

Canada's Aging Population and Implications for Government Finances

Taylor Jackson, Jason Clemens, and Milagros Palacios



2010

2036

2063



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Executive summary

Despite broad public awareness that our society is aging, very little has been done by governments across the country to prepare for the marked aging that has already begun. This study examines the fiscal pressures, specifically the demand for greater spending on seniors-related programming coupled with a weakened ability to generate tax revenues, that governments will face for the foreseeable future from an aging population.

Data abounds illustrating the aging of our population. Statistics Canada estimates that from 2010 to 2063, the seniors' share of Canada's population will increase from a little under 15 percent to over 25 percent.

Similarly, unlike most of the period from the early 1970s through to 2010 (or so), labour force participation is now expected to decline. Indeed, expectations are that labour force participation will return to its pre-1970s level by mid-century. More specifically, from 2017 to 2063, Canada's labour force participation rate is expected to fall from about 65 percent to 61 percent. This decline is akin to millions of fewer Canadians participating in the labour force.

This decline in labour force participation will adversely affect growth in per-capita income. Per-capita income grew, on average, by 1.3 percent between 1981 and 2016. However, expectations for the 2017 to 2045 period are that per-capita income will grow by only 0.9 percent, and almost the entirety of this decline in growth is expected to be due to lower labour force participation. The lower rates of per-capita income growth will mean the economy in general will grow more slowly, making it harder for government to collect revenues compared to its current capacity.

This slowdown in per-person income and economic growth more broadly comes at the same time that governments will face pressure for higher spending on a wide range of programs. This study examines both health care spending and income transfer programs to seniors.

Health care spending on a per-person basis is heavily skewed towards a person's first year of life (birth and related) and their retirement years (post 65). For instance, in 2014, the latest year of available data, the average per-person government spending on health care for Canadians between the ages of 15 and 64 was \$2,664. Compare that to the cost for those 65 and over who had

average annual per-capita health care costs of \$11,625, which was 4.4 times greater than the 15–64 average. The higher proportion of Canadians expected to be in the over-65 category means higher and higher health care costs.

In addition to increased health care spending, an aging population will also require governments to direct more resources to senior income transfer programs like Old Age Security (OAS) and the Guaranteed Income Supplement (GIS). Currently, spending on these programs costs about \$48.3 billion, which represents 2.4 percent of GDP. In 2045, spending on Elderly Benefits is projected to be approximately 1.1 to 1.2 percentage points of GDP higher than in 2017. This means that Elderly Benefits will represent between 3.5 and 3.6 percent of GDP by 2045, an increase of 47.0 percent from 2017. Using 2016 nominal GDP figures, the latest year for which we have complete data, this increase would be equivalent to \$22.6 billion more being spent on Elderly Benefits.

Simply put, population aging will contribute to a large increase in future levels of government spending. When combined, projected government spending increases related to health care and Elderly Benefits are expected to be 5.3 percentage points of GDP higher in 2045 compared to 2017. In dollar terms, this additional spending would be equivalent to an increase of \$107.1 billion using 2016 nominal GDP figures.

To illustrate the potential size of the looming fiscal imbalance, the study includes an analysis of probable revenues (conservatively estimated) with higher spending on health care and income transfer programs to seniors. Based on certain assumptions, by 2045, it is projected that there will be a 7.1 percent of GDP gap between government revenues and expenditures, in other words a deficit. For perspective, government deficits in 2016 would have been more than \$143 billion based on 7.1 percent of GDP. Depending on interest rate assumptions, the accumulation of debt over this period could be substantial. The estimates in the paper of debt accumulation by Canadian governments ranges between 170 percent and 250 percent of GDP.

These rather worrying fiscal outcomes are not inevitable. Proactive steps can and should be undertaken to reform program spending and encourage stronger economic growth, both of which would mitigate the adverse effects from the aging of our population that are outlined in this paper.

Introduction

Despite significant research¹ over the past decade-plus regarding the likely implications of an aging population on government finances, namely higher spending demands coupled with slower-growing government revenues, very little action has been taken to prepare government programs and finances for this significant demographic shift. Indeed, recent action like the federal government's decision to reinstate 65 as the age of eligibility for Old Age Security (OAS) actually works to exacerbate the adverse fiscal implications of an aging population and is out of step with international norms. This paper updates previous research with particular emphasis placed on the work of McGill University economist and former Clifford Clark Chair at the federal Department of Finance, Christopher Ragan (2012), in order to again highlight the serious risks posed to Canadian government finances and the need for immediate corrective action.²

The consensus conclusion of the previous research is that there is a two-pronged effect from population aging. The first relates to the expected stress that will be placed on government finances from increased spending demands. As the Canadian population ages, provincial and federal governments will have to devote more resources to meet the higher demands placed on, for example, health care and Old Age Security (OAS), assuming there is no change in the structure of these programs or their benefits.

1. See, for example, Standing Senate Committee on National Finance (2017); Fields, Uppal, and LaRochelle-Côté (2017); Canada (2016); PBO (2016); Clements et al. (2015); Ragan (2012); and Robson (2010).

2. An update is required at this time given that a number of the underlying forecasts used in previous research have been revised based on the latest available data. In addition, the state of Canadian government finances has also shifted. The federal government, for example, has committed to large deficit spending in the coming years. This means higher levels of government debt into the future and higher debt-servicing costs that could leave less room for governments to address higher future spending levels as a result of demographic changes.

The second effect arising from an aging population is slower rates of economic growth and thus slower growth in government revenues. As the population ages, it is expected that a lower proportion of Canadians will participate in the labour force. A proportionately lower labour force reduces overall rates of economic growth, which will have direct effects on governments' ability to raise revenues.

The prospect of large and growing deficits is therefore immediate and potentially long lasting, as governments face a dual headwind of greater spending demands as well as slower growing revenues due to an aging population.

This study proceeds as follows. The first section examines how Canadian demographics have already changed and the extent to which they are projected to change in the near future. It also assesses what impact this will likely have on labour markets and economic growth. The second section analyzes how demographic changes will likely impact spending on health care and income transfers to seniors. The third and final section analyzes how spending increases in these areas impact the fiscal balance (deficits or surpluses) of Canadian governments. The paper ends with a brief conclusion and commentary.

