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Fiscal Sustainability Report

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The *Parliament of Canada Act* mandates the Parliamentary Budget Officer (PBO) to provide independent analysis to the Senate and House of Commons on the state of the nation's finances, government estimates and trends in the national economy. The following report provides an assessment of the sustainability of the Government of Canada's finances over the long term.

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Summary

In its November 2009 Economic and Fiscal Assessment Update, PBO projected that the Government's structural budget balance would deteriorate over the medium term, resulting in a deficit equivalent to 1 per cent of gross domestic product (GDP) by 2013-14 and federal debt reaching 34 per cent of GDP. To assess whether a government's fiscal structure is sustainable, however, requires looking beyond projections of budget deficits and debt over a medium-term horizon to take into account the economic and fiscal implications of population ageing. A sustainable fiscal structure is one that does not lead to substantial and sustained increases in a government's debt relative to GDP over the long term.

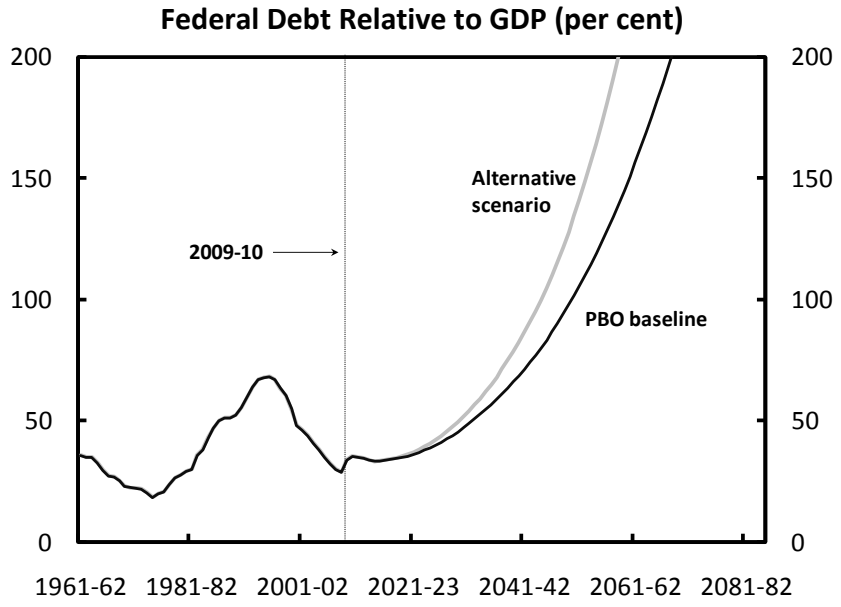
This report assesses the sustainability of the Government of Canada's fiscal structure. Such an assessment requires a long-term perspective because in Canada, as in other industrialized countries, a major demographic transition is underway that will strain government finances. During this time, the ageing of the population will move an increasing share of Canadians out of their prime working-age and into their retirement years. With an older population, spending pressures in areas such as health care and elderly benefits are projected to intensify. At the same time, slower labour force growth is projected to restrain growth in the economy, which will in turn slow the growth of government revenue.

Responsible fiscal planning, therefore, needs to take account of challenges not only over the next few years, but also those anticipated over the long term. Indeed, in the past few decades several OECD countries have assessed their fiscal sustainability by routinely preparing long-term economic and fiscal projections. This report, PBO's first *Fiscal Sustainability Report*, adopts a similar approach to that used by other OECD countries to assess the sustainability of the federal government's fiscal structure.

This report considers two projection scenarios, a baseline and an alternative, that differ with respect to their assumptions about the Canada Health Transfer (CHT). In the baseline scenario, the CHT grows in line with provincial-territorial government health expenditures projected using a standard approach, while in the alternative scenario the CHT is assumed to continue to grow at its current rate of 6 per cent per year. For each scenario the report provides an estimate of the 'fiscal gap' – the degree to which the current fiscal structure is not sustainable. Specifically, the fiscal gap is the amount of fiscal action in terms of increased revenue and/or reduced spending that is required to achieve fiscal sustainability.

Overall, PBO's analysis indicates that:

1. The Government's current fiscal structure is not sustainable over the long term. That is, under the current fiscal structure, the Government's debt relative to GDP is projected to increase on a substantial and sustained basis over the long term.



2. To close the fiscal gap, permanent fiscal actions – either through increased taxes or reduced program spending, or some combination of both – amounting to 1.0 and 1.9 per cent of GDP are required under the baseline and alternative scenarios respectively. Based on historical experience, the estimated amounts of fiscal action required are achievable.

3. The fiscal action required to achieve sustainability does not need to be taken immediately. Implementing the necessary measures may be delayed until the economy has fully recovered without unduly increasing the fiscal gap. However, a significant delay in implementing fiscal actions substantially increases the required amount of corrective measures.

Although it is important to acknowledge that many elements of a long-term projection are uncertain, the demographic transition underway in Canada is not. PBO views long-term projections and fiscal gap analysis as providing an essential perspective for fiscal planning.

The projections presented in this report, however, should not be interpreted as predictions of the most likely future outcomes. Rather, they are simply a set of 'what if' scenarios that attempt to illustrate and quantify the implications of leaving the Government's current fiscal structure unchanged over time.

Further, while this report estimates the amount of fiscal action required to achieve sustainability, the analysis cannot be used to determine which actions should be taken or what the Government's debt relative to GDP should be in the long term.

Contents

1. Fiscal Sustainability Reporting

- *Assessing fiscal sustainability requires looking beyond medium-term projections of a government's budgetary balance or debt.*
- *Over the past few decades several OECD countries have assessed their fiscal sustainability by routinely preparing long-term economic and fiscal projections.*
- *The PBO is committed to preparing long-term economic and fiscal projections and to providing a Fiscal Sustainability Report on a regular basis.*

On their own, medium-term fiscal projections provide a useful but incomplete description of the challenges policymakers face. The main limitation of analysis based on medium-term projections is that given the major demographic transition underway in Canada and many other countries, they cannot be used to determine whether a government's fiscal structure is *sustainable* over the long term.[1] A sustainable fiscal structure is one that does not lead to substantial and sustained increases in a government's debt relative to GDP over the long term.

The major demographic transition that is underway in Canada will strain governments' finances over the next several decades. During this time, population ageing will move an increasing share of the population out of their prime working-age years and into their retirement years. With an older population, spending pressures in areas such as health care and elderly benefits are projected to increase. At the same time, slower labour force growth is projected to restrain growth in the economy, which will slow the growth of the general tax base from which government collects its revenue.

In addition to preparing long-term projections for assessing public pension plans on a regular basis over the past few decades, governments in several OECD countries have assessed their fiscal sustainability by routinely preparing long-term economic and fiscal projections – indeed many are required to do so by legislation (Table 1-1). According to the OECD (2009), such reports "offer invaluable signposts to help current governments to respond to known fiscal pressures and risks in a gradual manner, earlier rather than later, and help future governments avoid being forced to adopt sudden policy changes".

Table 1-1

Overview of Reports in OECD (2009) Survey

Country	Formal reporting obligation	Prepared By	First/most recent release	Frequency produced
Australia	Charter of Budget Honesty 1998	Department of the Treasury	2002/2007	At least every 3 years
Canada	**none**	**Department of Finance**	**2000/2002**	**Ad hoc**
Denmark	EU Stability and Growth Pact	Ministry of Finance	1997/2008	Annually
Germany	EU Stability and Growth Pact	Federal Ministry of Finance	2005/2008	At least every 4 years
Korea	none	Joint Task Force Team	2006/2006	Ad hoc basis
Netherlands	EU Stability and Growth Pact	Central Planning Bureau	2000/2006	Ad hoc basis
New Zealand	Public Finance Act (1989, amended in 2004)	New Zealand Treasury	1993/2006	At least every 4 years
Norway	none	Ministry of Finance	1993/2009	At least every 4 years
Sweden	EU Stability and Growth Pact	Ministry of Finance	1999/2009	Annually
Switzerland	none	Federal Finance Administration	2008/2008	At least every 4 years
United Kingdom	Code of Fiscal Stability 1998	HM Treasury	1999/2008	Annually
United States	none	Office of Management and Budget	1997/2008	Annually
	none	Congressional Budget Office	1991/2007	Approx. every 2 years
	none	Government Accountability Office	1992/2008	3 times per year

Source: Anderson and Sheppard (2009).

[1] OECD (2009) suggests that, in addition to demographic change, fiscal pressures and risks stemming from global climate change and contingent government liabilities (e.g., guarantees on government loans and uncertain public-private relationships) could also be incorporated into long-term fiscal projections. This report, however, focuses exclusively on fiscal pressures from demographic change.

Long-term fiscal projections for Canada were last published in Department of Finance Canada staff working papers.[2] However, since these papers were published several years ago there have been significant economic and fiscal changes. While these research papers did not represent the official views of the Government, Budget 2007 committed to "publish a comprehensive fiscal sustainability and intergenerational report with the 2007 *Economic and Fiscal Update*". This report would "provide a broad analysis of current and future demographic changes and the implication of these changes for Canada's long-run economic and fiscal outlook". The Government's report is yet to be published.

PBO believes that long-term economic and fiscal projections are an essential element of budget transparency and sustainability analysis. PBO is therefore committed to preparing long-term economic and fiscal projections and to providing a Fiscal Sustainability Report (FSR) on a regular basis. This year's report is a first step in providing a comprehensive assessment of the sustainability of public finances in Canada. The scope of the analysis in this report is limited to the federal government as further work is required to assess the sustainability of provincial, territorial and local governments or the Canada Pension Plan and Quebec Pension Plan.

In carrying out its sustainability reports, the PBO will be guided, in part, by the recent OECD recommendations that long-term projections:

- be prepared annually;
- incorporate comparisons with previous projections;
- include sensitivity analysis; and,
- clearly present changes in the methodology, key assumptions and data.

Fiscal Sustainability Analysis

In its November 2009 Economic and Fiscal Assessment Update (EFAU) PBO projected that the Government's structural budget balance would deteriorate from essentially a balanced position in 2007-08 to a structural deficit equivalent to 1 per cent of gross domestic product (GDP) in 2013-14 and that the Government's debt-to-GDP ratio would rise from 29.9 per cent to 33.8 per cent of GDP over the same period. To assess whether the Government's fiscal structure is sustainable, however, requires a much longer-term perspective in order to take into account the economic and fiscal implications of population ageing (see Box 1-1).

Assessing whether – and the degree to which – the Government's finances are sustainable involves projecting the Government's debt-to-GDP ratio over the long term assuming that the current fiscal structure is maintained. A sustainable fiscal structure is one that does not lead to substantial and sustained increases in a government's debt relative GDP over the long term.

Long-term fiscal projections, however, should not be regarded as forecasts or predictions of the most likely economic and fiscal outcomes rather they should be viewed as 'what-if' scenarios. Indeed, an unsustainable fiscal structure could result in an explosive increase in a government's debt-to-GDP ratio over the long term. Such a scenario would not likely be realized as responses by the government, households, firms and financial markets would bring about changes to this structure. Nonetheless, long-term debt-to-GDP projections serve as a useful signal and a gauge of fiscal sustainability although it is important to recognize that they are – as is the case with all long-term projections – subject to considerable uncertainty. That being said, in preparing its long-term projections, PBO has adopted several of the approaches and assumptions used by other countries.[3]

[2] See King and Jackson (2000), Jackson and Matier (2003) and Kennedy and Matier (2003).

[3] For example see Australia's 2007 Intergenerational Report http://www.treasury.gov.au/documents/1239/PDF/IGR_2007_final_re

Box 1-1: Distinguishing Estimates of the Structural Budget Balance and the Fiscal Gap

The structural (cyclically-adjusted) budget balance estimates what the budget balance would be at a point in time, if the economy were operating at its potential. It helps to distinguish short-term budgetary changes driven by cyclical movements in the economy (which tend to dissipate over time) from those budgetary changes expected to persist over the medium term.

In this vein, PBO's November 2009 EFAU estimated the Government's structural deficit at 1 per cent of GDP in 2013-14, when the economy is projected to be back at its potential based on PBO's survey of private sector forecasters and PBO's estimate of potential GDP. This structural deficit estimate does not mean that the budget will not return to surplus. Rather it suggests that achieving surplus would require: the economy operating significantly above its potential; actions to increase revenues or reduce spending; or, some combination thereof.

While the above considerations are useful for medium-term planning, they do not address the sustainability of government finances over the long term, which requires accounting for the economic and fiscal implications of Canada's ageing population.

A useful way to convey the sustainability of the fiscal structure to policymakers is with the concept of the fiscal gap, which is an estimate of the adjustment needed to the current structure in order to keep government debt on a sustainable path until some future date. The required adjustment typically assumes permanent actions to increase revenue, reduce program spending or some combination of both. The fiscal gap concept is necessarily forward-looking and focused on longer-term sustainability.

Long-term projections of a government's debt relative to GDP provide an indication of whether or not a given fiscal structure is sustainable over the long term. Further, the degree to which the fiscal structure needs to be adjusted to achieve sustainability – the 'fiscal gap' – can be estimated using the underlying projections of revenue and spending and given assumptions about long-term debt-to-GDP levels.

Estimates of the fiscal gap, however, cannot be used to determine which actions should be taken to achieve fiscal sustainability over the long term or what a government's debt-to-GDP ratio should be in the long term. Such issues are beyond the scope of this report and need to be addressed in a richer framework.

As this is PBO's first FSR, in future work PBO hopes to improve its projection methodology. In addition, PBO has attempted to describe as clearly as possible the methodology and key assumptions that drive the results so that others may replicate, modify or challenge the analysis.

The remainder of this report is organized into 4 chapters. Chapter 2 provides an overview of the demographic assumptions and projections. Chapter 3 discusses the economic implications of population ageing and presents the long-term projection of GDP and key assumptions which impact the long-term fiscal outlook. Chapter 4 presents projections of the Government's revenue, expenditures and debt over the long term. Chapter 5 presents PBO's estimates of the Government's fiscal gap and sensitivity analysis. Several annexes are also included that provide additional information and technical details.

port.pdf, HM Treasury's Long-term Public Finance 2008 report http://www.hm-treasury.gov.uk/d/bud08_longterm_586.pdf, and the General Accountability Office's 2009 *Long-term Fiscal Outlook* http://www.gao.gov/new.items/d10137sp.pdf.

2. Demographic Projection

- *Over the last 50 years, Canada, like most industrialized countries, has observed a sharp decline in its total fertility rate and a significant increase in life expectancies at birth.*
- *As a consequence, the current structure of the Canadian population makes it inevitable that the share of the population 65 years of age and over will rise significantly over the next three decades.*
- *Going forward, the ratio of prime working age Canadians to individuals of retirement age (defined as those 15-64 divided by those 65 and over) is projected to fall from approximately 5-to-1 in 2008 to 2.5-to-1 by 2033, stabilizing at 2-to-1 by 2070.*

Canada, like most industrialized countries, is undergoing a demographic transition that will have profound impacts on the Canadian labour market, economy and society more generally. The share of Canada's population that is 65 years of age and over will rise dramatically in the future as the decline in the total fertility rate observed since the late 1950s combined with the increases in life expectancies observed over the last 80 years has created a population structure that makes this fact all but inevitable. This transition will be particularly strong over the next 20 years as the baby boomers, those born between 1946 and 1964, turn 65 years of age and begin making the transition into retirement.

The demographic structure of the Canadian population is one of the key drivers of PBO's long-term economic and fiscal projection. The population projections presented in this chapter were produced for PBO by Statistics Canada's Demography Division using assumptions provided by PBO. PBO's assumptions are consistent with Statistics Canada (2005) until 2031. Specifically, PBO's demographic projection is driven by three key assumptions about the total fertility rate, life expectancy at birth and the immigration rate.

Annex A presents alternative demographic projections to illustrate the impact of altering these assumptions.

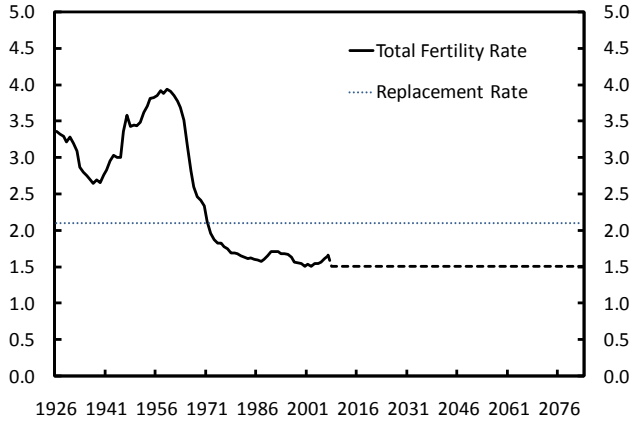
Total Fertility Rate

The total fertility rate, defined as the number of children born per woman of child-bearing age, peaked at 3.9 children per woman in 1959 towards the end of the period known as the "baby boom" and has declined significantly since then; remaining well below the replacement rate of 2.1 children per woman since the 1970s (Figure 2-1). Over the projection horizon, PBO has assumed that the total fertility rate will remain at 1.5 children per woman of child-bearing age, which is consistent with the Statistics Canada (2005) medium scenario and equals the average number of children born per woman observed over the 1997 to 2006 period (Figure 2-1).

