

OFFICE OF
THE PARLIAMENTARY BUDGET OFFICER



BUREAU DU
DIRECTEUR PARLEMENTAIRE DU BUDGET

Fiscal Sustainability Report 2014

Ottawa, Canada
September 30, 2014
www.pbo-dpb.gc.ca

The mandate of the Parliamentary Budget Officer (PBO) is to provide independent analysis to the Senate and to the House of Commons about the state of the nation's finances, the estimates of the government and trends in the national economy; and upon request from a committee or parliamentarian, to estimate the financial cost of any proposal for matters over which Parliament has jurisdiction.

This report provides an assessment of the long-term sustainability of government finances for three government sub-sectors: the federal government; subnational governments consisting of provinces, territories, local, and aboriginal governments; and the Canada and Quebec Pension Plans. PBO will provide an update of the medium-term fiscal outlook for the federal government in October 2014.

Prepared by: Scott Cameron, Helen Lao and Trevor Shaw

Contents

Summary	1
1 Fiscal sustainability reporting	4
2 Demographics	4
3 Long-term economic projection	6
4 Federal government operations	10
4.1 Federal government revenues	10
4.2 Federal government program spending	11
4.3 Federal government primary balance	13
5 Operations of subnational governments	14
5.1 Subnational government own-source revenues	14
5.2 Subnational government program spending	14
5.3 Subnational government primary balance	19
6 Canada and Quebec Pension Plans	19
6.1 CPP and QPP Contributions	19
6.2 CPP and QPP expenditures	20
7 Sustainability assessment	20
7.1 Fiscal gap of the federal government	22
7.2 Fiscal gap of subnational governments	23
7.3 Fiscal gap of the CPP and QPP funds	24
8 Sensitivity analysis	27
References	32
Annex A	33
Annex B	34
Annex C	37
Annex D	38
Annex E	41
Annex F	43

SUMMARY

This report assesses the long-term sustainability of Canada's federal government, subnational governments, and public pension plans. The purpose is to determine if policy changes are required to address the fiscal consequences of demographic trends in the economy and age-sensitive government spending programs.

The results suggest:

- The federal government has fiscal room to meet all the challenges of ageing demographics under current policy. It could increase spending or reduce taxes while maintaining sustainable public debt.
- Canada's subnational governments (provincial, territorial, local, and aboriginal) cannot meet the challenges of ageing demographics. They must make significant policy changes to put public debt on a sustainable path.
- The Canada Pension Plan and Quebec Pension Plan can finance the projected increase in beneficiaries while remaining sustainable as a share of the economy.

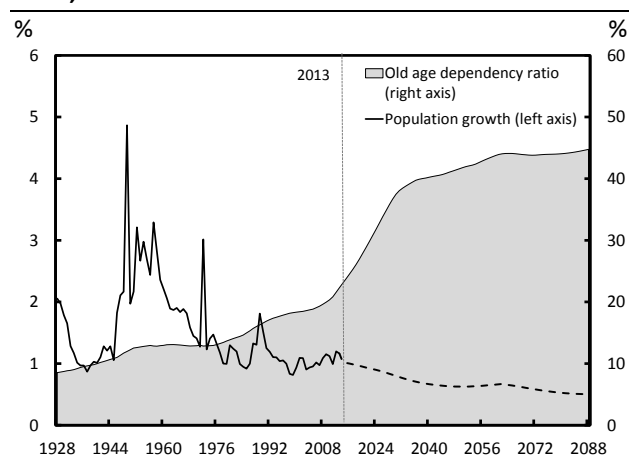
Canada's demographic challenge

Demographic projections for the Canadian population are the key driver of the long-term economic and fiscal outlook of the Parliamentary Budget Officer (PBO). Over the next 75 years, the old age dependency ratio (the ratio of the population aged 65 and over relative to the population aged 15 to 64) will rise dramatically because of the continued decline in the total fertility rate since the late 1950s and increases in life expectancies (Summary Figure 1).

The expected change in the composition and growth of the population will lead to slower growth in the labour force and total hours worked. PBO projects average annual real growth in Gross Domestic Product (GDP) will be 1.5 per cent from 2019 to 2088, down significantly from average growth of 2.6 per cent over the past 30 years (Summary Table 1).

Summary Figure 1

Population growth and the old age dependency ratio, 1927 to 2088



Sources: Office of the Parliamentary Budget Officer; Statistics Canada.
Note: Growth rates prior to 1971 are taken from CANSIM table 051-0026.

Summary Table 1

Average annual real GDP growth

%	1983-2013	2014-2018	2019-2088
Real GDP Growth	2.6	2.2	1.5
<i>Contribution to growth (p.p.)</i>			
Labour Input Growth	1.5	1.0	0.5
Working Age Population Growth	1.3	1.0	0.7
Employment Rate	0.3	-0.3	-0.2
Average Weekly Hours Worked	-0.1	0.3	0.0
Labour Productivity Growth	1.1	1.1	1.1

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

An ageing population will have an adverse effect on government finances. Weaker growth in nominal GDP will slow the growth of revenues of all levels of government. At the same time, population ageing will increase demand for government programs that mainly benefit older age groups, such as health care, elderly benefits, and public pension programs. The age-related increase in spending will be greater than the decrease in spending on programs for younger age groups, such as education, children's benefits, and social assistance.

Sustainability of Canadian public debt

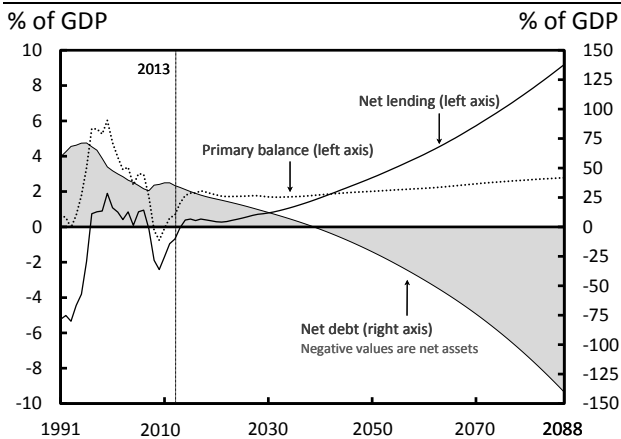
To assess the financial sustainability of the federal and subnational governments, PBO projects the flows of revenues and expenses 75 years into the future. The projections incorporate pressures from government policy, demographics, and the long-term economic outlook.

PBO defines government debt as sustainable if, under current policy, public debt as a share of the economy evolves such that in 2088 it is less than or equal to debt in 2013. This can be represented by a summary statistic called the fiscal gap. The fiscal gap is the amount by which governments must immediately and permanently reduce spending or increase taxes to make their debt sustainable.

PBO estimates that the federal government does not have a fiscal gap. The federal government's net debt was 35.1 per cent of GDP at the end of 2013. It is projected to decline over the projection, reaching a net asset position in 2040 (Summary Figure 2). The federal government could introduce new programs, expand existing programs, or reduce taxes by 1.4 per cent of GDP (\$28.2 billion in 2014) while maintaining sustainable debt.

Summary Figure 2

Federal government primary balance, net lending, and net debt, 1991 to 2088



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

By indexing federal funding for health care at the rate of growth of GDP, the federal government has mostly insulated itself from the fiscal impact of an ageing population. But provincial governments,

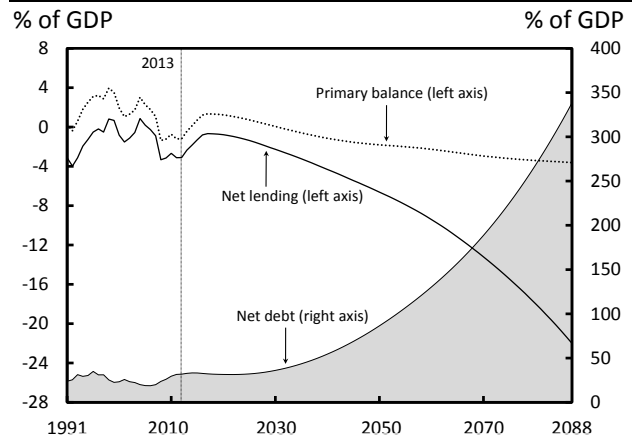
with direct constitutional responsibility for the delivery of health care, are unable to do so.

PBO estimates that Canada's aggregate subnational governments have a fiscal gap. Under current policy their debt is not sustainable. Net debt for subnational governments was 31.8 per cent of GDP at the end of 2013 and is projected to rise over the long term, reaching 338.1 per cent of GDP by 2088 (Summary Figure 3). The fiscal gap is driven mostly by the projected rise in health care costs as a result of population ageing and excess cost growth (cost increases in excess of income growth and demographic factors).

To put debt on a sustainable path, subnational governments must increase revenues, receive higher federal transfers, or find savings in health care or other programs amounting to an immediate and permanent improvement in their aggregate budgetary balance of 1.7 per cent of GDP (\$34.1 billion in 2014).

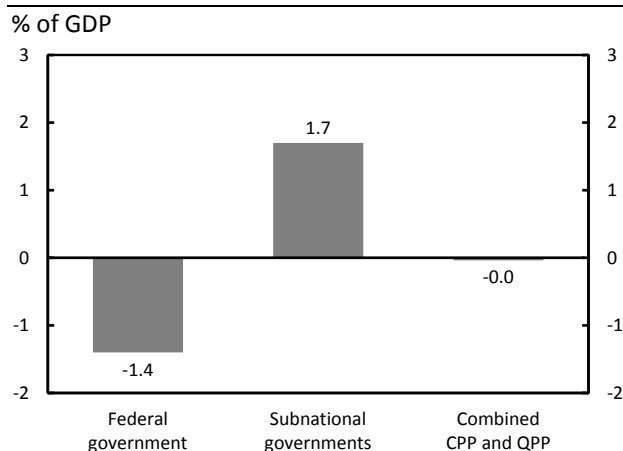
Summary Figure 3

Subnational government primary balance, net lending, and net debt, 1991 to 2088



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

The CPP and QPP are projected to be sustainable according to the same assessment criteria as the federal and subnational governments. Fiscal gaps for all three government sectors are summarized in Summary Figure 4.

Summary Figure 4**Fiscal gap estimates**

Source: Office of the Parliamentary Budget Officer.

Sensitivity analysis and alternative scenarios

PBO assesses the fiscal gaps under several alternative scenarios based on different demographic, economic, and fiscal assumptions. These are the key findings of these scenarios:

- The federal government has sustainable debt under separate alternative scenarios of older demographics, slower GDP growth, higher interest rates, higher enrichment of elderly benefits, and a CHT escalator indexed to cost increases associated with population ageing. Maintaining the CHT escalator at 6 per cent would be unsustainable, as it would introduce a federal fiscal gap of 0.4 per cent of GDP.
- Subnational governments continue to have unsustainable debt under the best case alternative scenarios, when assessed separately. Even if growth in health care costs is contained

to population ageing and income growth, subnational governments will have a fiscal gap of 0.9 per cent of GDP. Worse, if growth in health care costs cannot be reduced relative to recent history, provinces face a particularly daunting fiscal gap of 2.5 per cent of GDP.

- Under a combined alternative scenario in which provincial governments control excess cost growth and the impact of an ageing population is shared proportionally between the federal government and provincial governments via changes to the CHT escalator in 2025, the subnational government fiscal gap is reduced from 1.7 per cent of GDP to 0.6 per cent; at the same time, the federal government remains sustainable with fiscal room of 1.1 per cent of GDP.

Implications

In aggregate, the fiscal gap of the total general government sector (that is, the combined federal and subnational governments) is not sustainable. However, the fiscal room of the federal government mostly offsets the fiscal gap of subnational governments.

The fiscal gap of subnational governments is large, but not insurmountable. If provinces are able to control excess cost growth, an increase in the CHT escalator to account for population ageing when it is reviewed in 2024 would eliminate much of the fiscal gap of subnational governments while still leaving the federal government with considerable fiscal room. The remaining subnational fiscal gap could be closed with a mix of modest spending restraint and tax increases.

1 FISCAL SUSTAINABILITY REPORTING

The Fiscal Sustainability Report 2014 (FSR 2014) of the Parliamentary Budget Officer (PBO) assesses the long-run sustainability of federal government debt as well as the aggregated debt of subnational governments, that is, provincial, territorial, local, and aboriginal governments. FSR 2014 also includes a sustainability assessment of the Canada Pension Plan (CPP) and Quebec Pension Plan (QPP).

PBO measures the sustainability of government debt by projecting the annual flows of revenues and expenses 75 years into the future. To do so, PBO uses demographic projections (Section 2) to determine the impact of labour trends on long-term economic growth and other economic variables (Section 3). PBO then applies the demographic and economic projections to detailed fiscal models to determine their long-run impact on government borrowing under current policy (Sections 4, 5, and 6).

With these projections of government borrowing, PBO calculates a summary statistic called the *fiscal gap* (Section 7). The fiscal gap is the permanent change in the path of the government's primary balance (revenues less non-interest expenditure) that would need to be made immediately so that government debt as a share of GDP returns to the same ratio at the end of the projection as at the beginning.¹ The change in the primary balance could come from increasing revenues, reducing non-interest spending, or a combination of both.

PBO assesses the sustainability of the CPP and QPP by calculating a similar statistic that determines if the asset-to-GDP ratio is sustainable under legislated contribution rates.

To assess the sensitivity of PBO's projections to demographic, economic, and fiscal assumptions, the fiscal gap calculations for each government sector are repeated under a number of alternative scenarios (Section 8).

¹ The primary balance is defined in the IMF's draft Government Finance Statistics Manual 2014 (GFSM 2014) as revenues less non-interest spending, where non-interest spending is gross expenses (that is expenses excluding consumption of fixed capital) plus the acquisition of nonfinancial capital.

The long-term outlook of the economy and government policy is uncertain. But by projecting economic and fiscal trends in this formal framework, PBO can identify and quantify potential spending challenges so that the government can take preventative action to avoid sudden, dramatic policy changes in the future.

2 DEMOGRAPHICS

Canada is undergoing a demographic transition that will have a major impact on the labour market and economy. Over the next 75 years, the proportion of Canada's population that is aged 65 years and older will rise dramatically relative to the population aged 15 to 64. This is a result of the decline in the total fertility rate observed since the late 1950s and increases in life expectancies during the last 80 years. The demographic impact is greatest over the next 20 years as the baby boomers (those born between 1946 and 1965) transition into their retirement years.

The projected demographic profile of the Canadian population is one of the key drivers of PBO's long-term economic and fiscal projections. PBO's baseline population projection was produced based on assumptions from PBO, Statistics Canada (2010) and Statistics Canada (2014).² The demographic projection depends on assumptions for the total fertility rate, life expectancy at birth, and the immigration rate.

Total fertility rate

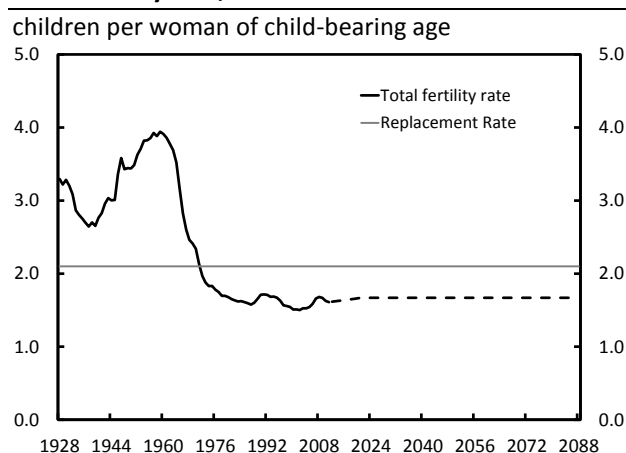
The total fertility rate, defined as the number of children born per woman of child bearing age, peaked at 3.9 children per woman in 1959 and has declined significantly since then. The total fertility rate dropped below the replacement rate of 2.1 children per woman in 1972. It reached the lowest level recorded in Canada in 2000 and 2002, at 1.51 children per woman. In 2008, the rate rose to 1.68.

² PBO's population projection was updated to include changes in Statistics Canada's population projection assumptions and the current population estimates for 2013. Beyond 2013, single year age and sex groups are extrapolated using Statistics Canada (2014) imputed growth rates. PBO's demographic assumptions are broadly comparable to Statistics Canada (2014) and the life expectancy at birth assumption is based on Statistics Canada (2010). PBO's demographic projection was produced in July 2014.

Over the projection horizon, PBO assumes that the fertility rate will increase slightly from the most recently observed level of 1.61 in 2011 to 1.67 in 2021 and will continue at 1.67 thereafter. This assumption is consistent with the medium scenario in Statistics Canada (2014).

Figure 2-1

Total fertility rate, 1928 to 2088



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

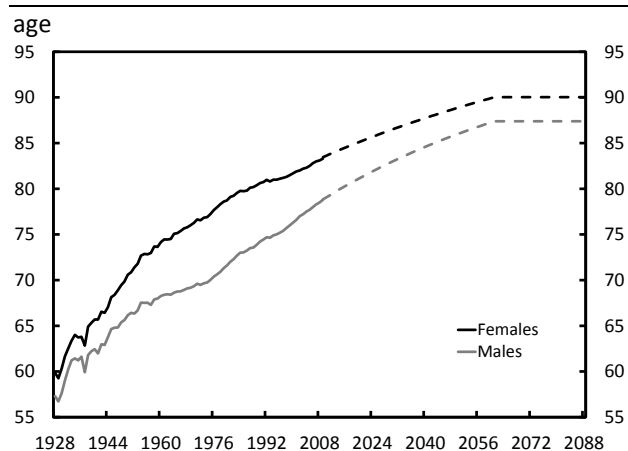
Life expectancy at birth

Life expectancy at birth has increased significantly over the last 80 years (Figure 2-2). Women 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. Life expectancies at birth of females rose at a faster rate than those of males during the 1950s to 1970s. By 1978, a life expectancy gap of 7.4 years had opened up. Life expectancies of both females and males continued to improve from 1978 to 2009. However, 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 4.5 years.

Over the projection horizon, PBO uses assumptions consistent with the medium-term scenario in Statistics Canada (2010). Life expectancies at birth are projected to increase for both males and females, with males reaching 87.4 years and females reaching 90.0 in 2061. At this point they are assumed to remain constant until 2088.