Canadian demographic changes

Three effects influence a country's population growth: the birth rate, the death rate, and net immigration. For much of Canada's history, the growth in Canada's population was the result of natural increases, which is the difference between births and deaths, with net immigration playing a significant role only in select periods. However, in recent years, Canada's fertility rate³ has fallen below the level required to replace Canada's existing population, resulting in net immigration being responsible for most of Canada's population growth, which itself is slowing over time (Statistics Canada, 2017).

The result of a declining fertility rate has been a slowdown in population growth as illustrated in **figure 1**. The average annual population growth rate in the 1950s was 2.7 percent. Contrast this with the most recent ten-year period from 2007 to 2016, when average annual population growth rate was only 1.1 percent, a 60 percent reduction compared to the 1950s.

Based on Statistics Canada's medium growth projection,⁴ Canada's future population growth rate is projected to continue to decline. By 2063, for example, the end point in Statistics Canada's current forecast, the population growth rate is projected to be a mere 0.7 percent.⁵

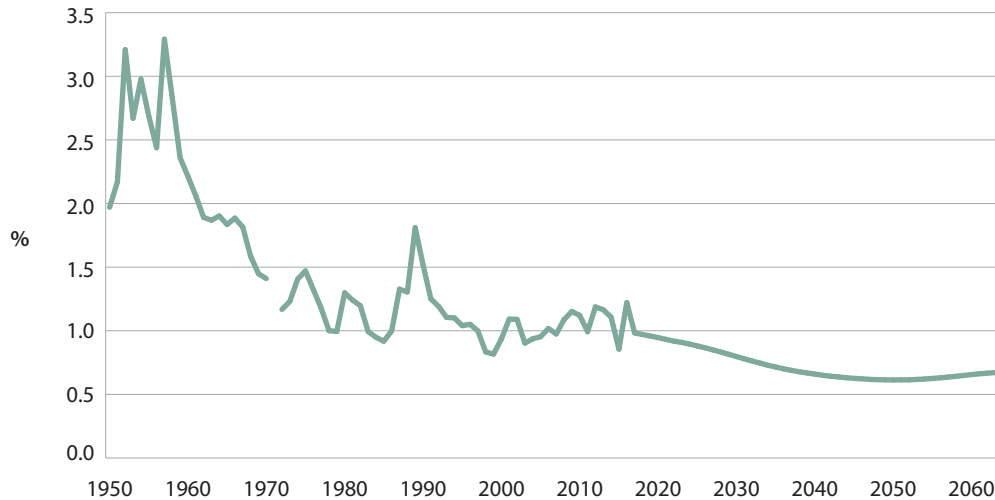
In addition to slower population growth, another demographic shift which Canadians are experiencing is increasing life expectancy. For example, from 1960 to 2015, life expectancy at birth increased for women from 74.2 years to 84.1 years and for men from 68.3 years to 80.2 years (World Bank, 2017).

3. The fertility rate is a measure of the expected number of births that a woman will have by the end of her reproductive years. Since the 1950s, the fertility in Canada has declined dramatically. In 1959, the fertility rate was 3.94 children per women. By 2011, the fertility rate had fallen to 1.61 children per Canadian women. This current fertility rate is below what is known as the replacement fertility rate, which is the rate necessary to replace both of a child's parents. The replacement fertility rate is estimated at 2.1 children per woman. It is greater than two in order to account for early childhood deaths (Statistics Canada, 2016).

4. The medium-growth projection is based on the following assumptions: the fertility rate remaining constant at 1.67; life expectancy reaching 87.5 years for males and 89.1 years for females; and a constant national immigration rate of 0.75 percent of the population.

5. Statistics Canada (2017) projects that almost all of Canada's population growth in the forecasted period will be the result of positive net immigration.

Figure 1
Canada's population growth rate, 1950–2063



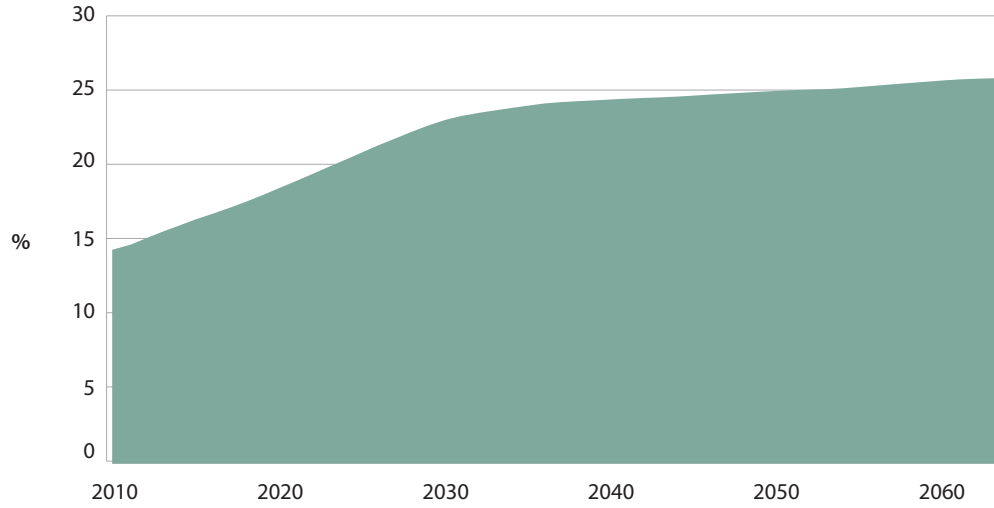
Notes: Data for 1971 is omitted due to a level change in the definition of the series. Data from 2017 to 2061 is a projection using the medium-growth scenario.

Sources: Statistics Canada, CANSIM 051-0001, 051-0026, 052-0005; calculations by authors.

The combination of a lower population growth rate and increasing life expectancy means that seniors will compose a growing share of Canada's future population. **Figure 2** shows the share of the overall population over the age of 65 starting in 2010. From 2010 to 2063, the seniors' share of Canada's population is projected to increase from a little under 15 percent to over 25 percent. The rate of growth will be highest from now until the mid-2030s, at which point the senior share of the population will have increased to approximately 23 percent. This rapid increase in the share of the population over 65 is a result of the aging of the so-called "baby boomers," those born in the period following World War II. The senior share of the population is expected to grow at a lower rate in the decades after the mid-2030s, stabilizing at roughly 25 percent of the overall population.

