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Communiqué

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Younger Canadians pay more tax, receive fewer benefits, than older generations, says C.D. Howe Institute study

Younger generations of Canadians are paying more in taxes and getting less from government in return, concludes a C.D. Howe Institute Commentary released today. The study finds that, historically, lifetime net taxes as a percentage of lifetime income have been rising for successive age groups. Under one scenario, the authors calculate that a person born in 1940 will have paid 32 percent of his or her labor income in net taxes while the comparable figure for a child born in 1995 is 38 percent.

The study, *Taxes, Transfers, and Generations in Canada: Who Gains and Who Loses from the Demographic Transition*, was written by Philip Oreopoulos, a graduate student at the University of California at Berkeley, and François Vaillancourt, an economist at the Université de Montréal.

The authors use an analytical technique known as "generational accounting" to examine the long-run implications of alternative fiscal policies, given population projections and the requirement that government ultimately be able to pay its bills, including the obligations of accrued debt. If a policy is not sustainable, government must eventually raise taxes or cut spending to prevent default.

Oreopoulos and Vaillancourt argue that if governments use expected surpluses to pay down debt, the current fiscal policy will be sustainable, with the lifetime net tax burden holding at about 38 percent for Canadians yet unborn. But if surpluses are used to raise spending, the authors calculate that the net tax burden for future generations will need to jump to as high as 55 percent, and using surpluses to reduce taxes will produce results almost as large.

Oreopoulos and Vaillancourt point out that, according to demographic projections, the number of Canadians past retirement age (age 65 and older) will rise from the current 19 percent of the working-age population to 27 percent in 2020, to 36 percent in 2030, and to almost 39 percent in 2040. This near-doubling of the ratio of seniors to working-age Canadians will have important consequences for the economy because the latter pay the largest part of taxes while those age 65 and over benefit most from government transfers and purchases (including health care and public pension programs). Thus, as the large baby-boom generation begins to retire, the public purse will have to accommodate a sharp rise in the proportion of the population that is collecting public pensions, a concomitant falloff in tax receipts, and a large increase in the need for health care.

The authors argue that policymakers must take account of the consequences of the baby boomers' retirement to avoid repeating the 1960s' mistake of not anticipating revenue requirements far enough into the future in an environment of slower economic growth, and to prevent increased tax burdens on Canadians who are now very young or yet unborn.

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Communiqué

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Les jeunes Canadiens versent plus d'impôts et reçoivent moins d'avantages que les générations plus âgées, indique une étude de l'Institut C.D. Howe

Les générations de jeunes Canadiens versent plus d'impôts et reçoivent moins d'avantages du gouvernement en échange. Telle est la conclusion d'un Commentaire de l'Institut C.D. Howe publié aujourd'hui, qui établit que dans le passé, les impôts nets exprimés en pourcentage des revenus gagnés au cours d'une vie ont augmenté successivement pour chaque groupe d'âge. Selon un scénario, les auteurs estiment qu'une personne née en 1940 aura versé 32 % de son revenu de travail en impôts nets, tandis que ce même pourcentage grimpera à 38 % pour une personne née en 1995.

L'étude, intitulée *Taxes, Transfers, and Generations in Canada: Who Gains and Who Loses from the Demographic Transition (Impôts, transferts et générations du Canada : Qui est gagnant et qui est perdant dans la transition démographique),* est rédigée par Philip Oreopoulos, un étudiant du troisième cycle de l'University of California at Berkeley, et François Vaillancourt, un économiste à l'Université de Montréal.

Les auteurs ont recours à une technique analytique dénommée la « comptabilité transgénérationelle » pour examiner les répercussions à long terme de diverses politiques fiscales, compte tenu des projections démographiques et de l'exigence que le gouvernement soit en mesure de payer ses factures, dont les obligations de la dette accumulée. Lorsqu'une politique n'est pas soutenable, le gouvernement doit éventuellement augmenter les impôts et réduire les dépenses afin de ne pas manquer à ses obligations.

MM. Oreopoulos et Vaillancourt soutiennent que si les gouvernements se servent des excédents budgétaires prévus pour réduire la dette, la politique fiscale actuelle sera soutenable, à raison d'un fardeau fiscal d'environ 38 % durant l'existence des Canadiens à naître. Cependant, si les excédents servent à augmenter les dépenses, les auteurs estiment que le fardeau fiscal net des générations à venir pourrait atteindre 55 %; d'autre part, l'utilisation des excédents pour réduire les impôts produira un fardeau presque aussi important.

Selon les auteurs, conformément aux projections démographiques, le nombre de Canadiens qui dépassent l'âge de la retraite (soit de 65 ans et plus) augmentera de 19 % de la population active à 27 % en 2020, à 36 % en 2030 et à presque 39 % en 2040. Ce quasi-doublement du

ratio de personnes âgées par rapport aux Canadiens en âge de travailler comportera des conséquences importantes pour l'économie car ces derniers doivent verser la majeure partie des impôts tandis que ceux de 65 ans et plus tirent profit des transferts et des achats publics (dont les programmes des services de santé et des prestations de pension). Au fur et à mesure que la génération du baby-boom prendra sa retraite, le Trésor public devra tenir compte d'une hausse brusque du pourcentage de la population qui est prestataire des régimes de pension publique, d'une baisse simultanée des recettes fiscales et d'une augmentation importante des besoins de services de santé.

MM. Oreopoulos et Vaillancourt soutiennent que les artisans de la politique doivent tenir compte des conséquences du départ à la retraite des membres de la génération du baby-boom pour éviter de renouveler l'erreur des années 60 — qui a été celle de ne pas prévoir suffisamment à l'avance les exigences de recettes dans le cadre d'une croissance économique ralentie — et pour éviter d'alourdir le fardeau fiscal des Canadiens qui sont très jeunes ou à naître.

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Taxes, Transfers, and Generations in Canada: Who Gains and Who Loses from the Demographic Transition, Commentaire n^{o} 107 de l'Institut C.D. Howe, par Philip Oreopoulos et François Vaillancourt, Toronto, Institut C.D. Howe, juin 1998, 24 p., 9,00 $ (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 0-88806-436-5.

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Taxes, Transfers, and Generations in Canada:

Who Gains and Who Loses from the Demographic Transition

by

Philip Oreopoulos
and
François Vaillancourt

As Canadians consider how best to use current and future budget surpluses, they should remember that the retirement of the huge cohorts of baby boomers will greatly change the pressures on government. Starting about 20 years from now, the public purse will have to accommodate a sharp rise in the proportion of the population collecting public pensions, a concomitant falloff in tax receipts, and a large increase in the need for health care.

Policymakers do not always look so far ahead, but the fiscal decisions they make now will greatly affect the country's economic health in 2020 and beyond. A tool for examining the long-range implications of alternative fiscal policies is generational accounting, by which analysts examine long-run fiscal feasibility, given demographic projections and the requirement that government be able to eventually pay its obligations from accrued debt. The same technique permits examination of the tax burden by age cohorts.

Such analysis suggests that Canada is now on a fiscal track that can be sustained *if* budget surpluses are used to reduce the debt. Using them to increase spending or cut taxes will require government to tighten fiscal policy down the road, which would have the additional unfortunate result of throwing increased tax burdens on Canadians who are now very young or yet unborn.