Figure 2-2

Life expectancy at birth, 1928 to 2088



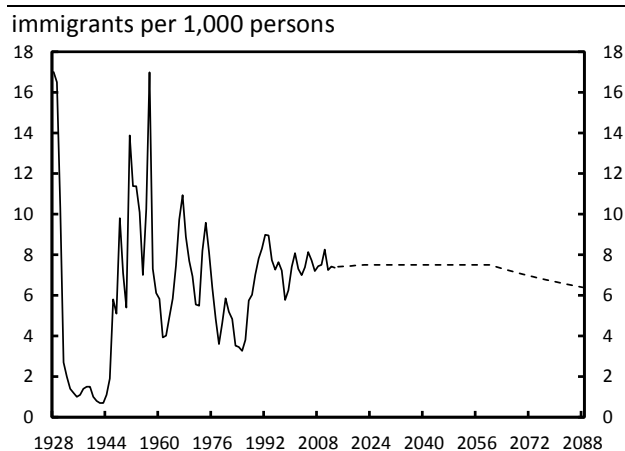
Sources: Office of the Parliamentary Budget Officer; Statistics Canada.

Immigration rate

The immigration rate has fluctuated significantly since 1928, which reflects different immigration policies that existed at given points in time (Figure 2-3). Since the mid-1990s, immigration has been more important to Canadian population growth than fertility and life expectancy trends.³

The immigration rate reached 7.4 immigrants per 1,000 people in 2013. Going forward, PBO has assumed that the immigration rate will gradually increase to 7.5 per 1,000 people from 2014 to 2061. At this point, the level of immigration is assumed to remain constant, implying a declining immigration rate beyond 2061.

³ Statistics Canada (2008). *Canadian Demographics at a Glance*, Cat. No. 91-003-XIE: <http://www.statcan.gc.ca/pub/91-003-x/91-003-x2007001-eng.pdf>

Figure 2-3**Immigration rate, 1928 to 2088**

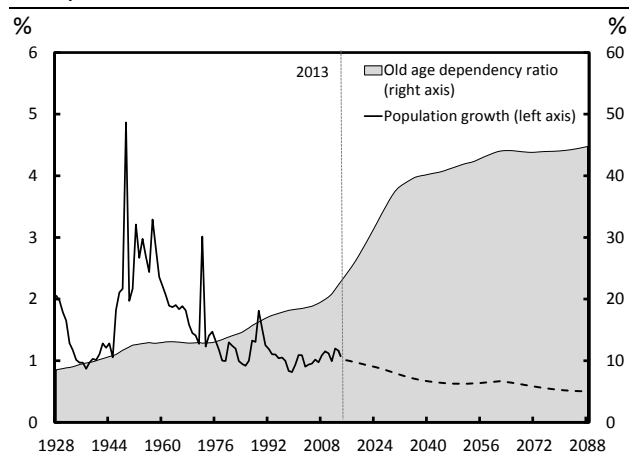
Sources: Office of the Parliamentary Budget Officer; Statistics Canada.

Composition and size of the Canadian population

PBO's population projection was produced by applying the three assumptions discussed above. As shown in Figure 2-4, population growth is expected to decline steadily throughout the projection horizon.

As the population declines, the old age dependency ratio (the ratio of individuals aged 65 and over divided by the population aged 15 to 64) is projected to drastically increase in the coming decades. The old age dependency ratio is projected to increase from 22.3 per cent in 2013 to 30.8 per cent by 2023. Thereafter, the dependency ratio continues to increase to 38.8 per cent by 2033. The pace is then projected to slow but the ratio continues to rise, reaching 44.1 per cent by 2063 and 44.8 per cent by 2088.

To put it differently, there were about 7.8 people of working age for every individual aged 65 years and over in 1973. By 2013, the ratio had fallen to 4.5. The ratio is projected to continue falling, reaching 3.2 in 2023 and 2.6 in 2033, then stabilizing at around 2.3 from 2055.

Figure 2-4**Population growth and the old age dependency ratio, 1921 to 2088**

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

3 LONG-TERM ECONOMIC PROJECTION

The economic projection from 2014 to 2018 is based on PBO's Economic and Fiscal Outlook 2014 (EFO 2014), updated for recently released economic data.

Beyond 2018, PBO's economic projection depends on the updated potential growth in gross domestic product (GDP) based on PBO's demographic projection,⁴ as well as the long-term assumptions for Consumer Price Index (CPI) inflation, GDP inflation, the 3-month Treasury bill rate, and the 10-year Government of Canada bond rate.⁵ Annex A compares the economic projections in FSR 2014 and FSR 2013.

Consistent with EFO 2014, the estimated output gap (that is, the level of real GDP relative to

⁴ Since the April 2014 EFO, PBO updated its estimate of potential GDP to reflect 2013 productivity and labour force data, as well as the updated population projection.

⁵ PBO's long-term assumptions for growth of CPI and GDP inflation are 2 per cent annually, consistent with the Bank of Canada's target inflation rate. PBO assumes the 3-month Treasury bill rate and the 10-year Government of Canada bond rate to be 4.2 and 5.3 per cent, respectively, over the long term. The assumptions are consistent with the inflation-adjusted rates of return of 2.2 and 3.3 per cent respectively, which is the average ex post real rates of return observed over the 1993 to 2007 period (this period was chosen to reflect the current monetary policy regime, but also to abstract from the recent financial crisis).

potential GDP) is essentially closed by 2016.⁶ Going forward, the economy is subject to both positive and negative shocks, but it can be expected that the economy would return to its potential level after such shocks.⁷ As a result, average real GDP growth should equal average potential GDP growth over a long horizon. This is consistent with PBO's assumption that real GDP will grow at the same rate as potential GDP over the long term.

Potential GDP

Over the long term, PBO projects real GDP growth based on its estimate of potential GDP growth.⁸ Potential GDP is the amount of output that an economy can produce when capital, labour, and technology are at their respective trends. Potential GDP is derived/projected from the supply side of the economy using the following identity:

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

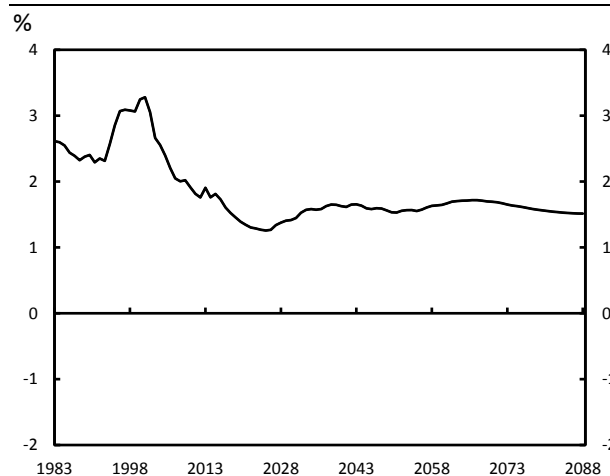
This identity states that real GDP (Y) is equal to labour input (L) multiplied by labour productivity (Y/L).

Potential GDP is projected by calculating trend labour input and trend labour productivity separately. These are determined by age and gender-specific trends in the working age population, the trend labour participation rate, and trend average weekly hours worked.

Trend labour input and trend labour productivity are then combined to produce estimates of potential GDP. Real potential GDP is estimated to

increase at an average annual rate of 1.5 per cent, from 2019 to 2088 (Figure 3-1).

Figure 3-1
Growth of Real Potential GDP, 1983 to 2088



Sources: Office of the Parliamentary Budget Officer.

Labour input

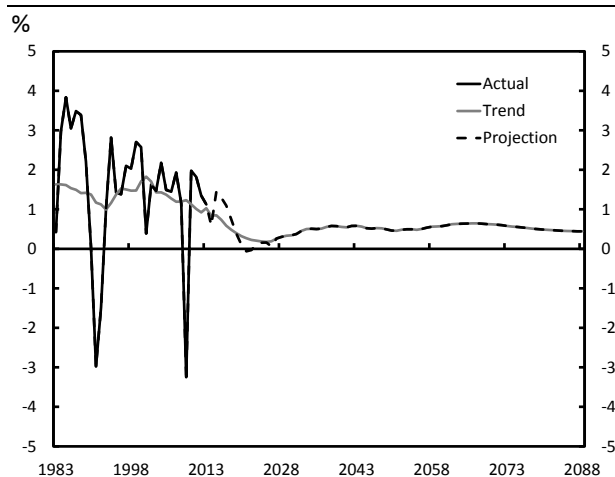
The first component to calculate GDP is labour input. Labour input is calculated as the product of the size of the working-age population, the aggregate employment rate, and the average weekly number of hours worked by an employed individual in a given week. Each component is projected separately by age and gender to capture the different factors that affect each component's profile. The projection of each component of labour input is discussed in detail in Annex B.

In the medium term, growth in labour input is projected to remain volatile, driven mainly by the economic cycle. Over the long term, it is projected to decrease significantly as a result of slower growth in the working age population and the projected decline in the aggregate employment rate (Figure 3-2). Specifically, labour input growth is projected to fall from 1.1 per cent in 2013 to 0.1 per cent around 2023. It is then projected to average 0.5 per cent over the remainder of the projection horizon.

⁶ PBO adjusted real GDP growth for 2014 up by 0.1 percentage point (p.p.) to 2.2 per cent from the April 2014 EFO to reflect updated economic data. Real GDP growth for the remaining years of the medium term projection are adjusted within 0.2 p.p. from the April 2014 EFO estimates to reflect updated historical data and potential growth. The updated GDP growth estimated for 2015, 2016, 2017 and 2018 are 2.5 per cent, 2.5 per cent, 2.1 per cent and 1.6 per cent, respectively.

⁷ Over the long term, PBO assumes that components of real GDP are equal to their respective trend estimates as temporary shocks to the economy dissipate and economic growth driven by demographic factors and long-term assumptions. Components of real GDP are assumed equal to their trend estimates after 2025.

⁸ See PBO (2010) for additional detail on the methodology and assumptions used to construct estimates of potential GDP.

Figure 3-2**Labour input growth, 1983 to 2088**

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

Labour productivity

The second component to estimate potential GDP is labour productivity. Labour productivity, defined as GDP per hour worked, measures the extent to which labour is efficiently used. Growth in labour productivity depends on capital deepening (that is, increases in capital relative to labour) as well as technological improvements, typically referred to as total factor productivity.

Growth in labour productivity has been volatile over the last 30 years, averaging 1.1 per cent since 1983. However, Canada's labour productivity growth has been particularly weak since 2003, averaging only 0.7 per cent annually. Labour productivity growth dropped significantly during the recent financial recession, to 0.0 per cent in 2008 and 0.6 per cent in 2009. It has improved slightly since then, but continued to remain low, reaching 0.9 per cent in 2013.

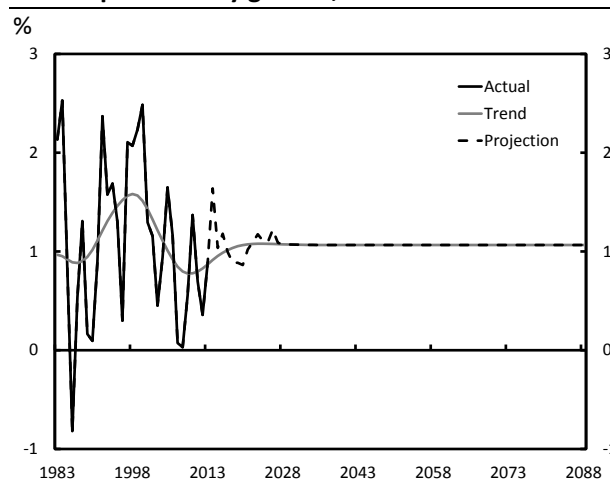
In the medium term, PBO projects growth in labour productivity will continue to be volatile, ranging from 1.6 per cent in 2014 to 0.9 per cent in 2018. Beyond the medium term, PBO assumes that it will return to 1.1 per cent by 2022, which was the average growth rate observed since 1983 (Figure 3-3).

Research results of the impact of population ageing on labour productivity have been mixed. On one

hand, population ageing could decrease productivity growth as it reduces the size of the labour force contributing to output production.

On the other hand, some research suggests that population ageing could increase productivity growth as a result of higher investment in skills and human capital. The resulting labour shortage and wage increases could also drive capital deepening and technological change.⁹

Therefore, PBO has made a neutral assumption on the impact of population ageing on labour productivity growth by assuming that it will return to its historical long-term average.

Figure 3-3**Labour productivity growth, 1983 to 2088**

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

Real GDP growth

Real GDP is expected to increase at an average annual rate of 2.2 per cent, from 2014 to 2018. Over the long term, growth in real GDP is projected to decline because of lower growth of labour input driven by the projected decline in the growth of working age population and employment rate (Table 3-1). Specifically, real GDP growth is projected to fall from 2.6 per cent a year, on

⁹ For a review of the research on the effects of ageing on labour productivity, see Breach (2008). Canada's Aging Workforce: Participation, Productivity, and Living Standards. Proceedings of a conference held by the Bank of Canada. <http://www.bankofcanada.ca/wp-content/uploads/2010/09/branch.pdf>.

average, from 1983 to 2013, to 1.5 per cent, on average, over the next two decades.

Table 3-1

Average annual real GDP growth, 1983 to 2088

%	1983-2013	2014-2018	2019-2088
Real GDP Growth	2.6	2.2	1.5
<i>Contribution to growth (p.p.)</i>			
Labour Input Growth	1.5	1.0	0.5
Working Age Population Growth	1.3	1.0	0.7
Employment Rate	0.3	-0.3	-0.2
Average Weekly Hours Worked	-0.1	0.3	0.0
Labour Productivity Growth	1.1	1.1	1.1

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

Note: Contribution to growth may not add due to rounding.

Nominal GDP growth

Over the long term, PBO assumes that the GDP deflator will grow at 2 per cent annually, which is consistent with the Bank of Canada's inflation target. Therefore, as growth of real GDP declines because of lower growth of labour input driven by the projected decline in the growth of the working age population and employment rate, growth in nominal GDP is also projected to decline. As a result, nominal GDP growth is projected to decline from an average annual rate of 5.3 per cent from 1983 to 2013, to 4.2 per cent between 2014 and 2018, and to 3.6 per cent from 2019 to 2088.

Table 3-2

Average Annual Nominal GDP Growth, 1983 to 2088

%	1983-2013	2014-2018	2019-2088
Nominal GDP Growth	5.3	4.2	3.6

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

Real GDP per capita

Real GDP per capita is a common measure of living standards. Its growth is used to enrich certain program entitlements in PBO's fiscal projections, such as the baseline children's benefits projection and alternative elderly benefits scenarios. 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

increases in real GDP per capita are driven by two factors:

- the fraction of the population that is employed in the production process (abstracting from movements in average hours worked), and;
- the efficiency with which those workers are able to produce goods and services (that is, labour productivity).

Growth in real GDP per capita has exceeded growth in labour productivity over the last 30 years. This has occurred because labour input growth exceeded growth in the total population, thus contributing positively to the growth in real GDP per capita.

Stronger labour input growth relative to total population growth can be explained by two factors. First, growth of the working age population exceeded total population growth throughout most of this period. While the total population increased at an annual rate of 1.1 per cent from 1983 to 2013, the working-age population increased 1.3 per cent a year on average over the same period.

Secondly, the aggregate employment rate trended upwards throughout this period as female participation in the labour market increased significantly. The female participation rate had increased from 53.0 per cent in 1983 to 62.1 per cent in 2013. On the other hand, these two factors were partially offset by the decline in average hours worked throughout this period.

Looking ahead, PBO estimates that growth in real GDP per capita will fall significantly over the next 30 years. Real GDP per capita increased by 1.5 per cent a year, on average, since 1983, but is projected to grow at an annual average rate of only 0.7 per cent from 2014 to 2044.

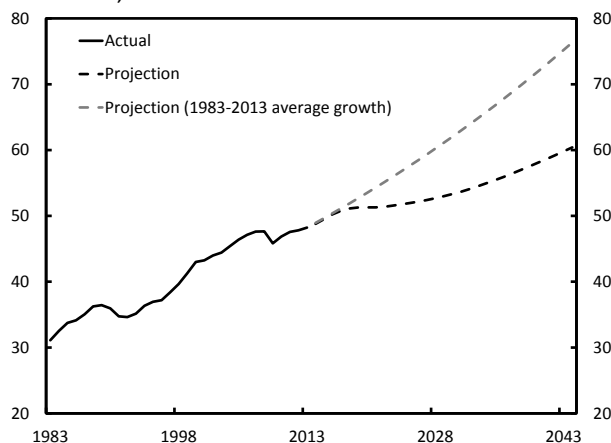
Similar to real GDP, the decline in the projected growth of real GDP per capita is driven by the relative slowdown in labour input growth. On the other hand, population ageing will put downward pressure on the fraction of the population that is involved in output production, therefore decreasing the aggregate employment rate and real GDP per capita growth.

As a result, real GDP per capita in 2044 is projected to be 26.4 per cent less than if real GDP per capita were to increase at the same rate it did over the last 30 years (Figure 3-4).

Figure 3-4

Real GDP per capita, 1983 to 2044

thousands, chained 2007 dollars



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

4 FEDERAL GOVERNMENT OPERATIONS

The following three sections describe PBO's projections of government revenues and program spending.

This section discusses the projection of federal fiscal aggregates. Section 5 describes the finances of subnational governments, including provincial, territorial, local and aboriginal governments. Section 6 presents the projections of the CPP and QPP. Annex C compares fiscal projections from FSR 2013 to FSR 2014.

The starting point for PBO's long-term projections is the medium-term forecast for 2014 to 2018, discussed in EFO 2014.¹⁰ Beyond 2018, PBO projects revenues and expenses as closely as possible to its assessment of the current policy outlook.¹¹ This includes announced policies which

are not yet in place, and long-run assumptions based on current and historical shares of revenue and spending in the economy. Where policies are set to expire, PBO assumes that well-established programs are likely to be renewed.

4.1 Federal government revenues

Federal government revenues consist of taxes on income (personal and corporate income tax and non-residents income tax), taxes on consumption (GST and the federal allocation of HST, excise taxes and duties, and taxes on imports), Employment Insurance (EI) premiums, sales of goods and services, and capital transfers.

PBO projects that revenues will recover over the medium term as the economy returns to its potential. Currently, federal revenues are 13.9 per cent of GDP. This amount is projected to increase over the medium term, peaking at 14.4 per cent of GDP in 2016, before declining to 14.3 per cent in 2018. The projected decline is caused, in part, by a projected decrease in the EI premium rate in 2017.

