



A Macdonald-Laurier Institute Publication

Canada's Looming Fiscal Squeeze **UPDATED**

The oldest babyboomers reach 65 this year.

In order to avoid a return to the high-debt situation of the mid 1990s, Canadians and their governments must soon begin thinking in a systematic and critical way about their long-term fiscal priorities.

By Christopher Ragan

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TABLE OF CONTENTS

Executive Summary	2
Sommaire	5
Introduction	8
Some Basic Demographic Projections	9
Declining Fertility, Rising Life Expectancy	9
The Inevitable Aging of the Population.....	10
Declining Labour Force Participation	11
Declining Growth of Material Living Standards	13
The Looming Fiscal Squeeze	15
Slowing Tax Revenues	15
Accelerating Age-Related Spending.....	16
Two Illustrations of the Fiscal Squeeze.....	19
The Dynamics of Debt	21
A Return to the Debt Wall?.....	22
Federal-Provincial Tensions.....	23
Non-Fiscal Solutions to the Fiscal Squeeze?	24
Increasing Immigration	24
Increasing Labour Force Participation.....	25
Increasing Fertility Rates	26
Restraining the Growth of Healthcare Spending.....	27
Faster Productivity Growth.....	28
An Inconvenient Truth	28
Difficult Fiscal Choices	29
The Challenges of Fiscal Adjustment	30
Intergenerational Equity.....	31
Final Remarks	31
References	33

Executive Summary

This paper assembles a collection of increasingly familiar demographic projections and draws the not-so-familiar implications for the fiscal challenges to be faced by future Canadian governments. The emphasis is on the rising share of national income to be devoted to publicly provided healthcare and seniors' benefits, and the increase in public debt that will occur if future governments do not adjust their spending programs or tax rates. The paper concludes that in order to avoid a return to the high-debt situation of the mid 1990s, Canadians and their governments must soon begin thinking in a systematic and critical way about their long-term fiscal priorities.

For the next twenty years there will be an inexorable decline in the working-age share of the population.

During the baby boom that followed the Second World War, the average fertility rate in Canada was 3.6 children per woman. Partly due to the increase in women participating in the Canadian labour force, Canada's fertility rate dropped to 1.7 children per women by 2007. This change in the fertility rate is expected to continue to slow the population growth rate. Thanks to healthier lifestyles and improved technology, the average life expectancy of a Canadian has risen from 68.5 years in 1951 to 80.5 years in 2006. The combination of fewer younger people entering the population and the current population living longer will act together to increase the average Canadian's age over the next few decades.

The aging of the baby boom resulted in a significant increase in the working-age share of the population, from 58 percent in 1962 to about 69 percent in the early 1980s. The youngest baby boomers came of age in the early 1980s, and in the subsequent three decades there were no significant changes in the working-age share of the population. But the oldest baby boomers reach 65 in 2011, and so for the next twenty years there will be an inexorable decline in the working-age share of the population, a decline that roughly mirrors the increase from thirty years earlier.

With the ongoing aging of Canada's baby-boom generation, a growing fraction of the population will fall into these older age categories, thus reducing the economy's overall labour force participation rate. The overall participation rate is projected to decline from over 67 percent today to below 61 percent by 2040, even with the assumption that age-specific participation rates increase by up to 4 percentage points between now and 2030, and remain constant thereafter.

The falling labour force participation rate will cause a decline in the future growth rate of average living standards, as measured by real per capita GDP, leading to two policy conclusions. First, productivity growth is likely to account for more than 100 percent of growth in real per capita GDP over the next few decades, meaning that Canadians and their governments must take seriously the issue of increasing productivity. Second, the reduction in the labour force participation rate taken by itself will reduce the growth rate of real per capita GDP (for any assumed productivity growth rate) and thus reduce the growth rate of Canadian governments' per capita tax base.



The aging of the Canadian population will force Canadian governments to face a significant two-part fiscal challenge. First, the aging of the population will lead to a slowing of national income, the primary tax base for governments, thus slowing tax revenues. Second, key Canadian public spending programs will become more costly as a share of GDP, especially those providing healthcare and income support for the elderly, even as the tax base slows considerably. Confronting this fiscal challenge will likely create political tensions between provincial and federal governments and will force governments at all levels to make some difficult fiscal decisions.

Confronted with spending demands that rise faster than tax revenues, future Canadian governments will be faced with three broad choices. First, they can attempt to reduce the growth rate of overall spending. Second, they can attempt to increase the growth rate of revenues through increases in tax rates. Finally, they can choose to increase their public borrowing. Of course, the third option is not a permanent solution since the debt eventually needs to be repaid and such repayment ultimately requires a command over resources, which in turn requires either spending reductions or increases in tax revenues. In the hypothetical situation in which future governments do not make any adjustments in spending or taxation but instead merely increase their borrowing, Canada's net public debt is projected to increase by between 25 and 50 percentage points of GDP by 2040.

The net public debt-to-GDP ratio was approximately 92 percent in 1996, and Canada was then seen by the International Monetary Fund (IMF) and others as having a serious fiscal problem. The failure to tackle the problem very soon would mean hitting the “debt wall”, with implications for declining access to global capital markets and rising domestic interest rates, just as we are now seeing in some European countries. The federal and provincial governments embarked on programs of significant fiscal consolidation. These actions, which quickly turned large annual budget deficits into modest budget surpluses, combined with a healthy economic recovery to produce a rapidly declining debt-to-GDP ratio. By the beginning of the 2008-09 financial crisis, the overall debt ratio was 37 percent of GDP, and as of the fall of 2011, it appears that most Canadian governments are on paths back to budget balance. Policy decisions must be carefully examined with avoidance of the “debt wall” in mind.

Productivity growth is likely to account for more than 100 percent of growth in real per capita GDP over the next few decades.

We address five non-fiscal solutions to the fiscal squeeze: increasing the immigration rate, increasing the retirement age, increasing the fertility rate, restraining the growth of healthcare spending, and increasing the growth rate of productivity. Immigrants also age over time, leading to eventual lower labour force participation and higher demands on public programs, and the immigration rate would have to at least double in order to merely continue the 2008 rate of growth of the Canadian labour force. This is politically unfeasible. Even an aggressive increase in the retirement age could not offset the impact of the large numbers of aging baby-boomers, who will inevitably drop out of the labour force and continue to require more healthcare. The fertility rate likely could not be raised from the current level of 1.7 children per woman to a level that would make a significant difference, and the programs required to marginally increase fertility would be prohibitively expensive. Restraining the growth of healthcare spending may be possible, but given the magnitude of the underlying demographic forces Canadian governments must recognize that even in an optimistic view of the future, there will be a significant increase in the share of national income devoted to public healthcare spending. Finally, faster productivity growth cannot be easily engineered by policy and would only help to lessen the fiscal squeeze if policy actions could somehow prevent the faster income growth from creating a similar expansion in the number or generosity of public spending programs.

The inconvenient truth that Canadians and their governments must face is that the demographic forces in play and the fiscal implications that follow are so large that governments will need to respond by making fundamental adjustments to their fiscal frameworks. As is always the case, the simple arithmetic of

government budgets implies that there are only two broad fiscal choices available to address the coming fiscal squeeze: spending programs can be reduced or eliminated or taxes can be increased. There is nothing else.

Government spending can be restrained in many ways, with some programs being reduced in scope while others are eliminated altogether. But such cuts are politically very difficult; one needs only to glance at the highly charged political debates going on in the United States and Europe to be reminded about how unpopular it is to consider reductions in public spending, especially if the cuts fall on important social programs. Governments also have many choices when it comes to raising tax revenues, including personal and corporate income taxes, expenditure and sales taxes, and product-specific excise taxes. Apart from the general unpopularity of higher taxes, an important choice would need to be made concerning which taxes would be raised and by how much.

There are only two broad fiscal choices available: spending programs can be reduced or eliminated or taxes can be increased. There is nothing else.

Since government debt is often incurred to provide current goods and services, but is serviced and repaid in the distant future, public debt usually involves a redistribution of income away from future generations toward current generations. In general, the more the policy changes are delayed through time, the more debt will be incurred before those adjustments take place and thus the more the burden of the fiscal adjustment will ultimately fall on Canadians who are currently young. Conversely, the more immediate are the changes in spending and taxation, the less debt will be incurred and thus the more the overall burden of adjustment will fall on the same

baby boomers whose aging is the fundamental cause of the looming fiscal squeeze. Which generation pays for the rising age-related expenditures of the baby boomers will be determined by the fiscal policy choices Canadian governments make in the coming years.

The government machine built over the past half-century was constructed during a time when the demographic forces were very advantageous: a young and fast-growing population. The implications were rapidly advancing living standards and the ability to easily fund many government programs. But as the oldest baby boomers reach 65 this year, and these demographic forces move into reverse for the next three decades, there will be a need to adjust this machine of government. The adjustment can occur primarily on the spending side or primarily on the revenue side – or indeed can occur on both. But some adjustment will be necessary. There will be a Canadian tendency for this debate about overall fiscal priorities to become focused on the division of fiscal capacity between different levels of government. A focus on the “fiscal imbalance” rather than the more general “fiscal squeeze” should be avoided as it will both cloud the central issues and needlessly politicize a debate that will in any event be fraught with difficult decisions. Canadians and their governments at all levels need to recognize that addressing Canada’s looming fiscal squeeze will require a careful and transparent examination of our fiscal priorities.



Sommaire

La présente étude rassemble une série de projections démographiques de plus en plus reconnues et acceptées et en tire des conclusions qui sont moins familières en ce qui a trait aux défis budgétaires auxquels seront confrontés les gouvernements canadiens dans l'avenir. L'analyse se concentre sur la portion grandissante du revenu national qui sera consacrée aux soins de santé fournis par le réseau public et aux prestations pour les personnes âgées, ainsi que sur l'augmentation de la dette publique qui sera encourue si les gouvernements n'ajustent pas leurs programmes de dépenses ou leurs taux d'imposition. L'étude conclut que dans le but d'éviter un retour à la situation d'endettement élevée du milieu des années 1990, les Canadiens et leurs gouvernements doivent commencer à réfléchir rapidement et de façon systématique et critique à leurs priorités financières à long terme.

Durant les années de baby boom qui ont suivi la Seconde Guerre mondiale, le taux moyen de fertilité au Canada était de 3,6 enfants par femme. En partie à cause de l'arrivée d'un nombre plus élevé de femmes sur le marché du travail, le taux de fertilité avait chuté à 1,7 enfant par femme en 2007. On s'attend à ce que cette évolution du taux de fertilité continue d'entraîner un ralentissement du taux de croissance de la population. Grâce à un mode de vie plus sain et à des technologies plus avancées, l'espérance de vie moyenne des Canadiens est passée de 68,5 années en 1951 à 80,5 années en 2006. L'effet combiné d'un plus petit nombre de jeunes et d'une population qui vit plus longtemps entraînera une augmentation de l'âge moyen des Canadiens au cours des prochaines décennies.

L'arrivée à l'âge adulte des boomers a eu pour conséquence une augmentation significative de la portion de la population en âge de travailler, de 58 % en 1962 à 69 % au début des années 1980. Les plus jeunes boomers sont devenus adultes au début des années 1980 et durant les trois décennies subséquentes, il n'y a pas eu de changement significatif dans la portion de la population en âge de travailler. Les plus vieux boomers ont toutefois eu 65 ans en 2011 et au cours des vingt prochaines années, on assistera à un déclin inexorable dans la portion en âge de travailler de la population, un déclin qui correspondra en gros à l'augmentation d'il y a trente ans.

Compte tenu du vieillissement en cours de la génération des boomers, une fraction de plus en plus large de la population va se retrouver dans cette catégorie des personnes âgées, ce qui réduira d'autant le taux global d'activité sur le marché du travail. Il est prévu que le taux global d'activité passe de 67 % aujourd'hui à moins de 61 % en 2040, même en présumant que les taux de participation de certains groupes d'âge spécifiques augmentent de 4 % entre maintenant et 2030 et qu'ils restent stables par la suite.

Le taux d'activité en baisse entraînera une diminution du taux de croissance du niveau de vie moyen, tel que mesuré par le PIB réel par habitant, ce qui mène à deux conclusions sur le plan des politiques publiques. Premièrement, la croissance de la productivité devrait compter pour plus de 100 % de la croissance du PIB réel par habitant au cours des prochaines décennies, ce qui signifie que les Canadiens et leurs gouvernements doivent prendre au sérieux la problématique de la productivité. Deuxièmement, la diminution du taux d'activité aura en soi pour conséquence de réduire le taux de croissance du PIB réel par habitant (quel que soit le taux présumé de croissance de la productivité) et donc de réduire le taux de croissance de l'assiette fiscale par habitant des gouvernements canadiens.