Figure 2-1

Total Fertility Rate, 1926 to 2084

(Children per woman of child-bearing age)



Sources: Statistics Canada; Office of the Parliamentary Budget Officer.

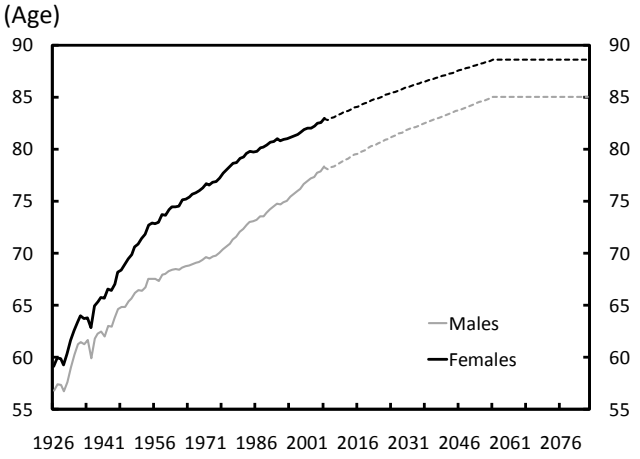
Life Expectancy at Birth

Life expectancy at birth has increased significantly over the last 80 years rising from approximately 58 years in 1926 to 80.6 years in 2006, an improvement of almost 23 years (Figure 2-2). Women, on average, have always had higher life expectancies at birth relative to their male counterparts, although the gap between the two

sexes has varied substantially over time. For example, a woman born in 1926 could, at that time, be expected to live approximately 2.3 years longer than a man born in the same year. However, while life expectancies of both sexes improved over the next 50 years, those of females rose at a faster rate than those of males and a life expectancy gap of 7.4 years had opened up by 1978. Life expectancies of both females and males continued to improve from 1978 to 2006, but male life expectancies increased at a faster rate than those of females over this period, narrowing the gap between female and male life expectancies to 4.6 years.

Figure 2-2

Life Expectancy at Birth, 1926 to 2084



Sources: Statistics Canada; Office of the Parliamentary Budget Officer.

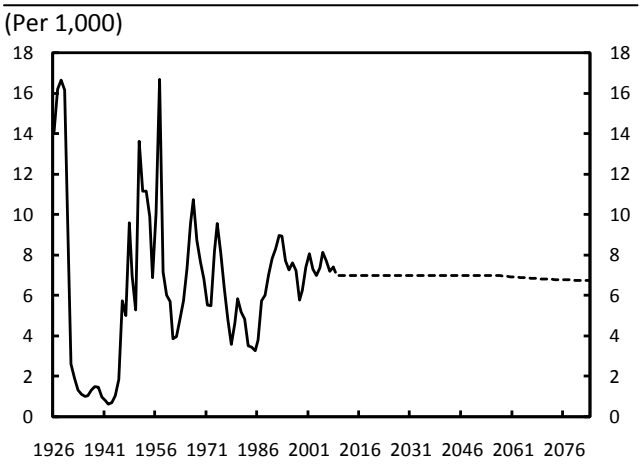
Going forward, PBO has chosen to use assumptions consistent with Statistics Canada (2005) medium scenario with life expectancies at birth projected to continue to improve, for both males and females, until 2056 at which point PBO has assumed that they will remain stable until 2084. Specifically, life expectancy at birth for males and females is projected to improve to 85 years and 87.6 years respectively.

Immigration Rate

The third assumption affecting PBO's population projection is the rate of immigration to Canada. The immigration rate has fluctuated significantly since 1926 reflecting the different immigration policies that existed at given points in time (Figure 2-3). Since the mid-1990s immigration rates have been fairly stable averaging approximately 7.3 immigrants per 1,000 persons in the population. Going forward, PBO has assumed that the immigration rate will remain stable at 7.0 per 1,000 until 2056 at which point the level of immigration is assumed to remain constant. This assumption is consistent with Statistics Canada's medium scenario until 2031, but assumes a higher level of immigration thereafter.

Figure 2-3

Immigration Rate, 1926 to 2084



Sources: Statistics Canada; Office of the Parliamentary Budget Officer.

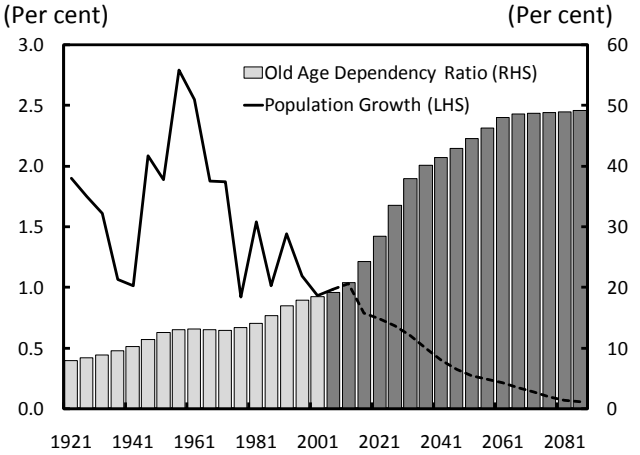
The Composition and Size of the Canadian Population

Given the three assumptions discussed above a detailed age and sex projection of the Canadian population has been produced. Two elements of the projection are noteworthy. First, population growth is expected to decline steadily throughout the projection horizon (Figure 2-4). Second, the old age dependency ratio, defined as individuals 65 years of age and over divided by the population between 15 and 64 years of age, is projected to

increase significantly in the coming decade rising to 26.7 per cent by 2019, a 7-percentage point increase, which is roughly equivalent to the total increase observed over the last four decades. Moreover, the pace of increase in the dependency ratio is expected to gain momentum, rising to 36.5 per cent by 2029. This pace is projected to slow after 2029, but the dependency ratio continues to increase until approximately 2070 when it stabilizes at around 49 per cent. Stated differently, in 1971 there were approximately 7.8 persons between the ages of 15 and 64 for every individual 65 years of age and over. By 2008 this ratio had fallen to 5.1 and is projected to continue falling, reaching 3.8 and 2.5 by 2019 and 2033 respectively before stabilizing at 2.0 in 2070.

Figure 2-4

Population Growth and the Old Age Dependency Ratio, 1921 to 2086



Sources: Statistics Canada; Office of the Parliamentary Budget Officer.

3. Long-term Economic Projection

- *As a result of population ageing, labour input growth is projected to decline significantly due to slower growth in the working age population and a decline in the share of the population participating in the labour market.*

- *The slowdown in labour input growth combined with PBO's assumption of labour productivity growth of 1.2 per cent suggests that the Canadian economy's potential growth rate will continue to decline, falling from 3.7 per cent in 2000 to 2.1 per cent in 2010 and 1.3 per cent by 2020.*

- *PBO's long-term projection suggests that growth in real GDP per capita will fall by a little more than half over the next 50 years. After growing by 2.1 per cent, on average, since 1961, real GDP per capita growth is projected to average only 0.9 per cent from 2009 to 2059.*

The second component of PBO's fiscal projection is its economic outlook. Over the 2009 to 2014 period the economic projection is taken from PBO's November Economic and Fiscal Assessment Update (EFAU). The economic assumptions underlying the November EFAU are taken from a survey of private sector forecasters for the following variables: real GDP growth, GDP inflation, Consumer Price Index (CPI) inflation, the unemployment rate, the 3-month Treasury-bill rate, and the 10-year Government of Canada benchmark bond rate. Beyond 2014, PBO's economic projection is driven by: our estimates of potential GDP growth, the size of the working age population, the aggregate employment rate and average weekly hours worked and by assumptions for: CPI inflation, GDP inflation, 3-month T-bill rate, and the 10-year government benchmark bond rate.

PBO's November EFAU provides a natural starting point for our long-term projection since, based on the November EFAU, the output gap (i.e. the level of real GDP relative to potential GDP) is almost closed by 2014 and therefore beyond the medium term, real GDP should grow, on average, at its potential growth rate. While it is inevitable that the economy will be subject to both positive and negative shocks going forward, the economy can be expected to return to its potential level following such shocks. As a result, average real GDP growth should equal average potential GDP growth over a long horizon, which is consistent with simply assuming that real GDP will grow at the same rate as potential GDP over the long term.

Potential GDP

PBO's projection of real GDP growth beyond 2014 is driven by its estimate of potential GDP.[4] Potential GDP is the amount of output that an economy can produce when capital, labour and technology are at their respective trends. The gap between real GDP and potential GDP, referred to as the output gap, is assumed to close by 2016, at which point real GDP is assumed to grow at the same rate as potential GDP. PBO's measure of potential GDP is calculated from the supply side of the economy using the following identity:

$$Y = L \cdot \left(\frac{Y}{L} \right)$$

This identity states that real GDP (Y) is equal to labour input (L) multiplied by labour productivity (Y/L). PBO projects a trend for labour input and labour productivity separately and then combines their respective trends to construct its measure of potential GDP.

Labour Input

Labour input, i.e. total hours worked, is determined by the size of the working age population (LFPOP), the aggregate employment rate (LFER) and the average number of hours worked (AHW) by an employed individual in a given week:

$$L = LFPOP \cdot LFER \cdot AHW \cdot 52$$

[4] See PBO (2010) for additional detail on the methodology and assumptions used to estimate potential GDP.

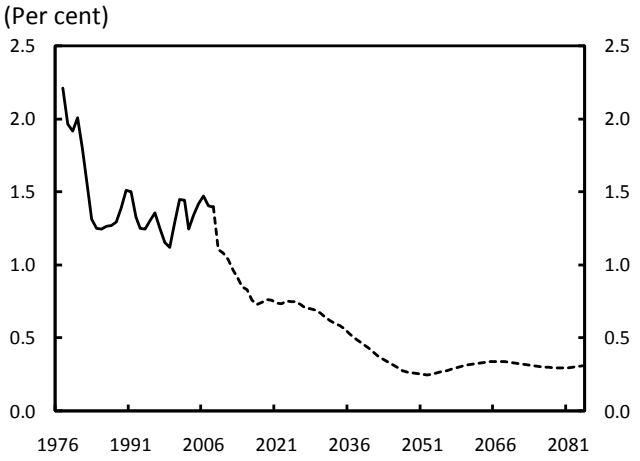
Each component is projected separately in PBO's projection in order to capture the different factors affecting their respective profiles. The demographic pressures noted above are projected to have important impacts on two of the components of labour input going forward.

i) Working Age Population

The working age population, defined as individuals 15 years of age and over, is taken from the Labour Force Survey. Over the projection horizon it is extrapolated using the individual age and sex profiles from the demographic projections discussed earlier. Growth in the working age population has slowed by a little more than a third in the last 30 years, falling from roughly 2.2 per cent in 1977 to 1.4 per cent in 2008 (Figure 3-1). Growth in the working age population is projected to continue to fall going forward, consistent with PBO's demographic projection.

Figure 3-1

Working Age Population Growth, 1977 to 2084



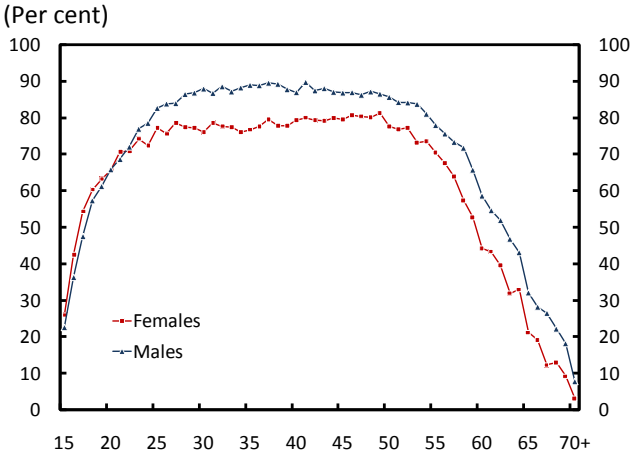
Sources: Statistics Canada; Office of the Parliamentary Budget Officer.

ii) Aggregate Employment Rate

The aggregate employment rate, defined as total employment relative to the size of the working age population, is the second key determinant of the amount of labour input that will be influenced by the demographic transition. If employment rates were independent of age, projecting the distribution of the working age population would have little impact on the aggregate employment rate. However, age matters and employment rates follow an inverted-U shape, staying relatively low until the mid-20s when the majority of individuals transition from school into the labour force (Figure 3-2). Participation in the labour market then rises and remains relatively stable throughout one's prime working years (25-54), before falling off after age 55 as individuals begin to transition into retirement and withdraw from the labour force.

Figure 3-2

Employment Rates by Age, 2008

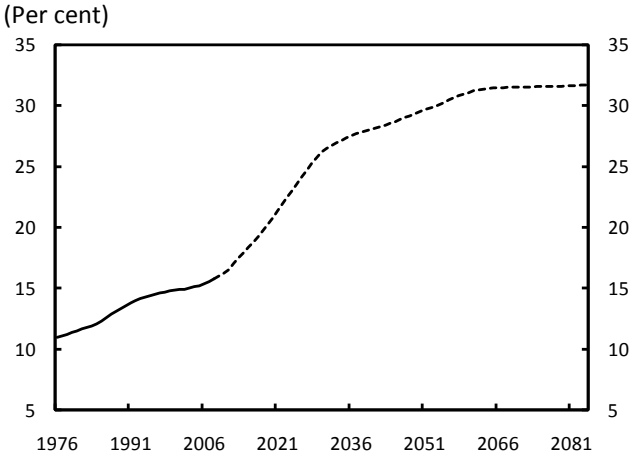


Sources: Statistics Canada; Office of the Parliamentary Budget Officer.

Therefore, the shift in the age composition of the Canadian population over the projection horizon towards older individuals will have important implications for the aggregate employment rate. Over the past 33 years, the share of the working age population 65 years of age and over has risen steadily from 11 per cent in 1976 to 15.8 per cent in 2008, a 4.8-percentage point increase (Figure 3-3). Based on PBO's projection this upward trend will accelerate rapidly in the next 20 years increasing 10 percentage points by 2029, as the large cohort of baby-boomers enter the 65 and over age group and live longer than earlier cohorts. The share of the working age population 65 and over is then projected to continue to rise, albeit at a slower pace, until 2060 at which point the share stabilizes around 32 per cent.

Figure 3-3

Population 65 years of Age and Over Relative to the Working Age Population, 1976 to 2084

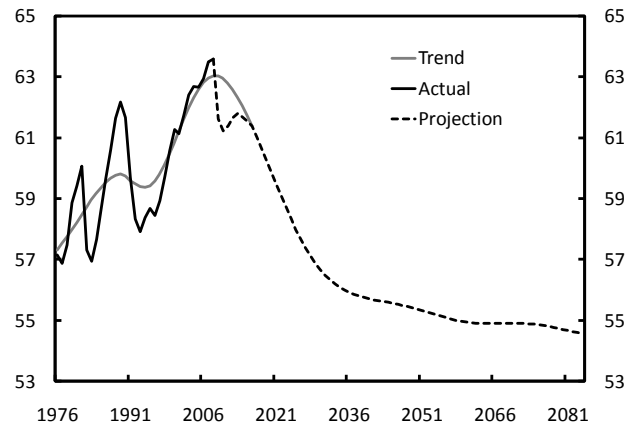


Sources: Statistics Canada; Office of the Parliamentary Budget Officer.

In the near term, the employment rate is projected to trough in 2010 before gradually recovering as the economy gains traction throughout the 2011 to 2014 period (Figure 3-4). Beyond 2014, the employment rate is assumed to return to its trend level by 2016 and is projected to decline due to the shifting composition of the working age population. The projected decline in the employment rate is particularly steep in the earlier part of the projection, with the declines moderating somewhat beyond 2030.