Over the long term, PBO projects that revenues will remain at the 2018 tax burden of 14.3 per cent of GDP (Figure 4-1). This tax burden is well below the 30-year historical average of 16.5 per cent and is slightly lower than the assumption of 14.5 per cent in FSR 2013.

Maintaining a constant tax burden requires active policy changes. For example, without policy changes, personal income tax (PIT) revenues would increase as a share of GDP with growth in real incomes because statutory thresholds and personal allowances are indexed only to inflation. PBO's implicit assumption is that PIT rates would be reduced, thresholds increased with earnings, or the tax mix would be adjusted in other ways to maintain a constant relative tax burden. This assumption is a popular treatment of revenues in the long-term projections of fiscal councils.¹²

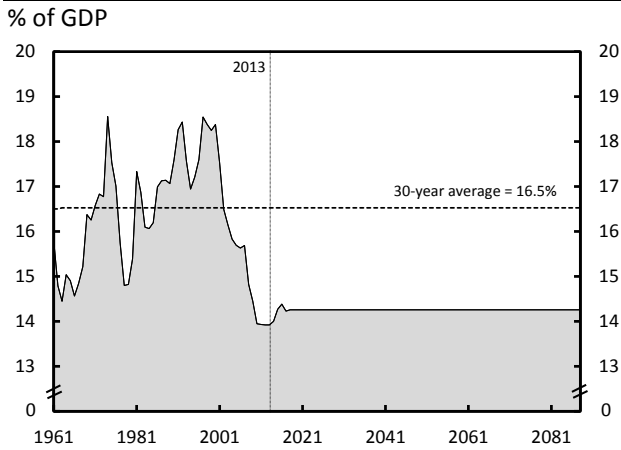
¹⁰ The EFO 2014 outlook is converted from a public accounts basis to a CSNA 2012 national accounts basis and updated with the latest quarter of historical data from the current and capital accounts of General Government, which are consistent with the GFSM 2014 framework.

¹¹ In FSR 2014, current policy includes announcements up to the September 11, 2014 announcement of the Small Business Job Credit reducing EI premiums for qualifying small businesses.

¹² For examples, see Office for Budget Responsibility (2014) and Congressional Budget Office (2014).

Figure 4-1

Federal revenues, 1961 to 2088



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

4.2 Federal government program spending

Federal program spending includes transfers to persons, transfers to other levels of government, and direct program expenses.

In the aggregate, the ratio of federal program spending to GDP is projected to decline from 13.3 per cent of GDP in 2013 to 12.2 per cent in 2018. Decreases are driven by direct program spending restraint, as well as lower transfers to persons, such as lower EI benefits resulting from declining unemployment rates. Medium-term spending restraint was discussed in greater detail in EFO 2014.

Beyond 2018, federal program spending is expected to increase as a share of GDP until 2032, as a result of increased demand on elderly benefits from population ageing. After 2032, program spending is projected to steadily decline. This will occur as the baby boom cohort moves past its life expectancy and as GDP growth surpasses spending growth in programs that are not fully indexed to growth in the economy (Figure 4-2).

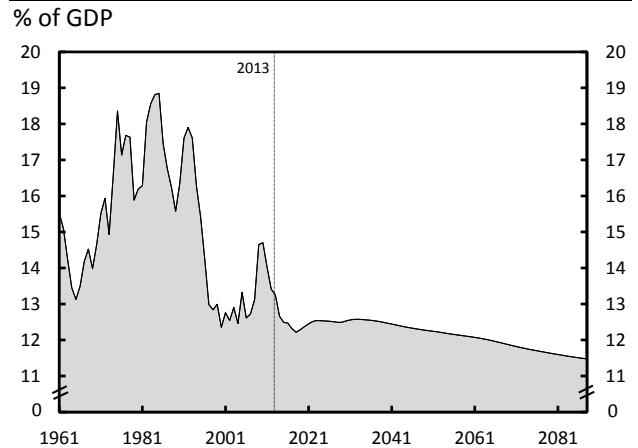
Long-term federal program spending projections are about 0.4 per cent of GDP lower than projected in FSR 2013. This is the result of updated demographics and economics, and the outlook for direct program expenses in Budget 2014.

Each component of federal program spending is affected differently by long-term demographic and

economic conditions. The remainder of this section describes the major spending categories in greater detail.

Figure 4-2

Federal program spending, 1961 to 2088



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

Elderly benefits

Elderly benefits consist of old age security (OAS), guaranteed income supplement (GIS), the spousal allowance, and allowance for the survivor. PBO projects elderly benefits using the demographics of eligible persons and CPI inflation.

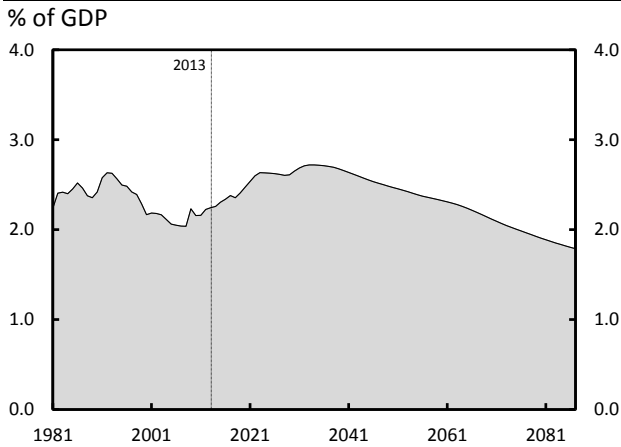
The eligible population is currently people aged 65 and over. Beginning in 2023, the eligibility age for elderly benefits programs will be gradually increased to 67 over a period of six years. This change will dampen some of the demographics-driven cost growth projected for elderly benefits programs going forward.¹³

The baby boom cohort is projected to increase the cost of the elderly benefits program until 2033, when it peaks at 2.8 per cent of GDP (Figure 4-3). As the baby boom cohort moves past its life expectancy, spending on elderly benefits is projected to steadily decline as a share of GDP, to 1.8 per cent in 2088.

¹³ The fiscal effect of this legislative change to the eligible population is discussed in greater detail in FSR 2012.

Figure 4-3

Elderly benefits, 1981 to 2088



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

Employment Insurance

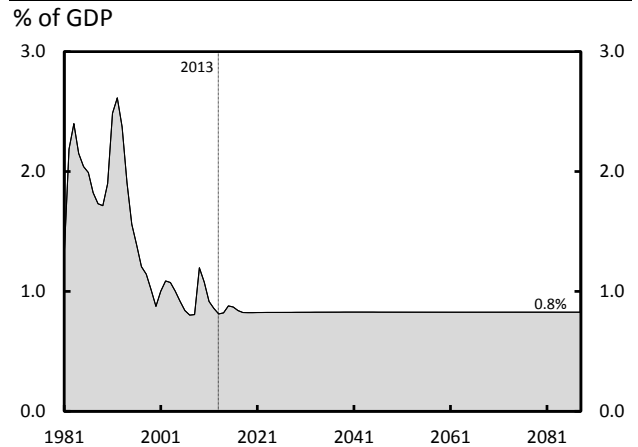
PBO estimates EI benefits over the long-term using projections of average wages and the number of beneficiaries. The growth in average wages is equal to the growth of labour productivity. The number of beneficiaries is assumed to grow with the size of the labour force. EI benefits are roughly constant as a share of GDP because labour productivity and the labour force are also the two determinants of the long-term projection of the economy (Figure 4-4).

Children's benefits

PBO assumes the costs of children's benefits (Canada Child Tax Benefit and Universal Child Care Benefits) will increase in line with nominal GDP and the share of the population under 18 years old. Because the share of the population under 18 is projected to decline slightly over the projection, spending on children's benefits is projected to decline marginally from 0.7 per cent of GDP in 2013 to 0.6 per cent through 2088 (Figure 4-5).

Figure 4-4

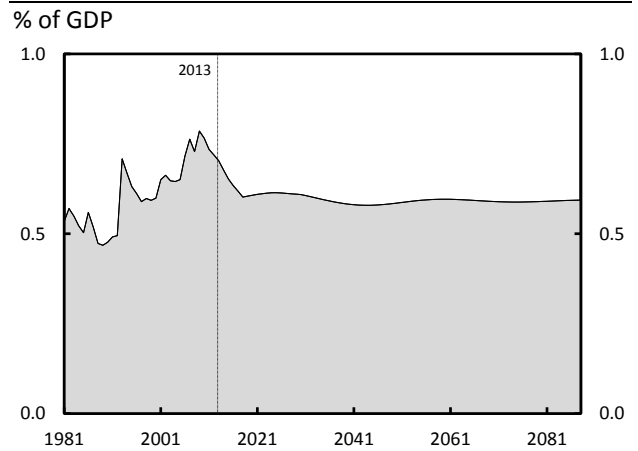
Employment insurance benefits, 1981 to 2088



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

Figure 4-5

Children's benefits, 1981 to 2088



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

Transfers to other levels of government

Federal transfers to provinces include the Canada Health Transfer (CHT), the Canada Social Transfer (CST), the Equalization program, Territorial Formula Financing, offshore accords, the Gas Tax Fund, and other transfers. Transfers to subnational governments are a major expense of the federal government, representing 32.0 per cent of non-interest spending in 2013.

Most transfers are allocated and escalated by established formulas which were last reformed in Budget 2012. PBO assumes transfer formulas

continue unchanged beyond their scheduled review period.

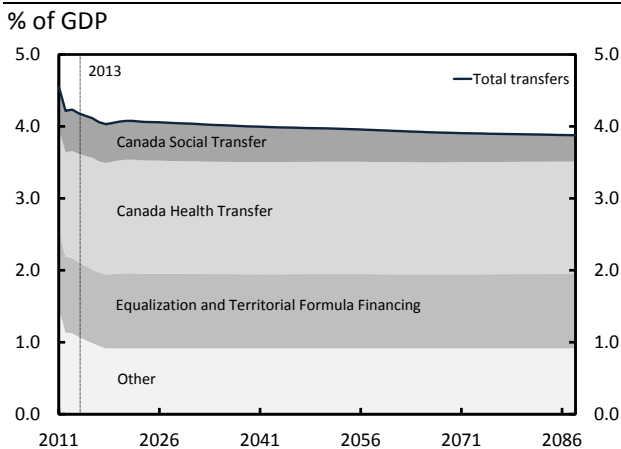
Equalization and Territorial Formula Financing are increased with GDP growth. The CHT rises by 6 per cent a year until 2016 and with a three-year moving average of GDP thereafter.

PBO assumes other transfers to provinces decline as a share of GDP over the medium term, in line with announced direct program expenses austerity. In 2019 and beyond they are assumed to increase with GDP growth. These transfers support specific program areas, such as funding arrangements for the justice system and transit investment.¹⁴

The annual CST escalator is 3 per cent a year. The escalator is lower than projected GDP growth, so CST spending declines gradually relative to GDP over time. Consequently, total transfers to other levels of government are projected to decline slightly as a share of GDP over the long term (Figure 4-6).

Figure 4-6

Federal transfers to subnational governments, 1961 to 2088



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

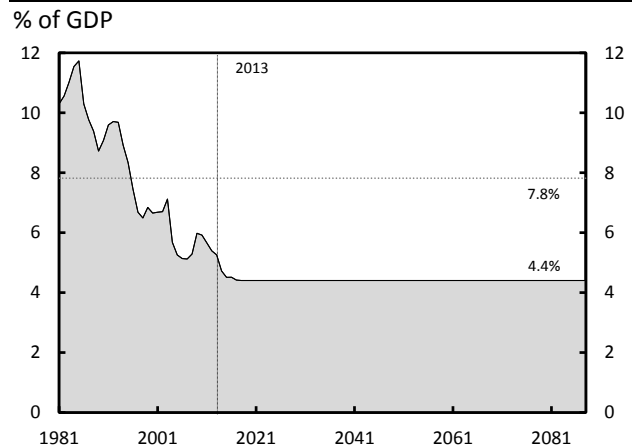
¹⁴ Transfers to subnational governments in CSNA 2012 include transfers to provinces which are listed as direct program expenses in the public accounts, rather than Major Transfers to Other Levels of Government. The difference between CSNA 2012 transfers to other levels of government and public accounts Major Transfers to Other Levels of Government was \$19.7 billion in 2013.

Other program spending

Other spending includes direct program expenses (excluding departmental transfers to provinces and capital amortization) and capital acquisitions. PBO's projection of other program spending over the medium term is based on the government's spending plan in Budget 2014. Beyond 2018, other program spending is assumed to grow with the economy, maintaining a constant share of 4.4 per cent of GDP. This is well below the historical average of 7.8 per cent of GDP (Figure 4-7).

Figure 4-7

Federal other program spending, 1981 to 2088



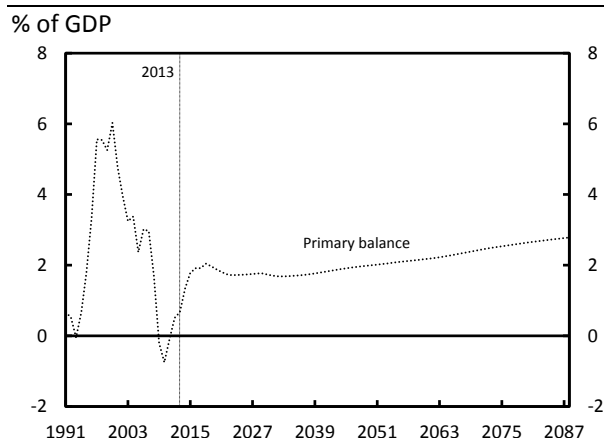
Sources: Office of the Parliamentary Budget Officer; Statistics Canada.

4.3 Federal government primary balance

Subtracting projected program expenses from revenues gives the primary balance of the federal government (Figure 4-8).

As the economy recovers over 2014 and 2015, federal revenues increase, while growth in overall program spending remains constrained. This results in a sharp improvement in the primary balance, reaching 2.0 per cent of GDP in 2018.

Beyond the medium-term, the federal primary balance is expected to remain roughly stable, averaging 2.1 per cent of GDP over the 75-year projection. It reaches a low of 1.7 per cent in 2033, when the impact of population ageing on elderly benefits is greatest. It gradually increases to 2.8 per cent in 2088 as elderly benefits and transfers to provinces decline relative to GDP.

Figure 4-8**Federal primary balance, 1961 to 2088**

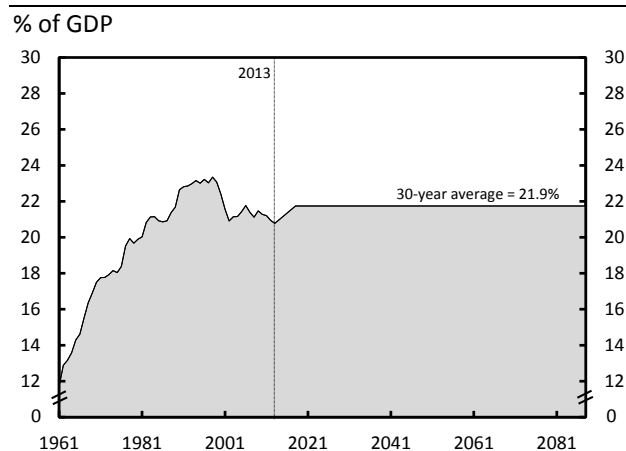
Sources: Office of the Parliamentary Budget Officer; Statistics Canada.

5 OPERATIONS OF SUBNATIONAL GOVERNMENTS

Revenues and program spending for subnational governments are projected by adding together the revenues and spending projections of provincial, territorial, local, and aboriginal governments, net of transfers between governments. Revenues include both own-source revenues and transfers from the federal government. Subnational government spending is modelled in four sectors: health care, education, social benefits, and other program spending.

5.1 Subnational government own-source revenues

Own-source revenues exclude federal transfers and intergovernmental transfers between subnational governments. These revenues reached a 30-year low in 2013 (20.7 per cent) but are projected to grow over the medium term. PBO assumes own-source revenues will return to the 30-year historical average by 2018 (21.9 per cent) and remain at the historical average over the long term (Figure 5-1). These projections are roughly unchanged from FSR 2013.

Figure 5-1**Subnational government own-source revenues, 1961 to 2088**

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

5.2 Subnational government program spending

Subnational government program spending is expected to continue to decline from the mid-recession peak of 27.3 per cent of GDP in 2009 to 24.4 per cent by 2018, as many subnational governments implement their announced deficit elimination measures (Figure 5-2).

Following the period of restraint, spending is projected to increase 3.8 per cent per year, reaching nearly 29.2 per cent of GDP by 2088. The long-term upward trend in program spending is driven mainly by growth in health spending.

PBO's projection of subnational government program spending is slightly lower relative to FSR 2013. This is because of lower historical and provisional estimates of health care costs over 2011 to 2013, combined with a lower long-term projection of nominal GDP and small changes in the expected demographic composition of the population.

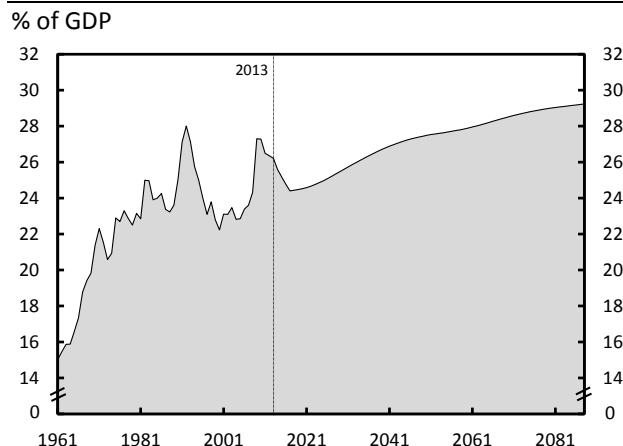
Health care spending

Canada's publicly funded health care system includes the costs of hospitals and other health care facilities, services from physicians and other

professionals, drug plans, public health administration, and other spending.¹⁵

Figure 5-2

Subnational government program spending, 1961 to 2088



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

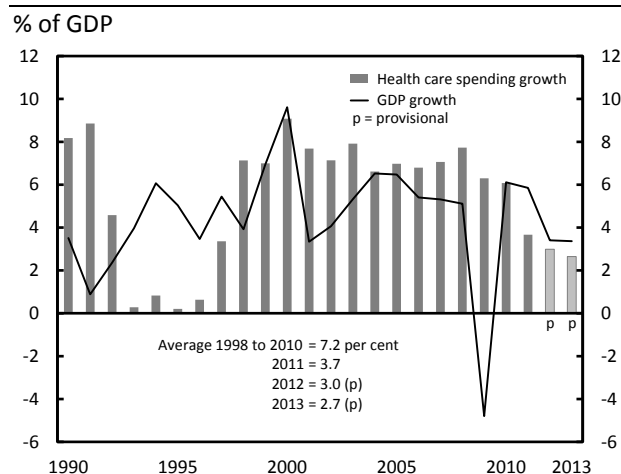
Health spending increased faster than GDP for 13 consecutive years between 1998 and 2010, growing at an average annual rate of 7.2 per cent (Figure 5-3). This spending growth contributed significantly to the deteriorating financial outlook of subnational governments in recent years.