Main Findings of the Commentary

- At present, the number of Canadians past retirement age (age 65 and older) is about 19 percent of the working-age population, a proportion that has changed little since 1960 and that will not fluctuate much during the next 15 years or so. But it will rise substantially as the baby-boom generation turns 65. Demographic projections put the ratio at 27 percent in 2020, 36 percent in 2030, and almost 39 percent in 2040.
- The near-doubling of the seniors dependency ratio between 2000 and 2040 will have important consequences for the economy because Canadians of working age pay the largest part of taxes while those age 65 and over benefit most from government transfers and purchases (including health care and public pension programs).
- Generational accounting is an analytical technique for investigating two related questions:
  - Is a country's current fiscal policy feasible (sustainable) in the long run, given population projections and the requirement that government ultimately be able to pay its bills, including the obligations of accrued debt? If the policy is not sustainable, government must eventually raise taxes or cut spending to prevent default.
  - What is the *lifetime* net tax burden (taxes paid minus transfer benefits received) for the average member of each age group? Is the distribution fair? Is it what was intended when the fiscal policies causing it were put in place?
- Historically, lifetime net taxes as a percentage of lifetime income have been rising for successive age cohorts in Canada. Under our most favorable scenario, we calculate that a person born in 1940 must expect to pay 32 percent of his or her labor income in net taxes; the comparable figure for a child born in 1995 is 38 percent. That rising trend cannot continue indefinitely.
- If, over the next few years, government uses its expected surpluses to pay down its debt, the current fiscal policy will be sustainable, with the lifetime net tax burden holding at about 38 percent for the cohorts of Canadians yet unborn. If, however, the surpluses are used to raise spending, the net tax burden for future generations will need to jump to 55 percent. Using the surpluses to reduce taxes will produce results almost as drastic.
- If policymakers are too shortsighted to take account of these inevitable consequences of the baby boomers' retirement, they may repeat the previous mistake of not anticipating revenue requirements far enough into the future.

Dwindling tolerance for excessive spending has encouraged Canadian governments, federal and provincial, to instigate a considerable amount of fiscal restraint over the past several years. Expenditure cuts and spending restraints in almost all major programs mean that both levels now expect balanced budgets and possibly budget surpluses over at least the next several years.

What will governments do with any surpluses? In making that decision, policymakers would do well to look further ahead than, say, the next decade. Not until after 2015 will the bulk of the baby boomers begin to reach age 65, placing so much pressure on legislators to maintain current health care and income security for the elderly that governments may have to raise taxes or resort again to deficit financing. Thus, considering only the shorter-term consequences of fiscal policy would overlook almost the entire influence of the baby boomers' retirement.

In this *Commentary*, we address the long-term implications of maintaining alternative government policies, given the demographic transition. One policy we consider is using a large portion of any projected federal surpluses for higher spending, a course of action we call the "spending-hike scenario." An alternative policy, the "debt-reduction scenario," allows these projected surpluses to be realized, thus reducing outstanding debt. We look at how these two cases would affect different age groups and which policy, if any, could be sustained well into the future without making further changes but leaving government able to still pay all its bills.

(Notice that, from this point on, we use the terms *government* and *consolidated government* to refer to federal, provincial, and municipal governments combined, unless we specify a particular level.)

We also present the historical impact that government taxes have had on different age groups, showing that the lifetime burden of net taxes (taxes minus transfers) is higher overall for younger generations than for older ones. Finally, we discuss some normative issues one should think about in deciding what an equitable distribution of government flows to and from different generations should look like.

Our main results are derived from a technique known as *generational accounting* (see Box 1), and our conclusions are the following:

- The fiscal impact of the aging of the baby boomers will be large but will not occur until after 2015. Not anticipating this impact will lead to ill-informed policy recommendations that may have unintended effects on various age groups.
- The ratio of debt to gross domestic product (GDP) will decline substantially for some years, but after 2015 pressures from rising expenditures for the elderly will slow this trend and possibly even reverse it.
- With no further changes to the current path of fiscal policy, the consolidated government budget is on a sustainable track, but *only* if decisionmakers use projected budget surpluses to pay down the debt. If, instead, government decides to direct a significant portion of its potential surpluses into expenditure increases or tax cuts, fiscal policy will become unsustainable and further tightening will be required later on.
- Historically, lifetime net taxes as a percentage of lifetime income have been rising for successive generations. Even under our debt-reduction scenario, which is sustainable, a person born in 1940, for example, can expect to pay 32 percent of his or her labor income in net taxes; the comparable figure for a child born in 1995 is 38 percent.
- There is no objective way to decide on an appropriate steady state of taxes and transfers among different age groups. Any policy change that benefits one group will hinder others. However, the rising trend in

net lifetime tax burdens on younger generations cannot continue indefinitely. Neither is that trend desirable if one accepts the principle that the benefits received by any generation should be financed by taxes its members have paid. Regardless of the desired level of intergenerational redistribution, any discussion of what to do with the forthcoming projected surpluses must acknowledge the aging population's potential impact on spending and tax receipts.

Demographics

A crude yet informative indicator of the economic impact of a changing population is shifts in the dependency ratio — the number of individuals in economically dependent age groups in relation to the number in productive (working) ages. With this information and breakdowns of which age groups currently pay taxes and receive transfer benefits, one can work out projections well into the future.

Dependency Ratios

Using Statistics Canada's "medium" baseline assumptions about fertility, mortality, and immigration,[1] we constructed two series of dependency ratios for the 1960–2040 period (see Figure 1). The youth dependency ratio is the proportion of the Canadian population under age 18 to the population between ages 25 and 64. The seniors dependency ratio is the proportion of the population age 65 and over to those between ages 25 and 64.

In the 1960s, the youth dependency ratio is high, surpassing 70.0 percent early in the decade. The reason is largely due to the baby-boom cohort (those born during 1945 through 1965). Fertility rates drop thereafter, causing the ratio to fall. By 1995, it is only 38.0 percent.

Subsequently, population projections, which involve assumptions of a low fertility rate, predict a continuing decrease to about 32.0 percent after 2015.

Box 1: *The Goals of Generational Accounting*

Using methods described later in this *Commentary*, analysts who employ generational accounting examine two broad questions.

- Is a country's long-run fiscal policy feasible, given projected demographic changes and the requirement that government eventually must be able to pay its bills, including any obligations from accrued debt? A government that cannot meet all its payments is practicing an unsustainable fiscal policy; at some point, it must adjust that policy by either raising taxes or cutting spending to prevent eventual default.
- What is the net tax burden on an average person in a particular generation, with the burden being calculated by allocating all taxes paid and transfers received to the appropriate age cohorts? Changes in policy can, of course, change these tax burdens.

Generational accounting was developed seven years ago in the United States by Alan Auerbach, Jagadeesh Gokhale, and Laurence Kotlikoff[a] and has since received attention from the World Bank, the Organisation for Economic Co-operation and Development, the German central bank, the European Commission, and the International Monetary Fund. To date, researchers have applied this technique to 18 countries, including Canada.[b]

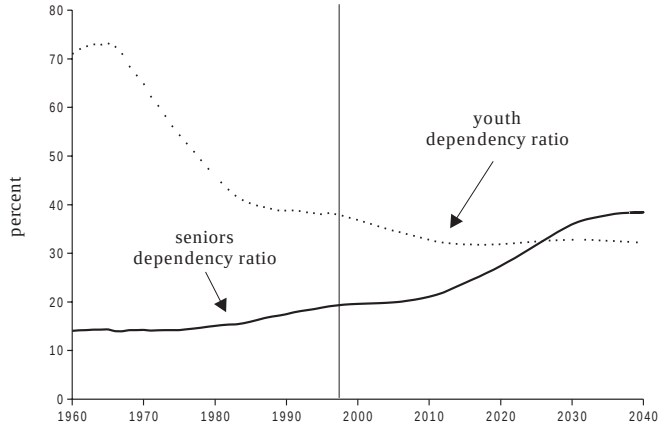
a Alan J. Auerbach, Jagadeesh Gokhale, and Laurence J. Kotlikoff, "Generational Accounts: A Meaningful Alternative to Deficit Accounting," in D. Bradford, ed., *Tax Policy and the Economy*, vol. 5 (Cambridge, Mass.: MIT Press, 1991).

b Alan J. Auerbach, Laurence J. Kotlikoff, and Willi Leibfritz, eds., *Generational Accounting Around the World* (Cambridge, Mass.: National Bureau of Economic Research, forthcoming).

In contrast, the seniors dependency ratio changes little from 1960 to 2005. It does not move significantly until the baby-boom cohort begins to reach age 65 (after 2015 for the majority of them). In 1995, the seniors dependency ratio is 18.9 percent; by 2005, it is 19.9 percent.