The working age (15–64 years old) share of the population will also be affected by this aging of the population. **Figure 3** shows the working age share of the population from 1962 to 2063. This period is first characterized by a rapid increase in the share of the working age population as the baby boomers entered the labour force in the late 1960s and early 1970s. As this group begins to turn 65, the working age share is expected to decline by almost the same amount that it initially increased. The working age share of the population peaked in 2007 at almost 70 percent. By 2063, it is projected to decline to 59 percent.

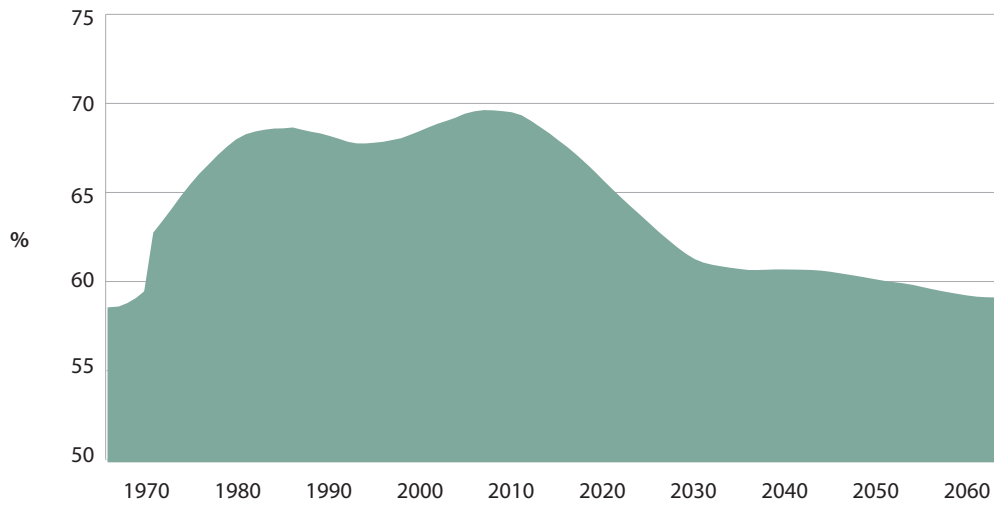
Figure 2
Share of population over 65 years old, 2010–2063



Note: Data from 2017 to 2061 is a projection using the medium-growth scenario.

Sources: Statistics Canada, CANSIM 051-0001, 052-0005; calculations by authors.

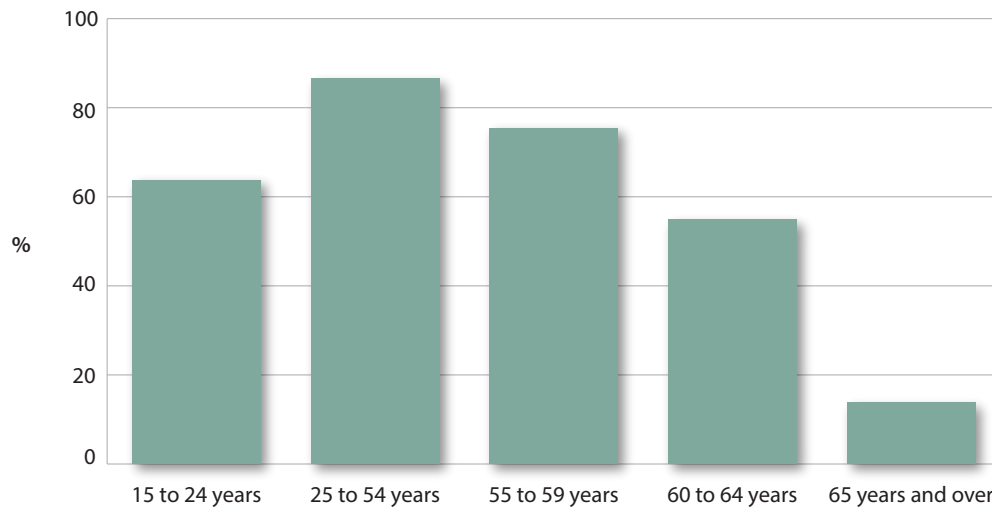
Figure 3
Share of population between 15 and 64 years old, 1962–2063



Note: Data from 2017 to 2061 is a projection using the medium-growth scenario.

Sources: Statistics Canada, CANSIM 051-0001, 052-0005; calculations by authors.

Figure 4
Labour force participation rates by age, 2016



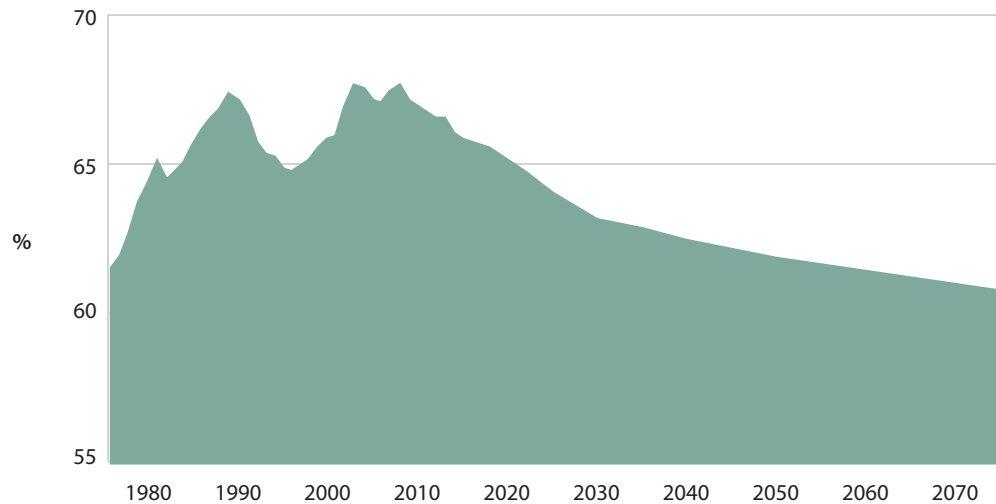
Source: Statistics Canada, CANSIM 282-0002.

