it when considering alternative policy rules. Another useful example of modeling in this spirit is Dalsgaard and de Serres (1999).

15 In general, the distributions of outcomes under the drifting approach are only slightly skewed: the mean and median outcomes are quite close together. For greater precision, however, the averages referred to here are medians.

16 To ensure that they capture lagged effects of fiscal policy on the economy, this and other measures of volatility refer to average figures over the fiscal year 2000/01 to 2024/25 period.

17 Over the full 20-year period, the primary balance tends to move toward deficit, creating room for both tax cuts and spending increases. Movements toward greater primary surplus are not uncommon, however, especially in the early years of the program that aims to pay down debt early. In these instances, a strict application of our formula would cause the would-be tax-cutting government to reflect the movement toward primary surplus in larger tax increases than its big-spending counterpart. Somewhat arbitrarily (and asymmetrically), we therefore constrain changes in tax rates under tax-cutting governments to be zero or less — in other words when tax-cutting governments anticipate adverse movements in the primary balance in our model, they respond only by cutting spending.

18 A t-test of the outcomes of, for example, the balance-seeking approach, implemented by a government of big-spending stabilizers, and those of the drifter would lead an observer who did not know that they were the results of different approaches to attach a reasonable probability (more than 20 percent) to the proposition that they had the same mean. Showing pair-wise comparisons of all the outcomes reported here would be very cumbersome so we report standard deviations for each set of runs instead.

19 One might argue that, as long as an explicit debt-reduction plan had long-term credibility, short-run credibility would be in jeopardy only if there were a noticeable departure from that desired debt path. In this case, a couple of annual deficits would not be alarming. It seems likely, however, that many observ-

ers would greet a return to deficits as a sign that fiscal policy was out of control again, regardless of the government's expressed intentions over the long term. In our view, moreover, only the surplus-seeking plans are likely to have solid long-term credibility. Since we want to compare all plans with the drifting approach, we report results on the frequency of deficits in the early years in all cases.

20 A surprisingly common approach in economic modeling is to assume that government-provided goods and services are, in effect, dumped into the ocean.

21 In a labor market that clears, the percentage change in employment equals $-e^d e^s/[(e^d - e^s)(1 - t)]$ times the change in the tax rate, where e^d, e^s, and t denote, respectively, the elasticities of labor demand and supply (with the former a negative number) and the pre-existing value of the tax rate. With the Cobb-Douglas production function we assume, $e^d = -4.167$. With a total (federal plus provincial and local) tax rate in the economy of 40 percent, our distortion parameter of -0.3 involves a value for e^s of a little less than 0.2 — somewhat lower than the baseline assumption made by researchers in the Department of Finance (see James 1994, 309). For an analysis of a labor market that does not clear which supports a distortion parameter of the same order of magnitude, see Scarth and Jackson (1998, 295).

22 Since 1999's tax rates have already been set without regard to the primary balance expected for that year, the 1999 figure was set exogenously. As explained in note 17, we constrain changes in tax rates under tax-cutting governments to be zero or less.

23 Since 1999 is already largely behind us, we suppress the "noise" disturbance in demand in 1999, to ensure that growth is not too far out of line with the experience recorded to date.

24 Ignoring timing, the consumption function is $C + a_3 G = a_2(Y - T + a_3 G)$. This equation is used to eliminate C in the standard income identity.

25 As with the demand disturbance, we suppress this feature in 1999.

26 Readers familiar with economic modeling may note a dissonance in this approach to slope-parameter uncertainty. The base-level values of these parameters are fully consistent with the model's initial conditions and all full-equilibrium, cross-equation consistency requirements. But as the random-number generator picks parameter values for any particular draw, it is not possible to ensure that, if these parameter values ruled indefinitely, the model would converge to a well-defined steady state. Since the meaningful definition of full equilibrium in a stochastic setting is the economy's average outcome, however, our model is internally consistent in this sense.

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