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April 2017 Annual Reassessment of Potential Output Growth in Canada



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Abstract

This note summarizes the Bank of Canada's annual reassessment of potential output growth, conducted for the April 2017 *Monetary Policy Report*. Potential output growth is projected to increase from 1.3 per cent in 2017 to 1.6 per cent by 2020. The lower estimate for potential output growth in the near term (relative to the 2016 assessment) largely reflects distinctly weak business investment over 2015 and 2016, as well as reallocation costs associated with the adjustment to lower oil prices. However, potential output growth improves throughout the projection as investment is expected to pick up, with an increasing share in productivity-enhancing machinery and equipment. Population aging will act as a drag on potential output growth, with a small offset coming from higher levels of immigration. An analysis of alternative scenarios suggests a range of potential output growth from ± 0.3 percentage points in 2017 to ± 0.5 percentage points in 2020.

Bank topics: Potential output; Productivity; Labour markets

JEL codes: E, E00, E2, E22, E23, E24, E37, E6

Résumé

La présente note résume la réévaluation de la croissance de la production potentielle à laquelle procède annuellement la Banque du Canada et dont les résultats sont publiés dans le Rapport sur la politique monétaire d'avril 2017. Le taux de croissance de la production potentielle devrait passer de 1,3 % en 2017 à 1,6 % d'ici 2020. Cette estimation de la croissance de la production potentielle à court terme, plus basse que dans le Rapport de 2016, s'explique dans une large mesure par les investissements particulièrement faibles des entreprises en 2015 et en 2016, ainsi que par les coûts de réaffectation liés à l'ajustement à des prix du pétrole moins élevés. La croissance de la production potentielle s'améliore cependant tout au long de la période de projection, sous l'effet de l'accélération prévue des investissements, lesquels sont composés d'une part croissante d'investissements en machines et matériel, générateurs de productivité. Le vieillissement de la population exercera sur cette croissance un effet modérateur légèrement compensé par une hausse des niveaux d'immigration. Une analyse d'autres scénarios laisse entrevoir que la croissance de la production potentielle s'établira dans une fourchette qui passera de $\pm 0,3$ point de pourcentage en 2017 à $\pm 0,5$ point de pourcentage en 2020.

Sujets : Production potentielle; Productivité; Marchés du travail

Codes JEL : E, E00, E2, E22, E23, E24, E37, E6

Summary

- This note summarizes the Bank of Canada’s annual reassessment of potential output growth conducted by Canadian Economic Analysis staff for the April 2017 *Monetary Policy Report*.
- Potential output growth is projected to increase from 1.3 per cent in 2017 to 1.6 per cent by 2020 (**Table 1**). Relative to the 2016 assessment, potential output growth has been revised down over 2016–19 and is expected to be the same in 2020.
- Potential output growth is calculated as the sum of the growth rates of trend labour productivity (TLP) and trend labour input (TLI).
 - The revised TLP growth profile reflects the ongoing widespread weakness in investment since the oil price shock, as well as reallocation costs associated with an adjustment to a new equilibrium allocation of labour and capital. In the longer term, investment is expected to pick up with an increasing share in productivity-enhancing machinery and equipment, which leads to TLP growth of 1.1 per cent by 2020.
 - TLI growth is expected to decline, from 0.7 per cent in 2017 to 0.5 per cent in 2020, due to the slowdown in population growth and population aging. This decline is slightly offset by higher levels of immigration.
- A number of alternative potential growth scenarios are considered, including the reduction of interprovincial trade barriers, the possibility of expanding global protectionism, ongoing concerns regarding scarring effects from low growth since the Great Recession, and different projections for population growth and immigration.¹ Together, the outcomes of these alternative scenarios help to form a range of values around the baseline estimates of growth.

¹ The Canadian Free Trade Agreement was announced on 7 April 2017. This agreement is aimed at reducing interprovincial barriers to trade. Although it is expected to have a positive effect on potential output, there is much uncertainty regarding the ultimate magnitude of this effect. Therefore, in this document we do not directly include its possible effects in the baseline estimates of potential output growth. Rather, we include it as an alternative scenario and note that this suggests a likely upside risk to the baseline estimates.