Le vieillissement de la population canadienne forcera les gouvernements à s'attaquer à deux défis reliés significatifs sur le plan financier. Tout d'abord, le vieillissement de la population entraînera un ralentissement

Au cours des vingt prochaines années, on assistera à un déclin inexorable dans la portion en âge de travailler de la population.

de l'augmentation du revenu national, qui constitue le fondement de l'assiette fiscale des gouvernements, réduisant donc d'autant les recettes fiscales. Ensuite, certains programmes de dépenses très importants deviendront plus coûteux en termes de proportion du PIB, en particulier ceux qui fournissent des soins de santé et un soutien au revenu des personnes âgées, et cela en même temps que l'assiette fiscale croît beaucoup moins vite. Relever ce défi financier créera probablement des tensions politiques entre les gouvernements fédéral et provinciaux et forcera les gouvernements à tous les niveaux à faire des choix budgétaires difficiles.

Devant une telle situation où les besoins sur le plan des dépenses augmenteront plus vite que les recettes fiscales, les gouvernements auront en gros trois choix. Premièrement, ils pourront tenter de réduire le rythme de croissance des dépenses globales. Deuxièmement, ils pourront essayer d'accroître le taux de croissance des recettes fiscales en augmentant les taux d'imposition. Enfin, ils pourront choisir d'augmenter les emprunts

publics. La troisième solution n'est bien sûr pas une solution permanente puisque la dette doit à un certain moment être remboursée et que ces remboursements nécessitent d'y affecter des ressources, ce qui à son tour implique soit des réductions de dépenses, soit des augmentations de recettes fiscales. Dans la situation hypothétique où les gouvernements choisiraient de ne faire aucun ajustement à leurs dépenses ou leurs recettes et se contenteraient d'emprunter davantage, on prévoit que la dette nette publique du Canada augmente de 25 à 50 points de pourcentage du PIB d'ici 2040.

La croissance de la productivité devrait compter pour plus de 100 % de la croissance du PIB réel par habitant au cours des prochaines décennies.

Le ratio de la dette publique nette par rapport au PIB était d'environ 92 % en 1996 et le Canada était alors considéré par le Fonds monétaire international (FMI) et par d'autres acteurs comme un pays ayant de sérieux problèmes financiers. Il aurait frappé le « mur de la dette » s'il ne s'était pas rapidement attaqué à ce problème, ce qui aurait remis en question son accès aux marchés internationaux de capitaux et aurait

entraîné à la hausse les taux d'intérêt, comme on l'observe en ce moment dans certains pays européens. Les gouvernements fédéral et provinciaux ont à ce moment entrepris de consolider leur situation financière. Ces efforts, qui ont rapidement transformé d'importants déficits budgétaires annuels en modestes surplus, combinés à une reprise économique forte, ont permis de diminuer rapidement le ratio de la dette au PIB. Au début de la crise financière de 2008-2009, ce ratio était de 37 %, et il semble que la plupart des gouvernements au Canada soient à l'automne 2011 sur la voie d'un retour à l'équilibre budgétaire. Il faut soupeser avec beaucoup de précaution les décisions à prendre sur le plan des politiques publiques en gardant à l'esprit la nécessité d'éviter ce « mur de la dette ».

Nous analysons cinq solutions de nature non fiscale aux contraintes fiscales à venir : accroître le niveau d'immigration, relever l'âge de la retraite, accroître le taux de fertilité, contenir la croissance des dépenses en santé et accroître le taux de croissance de la productivité.

Les immigrants vieillissent eux aussi, ce qui mène à un taux réduit d'activité sur le marché du travail et à des pressions plus fortes sur les programmes sociaux. Le niveau d'immigration devrait minimalement doubler pour qu'on maintienne simplement le taux de croissance de la population active canadienne observée en 2008. Cela est politiquement impossible. Même un relèvement important de l'âge de la retraite ne pourrait contrebalancer l'effet du vieillissement d'une cohorte nombreuse de boomers, qui finiront inévitablement par quitter la population active et par exiger plus de soins de santé. Il est peu probable qu'on puisse faire remonter le taux de fertilité de son niveau actuel de 1,7 enfant par femme à un niveau qui ferait une véritable différence, et les programmes nécessaires pour augmenter la fertilité même de façon marginale coûteraient excessivement cher. Il pourrait être possible de contenir les dépenses en santé, mais compte tenu de l'ampleur des forces démographiques sous-jacentes, les gouvernements canadiens doivent reconnaître que même dans un scénario optimiste, la part du revenu national consacrée aux dépenses publiques en santé augmentera de manière significative. Enfin, on ne peut susciter une plus forte croissance de la productivité simplement par l'adoption

de certaines politiques et cela ne contribuerait à réduire les contraintes fiscales que si l'on réussissait à empêcher la plus forte croissance du revenu d'entraîner une expansion parallèle dans la générosité des programmes gouvernementaux.

La situation dérangeante à laquelle les Canadiens et leurs gouvernements doivent faire face est que les forces démographiques en présence et leurs conséquences financières sont tellement considérables que les gouvernements devront y répondre en procédant à des ajustements fondamentaux à leurs cadres financiers. Comme c'est toujours le cas, la simple arithmétique des budgets gouvernementaux implique qu'il n'y a que deux grands choix disponibles permettant de régler la crise financière qui s'en vient : on peut soit réduire ou éliminer des programmes de dépenses, soit augmenter les impôts. Il n'y a pas d'autres avenues.

Les dépenses publiques peuvent être contenues de plusieurs façons, en diminuant l'ampleur de certains programmes et en abolissant carrément d'autres. De telles compressions sont toutefois très difficiles politiquement; il suffit de jeter un coup d'œil aux débats très politiquement chargés qui ont lieu aux États-Unis et en Europe pour se voir rappeler à quel point les réductions de dépenses publiques peuvent être impopulaires, surtout si ces compressions touchent des programmes sociaux. Les gouvernements ont aussi plusieurs choix en ce qui a trait aux hausses d'impôt, y compris les impôts sur les revenus des particuliers et des sociétés, les taxes de vente et les taxes d'accise sur des produits spécifiques. Outre le fait qu'augmenter les taxes et impôts est une décision impopulaire, il reste un choix important à faire entre ces différentes taxes et en ce qui a trait à l'ampleur de la hausse.

Dans la mesure où les dettes publiques servent souvent à fournir des biens et services courants, mais qu'elles sont remboursées dans un avenir lointain, elles impliquent habituellement une redistribution des revenus des générations futures vers les générations présentes. En général, plus on reporte à plus tard un changement de politique, plus on accumulera de dettes avant que ces ajustements surviennent et par conséquent plus le fardeau de l'ajustement financier sera en bout de ligne porté par les générations de Canadiens qui sont aujourd'hui dans leur jeune âge. Inversement, plus on ajuste rapidement les dépenses et les niveaux d'imposition, moins on aura recours à l'endettement et plus le fardeau de l'ajustement financier sera porté par les boomers dont le vieillissement est la cause fondamentale de la crise des finances publiques qui s'en vient. Les choix de politiques budgétaires que les gouvernements canadiens feront dans les années qui viennent détermineront quelles seront les générations qui paieront pour les dépenses croissantes au profit des boomers vieillissants.

La machine gouvernementale mise en place au cours du dernier demi-siècle l'a été à une époque où les forces démographiques étaient très favorables : la population était jeune et augmentait rapidement. Cela a permis de garantir une hausse rapide des niveaux de vie et un financement facile de nombreux programmes étatiques. Maintenant que les plus vieux boomers atteignent l'âge de la retraite et qu'on assiste à un renversement de ces forces démographiques pour les trois décennies à venir, il devient nécessaire d'ajuster cette machine gouvernementale. L'ajustement peut se produire principalement du côté des dépenses ou principalement du côté des recettes – ou des deux côtés. Mais d'une façon ou d'une autre, il faudra procéder à un certain ajustement. On assistera sans doute à un autre épisode de la manie canadienne de transformer un débat sur les priorités financières en débat sur la division de la capacité fiscale entre les différents ordres de gouvernement. Il faudrait éviter de transformer ce débat sur les contraintes financières en débat sur le « déséquilibre fiscal », puisque cela embrouillera les questions fondamentales et politisera inutilement un débat qui nécessitera de toute façon des décisions difficiles. Les Canadiens et leurs gouvernements à tous les niveaux doivent reconnaître qu'ils devront examiner attentivement et de façon transparentes leurs priorités budgétaires pour trouver des solutions à la crise financière qui s'en vient.

Il n'y a que deux grands choix disponibles : on peut soit réduire ou éliminer des programmes de dépenses, soit augmenter les impôts. Il n'y a pas d'autres avenues.

Introduction

Like many developed countries, Canada will face a significant fiscal challenge in the coming decades that has little to do with the most recent global financial crisis and recession. A large part of this challenge is the gradual but significant increase in the share of national income that will be devoted to public spending on healthcare. In turn, this increase will be driven by two separate forces: the continual development of new and expensive medical and pharmaceutical technologies, and the aging of Canada's large baby-boom generation. Population aging will also lead to a decline in the labour force participation rate and an associated decline in the growth rate of national income; as a result, governments' tax bases will grow more slowly in the future than they have in the past.

The acceleration of public spending on age-related programs and the slowing of tax revenues is Canada's looming "fiscal squeeze".

This combination of forces – the acceleration of public spending on age-related programs and the slowing of tax revenues – is Canada's looming "fiscal squeeze". It will force governments at all levels to make difficult fiscal decisions, choosing among reductions in expenditure programs, increases in tax rates, and higher budget deficits. Canadians and their governments need to recognize the scope and inevitability of this fiscal squeeze and begin discussing and debating various policy responses.

This paper has three objectives. The first is to explain the source and magnitude of Canada's looming fiscal squeeze. Despite what is heard in the popular press about rising healthcare spending and the aging of Canada's population, most Canadians are likely unaware of the overall magnitude of the associated fiscal challenge. Section 2 outlines the key demographic forces at play while Section 3 shows how these forces are projected to cause a significant fiscal squeeze over the next few decades.

The second objective is to examine the inevitability of this fiscal squeeze. Many Canadians appear to believe that dealing with the challenges of Canada's aging population is as simple as increasing the inflow of immigration, raising the retirement age, increasing Canada's fertility rate, or introducing efficiencies to slow the growth rate of healthcare spending. Section 4 briefly examines these options and argues that, while working in the right directions, these policy options are insufficient to address the magnitude of the coming demographic forces.

The third objective is to discuss in broad terms the difficult fiscal decisions that future Canadian governments will need to make. Section 5 begins by putting the fiscal squeeze in recent historical context and shows that the projected increase in total government spending as a share of GDP is well within our recent experience. The problem is not so much the level of overall spending but rather the projected gap between spending and tax revenues. Significant fiscal adjustments will thus be necessary if we are to avoid high levels of government indebtedness. We discuss the general difficulties of making such adjustments, including the associated intergenerational redistribution of income associated with alternative fiscal approaches. Section 6 offers some concluding remarks.

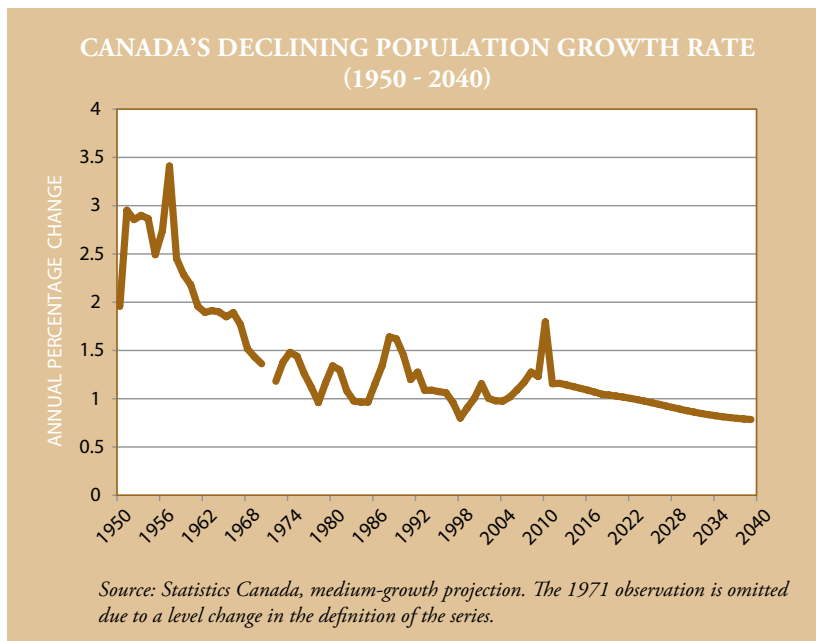
Some Basic Demographic Projections

During any given year, a country's total population will increase if the number of births plus net immigration exceeds the number of deaths. Any isolated change in the birth rate, the net immigration rate or the death rate tells us not only how the population will grow but also, depending on which rate is changing and by how much, how the average age of the population will change. In particular, changes in the birth rate have a clear effect on the population's average age. An isolated and sustained increase in a country's birth rate will not only increase the population growth rate but, since people are always born at age zero, it must also decrease the average age of the population. Conversely, and more importantly for Canada's future, a sustained decrease in the birth rate reduces the population growth rate and increases the average age of the population. Here we focus on the changing age structure of the Canadian population and the roles played by declining fertility and rising life expectancy.