Figure 3-4

Aggregate Employment Rate, 1976 to 2084



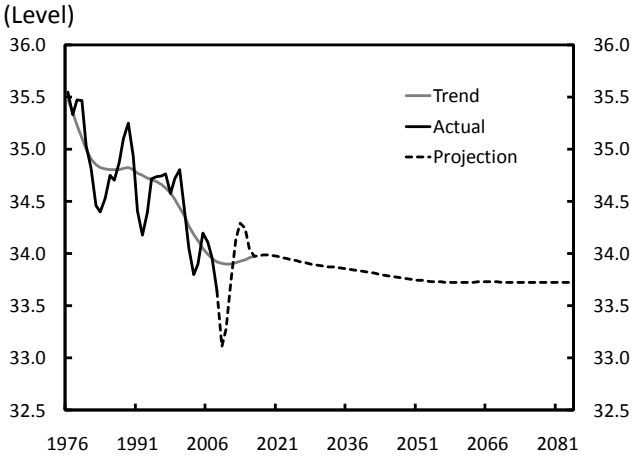
Sources: Statistics Canada; Office of the Parliamentary Budget Officer.

iii) Average Weekly Hours Worked

The final component of labour input, average weekly hours worked, is not projected to be significantly affected by the demographic transition. Average hours worked fell significantly in 2008 and 2009 as firms reduced production in the face of declining demand (Figure 3-5). Over the 2010-2014 period, average hours worked are projected to increase strongly as the economy rebounds and real GDP returns to, and surpasses, potential GDP. Average hours worked by employees are then assumed to return to trend by 2016 and are projected to remain relatively stable, declining only marginally, over the projection horizon.

Figure 3-5

Average Weekly Hours Worked, 1976 to 2084



Sources: Statistics Canada; Office of the Parliamentary Budget Officer.

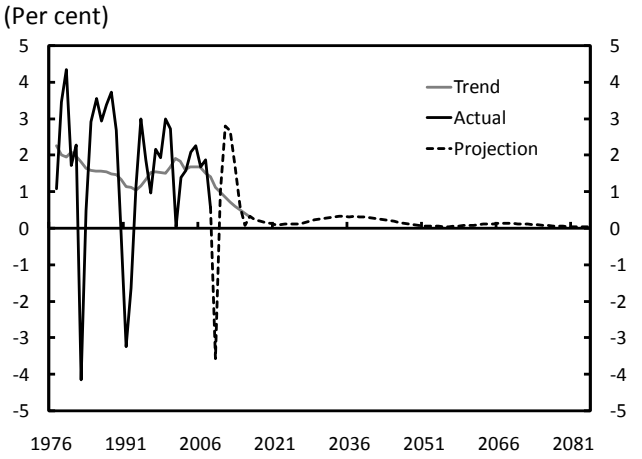
iv) Labour Input

The labour input projection is then constructed by combining the respective projection for the working age population, the aggregate employment rate and average weekly hours worked. In the near term, labour input growth is projected to remain volatile, being driven primarily by the economic cycle. However, beyond 2014 labour input growth is projected to decrease significantly due to the slowdown in the growth of the working age population and the projected decline in the aggregate employment rate (Figure

3-6). Specifically, labour input growth is projected to decline steadily beyond 2011 falling from 2.8 per cent to 0.6 and 0.1 per cent in 2014 and 2020 respectively. Labour input growth is then projected to fluctuate between 0.1 and 0.3 per cent growth well below the 1.9 per cent average growth observed over the 2003 to 2007 period.

Figure 3-6

Labour Input Growth, 1977 to 2084



Sources: Statistics Canada; Office of the Parliamentary Budget Officer.

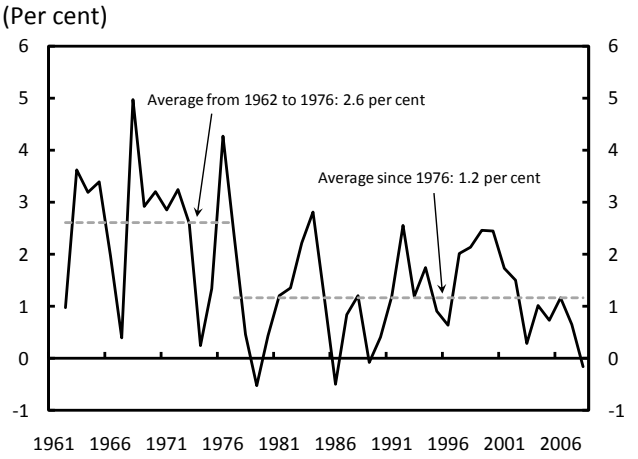
Labour Productivity

Growth in labour productivity, measured as GDP per hour worked, reflects capital deepening (i.e., increases in capital relative to labour) as well as technological improvements (typically referred to as total factor productivity).

Labour productivity growth has fluctuated significantly over the last 50 years, averaging 1.6 per cent since 1961 (Figure 3-7). However, this average masks the fact that Canada's productivity performance has deteriorated since the 1960s and early 1970s. From 1961 to 1976 labour productivity growth in Canada averaged 2.6 per cent, but since 1976 has only averaged 1.2 per cent. Moreover, since 2002 Canada's labour productivity performance has been particularly weak, having averaged only 0.6 per cent, coinciding with a period of relative strength in the Canadian labour market.

Figure 3-7

Labour Productivity Growth, 1962 to 2008



Sources: Statistics Canada; Office of the Parliamentary Budget Officer.

Beyond 2016, PBO has assumed that labour productivity growth will return to 1.2 per cent, the average rate observed since 1976. PBO believes that this is a reasonable assumption given Canada's recent productivity performance. While a significant amount of research has been done examining the potential impact that population ageing could have on labour productivity growth a consensus has yet to emerge. Some research suggests that labour productivity growth should rise due to capital deepening and increased incentives for younger workers to invest in human capital. Other research finds that labour productivity declines across older age groups thus suggesting that population ageing will put downward pressure on productivity. This conflicting evidence has led PBO to take a neutral assumption with respect to the likely impact of population ageing on labour productivity growth over the projection horizon. However, the sensitivity of PBO's fiscal gap estimate to this assumption is examined in Chapter 5.

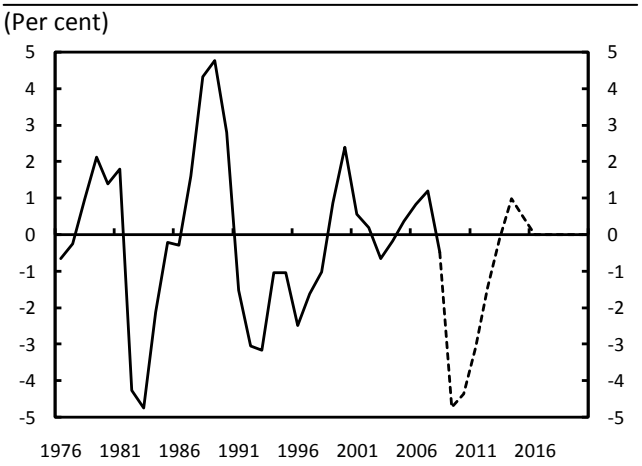
Real GDP Growth

Real GDP declined during the recent global recession. After having grown by only 0.4 per cent in 2008 the Canadian economy is projected to have declined by 2.3 per cent in 2009, pushing it well below its potential (see Figure 3-8). Based on the

private sector forecast presented in PBO's November 2009 EFAU, the Canadian economy is expected to rebound after 2009 with real GDP growth exceeding PBO's estimate of potential GDP growth throughout the 2010 to 2014 period. As a result, PBO's November EFAU projected that the output gap would eventually close by the fourth quarter of 2013, with the economy moving slightly above its potential in 2014 (+1.0 per cent).

Figure 3-8

Output Gap, 1976 to 2020

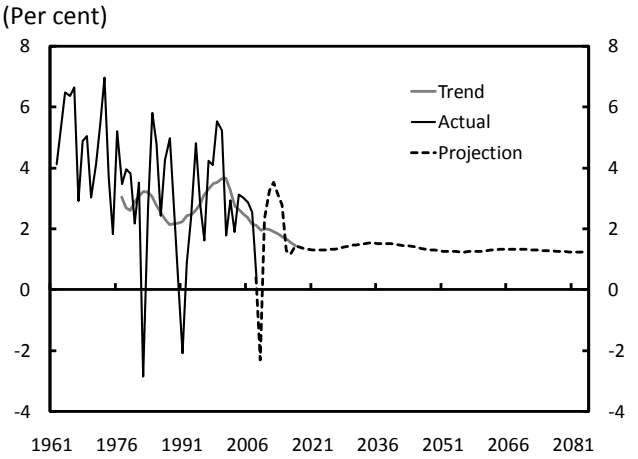


Sources: Statistics Canada; Office of the Parliamentary Budget Officer.

Beyond 2014, PBO assumes that the output gap will close by 2016 after which real GDP is projected to grow at the same rate as potential GDP (Figure 3-9). Real GDP growth is projected to decline over the projection horizon in line with the decline in labour input growth. More precisely, real GDP growth is projected to fall from 2.4 per cent growth, on average, over the 1991 to 2010 period to average growth of only 1.7 and 1.4 per cent over the 2011-2030 and 2031-2050 periods, respectively.

Figure 3-9

Real GDP Growth, 1962 to 2084



Sources: Statistics Canada; Office of the Parliamentary Budget Officer.

Real GDP Per Capita

As one of the most commonly used measures of increases in living standards, growth in real GDP per capita is often used as a benchmark to 'enrich' program entitlements in preparing long-term fiscal projections. Real GDP per capita can be expressed as:

$$\frac{Y}{POP} = \frac{L}{POP} \cdot \frac{Y}{L}$$

where: Y is real GDP, L is labour input, and POP is the total population. This identity shows that living standards are driven by two factors: the fraction of the population that is employed in the production process[5] and the efficiency with which those workers are able to produce goods and services (i.e. labour productivity).

Over the last 50 years, growth in real GDP per capita has exceeded growth in labour productivity. This has occurred because labour input growth exceeded growth in the total population over each of the last five decades thus contributing positively to the growth in real GDP per capita (Table 3-1). This stronger labour input growth relative to total

[5] Abstracting from movements in average hours worked.

population growth was the result of two factors. First, growth of the working age population, those 15 years of age and over, exceeded total population growth throughout most of this period. Second, the aggregate employment rate trended upwards throughout this period as female participation in the labour market increased significantly. These two factors were partially offset by the trend decline in average hours worked throughout this period.

Table 3-1

Components of Real GDP Per Capita Growth

(Per cent)

	Real GDP Per Capita	Real GDP	Labour Input	Labour Productivity	Population
1962 - 1970	3.2	5.0	2.2	2.7	1.7
1971 - 1980	2.6	4.1	2.3	1.7	1.4
1981 - 1990	1.6	2.8	1.7	1.1	1.2
1991 - 2000	1.9	2.9	1.2	1.7	1.0
2001 - 2010	0.8	1.8	0.9	1.0	1.0
2011 - 2020	1.3	2.1	0.9	1.2	0.8
2021 - 2030	0.7	1.4	0.1	1.2	0.7
2031 - 2084	1.1	1.3	0.1	1.2	0.2

Sources: Statistics Canada; Office of the Parliamentary Budget Officer.

Note: Labour input refers to total hours worked and labour productivity is measured as real GDP relative to total hours worked.

Going forward, PBO's long-term projection suggests that growth in real GDP per capita will fall by a little more than half over the next 50 years. Real GDP per capita grew by 2.1 per cent, on average, since 1961, but is projected to average growth of only 0.9 per cent from 2009 to 2059 (Table 3-1). The decline is being driven by both the relative slowdown in labour input growth and the growth assumption on labour productivity. First, the decline in the aggregate employment rate stemming from population ageing will put downward pressure on the fraction of the population that is involved in market production and consequently on real GDP per capita. Second, while real GDP per capita benefited from relatively robust labour productivity growth in the early part of the last half century, labour productivity growth over the last 30 years has been much more modest and is not expected to rise significantly over the projection horizon.

Other Assumptions

PBO makes assumptions for the following variables: CPI inflation, GDP inflation, 3-month T-bill rate, and the 10-year government benchmark bond rate. CPI and GDP inflation are assumed at 2 per cent annually, consistent with the Bank of Canada's target inflation rate. The 3-month T-bill rate and the 10-year government benchmark bond rate are assumed to be 4.2 and 5.3 per cent respectively. These assumptions are consistent with a real rates return of 2.2 and 3.3 per cent respectively, which is equal to the average ex post real rates of return observed over the 1993 to 2007 period.[6]

[6] This period was chosen to reflect the current monetary policy regime, but also to abstract from the recent financial crisis.

4. Long-term Fiscal Projection

- *Assessing whether the Government's fiscal structure is sustainable involves projecting its debt-to-GDP ratio over the long term.*
- *A sustainable fiscal structure is one that does not lead to substantial and sustained increases in a government's debt relative to GDP over the long term.*
- *PBO considers both a baseline scenario and an alternative scenario that assumes continued growth in the Canada Health Transfer at 6 per cent per year.*
- *In both scenarios, slower growth in revenues combined with increased spending on elderly benefits and health transfers results in explosive increases in the debt-to-GDP ratio over the long term, indicating that the current fiscal structure is not sustainable.*

The ageing of Canada's population will strain the Government's finances by putting downward pressure on budgetary revenues, as growth in economic activity, and therefore the tax base, slows. At the same time, ageing will put upward pressure on budgetary expenditures on programs whose benefits are mostly realized by Canadians in older age groups, such as elderly benefits and health care. The upward pressure on the costs of these programs will only be partially offset by reduced spending (as a share of GDP) on programs with benefits largely focused on younger age groups, such as education and social services. As a result, the combined impact of reduced revenue growth and higher expenditure growth is projected to lead to substantial and sustained increases in federal debt relative to GDP over the long term, indicating that the Government's current fiscal structure is not sustainable.

This chapter provides a detailed discussion of the methodology on which PBO's long-term projections of the Government's revenue and expenditures are based. The results of the projection for the outlook of the federal budgetary balance, operating balance and debt-to-GDP ratio under the current fiscal structure are also discussed. In Chapter 5, these results are used to calculate the "fiscal gap", which is a measure of the amount of fiscal action that is required to achieve sustainability.

It is important to note that PBO, like the Congressional Budget Office (CBO), assumes there to be no impact on economic growth or interest rates from the mounting debt that occurs in the scenarios considered. If this feedback were allowed, interest rates would be higher, and economic growth would be lower, in either scenario, as a result of the significant projected increase in federal debt levels that occur relative to GDP. Incorporating these effects, however, would simply accelerate the projected increases in debt-to-GDP ratios. This no-feedback assumption is essential in order to provide a stable economic backdrop that is required when producing these fiscal projections and fiscal gap estimates.[7]

Budgetary Revenues

For budgetary revenues, PBO has adopted the simplifying assumption that revenues grow in line with nominal GDP, the broadest measure of the Government's tax base. That is, beyond PBO's current medium-term projection horizon, based on the November 2009 EFAU, revenues remain constant as a share of GDP at their 2013-14 level.[8] The choice of 2013-14 is appropriate as the ongoing implementation of tax measures, such as the reduction to 15 per cent of the general corporate tax rate will be completed by this time and, according to PBO's most-recent projection, the output gap will essentially be closed and the economy will be operating near its potential GDP as of 2013. Therefore, at this point the Government's revenues are almost entirely structural in nature. Figure 4-1 illustrates this

[7] For a complete discussion see: The Long-term Budget Outlook, June 2009, Congressional Budget Office.

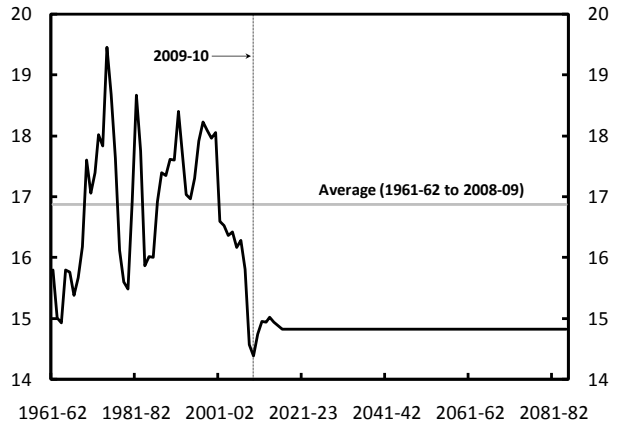
[8] With the exception of EI revenues, which are projected to decline from their 2013-14 level until they equal EI expenditures in 2016-17.

assumption, showing that revenues are held constant at just under 15 per cent of GDP, compared to the long-term historical average of around 17 per cent of GDP.

Figure 4-1

Federal Revenue

(Per cent of GDP)



Sources: Office of the Parliamentary Budget Officer; Department of Finance Canada.

Maintaining federal revenue constant as a share of GDP is the standard assumption used by many countries that have produced fiscal sustainability reports. Further, some of the largest revenue streams of the Government, such as those stemming from corporate income taxes and the Goods and Services Tax (GST), have flat rate structures, making the assumption appropriate.