Table 1: Estimates of potential output growth (%)					
	April 2016 MPR	April 2017 MPR			
	Potential output	Potential output	Trend labour productivity	Trend labour input	Range for potential output growth
2010–15	2.0	2.0	1.1	0.9	
2016	1.5	1.3	0.6 (0.8)	0.7 (0.7)	
2017	1.5	1.3	0.6 (1.0)	0.7 (0.6)	1.0–1.6
2018	1.5	1.4	0.8 (1.1)	0.7 (0.5)	1.1–1.7
2019	1.6	1.5	0.9 (1.1)	0.6 (0.5)	1.1–1.9
2020	1.6	1.6	1.1 (1.2)	0.5 (0.4)	1.1–2.1

Note: The numbers in brackets refer to the estimates from the April 2016 MPR. See Agopsowicz et al. (2016) for details. Numbers may not add up due to rounding.

1. Introduction

Each year before the release of the April *Monetary Policy Report* (MPR), Bank of Canada staff reassess the growth rate of potential output in Canada.² Section 2 of this note presents an update on the staff projection for potential output growth, based on analysis of the growth of trend labour productivity (TLP) and trend labour input (TLI).³ We also consider the role of labour market hysteresis.

There is considerable uncertainty regarding the estimate of potential output growth. To better quantify this uncertainty, in Section 3 we explore a number of alternative scenarios. These scenarios include the reduction of interprovincial trade barriers, increasing global protectionism, different assumptions concerning the degree of labour market hysteresis in Canada, and alternative population growth scenarios.

2. Baseline Estimates of Potential Output Growth

2.1 Overview and context

To develop a projection for potential output growth, we separately analyze trends in labour productivity (output per hour worked) and labour input (total hours worked) to establish the baseline projection for potential output. Near-term potential growth has been revised down from 1.5 per cent to 1.3 per cent in 2016 and 2017 (**Table 1** and **Chart 1**). The downward revisions, as explained below, largely reflect a reassessment of the effects on productivity of the oil price shock and the widespread weakness in investment both in the recent past and in the coming years. At the same time, the projection for TLI growth has been revised up, reflecting higher-than-expected immigration targets over the next few years. However, growth

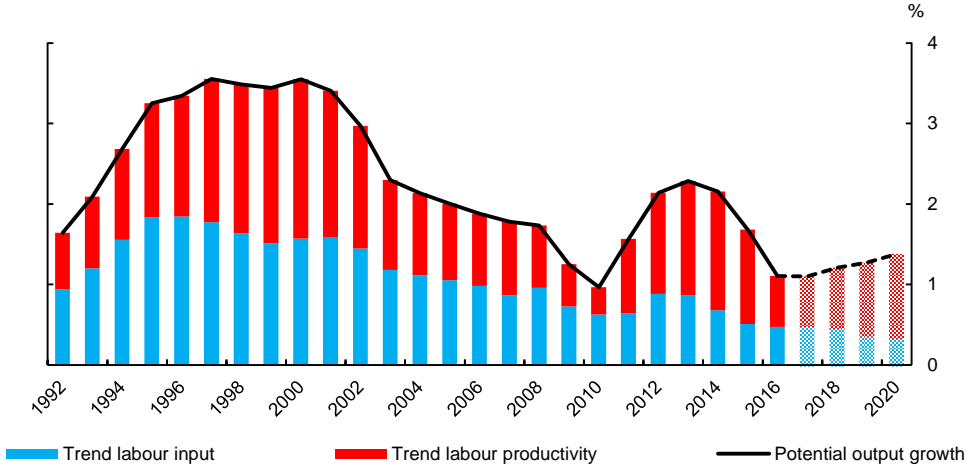
² See Agopsowicz et al. (2016) for the April 2016 assessment.

³ See Pichette et al. (2015) for a more detailed explanation of the analysis of TLP and TLI.

slowly picks up in the latter half of the projection as investment recovers, and productivity growth converges to near its long-run growth rate.