The increase in the share of the population over age 65 and the decline in the working age population will impact labour force participation, which simply measures the total labour force as a share of the overall population. As [figure 4](#) shows, the labour force participation of those 65 and over is dramatically lower than those in other age categories. For example, approximately 86 percent of Canadians age 25 to 54 in 2016 were either employed or actively looking for work. This compares to approximately 14 percent of Canadians over 65 that were participating in the labour force.

Figure 4 demonstrates that, as the senior share of the population increases, Canada's overall labour force participation rate will more than likely fall unless there is a marked increase in seniors' participation in the labour force. Indeed, this expectation is borne out in [figure 5](#), which uses data from Canada's Chief Actuary to forecast the future labour force participation rate. Based on those forecasts, from 2017 to 2063, Canada's labour force participation rate is expected to fall from about 65 percent to 61 percent.⁶ Although this decline may seem small, it is akin to millions of fewer Canadians participating in the labour force than if the labour force participation rate had maintained its 2017 level.

6. This forecast accounts for projected increases in the age-specific labour force participation rates of middle-aged and senior Canadians. If the current rates for these groups were used, we could expect that Canada's projected labour force participation rate in the future (see figure 5) would be even lower.

Figure 5
Labour force participation rate, 1976–2063



Note: Data from 2017 to 2061 is a projection from OSFI (2017a).

Source: Statistics Canada, CANSIM 282-0002; OSFI, 2017a; calculations by authors.

The expected decline in the labour force participation rate will also influence the future growth of real per-capita GDP.⁷ As Ragan (2012) explained, the growth in average living standards (per-capita GDP) can be attributed to three factors: increases in labour productivity⁸ (GDP per worker), increases in the fraction of the labour force employed,⁹ and increases in the labour force participation rate.

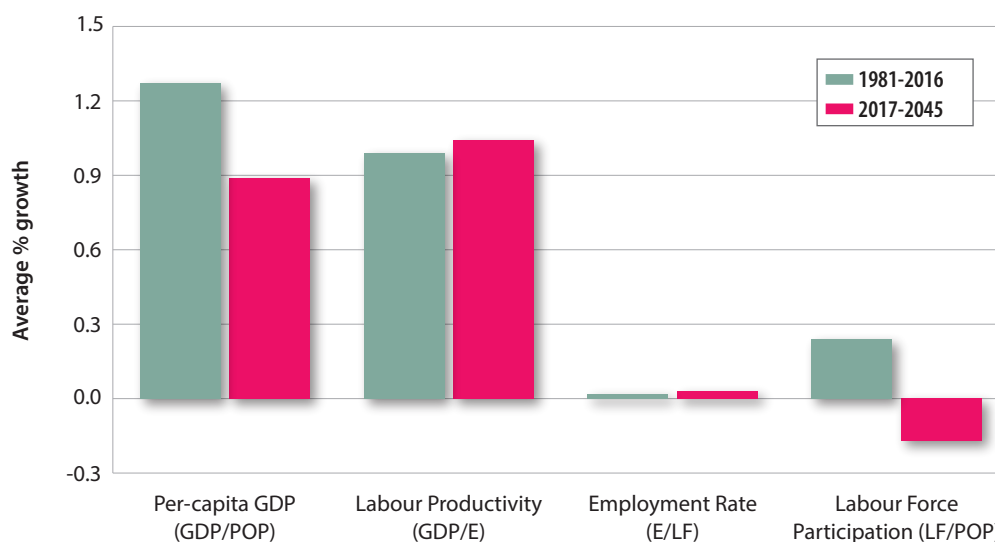
Figure 6 displays historic (1981–2016) and projected (2017–2045) average annual growth rates of per-person GDP, as well as the contributions from each of the three components mentioned above. In the 35 year period from 1981 to 2016, the average annual growth of real per-capita GDP was 1.27 percent. The vast majority of these gains were attributable to productivity growth, in other words, the majority of gains in per-person income came about because people were more productive in their ability to transform inputs into useable and demanded outputs. Indeed, over three-quarters of per-capita GDP growth in this period can be attributable to labour productivity growth.

7. Real per-capita GDP is a measure of Canada's GDP (value of all goods and services produced in the economy in a given time period) on a per-person basis and adjusted for inflation over time.

8. Labour productivity measures the amount of goods and services produced on a per-worker basis. For the purposes of this study, it is estimated by dividing GDP by the number of workers.

9. This is defined as the number of employed persons as a percentage of the labour force.

Figure 6
Sources of Canadian per-capita GDP growth, past and future



Sources: Authors' calculations based on Canada, 2016; OSFI, 2017a, 2017b; Statistics Canada, CANSIM 052-0005.

The fraction of the labour force employed (employment rate) contributed only a small amount to the growth in average living standards during this period. Roughly one-fifth of the average growth in real per-capita GDP can be attributed to increases in labour force participation.¹⁰

As illustrated in figure 6, the average annual growth in per-person GDP (a measure of living standards) is expected to be 0.4 percentage points lower from 2017 to 2045 than in the previous 35-year period: 1.27 percent versus 0.89 percent.¹¹ This reduction is completely attributed to the expected fall in the labour force participation rate, as the contributions to per-capita GDP growth from labour productivity and employment increases are expected to be roughly comparable to the previous period. Put simply, the drop in the labour force participation rate explains almost the entirety of the expected decline in the growth of per person income, as measured broadly by GDP.

In the previous 35 years, increases in labour force participation contributed 0.24 percentage points to the average growth in living standards. From 2017 to 2045, declining labour force participation is projected to reduce annual per-capita GDP growth by approximately 0.17 percentage points, which will cause average living standards to grow at a slower rate than in the

¹⁰. Labour force participation can affect per-capita GDP growth in a number of different ways. For example, a higher labour force participation rate means that a higher share of the population is actively working, and therefore earning income. Thus, on a per-capita basis, given the increased level of income earned, overall GDP per person would increase.

¹¹. Figures presented in this paragraph and the following are based on Canada (2016), OSFI (2017a, 2017b) and Statistics Canada's population projections (CANSIM 052-0005).

previous 35 years. Put differently, even though labour productivity is expected to increase (from 0.99 to 1.04 percent) and the employment rate is expected to remain relatively stable, per-capita GDP is expected to grow more slowly because of the decline in the labour force participation rate.