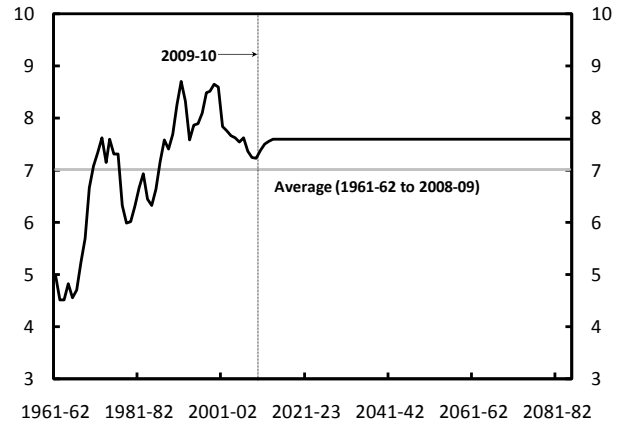
For personal income tax (PIT) revenues, however, this assumption implies that future policy action must occur to maintain the tax burden faced by individuals. That is, due to the progressivity of Canada's PIT system and that its brackets are indexed only to inflation, and not income, the real income growth that is expected over time will result in PIT revenues rising relative to GDP over the projection period, unless specific policy actions are taken.

PBO deems that a sustained increase in PIT revenues relative to GDP over the long term to be unlikely for two reasons: first, PIT relative to GDP is projected to be above its historical average as of 2013-14 (Figure 4-2); second, if PIT were projected in this manner, an ever-increasing proportion of Canadians would be pushed into the highest tax bracket, reducing the progressivity of the tax system and, therefore, the tendency for PIT revenues to rise relative to GDP over time. As a result, for this exercise, PBO believes holding revenue constant as a share of GDP to be the most appropriate assumption over the long term.[9]

Figure 4-2

PIT Revenue

(Per cent of GDP)



Sources: Office of the Parliamentary Budget Officer; Department of Finance Canada.

Budgetary Expenditures

As Canada's population ages, programs with benefits that are explicitly targeted towards older age groups, such as elderly benefits, or whose costs are disproportionately skewed towards older age groups, such as health care, will become relatively more important and expensive. On the other hand, those programs with benefits that are either targeted at younger age groups, such as children's benefits, or utilized relatively more

[9] Future PIT revenues may also be boosted somewhat due to the withdrawal of Registered Retirement Savings Plan and Registered Retirement Plan assets by retiring individuals that is likely to occur over the projection period due to the ageing of the population. Studies by the OECD (2004), "Long-term Budgetary Implications of Tax-Favoured Retirement Savings Plans" and the Department of Finance (2003), "Long-run projections of the Tax Expenditure on Retirement Savings" in *Tax Expenditure and Evaluations 2003*, however, indicate that this effect will likely be small.

frequently by individuals in younger age groups, such as those related to education, will become relatively less expensive.

For the Government of Canada, the main programs that can be expected to experience upward cost pressures are: Old Age Security (OAS) and related benefits – the Guaranteed Income Supplement (GIS) and Spousal Allowance (SA); and, the Canada Health Transfer (CHT), which is the main vehicle through which the Government of Canada funds provincial-territorial government health expenditures. The largest programs that can be expected to experience downward cost pressure are the Canada Social Transfer (CST) and children's benefits, which are comprised of the Canada Child Tax Benefit (CCTB) and Universal Child Care Benefits (UCCB).

PBO's projections of costs associated with each of the programs mentioned above are discussed in detail in this chapter. The remaining components of federal program spending (namely Equalization and Territorial Formula Financing and federal direct program expenditures), are assumed to grow in line with nominal GDP.

In the case of Employment Insurance (EI), although the program, which includes regular, maternity, parental and other special benefits, is largely used by the working-age population, the EI Act legislates that EI premium revenues be set such that they completely offset the costs of the program. As a result, as EI is legislated to be self-sustaining, the level of its benefits has no impact on the sustainability of the Government's fiscal structure. As such, EI benefits are assumed to maintain their projected 2013-14 share of GDP over the projection period, and EI revenues are projected to match this amount, plus associated administration costs.

Health Care Spending and the CHT

The majority of the responsibility for funding and managing Canada's health care system rests with provincial and territorial governments. As such, the Government of Canada's main health care-related expenditure, and in fact its single largest transfer ($24.0 billion in 2009-10) is the CHT, through which it finances a significant share of provincial-territorial government health expenditures. For example, data from the Canadian Institute of Health Information (CIHI) show that provincial and territorial governments spent about $104 billion on health care in 2007, of which the federal government financed about $21.3 billion (20.4 per cent) through the CHT.

The current annual value of the CHT is based on a 10-year accord, signed in 2004, between the federal and provincial-territorial governments, which set a CHT base funding level in 2005-06 at $19.0 billion and provided for 6 per cent annual growth in the CHT until fiscal year 2013-14, when it will reach $30.3 billion.

It is important to note also, however, that the federal government is directly responsible for the delivery and funding of health care services for certain specific groups, namely members of First Nations living on reserves, members of the military and veterans, as well as the funding for research and public health. Total spending in these categories totaled $6.1 billion in 2007. Federal direct expenditures on health make up a small portion of federal direct program spending (DPS) and are not projected independently as part of this exercise. These expenditures are targeted at very specific segments of Canada's population for which detailed demographic projections were not analyzed by PBO. As a result, in PBO's baseline projection, cost projections related to direct spending in these areas are assumed to grow at the same rate as the rest of federal DPS.

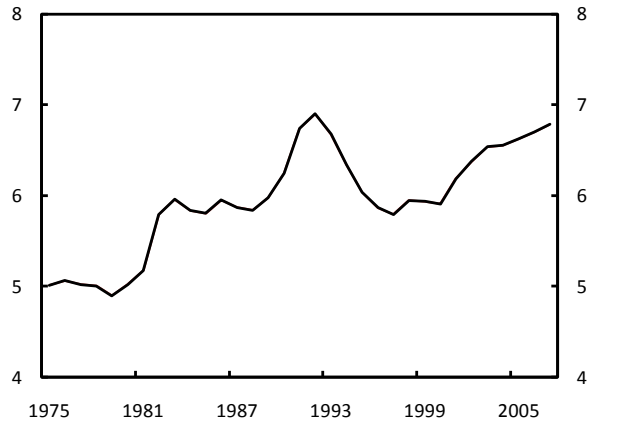
Provincial-territorial government health expenditures have risen considerably over the past 35 years. As a share of GDP, total provincial-territorial health expenditures increased from 5 per cent in 1975 to 6.8 per cent in 2007. Figure 4-3 shows that for most of this period health spending grew faster than GDP, with the exception of the 1990s, when the introduction of fiscal restraint measures at both the federal and provincial-

territorial levels led to significant cuts in health care services.

Figure 4-3

Provincial-Territorial Government Health Expenditure

(Per cent of GDP)



Source: Canadian Institute for Health Information.

Projecting Provincial-Territorial Government Health Expenditures

The standard approach used by CBO, the Organization for Economic Co-operation and Development (OECD) and others to project health expenditures is to decompose them into their three key drivers, namely: the age structure of the population; income; and, an enrichment factor posited to represent improvements in the quality and efficiency of the health care system (see Annex B). PBO's baseline projection of health expenditures uses this methodology.[10]

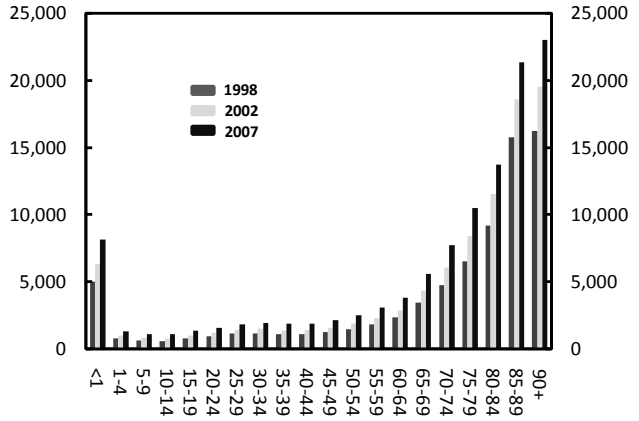
i) Age structure of the population

In general, the demand for and total cost associated with providing health care services will tend to rise as the population gets older. Figure 4-4 shows the rise in health spending per capita by age group and over time. Growth in per capita health expenditures is evident in every age group, and Figure 4-4 also highlights the significantly higher level of spending per capita for infants and seniors.[11]

Figure 4-4

Provincial-Territorial Government Health Expenditures by Age Group

(Dollars per capita)



Source: Canadian Institute for Health Information.

ii) Income

There is a vast economic literature suggesting a positive relationship between health spending and income, meaning that as an individual's income rises, their demand for health care services will also rise. What remains unsettled in the literature is the exact quantitative relationship between the two variables (i.e., the income elasticity of health care spending). OECD (2006) provides a review, as well as estimates, of the income elasticity of health spending from a number of studies. Although the paper is inconclusive, OECD (2006) argues that using unitary income elasticity in projecting health spending is a reasonable assumption. Based on the OECD paper, PBO assumes unitary income elasticity for health spending over history when

[10] For more detailed methodological discussions see: Congressional Budget Office (November 2007); OECD (2006); and Jackson and McDermott (2004).

[11] It is sometimes argued that the rise of life expectancy reflects a better health status of the population (i.e. *compression of morbidity)* and thus should lead to lower growth in health spending as the impact of ageing on health spending is delayed. Due to the difficulty of estimating this impact, PBO does not take it into account in its projection of health spending. See OECD (2006) and Hogan and Hogan (2002) for a detailed discussion of the relationship between ageing and health status and its implication for health spending.

identifying the enrichment factor. This means, a 1 per cent increase in income per capita would lead to a 1 per cent increase in health spending per capita.

iii) Enrichment

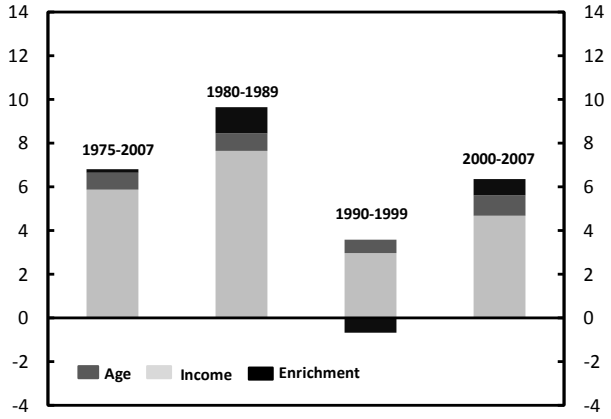
The final component of growth in health expenditures is determined residually, and is deemed to be the enrichment factor. Specifically, the increase in health expenditures that is not explained by the ageing of the population and increased income is posited to largely reflect technological advancements in health care. That is, this factor is thought to reflect the introduction of new drugs, equipment and procedures that have significantly raised the quality and effectiveness of health care services. As a result, demand for and utilization of health care services has increased, raising health care spending.

Figure 4-5 shows the decomposition of growth in health expenditures per capita into the three components described above for various periods from 1975 to 2007.[12]

Figure 4-5

Components of Provincial-Territorial Government Health Expenditures, 1975 to 2007

(Per cent annual growth)



Sources: Canadian Institute for Health Information; Office of the Parliamentary Budget Officer; Statistics Canada.

It is clear that income growth is the main driver of health expenditure growth over the entire period and in every sub-period. The age composition effect was relatively stable, ranging from 0.6 to 0.9 percentage points. The enrichment factor, however, varied significantly, ranging from -0.7 percentage points in the 1990s to 1.2 percentage points in the 1980s.

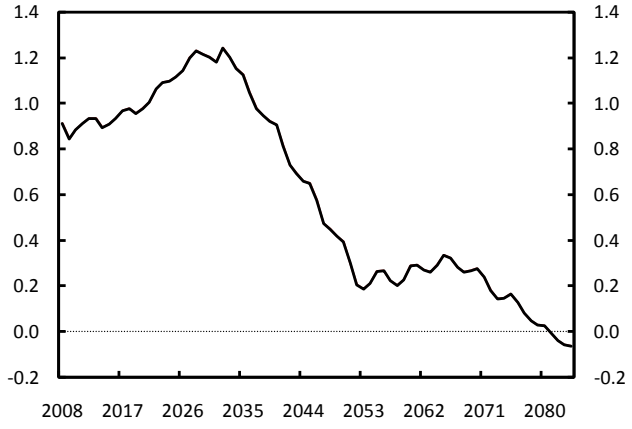
To be prudent, PBO's baseline health forecast uses the average enrichment factor calculated over the entire period, 1975-2007, averaging out the effects of periods of high and low growth in health expenditures. PBO's baseline projection also assumes a unitary health expenditure income elasticity. The age composition factor is projected using PBO's population projections and total 2007 health expenditures per capita by age group (see Annex B for details).

Figure 4-6 shows that growth in the age factor in this case increases steadily until 2030, before declining sharply over the following 25 years as growth of the population aged 65 and over peaks and begins to decline.

Figure 4-6

Growth in Age Factor

(Per cent annual growth)



Sources: Canadian Institute for Health Information; Office of the Parliamentary Budget Officer; Statistics Canada.

[12] See Annex B for the methodology used to estimate the age factor and the enrichment factor over the history and the projection period.

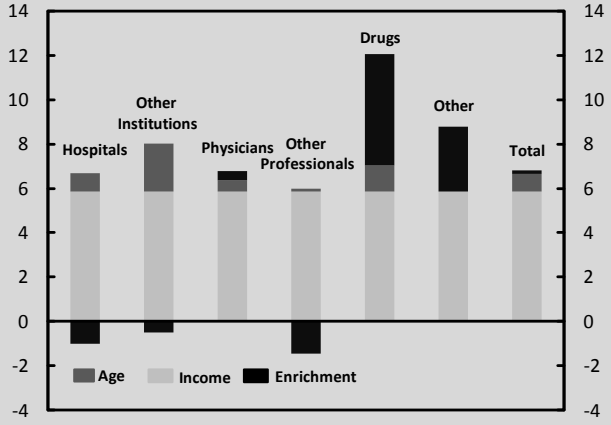
Box 4-1: A Component-Based Approach

To better understand the impacts of the age composition and enrichment factor on health expenditure growth, PBO also decomposed health expenditures into the main components for which age-specific data are available (Figure 4-1-1), these are: hospitals, other institutions (such as residential care facilities funded or licensed by provincial-territorial governments), physicians, other health professionals, drugs, and others (including spending on capital, public health, administration, health research, home care and transportation). This decomposition reveals that both the age factor and the enrichment factor vary significantly across the main categories of health expenditures. The age factor is more pronounced in the "drugs" and "other institutions" components, reflecting heavier use of these categories by the elderly population, while the enrichment factor is concentrated in the "drugs" and "others" components, reflecting the significant increase in the adoption of new drugs and medical equipment as well as increased spending on public health.

Figure 4-1-1

Components of Provincial-Territorial Government Health Expenditures, 1975 to 2007

(Per cent annual growth)



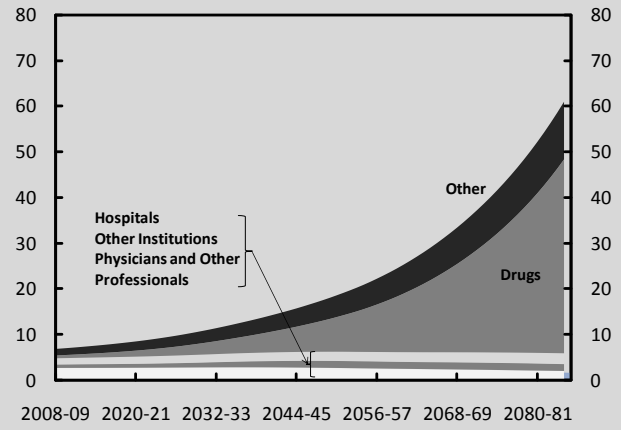
Sources: Canadian Institute for Health Information; Office of the Parliamentary Budget Officer; Statistics Canada.

To compliment PBO's baseline projection, a components-based projection was also produced whereby the six components of health expenditures mentioned above are projected separately, with enrichment factors calculated using historical (1975-2007) expenditures in each category.

Figure 4-1-2

Provincial-Territorial Government Health Expenditure by Component – Component-based Approach

(Per cent of GDP)



Sources: Canadian Institute for Health Information; Office of the Parliamentary Budget Officer; Statistics Canada.