Chart 1: Modest recovery in potential output growth expected following commodity price shock

Annual data



Sources: Statistics Canada and Bank of Canada calculations

Last data plotted: 2020

2.2 Trend labour productivity growth

We project that TLP growth will increase from 0.6 per cent in 2017 to 1.1 per cent in 2020 (**Chart 2**). The profile for TLP growth has been revised down in the near term (by as much as 0.4 percentage points in 2017—**Table 1**); however, the longer-run growth rate of 1.2 per cent remains unchanged (this is expected to be reached just beyond 2020). The downward revisions in the growth rates in 2016 and 2017 are due, in part, to the reassessment of the impact of the 2014–15 oil price shock on productivity growth. In addition, labour productivity growth has been adjusted to reflect historical revisions to the level of investment and the fact that our near-term projection of business investment has been revised down since April 2016 (**Chart 3**).⁴

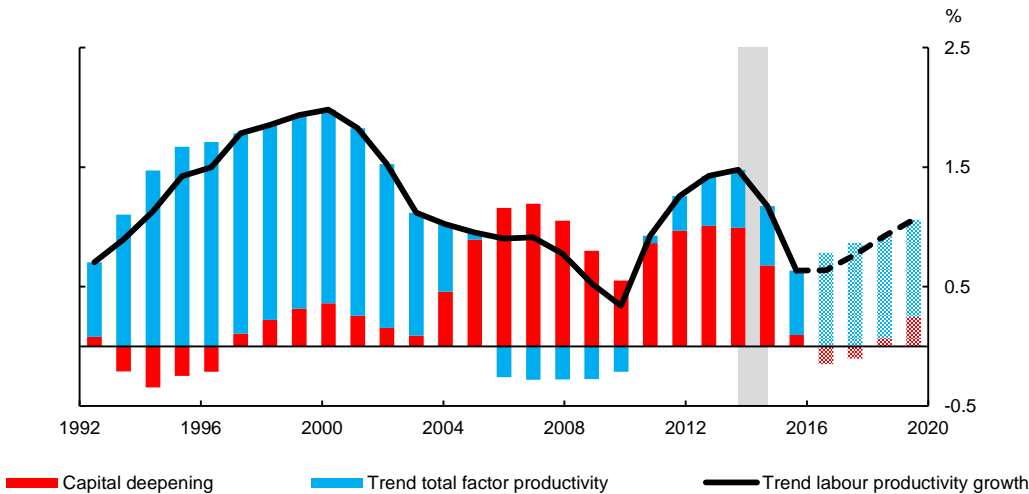
Trend productivity growth picks up in the latter half of the projection as a modest recovery in overall investment is expected, leading to increased capital deepening—a key component of productivity growth. At the same time, the share of this investment that is in productivity-enhancing machinery and equipment (M&E) is expected to increase, providing a further boost to labour productivity growth coming from total factor productivity (TFP) growth.

⁴ The current estimates of TLP also incorporate updated projected government investment (or capital formation). Government capital formation is expected to strengthen over the near term as we start to see the effects of infrastructure spending from fiscal stimulus.

We consider many factors when developing the projection for TLP growth, but the widespread effects of the oil price shock on overall investment—which drive the near-term dynamics—and the subsequent evolution in the composition of investment—which determines the longer-run recovery—are the main drivers of the growth profile over the projection.

Chart 2: Trend labour productivity growth profile reflects the severity of the oil price shock