Spending growth has shown promising signs of slowing. Historical data for 2011 that was recently released by the Canadian Institute for Health Information (CIHI) reported health spending increased by less than the growth of GDP for the first time since the period of spending restraint between 1994 and 1997. According to CIHI's provisional estimates, the growth of health spending continued to be below the growth of GDP in 2012 and 2013.

PBO projects health spending by decomposing its growth into three components: (1) the increase in expenditure as a result of higher incomes (2) the increase in costs as a result of population ageing, and (3) an excess cost growth factor.

Figure 5-3

Health care spending growth, 1990 to 2013



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

Growth in incomes is represented by the growth in GDP (national income). Since 1975, growth in expenditure on health in Canada and other G7 countries has tracked or exceeded growth in nominal GDP in most years.

The increase in health care costs from ageing is the main driver of health spending as a share of GDP. To project these cost increases, PBO constructs an age index by mapping per capita health spending by age group onto the projected population of the age groups over the next 75 years (Figure 5-4).¹⁶

The extent to which costs of health care have exceeded the increase attributable to population ageing and the growth in income is measured by *excess cost growth*. In PBO's FSR 2014 baseline projection, the long-run assumption of excess cost growth is 0.30 per cent, which is the average annual increase in excess cost growth over the period 1975 to 2013. This is lower than the excess cost growth assumption of 0.35 per cent used in FSR 2013. The excess cost growth assumption was lowered as a result of recent historical data for

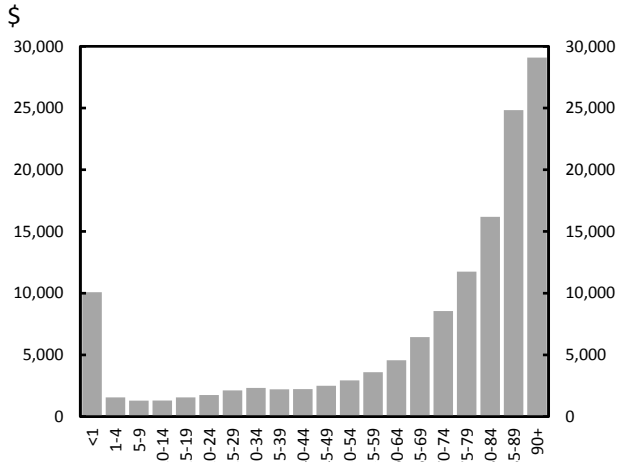
¹⁵ For details on the categories of health spending, see Canadian Institute for Health Information (2013).

¹⁶ Some researchers have argued that the increases in life expectancy will reflect better health outcomes of the population and should lead to lower growth in health spending as the impact of ageing on costs is delayed. PBO does not take this into account because there is a great deal of uncertainty involved in choosing alternative assumptions to CIHI's health expenditure estimates. For a detailed discussion of the relationship between ageing and health status and its implications for health spending, see OECD (2006) and Hogan, S. and S. Hogan (2002).

2011, and CIHI's provisional estimates for 2012 and 2013.

Figure 5-4

Per capita health expenditure by age group, 2010



Source: Canadian Institute for Health Information.

Historical health spending and PBO's projection of future health spending is shown in Figure 5-5. As a share of GDP, provincial spending on health care rose from 5.0 per cent in 1975 to 7.5 per cent in 2011. From 2011 to 2013, spending on health care is estimated to have declined slightly to 7.4 per cent of GDP.

From 2013 to 2050, health spending is projected to increase at an annual rate of 4.8 per cent, of which the ageing factor contributes 0.8 percentage points. Because nominal GDP is expected to grow at an annual rate of only 3.6 per cent, health spending is projected to expand from 7.4 per cent of GDP to 11.3 per cent. The increase in health spending as a share of the economy over this period is primarily driven by population ageing, which accounts for 69.9 per cent of the 3.9 percentage point increase.

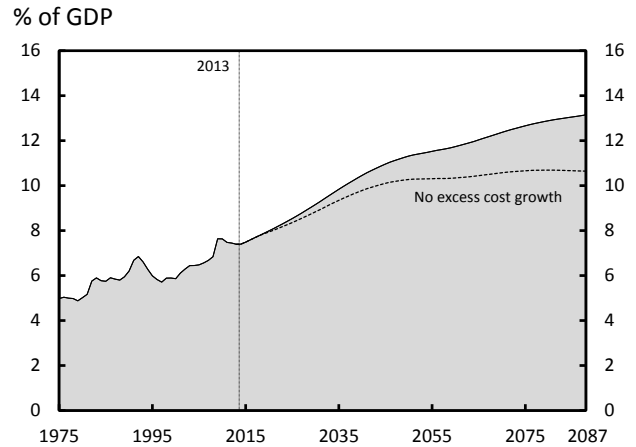
After 2050, the pressure of ageing on demand for health services is projected to decline. Growth in health spending slows to an average of 4.1 per cent annually, of which the ageing factor contributes 0.1 percentage points. Excess cost growth is the primary driver of the increase in health spending as a share of the economy over the remainder of the projection. The projection of health spending with

no excess cost growth is also given in Figure 5-5 for comparison.

In total, health spending rises from 7.4 per cent of GDP in 2013 to 13.1 per cent in 2088.

Figure 5-5

Health spending, 1975 to 2088



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

Although health care is administered provincially, the federal government sets objectives for its delivery in the Canada Health Act. The federal government provides assistance to meet those objectives through the CHT. The CHT escalator currently increases the transfer at an annual rate of 6 per cent. Changes to the CHT announced in 2011 will index the transfer to a 3-year moving average of nominal GDP growth beginning in 2017.

If the experience from 2011 to 2013 continues and provinces are able to control excess cost growth, indexing the CHT to GDP will leave only a small shortfall relative to a proportional federal contribution to health care costs over the next decade, before the most pronounced effects of population ageing arrive. When the current health accord is to be reviewed in 2024, annual transfers will be \$3.1 billion lower than if they had grown at a rate proportional to income growth and the increased demand for health care from population ageing (Table 5-1).

But if funding continues to be indexed to GDP beyond 2024, the difference between the CHT and the federal contribution that would ensure the burden of population ageing is shared

proportionally between levels of government is projected to increase to \$21.1 billion, or 0.4 per cent of GDP, in 2040. By the end of the outlook, it will increase to \$163.6 billion, or 0.6 per cent of GDP.

To ensure continued access to quality health care, provinces will need to make up this funding with higher taxes or lower spending on other public services.

Table 5-1

Alternative CHT escalators

\$billions, unless noted otherwise

	2017	2020	2024	2040	2060	2088
CHT indexed to GDP and costs related to population ageing	35.1	39.8	47.0	96.7	208.2	585.5
CHT indexed to GDP only	34.5	38.7	43.8	75.6	154.1	421.9
Difference	0.6	1.1	3.1	21.1	54.1	163.6
Difference (% of GDP)	0.0%	0.0%	0.1%	0.4%	0.5%	0.6%

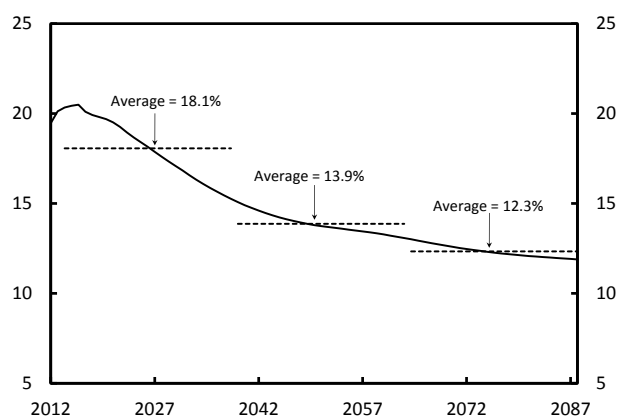
Source: Office of the Parliamentary Budget officer; NHEX.

PBO's baseline projection assumes provinces will be unable to control excess cost and CHT will continue to be indexed to GDP. Over the long term, the proportion of provincial health care costs covered by CHT falls from 20.1 per cent in 2013 to 11.9 per cent by 2088 (Figure 5-6).

Figure 5-6

Share of federal transfers in health spending, 2013 to 2088

% of GDP



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

Education expenses

PBO models education spending in line with the growth of nominal GDP as well as the growth of the share of the age group five to 24 relative to the

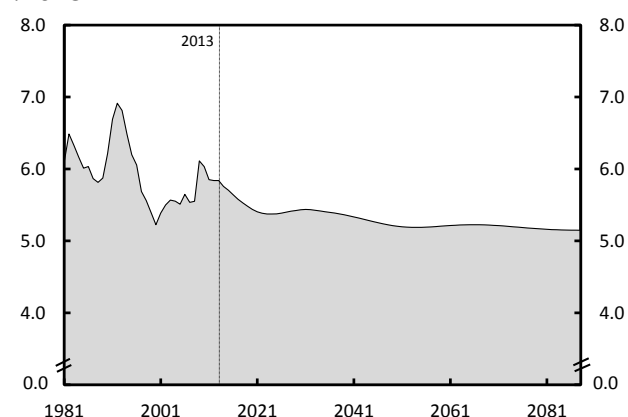
total population. PBO assumes there is no spending enrichment.

The population aged five to 24 is projected to grow more slowly than the overall population over the long term. Consequently, education spending is projected to decline as a share of GDP from 5.8 per cent in 2013 to 5.1 per cent in 2088 (Figure 5-7). The long-term decline in education spending is interrupted twice by relatively large cohorts of school aged children. These are the grandchildren and great grandchildren of the baby boom generation.

Figure 5-7

Education spending, 1981 to 2088

% of GDP



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

Social benefits

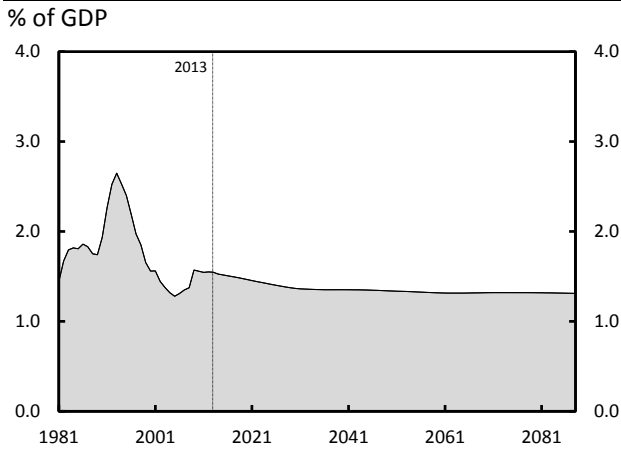
Social benefits include income replacement, disability support, and other social assistance programs. PBO projects social benefits using the growth in the share of the population aged 15 to 64 and the growth of nominal GDP.¹⁷

The population aged 15 to 64 declines as a share of the total population over 2014 to 2045. As a result, social benefits spending declines from 1.5 per cent of GDP in 2013 to 1.3 per cent in 2044, before stabilizing and growing at roughly the same rate as GDP over the remainder of the outlook (Figure 5-8).

¹⁷ PBO assumes the population eligible for social benefits is unaffected by changes to the ages of eligibility for federal elderly benefits.

Figure 5-8

Social benefits spending, 1981 to 2088

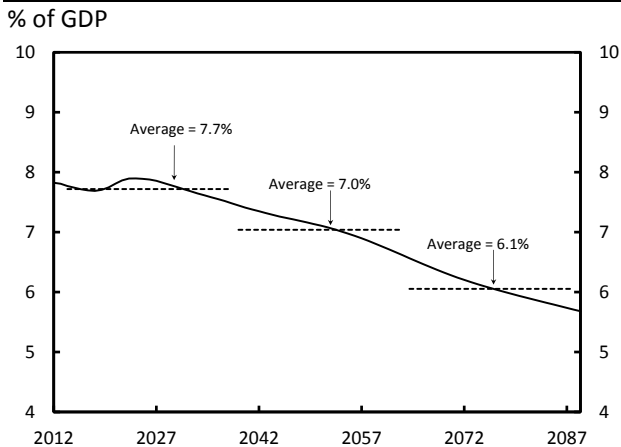


Sources: Office of the Parliamentary Budget Officer; Statistics Canada.

The CST escalator is assumed to continue at 3 per cent over the long term, which is slower than the projected growth of subnational government spending on social benefits and education. Federal CST transfers as a share of social benefits and education spending are projected to average 7.7 per cent over the first 25 years of the projection, 7.0 per cent over the next 25 years, and 6.1 per cent over the remainder (Figure 5-9).

Figure 5-9

Share of federal transfers in subnational social and education spending, 2013 to 2088



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

Other non-interest spending

PBO assumes that other program spending will remain frozen until the end of 2017, reflecting

PBO's review of discretionary spending plans in provincial budgets. While frozen, other spending will decrease as a share of GDP from 11.4 per cent of GDP in 2013 to 9.6 per cent in 2018.

The spending freeze is driven by Ontario's planned discretionary spending cuts, which offset planned increases in other provincial budgets. Therefore, PBO's sustainability calculations for subnational governments depend importantly on the assumption that Ontario successfully implements the spending restraint indicated in its 2014 provincial budget.

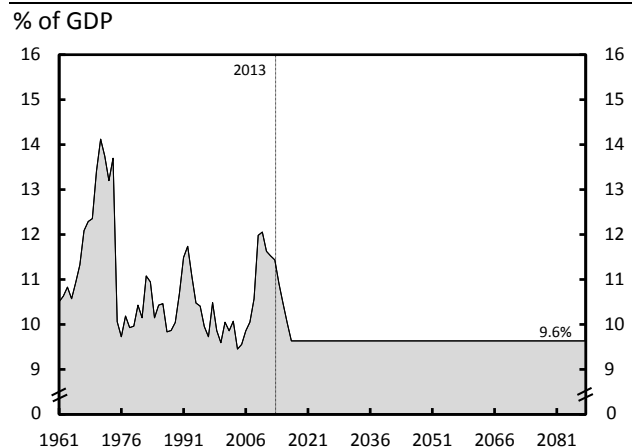
By 2017, most provincial budget plans return to surplus. PBO assumes spending restraint will be relaxed beyond 2017 and other program spending will increase at the same rate as GDP growth.

There has been some success in restraining other discretionary spending in the past three years: other spending has declined from a peak of 12.1 per cent of GDP in 2010 to 11.4 per cent in 2013. As other spending continues to decline, it will reach levels near historic lows (Figure 5-10).

PBO's medium-term restraint assumption amounts to a permanent reduction in other program spending of nearly 1 percentage point of GDP below its historical average of 10.5 per cent.

Figure 5-10

Subnational government other program spending, 1961 to 2088



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

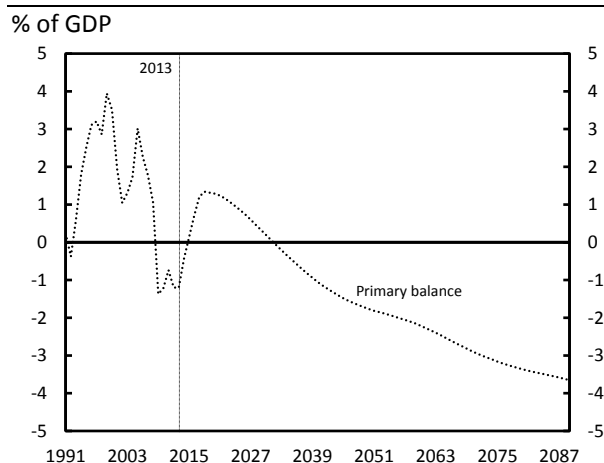
5.3 Subnational government primary balance

Subtracting projected program expenses from revenues gives the projected primary balance of subnational governments (Figure 5-11).

The projection of the primary balance of subnational governments peaks at a surplus of 1.3 per cent of GDP in 2018 as a result of medium-term spending restraint. After 2018, population ageing and escalating health care costs result in a steadily deteriorating primary balance over the long term, reaching a deficit of 3.6 per cent of GDP in 2088.

Figure 5-11

Subnational primary balance, 1961 to 2088



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

6 CANADA AND QUEBEC PENSION PLANS

The Canada Pension Plan (CPP) and Quebec Pension Plan (QPP) are included in FSR 2014 as they are material to PBO's debt-sustainability and risk analysis of the broader public sector.¹⁸ The Canada Revenue Agency and Employment and Social Development Canada jointly administer the CPP, while the Régie des rentes du Québec manages the QPP.

PBO projects the revenues and expenses of the CPP and QPP using its long-term demographic and

economic projections and the information in the 26th Actuarial Report of the Canada Pension Plan as at 31 December 2012 and the Actuarial Report of the Québec Pension Plan as at 31 December 2012.¹⁹ Annex E provides additional detail on the methodology used to project the CPP and QPP.

6.1 CPP and QPP revenues

The revenues of the CPP and QPP include both contributions and investment income, with contributions making up the majority.

Contributions to the CPP and QPP are determined by the contribution rate and pensionable earnings. The current legislated contribution rate for the CPP is 9.9 per cent, while the contribution rate for the QPP is set to increase from 10.35 per cent in 2014 to 10.80 per cent in 2018, increasing by 0.15 percentage points a year.