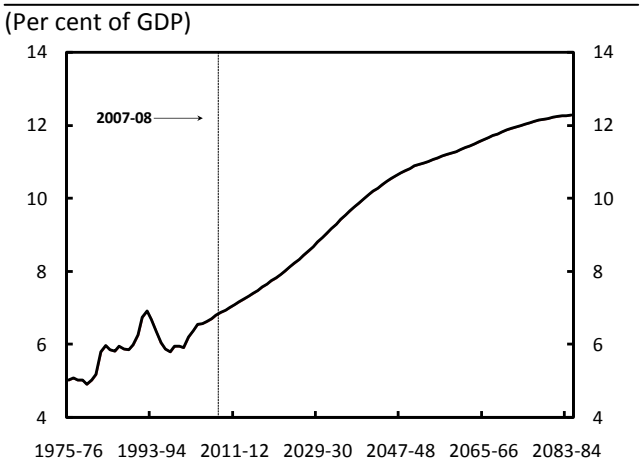
Total provincial-territorial government health expenditure is projected to rise to over 14 per cent of GDP by 2040-41 before rising to over 60 per cent of GDP by 2084-85 using the component-based approach. Jackson and McDermott (2000) contains a similar result using this method, projecting health spending of about 17 per cent of GDP by 2040. This increase is due to the extremely rapid projected growth in expenditures on "drugs" and, to a somewhat lesser extent, growth in the "other" expenditure component, which is largely a result of their high historical enrichment factors and the compounding nature of the projection method.

Caution is necessary in interpreting this projection, as it shows the consequences of allowing certain health expenditures to rise at rates well above growth in the size of the economy for an extended period of time.

Total provincial-territorial government health expenditure as a share of GDP is projected to rise from 6.8 per cent in 2007 to 10.9 per cent of GDP in 2050-51 and 12.3 per cent in 2084-85 (Figure 4-7). This increase is in line with other long-term projections of health expenditures. Jackson and King (2000) and TD Economics (2009) project health spending of 11 and 12 per cent of GDP respectively by 2040. Analysis conducted by the C.D. Howe Institute projects health spending of 12 per cent of GDP by 2050 and the OECD (2006) projects health spending of 10.2 per cent of GDP by 2050.

Figure 4-7

Provincial-Territorial Government Health Expenditures



Sources: Canadian Institute for Health Information; Office of the Parliamentary Budget Officer.

Projecting the Canada Health Transfer

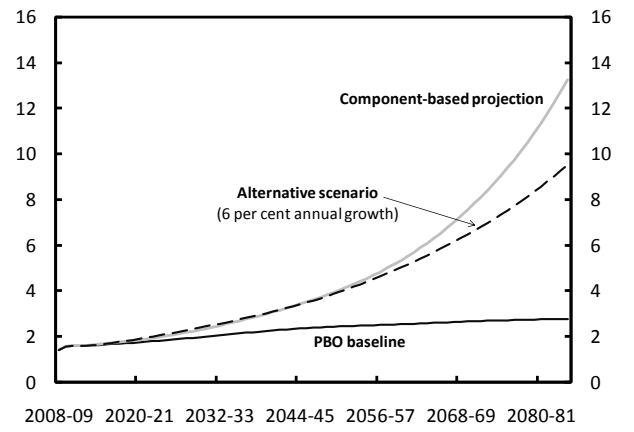
In PBO's baseline projection, the Government of Canada's share of provincial-territorial government health care costs is assumed to be maintained at its 2013-14 level, the final year of the current federal-provincial-territorial agreement, and therefore to grow in line with provincial-territorial government health expenditures as calculated above beginning in 2014-15 and over the remaining years of the projection period.

However, given the much higher growth in provincial-territorial government health expenditures projected using the component-based approach (see Box 4-1), PBO believes it useful to provide an alternative scenario. That said, given that the growth implied by the component-based approach seems implausible, i.e. that provincial-territorial government health expenditures would reach 60 per cent of GDP, PBO has adopted the continuation of the current 6 per cent annual CHT escalator as the alternative scenario.

Figure 4-8 presents the results for the CHT projection based on the projected provincial-territorial government health expenditures under the baseline and alternative (maintaining the 6 per cent escalator) scenarios and for reference, the CHT growing in line with provincial-territorial government health expenditures under the component-based projection.

Figure 4-8

Canada Health Transfer Projections



Source: Office of the Parliamentary Budget Officer.

PBO's baseline projection results in a relatively modest increase in the CHT as a share of GDP from 1.6 per cent in 2009-10 to 2.8 per cent in 2084-85, while a continued escalation in the CHT at 6 per cent annually would result in the CHT reaching 9.5 per cent of GDP by the end of the projection horizon. In the component-based projection, the rate of increase in the CHT is slightly below the 6 per cent escalator until 2044-45. Thereafter, it rises faster than the 6 per cent case, ultimately

pushing the CHT to over 13 per cent of GDP by 2084-85.

The above projections of health spending suggest that population ageing and health care enrichment will put significant pressure on provincial-territorial governments, which finance the majority of public health spending. Therefore, even if the CHT grows in line with provincial-territorial health spending, these governments would face higher cost pressures than the federal government, reflecting the fact that provincial-territorial governments spend more on health care as a share of GDP than the federal government.

Elderly Benefits

The elderly benefits program is the largest of the Government of Canada's transfers to individuals, with total payments of $33.4 billion in 2008-09. The program is comprised of three benefits, the largest of which is Old Age Security (OAS: $25.3 billion in 2008-09), which provides payments to individuals 65 and over based on a past-residency requirement. The payment is not income-tested, however, benefits begin to be clawed back for recipients with annual incomes greater than $66,335 as of 2009. Remaining elderly benefits are provided through the Guaranteed Income Supplement (GIS: $7.5 billion in 2008-09) and the Spousal Allowance (SA: $0.5 billion in 2008-09), which are income-tested benefits provided to seniors with low incomes. GIS is provided to OAS recipients with incomes below the threshold, while SA is provided to individuals aged 60-64 who are married to, or have been widowed by, an OAS recipient and have incomes below the threshold. Maximum benefits for all three programs are indexed to the CPI.

Projecting elderly benefits requires assumptions regarding the growth in the number of recipients as well as growth in average benefit payments over the projection period. In PBO's baseline projection, the recipients are projected to grow with the population 65 and over and average benefits with the CPI. Further, PBO's baseline projection assumes that elderly benefits are also enriched by a factor equivalent to one half of the growth in real GDP per capita over the projection period.[13]

The elderly benefits enrichment assumption is akin to assuming that recipients of OAS, GIS and SA programs benefit at least somewhat from the growth in living standards experienced by the remainder of the population over the 75-year projection horizon. That is, although indexed to inflation and therefore the cost of living, an assumption of no enrichment to the OAS program would mean that seniors whose income is made up entirely by OAS, GIS and SA benefits would not experience any of the increase in the standard of living, materializing through real income gains, realized by the rest of the population.

One way to put this into perspective is to consider the average elderly benefit payment relative to projected average wages. In 2008 the average annual elderly benefit was approximately 14 per cent of the average annual wage (Figure 4-9). With no enrichment to the OAS program, the average elderly benefit relative to average wages would be expected to fall by about 60 per cent to 5.7 per cent by 2084-85. The PBO baseline enrichment assumption slows this decline such that the ratio would be 8.4 per cent in 2084-85.[14]

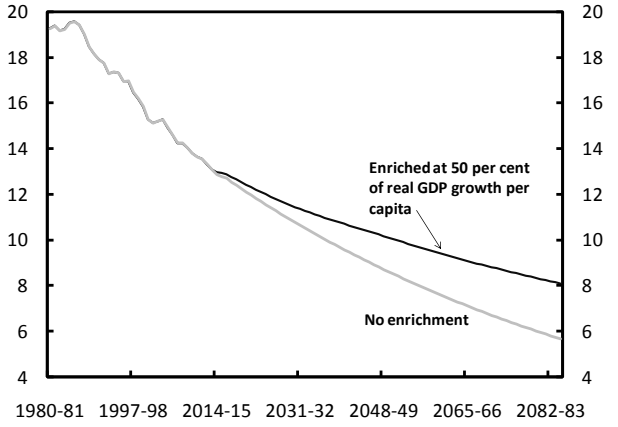
[13] The estimated enrichment factor (calculated removing growth due to CPI inflation and growth in the population 65 and over) from 1961-62 to 2008-09 is approximately 1.7 per cent. Real GDP growth per capita over this period was approximately 2.1 per cent.

[14] The Office of the Superintendent of Financial Institutions (OSFI) provides OAS, GIS and SA benefits projections to 2075 in its annual Actuarial Report on the Old Age Security Program. In doing so, OSFI provides detailed assumptions regarding the proportion of the eligible population expected to qualify, as well as the proportion of maximum benefits for which the average recipient would qualify. PBO has applied OSFI's assumptions, which have been prepared based on the Chief Actuary's own economic and demographic assumptions, to results that arise from PBO's underlying demographic and economic assumptions using OSFI's methodology. The results are consistent with PBO's basic methodology, described above, with an annual enrichment factor of about -0.2 per cent.

Figure 4-9

Average Elderly Benefits Relative to Average Wages

(Per cent of wage income)



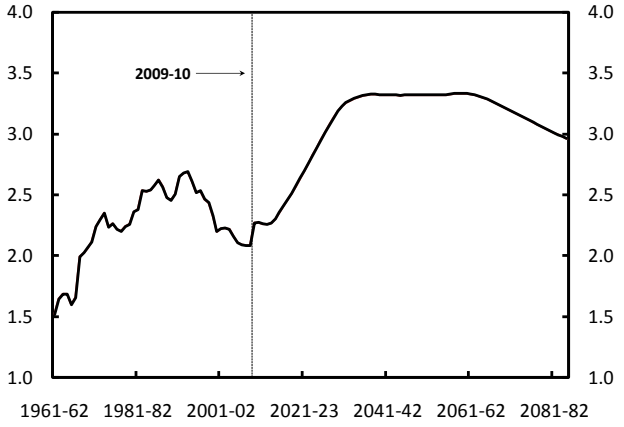
Sources: Office of the Parliamentary Budget Officer; Statistics Canada.

PBO's baseline projection of elderly benefits (Figure 4-10) results in an increase in the cost of the program of approximately 1 per cent of GDP from 2013-14 (2.3 per cent of GDP) to 3.3 per cent of GDP by 2031-32. Elderly benefits are then projected to remain at around 3.3 per cent of GDP for the following 35 years, before beginning to decline in 2064-65, as growth in the population 65 and over begins to decline.

Figure 4-10

Elderly Benefits

(Per cent of GDP)



Sources: Office of the Parliamentary Budget Officer; Department of Finance Canada.

Canada Social Transfer

The Canada Social Transfer (CST) provides federal funding to provinces and territories to support spending on social assistance, post-secondary education, and early childhood development. Until 2013-14, the CST is legislated to grow at 3 per cent annually. For the remainder of the projection, PBO sums the spending pressures for the three CST components, which are determined by: inflation; growth of the relevant population; and a program enrichment factor (see Annex C for the projection methodology and more detailed results).

Overall the results suggest a modest reduction in CST-related spending pressures, largely because the target populations for these programs are declining as a share of the overall population over the projection.

The program enrichment factors for the social assistance and post secondary education components have been set to their respective recent historical averages of 26 per cent and 50 per cent of real GDP per capita growth respectively. In the absence of historical data on the third component, the enrichment factor for the early childhood development component is assumed to grow with real GDP per capita over the projection period.

Over the 75-year projection period, CST growth averages 2.6 per cent annually, and declines as a share of GDP from 0.7 per cent in 2009-10 to 0.4 per cent in 2084-85.

Children's Benefits

Children's benefits are comprised of the Canada Child Tax Benefit (CCTB) and Universal Child Care Benefits (UCCB). The CCTB is a monthly payment made to help eligible families, those with family incomes below a determined threshold with children under 18 years of age. The UCCB is a payment made to individuals with primary responsibility for the care and upbringing of a child under the age of 6 years and is paid in instalments of $100 per month per child. For the purposes of

this report, children's benefits are equivalent to those contained in PBO's November 2009 EFAU projections to 2013-14, after which they are projected to grow with CPI, their relevant populations and, like the early childhood development and early learning and childcare component of the CST, an enrichment factor equivalent to real GDP per capita growth.[15] In the resulting projection, children's benefits decline slightly throughout the projection period as a share of GDP, moving from 0.8 per cent of GDP in 2009-10 to 0.6 per cent over the 75-year period.

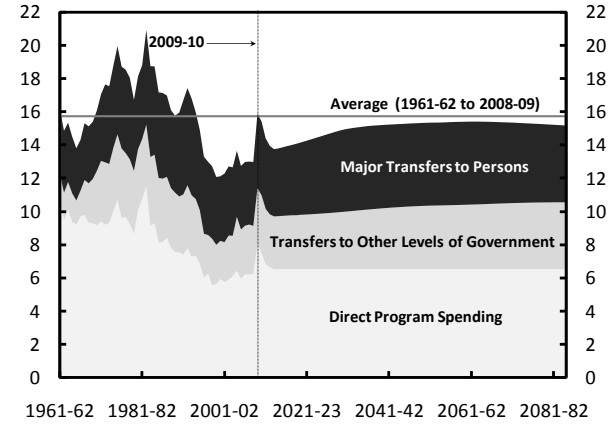
Total Program Spending

The remaining components of federal program spending are assumed to grow with nominal GDP over the projection period. This assumption, combined with the projections of the CHT, CST and elderly and children's benefits as described above, results in a program spending projection that rises from 13.8 per cent in 2013-14 to 15.4 per cent in 2050-51, before declining slightly to around 15.2 per cent by 2084-85 (Figure 4-11). It is important to note also that under these assumptions program spending as a share of GDP approaches but does not quite reach its historical average (1961-62 to 2008-09) of 15.8 per cent of GDP.

Figure 4-11

Program Spending

(Per cent of GDP)



Sources: Office of the Parliamentary Budget Officer; Department of Finance Canada.

Debt Dynamics and Fiscal Sustainability

Assessing whether the Government's fiscal structure is sustainable involves projecting its debt-to-GDP ratio over the long term. Fiscal sustainability requires that federal debt cannot ultimately grow faster than the economy.

Simple arithmetic dictates that the debt-to-GDP ratio will increase if the Government's debt grows faster than GDP. It is informative, however, to distinguish the key drivers underlying government debt-to-GDP accumulation: 1) the operating balance (i.e. revenue less program spending) relative to GDP; and, 2) the differential between the interest rate on debt and nominal GDP growth (see Box 4-2).

[15] Children's benefits, as shown in the Department of Finance Fiscal Reference Tables experienced enrichment of 3.8 per cent over the 1971-72 to 2008-09 period (after accounting for CPI and population growth) compared to real GDP per capita growth of 1.9 per cent over the period.

Box 4-2: The Arithmetic of Debt-to-GDP Accumulation

Maintaining a stable debt-to-GDP ratio (*D/Y*) over time requires running budget deficits that increase in line with GDP. The size of the budget deficit (as a share of GDP) necessary to maintain a stable debt ratio is equal to the GDP growth rate (*g*) multiplied by the current debt ratio (*g·D/Y*). However, when the effective interest rate on debt (*i*) exceeds GDP growth, which has been the case since 1980-81 with the exception of 2000-01, maintaining a stable debt ratio requires running operating balance (*OB*) *surpluses*. Further, as highlighted in Department of Finance Canada (1994), as a share of GDP, the size of the operating surplus necessary to maintain a stable debt ratio depends on the difference between the interest rate and the GDP growth rate as well as the current debt ratio (*D/Y*).

$$\frac{OB}{Y} = (i - g) \cdot \frac{D}{Y}$$

This relationship dictates that the debt-to-GDP ratio will increase if the operating balance as a share of GDP is smaller than the interest-growth rate differential multiplied by the current debt ratio.

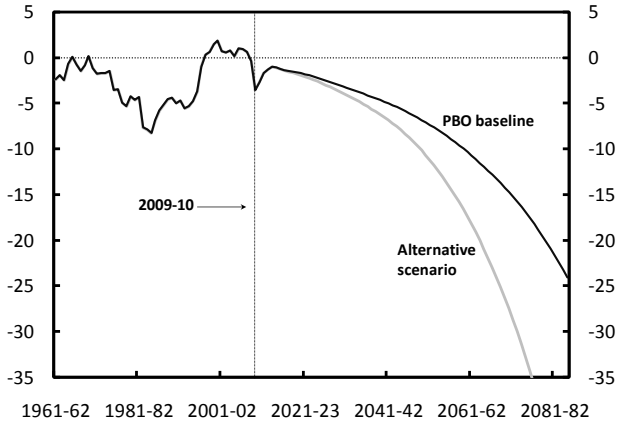
Figures 4-12 through 4-15 below show the dynamics resulting from PBO's baseline projection, as well as from the alternative scenario, in which the CHT is assumed to grow at 6 per cent annually over the long term. For the sake of simplicity, public debt charges are projected in this exercise using the effective interest rate on federal debt in the final year of PBO's November 2009 medium-term projection (see Annex D). This rate is consistent with that experienced in recent history and PBO's stable long-term projections of relevant interest rates. The result of this assumption is that changes in debt charges are driven by changes in the accumulated deficit over the projection horizon.