After 2005, the ratio of seniors to those of working age rises more sharply. By 2020, it is

Figure 1: ***Youth and Seniors Dependency Ratios, Canada, 1960–2040***



Notes: The values to the right of the vertical rule are estimates, using Statistics Canada's "medium" baseline assumptions. Fertility and mor- tality rates are assumed constant after 2018.

Source: Statistics Canada, Population Projections Section, Demography Division, *Population Projections for Canada, Provinces and Territories, 1993–2016, and Population Projections for Canada, 2017–2041*, cat. 91-520-XPB (Ottawa, 1994).

projected to be 27.4 percent. Over the next two decades, the ratio climbs further, to 38.5 percent, where it remains thereafter.[2]

Age Profiles of Taxes and Transfers

The near-doubling of the seniors dependency ratio between 2000 and 2040 matters because the majority of government transfers and purchases are made to or for Canadians age 65 or older, while the majority of taxes are paid by those of working age (see Figure 2).[3]

The typical age profile for taxes follows a lifecycle pattern, with the average paid rising with income and peaking in the individual's late forties and early fifties. The level declines quickly after age 60.

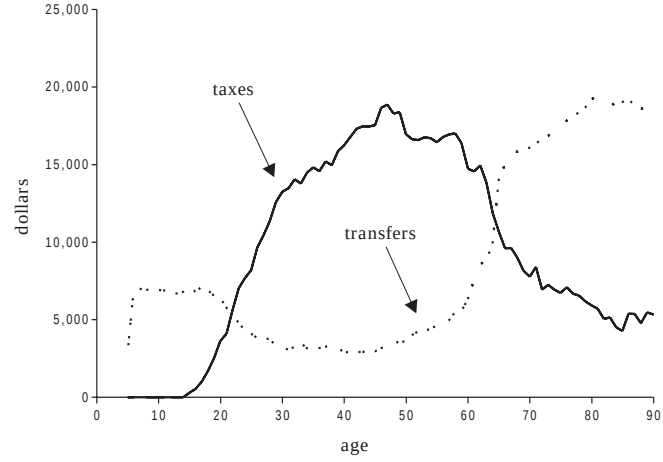
Transfers, including spending on edu-cation and health care, comprise about 65 percent of the consolidated government's total expenditures. (Throughout this paper, "health care" refers to *public* health care.) Transfers to Canadians under age 18 are mostly for education. For example, of the $7,250 in transfers that goes to the average 15-year-old in our profile, 89 percent is for education.

The middle-aged cohorts receive the least from government. At about age 60, however, average transfers sharply rise. By age 65, transfers received are $14,029 for each member of a cohort, rising to $17,554 by age 75. Overall, average transfers almost triple between ages 55 and 75.

Clearly, most government transfers, direct and in-kind, go to the elderly, particularly for health care and various public pension programs, such as the Canada and Quebec Pension Plans (CPP / QPP), old age security (OAS), the spouse's allowance, the federal guaranteed income supplement (GIS) and its provincial counterparts, and public employee pensions.

In 1995, health care spending comprised 30.1 percent of transfers (18.0 percent of total government expenditures) and public pension programs 27.5 percent (16.5 percent of total expenditures). And these ex-

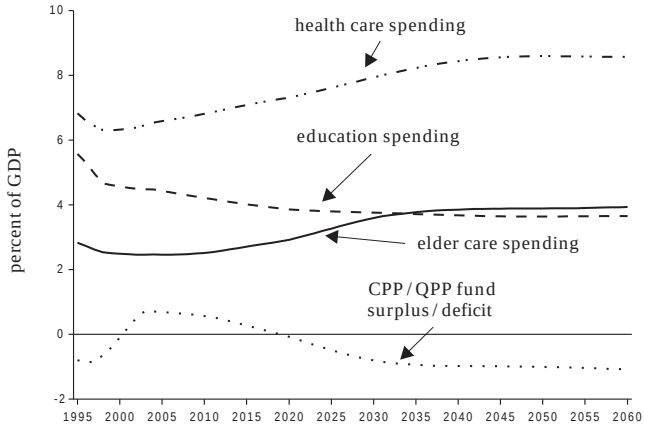
Figure 2: ***Age Profiles of Taxes and Transfers, Canada, 1995***



Note: Transfers include implicit health care and educational expenditures.

Source: Data from Statistics Canada's Social Policy Simulator and Database Model.

Figure 3: ***Demographic Impact on Fiscal Policy, Canada, 1995–2060***



Notes: The projections (amounts for all years after 1995) are based on the debt-reduction scenario set out later in the text and in Table 1. *Elder care* is our shorthand for OAS, GIS, and the spouse's allowance combined.

Source: Authors' calculations using data and methodology described later in the text.

penditures are bound to rise as the population ages.

Figure 3 reflects what happens under our debt-reduction scenario (detailed later). For the first few years after 1995, spending cuts push down health care and public pensions as a percentage of GDP. The effects of population change become substantial only after 2015.

In summary, health care expenditures rise from 6.3 percent in 1999 to peak at 8.4 percent of GDP by 2045. "Elder care" (our term throughout this *Commentary* for OAS, GIS, and the spouse's allowance combined) expenditures rise from 2.5 percent of GDP in 2008 to 3.9 percent by 2041. In the CPP / QPP, a large surplus fund accumulates initially as a result of higher contribution payments. But with the growing proportion of elderly in the population, the annual balance moves into deficit by 2020 and remains there at about 1.0 percent of GDP.

Education spending follows a quite different pattern. Given current policy cuts to government purchases in this area, this expen-diture is reduced to 4.7 percent of GDP in 1999. This amount falls further as the proportion of Canadians under age 25 falls; education spending becomes 3.7 percent of GDP by 2041.

The Path of Fiscal Policy

The fiscal effects of the demographic transition in Canada can be seen using long-run projections. This section presents our two basic scenarios, which are later applied to determine the net tax impact on different generations.

Projections

Our projections for the paths of government taxes and transfers are based on the June 1997 Policy and Economic Analysis Program (PEAP),[4] augmented by our own assumptions. The PEAP uses a computer simulation model of the Canadian economy together with a number of judgments about future economic conditions. The principal assumptions entering the program are in the areas of monetary and exchange rate policy, US economic prospects, and Canadian fiscal policy. The last of these categories is highlighted below (although assumptions in the other areas also have effects on the estimates).

Two of the projections we examined are the spending-hike scenario and the debt-reduction scenario (see Table 1), from 1995 through to 2050 (and beyond).[5] We used revenue and expenditure forecasts to 2020 from the PEAP and calculated values for later years by assuming that taxes and transfers exhibited at the end of 2020 grow in step with productivity, inflation, and population change. The initial value for the consolidated government net financial debt came from the National Balance Sheet Accounts.

In the spending-hike scenario, the PEAP projects a National Accounts federal budget surplus by 1999.[6] In general, provincial and local

Table 1: ***Fiscal Projections under Two Scenarios, 1995–2050***

	Total Tax Revenue	Total Transfers	Government Purchases	Debt/Surplus		Net Debt
				Primary	Budget	
			(percentage of GDP)			
			Spending-Hike Scenario			
1995	36.5	20.2	17.4	– 1.1	– 4.6	70.1
2000	35.7	18.6	13.9	3.2	2.2	61.2
2005	35.9	19.1	13.6	3.2	2.5	42.4
2010	35.1	19.7	13.3	2.1	1.8	26.6
2015	34.4	20.4	14.0	0.0	– 0.1	18.9
2020	33.5	20.5	13.7	– 0.8	– 0.9	19.0
2025	34.1	22.1	14.1	– 2.1	– 2.4	25.0
2030	34.8	23.7	14.4	– 3.4	– 4.0	38.6
2035	35.4	24.9	14.7	– 4.2	– 5.3	58.8
2040	36.0	25.7	15.0	– 4.7	– 6.3	83.7
2045	36.6	26.3	15.2	– 4.9	– 7.2	112.0
2050	37.0	26.7	15.3	– 5.0	– 8.0	142.9
			Debt-Reduction Scenario			
1995	36.5	20.2	17.4	– 1.1	– 4.6	70.1
2000	34.7	17.4	13.1	4.1	3.2	58.9
2005	34.2	17.5	12.8	4.0	3.4	35.8
2010	33.3	17.9	12.1	3.4	3.3	16.0
2015	32.7	18.2	11.6	2.8	3.1	– 1.3
2020	32.1	18.6	11.6	1.9	2.5	– 15.0
2025	32.8	19.1	13.0	0.7	1.5	– 24.5
2030	33.3	20.0	13.8	– 0.5	0.5	– 28.6
2035	33.7	21.0	13.9	– 1.2	– 0.3	– 27.8
2040	34.5	21.9	14.1	– 1.5	– 0.7	– 24.3
2045	35.0	22.1	14.5	– 1.7	– 1.0	– 19.2
2050	35.4	22.6	14.5	– 1.8	– 1.2	– 13.2

Note: Data are on a National Accounts basis; discrepancies in the addition of some rows are because of rounding.