Annual data

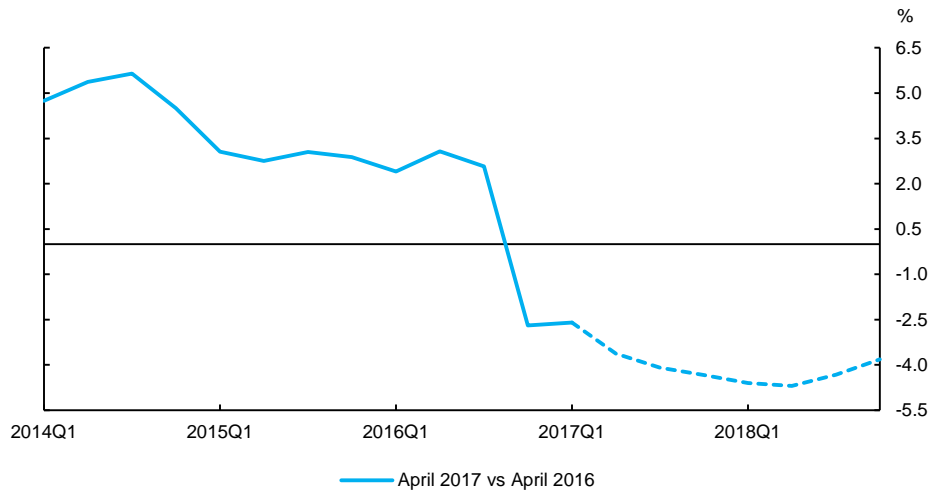


Source: Bank of Canada calculations

Last data plotted: 2020

Chart 3: Revisions to the investment profile (historical and projection)

Quarterly data



Sources: Statistics Canada and Bank of Canada calculations

Last data plotted: 2018Q4

Near-term growth profile: The continuing effects of the oil-price shock and overall weakness in business investment

The current profile for the growth rate of potential output reflects the effects of the oil price shock that occurred in late 2014 and early 2015. Significant negative oil price shocks are expected to lead to a number of adjustments in the Canadian economy, starting first with a drop in investment demand by the oil and gas sector (and other sectors as well, as overall demand drops) and the subsequent loss of sector-specific human capital as workers are laid off in this sector and relocate to find employment in other sectors. Both channels can have negative effects on TLP growth, and for this reason, the shock to the price of oil and the aftermath are treated as a productivity shock (Ambler 2016 also makes the case that oil price shocks can act like productivity shocks).⁵

The overall level of investment dropped by about 20 per cent from mid-2014 to the end of 2016; much of this was driven by the withdrawal of investment in the oil and gas sector, which saw the level of investment drop by nearly 50 per cent (**Chart 4**). However, it is important to note that the decline in investment was broad-based and affected many sectors other than oil and gas (**Chart 5**): non-oil and gas investment declined by about 12 per cent. To put things in perspective, it is important to recognize that the overall impact of the oil price shock on investment is of a similar magnitude to, if not bigger than, what was seen following the onset

⁵ Within this framework, an oil price shock could also have an impact on TLI. However, the oil and gas sector's share of employment in aggregate employment is very small (an average 1.6 per cent over the past three years) relative to its output and investment shares (6.1 per cent and 21.8 per cent, respectively). The shift of employment out of the oil and gas sector and into other sectors is taken into account in the estimation of TLI, and the effect is very small. Therefore, we focus on the effect of the oil price shock on TLP in this note.

of the Great Recession in 2008. Moreover, the recovery in investment will likely be weaker than what was seen in the years immediately following 2009 (**Chart 6**). Therefore, the cumulative effect on investment is expected to have a material impact on TLP growth—through a slowdown in capital deepening—over the next few years. As seen in **Chart 3**, TLP growth drops from 1.5 per cent in 2014 to a low of 0.6 per cent in 2017 (and capital deepening becomes negative), after which trend productivity growth begins to recover.

At the same time, reallocation effects associated with displaced workers from the oil and gas sector, who must retrain and find work in other sectors, will also put downward pressure on TLP growth in the near term. However, because the oil and gas sector's share of employment is rather small (less than 2 per cent, averaged over the last three years), these effects are expected to be small in the aggregate. Nevertheless, they do show up in the estimates of the growth rate of TFP: a recovery in the growth rate of TFP that starts in 2011 is temporarily stalled in 2015 and 2016 (**Chart 3**).