Under the baseline scenario, the Government's budget deficit, at approximately 1 per cent of GDP in 2013-14 (the final year of PBO's most recent medium-term projection), is projected to deteriorate to about 24 per cent of GDP in the final year of the projection period (Figure 4-12). As a result, the Government's debt-to-GDP ratio climbs from 33.8 per cent in 2013-14 to a projected 100 per cent of GDP in 2050-51 and finally reaching 365 per cent of GDP by 2084-85 (Figure 4-13). Under the alternative scenario with the CHT growing at 6 per cent per year, the deterioration in the Government's budget deficit and debt relative to GDP is even more dramatic.

Figure 4-12

Budgetary Balance

(Per cent of GDP)

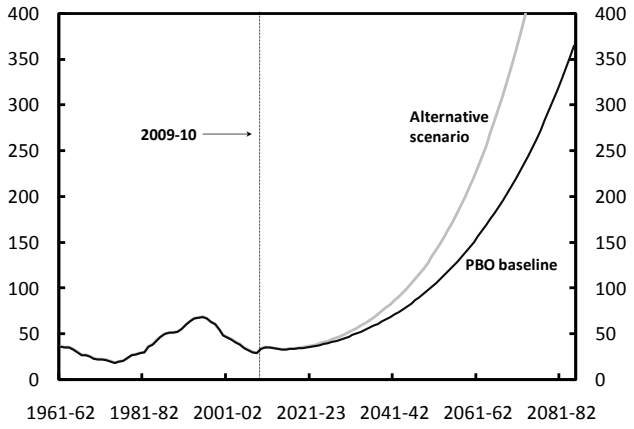


Sources: Office of the Parliamentary Budget Officer, Department of Finance Canada.

Figure 4-13

Federal Debt

(Per cent of GDP)



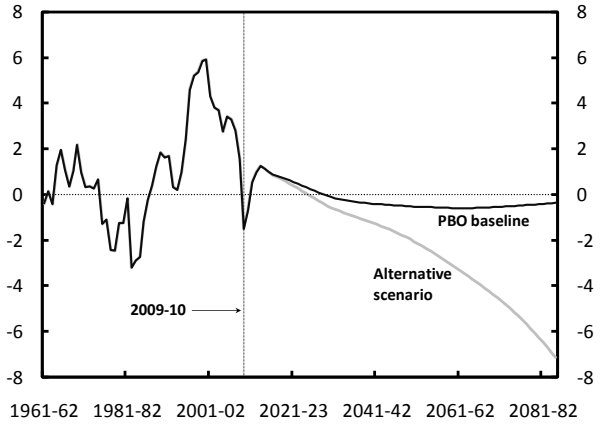
Sources: Office of the Parliamentary Budget Officer; Department of Finance Canada.

Figures 4-14 and 4-15 show the operating balance, which is revenues less program spending, and public debt charges as shares of GDP respectively, effectively breaking up the budgetary balance into its component parts.

Figure 4-14

Operating Balance

(Per cent of GDP)



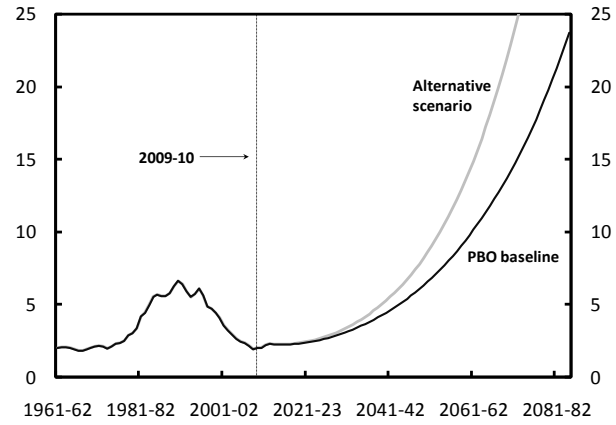
Sources: Office of the Parliamentary Budget Officer; Department of Finance Canada.

While the Government's operating balance (as a share of GDP) under the baseline scenario appears to deteriorate modestly yet remain relatively stable – averaging -0.5 per cent over the longer-term – this produces an unstable dynamic between debt and debt charges. Since the size of the operating balance is not sufficient to maintain a stable debt ratio – indeed an operating surplus is required – initial budget deficits begin to feed debt levels, which lead to higher annual public debt charges, which causes higher deficits and higher debt levels etc., resulting in an explosive increase in the debt-to-GDP ratio over the long term.

Figure 4-15

Public Debt Charges

(Per cent of GDP)



Sources: Office of the Parliamentary Budget Officer; Department of Finance Canada.

Under the alternative scenario, the same dynamic arises but it plays out more quickly. The substantial deterioration in the operating balance relative to GDP under the alternative scenario contributes to a more rapid deterioration in the budgetary balance, accelerating the debt-debt charge dynamic, resulting in an even more explosive debt-to-GDP ratio over the long term.

Recall that PBO has assumed that there are no 'feedback' effects between the higher debt-to-GDP and the economy. Box 4-3 below provides a brief discussion of the economic impacts of a higher debt to GDP ratio. Incorporating these effects, however, would simply accelerate the projected increases in debt-to-GDP ratios, as interest rates would be higher, and economic growth would be lower.

Box 4-3: Impacts of Debt-to-GDP Accumulation

Permanent increases in government debt relative to the size of the economy can impact the economy through various channels (e.g., Macklem, Rose and Tetlow (1994)). First, a permanent increase in the debt ratio can lead to reduced domestic savings if private saving does not increase sufficiently to offset the decrease in public saving (i.e., the increased budget deficits). Reduced domestic savings results in lower private investment and ultimately lower GDP and/or increased borrowing from abroad, leading to increased foreign indebtedness. The increase in foreign indebtedness would ultimately have to be financed by higher trade surpluses and reduced domestic consumption. Second, a permanent increase in the debt-to-GDP ratio requires that a government run a larger operating surplus, financed through increases in tax rates and/or reductions in program spending, resulting in lower consumption, investment and GDP as households and firms respond to the required fiscal measures. Lastly, an increase in government debt relative to GDP to high levels could increase the uncertainty about future fiscal actions, resulting in an increase in the interest rate risk premium on government debt.

The Government's Current Fiscal Structure is Not Sustainable

An explosive debt-to-GDP ratio is the primary characteristic used to determine the sustainability of a given fiscal structure. PBO's long-term projections, under both the baseline and alternative scenarios, indicate that the Government's current fiscal structure is not sustainable. The following chapter provides estimates of the amount of fiscal action required to achieve sustainability, returning the debt-to-GDP trajectory to a sustainable path and thereby closing the 'fiscal gap'.

5. Fiscal Gap Estimates

- *The fiscal gap represents the increase in taxes and/or reduction in spending, measured relative to GDP, that is required to achieve sustainability over the long term.*

- *Under the baseline scenario, PBO estimates the Government's fiscal gap at 1.0 per cent of GDP. Under the alternative scenario with continued growth in the CHT at 6 per cent annually, PBO estimates a fiscal gap of 1.9 per cent of GDP.*

- *Based on historical experience, the amount of fiscal action required to ensure sustainability in the baseline and alternative scenarios is achievable.*

- *Delays in implementing fiscal actions increase the amount of corrective action required to achieve sustainability over the long term.*

The debt-to-GDP projections in the previous chapter provide a clear indication that the Government's current fiscal structure is not sustainable. The degree to which this structure is not sustainable can be estimated by the 'fiscal gap' – the difference between the current fiscal structure and a structure that is sustainable over the long term. Specifically, the fiscal gap represents the increase in taxes and/or reduction in spending required to ensure that government debt relative to GDP does not increase on a substantial and sustained basis over the long term.[16]

The fiscal gap measure has been used by organizations such as the Congressional Budget Office (CBO), the OECD and IMF, as well as by researchers and analysts to quantify the long-term fiscal imbalance facing governments.[17] Among its advantages is that it conveys in a single number the magnitude of the fiscal action necessary to avoid unsustainable increases in a government's debt-to-GDP ratio. It also shifts the focus beyond assessing the budget balance or the debt-to-GDP ratio in a given year by explicitly taking into account future revenue and spending pressures. It can be calculated under a variety of assumptions and over different time horizons.

That being said, the fiscal gap cannot determine which actions should be taken to achieve fiscal sustainability over the long term or what a government's debt-to-GDP ratio should be in the long term. Such issues are beyond the scope of this report and need to be addressed in a richer framework that captures the costs and benefits of taxation, government spending and debt. Moreover, the fiscal gap estimates are based on the assumption that the economic backdrop over the long term remains stable i.e., there are no 'feedback' effects between higher debt-to-GDP or taxes or reduced spending and the economic projection.

Estimating the Fiscal Gap

The fiscal gap is typically measured as the immediate and permanent increase in a government's operating balance (i.e., revenue less program spending) measured relative to GDP that is required to achieve the level of the current debt-to-GDP ratio over the long term. The required increase in the operating balance can be achieved by increasing revenue, reducing program spending or some combination of both, from their projected paths over the long term. Since the projections of revenue and program spending span long time horizons, it is necessary to adjust them for the 'time value of money' i.e., to measure them in present-value terms. CBO (2009) notes that the fiscal gap "is the present-value measure of the nation's fiscal imbalance". Annex E provides the technical derivation of the fiscal gap.

As discussed in the previous chapter, the accumulation of government debt-to-GDP over the long term is driven by both the size of the projected operating balances relative to GDP and

[16] The fiscal gap methodology was developed in Blanchard et al. (1990) and Auerbach (1994).

[17] For example, see CBO (2009), Auerbach and Gale (2009) and OECD (2009).

the effective interest rate-GDP growth rate differential. However, the extent to which the current fiscal structure is not sustainable depends on the size of the operating balance-to-GDP ratio *relative* to the interest rate-GDP growth rate differential multiplied by the current debt-to-GDP ratio.[18]

Table 5-1 presents PBO's estimate of the Government's fiscal gap calculated over 25, 50 and 75-year horizons, i.e., for the years 2010-11 to 2034-35, 2010-11 to 2059-60 and 2010-11 to 2084-85 respectively under the baseline and alternative scenarios. As noted, the fiscal projections from 2009-10 to 2013-14 are taken from PBO's November 2009 EFAU. The Government's 'current' debt-to-GDP ratio is projected at 33.9 per cent in 2009-10 and the estimates are based on the assumption that fiscal actions required to achieve sustainability would be permanent and implemented immediately (i.e., starting in 2010-11). For each projection horizon (i.e., 25, 50 and 75 years), implementing these fiscal actions would ensure that the debt-to-GDP ratio returns to its 2009-10 level at the end of each horizon.

Table 5-1

Fiscal Gap Estimates

(Per cent of GDP)

	Projection Horizon		
	25 years	50 years	75 years
Baseline scenario	0.55	0.87	0.97
Alternative scenario	0.74	1.38	1.89

Source: Office of the Parliamentary Budget Officer.

Notes: The projection period starts in 2010-11. Calculations are based on the endpoint debt-to-GDP ratio of 33.9 per cent.

Under the baseline scenario, the fiscal gap is estimated at 0.55 per cent of GDP over a 25-year horizon. The estimate rises to 0.97 per cent of GDP when calculated over a 75-year horizon. In the latter case, this means that beginning in 2010-11, the Government's operating balance needs to be increased by almost one percentage point of GDP above its baseline level, through some combination of higher taxes and reduced program expenditure to achieve a debt-to-GDP ratio of 33.9 per cent after 75 years. Under the alternative scenario with the CHT growing at 6 per cent annually over the long term, the fiscal gap is estimated at 0.74 per cent of GDP over a 25-year horizon and 1.89 per cent of GDP when calculated over a 75-year horizon. The fiscal gap estimates increase as the projection period is extended, reflecting the inclusion of increased cost pressures stemming from population ageing and from the impact of enrichment (i.e., per capita growth in excess of GDP per capita growth and adjusted for age composition).

PBO believes that given the lengthy time horizon over which the demographic transition is occurring, it is more appropriate to focus on the 75-year fiscal gap to determine the amount of fiscal action necessary to achieve fiscal sustainability. While somewhat informative, the 25-year fiscal gap excludes a significant period of the demographic transition. For example, beyond the 25-year horizon, the old age dependency ratio is projected to increase by almost 10 percentage points from 39.3 per cent to 49.5 per cent over the remaining 50 years. Thus additional measures would still be required to achieve fiscal sustainability over the subsequent horizon, notwithstanding the fact that the projected levels of revenue and expenditure over the very the long term are discounted heavily.

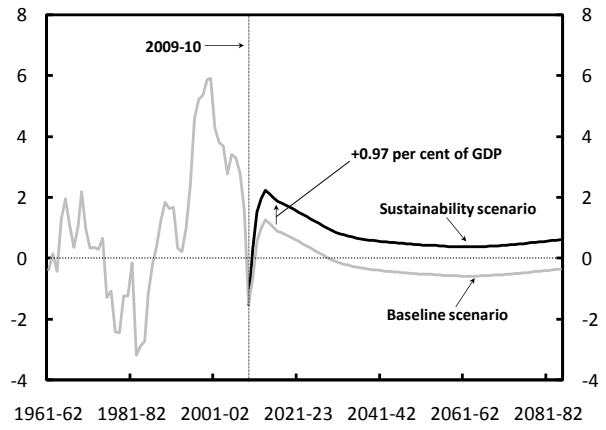
Figure 5-1 below illustrates the adjustment (amounting to 0.97 per cent of GDP) to the Government's projected operating balance required to close the fiscal gap under the baseline scenario i.e., achieve fiscal sustainability over the 75-year horizon.

[18] If projected operating balances were constant as a share of GDP over the long term, the fiscal gap would be equal to their share minus the interest rate-GDP growth rate differential multiplied by the current debt-to-GDP ratio.

Figure 5-1

Increase in the Baseline Operating Balance Required to Achieve Fiscal Sustainability

(Per cent of GDP)



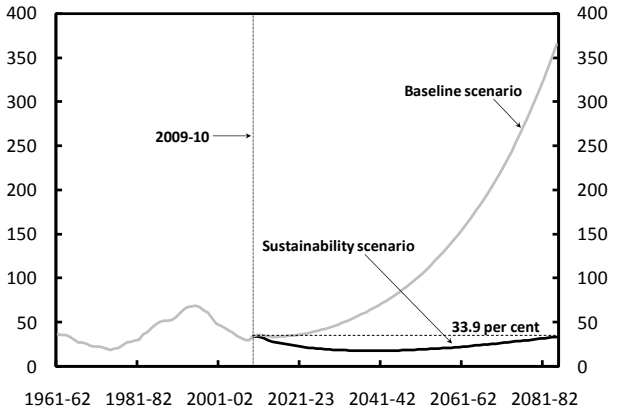
Sources: Office of the PBO; Department of Finance Canada.

Figure 5-2 shows the resulting impact on the Government's debt-to-GDP ratio of the adjustment to the operating balance necessary to close the fiscal gap. With the immediate and permanent increase in the operating balance-to-GDP ratio of 0.97 percentage points above its baseline level, the Government's debt-to-GDP ratio would decline somewhat from current levels before reaching the targeted endpoint of 33.9 per cent in 2084-85.

Figure 5-2

Debt-to-GDP Ratio under the Baseline and Sustainability Scenarios

(Per cent of GDP)



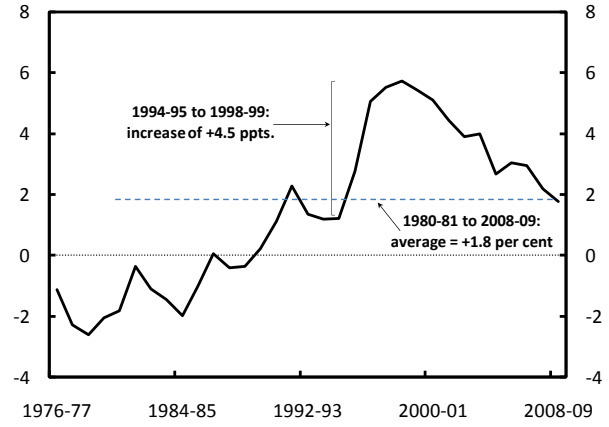
Sources: Office of the Parliamentary Budget Officer; Department of Finance Canada.

Based on historical experience, PBO believes that the amount of fiscal action required to ensure fiscal sustainability is achievable. Figure 5-3 shows that the structural operating balance (as a share of potential nominal GDP) increased by 4.5 percentage points from 1994-95 to 1998-99, a period over which the Government implemented and surpassed its deficit reduction targets. While not permanent, this amount of fiscal action exceeds the estimates of 0.97 and 1.89 per cent of GDP in the baseline and alternative scenarios. Further, the required increase in the operating balance of 0.97 per cent of GDP under the baseline scenario would result in a projected operating surplus averaging under 1 per of GDP over the projection horizon. This is well below the 1980-81 to 2008-09 historical average of 1.8 per cent of potential nominal GDP, the period over which the effective interest rate on federal debt exceeded growth in nominal GDP.