Source: Authors' calculations using data and methodology described in the text.

government surpluses also occur, but strong expenditure requirements keep them small.

The incentive for the federal government to spend projected surpluses, the scenario assumes, is too great to ignore. To keep its national accounts surpluses roughly in balance, it increases spending proportionally on welfare, health care, and government expenditures.

In contrast, the debt-reduction scenario assumes that the current path of fiscal policy remains unchanged. No additional spending increases or tax cuts arise other than those already anticipated, and budget surpluses go toward debt reduction. (See Box 2.)

Taxes, Borrowing, and Spending to 2020

Beyond the immediate recovery from the earlier recessionary period, the PEAP's projections are intended to capture long-term trends, not business cycles. And the forecast is a buoy-

Box 2: *The Rationale for the Base-Case Scenario*

Analysts creating fiscal projections that involve surpluses must make assumptions about how government is likely to keep the National Accounts roughly in balance. There are essentially three choices: to use a sizable portion of the surplus to pay down accumulated debt, to increase spending, or to reduce taxes.

When we were working out our projections, the choice for one of our base cases was easy. Many voices in Canada are calling today for reducing the debt load.

The choice for the second base case was harder. We settled on spending increases because we thought this more likely than tax decreases. And we specified rises in health care, education, welfare, and general purchases because these categories are general and large enough that using projected surpluses on them would not lead to unrealistic increases in program size.

The use of surpluses for tax reduction is not, however, implausible. Indeed, the original PEAP projection used cuts in the federal personal income tax, instead of expenditure increases, and we examine this scenario in a later section. To anticipate that discussion, we note here that the general results of our tax-cut case are only slightly better than those of our spending-hike case.

ant Canadian economy. Unemployment falls to 8.2 percent by 2000 and to 7.1 percent by 2005; thereafter, it remains about the same. Labor productivity growth is 2.5 percent for 1997 and 2.0 percent for 1998; it drops to 1.6 percent the year after and to 1.0 percent by 2020 (which is roughly the average growth rate over the past 20 years or so).

Higher-than-average growth for these initial years means higher tax revenues for government (holding tax rates constant) and lower cyclical expenditures, such as unemployment insurance (UI) and welfare payments.

The main difference between the spending-hike and debt-reduction scenarios in these years is on the spending side. The former assumes expenditure increases in social security, health care, and government purchases to keep federal budget surpluses in balance.

In the debt-reduction case, however, expenditures increase only slowly, beginning in 1998. Federal-provincial transfers are reduced (as announced in previous budgets), growth in defense spending and other federal programs is lower, and per capita growth in provincial, local, and hospital expenditures is maintained. Welfare cuts in Ontario and some reductions in disability payments from the CPP are also accommodated.

On the revenue side, CPP / QPP contributions rise over a six-year period, according to recently passed legislation. Rates go from 5.85 percent in 1997 to 9.90 percent in 2003, and investment of the plans' surpluses earns a higher rate of return under the reforms than previously.

Taxes, Borrowing, and Spending beyond 2020

To project beyond 2020, we used profiles obtained from Statistics Canada's Social Policy Simulation Database and Model (SPSD / M) and the federal Department of Health[7] to distribute real per capita amounts for each tax and transfer category. We then assumed these values increase beyond 2020 at the productivity growth rate of 1 percent. Finally, we multiplied these amounts by the population projections previously discussed. Thus, our projections of total government revenues and expenditures are driven by changes in population size, demographic changes, and overall productivity growth.

We calculated the deficit for these years by subtracting estimated interest payments from the primary surplus (tax revenue less transfers and government purchases) and capital consumption allowance. We assumed the government's real borrowing rate to be the same as the real 90-day commercial paper rate, projected to be about 2.4 percent throughout the period examined.

Fiscal Implications

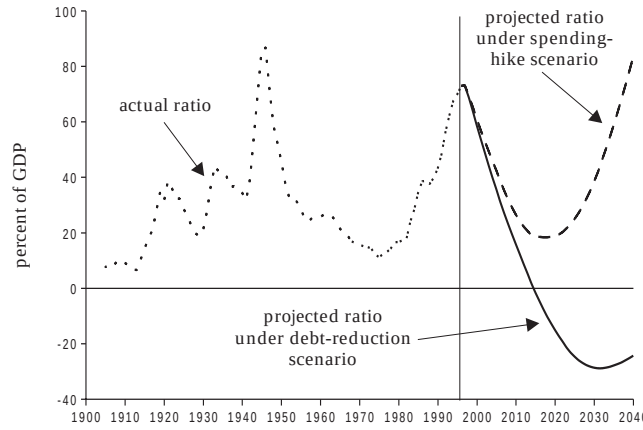
The projections for years after 2015 clearly show the fiscal effects of the overall aging of the population. Total transfer expenditures, including health care and elder care spending, rise substantially under both scenarios. For the debt-reduction case, they go from 18.2 percent of GDP in 2015 to 20.0 percent by 2030 and to 22.6 percent by 2050. A fall in government purchases, which include education expenditures mainly allocated to the young, provides only a partial offset.

Transfers and government purchases rise more rapidly in the spending-hike scenario. Total transfers in 2025 are 22.1 percent of GDP and government purchases are 14.1 percent.

Notice that almost the entire influence of the baby boomers' retirement on the government's net debt position comes after 2015. In the spending-hike case, the fall in the net debt-to-GDP ratio slows, and by 2022 higher spending on the elderly causes net debt to grow faster than GDP. By 2050, the ratio reaches 142.9 percent.

But in the debt-reduction case, the debt falls to zero after 2014. Left alone, net surpluses accumulate. The speed of accumulation slows after 2020, however, and by 2031 the ratio begins to rise.

Figure 4: ***Ratio of Net Debt to GDP, Canada, 1905–1997 and Projections to 2040***



Sources: Pre–1926 tax and transfer aggregates: M.C. Urquhart and K.A.H. Buckley, eds., *Historical Statistics of Canada* (Cambridge; Toronto: Cambridge University Press and Macmillan of Canada, 1965); and W. Irwin Gillespie, *Tax, Borrow, and Spend: Financing Federal Spending in Canada, 1867–1990* (Ottawa: Carleton University Press, 1991). Aggregates for 1926–95: The National Income and Expenditure Accounts. Aggregates for 1996–2040: Projections, see Table 1 and text.

The Projections in Perspective

The two scenarios can be viewed in historical perspective by plotting the past and estimated debt-to-GDP ratios from 1910 until well into the future (see Figure 4). Except for the periods during the world wars and the Great Depression, the country's deficit position fluctuated narrowly around zero in most years prior to the mid-twentieth century. Debt that had accumulated during the wartime periods was repaid promptly afterward by running budget surpluses with massive cuts in defense spending and some tax increases.

Between 1950 and 1975, government expenditures increased from 19.7 to 34.1 percent of national output. For the most part, tax revenues rose closely in line with expenditures. Strong economic growth and high fertility precluded the need for more major budget financing. Labor productivity was rising some 2 to 3 percent a year, and real interest rates were low.