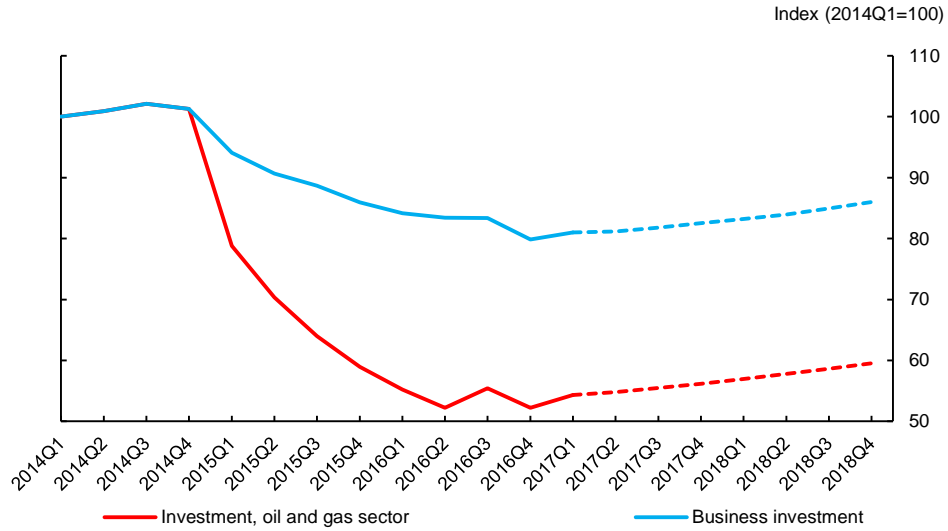
The decrease in output in the mining, oil and gas sector also represents a shift in output share from a sector with a very high productivity level to sectors with lower productivity levels. On average, over the 2005–15 period, the level of labour productivity (real output per hour worked) was approximately four times higher in mining, oil and gas extraction than in the overall business sector, and this ratio holds true for the subcomponents of the business sector—i.e., manufacturing, construction, agriculture and services.⁶ This reallocation effect has a small negative effect on trend productivity growth in the first two years of the projection, after which it is assumed the new equilibrium is reached and there are no further effects on the growth rate of trend productivity.⁷

⁶ There are subsectors within the service sector that have very high productivity levels, such as the real estate, rental and leasing sector.

⁷ In fact, productivity growth in the mining, oil and gas sector has picked up dramatically in the last few years as firms have cut costs and become more efficient. To some extent, this has offset some of the negative reallocation effects.

Chart 4: Significant and widespread drop-off in investment following oil price shock