Figure 5-3

Structural Operating Balance, 1976-77 to 2008-09

(Per cent of potential nominal GDP)



Sources: Office of the Parliamentary Budget Officer; Department of Finance Canada.

Supplementary Fiscal Gap Estimates

As noted above, although the fiscal gap is typically computed using the current debt-to-GDP ratio as the endpoint over the long term, it can also be computed for any given debt-to-GDP value. Table 5-2 presents the fiscal gap calculations under the baseline and alternative scenarios for debt-to-GDP

ratios increasing in 25-percentage point increments from 0 to 100 per cent of GDP. The 'benchmark' estimates, calculated based on the current debt-to-GDP ratio (33.9 per cent) are shaded.

Table 5-2

Fiscal Gap Estimates under Different Debt-to-GDP Endpoint Values

(Per cent of GDP)

	Debt-to-GDP endpoint					
	0	25	33.9	50	75	100
Baseline scenario:						
25 years	1.44	0.78	0.55	0.12	-0.53	-1.19
50 years	1.14	0.94	0.87	0.74	0.55	0.35
75 years	1.07	0.99	0.97	0.92	0.85	0.77
Alternative scenario:						
25 years	1.63	0.97	0.74	0.31	-0.34	-1.00
50 years	1.65	1.45	1.38	1.26	1.06	0.87
75 years	1.99	1.92	1.89	1.85	1.77	1.70

Source: Office of the Parliamentary Budget Officer.

Table 5-2 shows that all else equal, an increase (decrease) in the debt-to-GDP endpoint reduces (increases) the fiscal gap as a smaller (larger) operating balance is required to achieve a higher (lower) debt ratio endpoint. Table 5-2 also shows that the fiscal gap estimates at the 25-year horizon are more sensitive to the debt-to-GDP endpoint than the fiscal gaps computed at the 75-year horizon. Indeed, at the 25-year horizon, the fiscal gaps in both the baseline and alternative scenarios shift from 1.4 and 1.6 per cent of GDP when a debt ratio of zero is considered to -1.2 and -1.0 per cent of GDP respectively when a debt-to-GDP ratio of 100 per cent is considered.[19] However, the 75-year fiscal gap is reduced to a lesser extent and remains positive across all endpoint values. This simply reflects the impact of discounting the endpoint debt ratio. Over longer horizons the endpoint debt-to-GDP ratio is discounted to a greater extent and therefore changes in the endpoint will not affect the fiscal gap estimate to the same extent. Indeed, the fiscal gap only increases by 0.1 percentage points from the benchmark estimate when a debt-to-GDP endpoint of zero per cent is considered.

The fiscal gaps computed above are also based on the assumption that fiscal measures required to achieve sustainability are implemented immediately; however, estimates can also be computed under alternative assumptions about the speed at which the required measures are implemented. Table 5-3 presents fiscal gap estimates under various assumptions about the implementation date while maintaining the endpoint debt-to-GDP ratio of 33.9 per cent in 2084-85. The benchmark fiscal gap estimates where measures are implemented immediately (i.e., in 2010-11) with an endpoint debt-to-GDP ratio of 33.9 per cent in 2084-85 are shaded.

Table 5-3

Fiscal Gap Estimates under Various Implementation Dates

(Per cent of GDP)

	Implementation Date					
	2010-11	2011-12	2014-15	2020-21	2030-31	2040-41
Baseline scenario:						
2084-85 endpoint	0.97	1.00	1.11	1.40	2.06	3.11
Alternative scenario:						
2084-85 endpoint	1.89	1.96	2.18	2.73	4.03	6.09

Source: Office of the Parliamentary Budget Officer.

Delaying implementing the measures required to achieve fiscal sustainability by one year i.e., waiting until the temporary stimulus under the Economic Action Plan is completed, only marginally increases the fiscal gap. Delaying implementation until after the economy has reached its potential GDP (i.e., 2014 based on PBO's most recent projection), raises the fiscal gap slightly under the baseline scenario to 1.1 per cent of GDP. Under the alternative scenario, the increase in the fiscal gap is

[19] In theory this suggests that the Government could reduce taxes and/or increase spending and stabilize the debt-to-GDP ratio at 75 or 100 per cent in 25 years under the baseline and alternative scenarios. However, beyond this point the Government's debt-to-GDP would increase without bound and the fiscal structure would not be sustainable.

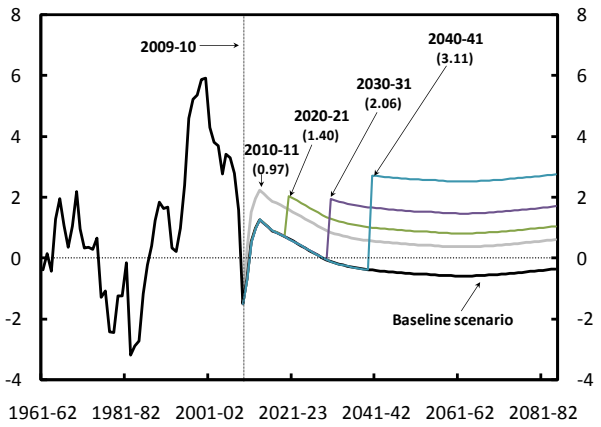
somewhat larger at 2.2 per cent of GDP when measures are implemented in 2014-15.

The fiscal gaps are also calculated in 10-year increments of delay with a maximum delay of 30 years considered. Delays of this magnitude demonstrate that the amount of fiscal action required to return the Government's debt-to-GDP ratio back to its 2009-10 level increase significantly as the implementation horizon extends over decades. For example, under the baseline scenario, the amount of fiscal measures required to achieve sustainability increases by 40 per cent (from 1.0 per cent of GDP to 1.4 per cent of GDP) with an implementation delay of 10 years; a 20-year delay doubles the amount of measures; and, delaying 30 years triples the amount of required measures, reaching 3.1 per cent of GDP. Figure 5-4 illustrates the projected paths of the operating balance under the baseline scenario for the 10-year increment delays considered.

Figure 5-4

Projected Operating Balance with 10-year Implementation Delays

(Per cent of GDP)



Sources: Office of the Parliamentary Budget Officer; Department of Finance Canada.

The impact of delaying implementation under the alternative scenario generally mirrors the results under the baseline scenario (i.e., delaying 20 and 30 years approximately doubles and triples respectively the benchmark fiscal gaps), with the fiscal gap reaching 6.1 per cent of GDP if the implementation of measures were delayed until 2040-41.

Sensitivity Analysis

To illustrate the sensitivity of the 75-year fiscal gap, PBO considers alternative projections and assumptions for key economic variables: the employment rate, productivity growth and interest rates.[20] For the baseline scenario, it is assumed that higher (lower) GDP resulting from a higher (lower) employment rate or from higher (lower) productivity growth affects both revenues and program spending. For example, a higher employment rate will raise nominal GDP – the broadest measure of the Government's tax base – and therefore increase revenue. However, by assumption, spending will also increase given its direct link to GDP and GDP per capita. For the alternative scenario, growth in the CHT is assumed to remain at 6 per cent while changes to GDP feed through other program spending components as in the baseline results. Further, changes to interest rates are assumed not to impact GDP and therefore revenue and program spending are unaffected. The effective interest rate on federal debt is assumed to move one-for-one with the increase in market interest rates. Table 5-4 presents the 75-year fiscal gap estimates in the baseline and alternative scenarios.

[20] The alternative economic projections and assumptions are introduced in 2015 and therefore have no impact on the medium-term (2009-10 to 2013-14) fiscal projection.

Table 5-4

Fiscal Gap Estimates under Alternative Assumptions about Key Economic Variables

(Per cent of GDP)

	Scenario	
	Baseline: 0.97	Alternative: 1.89
Employment rate:		
2 percentage points lower	1.05	2.06
2 percentage points higher	0.89	1.74
Productivity growth:		
0.5 percentage points lower	1.20	2.42
0.5 percentage points higher	0.71	1.35
Interest rates:		
100 basis points lower	0.78	1.95
100 basis points higher	1.15	1.88

Source: Office of the Parliamentary Budget Officer.

Sensitivity to the Employment Rate

A 2-percentage point reduction (increase) in the projected employment rate lowers (raises) the projected *level* of GDP – but not its long-term projected *growth* rate. Under the baseline scenario, the projected operating balance, as a share of GDP, is only slightly changed as most of program spending moves one-for-one with the change in revenues and GDP. However, some programs such as OAS and CST social assistance spending are only partially indexed to GDP and as a result do not decrease or increase to the same extent as the GDP projection. As a share of GDP, these programs therefore increase (decrease) marginally when the employment rate is lowered (increased). This reduces (increases) the projected operating balance-to-GDP ratio only marginally, leading to a larger (smaller) estimate of the fiscal gap compared to the benchmark estimate. Under the alternative scenario, the fiscal gap is somewhat more responsive to changes in the employment rate given that growth in CHT is maintained at 6 per cent and therefore does not provide any offset as revenues respond to the changes in GDP.

Sensitivity to Productivity Growth

A 0.5-percentage point reduction (increase) in productivity growth lowers (raises) the projected growth rate of GDP over the long term. While revenue and most of program spending move one-for-one with the change to GDP growth in the baseline scenario, given the partial indexation of OAS and CST social assistance spending to GDP, these programs do not respond to the same extent. As a result, the projected operating balance, as a share of GDP, is slightly changed from its original levels in the baseline scenario. In the alternative scenario, changes to productivity growth impact the projected operating balance to a greater extent given the maintained assumption on CHT growth. Moreover, changes to the GDP growth projection also affect the effective interest rate-GDP growth rate differential – which helps determine the size of the 'sustainable' operating balance – so that a reduction (increase) in productivity growth means that a larger (smaller) operating balance is required to achieve a given debt-to-GDP ratio. Thus the lower (higher) productivity growth assumption lowers (raises) the operating balance-to-GDP projection and increases (reduces) the effective interest rate-GDP growth rate differential which together result in a larger (smaller) fiscal gap compared to the benchmark estimates in the baseline and alternative scenarios.

Sensitivity to Interest Rates

100-basis point changes to market interest rates are assumed to feed one-for-one into the effective interest rate on federal debt. Changes to the effective interest rate do not affect the projected operating balance; however, they do affect the calculation of its present value and the interest rate-GDP growth rate differential. Under the baseline scenario, a 100-basis point reduction (increase) in interest rates results in a smaller (larger) fiscal gap compared to the benchmark estimate (0.97 per cent of GDP). This reflects the impact of a lower (higher) interest rate-GDP growth rate differential – a smaller (larger) operating balance is required to achieve the same debt-to-GDP ratio.

However, under the alternative scenario a 100-basis point reduction (increase) in interest rates results in a slightly *larger* (smaller) fiscal gap compared to the benchmark estimate (1.89 per cent of GDP). In this case, the impact on the fiscal gap of changing the interest rate-GDP growth rate differential is more than offset by the impact on the present value calculation of the operating balance-to-GDP ratio. In the alternative scenario, the operating balance, as a share of GDP, is projected to deteriorate significantly over the long term (see Figure 4-14). Reducing (increasing) the effective interest rate means that the outer years of the projection horizon – where the deterioration in the operating balance is the largest – are given more (less) weight in the present-value calculation, resulting in a larger (smaller) fiscal gap compared to the benchmark estimate. This impact is muted under the baseline scenario because the projected operating balance as a share of GDP is relatively stable over the long term (see Figure 4-14).

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Annex A
Alternative Demographic Projections

The demographic projection presented in Chapter 2 is meant to reflect a plausible scenario moving forward. All population projections, however, are sensitive to the assumptions for the total fertility rate, life expectancy at birth and the immigration rate, each of which is subject to varying degrees of uncertainty. Therefore, to illustrate the impact that altering these assumptions could have on both population growth and the composition of the population, PBO has chosen to present the alternative scenarios produced in Statistics Canada (2005). These projections presented medium, low and high assumptions for each of these three components, which were then used to construct projections out to 2056.

First, for the total fertility rate assumption Statistics Canada's medium scenario assumption is 1.5 children per woman of child-bearing age, which is consistent with PBO's baseline assumption. For the low and high scenarios Statistics Canada assumes 1.3 and 1.7 children per woman of child-bearing age respectively (Table A-1). Second, for the assumption on life expectancy at birth, Statistics Canada's medium scenario is also consistent with PBO's baseline assumptions discussed above. For the low (high) scenario Statistics Canada has assumed that life expectancy at birth will continue to improve throughout the projection horizon, although at slightly lower (higher) pace. In the low (high) scenario male life expectancy reaches 84.2 (85.8) years by 2056 while for females it reaches 87.9 (89.2) years. Finally, the immigration rate assumption in Statistics Canada's medium scenario is held constant at 7.0 per 1,000 until 2031 and gradually falls to 6.6 per 1,000 in 2056, a slightly lower assumption than in PBO baseline scenario. The low and high scenarios assume an immigration rate of 5.5 and 8.5 per thousand until 2031 respectively.

These alternative assumptions allow one to potentially construct a total of 27 different population projection scenarios. However, since this is mainly for illustrative purposes PBO has chosen to examine the two extreme scenarios (referred to as the low and high scenarios) where all three assumptions are at their respective low and high assumptions. In both the low and high scenarios population growth is projected to decline going forward.

Two key conclusions arise from these alternative scenarios. First, population growth can be expected to decline going forward. Over the 2010 to 2056 period, in Statistics Canada's medium scenario, population growth is projected to grow at an average annual rate of 0.52 per cent. In the low scenario this average growth rate declines to 0.17 per cent, but in the high scenario averages 0.84 per cent, still under current rates and well below rates observed since 1921 (Table A-1).

Table A-1

Population Growth in Alternative Scenarios

(Per cent)

	Medium Scenario	Low Scenario	High Scenario
1970 - 1979	1.42	1.42	1.42
1980 - 1989	1.20	1.20	1.20
1990 - 1999	1.09	1.09	1.09
2000 - 2009	1.05	1.05	1.05
2010 - 2019	0.78	0.48	1.06
2020 - 2029	0.67	0.35	0.99
2030 - 2039	0.49	0.13	0.83
2040 - 2049	0.32	-0.07	0.67

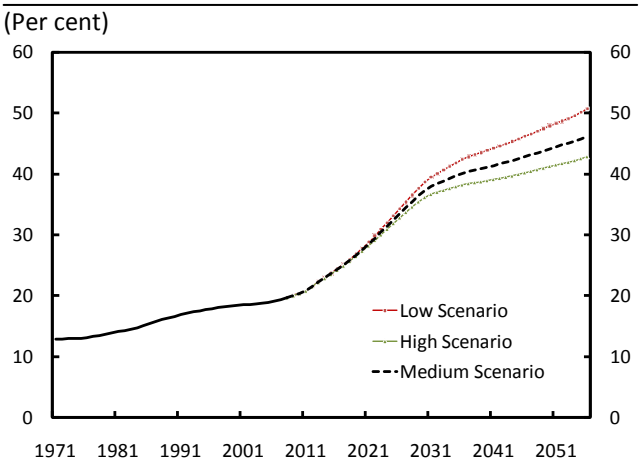
Sources: Statistics Canada; Office of the Parliamentary Budget Officer.

Second, the shift in the age composition of the Canadian population is inevitable as it is being driven by the current structure of the population and the old age dependency ratio will rise significantly over the projection horizon. In Statistics Canada's medium scenario the old age dependency ratio rises from 19.7 per cent in 2008 to 46.3 per cent by 2056, which is only slightly

lower than the 42.9 per cent reached in the high scenario and lower than the 50.7 per cent in the low scenario (Figure A-1).

Figure A-1

Old Age Dependency Ratio, 1971 to 2056



Sources: Statistics Canada; Office of the Parliamentary Budget Officer.

Annex B
Methodology for Projecting Health Expenditure

To project health expenditures in the future PBO adopts the methodology used by the U.S. Congressional Budget Office.[21]

Growth in health expenditures per capita is assumed to be composed of three factors: growth in GDP per capita; growth in the age composition factor; and growth in the enrichment of the health care service.[22]

This relationship can be written as:

$$EXPP_t = EXPP_{t-1} \cdot \left(\frac{GDPP_t}{GDPP_{t-1}} \right) \cdot \left(\frac{AGE_t}{AGE_{t-1}} \right) \cdot (1 + X_t)$$

Where *EXPP* is nominal health expenditure per capita, *GDPP is* nominal GDP per capita, *AGE* is the ageing component of per capita expenditure, and *X* is the enrichment factor. This model assumes that the income elasticity of health expenditure is equal to 1.