Declining Fertility, Rising Life Expectancy

As Figure 1 shows, Canada's population growth rate has been declining significantly for the past sixty years. In the two decades immediately following the Second World War, Canada experienced a significant baby boom, when the average fertility rate in Canada was 3.6 children per woman. In subsequent decades, however, the birth rate in Canada declined significantly. By 2007, Canada's fertility rate had dropped to about 1.7 children per woman (OECD 2010).

Figure 1



Canada's population growth rate has been declining significantly for the past sixty years.

Figure 1 also shows that under Statistics Canada's medium-growth projection, Canada's population growth rate is projected to decline gradually over the next few decades, driven mostly by the stability of the fertility rate at its current low level.¹ For a developed country like Canada, a stable population without immigration

¹ The medium-growth projection is based on the following assumptions: the fertility rate remaining constant at 1.7; life expectancy reaching 84.0 years for males and 87.3 years for females by 2036; and a constant national immigration rate of 0.75 percent of the population.

requires a “replacement rate” of about 2.1, so with a fertility rate of 1.7 net immigration is necessary to sustain positive population growth. Yet even if Canada’s fertility rate were to rise modestly over the near future, there would still be a need to deal with the implications of the aging of the baby-boom generation. No realistic increase in the future fertility rate could offset the effects of the large decline in fertility that has occurred since the early 1960s.

No realistic increase in future fertility could offset the large decline that has occurred since the early 1960s.

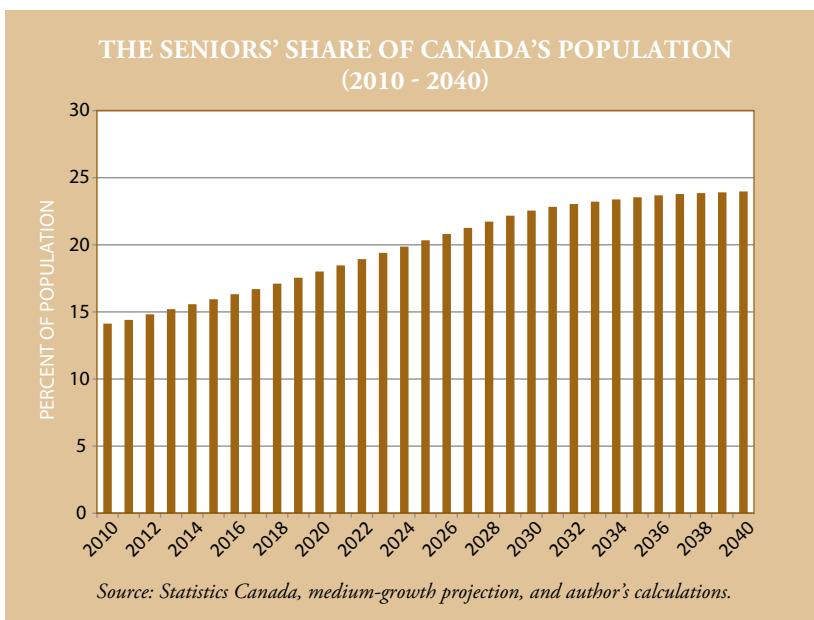
Over the same post-war period, there has been a gradual increase in Canadians’ life expectancy. In 1951, the average newborn Canadian boy was expected to live for 66 years, and the average newborn Canadian girl was expected to live for 71 years. By 2006 life expectancy had increased to 78 years for a boy and 83 years for a girl.²

The Inevitable Aging of the Population

With these two key demographic forces at play, it is inevitable that the average age of the Canadian population has been rising. A falling fertility rate implies that fewer *young* people are entering the population, and this effect taken alone tends to increase the average Canadian’s age. Rising life expectancy implies that Canadians are growing older before they die, and this effect also tends to increase the average Canadian’s age. As these two forces continue, they will drive Canada’s population aging over the next several decades.

Figure 2 shows how the fraction of the total Canadian population accounted for by seniors (65 years and over) is projected to increase over the next three decades. This fraction is currently at 14 percent and will rise steadily with the aging of the baby-boom generation. By 2050, when most baby boomers will have died (as even the youngest baby boomers will then be 85-90 years old), the seniors’ fraction is projected to stabilize at roughly 25 percent.

Figure 2

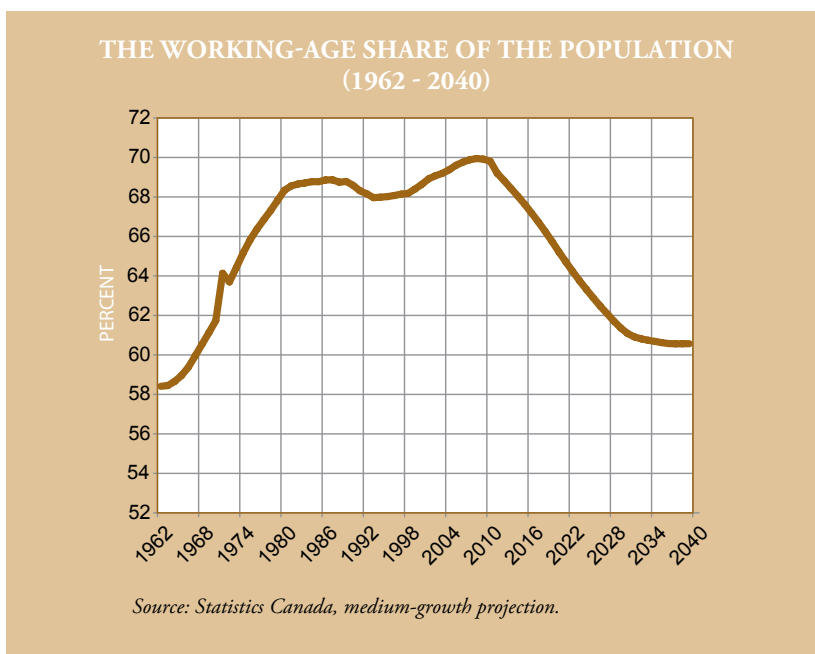


2 Statistics Canada, Table 102-0512.

Another way to see the changing age structure of Canada’s population is to consider the share of the total population that is of the typical working age, 15 to 64. Figure 3 shows this share from 1962 to the present day and projected until 2040. The oldest baby boomers were born in 1946 and so “came of age” in the early 1960s. Over the subsequent twenty years, the aging of the baby boom resulted in a significant increase in the working-age share of the population, from 58 percent in 1962 to about 69 percent in the early 1980s. The youngest baby boomers (born in about 1962) came of age in the early 1980s, and in the subsequent three decades there were no significant changes in the working-age share of the population. But the oldest baby boomers reach 65 in 2011, and so for the next twenty years there will be an inexorable decline in the working-age share of the population, a decline that roughly mirrors the increase from thirty years earlier.³

For the next twenty years there will be an inexorable decline in the working-age share of the population.

Figure 3

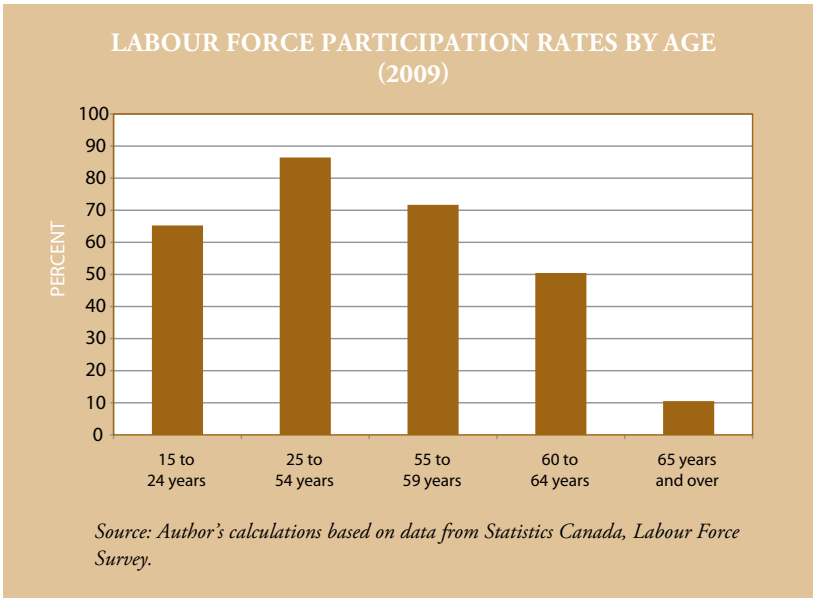


Declining Labour Force Participation

Any individual must decide whether to join or remain outside the labour force, and such decisions vary considerably by age. In the aggregate, labour force participation rates among Canadians between the ages of 55 and 64 are well below those for Canadians between the ages of 25 and 54, as Figure 4 shows for 2009 data. Participation rates for people 65 years and over are much lower still.

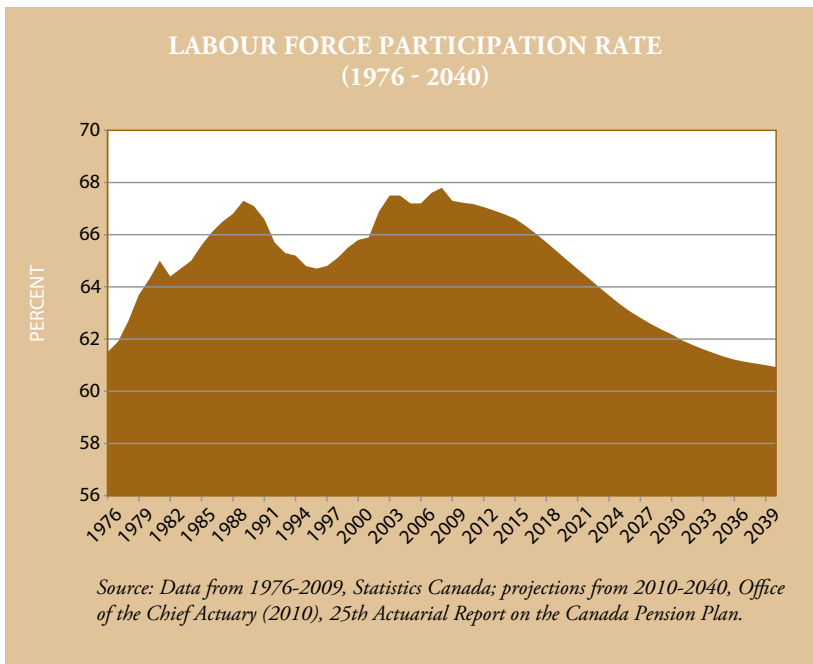
³ Since Figure 3 does not show the result of a labour force participation decision, we can be quite confident about the longer term projections. There is obviously great uncertainty regarding when any specific individual will die, but the law of large numbers ensures that the aggregate death rate at each age can be projected with considerable precision.

Figure 4



With the ongoing aging of Canada's baby-boom generation, a growing fraction of the population will reside in these older age categories, thus reducing the economy's overall labour force participation rate. Figure 5 shows such projections by Canada's Chief Actuary.

Figure 5



The overall participation rate is projected to decline from over 67 percent today to below 61 percent by 2040. Note that these projections *do not* assume that age-specific participation rates are held at their current levels. Rather, the Chief Actuary's projections assume that participation rates, especially for middle-aged Canadians,

increase by up to 4 percentage points between now and 2030, and remain constant thereafter. These assumptions reflect the observation that today's middle-aged Canadians are more attached to the labour force than similarly aged people from earlier generations, and that this pattern is likely to continue for the next twenty years. If these projections were instead based on current age-specific participation rates, the overall labour force participation rate would be projected to decline to about 58 percent by 2040.