Quarterly data

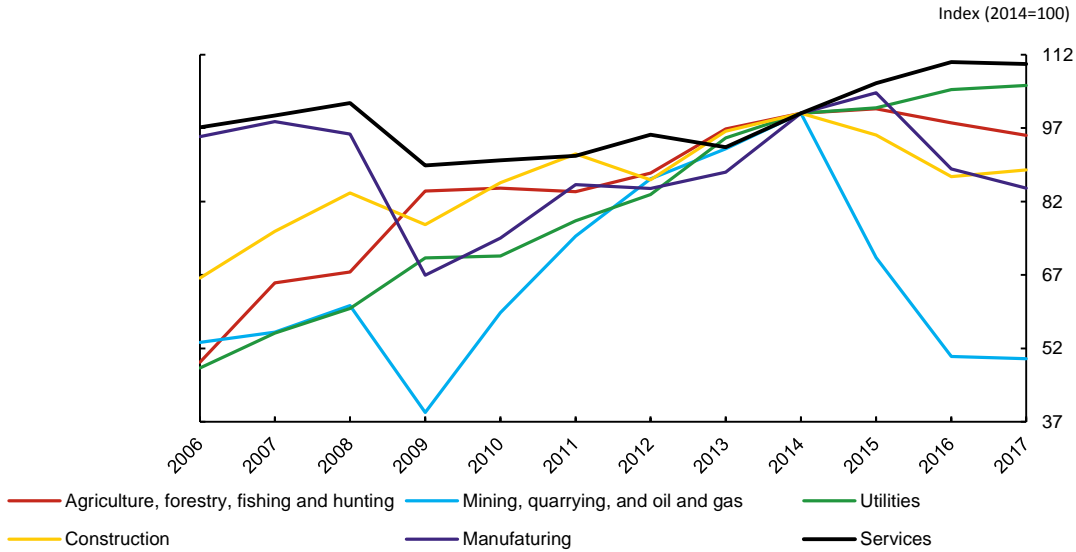


Sources: Statistics Canada and Bank of Canada calculations

Last data plotted: 2018Q4

Chart 5: Business investment by industry

Annual data

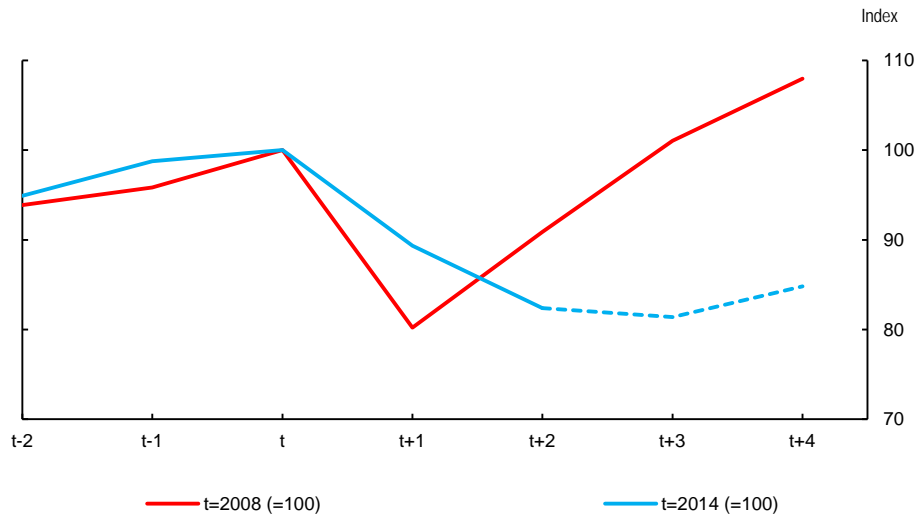


Source: Statistics Canada

Last observation: 2017

Chart 6: Business sector investment, cycle-on-cycle

Annual data



Sources: Statistics Canada and Bank Canada calculations

Last observation: t+4

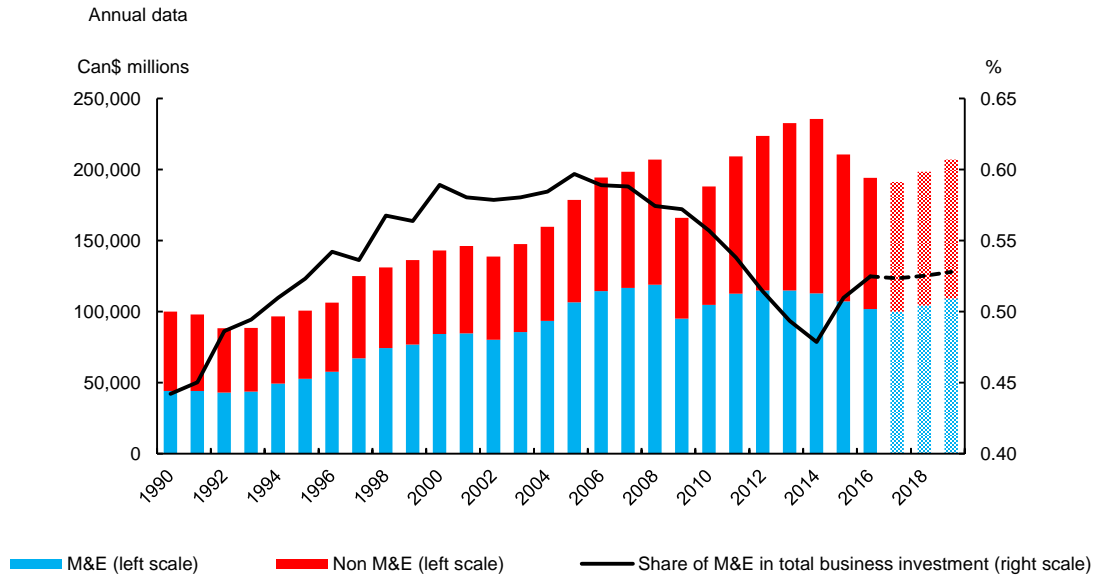
Recovery and the shift in the composition of investment

As the economy adjusts to the new price of oil and a new equilibrium is reached in the allocation of labour and capital, we expect a modest recovery in investment, both in the oil and gas sector and in the business sector as a whole. The oil price shock led not only to a decline in total investment but also to a decline in investment in productivity-enhancing M&E in both 2015 and 2016 (**Chart 7**). Investment in M&E is important for labour productivity growth for a number of reasons. New M&E will increase the amount of capital available to workers and therefore increase productivity through capital deepening. Moreover, the adoption of new M&E brings with it new technology and processes that will boost productivity growth further.⁸ New M&E using the latest technology brings firms (and hence the economy) closer to the technological frontier; this is especially true if the new investment is in information and communication technologies (ICT), research and development (R&D) and intellectual property (which are all included in M&E).⁹ Consequently, the recent decline in M&E investment contributed to the weak trend productivity growth observed in 2015 and 2016.