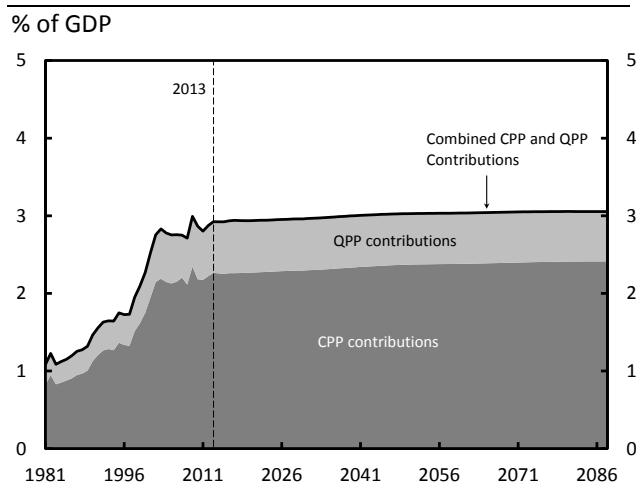
Over the projection horizon, PBO assumes that contributions grow in line with employment, inflation, and labour productivity from the demographic and economic projections described in Section 2 and 3.

CPP contributions are projected to increase from 2.3 per cent of GDP in 2014 to 2.4 per cent in 2088. QPP contributions are projected to decline from 0.7 per cent of GDP in 2014 to 0.6 per cent in 2088. The difference between CPP and QPP contributions relative to GDP reflects slower employment growth in Quebec compared with the rest of Canada.²⁰ The combined CPP and QPP contributions are estimated to increase gradually from 2.9 per cent of GDP in 2014 to 3.1 per cent of GDP in 2088 (Figure 6-1).

¹⁹ Office of the Superintendent of Financial Institutions Canada (2013). 26th Actuarial Report on the Canada Pension Plan as at 31 December 2012: <http://www.osfi-bsif.gc.ca/Eng/Docs/cpp26.pdf>; Régie des rentes du Québec (2013) Actuarial Report of the Québec Pension Plan as at 31 December 2012: http://www.rrq.gouv.qc.ca/SiteCollectionDocuments/www.rrq.gouv.qc.ca/Anglais/publications/regime_rentes/EA2012en.pdf

²⁰ PBO does not project Quebec employment separately. PBO uses the distribution from the 26th Actuarial Report on the CPP to allocate PBO's national employment projections to Quebec and the rest of Canada. The average annual growth of employment in Quebec from 2014 to 2088 is 0.3 per cent, while the rest of Canada is 0.5 per cent over the same period.

¹⁸ The CPP and QPP are autonomous pension funds, meaning they have their own assets and liabilities and engage in market transactions on their own account. By the classifications of GFSM 2014 they form part of the *public sector* but not the *general government sector*.

Figure 6-1**CPP and QPP Contributions, 1981 to 2088**

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

The second component of CPP and QPP revenues is investment income, which is determined by the rate of return for the CPP and QPP investment portfolios. The rate of return is calculated using PBO's projection of the interest rate on 10-year Government of Canada bonds, and the Chief Actuary's estimation of the portfolio shares and risk premiums. PBO projects the nominal rate of return on CPP and QPP investments will increase from 5.4 per cent in 2014 to 6.5 per cent in 2023, remaining constant thereafter.

6.2 CPP and QPP expenditures

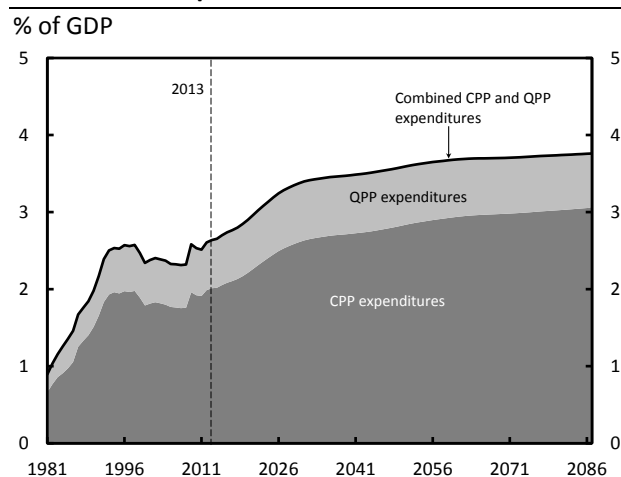
CPP and QPP expenditures are composed of retirement benefits, other benefits, and administration expenses. Expenditures are projected to increase over the long term as the old age dependency ratio increases from 22.3 per cent in 2013 to 44.8 per cent in 2088. PBO projects that CPP and QPP retirement benefits will increase from 2.0 per cent of GDP in 2013 to 2.9 per cent in 2034 as the baby boomer generation transitions into retirement. Retirement benefits are projected to continue increasing thereafter, reaching 3.3 per cent of GDP in 2088. The increase in retirement benefits is driven by both population ageing and enrichment of benefit payments. Benefits are enriched because growth in labour productivity will

increase average contributory earnings for future beneficiaries.

Other benefits, which include disability benefits, survivor benefits, death benefits and children's benefits, are projected to increase at an average annual rate of 3.3 per cent over the projection horizon. Other benefits increase as a result of the projected growth in the working-age population, inflation, and labour productivity.

Administration expenses are projected to increase in line with contributory earnings at 3.5 per cent annually, on average, over the projection period.

Overall, combined CPP and QPP expenditures are projected to increase from 2.6 per cent of GDP in 2013 to 3.8 per cent in 2088 (Figure 6-2).

Figure 6-2**CPP and QPP Expenditures, 1981 to 2088**

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

7 SUSTAINABILITY ASSESSMENT

PBO measures fiscal sustainability in terms of the projected end point of the time path of public debt over a finite horizon of the next 75 years.²¹ If the debt-to-GDP ratio in 2088 is less than or equal to the ratio in 2013, PBO considers the government's fiscal policy sustainable. If the debt-to-GDP ratio is greater in 2088 than 2013 and accelerating, the

²¹ PBO chose a 75-year horizon because it captures the demographics of the baby boom generation, their children, and their grandchildren, and is long enough for the old-age dependency ratio to stabilize.

government's fiscal policy is unsustainable and may require policy corrections.

To arrive at the path of public debt, PBO begins with the most recent observations of government balance sheets from Statistics Canada's Government Finance Statistics tables.²² The measure of debt PBO uses is *net debt*, defined in GFSM 2014 as gross debt minus financial assets corresponding to debt instruments. Gross debt is the sum of all financial claims that governments owe creditors at a future date.²³ Notably this includes both market debt and accrued benefits obligations for future public service pension and health plans. Financial assets are the same debt instruments, but where the government is the creditor.

PBO adds the projected long-term annual flows of the primary balance of the federal and subnational governments to the stock of net debt to determine the impact of annual operations on borrowing or lending. Annual interest is charged on the debt resulting from the initial stock of debt and borrowing activities throughout the year. Interest rates are projected according to the methodology described in Box 1.

The sum of the primary balance and interest charges in each year gives *net lending* if positive (that is, government is contributing financial resources to other sectors of the economy), or *net borrowing* if negative (that is, government is consuming financial resources from other sectors of the economy).

The annual flow of net lending determines the accumulation of additional debt. However, the sustainability of the levels of future debt depends not just on the accumulation of the nominal stock of debt, but also on the yearly national income which is available to service the debt—that is, GDP. If GDP grows faster than additional debt

Box 1: Projecting effective interest rates

PBO calculates the effective rate on government debt as public debt charges divided by the stock of the previous year's interest-bearing debt. Interest-bearing debt includes both market debt (short-term and long-term bonds) and non-market debt (unfunded pension plan obligations and other accounts payable).

The interest rate on federal market debt is determined by an estimated equation weighting short-term and long-term debt. Over the long-term, non-market debt and its interest charges are phased out and the long-term interest rate approaches the long-term interest rate on market debt, which is assumed to be equal to 4.9 per cent. The long-term interest rate on market debt is a weighted average of the market interest rates on 3-month treasury bills (4.2 per cent) and 10-year government of Canada bonds (5.3 per cent) from the economic projection.

PBO assumes that the effective interest rate on market debt of the subnational government sector settles at 50 basis points above the interest rate on the 10-year Government of Canada bond rate. This is based on the average market interest rate difference between long-term federal and provincial government debt between 1993 and 2007.^a As a result, there is a 90-point difference between the interest rate of federal and subnational governments over the long term (that is, 5.8 versus 4.9 per cent respectively) which is moderately smaller than the average differential of 110 basis points from 1992 to 2007.

^aThe long-term federal rate is the average yield on Government of Canada bonds with maturities over 10 years and the long-term provincial rate is Scotia Capital's average weighted yield on long-term provincial bonds.

accumulates, debt will shrink as a share of national income. If GDP grows more slowly than the accumulation of additional debt, debt could grow more quickly than the nation's ability to finance it. All stocks and flows in PBO's fiscal sustainability assessments are presented as a share of GDP. The relationship among nominal GDP growth, interest rates, and fiscal sustainability is described further in Box 2.

Using the projected path of public debt, PBO calculates a summary statistic of sustainability of the government fiscal position known as the *fiscal*

²² The Government Finance Statistics tables are prepared according to internationally comparable standards. See CANSIM Table 385-0032 and related publications.

²³ The scope of financial liabilities include: monetary gold and special drawing rights (SDRs), currency and deposits, debt securities, loans, insurance, pension, standardized guarantee schemes, and other accounts receivable.

Box 2: Interest rates, growth rates, and sustainability

When the effective interest rate on debt (i) exceeds GDP growth (g) maintaining a stable debt-to-GDP ratio (D/Y) requires running primary balance (PB) surpluses. As a share of GDP, the size of the primary balance surplus necessary to maintain a stable debt-to-GDP ratio depends on the difference between the interest rate and the GDP growth rate as well as the current debt ratio:

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

This relationship says that the debt-to-GDP ratio will increase if the primary balance as a share of GDP is smaller than the difference between the interest rate and growth rate multiplied by the current debt ratio.

For the CPP and QPP, when the rate of return (r) exceeds GDP growth (g), maintaining a stable asset-to-GDP ratio (A/Y) requires negative net cash flows (NCF) to offset investment income. As a share of GDP, the size of the net cash flow (contributions less expenditures) necessary to maintain a stable asset ratio depends on the difference between the rate of return and the GDP growth rate as well as the current asset ratio.

$$\frac{NCF}{Y} = -(r - g) \cdot \frac{A}{Y}$$

gap.²⁴ The fiscal gap is the immediate and permanent improvement to the primary balance required to achieve the same debt-to-GDP ratio at the end of the chosen time horizon as at the beginning of the projection (2088 and 2013, respectively).

An improvement in the primary balance can be achieved by increasing revenues, decreasing non-interest spending, or a combination of the two. If left uncorrected, a positive fiscal gap would lead to government debt increasing exponentially as a share of the economy, eventually making government programs difficult to finance. Annex F

provides a detailed definition and derivation of the fiscal gap.

Sections 7.1 and 7.2 present PBO's baseline fiscal gap estimates for the federal government and subnational governments. Section 7.3 presents PBO's assessment of the CPP and QPP funds, which uses a similar methodology and summary statistic.

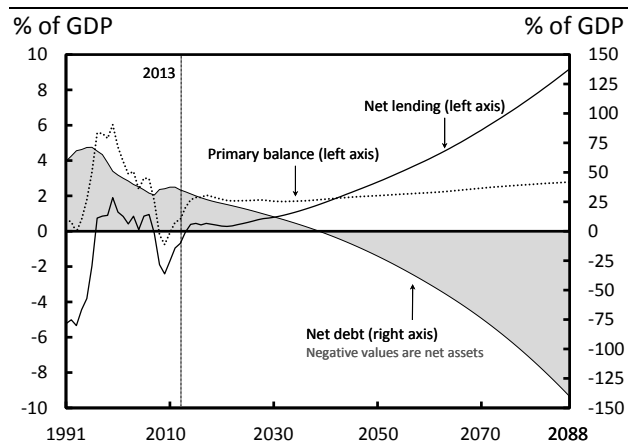
7.1 Fiscal gap of the federal government

Figure 7-1 shows PBO's projection of the federal primary balance, net lending, and net debt.

Although the primary balance surplus is projected to decline slightly from 2018 to 2032 and the interest rate on debt is projected to exceed GDP growth, the annual surpluses are larger than necessary to stabilize the debt-to-GDP ratio. Net debt falls as a share of GDP and is eliminated in 2040, after which the government begins to accumulate a net financial asset position.

Figure 7-1

Federal government primary balance, net lending, and net debt, 1991 to 2088



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

Table 7-1 presents PBO's estimate of the baseline federal government fiscal gap calculated over 25-, 50-, and 75-year horizons. The federal government net debt-to-GDP ratio was 35.1 per cent in 2013. The fiscal gap estimate is based on the assumption that fiscal actions required to stabilize the debt ratio would be implemented immediately (that is, starting in 2014) and maintained indefinitely. For each projection horizon, implementing these fiscal

²⁴ PBO's fiscal gap methodology has been adapted from the Blanchard et al (1990) and Auerbach (1994).

actions would ensure that the ratio of federal net debt to GDP returns to its 2013 level at the end of each horizon.

Table 7-1**Fiscal gap estimate, federal government**

% of GDP	Projection horizon		
	25 years	50 years	75 years
Federal government	-1.1	-1.2	-1.4

Source: Office of the Parliamentary Budget Officer.

Note: The projection period starts in 2014. Calculations are based on the endpoint net debt-to-GDP ratio of 35.1 per cent.

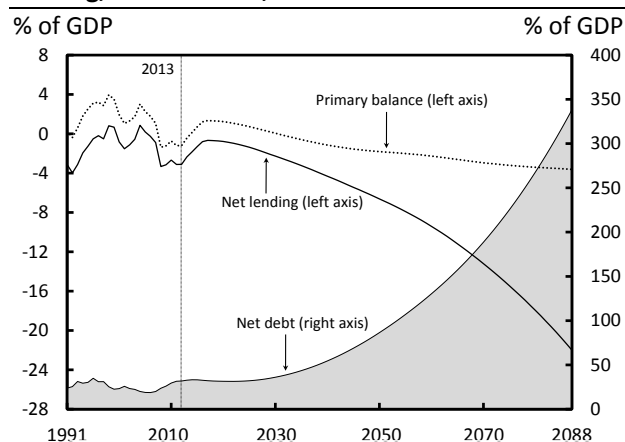
The baseline federal fiscal gap is estimated to be -1.4 per cent of GDP using a 75-year horizon. A negative fiscal gap means there is fiscal room available to permanently increase spending or decrease revenues while returning to the current net debt-to-GDP ratio in 2088. Earlier target dates have less fiscal room available mainly because interest revenues from future net assets do not have as much time to accumulate.

Changes from last year's assessment

The federal fiscal room projected in FSR 2014 has increased slightly relative to FSR 2013, from 1.3 per cent to 1.4 per cent. The government is projected to reach a net asset position four years earlier. This is mainly the result of further direct program expenses restraint over the medium-term. A full comparison of results from FSR 2014 to FSR 2013 is provided in Annex C.

7.2 Fiscal gap of subnational governments

Figure 7-2 shows the primary balance, net lending, and debt dynamics of subnational governments resulting from PBO's baseline projection of revenues and program spending, combined with the projected interest rate charges.

Figure 7-2**Subnational government primary balance, net lending, and net debt, 1991 to 2088**

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

With interest rates on subnational government debt exceeding GDP growth, maintaining a stable debt-to-GDP ratio requires running primary surpluses. Increasing future primary deficits result in rapidly increasing net borrowing. The debt-to-GDP ratio reaches 338.1 per cent in 2088.

The baseline fiscal gap for subnational governments is estimated to be 1.7 per cent of GDP. Beginning in 2014 the primary balance would need to increase by 1.7 percentage points of GDP annually above its projected baseline by increasing revenues, reducing program spending, or some combination of both, in order to return to a net debt-to-GDP ratio of 31.8 per cent after 75 years (Table 7-2).

If an earlier date is targeted, less of an adjustment is required because the full extent of projected increases in health care costs resulting from population ageing and excess cost growth will have not yet occurred.

Table 7-2**Fiscal gap estimate, subnational governments**

% of GDP	Projection horizon		
	25 years	50 years	75 years
Subnational governments	0.5	1.3	1.7

Source: Office of the Parliamentary Budget Officer.

Note: The projection period begins in 2014. Calculations are based on the endpoint net debt-to-GDP ratio of 31.8 per cent.

The fiscal gap is calculated as the fiscal response required in 2014, but action need not be taken immediately. Measures to improve the primary balance can be implemented gradually; however, the longer they are delayed the greater the adjustments will need to be.

Changes from last year's assessment

Based on the revised population projections, economic environment, new fiscal measures, and the latest historical data, the fiscal gap of subnational governments has improved from last year. This is mainly the result of lower historical and provisional estimates of health care costs over 2011 to 2013. A full comparison of results from FSR 2014 to FSR 2013 is provided in Annex C.

Alternative debt-to-GDP targets

Rather than returning to the current ratio of net debt-to-GDP in 2088, fiscal gaps may also be calculated for alternative long-term debt-to-GDP targets. Table 7-3 provides PBO's estimated fiscal gaps for each alternative assumption for federal and subnational government net debt-to-GDP targets.

To eliminate net debt by 2088 instead of 2040, the federal government would need to permanently increase spending or decrease revenues by 1.1 per cent of GDP. Subnational governments would need a sustained reduction in spending or increase in revenues of 1.9 per cent of GDP annually to do the same.

Alternatively, if targeting a debt-to-GDP ratio of 100 per cent of GDP in 2088, the federal government would have to increase spending or reduce revenues by 2.0 per cent of GDP. The subnational governments would still have to reduce spending or increase revenues, although by a lesser rate of 1.3 per cent of GDP.

Table 7-3

Fiscal gap of federal and subnational governments under alternative net debt-to-GDP targets

% of GDP	Net debt-to-GDP endpoint in 2088					
	2013 ratio	0	25	50	75	100
Federal government	-1.4	-1.1	-1.4	-1.6	-1.8	-2.0
Subnational governments	1.7	1.9	1.8	1.6	1.5	1.3

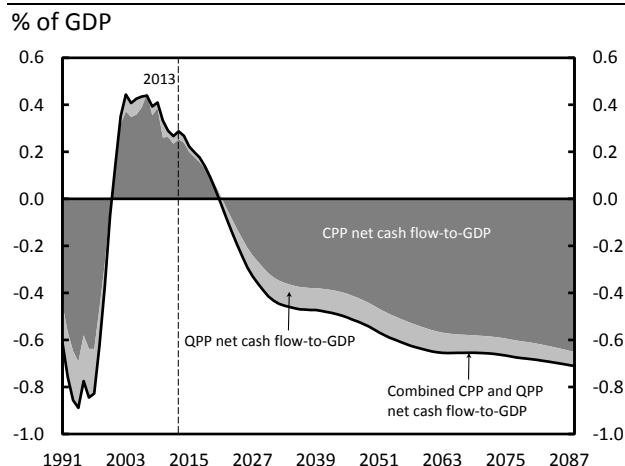
Sources: Office of the Parliamentary Budget Officer.