Declining Growth of Material Living Standards

The final part of our demographic story is how the falling labour force participation rate will cause a decline in the future growth rate of average living standards, as measured by real per capita income, or gross domestic product (GDP). Using POP to represent the population and GDP/POP to represent average real income per person, we can account for changes in average living standards with the following simple equation:

$$GDP/POP = (GDP/E) \times (E/LF) \times (LF/POP)$$

E and LF could easily be cancelled to yield $GDP/POP = GDP/POP$, an identity. The value of this identity is that it shows, across any two points in time, how changes in the three terms on the right-hand side must be consistent with the overall change in per capita GDP. E is the level of employment, and GDP/E is thus a simple measure of labour productivity. LF is the size of the labour force, and so E/LF is the employment rate (or 1 minus the more familiar unemployment rate). LF/POP is the overall labour force participation rate. In order to determine what is likely to happen to Canada's growth in per capita GDP over the coming decades, we can add together the likely changes in each of the component parts.

From any one year to the next, there is usually an increase in labour productivity (GDP/E) by about 1 percent. With the other components held constant, this productivity growth gradually increases average living standards. It is reasonable to assume that productivity will continue growing in the future, although there is considerable uncertainty about whether its growth rate will rise or fall, and plenty of debate regarding which government policies are best placed to affect that growth rate.

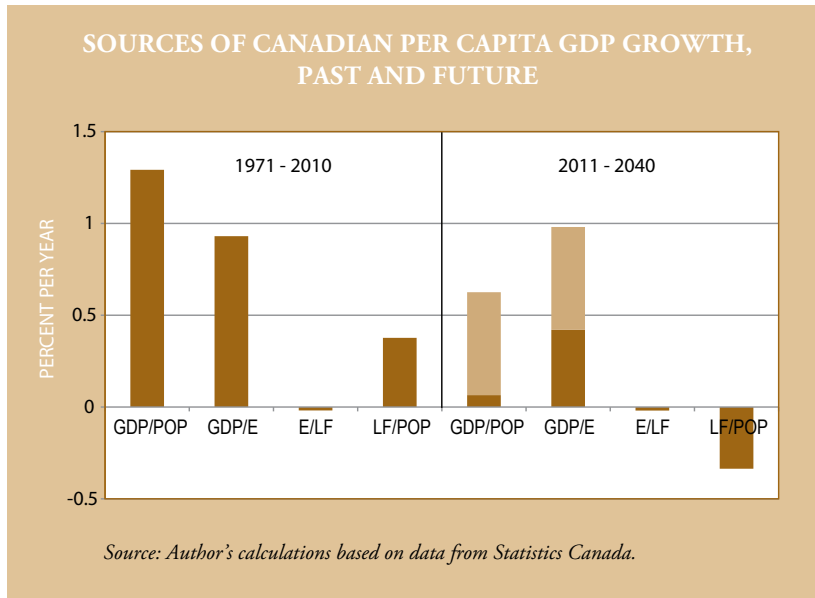
The second component, the fraction of the labour force actually employed (E/LF), fluctuates considerably over the course of the typical business cycle but is remarkably stable over longer periods of time, and thus plays almost no role in determining long-run changes in living standards. This longer-run stability in E/LF reflects the effective functioning of labour markets, where adjustments in real wages provide a tendency for unemployment to (eventually) return to its "natural" rate, often referred to as the NAIRU (for Non-Accelerating Inflation Rate of Unemployment).

The overall labour force participation rate (LF/POP) also fluctuates over the business cycle but in addition it has important long-run trends driven by demographic forces. Abstracting from short-run fluctuations, we see that the projected future decline in the labour force participation rate shown in Figure 5 will drive a reduction in the growth rate of real per capita GDP. Since the early 1960s, the coming-of-age of the baby-boom generation has tended to increase the growth rate of Canadian living standards because it increased the fraction of the overall population that was working and generating income. But the continuing aging and eventual retirement of this same generation will have the opposite effect in the future. It will actually be a drag

Today's middle-aged Canadians are more attached to the labour force than similarly aged people from earlier generations.

on the future path of average living standards. Figure 6 shows how much these three components of per capita GDP growth are likely to change from the past to the future.

Figure 6



Between 1971 and 2010, real per capita GDP increased by about 1.3 percent annually; two-thirds of this growth came from productivity growth and the remaining one-third came from rising labour force participation. The short-run changes in E/LF reversed themselves over time so that this component accounted for almost no part of the long-run growth in average living standards.

For the next thirty years, however, no matter what happens to productivity growth, the absolute decline in the labour force participation rate will be a significant drag on the growth of per capita GDP by an average of about 0.3 percent per year. There is naturally great uncertainty about future productivity growth, and Figure 6 shows two options. The dark bar is based on the assumption that GDP/E grows in the future at the same rate that we have observed over the past decade, about 0.4 percent annually. In this case, per capita GDP can be expected to grow at an average annual rate of less than 0.1 percent; average material living standards would be almost stagnant. The light bar shows the more optimistic option, which assumes that average hours worked per employee remain constant and that all future productivity growth thenceforth shows up as growth in GDP/E , at a rate of just less than 1 percent annually.⁴ In this case, average material living standards will rise at a rate of about 0.6 percent per year.

The projected future decline in the labour force participation rate will drive a reduction in the growth rate of real per capita GDP.

The central message from Figure 6 is clear: the inevitable decline in the overall labour force participation rate over the next thirty years will be a significant drag on the growth of per capita GDP. Under reasonable assumptions about productivity growth, future material living standards will grow much more slowly in the future than they have since 1971. Even with significant increases

⁴ The term GDP/E is exactly equal to $(GDP/Hours) \times (Hours/E)$, where the former is a more precise measure of labour productivity and the latter is average hours worked per employee. The trend decline in hours per worker that has occurred over the past few decades implies that GDP/E has grown more slowly than $GDP/Hours$. So if $Hours/E$ stops falling and remains constant in the future, then GDP/E will likely grow faster than it has in the last decade.

in future productivity growth rates, real per capita GDP will grow at roughly half its pace from the previous forty years.

Two separate policy conclusions emerge from these projections. The first is that productivity growth will be a relatively more important source of growing living standards in the future than it has been in the recent past (Ragan 2010b). From 1971-2010 productivity growth accounted for roughly two-thirds of the growth in real per capita GDP whereas it is likely to account for *more than 100 percent* of such growth over the next few decades. The policy imperative is clear: Canadians and their governments need to think carefully about how to increase the growth of productivity.⁵ The second policy conclusion is that the reduction in the labour force participation rate, taken by itself, will reduce the growth rate of real per capita GDP (for any assumed productivity growth rate) and thus reduce the growth rate of Canadian governments' per capita tax base. This brings us to the fiscal squeeze.

Living standards will grow much more slowly in the future than they have since 1971.

The Looming Fiscal Squeeze

Canadian governments will face a two-part fiscal challenge in the coming few decades. First, the aging of the population will lead to a slowing of national income, which is the primary tax base for governments. Second, major Canadian public spending programs will become more costly as a share of GDP, especially those providing healthcare and income support for the elderly. This fiscal challenge will likely create political tensions between provincial and federal governments and will force governments at all levels to make some difficult fiscal decisions.

Slowing Tax Revenues

Canadian governments levy all kinds of taxes, including personal and corporate income taxes, the federal Goods and Services Tax (GST), provincial sales taxes, municipal property taxes, and various excise taxes such as those that apply to the sale of gasoline, cigarettes, and liquor. Since the revenues raised by the most important Canadian taxes tend to fluctuate with income and spending, we can view national income (GDP) as a good approximation to governments' overall tax base.

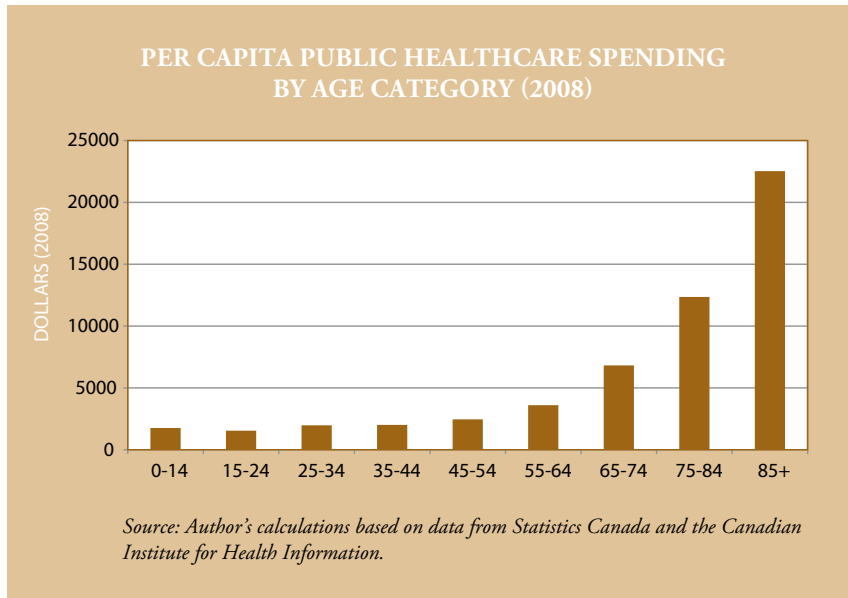
We have seen in Figures 5 and 6 that an important effect of Canada's population aging will be a significant decline in the labour force participation rate over the next thirty years, with the important consequence that real per capita GDP will grow more slowly than it did over the past four decades. The implications for government tax revenues are clear: without changes in tax rates, the slowing of the growth in per capita income will lead to a slowing of Canadian governments' per capita tax revenues. From Figure 6, one can project that the annual growth rate of per capita income for the next thirty years will be lower by about 1 percentage point than it was over the past few decades; for unchanged tax rates, the annual growth rate of governments' per capita tax revenues will also fall by about 1 percentage point.

⁵ For a comprehensive and very readable review of Canadian productivity and related policies, see TD Economics (2010b); see Sharpe (2004) for some remaining puzzles.

Accelerating Age-Related Spending

Average annual healthcare spending per person increases significantly with age. In general, older people suffer more from illnesses than do the young. They also require more hospitalization, use more pharmaceutical drugs, and recover more slowly from accidents of various kinds than do younger people. Using data from the Canadian Institute for Health Information (CIHI) for 2008, Figure 7 shows how per capita public healthcare spending varies by age category, with the amount of spending for Canadians aged 75 and over several times larger than that for those under the age of 55.

Figure 7

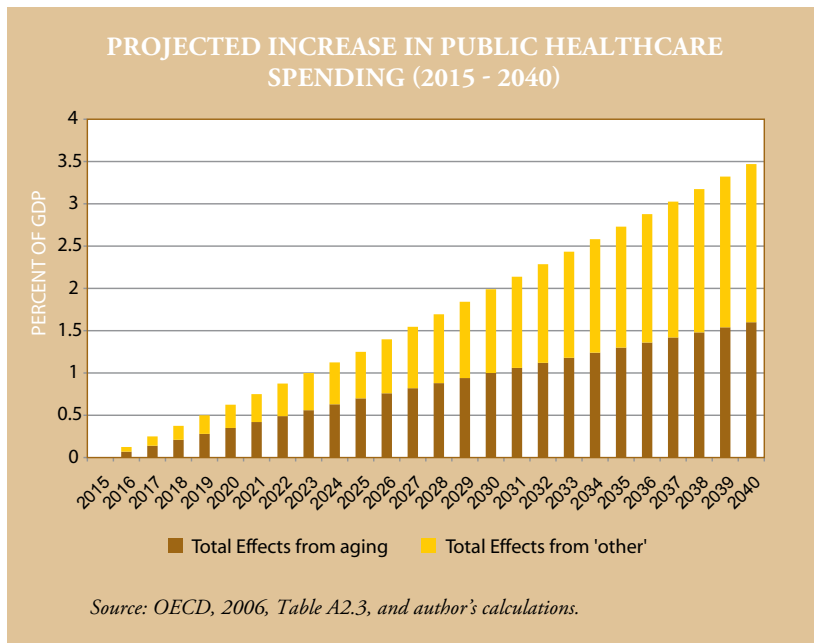


The share of Canadian GDP devoted to public healthcare spending by 2040 will be roughly 3.5 percentage points higher than in 2015.