⁸ Because investment in M&E often leads to the use and development of new technology and processes of production, these investments are not entirely captured in capital deepening, and so are seen as boosting TFP growth as well.

⁹ Many papers have established a positive link between investment in ICT, R&D and intellectual property, and productivity growth. See, for example, Jorgenson and Stiroh (2000), Gu and Wang (2004) and Doraszelski and Jaumandreu (2013). The weakness in ICT investment in Canada is noted in Agopsowicz et al. (2016) as an important contributor to relatively weak productivity growth in Canada over the last fifteen years.

Chart 7: Total business investment and investment in machinery and equipment (M&E)



Sources: Statistics Canada and Bank of Canada calculations

Last data plotted: 2019

However, business sector investment is expected to pick up starting in 2017, with an increasing share of investment in M&E. And, despite the fact that the level of investment in M&E remains below the 2013 level until 2019, firms are expected to invest in new M&E, thereby modernizing their production processes and improving productivity. Therefore, we see an increase in the growth rate of TLP in 2018 and continuing through to 2020 as a result of further capital deepening and the productivity benefits that come with these specific types of investments. Finally, this projected pickup in M&E investment is corroborated in the latest results of the *Business Outlook Survey*, where the outlook for investment in M&E is the strongest it has been since the third quarter of 2010.

Other important factors influencing the TLP growth projection

While the effects of the oil price shock and the subsequent recovery in investment are the main drivers of TLP growth over the projection, other factors come into play when determining the long-run (or steady-state) growth rate of TLP. There is increasing evidence that within many countries (including Canada) the gap between the most productive firms and others has been increasing in recent years (OECD 2015). At the same time, economic dynamism—defined as the continued turnover of firms—has also been on the decline (see Cao et al. 2015 for Canadian evidence). The turnover of firms contributes to productivity growth in a number of ways, including the replacement of less-productive firms by more-productive ones, and the fact that new firms can be a source of innovation and can push incumbents to become more productive. If these overall trends continue (and we currently expect that they will), they will affect the longer-run (or steady-state) rate of aggregate productivity growth. Therefore, longer-run trend productivity growth is expected to be around

1.2 per cent (the growth rate reached just beyond 2020), which is the average growth rate of labour productivity over the 1982–2016 period. This is below the strong productivity growth observed in the late 1990s, and the gap between the most productive firms and others, as well the slowdown in turnover, leads us to determine that rates of growth beyond the long-run average are not attainable in the projection period.

2.3 Trend labour input growth

TLI growth is projected to decline from 0.7 per cent in 2016–18 to 0.5 per cent in 2020 (**Table 1**). The current assessment suggests stronger growth, by around 0.1 percentage points, relative to April 2016, which is entirely explained by stronger projected population growth. Both the trend employment rate and trend average hours worked were revised slightly down over the projection horizon, following new data. Statistics Canada has also begun to release information from the 2016 Census; however, the information necessary for our models will not be released until at least 2018 (see **Box 1** for more information on what we have learned so far from the 2016 Census).¹⁰ Nevertheless, our estimates do take into account updated projections for higher levels of immigration.

Box 1: What we have learned so far from the 2016 Census

In February, Statistics Canada began releasing some preliminary results from the 2016 Census Program. So far, only information on total population estimates and dwelling counts has been released. The next release, including distribution of population by age and sex, along with the type of dwelling, is scheduled for 3 May 2017.