Note: All gaps calculated over 75 years.

7.3 Fiscal gap of the CPP and QPP funds

As the baby boomer generation transitions into their retirement and collects pension benefits, the net cash flow (that is, contributions less expenditures) of the CPP is projected to decrease from a surplus of 0.3 per cent of GDP in 2013 to a deficit of 0.4 per cent of GDP in 2048. As the children and grandchildren of the baby boomer generation move into retirement, net cash flow is projected to decrease further, reaching -0.7 per cent of GDP in 2088 (Figure 7-3).

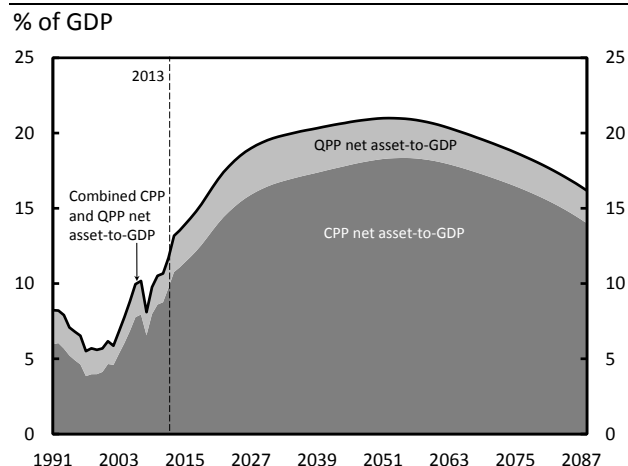
The QPP net cash flow is projected to balance from 2013 until 2022 as contributions are estimated to grow in line with expenditures. After 2022, net cash flow for the QPP is estimated to decline slightly to -0.1 per cent of GDP throughout the rest of the projection period. This reflects the assumption that Quebec's old age dependency ratio is slightly higher than the rest of Canada, which places relatively more upward pressure on QPP benefit payments. However, the legislated increase in the QPP contribution rate (it is set to increase to 10.8 per cent in 2018) partly offsets the increase in projected benefit payments. Therefore, the net cash flow for the QPP is projected to decrease at a slower pace than the CPP.

Figure 7-3**CPP and QPP net cash flows relative to GDP, 1991 to 2088**

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

PBO projects net assets for the CPP and QPP relative to GDP based on projected net cash flows and rates of return on investments. Given the current legislated contribution rates of the two plans, PBO estimates that CPP and QPP net assets will increase from 13.2 per cent of GDP in 2013 to 21.0 in 2050. Thereafter, their net assets are projected to gradually decline to 16.2 per cent of GDP in 2088 as net cash flows decrease (Figure 7-4).

Since the CPP and QPP net cash flows are projected to turn negative in 2023, both plans would depend increasingly on investment income as a source of revenues to maintain financial sustainability. PBO projects investment income based on plan assets and the projected rate of return. Since PBO assumes a constant real rate of return over the long term, net assets relative to GDP are projected to decline. This is because the negative net cash flow puts downward pressure on the growth of net assets which in turn would decrease the growth of investment income and future net assets.

Figure 7-4**CPP and QPP net assets relative to GDP, 1991 to 2088**

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

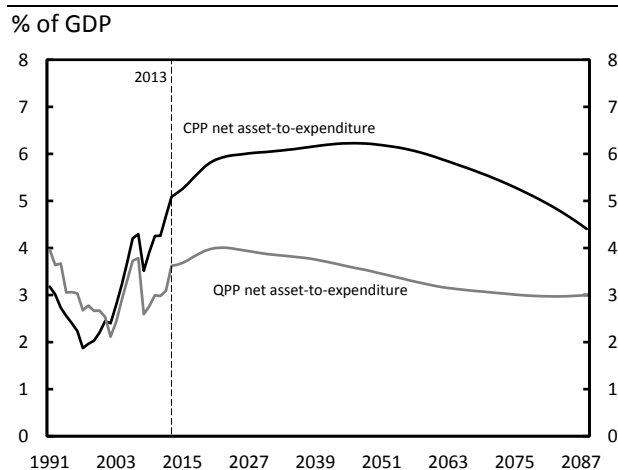
The paths of the asset-to-expenditure ratios of the CPP and QPP can also be used as an indicator of fiscal sustainability.

PBO projects that the CPP asset-to-expenditure ratio will increase steadily from 5.1 in 2013 to 6.2 in 2039. Thereafter, the asset-to-expenditure ratio will decline gradually to 4.4 in 2088 as net assets are projected to grow at a slower pace.

PBO projects that the QPP asset-to-expenditure ratio will increase from 3.6 in 2013 to 4.0 in 2020, after which the ratio is estimated to decline gradually to 3.0 in 2088 (Figure 7-5).

Relative to FSR 2013, the projected asset-to-expenditure ratios are lower in the long term which reflects the changes in the demographic and economic projections. The projections of asset-to-expenditure ratios are highly sensitive to demographic and economic assumptions.²⁵

²⁵ Based on the 26th Actuarial Report on the Canada Pension Plan as at 31 December 2012, the asset-to-expenditure ratio is projected to increase to 5.7 in 2088. PBO's projected asset-to-expenditure ratio may differ slightly due to differences in the demographic and economic assumptions and data. Based on Actuarial Report of the Québec Pension Plan as at 31 December 2012, the projected asset-to-expenditure ratio is projected to decline to 2.2 in 2062.

Figure 7-5**CPP and QPP net assets relative to expenditures, 1991 to 2088**

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

Based on the same approach used to calculate the estimates for federal and subnational governments, the fiscal gaps of the CPP and QPP are estimated as the permanent change in revenues and/or expenditures that needs to be made immediately to make the net asset-to-GDP ratio equal at the beginning and the end of the projection.

PBO projects that the 75-year fiscal gaps for both the CPP and QPP are zero, suggesting that both plans are sustainable over the long term (Table 7-4).

Table 7-4**Fiscal gap estimates, CPP and QPP**

% of GDP	Projection horizon		
	25 years	50 years	75 years
Combined CPP and QPP	-0.2	-0.1	0.0
Canada Pension Plan	-0.2	-0.1	0.0
Quebec Pension Plan	0.0	0.0	0.0

Sources: Office of the Parliamentary Budget Officer.

Note: The projection starts in 2014. The calculations of the CPP and QPP fiscal gap are based on the endpoint net asset-to-GDP ratio of 10.8 per cent of GDP for the CPP and 2.4 per cent of GDP for the QPP.

PBO also estimates the steady-state contribution rates which ensure that the asset-to-expenditure

ratio at the end of the projection horizon is equal to the level in 2013.²⁶

PBO's estimates of the steady-state contribution rates for the CPP are lower than the statutory contribution rate over the 25-year and 50-year projection horizons (Table 7-5). However, applying PBO's baseline demographic and economic projection, the estimated 75-year steady-state contribution rate for the CPP is 10.01 per cent, which is slightly above the current statutory contribution rate of 9.9 per cent.

The estimated steady-state contribution rate for the QPP over the 25-year projection horizon is lower than the statutory contribution rate, but higher over the 50-year and 75-year projection horizon. Estimates of the steady-state contribution rates for the CPP increase as the projection horizon lengthens since the projected CPP net cash flow decreases over time because of population ageing. Estimates of the steady-state contribution rates for the QPP are relatively more stable, reflecting steady and relatively more balanced net cash flow over the projection horizons.

The projection of the asset-to-expenditure ratio used to calculate the steady contribution rate is highly sensitive to economic and demographic assumptions. Further, PBO's starting point for the projection of the steady-state contribution rates is different than those in the CPP and QPP actuarial reports.

²⁶ PBO applies the steady-state contribution rate to the 2014 levels. However, in the CPP actuarial report, the steady-state rate is applied after the end of the review period (three years beyond the last historical data point), and is defined as the lowest level contribution rate that results in the projected asset/expenditure ratio of the Plan being the same in the 10th and 60th years following the end of the review period. The steady-state contribution rate is applicable for 2016 and thereafter in the CPP actuarial report. In the QPP actuarial report, the steady state contribution rate is the contribution rate that would stabilize the ratio of the reserve (asset) to cash outflows in the final years of the projection period and the ratio must be identical in the 30th and 50th years of projection. The steady-state contribution rate is applicable for 2018 and thereafter in the QPP actuarial report.

Table 7-5**Steady-state contribution rate estimates, CPP and QPP**

%	Projection horizon		
	25 years	50 years	75 years
Canada Pension Plan	9.59	9.87	10.01
Quebec Pension Plan	10.70	10.82	10.81

Sources: Office of the Parliamentary Budget Officer.

Note: The projection starts in 2014. The calculations of the CPP and QPP steady-state contribution rates are based on the endpoint net asset-to-expenditure ratio of 4.8 for the CPP and 3.6 for the QPP.

8 SENSITIVITY ANALYSIS

To assess the sensitivity of PBO's 75-year baseline fiscal gaps, PBO tests a number of alternative demographic, economic, and policy assumptions. This section describes the impact on the fiscal gap of the following alternative scenarios:

- a) Older and younger demographic projections
- b) Higher and lower economic growth
- c) Higher and lower interest rates
- d) Higher enrichment of elderly benefits
- e) Higher medium-term provincial spending
- f) Higher and lower excess cost growth in health spending
- g) Alternative CHT escalators
- h) Combining elimination of excess cost growth and an alternative CHT escalator

a) Older and younger demographic projections

PBO projects the fiscal gap under two alternative demographic scenarios: (1) a higher cost older scenario with lower fertility, higher life expectancy and lower immigration rates, and (2) a lower cost younger scenario with higher fertility, lower life expectancy, and higher immigration rates.

In the younger demographics assumption, the fertility rate increases from 1.61 in 2011 to 1.88 in 2021, and is held constant afterward. The immigration rate rises gradually from 7.5 per 1,000 in 2013 to 9.0 per 1,000 in 2022, remaining constant thereafter.

In the older demographics assumption, the fertility rate decreases from 1.61 in 2011 to 1.53 from 2021 onward. The immigration rate declines gradually from 6.8 per thousand in 2013 to 5.0 per thousand in 2022. Table 8-1 summarizes the baseline and alternative demographic assumptions.

Table 8-1**Alternative demographic projections**

	Baseline	Older	Younger
Total fertility rate in 2021 (births per woman)	1.67	1.53	1.88
Life expectancy at birth in 2062 (years)			
Males	87.4	88.8	85.8
Females	90.0	91.3	88.6
Immigration rate in 2022/2023 (per 1,000 persons)	7.5	5.0	9.0

Source: Office of the Parliamentary Budget Officer; Statistics Canada

With older demographics, age-related spending increases and output declines (lowering revenues, but also lowering program spending such as federal transfers that are escalated with GDP growth). The net effect of older demographics on the federal and subnational primary balances and net debt paths is negative. Federal fiscal room declines to 0.8 per cent of GDP and the subnational government fiscal gap increases, requiring a permanent fiscal tightening of 2.1 per cent of GDP (Table 8-2).

With younger demographics, federal fiscal room increases to 2.0 per cent of GDP and the subnational fiscal gap improves to 1.4 per cent of GDP.

Table 8-2**Fiscal gap under alternative demographic scenarios**

% of GDP	Baseline	Older	Younger
Federal government	-1.4	-0.8	-2.0
Other levels of government	1.7	2.1	1.4

Source: Office of the Parliamentary Budget Officer.

For the CPP and QPP, older demographics would increase benefit payments, requiring additional contributions to maintain the same asset-to-GDP ratio in 2088. The CPP fiscal gap would increase to

0.1 per cent of GDP (Table 8-3). The QPP fiscal gap increases but remains at roughly 0.0 per cent of GDP.

With younger demographics, fewer contributions are required to maintain the same asset-to-GDP ratio in 2088. The fiscal room of the CPP increases to 0.2 per cent of GDP. The fiscal room of the QPP also increases slightly, but is less sensitive to younger demographic and remains at roughly 0.0 per cent of GDP.

Table 8-3

Fiscal gap under alternative demographic scenarios – CPP and QPP

% of GDP			
	Baseline	Older	Younger
Canada Pension Plan	0.0	0.1	-0.2
Quebec Pension Plan	0.0	0.0	0.0

Source: Office of the Parliamentary Budget Officer.

b) Alternative economic projections

PBO also assesses the fiscal gaps under two alternative economic scenarios beyond the medium term: real GDP growth of 0.5 percentage points above baseline growth, and 0.5 percentage points below baseline growth.²⁷

With lower GDP growth, federal government fiscal room falls to 0.8 per cent of GDP and the subnational government fiscal gap remains at roughly 1.7 per cent of GDP (Table 8-4). With higher GDP growth, federal government fiscal room increases to 2.0 per cent of GDP and the subnational fiscal gap increases slightly to 1.8 per cent of GDP.

Federal fiscal room is sensitive to real GDP growth because elderly benefits are indexed only to inflation, and the CST escalator grows only at 3 per cent.

The subnational fiscal gap is not sensitive to GDP growth as a result of the assumption that most revenues and transfers (with the exception of CST) and all major spending programs are grown with

GDP. Therefore alternative growth assumptions have offsetting effects on the primary balance.

Table 8-4

Fiscal gap under alternative real GDP growth projections

% of GDP			
	Baseline	Lower GDP growth	Higher GDP growth
Federal government	-1.4	-0.8	-2.0
Subnational governments	1.7	1.7	1.8

Source: Office of the Parliamentary Budget Officer.

The CPP and QPP fiscal gaps would remain broadly stable under alternative real GDP growth scenarios (Table 8-5). This is because both contributions and pension benefits are projected to grow with labour productivity. Therefore, a change in real GDP based on an alternative assumption of labour productivity growth will have an offsetting effect on both revenues and expenditures.

Table 8-5

Fiscal gap under alternative real GDP growth projections – CPP and QPP

% of GDP			
	Baseline	Lower GDP growth	Higher GDP growth
Canada Pension Plan	0.0	0.0	0.0
Quebec Pension Plan	0.0	0.0	0.0

Source: Office of the Parliamentary Budget Officer.

c) Higher and lower interest rates

PBO also assesses the fiscal gaps under two alternative interest rate scenarios beyond the medium term: a 50-basis point increase in interest rates and a 50-basis point decrease in interest rates.

A reduction in the effective interest rate increases federal fiscal room compared with the baseline estimate (Table 8-6). A smaller difference between the interest rate and the GDP growth rate requires smaller primary balances to achieve the same debt-to-GDP ratio in 2088. An increase in the effective interest rate has the opposite effect, reducing fiscal room.

²⁷ The 0.5-percentage point reduction (increase) in projected real GDP growth is based on a reduction (increase) in labour productivity growth. As a result, the demographic and labour input projections are unchanged from the baseline.

Table 8-6**Fiscal gap with alternative effective interest rate assumptions**

% of GDP	Baseline	Lower interest rate	Higher interest rate
Federal government	-1.4	-1.7	-1.2
Subnational governments	1.7	1.7	1.8

Source: Office of the Parliamentary Budget Officer.

The subnational government fiscal gap is relatively insensitive to alternative effective interest rates. To maintain sustainable debt, the subnational governments require large primary balance surpluses until 2050 to offset growing deficits afterward. Therefore a reduction in interest rates reduces future deficit financing costs but also reduces interest savings over the first three decades. The two effects roughly offset each other.

Under the lower rate of return scenario, CPP and QPP funds yield lower investment income. The CPP fiscal gap would increase to 0.1 per cent of GDP, while the QPP fiscal gap would increase slightly but remain roughly at 0.0 per cent of GDP.

Under the higher interest rate scenario, the CPP fiscal gap would decrease to -0.1 per cent of GDP, while the QPP fiscal gap would decrease slightly but remain roughly at 0.0 per cent of GDP (Table 8-7).

Table 8-7**Fiscal gap with alternative interest rate assumptions – QPP and CPP**

% of GDP	Baseline	Lower interest rate	Higher interest rate
Canada Pension Plan	0.0	0.1	-0.1
Quebec Pension Plan	0.0	0.0	0.0

Source: Office of the Parliamentary Budget Officer.

d) Enriching elderly benefits

Baseline elderly benefits are projected according to current policy, which indexes payments to increases in the cost of living (CPI inflation) only. In the future, government may enrich elderly benefits to prevent the purchasing power of payments from falling behind the growth in the living standards of the population. Increases in living standards are

modeled in PBO's sensitivity analysis as the growth of real GDP per capita.

PBO considers two alternative enrichment scenarios: (1) benefits are enriched by half the growth of real GDP per capita, and (2) benefits are enriched fully with the growth of real GDP per capita. Alternative elderly benefits scenarios affect only the federal fiscal gap.

When enriched by half the growth of real GDP per capita, federal fiscal room falls from 1.4 per cent of GDP to 1.2 per cent (Table 8-8). When enriched fully by the growth of real GDP per capita, fiscal room would be reduced further to 0.9 per cent of GDP. Federal debt is sustainable under both enrichment scenarios.

Table 8-8**Fiscal gap with alternative enrichment of elderly benefits**

% of GDP	Baseline	Half real GDP per capita	Real GDP per capita
Federal government	-1.4	-1.2	-0.9

Source: Office of the Parliamentary Budget Officer.

e) Higher medium-term provincial spending

PBO's medium-term assumption of subnational government discretionary spending restraint depends on the planned spending restraint published in provincial budgets. Nominal GDP growth over 2014-2018 is forecast at 4.4 per year on average. If spending instead increases at half the rate of average forecast GDP growth (2.2 per cent a year), the fiscal gap of subnational governments will rise to 2.6 per cent (Table 8-9). If program spending of all subnational governments instead grows at the rate of growth of GDP, the fiscal gap will rise to 3.5 per cent.

Table 8-9**Fiscal gap with higher medium-term provincial spending**

% of GDP	Baseline	Half GDP growth	GDP growth
Subnational governments	1.7	2.6	3.5

Source: Office of the Parliamentary Budget Officer.

f) Alternative health cost growth assumptions

PBO's baseline health projection assumes costs grow with ageing, income (GDP growth), and an excess cost growth factor equal to average cost increases exceeding the age index and GDP growth from 1975 to 2013. PBO considers two alternative health care excess cost growth assumptions: (1) no excess cost growth, and (2) excess cost growth equal to the rate over the last decade, 2004 to 2013, which was 0.6 per cent. Alternative health spending scenarios affect only the fiscal gap of subnational levels of government.