After 1980, however, the growth rate of national income consistently slowed while the national rate of unemployment doubled. The 1981–82 and 1990–92 recessions were the most severe downturns since the Great Depression. High real interest rates coupled with a sub-stantial, recession-induced rise in expenditures and falloff of revenues produced a doubling of the debt-to-GDP ratio in less than a decade.

Canadian governments reacted only slowly to this growing financial problem, but

by 1995 almost all had taken measures to control their spending. The projections beyond 1996 show that their efforts to reduce and remove their deficits will lead to a steady decline in debt relative to GDP. The impact of the baby boomers' aging could to reverse this trend, however. In our spending-hike scenario, budget deficits appear again after 2014, and in less than a quarter-century the debt-to-GDP ratio climbs to a level higher than that of in 1995. In our debt-reduction case, however, the downward trend in the accumulated budget balance continues until 2031 and then levels off slowly.

Distributional Effects across Generations

In the last section, we discussed the potential paths of government fiscal policy over the long term. The path chosen will have many kinds of impacts: on efficiency, on distortions, and on distribution, to name the most obvious. What we are concerned with, however, is how this path affects various age groups — those currently living and those yet to be born.

When a government borrows to finance expenditures or tax cuts, it lowers the current tax burden of households, allowing them to spend more. In the future, when the time comes to repay the interest and principle from this borrowing, those who benefited from the tax breaks may not be the same individuals as those who end up paying for them. Thus, one can think of deficits as representing future taxation. Current taxpayers gain, while future taxpayers lose.

These gains and losses tend to offset each other, however. Some individuals benefit at the expense of others (say, through the effects on wages and interest rates, matters generational accounting does not reflect[8]), but on the whole, the impacts from budget deficits balance. To see this point, consider the government's long-run budget constraint: all current and future government purchases of goods and services plus any debt-servicing costs must be paid with net taxes collected from age groups either living now or in the future. More precisely, at any given date, the sum of all subsequent tax payments net of transfers and discounted to the present must be large enough to cover the present value of all future government purchases and pay off the initial debt (see Box 3).

Suppose the government finances a transfer increase to those currently working by borrowing, instead of by raising taxes. If all other expenditures and receipts remain the same — that is, if the right-hand side of the equation in Box 3 does not change — the government's budget constraint requires higher net taxes for some future generation. And if the net tax burden faced by one age group is to fall, the burden faced by another must rise.

Box 3: *The Long-Run Budget Constraint and Present Value*

Simply stated, the government's long-run budget constraint is the need to balance the following equation[a]:

Present value of all current and future net taxes
= Present value of all current and future government purchases
+ government net debt.

The constraint fails only if the government defaults on its debt. Those who then end up with the burden are the government's creditors.

Notice that the present-value calculation makes payments and receipts comparable through time. A dollar received today is worth more than a dollar received tomorrow because of the yield it would earn if it were invested and because of the uncertainty involved in the chances of actually receiving the dollar tomorrow.

a Alan J. Auerbach, Jagadeesh Gokhale, and Laurence J. Kotlikoff, "Generational Accounts: A Meaningful Alternative to Deficit Accounting," in D. Bradford, ed., *Tax Policy and the Economy*, vol. 5 (Cambridge, Mass.: MIT Press, 1991).

We can now be more precise in our definition of *sustainability*. A policy is sustainable if the total present value of net taxes collected now and in the future is equal to or greater than the debt-servicing costs and the long-run costs of government purchases. In other words, a current and projected set of net taxes that cannot meet all current and projected financial obligations is not sustainable.

If a given fiscal policy is unsustainable, then one or more components within the long-run budget constraint have to be adjusted so that the equation holds. The adjustment can occur in a number of ways. Taxes can rise or government purchases can fall. Moreover, the burden can be allotted to different age groups. (By looking only at age group cohorts, generational accounting ignores any distributional changes that a change in policy might cause *within* a generation.)

Generational Accounting

Budget deficits cannot be used to forecast the implications of maintaining age-specific programs, nor can they anticipate changes to fiscal policy. Long-term projections, such as those already presented here, are more useful in that they provide a more comprehensive view of where the current path of government programs and revenues is leading. Even these do not, however, show how different people will be affected nor whether the path being followed will satisfy the government's long-term budget constraint.

A recently developed method of measuring the effects of fiscal policy is generational accounting, whose goals were described in Box 1. To expand that description, we can say that the methodology proceeds as follows.[9]

- Take a given projection of government expenditures and receipts and attempt to allocate corresponding net tax burdens to currently living age groups. Add together all the taxes that an age group can expect to pay and all the transfers it can expect to receive, converting these amounts to present values using a specified discount rate. A cohort's generational account is the tax burden its members can expect to pay over their remaining lives, net of transfers.
- Use the government's long-run budget constraint to assess the sustainability of such policy. Estimate all parts of the constraint except the net tax payment required for future generations. After a calculation of the total net tax burden that current ages are paying, any remaining payment needed to satisfy the constraint is allocated to future age groups in proportion to their income. Thus, the net tax rates for all future age groups are, on average, the same.

Generational accounts are often presented as proportions of wage income. The tax account of a cohort's members from birth (that is, their lifetime net tax burden) stated as a percentage of their total present value income is called their *lifetime net tax rate*. With enough historical data and a number of additional assumptions, one can calculate the lifetime net tax rates for all living and future generations.

Notice that allocating the entire remaining net tax burden on future ages is not a prediction of how policy will change but simply a measure of how sustainable or unsustainable it is. Once we know this, we can construct alternative policies that will alter the net tax burden among different age groups.

Notice, too, that generational accounting does not take into account the effects that changes to savings or taxes may have on the economy. (The PEAP's explicit modeling of the economy somewhat accommodates the influences, but it does not generally include interest rate movements.) Some analysts suggest, however, that the results from generational accounting are relatively unaffected from these factors.[10]

Data Sources

The data required to calculate generational accounts are evident from the formula for the government's intertemporal budget constraint. Analysts need:

- an estimate of the stock of government net debt in the base year and for every prior year they use to compute a cohort's lifetime account;
- a discount rate to convert expenditures and receipts into present value;
- a set of population estimates, by age and sex, both historic and projected;
- historical data on government taxes and spending; and
- long-term fiscal policy projections.

Our sources for these data were as outlined below. All money amounts were converted to 1995 dollars using the GDP deflator from the National Income and Expenditure Accounts.

Net Consolidated Government Debt

For 1926 through 1995, we took consolidated government net debt to be the negative of Statistics Canada's government net financial assets, as set out in the appropriate National Balance Sheet. For years before 1926, we extrapolated estimates of Dominion debt from Gillespie[11] by computing what the net debt value in 1905 would have been assuming that it grew (or fell) by the same proportion in the Gillespie figures to arrive at the 1926 value in the Statistics Canada figures.

Discount Rate

We chose a 5 percent discount rate, roughly halfway between the relatively risk-free government borrowing rate and the higher market rate of return. This 5 percent value reflects the uncertainty that taxpayers face when facing future payments, receipts, and expenditures. (The uncertainty is, however, probably less than what they face when forecasting the real return on capital.)

An often-made point is that the results of generational accounting are sensitive to the discount rate chosen. This criticism is, however, more applicable to the actual values of the accounts than to the net lifetime tax rates, which are the ratios of two present-value amounts.

In the next section, we present our main results under alternative discount rate assumptions. Our conclusions are the same under a wide range of possible rates.

Population Data

We used population estimates from 1905 to 1995 from Statistics Canada data. The values used were separated by sex and by 91 age groups (0 to 90+ years). Where only five-year age-group data were available, we divided these groups by five to generate single-year populations.

For 1996 to 2041, we took projections from Statistics Canada's Demography Division's medium baseline forecasts; we then extended them to 2100 using the same component assumptions prevalent at the end of 2041. (The PEAP uses these same projections for its fiscal forecasts). The population is assumed to level off thereafter.