Two conclusions, similar to Ragan's (2012), result from this analysis. The first is that any future acceleration in real average annual per-capita GDP growth will have to come from faster productivity growth. The second conclusion is that the slower growth in real per-capita GDP, resulting from the impact that demographic changes will have on labour force participation, will reduce the size of the Canadian economy compared to a scenario where there was a higher rate of economic growth. This reduction in economic growth also means that the tax base upon which government taxes are levied will also grow more slowly than in previous periods.

Demographic changes and government spending

Demographic shifts resulting from an aging population will primarily impact government program spending in two ways: higher health care spending and higher spending on income transfers to seniors.¹²

Health care costs

Elderly Canadians, on average, tend to consume markedly higher levels of health care than their younger counterparts. This is to be expected, since as one ages one tends to not only be more susceptible to illness but also to suffer from the effects of costly chronic diseases which require much more intensive and regular medical attention.

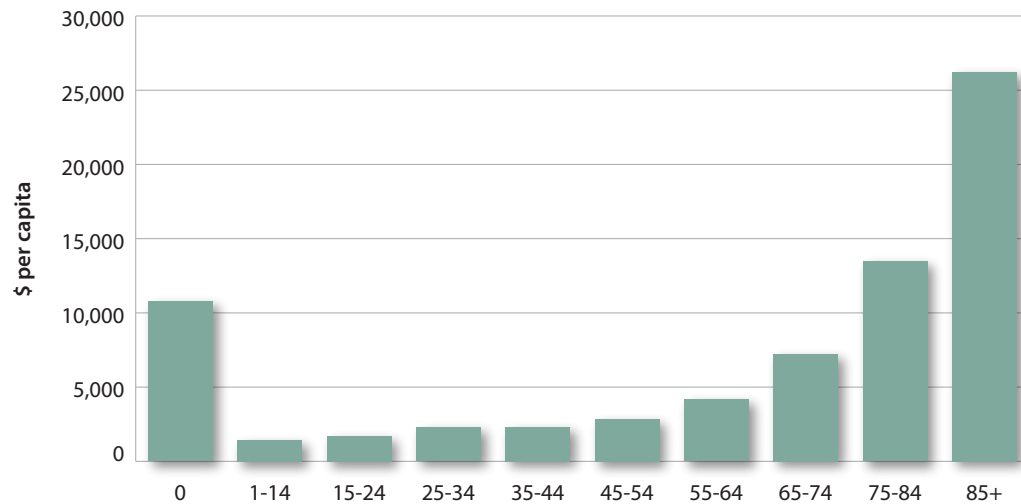
According to the Canadian Institute for Health Information (2016), in 2014, the latest year for which data is available, Canadians aged 65-plus accounted for 46 percent of all health care expenditures, while only amounting to approximately 16 percent of the Canadian population. This imbalance between the proportion of the population over the age of 65 and the proportion of health care spending attributed to seniors is the result of the aforementioned differential health care cost by age group.

¹². An aging population conceptually also affects other government spending programs such as education and child benefits. In the case of government education and child benefits spending, it's possible that an aging population could lead to reductions in associated government spending. Previous research, however, has found that the impact of demographic changes is expected to lead to only relatively modest changes in the spending requirements of education and child benefits (see Robson, 2010). Indeed, recent research on K–12 education, which has experienced a decline in enrolment consistently over the last decade-plus, shows that it has not simultaneously recorded decreases in spending (MacLeod and Emes, 2017).

Figure 7 illustrates the average government health care costs on a per-person basis adjusted for age. Health care spending on a per-person basis is heavily skewed towards a person's first year of life (birth and related) and their retirement years (post 65). For instance, in 2014, the average per-person government spending on health care for Canadians between the ages of 15 and 64 was \$2,664. Compare that to the cost for those 65 and over who had average annual per-capita health care costs of \$11,625, which was 4.4 times greater than the 15–64 average. The higher proportion of Canadians expected to be in the category of over 65 means higher and higher health care costs.

As Canada's population continues to age over the next few decades, and without concurrent reforms to the health care system, health care costs can be expected to increase, as a higher proportion of Canadians will be in the age brackets with the highest average per-capita health care costs. Estimates from the Organization for Cooperation and Development (OECD) for Canada, for instance, provide a sense of how aging is expected to increase health care spending in the future.

Figure 7
Health care expenditure per capita by age group, Canada, 2014



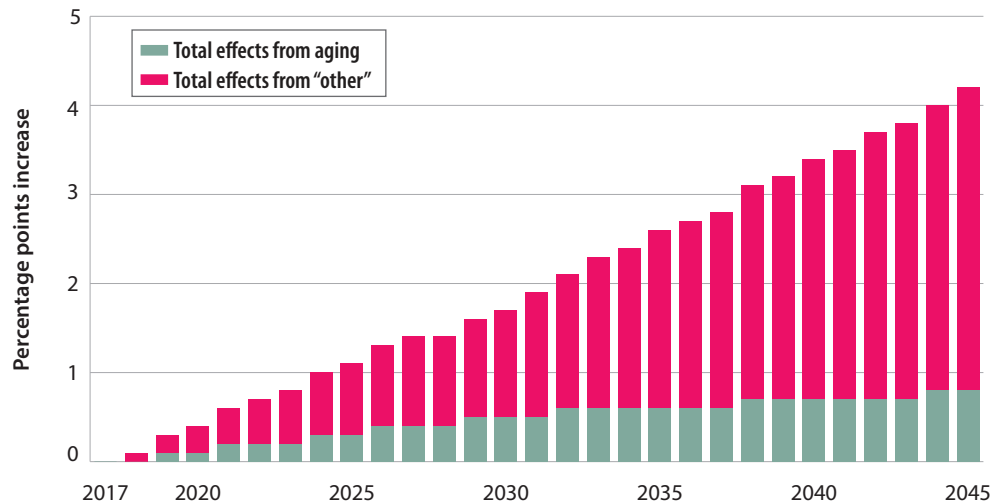
Note: Health costs are relatively high for newborns in their first year of life. For example, according to CIHI (2016), in 2014 spending on newborns under the age of 1 amounted to 2.9 percent of total health care spending in Canada.

Sources: CIHI, 2016; Statistics Canada, CANSIM Table 051-0001; calculations by authors.