If provinces are able to eliminate excess cost growth, the fiscal gap of subnational governments will be reduced to 0.9 per cent of GDP (Table 8-10). If excess cost growth remains the same as the average over the past decade, the fiscal gap will increase to 2.5 per cent of GDP.

Table 8-10

Health spending excess cost growth

% of GDP

	Baseline fiscal gap	No excess cost growth	Excess cost growth 2004-2013
Subnational governments	1.7	0.9	2.5

Source: Office of the Parliamentary Budget Officer.

g) Alternative CHT escalators

The most significant driver of the fiscal gap of subnational governments is the expected increase in health care costs resulting from population ageing.

By indexing the Canada Health Transfer to GDP, the federal government has insulated itself from the impact of demographics on health spending. Federal spending on health transfers will grow inversely with health care costs; as the population ages, GDP growth will decline.

PBO has estimated the impact of two alternative CHT funding escalators on the fiscal gaps of federal and subnational governments: (1) the CHT continues to grow at 6 per cent beyond 2016, and (2) the CHT escalator is changed to increase at the rate of population ageing in 2025 (after the current 10-year announcement). Results for these scenarios are given in Table 8-11.

If the CHT were to grow at 6 per cent for the next 75 years it would increase in value from 1.5 per cent of GDP in 2013 (\$28.0 billion) to 8.2 per cent (\$2.2 trillion). This would be unsustainable for the federal government, eliminating fiscal room of 1.4 per cent of GDP and creating a fiscal gap of 0.4 per cent. The fiscal gap of subnational governments would be nearly eliminated, falling to 0.1 per cent of GDP.

Indexing the CHT to GDP and the expected increase in health care costs resulting from demographics would increase the annual growth of federal assistance by roughly one percentage point higher than planned indexation to GDP over the next two decades, as the most serious demographic shift occurs. But growth would slow toward the end of the forecast and approach the same rate of growth as GDP by 2088 (Table 8-12). This would be sustainable for the federal government, reducing fiscal room from 1.4 per cent of GDP to 1.1 per cent. The fiscal gap of subnational governments would be reduced from 1.7 per cent of GDP to 1.4 per cent.

Table 8-11

Alternative health accords

% of GDP

	Baseline	6 per cent	Ageing cost share 2025
Federal government	-1.4	0.4	-1.1
Subnational governments	1.7	0.1	1.4

Source: Office of the Parliamentary Budget Officer

Table 8-12

CHT escalator, ageing cost share vs. GDP

growth (%)

	2017	2024	2040	2050	2060	2088
Ageing cost share	5.5	4.2	4.6	3.9	3.8	3.5
GDP only	4.5	3.1	3.7	3.6	3.7	3.5

Source: Office of the Parliamentary Budget Officer

h) Combining elimination of excess cost growth and an alternative CHT escalator in 2025

Subnational government debt is unsustainable even under the most optimistic scenarios, when assessed separately. This scenario combines the impact on the fiscal gap of two changes to fiscal

policy: (1) provinces successfully eliminate excess cost growth in health care, and (2) the CHT escalator is changed to grow with GDP and the expected increase in health care costs as a result of population ageing beginning 2025.²⁸

This combined scenario would preserve considerable fiscal room at the federal level, and reduce the subnational government fiscal gap to a more manageable level. Subnational government debt sustainability could be achieved under this scenario with permanent revenue increases or spending restraint proportional to 0.6 per cent of GDP, equivalent to \$12.0 billion in 2014.

Table 8-13

Combined elimination of excess cost growth and alternative CHT escalator

% of GDP	Baseline	No excess costs growth and alternative CHT in 2025
Federal government	-1.4	-1.1
Subnational governments	1.7	0.6

Source: Office of the Parliamentary Budget Officer

Implications

In aggregate, the fiscal gap of the total general government sector (that is, the combined federal and subnational governments) is not sustainable. However, the fiscal room of the federal government mostly offsets the fiscal gap of subnational governments.

The fiscal gap of subnational governments is large, but not insurmountable. If provinces are able to control excess cost growth, an increase in the CHT escalator to account for population ageing when it is reviewed in 2024 would eliminate much of the fiscal gap of subnational governments while still leaving the federal government with considerable fiscal room. The remaining subnational fiscal gap could be closed with a mix of modest spending restraint and tax increases.

²⁸ This CHT escalator is modeled in favour of the 6 per cent scenario because it preserves the sustainability of federal debt.

References

- Auerbach, A. 1994. The U.S. Fiscal Problem: Where We Are, How We Got Here, and Where We're Going. *NBER Macroeconomics Annual*, S. Fisher and J. Rotemberg (eds.). p. 141-75.
- Beach, C.M. 2008. *Canada's Aging Workforce: Participation, Productivity, and Living Standards. Proceedings of a conference held by the Bank of Canada*. <http://www.bankofcanada.ca/wp-content/uploads/2010/09/beach.pdf>.
- Blanchard, O., J.C. Chouraqui, R.P. Hagemann and N. Sartor. 1990. *The Sustainability of Fiscal Policy: New Answers to an Old Question*. OECD Economic Studies No. 15 Autumn, p. 7-36.
- Canadian Institute for Health Information. 2013. *National Health Expenditure Trends, 1975 to 2013*. https://secure.cihi.ca/free_products/NHEXTrendsReport_EN.pdf.
- Congressional Budget Office. 2014. *The 2014 Long-Term Budget Outlook*. http://www.cbo.gov/sites/default/files/cbofiles/attachments/45471-Long-TermBudgetOutlook_7-29.pdf.
- Department of Finance Canada. 2014. *Economic Action Plan 2014*. <http://www.budget.gc.ca/2014/docs/plan/toc-tdm-eng.html>.
- Hogan, S. and S. Hogan. 2002. *How Will the Ageing of the Population Affect Health Care needs and Costs in the Foreseeable Future?* Commission on the Future of Health Care in Canada discussion paper No. 25.
- Office of the Superintendent of Financial Institutions Canada. 2013. *26th Actuarial Report on the Canada Pension Plan as at 31 December 2012*. <http://www.osfi-bsif.gc.ca/Eng/Docs/cpp26.pdf>.
- Régie des rentes du Québec. 2013. *Actuarial Report of the Québec Pension Plan as at 31 December 2012*. http://www.rrq.gouv.qc/Anglais/publications/regime_rentes/EA2012en.pdf.
- Organisation for Economic Co-operation and Development. 2006. *Projecting OECD Health and Long-Term Care Expenditures: What Are the Main Drivers?* OECD Economics Department Working Paper No. 477. <http://www.oecd.org/tax/public-finance/36085940.pdf>.
- Office for Budget Responsibility. 2014. *Fiscal Sustainability Report*. <http://cdn.budgetresponsibility.org.uk/41298-OBR-accessible.pdf>.
- Parliamentary Budget Officer. 2014. *Economic and Fiscal Outlook 2014*. http://www.pbo-dpb.gc.ca/files/files/EFO_April_2014.pdf.
- Parliamentary Budget Officer. 2013. *Fiscal Sustainability Report 2013*. http://www.pbo-dpb.gc.ca/files/files/FSR_2013.pdf.
- Parliamentary Budget Officer. 2012. *Fiscal Sustainability Report 2012*. http://www.pbo-dpb.gc.ca/files/files/FSR_2012.pdf.
- Parliamentary Budget Officer. 2010. *Estimating Potential GDP and the Government's Structural Budget Balance*. http://www.pbo-dpb.gc.ca/files/files/Publications/Potential_CAB_B_EN.pdf.
- Statistics Canada. 2014. *Population Projections for Canada 2013 to 2063, Provinces and Territories 2013 to 2038*. <http://www.statcan.gc.ca/pub/91-520-x/91-520-x2014001-eng.htm>.
- Statistics Canada. 2010. *Population Projections for Canada, Provinces and Territories 2009 to 2036*. Cat. No. 91-520-XIE. <http://www.statcan.gc.ca/pub/91-520-x/91-520-x2010001-eng.pdf>.

Annex A

Summary of FSR 2014 and FSR 2013 demographic and economic projections

Table A-1

%, unless otherwise indicated

	FSR 2014			FSR 2013		
	2035	2060	2085	2035	2060	2085
Demographic assumptions						
Fertility rate (births per woman)	1.67	1.67	1.67	1.7	1.7	1.7
Life expectancy Males	83.8	87.3	87.4	83.8	87.3	87.4
(years at birth) Females	87.1	89.9	90.0	87.1	89.9	90.0
Immigration rate (per 1,000)	7.5	7.5	6.5	7.6	7.8	6.6
Population growth	0.7	0.7	0.5	0.8	0.7	0.6
Ages 65+ population growth	1.4	1.0	0.6	1.5	1.0	0.8
Old age dependency ratio	39.4	43.8	44.4	38.8	43.3	44.0
Economic projections						
Nominal GDP growth	3.6	3.7	3.6	3.7	3.8	3.6
CPI and GDP inflation	2.0	2.0	2.0	2.0	2.0	2.0
Real GDP growth	1.6	1.6	1.5	1.7	1.8	1.6
Labour input growth	0.5	0.6	0.5	0.6	0.7	0.5
Labour productivity growth	1.1	1.1	1.1	1.1	1.1	1.1
Real GDP per capita growth	0.8	1.0	1.0	0.9	1.0	1.0
Unemployment rate	6.4	6.5	6.5	6.0	6.1	6.1
Employment rate	55.2	53.4	53.0	55.5	53.9	53.6
Participation rate	58.9	57.1	56.7	59.1	57.4	57.0
Average weekly hours worked (hours/week)	34.6	34.6	34.6	34.3	34.4	34.3
3-month treasury bill rate	4.2	4.2	4.2	4.2	4.2	4.2
10-year government bond rate	5.3	5.3	5.3	5.3	5.3	5.3

Source: Office of the Parliamentary Budget Officer.

Annex B

Labour input projection methodology

As discussed in Section 3, labour input (that is, total hours worked) is determined by the size of the working age population (*LFPOP*), the aggregate employment rate (*LFER*) and the average weekly number of hours worked (*AHW*) by an employed individual in a given week:

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

Each component is projected separately in PBO's projection to capture the different factors affecting their respective profiles. The demographic pressures noted above are projected to have important impacts on the working age population and the aggregate employment rate going forward.

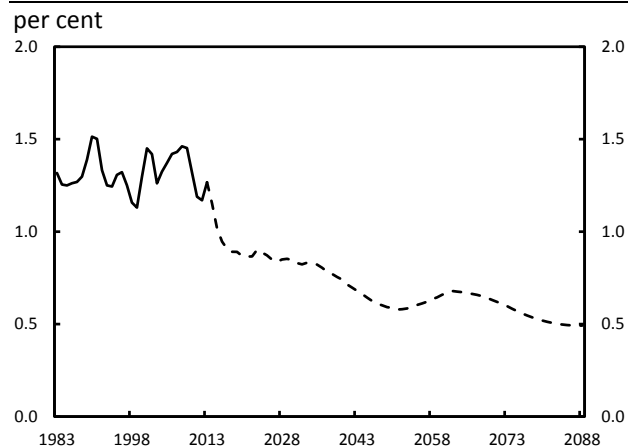
Over the long term, the components of labour input are assumed to equal their trend estimates as temporary shocks to the economy dissipate and economic growth driven by demographic factors and long-term assumptions. Components of labour input are assumed to equal their respective trend estimates after 2025.

Working age population

Working age population, defined as individuals 15 years of age and over, is taken from the Labour Force Survey.²⁹ Growth in the working age population has fluctuated over the last 30 years. Over the long term, working age population is extrapolated using the individual age and sex profiles from the demographic projections. Growth in the working age population is projected to fall in the projection horizon, from 1.3 per cent in 2013 to 0.5 per cent in 2088, consistent with PBO's demographic projection (Figure B-1).

Table B-1

Growth in the working age population, 1983 to 2088



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

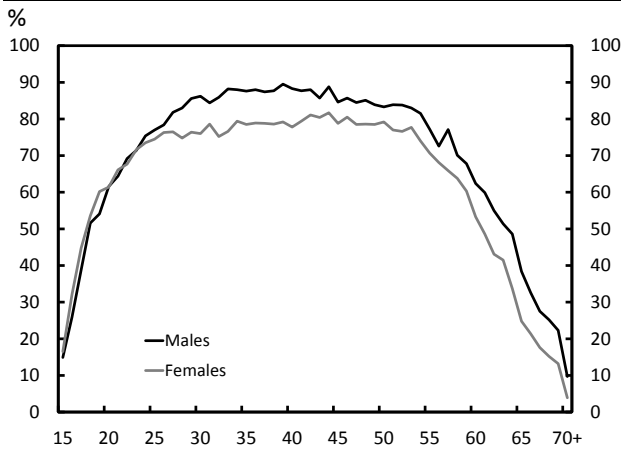
Aggregate employment rate

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. Age matters as 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 B-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.

²⁹ More specifically, Statistics Canada defines the (working age) population as those members of the civilian non-institutional population 15 years of age and over.

Figure B-2

Employment rates by age, 2013

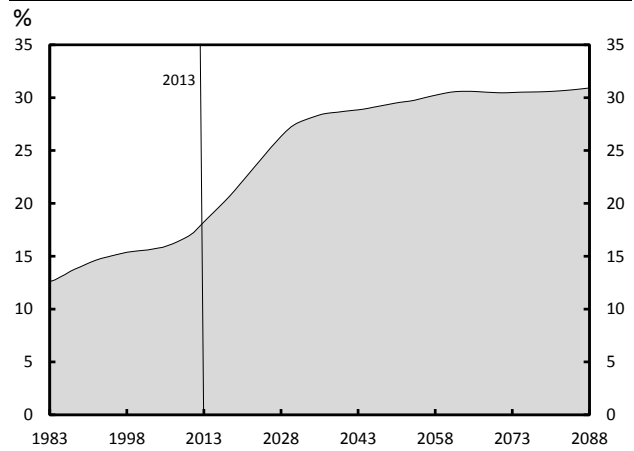


Sources: Office of the Parliamentary Budget Officer; Statistics Canada.

As the age composition of the Canadian population over the projection horizon shifts towards older individuals, this will have important implications for the aggregate employment rate. Over the past 30 years, the share of the population 65 years of age and over relative to population 15 years and over has risen steadily from 12.6 per cent in 1983 to 18.2 per cent in 2013 (Figure B-3). Based on PBO's demographic projection, this upward trend will accelerate rapidly in the next 20 years, and the ratio of the population 65 years of age over population aged 15 and over will increase to 28.0 per cent in 2033 as the large cohort of baby-boomers enter the 65 and over age group and live longer than earlier cohorts. The share of the population 65 and over population aged 15 and over is then projected to continue to rise, albeit at a slower pace and reached 30.9 per cent in 2088.

Figure B-3

Population 65 years of age and over relative to population 15 years of age and over, 1983 to 2088

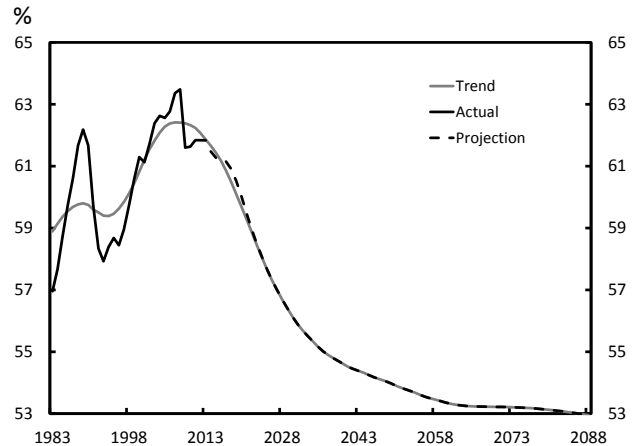


Sources: Office of the Parliamentary Budget Officer; Statistics Canada.

The employment rate has been declining over the recent period. Over the medium term, the employment rate is projected to decline throughout the 2014 to 2018 period, as is the trend employment rate (Figure B-4). The employment rate is assumed to gradually return to its trend level by 2026 and is projected to decline thereafter due to the shifting composition of the working age population.

Figure B-4

Aggregate employment rate, 1983 to 2088



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

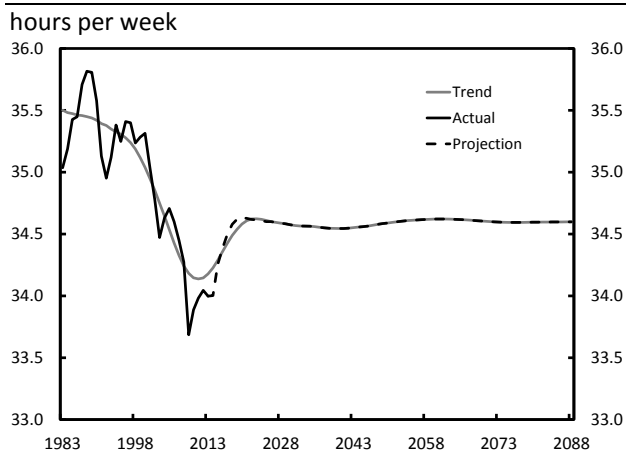
Average weekly hours worked

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, but has subsequently rebounded toward its trend (Figure B-5). Over the 2014-2018 period, average hours worked are projected to increase to get back to trend as the economy returns to its potential. Average hours worked by employees are then assumed to return to trend by 2026 and are projected to remain relatively stable over the projection horizon.

Figure B-5

Average weekly hours worked, 1983 to 2088



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

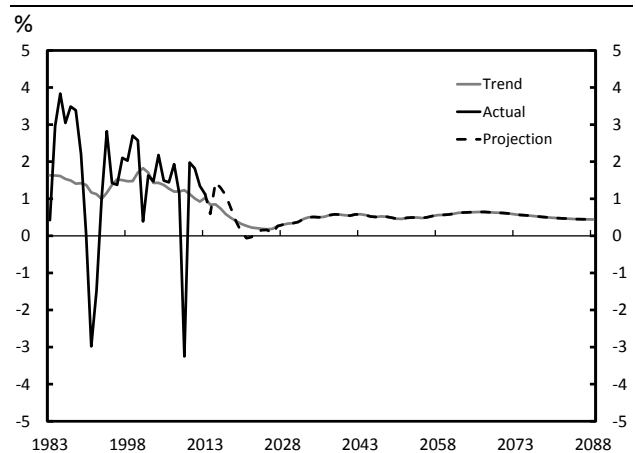
Labour input

Combining the projections for the working age population, aggregate employment rate and

average weekly hours worked yields labour input. In the medium term, labour input growth is projected to remain volatile, being driven primarily by the economic cycle. As labour input returns to trend after 2025, it is projected to decrease due to the slowdown in the growth of the working age population and the projected decline in the aggregate employment rate (Figure B-6). Specifically, labour input growth is projected to fall from 1.1 per cent in 2013 to 0.1 per cent around 2023, but is then projected to decline gradually to 0.4 per cent in 2088.