Since we are concerned with present-value per capita amounts, the further out the projections, the less weight they have on the results. For this reason, differences in the long-term population projections will make little significant difference when calculating the total future fiscal burden.[12]

Taxes, Transfers, and Government Purchases

We used the National Income and Expenditure Accounts to compile tax, transfer, and govern-

Table 2: ***Taxing and Spending Categories in the Generational Accounts***

Tax Categories	Spending Categories
Personal income taxes	Child tax benefits
Commodity taxes	Goods and services tax credits
Unemployment insurance contributions	Unemployment insurance benefits
Workers' compensation contributions	Workers' compensation benefits
CPP / QPP contributions	CPP / QPP benefits
Public employee pension contributions	Public employee pension benefits
Property taxes	Health care
Capital income taxes	Elder care (OAS + GIS + spouse's allowance)
Other taxes	Other government purchases (including education)

ment purchase aggregates, as well as data for wages and salaries, for the years between 1926 and 1995. We separated health care and education spending from other government purchases[13] and obtained pre-1926 tax and trans-fer aggregates.[14] We used nine tax and nine spending categories, as listed in Table 2.

For future values, we obtained some from the PEAP, which contains aggregate amounts for all the tax categories and for unemployment insurance, CPP / QPP, and government purchases. Where transfer projections were unavailable, we usually took the 1995 National Accounts values and assumed growth at the same rate that total transfers to persons were calculated to grow using the PEAP. The exception was health care expenditures, which we allowed to grow at the same rate as other government expenditures.

To distribute the aggregates by age and sex, we used various cross-sectional surveys. For values in 1995 and beyond, we used Statistics Canada's SPSD / M.[15] In general, we assumed most taxes are borne by those paying them: income taxes fall on income recipients, consumption taxes on consumers, and property taxes on property owners. Payroll taxes were allocated to employees, and corporate taxes were divided evenly between owners of capital and consumers. Where profiles existed for households only (for example in the case of commodity taxes and payroll taxes), we usually allocated taxes and transfers evenly between males and females. Finally, government purchases, except for health care and education, were implicitly allocated evenly among all age groups.

For relative age and sex profiles before 1995, we used data from Revenue Canada.[16] The aggregate categories of income and corporate taxes, CPP / QPP and UI contributions, child benefits, and CPP / QPP benefits were adjusted relative to the SPSD / M data using earlier profiles for the years 1994, 1974, and 1965. Profiles for the missing years were assumed to be the same as the one used for the most recent year for which data were available. This method posed less of a constraint than it may appear, since transfer programs were also less numerous for earlier years.

Data for unemployment insurance benefits are available from 1942 onward (that is, since the program's institution) on the number of benefit days by five-year age groups.[17] We used these data from 1942, 1950, 1960, and 1970. For later years, we could turn to the income tax data since UI benefits became taxable in 1971.

For OAS, we distributed benefits across the relevant age group: age 70 and over for the 1926–65 period and age 65 and over for the period after 1970 (allowing for the phased-in

transition of the new retirement age over the 1966–70 period).

(It is worth noting, however, that using the same profiles for all years as for 1995 changed the results very little.)

Fiscal Policy Projections

For fiscal projections, we used the two alternatives described in the previous section. Both use the main economic forecasts of the PEAP out to 2020. After that, we set all expenditures and revenues to grow, on a per capita basis, at the assumed productivity rate of 1 percent.

Lifetime Net Tax Rates

Comparing the situation of one age group with that of another requires a look at entire lifetime taxes and transfers. *Lifetime net tax rates* are defined as the present value of an age cohort's lifetime net taxes (their generational account calculated from the year of birth) divided by the present value of members' lifetime labor income. Calculating the present values as of each cohort's birth year allows for straightforward comparison. Lifetime taxes and transfers have trended upward, as have lifetime real incomes. To compare generations, we measured net taxes relative to present-value income. Lifetime income should include all income that increases a cohort's resources: labor earnings, inherited wealth, and capital gains above the normal return to saving. The normal return to saving is not itself included in income; doing so would be double counting.

Unfortunately, data do not exist on the share of each generation's income that has come from inherited wealth or supernormal capital gains. So we used labor earnings to represent income. (Any error due to this omission is relatively small in the aggregate, given that labor income has long accounted for approximately four-fifths of all income and that only the supernormal part of income from capital should be included.)

Results

For our analysis, we first used the data and assumptions just described, including two alternative fiscal paths for the future — the spend-ing-hike scenario, in which part of the budget surpluses that would otherwise occur for several years after 1998 are used to increase welfare, health care, and government purchases; and the debt-reduction scenario, in which surpluses are realized and used to pay down debt (recall Box 2).

After obtaining results for these two base cases, we tried varying a few assumptions — namely, the discount rate and the policies behind our projected fiscal paths.

The Base Results

Table 3 sets out the base cases. For each currently living generation, it reports the lifetime net tax rate, which is the difference between the lifetime gross tax rate and the lifetime gross transfer rate (the latter, as already noted, includes health care and education spending).

Clearly, both lifetime taxes and lifetime transfers have trended upward over time, pushing up the lifetime net burden on successive age cohorts.

Thus, both projection scenarios estimate lifetime net tax rates for younger generations higher than those faced by older cohorts. In the debt-reduction case, a person born in 1910 can expect to pay 31 percent of his or her labor earnings in net taxes, while someone born in 1995 can expect to pay 38 percent. In other words, younger generations are paying a higher portion of their lifetime earnings in net taxes than generations born earlier.

Where the two scenarios differ most is in what happens to future age cohorts (those

Table 3: ***Lifetime Net Tax Rates for Living and Future Age Groups, Base Cases***

Age Group's Year of Birth	Debt-Reduction Scenario			Spending-Hike Scenario		
	Net Tax Rate	Gross Tax Rate	Gross Transfer Rate	Net Tax Rate	Gross Tax Rate	Gross Transfer Rate
	(percentage of lifetime income)					
1910	31.2	45.5	14.3	31.2	45.5	14.3
1920	31.1	49.7	18.6	30.9	49.7	18.8
1930	31.2	51.3	20.0	30.8	51.3	20.5
1940	32.3	52.9	20.6	31.5	53.0	21.6
1950	34.4	55.2	20.8	33.2	55.6	22.4
1960	34.5	57.9	23.3	33.1	58.7	25.6
1970	35.6	61.4	25.8	33.9	63.1	29.2
1980	36.2	63.3	27.1	34.0	66.0	32.0
1990	37.1	63.8	26.8	34.0	67.1	33.1
1995	38.0	63.9	25.9	34.1	67.2	33.2
Future ages	38.2			55.0		

Note: Discrepancies in the addition of some rows are because of rounding.
Source: Authors' calculations using data and methodology described in the text.

born after 1995 and identified in the table as "future ages"). In the debt-reduction scenario, imposing on them a lifetime net tax rate about the same as that for newborns (approximately 38 percent) is enough to satisfy the government's long-run budget constraint. Hence, a policy in which surpluses are used to pay down the debt ensures no higher net tax burden on those born in the future.

The situation is quite different for the spending-hike scenario. Gross transfer rates for currently living age groups born after 1920 are higher in this scenario than in the debt-reduction case. These generations gain from the greater spending on programs. Most of the benefits go to those born after 1980. For example, lifetime net tax rates for newborns in 1995 fall from 38 percent in the debt-reduction case to 34 percent in the spending-hike case.

As noted earlier, any gain to one generation must be offset by an equivalent loss to another. This mathematical truism is reflected in the huge jump in lifetime net tax rates for future generations in the spending-hike scenario. As expenditures increase for living generations, greater net payments from future age groups are needed to meet the government's budget constraint. Lifetime net tax rates have to rise to 55 percent.

We are not saying such a discrete jump in net taxes will occur. Rather, the expenditure increases implemented under the projections of the spending-hike scenario eventually will have to be eliminated or higher taxes will be needed later on.

Suppose government does not react to reverse the imbalance of the spending-hike case until 2015, around the time when budgetary deficits reappear. We estimate that, to equalize net lifetime tax rates then, personal income taxes must rise by 25 percent or government purchases must fall by 36 percent (see Table 4).