According to data available on Statistics Canada's website, Canadian governments spent \$122 billion on healthcare in 2009, roughly 7.6 percent of GDP. This share has been rising steadily over time, but is now set to rise more quickly. The aging of the baby-boom generation implies that, for the next thirty years or so, a steadily increasing fraction of the Canadian population will reside in the high-cost categories shown in Figure 7. As a result, public spending on healthcare will increase in both average per capita terms and when expressed as a share of overall GDP. The Organization for Economic Cooperation and Development (OECD) has constructed projections for the *increase* in public healthcare spending that will occur in many countries between 2015 and 2040 – the period that will see the bulk of the aging of the baby-boom generation. As shown in Figure 8, the OECD projects that the share of Canadian GDP devoted to public healthcare spending will increase gradually every year, and by 2040 will be roughly 3.5 percentage points higher than in 2015.⁶

6 Since the aging of the baby-boom generation will increase per capita public healthcare spending for a few years before 2015 and for a few years after 2040, the estimated increase of 3.5 percentage points of GDP should probably be seen as a lower-bound estimate of the full change that Canada will experience in the coming decades.

Figure 8



Population aging accounts for only about half of the projected increase in healthcare expenditures. Two other factors, taken together, are equally important. First, as real per capita incomes continue to increase, it is estimated that the demand for healthcare will also rise, perhaps even more than in proportion to the increase in income; in the language of economists, healthcare is a “normal” good. The second and more important factor driving greater expenditure on healthcare comes from the continuing development of new medical technologies. In some cases, new technologies allow medical practitioners to do existing procedures in lower-cost ways, and therefore these new technologies help to reduce overall spending on healthcare. But in many cases, new technologies and drug treatments allow for expensive procedures that were not previously possible at any cost. And when faced with the possibility of a successful new treatment or procedure, even at high cost, it is natural that physicians and patients alike choose to proceed. In other words, an important source of rising healthcare expenditures is that technological advances give us new ways to spend money on healthcare that were simply not available in the past.

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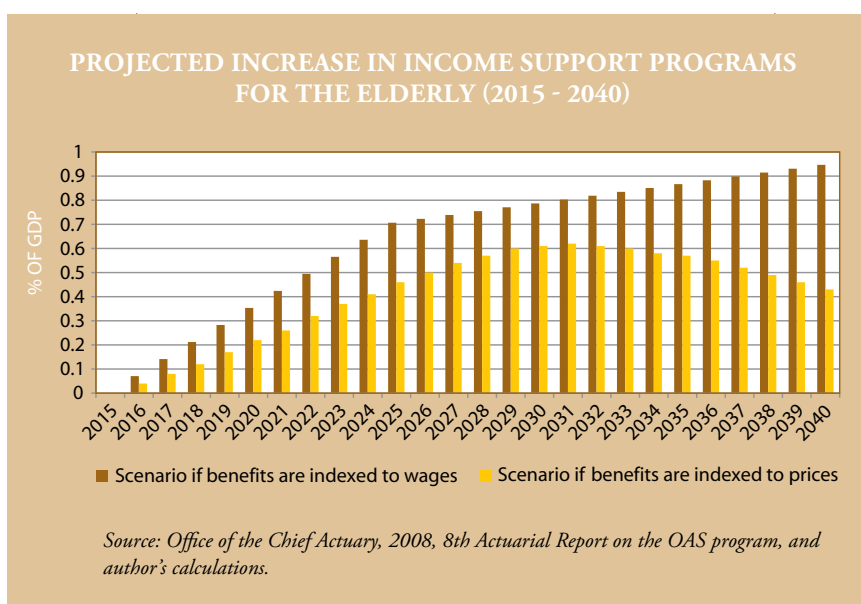
There is room for debate about how the increases in public healthcare spending that Canada will experience over the next three decades are likely to be split between the “pure aging” effect (the brown bars) and the effect coming from rising income and improving technology (the yellow bars). Yet there is surprisingly little disagreement about the overall projected spending increases. The OECD projections in Figure 8 are roughly comparable with independent projections made by Dodge and Dion (2011), which stop in 2031, and also with projections made recently by Canada’s Parliamentary Budget Office (PBO 2011).

The aging of the Canadian population will also lead to increased demands for public spending on elderly benefits. Programs such as Old Age Security (OAS) and the Guaranteed Income Supplement (GIS) provide direct income assistance to the elderly, especially those with low incomes. These programs currently cost Canadian governments about \$35 billion annually, which is just over 2 percent of GDP. As baby boomers

Aging will also lead to increased demands for public spending on elderly benefits.

continue to age and more of them enter their golden years, there will inevitably be greater demands on these existing programs. Projections from the Chief Actuary in Figure 9 show that spending on such income support programs will increase gradually over time and by 2040 will be above the 2015 level by between 0.4 and 0.9 percent of GDP. These projections depend on the assumptions of how elderly benefits are indexed. If they are simply indexed to the rising price level (the yellow bars), the spending on income support programs will rise and then eventually fall back as a percentage of GDP. But if elderly benefits are indexed to wages (and real wages continue to rise gradually), the spending on income support programs will continue rising as a share of GDP, and by 2040 will be 0.9 percent above the 2015 level. The actual level of future indexation is clearly unknown, and will depend on the political and fiscal realities of the day. For the purposes of this paper, we take an intermediate value and assume that spending on income support programs for the elderly rises gradually so that by 2040 it is 0.7 percent above its 2015 level.

Figure 9



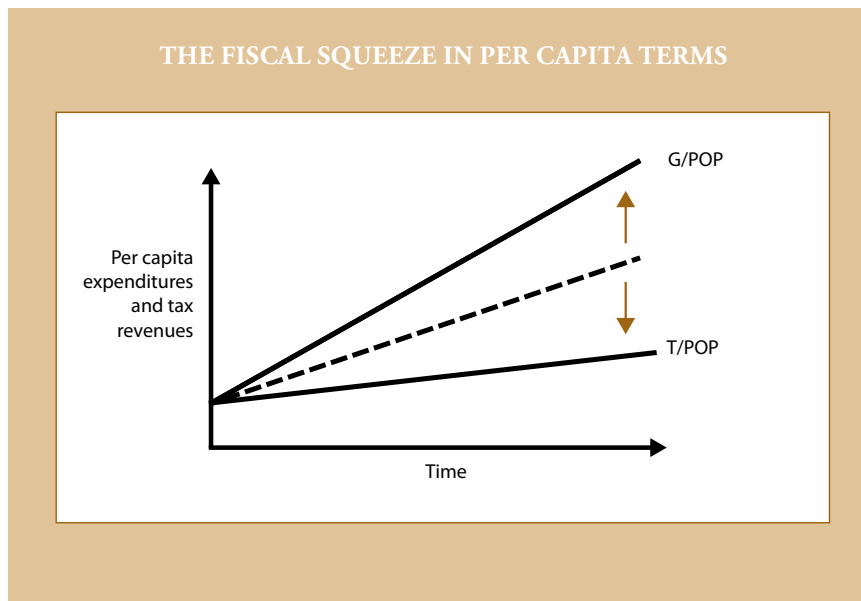
The aging of the Canadian population may allow us to devote a smaller share of our total public spending toward programs designed for the young, such as education and child benefits. As it turns out, however, the savings that come from the declining share of the population receiving these programs will be approximately matched by the likely increases in per capita spending on these programs. As a result, spending on education and child benefits is projected to remain roughly constant at its current level of 7 percent of GDP until at least 2040 (Robson 2010).

Overall, the effect of population aging is expected to significantly increase the share of GDP that Canadian governments will devote to age-related programs. Spending on healthcare and elderly benefits, as a share of GDP, will increase gradually but inexorably into the future, and by 2040 the total spending will be approximately 4.2 percentage points of GDP higher than its 2015 level. For an economy in which all levels of government combined spend roughly 37 percent of GDP, this increase translates into an 11 percent expansion in the scale of government spending. This heightened demand for public spending will occur over a period when the same demographic forces will cause the tax base to slow considerably. This two-part challenge is Canada's looming fiscal squeeze.

Two Illustrations of the Fiscal Squeeze

The fiscal squeeze can be illustrated by showing the time paths of government spending and tax revenues either in per capita terms or as a share of GDP. Figure 10 shows per capita spending and tax revenues. The dotted line shows how per capita spending (G/POP) and per capita tax revenues (T/POP) would continue rising in a hypothetical world with no change in the age-structure of the population and no change in fiscal policies (and with the overall government sector beginning with a balanced budget). In this world, the assumption that government spending and tax revenues are held constant as a share of GDP would still lead to rising *per capita* spending and revenues due to the underlying growth in per capita incomes, driven by growth in productivity.⁷

Figure 10



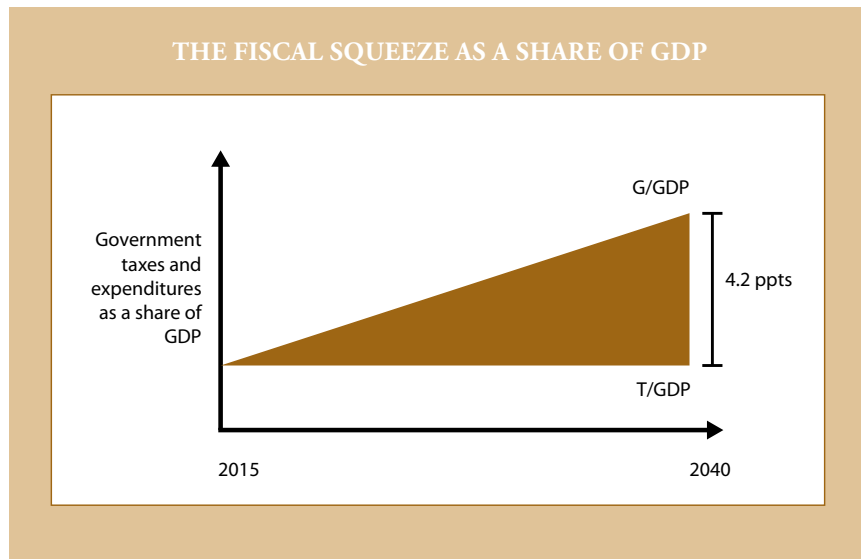
This two-part challenge is Canada's looming fiscal squeeze.

There are then two halves to the fiscal squeeze as we move into the future. The first is the increase in per capita spending on healthcare and elderly benefits; the line marked G/POP rotates upward above the dotted line, showing a faster rate of growth. The second is that even if tax rates are held constant, and so tax revenues are approximately constant as a share of GDP, per capita tax revenue begins slowing because of the decline in the labour force participation rate; the line marked T/POP rotates downward below the dotted line. The growing fiscal squeeze is then seen as the increasing gap between the two solid lines.

An alternative way to illustrate the fiscal squeeze is to express government spending and tax revenues as shares of GDP, as is done in Figure 11.

⁷ Government spending per capita (G/POP) is equal to $(G/GDP) \times (GDP/POP)$ and per capita tax revenue (T/POP) is equal to $(T/GDP) \times (GDP/POP)$. In the absence of an aging population, ongoing productivity growth leads to increases in GDP/POP and thus to rising per capita spending and tax revenues, even with G/GDP and T/GDP held constant.

Figure 11



Since taxes are generally applied to income (or to consumption expenditure, which is a relatively stable share of income), tax revenues will remain approximately constant as a share of GDP if tax rates are held constant. Under the assumption that tax rates are unchanged, therefore, the T/GDP line in Figure 11 is horizontal.⁸ Public spending on healthcare and elderly benefits is, however, expected to increase as a share of GDP, and so the G/GDP line is upward sloping. From the projections in Figures 8 and 9, annual spending will increase gradually every year and by 2040 will be approximately 4.2 percentage points higher than its level in 2015.⁹ Since most people are accustomed to thinking about government spending and tax revenues as shares of GDP rather than in per capita terms, we use Figure 11 to examine the cumulative size of the fiscal squeeze.

Confronted with spending demands that rise faster than tax revenues, future Canadian governments will be faced with three broad choices.

Confronted with spending demands that rise faster than tax revenues, future Canadian governments will be faced with three broad choices. First, they can attempt to reduce the growth rate of overall spending. Second, they can attempt to increase the growth rate of revenues through increases in tax rates. Finally, they can choose to increase the scale of public borrowing. Of course, the third option is not a permanent solution since government debt eventually needs to be repaid and such repayment ultimately requires a command over resources, which in turn requires either spending reductions or increases in tax revenues. But it is worthwhile considering this third option to get a sense of the cumulative scale of the fiscal squeeze and why some fundamental fiscal adjustment will almost certainly be necessary.

Consider the hypothetical situation in which future Canadian governments, when confronted with the realities of the fiscal squeeze, choose to make no adjustments in their overall spending or taxation but instead simply add to their public borrowing as a means of financing the fiscal squeeze. How much new public debt would be incurred in this situation between 2015 and 2040? In order to answer this question, we must make the distinction between governments' overall budget deficit and the primary budget deficit – that is, the deficit in the absence of

8 The overall Canadian tax system is slightly progressive, so a 10 percent increase in GDP leads to a slightly larger than 10 percent increase in tax revenues. As a result, constant tax rates would result in a slightly upward sloping T/GDP line. This small effect is ignored here.