Figure B-6

Labour input growth, 1983 to 2088



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

Annex C

Summary of FSR 2014 and FSR 2013 fiscal projections

Table C-1

% of GDP

	FSR 2014			FSR 2013		
	2035	2060	2085	2035	2060	2085
<i>Federal government</i>						
Revenue	14.3	14.3	14.3	14.5	14.5	14.5
Canada Health Transfer	1.6	1.6	1.6	1.6	1.6	1.6
Canada Social Transfer	0.5	0.4	0.4	0.5	0.4	0.4
Other transfers to governments	1.9	1.9	1.9	2.0	2.0	2.0
Elderly benefits	2.7	2.3	1.8	2.7	2.4	1.8
Employment Insurance benefits	0.8	0.8	0.8	0.8	0.8	0.8
Children's benefits	0.6	0.6	0.6	0.6	0.6	0.6
Other program spending	4.4	4.4	4.4	4.6	4.6	4.6
Primary balance	1.7	2.2	2.7	1.6	2.1	2.7
Interest on the public debt	0.6	-1.8	-5.6	0.9	-1.3	-5.0
Net lending	1.1	4.0	8.5	0.7	3.4	7.7
Net debt	7.0	-42.4	-126.9	13.3	-31.6	-109.7
<i>Subnational governments</i>						
Own-source revenue	21.7	21.7	21.7	21.8	21.8	21.8
Health spending	9.8	11.7	13.1	10.2	12.2	13.7
Education spending	5.4	5.2	5.2	5.5	5.3	5.2
Social spending	1.4	1.3	1.3	1.4	1.3	1.3
Other program spending	9.6	9.6	9.6	9.5	9.5	9.5
Primary balance	-0.5	-2.2	-3.5	-0.7	-2.6	-4.0
Interest on the public debt	2.8	7.2	17.2	2.8	7.6	18.3
Net lending	-3.2	-9.4	-20.7	-3.5	-10.1	-22.3
Net debt	44.3	131.1	316.6	46.7	138.8	337.2
<i>CPP/QPP</i>						
Contributions	3.0	3.0	3.1	3.0	3.0	3.1
Expenditures	3.4	3.7	3.8	3.3	3.6	3.7
Net cash flow	-0.5	-0.6	-0.7	-0.4	-0.5	-0.6
Investment income	1.2	1.3	1.1	1.1	1.3	1.3
Net lending	0.8	0.7	0.4	0.8	0.8	0.7
Net assets	20.0	20.6	16.9	18.1	20.8	20.7

Source: Office of the Parliamentary Budget Officer.

Annex D

Government fiscal projection methodology

This annex describes PBO's long-term fiscal projection methodology for the federal and subnational government sectors.

Government Finance Statistics (GFS) accounting framework

This report uses, on a calendar-year basis, Statistics Canada's preliminary GFS-based statistics (available from 1991 to 2013) and the underlying National Accounts statistics on which they are based (available from 1981 to 2013). This data ensures consistency across government sectors and can be used to consolidate the subnational governments current and capital accounts and balance sheets.

Canada's System of National Accounts (CSNA2012), however, does not explicitly identify spending on health; rather it combines it with spending on social services to form a sub-sector in the provincial-territorial government sequence of accounts. PBO therefore uses data from the National Health Expenditure Database (NHEX) produced by the Canadian Institute for Health Information (CIHI) for government health spending. A residual spending category ensures that overall provincial-territorial spending matches the CSNA total.

Revenue projections

For long-term projections beyond 2018, PBO assumes that federal and subnational government own-source revenue will remain constant as a share of GDP (the broadest measure of the tax base) at 14.5 per cent and 21.8 per cent, respectively.³⁰ This assumption implies certain government tax policies will adjust such that the tax burden on Canadians remains the same over

the long-term projection horizon.³¹ This approach is common to other independent fiscal institutions such as the Congressional Budget Office (CBO) in the United States. The 2014 Fiscal Sustainability Report of the Office for Budget Responsibility (OBR) in the United Kingdom incorporated demographics into revenues, but the affect was small.

Program spending projections

The general approach for projecting long-term federal and subnational government spending on programs decomposes growth in nominal spending on a given category (EXP) into its three key drivers: age composition (AGE), nominal income (GDP) and an enrichment factor (X).³²

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

The age composition factor for each category attempts to capture the impact of changes in the population's age structure over time. Specifically, it is constructed as an index of the weighted (with weights ω_i) shares of age groups (Pop_i) in the population (Pop).

$$AGE_t = \sum_i \left[\omega_i \cdot \left(\frac{Pop_{i,t}}{Pop_t} \right) \right]$$

Individual spending programs are then projected according to shifts in their target demographics and particular legislation. Figure D-1 shows the population shares for the age groups affecting spending programs. While the under-18, 5-to-24, and 15-to-64 cohorts are gradually declining over the long term, the 65-and-over cohort is projected to increase significantly over the period, from 14.9

³⁰ The medium-term projection of federal revenues is based on PBO's updated April 2014 EFO projections, revised to include the latest national accounts data and Fiscal Monitor results; the medium-term projection returns subnational own-source revenue to its historical average share of the economy, from a cyclical low of 20.9 per cent of GDP in 2011 to 21.8 per cent in 2017. The average historical share was calculated over the period 1983 to 2012.

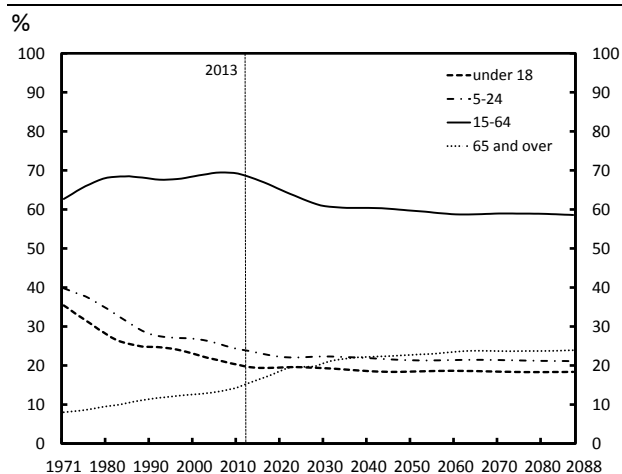
³¹ Many of the largest revenue streams (e.g., taxes on goods and services and corporate income) have flat rate structures and would not need adjustment; however, future policy action must occur to maintain policies with progressive structures such as personal income tax.

³² In some studies this factor is called *excess cost growth* or *residual cost growth*.

per cent of the population in 2013 to 26.0 per cent in 2088.

Figure D-1

Population shares for key age groups



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

For categories in which benefits or spending are well targeted – for example federal spending on elderly benefits – the weights for age groups 65 and over are set equal to one and the weights for all other age groups are set equal to zero. In the case of subnational government health spending, the weights are based on health expenditure data on a per capita age group basis produced by CIHI.

Growth in the enrichment factor for health spending is set equal to its long-term historical average (1976 to 2013). For federal spending on elderly benefits, PBO has changed the enrichment assumption to more closely follow current policy, which indexes benefits only to CPI inflation. The long-term enrichment factor for EI is set such that the average benefit payment grows in line with nominal wages.

For subnational government spending on education, social benefits and children's benefits, the enrichment factor is assumed to be zero over the long term.³³ This implies that relative to the

size of the economy, spending on these categories will increase or decrease over the long term in line with changes in the age structure of the population. This means that spending targeted at relatively older (younger) age groups will increase (decrease) relative to GDP over the long term. Further, this assumption implies that inflation-adjusted spending per beneficiary is fully indexed to growth in real GDP per capita.

The remainder of program spending – excluding federal intergovernmental transfers – is assumed to grow in line with nominal GDP over the long term for both federal and subnational government sectors.

Beyond 2024, the next review date for the CHT and CST, PBO assumes that the CHT and CST will continue to increase annually at the escalators that will be in effect beginning in 2017 (that is, average growth in nominal GDP and 3 per cent, respectively). Equalization and Territorial Formula Financing and other federal transfers, as well as transfers from provincial-territorial governments to the federal government, are assumed to grow in line with nominal GDP over the long term.

In this report, the stock of debt that is used to assess fiscal sustainability is based on the GFS concept of net financial worth, which is defined as financial assets less total liabilities. Rearranging these terms (that is, total liabilities less financial assets) results in net debt which is typically the concept used to assess fiscal sustainability.

Debt accounting

Revenue and non-interest program spending form a government's primary balance.³⁴ The primary balance less interest payments is equivalent to net lending in the GFS framework and mirrors closely the Public Accounts concept of the budgetary balance.

³³ The medium-term outlook for spending on health, education and social benefits is constructed based on the long-term projection approach. However, in the case of health spending it is assumed that there is zero growth in enrichment (on average) over the period 2012 to 2016, reflecting a degree of spending restraint. Over the same

period, growth in spending on education and social benefits is, on average, the same as projected using the long-term approach.

³⁴ Here PBO defines the primary balance as gross expenses (excluding consumption of fixed capital) plus the acquisition of nonfinancial capital.

Federal and subnational governments are assumed to finance any budgetary deficits (that is, net borrowing from other sectors in the economy) by issuing interest-bearing debt. Similarly, any budgetary surpluses (that is, net lending to other sectors in the economy) are used to pay down interest-bearing debt. In addition, it is assumed that there are no changes to the initial stock of financial assets and non-interest-bearing debt.

These assumptions result in the following evolution for a government's net debt:

$$Net\ Debt_t = Net\ Debt_{t-1} - Net\ Lending_t$$

To ensure a stable economic backdrop, and consistent with baseline projections in CBO (2012) and OBR (2013), PBO's long-term fiscal projections are constructed under the assumption that there is no feedback to the economy. However, rising debt ratios beyond the medium term could reduce GDP and/or put upward pressure on interest rates. Incorporating these effects would simply accelerate any projected increases in debt-to-GDP ratios.

Annex E

CPP and QPP projection methodology

This annex describes PBO's projection methodology for the Canada and Quebec Pension Plans.

The Office of the Chief Actuary and the Régie des rentes du Québec provide long-term projections of each plan's contributions, investment income and expenditures in their Actuarial Reports. The most recent report on the CPP is the 26th Actuarial Report on the Canada Pension Plan as at 31 December 2012. For the QPP, it is the Actuarial Update to the Actuarial Report of the Quebec Pension Plan as at 31 December 2012. Based on these reports, PBO has developed its own methodology to project CPP and QPP contributions, investment income and expenditures over a 75-year horizon using its own demographic and economic assumptions and projections.

CPP and QPP contributions

Growth in each plan's contributions (C_t) is composed of five factors: growth in the share of contributors in employment ($CRATIO$); growth in employment (LFE); CPI inflation; labour productivity growth (gp); and, a residual component. Series identified by the superscript AR are derived from the CPP and QPP Actuarial Reports.

This relationship can be expressed as:

$$C_{t,j} = C_{t-1,j} \cdot \frac{CRATIO_{t,j}^{AR}}{CRATIO_{t-1,j}^{AR}} \cdot \frac{LFE_{t,j}}{LFE_{t-1,j}} \cdot \frac{CPI_t}{CPI_{t-1}} \cdot (1 + gp_t) \cdot (1 + \epsilon_{t,j}^{AR})$$

For the CPP, LFE refers to employment in Canada excluding Quebec and for the QPP it refers to employment in Quebec.³⁵ The residual growth component, ϵ^{AR} , is calculated as the difference

between the growth in contributions from the actuarial reports and the growth rate produced from using the above growth decomposition and the projections for the other components from the actuarial reports. Over the projection horizon, the residual growth components for CPP and QPP contributions (derived from their actuarial reports) average zero.

$$(1 + \epsilon_{t,j}^{AR}) = \frac{C_{t,j}^{AR}}{C_{t-1,j}^{AR}} \cdot \left[\frac{CRATIO_{t,j}^{AR}}{CRATIO_{t-1,j}^{AR}} \cdot \frac{LFE_{t,j}^{AR}}{LFE_{t-1,j}^{AR}} \cdot \frac{CPI_{t,j}^{AR}}{CPI_{t-1,j}^{AR}} \cdot (1 + gp_{t,j}^{AR}) \right]^{-1}$$

CPP and QPP expenditures

Expenditures for CPP and QPP are composed of benefits payments and administrative costs, with retirement benefits making up the largest share of total benefits. Similar to the approach used to project contributions, PBO uses a growth accounting framework to project CPP and QPP benefits.

Retirement benefits

Growth in retirement benefits for each plan (RB_t) consists of: growth in the share of beneficiaries in the population aged 65 and older ($BRATIO$); growth in population aged 65 and older ($POP65$); CPI inflation; labour productivity growth (gp); and, a residual growth component. In addition, growth in labour productivity is adjusted by a scaling factor (β) to reflect the fact that benefits of new entrants into the program are based on their history of contributory earnings (which will be rising through time in line with labour productivity growth) while benefits paid to existing plan members are indexed to inflation only.

$$RB_{t,j} = RB_{t-1,j} \cdot \frac{BRATIO_{t,j}^{AR}}{BRATIO_{t-1,j}^{AR}} \cdot \frac{POP65_{t,j}}{POP65_{t-1,j}} \cdot \frac{CPI_t}{CPI_{t-1}} \cdot (1 + \beta \cdot gp_t) \cdot (1 + \theta_{t,j}^{AR})$$

The residual growth component, θ^{AR} , is calculated as the difference between the growth in retirement benefits from the actuarial reports and

³⁵ PBO's long-term demographic and economic projections are constructed at the national level. To allocate PBO's national population and employment projections to Canada excluding Quebec and to Quebec, PBO uses the distribution from the 26th Actuarial Report on the CPP.

the growth rate produced from using the above growth decomposition and the projections for the other components from the actuarial reports.

$$(1 + \theta_{t,j}^{AR}) = \frac{RB_{t,j}^{AR}}{RB_{t-1,j}^{AR}} \cdot \left[\frac{BRATIO_{t,j}^{AR}}{BRATIO_{t-1,j}^{AR}} \cdot \frac{POP65_{t,j}^{AR}}{POP65_{t-1,j}^{AR}} \cdot \frac{CPI_{t,j}^{AR}}{CPI_{t-1,j}^{AR}} \cdot (1 + \beta_i \cdot gp_{t,1}^{AR}) \right]^{-1}$$

The scaling factor β is selected such that the residual growth component averages zero over the projection horizon. For the CPP (QPP), the scaling factor β is set at 0.78 (0.85).

Other benefits

Other benefits, which include disability benefits, death and survivor benefits, disabled contributor's child and orphan benefits, are projected using the same approach as for retirement benefits; however, the target population is expanded to ages 15 years and older. For the CPP (QPP), a scaling factor of 0.33 (0.21) is selected to ensure that the residual growth component is zero, on average, over the projection horizon based on the projected data and projected growth rates in the CPP and QPP Actuarial Reports.

Administrative costs

Administrative costs for each plan ($ADMIN$) are projected as a proportion of contributory earnings ($CEARN$) based on the projections of administrative costs relative to contributory earnings in the CPP and QPP Actuarial Reports, denoted by the superscript AR .

$$ADMIN_{t,j} = \frac{ADMIN_{t,j}^{AR}}{CEARN_{t,j}^{AR}} \cdot CEARN_{t,j}$$

Rate of return

Following the approach used in the actuarial reports, the 10-year Government of Canada bond rate serves as the benchmark rate of return for assets in the CPP and QPP investment portfolios. PBO assumes that the ultimate inflation-adjusted return on the 10-year Government of Canada bond rate is 3.3 per cent (5.3 per cent in nominal terms, assuming 2 per cent inflation). The inflation-adjusted rate of return on the investment portfolio is constructed by multiplying the share of each

asset in the portfolio by its assumed rate of return. Thus for each type of asset, its assumed rate of return is comprised of the inflation-adjusted benchmark bond rate plus its long-run risk premium. Based on PBO's benchmark bond rate and the portfolio shares and risk premiums from the CPP Actuarial Report³⁶ the nominal return on the CPP and QPP investment portfolios is projected to ultimately reach 6.5 per cent, which is 30 basis points higher and 10 basis points higher, respectively, than assumed in the CPP and QPP³⁷ Actuarial Reports. This rate of return is then applied to each plan's assets in the previous period, which determines investment income for the current year.

³⁶ Asset shares of the CPP investment portfolio are taken from Table 60 in Office of the Superintendent of Financial Institutions Canada (2013).

³⁷ In the Actuarial Report of the Canada Pension Plan as at 31 December 2012, the average nominal rate of return on CPP assets for the period 2019 and thereafter is 6.2 per cent. In the Actuarial Report of the Quebec Pension Plan as at 31 December 2012, taking into account inflation, the average nominal rate of return for the 50-year projection period is 6.4 per cent.

Annex F

Fiscal gap definition

A government's budget balance BB is defined as $BB_t = PB_t - i_t \cdot D_{t-1}$, where PB is the primary balance (revenues minus program spending) and i is the effective rate on government debt D . Government debt accumulates according to $D_t = (1 + i_t) \cdot D_{t-1} - PB_t$. Solving the debt accumulation equation forward and substituting yields:

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

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

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

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

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

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

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

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

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.

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

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

The fiscal gap can also be expressed relative to GDP, where g represents growth in nominal GDP.

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

Over the long-term projection horizon, PBO's assumed level of the effective interest rate on government debt exceeds its projected growth in nominal GDP.

In the case where interest rates and GDP growth rates are constant, the fiscal gap reduces to the following:

$$\Delta = \left(\frac{i - g}{1 + g} \right) \cdot \left[\frac{D_t}{Y_t} - \left(\frac{1 + g}{1 + i} \right)^k \cdot d^* - \sum_{i=1}^k \left(\frac{1 + g}{1 + i} \right)^i \cdot \frac{\overline{PB}_{t+i}}{\bar{Y}_{t+i}} \right]$$