The tax increase affects mainly the lifetime net tax rates of the young. Net lifetime tax rates are equalized at 40 percent (about two percentage points higher than they are under the debt-reduction scenario — see Table 3). Older age groups are largely unaffected since many are near or past retirement by 2015 and have al-

Table 4: ***Lifetime Net Tax Rates for Living and Future Age Groups under the Spending-Hike Scenario and the Possibility of Policy Change in 2015***

Age Group's Year of Birth	Spending-Hike Scenario		
		Policy Change in 2015[a]	
	No Additional Policy	26% Hike in Personal Income Tax	36% Reduction in Government Purchases
	(net taxes as a percentage of lifetime income)		
1910	31.2	31.2	31.2
1920	30.9	30.9	30.9
1930	30.8	30.8	30.8
1940	31.5	31.6	31.5
1950	33.2	33.7	33.2
1960	33.1	34.4	33.1
1970	33.9	36.8	33.9
1980	34.0	38.5	34.0
1990	34.0	40.4	34.0
1995	34.1	40.5	34.1
Future ages	55.0	40.5	34.1

[a] Notice that these cases are sustainable because the policy change equalizes the lifetime net tax rates for the cohort born in 1995 and the cohorts born afterward.

Source: Authors' calculations using data and methodology described in the text.

ready paid taxes under the unsustainable policy for most of their lives.

Different Discount Rates

In the cases we have discussed so far, we used a 5 percent discount rate to convert age-specific per capita amounts into present values. At this discount rate, the debt-reduction scenario leads to net lifetime tax rates for newborns and for future generations that are roughly the same — about 38 percent.

What is the effect of using a different rate? It depends on the time profiles of spending and net payments. Most generational accounting studies find that a lower discount rate tends to decrease the level of fiscal imbalance while a higher rate raises it.

We tried both raising and lowering the discount rate for the debt-reduction scenario (Table 5). With a discount factor of 2.5 percent, lifetime net tax rates are lower than in our base case; so is the projected fiscal imbalance. Net tax rates for newborns in 1995 average almost 35 percent of lifetime income, while future age groups have to face rates of 33 percent for a sustainable policy.

With a higher discount factor of 7.5 percent, net tax rates for newborns are almost 36 percent while future generations face rates of nearly 40 percent.

All three cases show a rising trend in net lifetime tax rates for the currently living and suggest that this projected fiscal policy is approximately sustainable.

Alternative Projections

Generational accounting's results follow logically from the projections and assumptions used. Having used the spending-hike and debt-reduction projections for our base cases, we tried two alternative projections to examine what net lifetime tax rates could look like under different circumstances.

Table 5: ***Sensitivity Analysis of Lifetime Net Tax Rates to Alternative Discount Rates***
(debt-reduction scenario plus a 2 percent increase in income taxes)

Age Group's Year of Birth	Discount Rate		
	2.5%	5.0%	7.5%
	(net taxes as a percentage of lifetime income)		
1910	27.3	31.2	30.9
1920	25.5	31.1	31.9
1930	25.7	31.2	32.2
1940	27.6	32.3	32.7
1950	31.1	34.4	34.0
1960	32.3	34.5	32.8
1970	33.3	35.6	32.9
1980	33.6	36.2	33.1
1990	34.3	37.1	34.2
1995	34.7	38.0	35.9
Future ages	33.1	38.2	39.6

Source: Authors' calculations using data and methodology described in the text.

A Tax Cut

Our first alternative projection, shown in Table 6, starts out like the spending-hike scenario except that the relevant portion of the projected surplus is given out in personal income tax cuts. Consequently, net lifetime tax rates are lower for younger generations. The cohort born in 1980 averages a net lifetime rate of 31 percent of lifetime income, compared with more than 33 percent in the debt-reduction case. For individuals born in 1995, net lifetime tax rates drop to less than 30 percent.

But like the spending-hike scenario, the tax-cut case is unsustainable in that fiscal policy will have to be tightened later on. To satisfy the government's long-run budget constraint, net lifetime tax rates for future generations have to rise to 46 percent.

The difference in the results of the two scenarios is influenced by the way the generational accounts are estimated. Part of the expenditure increases in the spending-hike case are from government purchases, which are not reflected in net lifetime tax rates. Those rates are higher for older age groups in the tax-cut scenario because these cohorts receive fewer transfers. Rates are lower for younger age groups because higher government purchases are included in the calculations of fiscal sustainability but not in determining the actual rates.

Our Earlier Projections

In an earlier paper,[18] we used a set of projections for taxes and expenditures that differ from that of the PEAP model but are similar in content.

Beginning in 1996, most real per capita amounts of taxes and transfers are increased by 1 percent per year, keeping in step with productivity. The exceptions are:

- Real per capita amounts for elder care do not grow over the 1996–2010 period; thereafter, they rise at 0.5 percent (half the growth rate).

Table 6: ***Lifetime Net tax Rates under Some Alternative Fiscal Scenarios, 1995–2050***

Fiscal Projections					Net Lifetime Tax Rates	
Year	Total Tax Revenue	Total Expenditures	Budget Surplus	Net Debt	Age Group's Year of Birth	Net Tax Rate
	(percentage of GDP)					*(net taxes as % of lifetime income)*
			Tax-Cut Scenario			
1995	36.5	37.2	– 4.6	70.1	1910	31.2
2000	35.4	30.3	3.8	58.5	1920	31.1
2005	33.5	29.4	3.3	33.6	1930	31.2
2010	31.3	28.7	2.2	16.1	1940	32.3
2015	29.3	28.2	1.0	6.3	1950	34.1
2020	27.4	27.6	– 0.2	3.2	1960	33.5
2025	27.9	29.4	– 1.4	6.3	1970	32.8
2030	28.5	31.1	– 2.8	15.6	1980	30.9
2035	29.1	32.3	– 3.8	30.3	1990	29.6
2040	29.6	33.1	– 4.5	48.7	1995	29.6
2045	30.0	33.7	– 5.2	69.5		
2050	30.4	34.2	– 5.8	92.3	Future ages	46.2
			Scenario Used by Oreopoulos and Vaillancourt (1998)			
1995	36.5	37.2	– 4.6	70.1	1910	31.2
2000	36.6	32.8	2.4	63.8	1920	30.7
2005	37.3	32.5	3.8	41.6	1930	30.3
2010	36.9	32.5	4.0	18.4	1940	30.5
2015	36.7	33.2	3.5	– 1.6	1950	32.3
2020	36.1	34.0	2.6	– 16.4	1960	32.8
2025	36.7	36.2	1.3	– 25.4	1970	35.0
2030	37.5	38.4	– 0.1	– 27.6	1980	36.7
2035	38.2	39.9	– 1.1	– 23.7	1990	36.7
2040	38.8	41.0	– 1.6	– 16.1	1995	39.2
2045	39.4	41.6	– 2.0	– 6.8		
2050	39.8	42.1	– 2.2	3.6	Future ages	40.1

Sources: For the tax-cut scenario, authors' calculations using data and methodology described in the text. For the second scenario, authors' calculations using projections set out in Philip Oreopoulos and François Vaillancourt, "Applying the Generational Accounting Approach to Canada: Findings and Fallacies" (paper presented at the Statistics Canada conference, Intergenerational Equity in Canada, Ottawa, February 20–24, 1997).

- Child tax benefits do not grow on a real per capita basis.
- The PEAP projections for UI and CPP/QPP contributions are used only until 2005.
- Government purchases are reduced from 1996 to 2001 because of expected reductions in the federal government's transfers to the provinces.

Table 6 sets out the results for this case, which are very similar to those of the debt-reduction scenario. Both policies are approximately sustainable, and both estimate net lifetime tax rates for the young of 38 to 40 percent.

Thinking about the Future

The results from the preceding section suggest that one reason to consider fiscal policy carefully is that whatever is done now will have far-reaching consequences for the lifetime net tax rates of future age cohorts.

Although we argue here that those rates should not be allowed to rise more than they already have, the issue is not straightforward. Indeed, there is no positive justification for one distribution of net lifetime tax rates over another. Any situation that makes one group better off and another worse off requires a judgment call on what is fair.