Figure 8 illustrates the OECD's projections for Canada, which indicate that by 2045, public spending on health care is expected to be 4.2 percentage points of GDP higher than today (2017). Considering that publicly-funded health care spending is approximately \$148 billion or 7.3 percent of GDP in 2016 (CIHI, 2016), this means that by 2045, public spending on health care will reach 11.5 percent of GDP, an increase of roughly 57 percent.¹³

In 2045, almost 20 percent of the projected increase in health care spending is expected to result from aging. In the earlier years of the OECD forecast, population aging accounted for as much almost 30 percent of the projected increase in public health care spending (OECD, 2013). Over time, other cost drivers such as greater demands for health care by non-seniors and increased expenditures related to new medical technologies and pharmaceuticals will also lead to higher health care costs (OECD, 2013).¹⁴

Figure 8
Projected increase in Canada's public health care spending as % of GDP, 2017–45



Sources: OECD, 2013; calculations by authors.

13. Canada (2016) forecasts that nominal GDP will reach \$5,946.8 billion by 2045. This means that publicly funded health care would reach approximately \$684 billion, an increase of more than \$535 billion since 2016 in nominal terms.

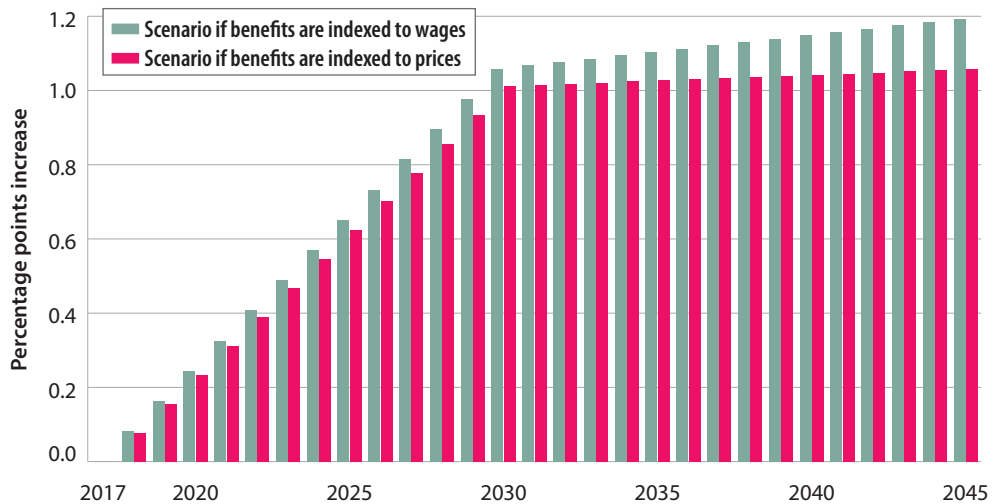
14. It's worth noting that there is some debate as to the extent to which health care expenditures will increase in the future, both in terms of age and non-age-related factors. For example, spending on new technology has a large effect on projected healthcare spending increases than does aging in the OECD (2013) report that serves as the basis of our health care spending increase estimates. However, in the previous iterations of the OECD report (2006), aging made up a greater share of the total spending increase when compared to more recent iterations. While this illustrates that there is some debate as to the relative importance of various components and their link to spending increases, what is not contentious is that large increases in public health expenditures are on the horizon (Ragan, 2012).

Spending on seniors

In addition to increased health care spending, an aging population will also require governments to direct more resources to senior income transfer programs like Old Age Security (OAS) and the Guaranteed Income Supplement (GIS).¹⁵ Currently, spending on these programs costs about \$48.3 billion, which represents 2.4 percent of GDP or 16.6 percent of federal government program spending (Canada, 2017). **Figure 9** shows how spending on Elderly Benefits (OAS and GIS) is projected to increase in the decades to come by Canada's Chief Actuary. In 2045, spending on Elderly Benefits is projected to be approximately 1.1 to 1.2 percentage points of GDP higher than in 2017.¹⁶ This means that Elderly Benefits will represent between 3.5 and 3.6 percent of GDP by 2045, an increase of 47.0 percent since 2017. Using 2016 nominal GDP figures, the latest year for which we have complete data, this increase would be equivalent to approximately \$22.6 billion more being spent on Elderly Benefits.

Figure 9

Projected increase in income support programs for the elderly as % of GDP, 2017–45



Sources: OSFI, 2017b; calculations by authors.

15. The Canada and Quebec Pension Plans are excluded from this analysis given that they are self-contained public programs. In other words, the surplus or deficit of the CPP or QPP is not included in the general finances of Canadian governments.

16. The different estimates depend on whether benefits are indexed to prices or wages. If they are indexed to prices, greater spending on OAS is projected to level off around 2030. However, if benefits are indexed to wage growth, then costs are expected to continue increasing gradually throughout the period. The intermediate value between the two scenarios of one percent of GDP relative to 2017 is what is used for the purposes of this study.

Simply put, population aging will contribute to a large increase in future levels of government spending. When combined, projected government spending increases related to health care and Elderly Benefits are expected to be 5.3 percentage points of GDP higher in 2045 compared to 2017. With Canadian government spending currently amounting to 37.2 percent of GDP,¹⁷ program spending is projected to reach 42.5 percent relative to the size of the economy in 2045 (an increase of 13.6 percent). In dollar terms, this additional spending would be equivalent to an increase of \$107.1 billion using 2016 nominal GDP figures.

As Ragan (2012) previously explained, there are two components to future fiscal imbalances related to demographic shifts. The first is what has just been described above: projected increases in spending on health care and income support programs for the elderly. The second is that the growth rate in tax revenue is expected to slow.