9 Note from Figures 8 and 9 that the projected increases in spending are approximately linear through time, each year seeing a roughly constant increase in spending as a share of GDP. For this reason, Figures 10 and 11 are constructed with the simplifying assumption of linearity.

debt-service costs. The area of the shaded triangle in Figure 11 provides an estimate of the cumulative increase in the primary deficit that would take place over the 25-year period, and is equal to 52.5 percentage points of GDP (25 years \times 4.2 percentage points \times $\frac{1}{2}$ = 52.5 percentage points). But due to the nature of debt dynamics, this 52.5 percentage points is *not* the projected increase in Canada's net debt-to-GDP ratio in the same hypothetical situation.

The Dynamics of Debt

It is well known that a country's debt-to-GDP ratio evolves according to a simple arithmetic relationship that illustrates the different forces at play. The simple equation is:

$$\Delta d = x + (r - g)d$$

where d is the debt-to-GDP ratio, Δd is the change in this ratio over time, x is the primary budget deficit as a share of GDP, r is the average real interest rate applying to existing government debt, and g is the growth rate of real GDP. The intuition behind this relationship is actually straightforward. First, consider the role of x : the more current program spending rises above current tax revenues, the larger is x and thus the more the debt ratio will be rising. Second, consider the role of $r-g$: r is the rate at which the debt is accumulating while g is the rate at which GDP is growing, so the larger is r relative to g , the faster the debt-to-GDP ratio rises.¹⁰

We can use this equation to project the path of the debt-to-GDP ratio between 2015 and 2040 in the hypothetical situation in which Canadian governments do not adjust their taxation or spending. To do so, we need four pieces of information:

- i) the value of d in 2015
- ii) the value of x in 2015
- iii) the path of x between 2015 and 2040
- iv) the path of $r-g$ between 2015 and 2040.

In the projections that follow, I use the following sources to secure these data. First, according to the IMF's September 2011 *Fiscal Monitor*, Canada's total government net debt-to-GDP ratio is projected to rise by approximately 2.9 percentage points between 2010 and 2015; this yields a value of d in 2015 of 47.0 percent. Second, the IMF projects in its December 2011 Article IV Consultation for Canada that the primary *surplus* for the combined government sector in 2015 will be 1.5 percent of GDP (and so x will be -1.5 in that year). Third, the projected *increment* to the value of x is given by the analysis in the previous section and illustrated in Figure 11; x is projected to increase gradually by 4.2 percentage points from 2015 to 2040.

The projected path of $r-g$ between 2015 and 2040 is obviously more difficult to determine, but the longer-term demographic forces are likely to affect both r and g . First, the real GDP growth rate will decline as the labour-force participation rate slowly falls. According to the Parliamentary Budget Office's *Fiscal Sustainability Report 2011*, the growth rate of real GDP is expected to average only about 1.8 percent per year between 2015 and 2040. Second, the decline of the share of the population in its high-saving (pre-retirement) years may put upward pressure on real interest rates; but even if this particular force is small, increases in r in the near future will surely occur as economies recover and monetary policy returns to some sense of "normal". The same PBO report projects the average long-term nominal interest rate on the combined federal and provincial government debt to be in the 5-6 percent range, which suggests a real interest rate of 3-4 percent if average inflation remains at the Bank of Canada's current target.

Even with r in the 3-4 percent range, and g likely to be below 2 percent, there are many possibilities for the path of $r-g$ from 2015 to 2040. A realistic and prudent assumption might be that the value of $r-g$ over

10 For an excellent application which shows the importance of movements in r and g in determining the dynamics of Canadian government debt in the recent past, see Kneebone and Chung (2004).

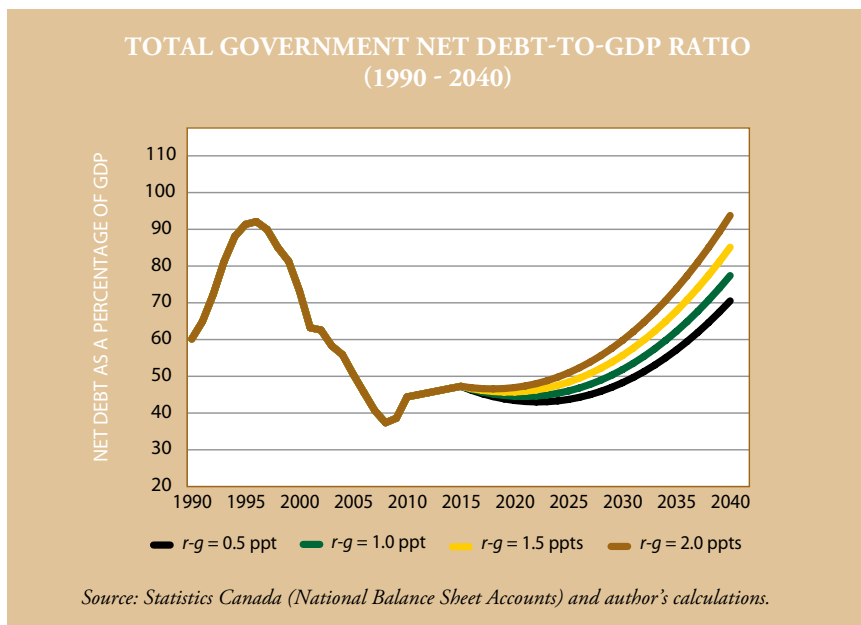
the projection period will be between 1.5 and 2.0 percent, although there is clearly room for debate. In the projections that follow, I consider four different average values of $r-g$ and examine how the projected path of the debt-to-GDP ratio is sensitive to these alternatives.

By the beginning of the 2008-09 financial crisis, the overall debt ratio was 37 percent of GDP.

A Return to the Debt Wall?

Figure 12 shows the net public debt-to-GDP ratio for the combined government sector from 1990 to today and projected to 2040. The debt ratio increased through the 1980s and early 1990s, peaking at approximately 92 percent in 1996. At that point, the International Monetary Fund and others saw Canada as having a serious fiscal problem, and the failure to tackle the problem very soon would likely mean hitting the “debt wall”, with implications for declining access to global capital markets and rising domestic interest rates, just as we are now seeing in some European countries.

Figure 12



Beginning in the mid 1990s, the federal and provincial governments embarked on programs of significant fiscal consolidation. These actions, which quickly turned large annual budget deficits into modest budget surpluses, combined with a healthy economic recovery to produce a rapidly declining debt-to-GDP ratio. By the beginning of the 2008-09 financial crisis, the overall debt ratio was 37 percent of GDP. The recession from 2008 through late 2009 reduced budgetary revenues and motivated significant policies of fiscal stimulus, and so naturally increased Canada’s public debt ratio. The eventual (and ongoing) economic recovery, combined with the end of temporary stimulus measures and other modest cuts in spending, has reduced budget deficits in all Canadian jurisdictions. As of the fall of 2011, most Canadian governments are planning a gradual return to budget balance, although there is some variation in the expected duration of those paths and reasonable debate regarding their credibility. The IMF projects in its September 2011 *Fiscal Monitor* that the combined Canadian government sector will return to budget balance by 2016.

The projections in Figure 12 from 2011 to 2040 are based on the assumptions described in the previous section. After 2015, four alternative projections are shown, each corresponding to a different value of $r-g$. All four projections involve a small short-term reduction in the debt-to-GDP ratio followed by a longer-term increase. The reduction is caused by the primary budget surplus that the combined governments are projected to have in 2015. With such a primary surplus in place before the fiscal squeeze begins, it takes a few years before the rising age-related spending increases the debt-to-GDP ratio; the initial primary surplus “absorbs” the fiscal squeeze in these early years of the projection. But this absorptive capacity of the initial primary surplus depends importantly on the value of $r-g$. The higher is the value of $r-g$, the less is both the duration and magnitude of the decline in the debt ratio before it begins its inevitable and significant upward climb. In the most realistic projections, those with $r-g$ between 1.5 and 2.0 percentage points, the debt ratio rises back to the high levels of the mid 1990s. Recall that these projections are based on an important hypothetical – they show what would happen if future Canadian governments, when confronted with the fiscal squeeze, made no fundamental adjustments to their spending programs or rates of taxation.

The central point of the projections in Figure 12 is to show the implications associated with this set of policy decisions. Future Canadian governments need to make adjustments to their spending or taxation in the face of the coming fiscal squeeze. If they avoid making such adjustments and instead simply increase their borrowing, it will mean eventually returning to high levels of public indebtedness with net public debt likely rising to between 75 and 95 percent of GDP by 2040. To avoid the significant costs associated with high levels of public debt, we should strive to avoid such a debt path.¹¹ Canadians and their governments successfully reduced the debt-to-GDP ratio during the late 1990s and early 2000s, when levels of debt in other countries were lower than ours and the booming US economy provided growing demand for our exports. But this experience should not convince us that to do so again – in a very different global economic environment – would be an easy task. Mindful of the problems of high public debt, we should intentionally choose our policies to avoid a return to the “debt wall”. A quick glance at the current situation in Greece and other highly indebted European countries should be all that is necessary to remind us of the dangers.

Even if we were to design our future policies to prevent public debt rising above a higher but sustainable level, such as 60 percent of GDP, Figure 12 shows that respecting such a debt ceiling would only be possible if future governments made significant adjustments to either their spending or tax revenues.¹² Difficult current decisions could be avoided but only by leaving them for the next generation.

Future Canadian governments need to make adjustments to their spending or taxation in the face of the coming fiscal squeeze.

Federal-Provincial Tensions

In discussing the fiscal squeeze that will confront future Canadian governments, we have made no distinction between the various levels of government: federal, provincial, territorial, or municipal. The spending projections in Figures 8 and 9 and the fiscal squeeze shown in Figure 11 are shown for all levels of government combined. The political realities in Canada force us to recognize the clear distinctions between the various levels of government. This is especially true when noting that the key spending demands in the future will come from rising healthcare expenditures, a responsibility almost wholly within the jurisdiction of the provinces. At the same time, however, no part of Canada’s system of fiscal federalism will automatically create a matching fiscal capacity within the provinces. As a result, we will soon see a return of the federal-

11 For a discussion of many aspects of the costs of high government debt, see the several papers in Ragan and Watson (2004).

12 There would naturally be debate about the appropriate level of a self-imposed debt ceiling. But most economists would argue that even 60 percent might be far above the “optimal” public debt ratio. See Scarth (2004) for a discussion in the context of Canada.

provincial fiscal tensions that occurred last decade. Indeed, this process has already begun as Ottawa and the provinces position themselves for the renewal of the existing healthcare funding arrangements, due to expire in 2014.¹³

The actual transfer of future resources between the various levels of government in Canada will depend crucially on the political landscape and personalities in place at the time. There is no sensible way to make predictions about how those debates will unfold. Fortunately, it is not necessary to make such predictions in order to know the scale of the fiscal challenges that our *combined* governments will face. For the purposes of this essay, it is better to focus on the overall fiscal burden for the combined government sector rather than the (nonetheless important) issue of how this fiscal burden is shared across different levels of government.

Non-Fiscal Solutions to the Fiscal Squeeze?

Realistic policy changes would be too small to fully offset the effects of the coming demographic forces. Genuine fiscal adjustment will be unavoidable.

Before examining some broad fiscal options, it is useful to explore some of the other policy options often encountered in popular discussions of Canada's aging population and rising age-related expenditures. We address five issues briefly: increasing the immigration rate; increasing the retirement age; increasing the fertility rate; restraining the growth of healthcare spending; and increasing the growth rate of productivity. While changes in these directions would generally be useful in reducing the size of the looming fiscal squeeze, it is important to recognize that realistic policy changes would be too small to fully offset the effects of the coming demographic forces. Genuine fiscal adjustment will be unavoidable.

Increasing Immigration

When confronted with the idea that population aging will reduce Canada's labour force participation rate and generate serious fiscal challenges for governments, many people quickly respond by recommending an increase in the annual inflow of immigrants. A larger population implies more workers, and more workers leads to more tax revenues. But it is not so simple.