One criterion for assessing a redistributive policy is the *ability-to-pay principle*: redistribution is desirable if it goes from those who have more to those who have less. Applied across age groups, this criterion would recommend higher net tax burdens for future generations. The reason is that technological progress and economic growth keep raising lifetime real buying power. That of someone born in, say, the current decade is, on average, higher than that of someone born in the 1920s. Similarly, that of the cohort born in 2050 will probably be more than that of the cohort born this year.

Using this logic and the ability-to-pay principle, one might consider budget deficits appropriate because they transfer a portion of a future cohort's higher after-tax income to an earlier-born cohort with lower after-tax income.

Lifetime net tax rates cannot climb forever, however. The larger the future tax bill, the more incentive people will have to find ways to avoid it, thus placing an even larger bill on those who eventually pay — or making government default more likely. Net lifetime tax rates have been rising since 1920. Even under our sustainable debt-reduction scenario, net tax rates for the 1995 cohort and future generations level off at about 38 percent of lifetime income, six or seven percentage points higher than what cohorts born before 1940 pay.

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Another conceivable criterion to judge the equity of the distribution of net tax rates is the benefits principle: a generation should receive benefits only from taxes paid. Redistribution may occur *within* a generation, but none should deliberately take resources from another. Under this criterion, lifetime net tax rates should be roughly constant across all age groups, and no government borrowing is appropriate because it allows some age groups to spend more without having to pay more. (The exception is borrowing that leads to benefits that later age groups will also receive, such as infrastructure and national parks.)

Another reason for restraining net lifetime tax rates from further growth is that these rates were never meant to be so high. No one ever intended to impose a larger and larger net tax burden on future generations. Rather, the high

rates have resulted from a gross miscalculation on the part of governments.

During the program expansion begun in the 1950s, the demographic and economic situation made it seem possible that an ever-greater tax pool could fund financial demands. Fertility rates were high, and economic growth was strong. Unfortunately, the conditions that then prevailed quickly deteriorated. Fertility and productivity rates dropped. The slow periods of growth in the 1980s and early 1990s only made things worse. But the programs were entrenched and popular. Only with a strong public mandate for debt reduction were governments able to restrict their spending. The practice of high deficits had never been intended to impose higher net tax rates on younger and future generations.

Overall, if government intends to prevent higher net tax burdens on future age cohorts, it must follow a policy of debt reduction.

Conclusion

With budget surpluses projected for the next several years, public debate has shifted to what to do with the extra money. One of our key findings in this *Commentary* is that, when policy-makers are considering alternative budget programs, they should take into account the coming demographic effect of the baby boomers' retirement. The effect of the aging of the population will be large yet not much felt until after 2015. If government debt has not been reduced by then, the pressures from higher expenditures could push the debt-to-GDP ratio higher than before.

Using the generational accounting approach, we find that lifetime net taxes, as a portion of lifetime income, have risen for younger generations. A policy that assumes government will increase spending to keep its budget roughly in balance cannot be sustained without imposing substantially higher net tax rates in the future. Thus, by ignoring the long-run impact of the baby boomers' retirement, policy-makers might make the mistake of not anticipating higher future revenue requirements. If government does not want to impose higher net tax rates on future generations, it should focus on a policy of debt reduction.

Notes

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1 Statistics Canada, Population Projections Section, Demography Division, *Population Projections for Canada, Provinces and Territories, 1993–2016, and Population Projections for Canada, 2017–2041*, cat. 91-520-XPB (Ottawa, 1994).

2 Partly because fertility and mortality rates are assumed to be constant after 2018. Thus, the age-group

proportions eventually become unchanging in our projection.

3 For a more detailed discussion of these profiles, see Chantal Hicks, "The Age Distribution of the Tax/Transfer System in Canada," in Miles Corak, ed., *Government Finances and Generational Equity* (Ottawa: Statistics Canada, 1998).

4 For a discussion of the PEAP model, see Peter Dungan, Steve Murphy, and Thomas Wilson, "Outlook for the Canadian Economy: National Projections Through 2020," PEAP Policy Study 97-3 (Toronto: University of Toronto, Institute for Policy Analysis, 1997).

5 Although mostly reported here only through 2050, our projections continue to 2100, using the prevailing assumptions for 2050 and a constant population.

6 The data used in this *Commentary* are on a National Accounts basis, rather than the more familiar Public Accounts basis used in government budgets. The main difference between the two is that the Public Accounts include the unfunded liabilities for public employee pensions and exclude revenues and expenditures for local hospitals and the CPP/QPP. We preferred the National Accounts because we implicitly calculated the unfunded liabilities of all government programs when projecting forward. Including these amounts initially would have meant double counting.

7 Canada, Department of Health, Policy and Consultation Branch, *National Health Expenditures in Canada, 1975–1994* (Ottawa, 1996).

8 Although Ball and Mankiw explain that there is also a zero-sum game between labor and owners of capital. See Laurence N. Ball and Gregory Mankiw, 'What Do Budget Deficits Do?" in *Budget Deficits and Debt: Issues and Options* (Kansas City, MO: Federal Reserve Bank of Kansas City, 1995).

9 Several papers evaluate the procedures and methods behind generational accounting, and a conference held by Statistics Canada in 1997 discussed issues with respect to applying it to Canada. For further reading on the methodology and issues, see Philip Oreopoulos and François Vaillancourt, "Applying the Generational Accounting Approach to Canada: Findings and Fallacies," in Corak, ed., *Government Finances and Generational Equity*; United States, Congress, Congressional Budget Office, *Who Pays and When? An Assessment of Generational Accounting* (Washington, DC, 1995); Peter Diamond, "Generational Accounts and Generational Balance: An Assessment," *National Tax Journal* 49 (4, 1996): 597–607; Robert Haveman, "Should Generational Accounts Replace Public Budgets and Deficits?" *Journal of Economic Perspectives* 8 (1, 1994): 95–111; and Alan J. Auerbach, Jagadeesh Gokhale, and Laurence J. Kotlikoff, "Generational Accounting: A Meaningful Way to Evaluate Fiscal Policy," *Journal of Economic Perspectives* 8 (1, 1994): 73–94.

10 See Hans Fehr and Laurence J. Kotlikoff, "Generational Accounting in General Equillibrium," NBER Working Paper 5090 (Cambridge, Mass.: National Bureau of Economic Research, 1995); and Frédéric Docquier, Philippe Liégeois, and Jean-Philippe Stjins, "Comptabilité générationelle et vieillissement démographique: les enseignements d'un modèle d'équilibre général calculable calibré pour la Belgique" (Brussels, Université Libre de Bruxelles, 1998), mimeo.

11 W. Irwin Gillespie, *Tax, Borrow, and Spend: Financing Federal Spending in Canada, 1867–1990* (Ottawa: Carleton University Press, 1991).

12 The sensitivity of generational accounts under alternative population projections for the United States is examined in Jagadeesh Gokhale, Benjamin R. Page, and John R. Sturrock, "Generational Accounts for the United States: An Update" (Cleveland, Federal Reserve Bank of Cleveland, 1998), mimeo. The variation they report is minimal, and does not alter their conclusions.

13 From Canada, Department of Health, *National Health Expenditures in Canada*; and M.C. Urquhart and K.A.H. Buckley, eds., *Historical Statistics of Canada* (Cambridge; Toronto: Cambridge University Press and Macmillan of Canada, 1965).

14 Urquhart and Buckley, eds., *Historical Statistics of Canada*; and Gillespie, *Tax, Borrow, and Spend*.

15 For a description of the SPSD/M, see Michael Bordt et al., "The Social Policy Simulation Database and Model: An Integrated Tool for Tax/Transfer Analysis," *Canadian Tax Journal* 38 (1, 1998): 48–65.

16 Canada, Department of National Revenue, *Tax Statistics on Individuals*, various years.

17 See Canada, Dominion Bureau of Statistics, *Benefit Period Established and Terminated under the Unemployment Insurance Act*, cat. 73-201, various years and tables (for example, table 8 in the 1942 edition).

18 Oreopoulos and Vaillancourt, "Applying the Generational Accounting Approach to Canada."

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