17. Calculations by authors based on Statistics Canada, CANSIM Tables 380-0064 and 385-0032.

Fiscal balance

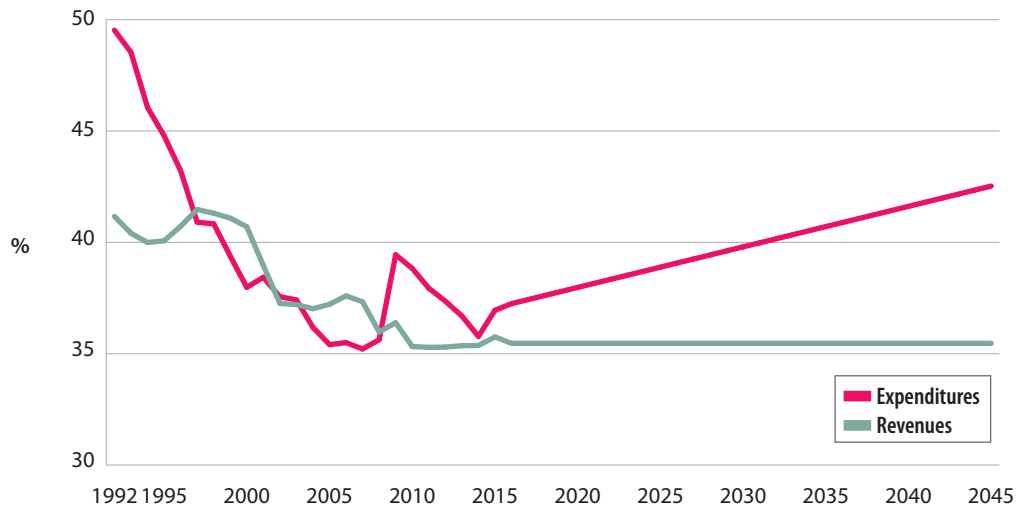
To illustrate the potential size of the looming fiscal imbalance, **figure 10** shows combined government spending and revenues from 1992 to 2045.¹⁸ This analysis assumes that tax revenues as a share of GDP are held at their 2017 level.¹⁹ Using the projected increases in health care and Elderly Benefits (OAS and GIS) spending, by 2045, government expenditures are expected to be 5.3 percentage points higher as a share of GDP than government revenues. Based on holding current revenue levels constant, the increased government spending means that by 2045 it is projected that there will be a 7.1 percent of GDP gap between government revenues and expenditures. For perspective, the deficit in 2016 would have been more than \$143 billion based on 7.1 percent of GDP.

The main take away from figure 10 is the looming deterioration in government finances. The projections indicate that Canadian governments are expected to run a shortfall in every year moving forward. As can be seen, the deficits are expected to get larger as demographic changes place higher demands on government spending. For example, the difference between government revenues and total spending in 2017 amounted to two percent of GDP. By 2045, the fiscal imbalance is projected to be 7.1 percent of GDP or \$143 billion (using 2016 nominal GDP figures). This means that by 2045 the fiscal imbalance between government spending and revenues will be more than three and a half times larger than it was in 2017.

18. This includes all federal, provincial, and municipal spending and revenues, minus CPP/QPP revenues and expenditures. CPP/QPP revenues are excluded as they are not considered to be part of general government revenues and/or spending.

19. This assumption is the result of our analysis of how demographic changes will affect the labour market and the economy more generally. As the labour force participation rate declines, there will be an expected reduction in the size of the Canadian economy compared to a scenario where there was a higher rate of economic growth. This reduction in economic growth also means that the tax base upon which government taxes are levied will also grow more slowly than in previous periods, thus making it harder to raise higher levels of revenue at current tax rates.

Figure 10
Canada's fiscal squeeze in historical perspective



Note: Data exclude CPP/QPP revenues and expenditures.

Sources: Statistics Canada, CANSIM Table 385-0032; calculations by authors.

It is important to note that the projected increases in government spending will not fall on only one level of government. For example, the projected health care spending increases will predominantly fall on the provinces given that health care is a provincial matter, while the increased spending on senior income transfers will fall under the jurisdiction of the federal government. Increases in health care spending will also not be uniform among the provinces. Provinces can be expected to have different levels of health care spending increases depending not only on provincial level demographic changes but also on how each province has structured its health care system. While it is important to understand how an aging population will impact each province's finances, such an analysis is beyond the scope of this study, which remains focused on consolidated general government financials in order to present the broad fiscal impacts of demographic changes.²⁰

The following analysis follows Ragan (2012) by demonstrating the consequences of prolonged deficits on government debt,²¹ assuming that the imbalance between government spending and revenues (see figure 10) is addressed solely through borrowing, that is, deficits. The alternative is for governments to adjust spending on programs and/or tax rates. The effect that the increased spending will have on government debt is dependent on a number of different variables, including the size of the primary deficit, the current amount of debt, and the difference between the average real interest

²⁰. For an analysis of projected health care spending increases by province, see Barua et al. (2017).

²¹. This includes debt from all levels of government: federal, provincial, and municipal.

rate that is applied to government debt (r) and the real GDP growth rate (g).²² The analysis includes six different scenarios to project how increased spending and fiscal imbalances could affect government debt in coming decades.

The different scenarios are the result of different assumptions regarding future average real interest rates and future real GDP growth rates.²³ The difference between real interest rates and real GDP matters for two reasons. The first reason is that the higher the real interest rate, the higher the payments that governments will have to make on servicing the debt. The second reason is that if GDP grows, then the denominator on which the debt-to-GDP ratio relies also grows, thereby lowering the ratio if nothing else changes. Thus, if the real interest rate paid on government debt is greater than GDP growth, then holding all else constant, the debt-to-GDP ratio can be expected to rise. If GDP growth is greater than interest rates, then a government's debt-to-GDP ratio can be expected to fall, holding all else constant.

The starting point of debt and the size of the primary government deficit are the same in each scenario.²⁴ The primary government deficit does not change in each scenario since its size is the result of our projections in the previous sections.

We produce a wide range of scenarios as it is difficult to predict what the future path of interest rates in particular will be, although it is likely that demographic changes will play a part in determining future interest rates (Walker, 2016).

Figure 11 displays the results of the various scenarios. As mentioned above, when real interest rates are higher than real GDP growth, government debt-to-GDP ratios can be expected to increase. The larger the gap between these two variables, the greater the increase in the debt-to-GDP ratio. The reason is that the interest payments will grow more quickly than the economy, and thus government revenues, which results in increasing accumulation of debt relative to the size of the economy.