There are at least two problems with using increased immigration as a means of addressing Canada's looming fiscal squeeze. The first is that immigrants, like native-born Canadians, age over time and consequently change both their labour force behaviour and their demands on public programs. Recall that the essential source of the fiscal squeeze is that Canada's labour force participation rate will fall at the same time that age-related spending rises. So unless immigration flows can be effectively targeted toward groups with higher-than-average labour force participation rates, the decline in Canada's overall participation rate will not be dampened. Similarly, unless immigration can be targeted toward groups that place lower-than-average demands on public spending, the rise in age-related spending will not be dampened. It would be very complicated to make such targeting effective. And even if it were achievable it may lead to some public outcry

¹³ Demographic differences across provinces imply that the looming fiscal squeeze will influence some provinces more than others, and thus possibly exacerbate the economic and fiscal tensions that already exist between the various provinces. This will further complicate future federal-provincial fiscal negotiations.

as it became clear that immigrant selection was based less on issues of family unification and more on age and other economic characteristics of the individuals involved.

Perhaps the bigger problem with relying on increased immigration to address the coming fiscal squeeze is the magnitude of the increase required to offset the inherent aging of the Canadian population. For example, Banerjee and Robson (2009) show that only with a sustained doubling (or more) of recent immigration flows could Canada's labour force be expected to continue growing at 1.2 percent annually (as occurred in 2004-08) rather than the slower rate that would otherwise accompany the decline in the overall participation rate shown above in Figure 5. An even larger increase would be required if the policy was not effectively targeted toward younger workers.

What is the problem with increasing immigration flows to twice or three times the current level? Nothing in principle may be wrong with such a policy decision, although some observers will argue that large changes in net immigration may create social tensions that are neither easy to address nor desirable to ignore. More practically, however, this scale of policy adjustment is probably politically infeasible. Ottawa is a place where dramatic policy actions that significantly affect all regions of the country are taken only occasionally, and typically at great political risk. A 10 percent increase in the annual inflow of immigrants would be seen as a bold initiative; a 150 percent increase is almost unthinkable.

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Increasing Labour Force Participation

A second policy option is to encourage Canadian workers to increase their attachment to the labour force. For those who are working, encourage them to retire later than they otherwise would; for those who are not working, encourage them to seek work. Any resulting increase in the labour force participation rate would dampen the projected decline in Figure 5 and thus, when eventually matched by an increase in employment, would work directly to dampen the slowing of the governments' tax base.¹⁴ Keep in mind, however, that the projected decline in Figure 5 is based on the assumption that most age-specific participation rates *increase by* 2-4 percentage points over the next twenty years. So any dampening of this projected decline would require *additional* increases in labour force participation.

Many possible policy changes might have this effect. Adjustments to the tax-and-transfer system, especially as it applies to low- and middle-income Canadians, may have the effect of dramatically reducing effective marginal income tax rates and thereby increasing incentives for workforce participation (Laurin and Poschmann 2011). More generous subsidization of daycare or early childhood education may improve labour force participation among those parents who would otherwise remain at home with their children (Baker, Gruber, and Milligan 2006). Enhanced retraining schemes or wage subsidies may improve the job-market prospects of displaced workers under pressure to change their occupations, industries, or regions (Finnie and Gray 2011). Finally, increases in the minimum age at which Canadians can begin claiming their CPP/QPP pensions would almost certainly raise the overall labour force participation rate.

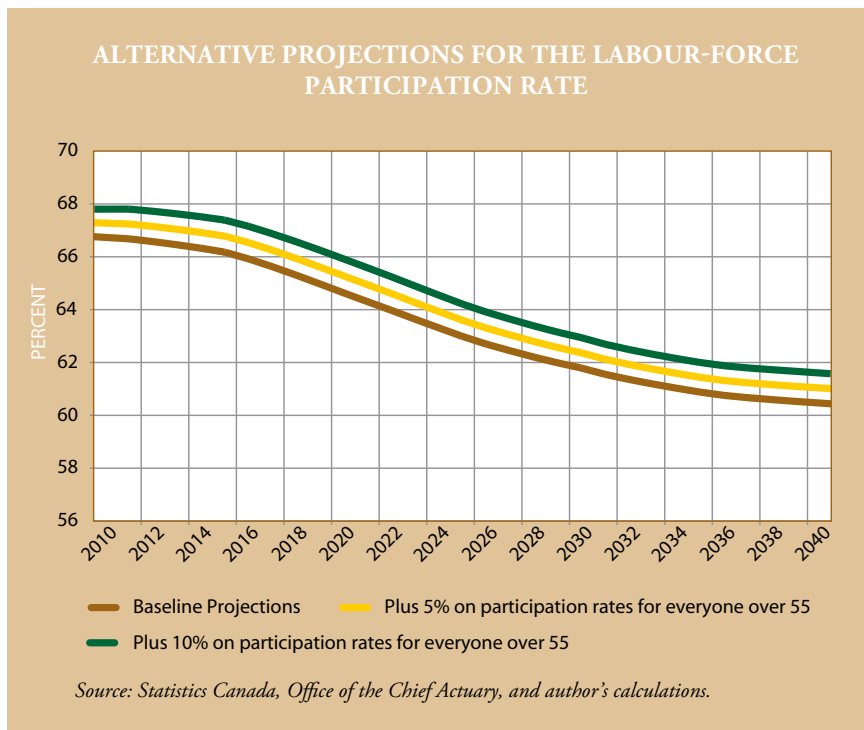
All of these possible policy adjustments would have effects on socio-economic variables other than Canada's labour force participation rate, and each would deserve careful examination and debate. Each would also have fiscal implications that would need to be examined carefully. For example, more generous subsidization of daycare or enhanced retraining schemes may well increase the nation's labour force participation rate and thus

¹⁴ By dampening the slowdown in the tax base, one half of the fiscal squeeze would be affected. A quite separate issue is whether individuals' greater attachment to the workforce would have any effect on their current or subsequent demand for healthcare services, the other half of the fiscal squeeze.

dampen the fiscal squeeze through this channel; but each would also have direct and possibly large fiscal costs that need to be considered.

A larger general concern is that many policy changes of this type, though working in the right direction to increase labour force participation, may simply have a small overall effect on the future fiscal squeeze. Figure 13 shows three alternative projections for the aggregate labour force participation rate.

Figure 13



The unavoidable and likely unchangeable fact is that older people participate less in the labour force. A significant decline in overall participation is thus all but inevitable.

The baseline projection (in brown) uses Statistics Canada's medium-growth population projection together with the Chief Actuary's projected age-specific participation rates, and is almost identical to the projection in Figure 5. The other two projections are based on the assumption that the average labour force participation rates for people aged 55 years and over increase by 5 percent (yellow) and 10 percent (green) respectively above the rates assumed in the base case; these increases are assumed to take effect immediately and last until 2040. It is clear that these increases in age-specific participation rates do not change the overall pattern for the economy as a whole. The unavoidable and likely unchangeable fact is that older people participate less in the labour force, and the aging of the baby-boom generation means that a higher fraction of the population will occur in these older age categories. A significant decline in the overall labour force participation rate is thus all but inevitable.

Increasing Fertility Rates

Another possible policy response to reduce the impact of the coming fiscal squeeze is to make adjustments in the tax-and-transfer system aimed at increasing the fertility rate (usually defined as the number of children born to the average woman of child-bearing age). This policy option faces two immediate challenges. First,

the increases in fertility that could be generated by policy adjustments are likely to be very small relative to the overall declines in fertility that Canada has experienced over the past several decades. From 1926 to 1946, Canada's average fertility rate was about 3 children per woman. It then rose to an average of 3.6 children for the two decades of the baby boom (Milligan 2002). Since the mid 1960s, it smoothly declined to its current level of about 1.7 children per woman.

It is this scale of decline in fertility that explains why the aging of the baby-boom generation is such an important demographic phenomenon; if fertility had stayed near its level from the 1950s and early 1960s, the aging and retirement of Canada's baby boomers would not generate a large economic and fiscal challenge because that generation would simply be "replaced" by similarly sized subsequent generations. Relying on increases in fertility to address the coming fiscal squeeze thus requires policy options that will approximately double the current fertility rate.¹⁵ Given the dramatic social changes that have occurred over the past several decades, however, this may simply be asking too much from economic or social policy. For example, Milligan (2002) reviewed the fertility effects from Quebec's "baby bonus" program that applied from 1989 through 1997 and offered families \$500 for a first child, up to \$1000 for a second child, and up to \$8000 for third and subsequent children. Milligan concludes that the program was a success on its own terms because it was effective at increasing the average fertility rate by about 15 percent, from 1.5 to almost 1.7 children per woman. But even this change in overall fertility can only chip away at the edges of the larger demographic forces.

The second challenge confronted by attempts to increase fertility is the direct fiscal cost of the policies. The Quebec plan was cancelled less than a decade after it began, partly due to the perception that it had not generated enough of an increase in fertility and partly because of the fiscal cost. Milligan (2002) estimates that the average dollar cost per child *born as a result of the subsidy program* was above \$15,000, for an aggregate cost over the life of the program of \$1.4 billion. The high cost reflects two problems common to most subsidy programs. First, the price-related incentives at the micro level may be weak, meaning that only with large subsidies will individuals (or families) change their behaviour. Second, many individuals (or families) receive the subsidy even though they would have chosen to have additional children without the subsidy; this effect certainly played a role in the Quebec program. Milligan (2002) estimates that only 93,000 of the 736,000 actual births between 1989 and 1996 could be attributed to the baby bonus. Yet all births were eligible to generate a subsidy payment, thus increasing the total cost of the program.

Restraining the Growth of Healthcare Spending

Since a key component of the looming fiscal squeeze is the projected increase in the share of GDP that will be devoted to publicly financed healthcare services, an obvious policy option is to examine policy choices that could deliver these services more cheaply. It may be easy to cut spending if we are prepared to accept a decline in overall service; but the more challenging goal is to restrain the growth of healthcare spending *while maintaining or even improving the quality of services*. In other words, the challenge is to improve the efficiency of healthcare provision. Once this discussion begins in earnest, it is inevitable that we will start asking about possible changes to the existing delivery mechanism, perhaps including an increased role for the private sector. Such a discussion will be uncomfortable for many Canadians. We briefly flirted with these issues in the mid 1990s when the federal government reduced its transfers to the provinces, thus putting significant financial pressures on the healthcare systems, the provinces' largest and fastest-growing budget item. But a quick fiscal turn-around aided by a fast-growing economy allowed us to avoid a protracted and unpleasant discussion. The coming demographic forces are strong and sustained, however, and Canadians will likely return to this debate in a more serious way. We should all brace ourselves.

The challenge is to improve the efficiency of healthcare provision.

¹⁵ Even in this case, any large increase in fertility that began today would not produce an economic and fiscal "payoff" for the country until those children began working roughly twenty years from now.

Many growth-restraining changes to the current healthcare system could be explored, but it is well beyond the scope of this paper to do so.¹⁶ Whatever realistic restraint can be placed on spending growth, it is important to keep in mind that the underlying demographic and technological forces are so strong that they will still cause healthcare spending to rise far more quickly in the future than it has in the past (Dodge and Dion 2011). Canadian governments must therefore recognize that even in an optimistic view of the future, there will be a significant increase in the share of national income devoted to public healthcare spending.

Faster Productivity Growth

One final option is often mentioned as a solution to Canada's looming fiscal squeeze: faster productivity growth. We have already discussed the importance of productivity growth in driving long-run living standards and have also emphasized the urgency of increasing future productivity growth in order to offset the drag on living standards that will be created by the declining labour force participation rate.

As important as faster productivity growth will be to the future path of our living standards, however, it should not be viewed as an obvious solution to the fiscal squeeze, for two reasons. First, higher productivity growth is not a direct policy choice – it is an aspiration. Economists and policymakers may well wish to have a higher growth rate of productivity, but they remain quite unsure which specific policies can be used effectively to generate this result. This is not an argument to ignore the potential importance of productivity growth, only to recognize our own limitations in affecting it. Second, and perhaps more important, a higher growth rate of productivity would not necessarily lessen the coming fiscal squeeze. If tax rates remained constant, the *T/GDP* line in Figure 11 would be largely unaffected by an increase in productivity growth because tax revenues would automatically rise faster in line with the faster output growth. The *G/GDP* line would only rotate downward if the implied faster output growth did not “drive” further government spending in a proportionate manner. In other words, faster productivity growth, even if it could be engineered, would only help to lessen the fiscal squeeze if policy actions could somehow prevent the faster income growth from creating a similar expansion in the number or generosity of public spending programs.