The age factor is estimated by applying the changes in the composition of the population to base-year health expenditures per capita by age group. This can be written as follows:

$$AGE_t = \sum_i \left[EXPP_i^b \cdot \left(\frac{Pop_{it}}{Pop_t} \right) \right]$$

Where $EXPP_i^b$ is the health expenditure per capita for a given age group (*i*) in the base period *(b)*, Pop_i is the number of individuals in a given age group and Pop is total population.

The enrichment factor, *X*, can then be estimated residually.

The Canadian Institute for Health Information (CIHI) provides data for health expenditures per capita by age group from 1998 to 2007. To measure the age factor over the history PBO used 1998 as the base year and estimated the age factor from 1975 to 2007. This, together with the available data on health expenditures per capita and the GDP per capita, allowed PBO to estimate the enrichment factor from 1976 to 2007. For the component-based approach the age factor and the enrichment factor were estimated separately for each category of health expenditures.

To project health expenditures in the future PBO assumed that the average enrichment factor over history will be maintained over the projection period. PBO then projected the age factor in the future. The year 2007 was used as the base year, which is the last year for which health expenditure data are available. Projections for population by age group are based on PBO's assumptions.

This framework can also be expressed and projected in terms of health expenditure *EXP* relative to nominal GDP:

$$\frac{EXP_t}{GDP_t} = \left(\frac{EXP_{t-1}}{GDP_{t-1}} \right) \cdot \left(\frac{AGE_t}{AGE_{t-1}} \right) \cdot (1 + X)$$

[21] See Appendix B of The Long-Term Outlook for Health Care Spending (November 2007), *Congressional Budget Office.* Other researchers have used a similar approach.

[22] In some studies this factor is called *excess cost growth* or *residual cost growth.*

Annex C
Canada Social Transfer Projection

The Canada Social Transfer (CST) provides federal funding to provinces and territories to support spending in three areas: 1) social assistance and services; 2) post-secondary education; and 3) early childhood development and early learning and childcare. Until 2013-14, the CST is legislated to grow at 3 per cent annually. For the remainder of the projection, the PBO sums the spending pressures for the three CST components, which are determined by: inflation; growth of the relevant population; and a program enrichment factor.

In the baseline 75-year projection, CST growth averages 2.6 per cent annually. Because this growth rate is slower than nominal GDP growth of 3.5 per cent over the projection, the CST is an area where spending pressures moderate, declining as a share of GDP from 0.7 per cent in 2009 to 0.4 per cent in 2084. This annex describes the projection methodology and results in more detail.

Table C-1 provides the growth in each CST component over the projection, and the growth of each cost driver for each CST component.

Table C-1

Projected CST Growth, by Component and Cost Driver, Average Annual Growth 2009-2084

(Per cent)

		Cost Driver			
	Total	Inflation	Population Growth	Changing Age Distribution	Program Enrichment
Projected Canada Social Transfer Growth	**2.60**				
CST Components:					
Social Assistance	2.48	2.00	0.37	-0.15	0.25
Post-Secondary Education	2.61	2.00	0.18	n.a.	0.42
Children	3.11	2.00	0.11	n.a.	0.98

Source: Office of the Parliamentary Budget Officer.

Social Assistance Component

The social assistance component grows at an average annual rate of 2.5 per cent over the projection. In each year, nominal social assistance growth is related to: inflation; the growth of Canada's population; the change in the age composition of Canada's population; and the growth of the program enrichment factor, as expressed in the following formula:

$$sa_t = (1+\pi_t)\cdot(1+\dot{pop}_t)\cdot(1+\dot{age}_t)\cdot(1+\dot{enrich}_t)\cdot sa_{t-1}$$

For 2009-2014, inflation is based on the PBO's November 2009 Economic and Fiscal Assessment Update, which uses the average response from a survey of private sector forecasters. Thereafter, inflation is assumed to grow at 2 per cent annually, the Bank of Canada's current inflation target.

The next two right-hand side variables in the above equation are a two-step way to estimate the growth in the population receiving social assistance. The benefit of this approach is that the term *age* isolates the impact of changes in the *age-distribution* of Canada's population (i.e. population ageing) separately from changes in the *level* of the overall population. This approach does, however, require detailed estimates of individual-level expenditures by age, which is not available for the remaining two CST components.[23]

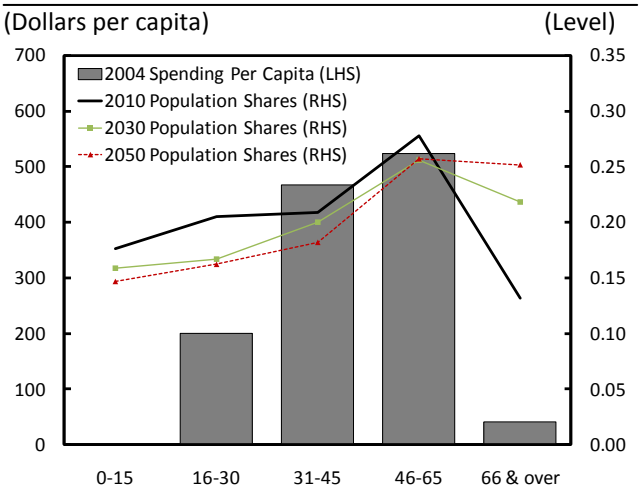
The results suggest that absent any program enrichment, population ageing will mildly reduce real provincial social assistance spending pressure per capita. Figure C-1 provides the intuition for this result. The vertical bars show that prime working age people receive the vast majority of social assistance spending, with only small amounts received by those over age 65. The lines on the figure show the ageing of Canada's population over the next 40 years. Real spending pressures for social assistance are projected to fall on a per capita basis because less of the population is in the costlier prime working age, while the increasing population shares of those over age 65

[23] PBO estimates these using Statistic Canada's *Social Policy Simulation Database and Model* (SPSD/M, version 16.2).

affect a group for whom social assistance receipts are quite small.

Figure C-1

Provincial Social Assistance Spending Per Capita in 2004, By Age Group



Sources: Office of the Parliamentary Budget Officer; Statistics Canada.

The $agecomp_t$ term is calculated as follows:

$$agecomp_t = \sum_{sex=M,F} \sum_{age=0}^{90+} \left(R_{age,t}^{sex} \cdot \frac{POP_{age,t}^{sex}}{POP_{sex,t}} \right)$$

where $R_{age,t}^{sex} = \frac{sa_{age,2004}^{sex}}{\left(\frac{1}{N}\right)\sum_{age} sa_{age,2004}^{sex}}$ and PBO assumes that $R_{age,t}^{sex} = R_{age}^{sex} \forall t$

The idea is to estimate how program spending pressures change due to shifts in the age-distribution of the population. $R_{age,t}^{sex}$ represents, for example, how much a typical male aged 25 received in social assistance per capita in 2004, relative to the male per capita average. PBO assumes that the age-distribution of these relative spending rates are constant over history and the projection. Weighting the R_{age}^{sex} terms by their respective population shares (which is in turn multiplied by the overall population) yields the number of people in each age-sex group in a given year.

The final term is the program enrichment factor. For this component, after the 3 per cent CST increases legislated until 2013-14, the estimated historical enrichment is assumed to continue over the projection. Historical program enrichment is estimated as the increase in real provincial and territorial social assistance spending per capita, estimated from historical data.[24] Over this historical period, this can be expressed as a share of average annual real GDP per capita growth, so that over the projection the estimated share of 0.26 is held constant, and the enrichment factor is driven by the dynamics of real GDP per capita growth.

Post-Secondary Education Component

The post-secondary component grows at an average annual rate of 2.6 per cent over the projection. Following the basic approach of the previous section, growth in nominal post-secondary spending is given by:

$$pse_t = (1+\pi_t)\cdot(1+\dot{pop}_t)\cdot(1+\dot{enrich}_t)\cdot pse_{t-1}$$

For the remaining two CST components the population ageing impact cannot be isolated from overall population changes, due to a lack of detailed individual-level data on program spending by age.

Inflation grows as above, averaging 2 per cent over the projection.

The relevant population growth is projected using estimates of enrolment rates and population projections, where PBO assumes the relevant population for post-secondary education is aged 17-29. The PBO follows the approach of Statistics Canada's (2007) 'Scenario 2' of enrolment rate growth in line with historical trends.[25] This is done

[24] Using nominal provincial and territorial social services spending from 1988-89 to 2008-09 from Statistics Canada's Financial Management System (FMS) government data, after accounting for CPI inflation and population growth.

[25] See Hango, Darcy, and Patrice de Broucker *Postsecondary Enrolment Trends to 2031: Three Scenarios,* Statistics Canada Research Paper 2007, Catalogue number 81-595-MIE — No. 058.

by estimating a linear trend for the growth observed in enrolment rates over 1992-2005, extrapolating this forward until 2016, and maintaining a constant enrolment rate thereafter. Multiplying these enrolment rates by the projected post-secondary population gives projected post-secondary enrolment. The analysis is done separately for university and college for full-time and part-time attendance, and aggregated.

The program enrichment factor is again derived from estimated real provincial and territorial post-secondary education spending per student, using historical data from Statistics Canada's FMS government data and education statistics. This grew 0.5 times as quickly as real GDP growth per capita over 1992-2005. As a result, for the projection after 2013-14, the PSE component is enriched at half of real GDP growth per capita each year.

Children's Component

The children's component grows at an average annual rate of 3.1 per cent over the projection. As above,

$$child_t = (1+\pi_t)\cdot(1+\dot{pop}_t)\cdot(1+\dot{enrich}_t)\cdot child_{t-1}$$

Inflation is as above. Here, the relevant population is age 0-4. In the absence of detailed spending data on this component, enrichment is assumed to grow at real GDP per capita growth over the projection, after 2013-14.

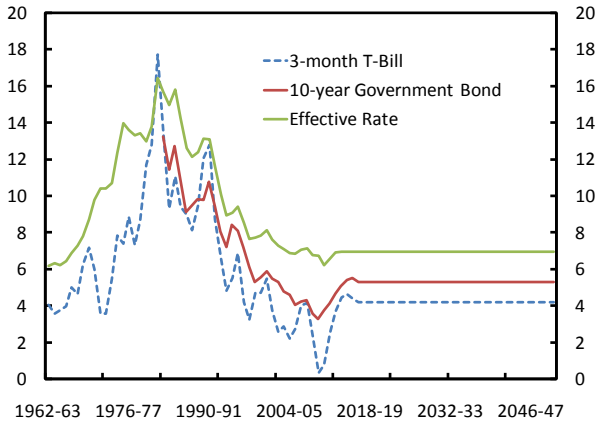
Annex D
Effective Interest Rate on Federal Debt

To calculate the borrowing costs of the Government, PBO estimates an effective interest rate defined as public debt charges divided by the previous year's accumulated deficit ('effective rate'). For the purpose of this report, PBO holds the effective rate constant at its 2013-14 level (6.95 per cent) for the duration of the projection.[26] PBO has chosen this assumption for its simplicity and because it is consistent with the historical relationship between the effective rate and market rates on 10-year government bonds and 90-day treasury bills over the last 30 years (Figure D-1).

Figure D-1

Effective Rate, 10-year Government Bond Rate, and 90-day Treasury Bill Yields

(Per cent)



Sources: Office of the Parliamentary Budget Officer; Public Accounts of Canada; Statistics Canada.

Notes: The effective rate is defined as public debt charges divided by the previous period's accumulated deficit. Short rates are yields on 90-day treasury bills, and long rates are yields on 10-year government bonds.

Determinants of Public Debt Charges

Public debt charges, and the effective rate, are a function of interest rates on market debt and interest rates on non-market debt. Over the 1995-2008 period, the effective rate of interest on non-market debt averaged 8.4 per cent while the effective rate of interest on market debt averaged 6.0 per cent. The share of market debt in total interest bearing debt also steadily fell over this period from 75.9 per cent in 1995-96 to 67.1 per cent in 2007-08, increasing the importance of non-market debt on the effective rate.

The largest components of non-market debt are the superannuation accounts of public pension plans.[27] They comprised 76.6 per cent of non-market debt in 2008-09 and the notional interest charged to these accounts is a significant portion of public debt charges (32.7 per cent in 2008-09). By holding the effective rate on public debt constant over the long term, PBO is implicitly assuming that the relative size of market debt and non-market debt will remain the same in the future.

Alternative Rate Path Assumption

PBO is currently conducting a more in-depth analysis of public debt charges, specifically focusing on non-market debt. Preliminary analysis suggests that the rate of interest on non-market debt may converge to market rates and that the share of non-market debt in total interest bearing debt will decrease over the long term. If the effective rate on public debt were to decrease from 6.95 per cent in 2013-14 to 5.0 per cent by 2050, the 75-year fiscal gap in the baseline scenario would decline from 0.97 to 0.74 per cent of GDP and would increase from 1.89 to 2.05 per cent of GDP in the alternative scenario.

[26] Values for 2009-10 to 2013-14 are from PBO's Economic and Fiscal Assessment Update published in November 2009.

[27] The three largest pensions are those for the Public Service, Canadian Forces and the Royal Canadian Mounted Police.

Annex E
Fiscal Gap Derivation and Definition

The government budget balance *BB* is defined as $BB_t = OB_t - i_t \cdot D_{t-1}$, where *OB* is the operating balance (revenues minus program spending) and *i* is the effective rate on government debt *D*. Government debt accumulates according to $D_t = (1+i_t)\cdot D_{t-1} - OB_t$. Solving the debt accumulation equation forward and substituting yields:

$$D_t = \prod_{i=1}^{k}\left(\frac{1}{1+i_{t+i}}\right)\cdot D_{t+k} + \sum_{i=1}^{k}\prod_{j=1}^{i}\left(\frac{1}{1+i_{t+i}}\right)\cdot OB_{t+i}$$

Fiscal sustainability is conventionally defined as satisfying the condition that debt cannot ultimately grow faster than the interest rate. Denoting growth in debt as *x* and evaluating over the infinite horizon implies that if debt does not grow faster than the interest rate over the long term, then

$$\lim_{k\to\infty}\prod_{i=1}^{k}\left(\frac{1}{1+i_{t+i}}\right)\cdot D_{t+k} = \lim_{k\to\infty}\prod_{i=1}^{k}\left(\frac{1+x_{t+i}}{1+i_{t+i}}\right)\cdot D_t = 0\,;$$

and the relationship holds than the current debt level must equal the present value of future operating balances, which is the starting point for fiscal gap calculations.

$$D_t = \sum_{i=1}^{\infty}\prod_{j=1}^{i}\left(\frac{1}{1+i_{t+i}}\right)\cdot OB_{t+i}$$

Given projected operating balances $\overline{OB}$, the current level of debt is unlikely to equal the present value of operating balances; thus the fiscal gap is the difference between the current debt level and the present value of projected operating balances. The fiscal gap Δ is usually expressed as the immediate and permanent change to the projected operating balance, calculated as a constant proportion of projected GDP ($\bar{Y}$).

$$D_t = \sum_{i=1}^{\infty}\prod_{j=1}^{i}\left(\frac{1}{1+i_{t+i}}\right)\cdot\left(\overline{OB}_{t+i} + \Delta\cdot\bar{Y}_{t+i}\right)$$

$$\Delta = \frac{D_t - \sum_{i=1}^{\infty}\prod_{j=1}^{i}\left(\frac{1}{1+i_{t+i}}\right)\cdot\overline{OB}_{t+i}}{\sum_{i=1}^{\infty}\prod_{j=1}^{i}\left(\frac{1}{1+i_{t+i}}\right)\cdot\bar{Y}_{t+i}}$$

The fiscal gap can also be computed over finite horizons under alternative assumptions about the endpoint debt-to-GDP ratio d^* at some point *k* periods in the future. Typically the current debt-to-GDP ratio is used as the endpoint.

$$D_t = \prod_{i=1}^{k}\left(\frac{1}{1+i_{t+i}}\right)\cdot d^*\cdot\bar{Y}_{t+k} + \sum_{i=1}^{k}\prod_{j=1}^{i}\left(\frac{1}{1+i_{t+i}}\right)\cdot\left(\overline{OB}_{t+i} + \Delta\cdot\bar{Y}_{t+i}\right)$$

$$\Delta = \frac{D_t - \prod_{i=1}^{k}\left(\frac{1}{1+i_{t+i}}\right)\cdot d^*\cdot\bar{Y}_{t+k} - \sum_{i=1}^{k}\prod_{j=1}^{i}\left(\frac{1}{1+i_{t+i}}\right)\cdot\overline{OB}_{t+i}}{\sum_{i=1}^{k}\prod_{j=1}^{i}\left(\frac{1}{1+i_{t+i}}\right)\cdot\bar{Y}_{t+i}}$$