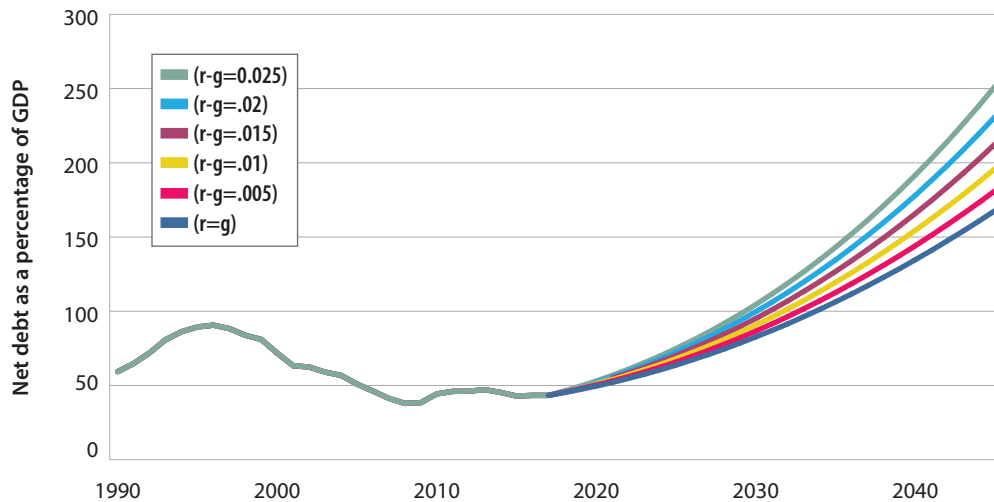
The scenario where governments accumulate the most debt is as a result of real interest rates being 2.5 percentage points higher than real GDP growth. Given our projections of increased spending from demographic changes, net government debt as a percentage of GDP under this scenario is projected to be over 250 percent of GDP in 2045. In the best-case scenario, which assumes average real interest rates equal to real GDP growth, net government debt is projected to reach almost 170 percent of GDP in 2045. The mid-range scenarios project net government debt to reach between 196 and 213 percent of GDP by 2045.

22. For a more in-depth overview of how these different variables impact the change in government debt, see Ragan (2012) and Turner and Spinelli (2012).

23. Real interest rates refer to the interest rate minus inflation.

24. The primary budget deficit refers to the difference between current government program spending and current revenues.

Figure 11
Total Government Net Debt to GDP Ratio, 1990–2045



Sources: Statistics Canada, CANSIM 378-0125; IMF, 2017; OECD, 2016; calculations by authors.

The purpose of these projections is to provide estimates of the consequences of the looming fiscal imbalance. However, there are significant costs associated with increasing debt to such high levels. One such consequence is the effect that increased interest payments could have on government budgets (Wen, 2016). Similar to households, governments must decide how to allocate spending to various parts of their budget. If interest payment costs increase, it could mean that governments have to reduce spending in other areas like education or national defence. Research has also found that higher levels of government debt can also lead to lower levels of economic growth (Woo and Kumar, 2015; Égert, 2015; Chudik, 2015).²⁵

²⁵ There are a number of different reasons why government debt can negatively impact economic growth. One is that higher levels of debt can lead to higher interest rates, which can then reduce capital investment and productivity growth. High levels of debt can also negatively affect economic growth when higher taxes are levied in order to help pay down the debt.

Conclusion

As Canada's population continues to age, seniors will represent an increasingly large share of the population, and the share of the population of working age will consequently decline. The result is that labour force participation is widely expected to decline, which will have effects on economic growth and thus the ability of governments to collect revenues.

At the same time, governments are expected to experience a rise in health care expenditures and transfers to seniors based on the aging of the population. For example, by 2045 health care expenditures are projected to be 57 percent higher than today and transfers to seniors are projected to be 47 percent higher. When combined, the estimates indicate that by 2045, increased spending on health care and Elderly Benefits will be 5.3 percentage points of GDP higher than in 2017. Assuming the current rate of revenue to GDP is maintained over the next three decades, this increase in spending will contribute to a significant deficit between government revenues and spending that in 2045 could amount to 7.1 percent of GDP, or more than \$143 billion (using 2016 nominal GDP figures).

If governments choose to deal with the looming fiscal imbalance through higher deficits and debt, the results could be dramatic. Depending primarily on trends in interest rates and economic growth, Canada's net debt-to-GDP ratio could range from 167 to 252 percent of GDP in 2045. This compares to a net debt-to-GDP ratio of 43.3 percent in 2017. Such a large accumulation in debt could have negative consequences for the Canadian economy. Similarly, if governments choose to address the fiscal imbalance by raising tax rates and increasing revenue, Canada could also face a host of negative economic consequences. In sum, the demographic changes already underway will profoundly influence government spending and its ability to raise revenues over the foreseeable future. One way or another, the increased spending pressures and reduced ability to raise revenue will imperil government finances. Canadian governments will have a choice: whether to respond to the pressures by reforming spending, to introduce policies to improve economic growth and productivity, or to simply borrow their way through the problem. Recognizing the nature of the demographic problems already affecting Canadian government finances is the first step to understanding the best solutions.

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About the authors



Taylor Jackson

Taylor Jackson is an independent researcher and a former Senior Policy Analyst with the Fraser Institute. He holds a B.A. and M.A. in Political Science from Simon Fraser University. Mr. Jackson is the coauthor of a number of Fraser Institute studies, including *Safety in the Transportation of Oil and Gas: Pipelines or Rail?*, and the Fraser Institute's annual *Global Petroleum Survey* and *Survey of Mining Companies*. He is also the coauthor of a book chapter on the past, present, and future of Canadian-American relations with Professor Alexander Moens. Mr Jackson's work has been covered in the media all around the world and his commentaries have appeared in the *National Post*, *Financial Post*, and *Washington Times*, as well as other newspapers across Canada.



Jason Clemens

Jason Clemens is the Executive Vice President of the Fraser Institute. He has an Honors Bachelors Degree of Commerce and a Master's Degree in Business Administration from the University of Windsor as well as a Post Baccalaureate Degree in Economics from Simon Fraser University. He has published over 70 major studies on a wide range of topics, including taxation and entrepreneurship. He has published over 300 shorter articles in US, Canadian, and international newspapers.



Milagros Palacios

Milagros Palacios is the Associate Director for the Addington Centre for Measurement at the Fraser Institute. She holds a BS in Industrial Engineering from the Pontifical Catholic University of Peru and a M.Sc. in Economics from the University of Concepción, Chile. Since joining the Institute, she has published or co-published over 100 research studies and over 80 commentaries on a wide range of public policy issues including taxation, government finances, investment, productivity, labour markets, and charitable giving.

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