An Inconvenient Truth

Policy adjustments that lead to increases in immigration, labour force attachment, and fertility will work in the direction of increasing Canada's overall labour force participation rate and thus will help to reduce the size of Canada's future fiscal squeeze. Policy actions that successfully restrain the growth of public healthcare spending can have a similar effect. Policies leading to faster productivity growth can improve the path of our future living standards but may have little effect on the fiscal squeeze. In addition to being mindful of the direct fiscal cost of some of these policy actions, which if large enough would preclude their inclusion among a set of policies to effectively address the fiscal squeeze, the relatively modest scope for policy changes on these fronts should not be ignored. Even with several policy actions acting in unison, it is almost inconceivable that the scale of changes necessary to *fully offset* the coming fiscal squeeze could be at once feasible and politically acceptable.

Spending programs
can be reduced or
eliminated or taxes
can be increased.
There is nothing else.

The inconvenient truth that Canadians and their governments must immediately face is that the existing demographic forces and the fiscal implications that follow are so large that governments will need to respond by making fundamental adjustments to their fiscal frameworks. As is always the case, the simple arithmetic of government budgets implies that there are only two broad fiscal choices available to address the looming fiscal squeeze. Spending programs can be reduced or eliminated or taxes can be increased. There is nothing else.

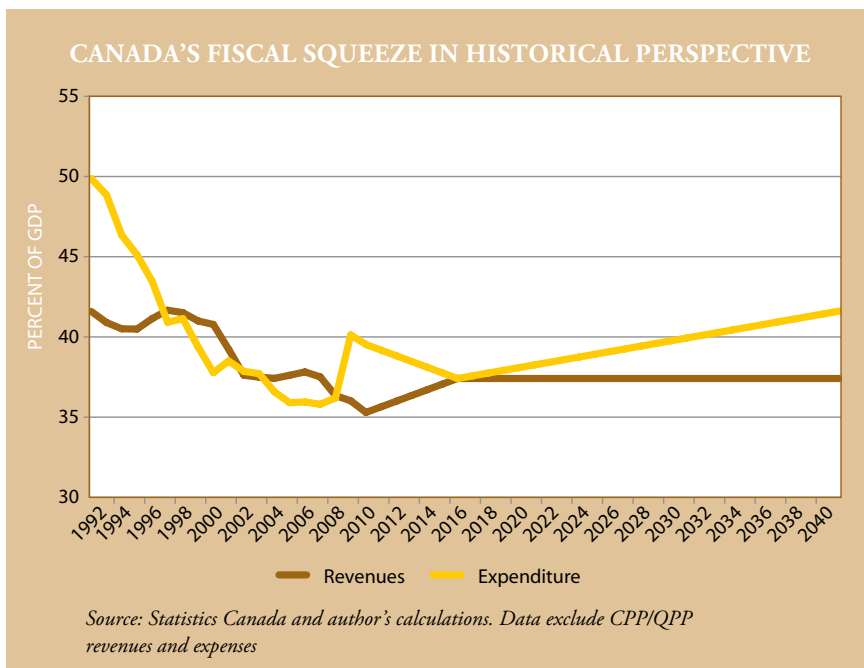
¹⁶ See TD Economics (2010a) for a thoughtful discussion of ten possible proposals to restrain healthcare spending in Ontario. The Canadian Medical Association has also released the report of an Advisory Panel exploring reforms to the entire Canadian healthcare system targeted at improving the efficiency of delivery (CMA 2011).

Difficult Fiscal Choices

Figure 14 puts Canada’s looming fiscal squeeze in recent historical perspective. For all Canadian governments combined, the figure shows total revenues and expenditures as a share of GDP since 1992. The data from 1992 through 2010 are the actual historical data. We maintain the IMF’s assumption that the consolidated government sector achieves a balanced budget by 2016, and for simplicity we assume that this balance is achieved by making equal changes on the spending and revenue side.¹⁷ From 2016 through 2040, we assume that tax revenues remain constant as a share of GDP while expenditures increase by 4.2 percentage points. The result is a path of spending and revenues that would occur if Canadian governments made no fundamental adjustments to their fiscal policies in response to the fiscal squeeze.

With the current fiscal policies in place the path of spending is projected to deviate significantly from the path of tax revenues.

Figure 14



Seen in this way, the coming fiscal squeeze may not seem so dramatic. Total government expenditures were just under 50 percent of GDP in the early 1990s; after a decade or more of significant fiscal consolidation followed by two years of recession-induced fiscal stimulus, expenditures are now about 40 percent of GDP. Revenues averaged about 40 percent of GDP throughout the 1990s and with some modest tax reductions have fallen to about 35 percent. One could therefore argue that if the coming fiscal squeeze pushed government expenditures up to about 42 percent of GDP by 2040, this level of spending would be well within our recent historical memory and would thus present no serious problem. This may be true, though there is naturally some debate about the “appropriate” level of government spending. But the real point is not that the level of spending might rise to some inappropriate or unsustainable level. Rather, the point is that with the current fiscal policies in place the path of spending is projected to deviate significantly from the path

17 If overall budget balance is not achieved by 2016, or is achieved with a different split between spending and revenue changes, the beginning of the “triangle” in Figure 14 will occur at a different year and/or different percentage of GDP. This would change the details but not the essence of the central message regarding the magnitude of the fiscal squeeze in historical context.

of tax revenues. The same set of concerns about high public indebtedness that drove the fiscal consolidation in the late 1990s should lead us to adjust our future fiscal policies to ensure that there is no persistent gap between revenues and expenditures over the next 30 years. Would such a fiscal adjustment be easily achieved?

The Challenges of Fiscal Adjustment

Government spending can be restrained in many ways, with some programs being reduced in scope while others are eliminated altogether. But such cuts are politically contentious; one needs only to glance at the highly charged political debates going on in the United States and Europe to be reminded of the unpopularity of reducing public spending, especially if the cuts fall on important social programs. Once put in place, public spending programs immediately develop supporters whose positions become solidly entrenched. As the late archconservative Milton Friedman once astutely observed, “nothing is so permanent as a temporary government program.” Past experience in Canada and elsewhere, however, has proven that cutting spending programs is possible despite the inevitable hurdles and controversy. Committed political leadership and effective communications are required.

This essay is not the place to review the relative merit of specific spending programs, though this is precisely the exercise that all Canadian governments will soon need to embark upon in a serious and ongoing way.

It would be wise to establish formal mechanisms for assessing the effectiveness and desirability of current programs so that priorities can be established and low-priority programs reduced or eliminated. Such mechanisms need to be tailored to identify fiscal adjustments commensurate in size and scope with the magnitude of the coming fiscal squeeze. Some Canadian governments are now involved in exercises of this nature, but not with a sufficient scope to address our future challenges. More will need to be done. The federal government’s *Program Review* process from the early 1990s is an excellent example that should be repeated (Bourgon 2009).

Any attempt to avoid these unpleasant fiscal realities would only result in increased government borrowing.

Governments also have many choices when it comes to raising tax revenues, including personal and corporate income taxes, expenditure and sales taxes, and product-specific excise taxes. Apart from the general unpopularity of higher taxes, an important choice would need to be made concerning which taxes would be raised and by how much. Unfortunately, there is typically a misalignment between the efficiency of a tax and its popularity, so any tax increase will generate either significant economic or political costs. For example, most economists would agree that increasing a broad-based consumption tax like the GST would be the best way to raise taxes because it would have the smallest negative effect on economic growth. But given the GST’s status as the most vilified tax in recent Canadian history (as shown by the recent referendum and policy reversal in British Columbia), it is likely the least popular tax increase one could imagine implementing. In contrast, many Canadians would argue that if taxes must be increased, corporations should be asked to pay more. Economists know well that higher corporate taxes are an almost certain route toward reduced economic growth and that the burden of such taxes ultimately falls on workers. Finding the right balance between the economic costs and political costs requires considerable finesse on the part of the government, a balancing act that would be aided with clearly stated objectives and careful but honest communications.

Being forced to choose between these broad fiscal options will be unpleasant for future Canadian governments, but some combination of these choices will be inevitable. Any attempt to avoid these unpleasant fiscal realities would only result in increased government borrowing. As we saw in Figure 12, there are real limits to this process if Canada is to avoid returning to the serious debt problems that plagued us in the mid 1990s.

Intergenerational Equity

With government indebtedness comes the issue of intergenerational equity. Often government debt is incurred to provide current goods and services and is serviced and repaid in the distant future, so public debt usually involves a redistribution of income away from future generations toward current generations (Scarth 2004). It follows that the various patterns of fiscal adjustments that Canadian governments could choose in the future, each with their own implications for the level of government debt, will also differ in terms of intergenerational equity. In general, the more the policy changes are delayed through time, the more debt will be incurred before those adjustments take place, and thus the more the burden of fiscal adjustment will ultimately fall on Canadians who are currently “young” (or even unborn). Conversely, the more immediate the changes in spending and taxation, the less debt will be incurred, and thus more of the overall burden of adjustment will fall on the same baby boomers whose rising spending on healthcare and elderly benefits is the driving source of the looming fiscal squeeze.

This observation leads to the obvious question: who *should* be paying for the rising age-related expenditures of the baby boomers? This normative question is rhetorical for the purposes of this essay, but its answer will at least implicitly lay behind the fiscal-policy choices Canadian governments make in the coming years.

Final Remarks

Over the past fifty or so years, Canadians have built an impressive “machine” of government. This machine reaches into our pockets and collects resources in various ways: by taxing personal income, corporate profits, expenditures, and property values. The same machine uses this revenue to finance the delivery of goods and services that Canadians value – the justice system, national parks, public education, healthcare, national defense, roads and highways, and much more. Naturally we can and should debate the efficiency of this machine, and should constantly be exploring ways to improve its effectiveness. We should also continue to question whether its scale is best suited to the needs and aspirations of Canadians and whether it is providing the optimal mix of goods and services.

The key point of this essay is not about such debates. Rather, the key point is that this government machine built over the past half-century was constructed during a time when the demographic forces were very advantageous: a young and fast-growing population. The implications were rapidly advancing living standards and the ability to easily fund many government programs. But as the oldest baby boomers reach 65 this year and these demographic forces move into reverse for the next three decades, there will be a need to adjust this machine of government. The adjustment can occur primarily on the spending side or primarily on the revenue side, or indeed can occur on both. But some adjustment will be necessary. None of this is an argument specifically for a smaller machine of government or a larger one; it is only that whatever level of spending the machine provides must be balanced by the level of taxes it collects. The coming demographic changes imply that achieving this balance in the future will only be possible if Canadian governments make deliberate and significant policy adjustments. Ignoring this fact is a sure route back to the problems we experienced in the mid 1990s with high levels of public indebtedness.

None of this is an argument for a smaller machine of government or a larger one; it is only that whatever level of spending the machine provides must be balanced by the level of taxes it collects.

There may be a Canadian tendency for this debate about overall fiscal priorities to become focused on the *division of fiscal capacity* between different levels of government. The increased demands for healthcare spending will surely create significant fiscal tensions between the federal and provincial governments for the simple reason that the lion's share of the increased spending will come directly from the provincial budgets.

At the same time, however, no existing institutional arrangement will generate an automatic transfer of taxing power toward the provinces. Thus as population aging drives the increase in age-related spending, provinces will demand greater financial transfers from the federal government. Tensions surrounding Canada's system of fiscal federalism will return with a vengeance.

Canadians should not allow jurisdictional debate to cloud the overall issues. In the face of growing demands for age-related spending, someone will need to make some difficult fiscal choices.

Yet Canadians should not allow such a jurisdictional debate to cloud the overall issues. In the face of growing demands for age-related spending, *someone* will need to make some difficult fiscal choices – they simply cannot be avoided. Greater financial transfers from Ottawa would obviously make life easier for provincial governments, but the burden would then be squarely on the federal government to make the tough fiscal decisions. In general terms the federal government has no more fiscal levers at its disposal than does any provincial government. With a limited fiscal capacity of its own, the federal government would only be able to make larger transfers to the provinces if it could either restrain its other spending, increase taxes, or some combination of the two.

A focus on what some have called the “fiscal imbalance” rather than the more general “fiscal squeeze” should therefore be avoided as it will both cloud the central issues and needlessly politicize a debate that will in any event be fraught with difficult decisions. Canadians and their governments at all levels need to recognize that addressing Canada's looming fiscal squeeze will require a careful and transparent examination of our fiscal priorities. The sooner we begin this essential task, the better.

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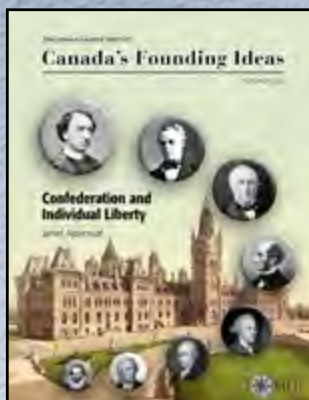
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