Census data suggest that the Canadian population increased by 5.0 per cent over 2011–16, from 33,476,688 in 2011 up to 35,151,728 in 2016. Population growth in Canada between 2011 and 2016 was the highest among G7 countries. The largest percentage increase in the provincial population over 2011–16 was in Nunavut (12.7 per cent), Alberta (11.6 per cent) and Saskatchewan (6.3 per cent), followed by Yukon (5.8 per cent), Manitoba (5.8 per cent), British Columbia (5.6 per cent), Ontario (4.6 per cent) and Quebec (3.3 per cent). The lowest increase was in the Atlantic provinces (-0.5 per cent in New Brunswick, 0.2 per cent in Nova Scotia, 1.0 per cent in Newfoundland and Labrador, 1.9 per cent in Prince Edward Island) and the Northwest Territories (0.8 per cent).

Implications for potential output growth

Overall, population growth rates from the newly released census are in line with the current Statistics Canada estimates used in the potential output reassessment, yet they suggest a slightly lower population growth over 2011–16 (5.0 per cent from the census versus 5.7 per cent from the current Statistics Canada assessment). This might represent a small downside risk on the trend labour input and potential output

¹⁰ In particular, we need updated population estimates by age groups and gender, as well as the revised projection of population growth by age groups and gender incorporating new census information.

growth estimates over recent years and the projection; however, the distribution of population by age groups would be needed for further assessment. The Labour Force Survey (LFS) is also expected to be rebased using the latest census information, but this update is not expected to be available in time for this analysis (the 2011 Census was incorporated into the LFS only at the beginning of 2015).

Immigration and population growth

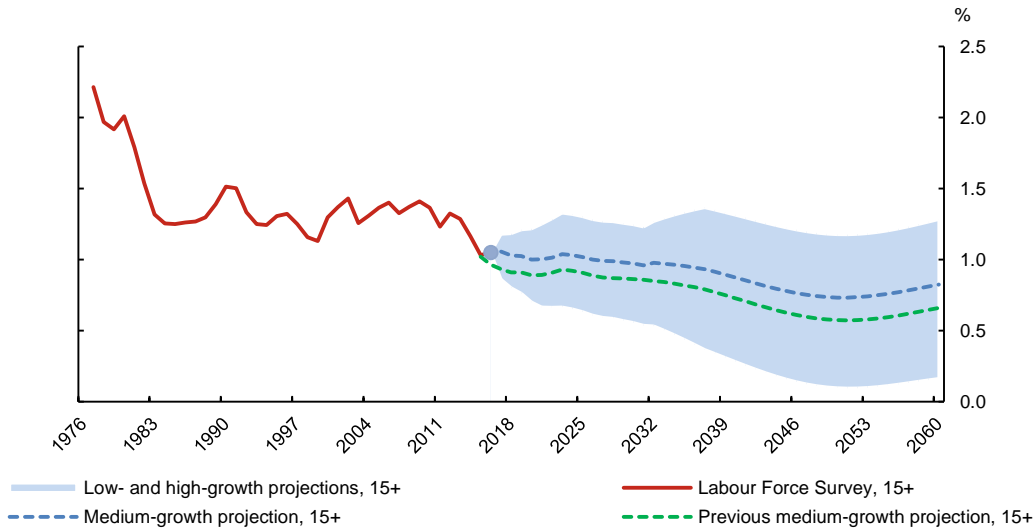
The population projection has been updated for this reassessment to take into account the higher immigration intake in the last year, as well as the higher immigration target for the upcoming year, as announced by Immigration, Refugees and Citizenship Canada (IRCC). Following several years of stability and two consecutive years of increases in the federal government's immigration targets, the medium-growth population scenario now assumes a slightly higher immigration rate than the projection for 2016: 8.3 per 1,000.¹¹ As a result, population growth has been revised up by around 0.1 percentage points over the projection horizon relative to the 2016 assessment (**Chart 8**).

Higher levels of immigration are thus the main driver behind upward revisions to TLI growth. Since the 1990s, immigration has been the main contributor to overall population growth in Canada and is projected to be its main driver in the future (**Chart 9**).

¹¹ The assumed immigration rate is also comparable to the average rates provided by the demographers who responded to the Opinion Survey on Future Demographic Trends conducted by Statistics Canada.

Chart 8: Working age population growth and projection

Annual data

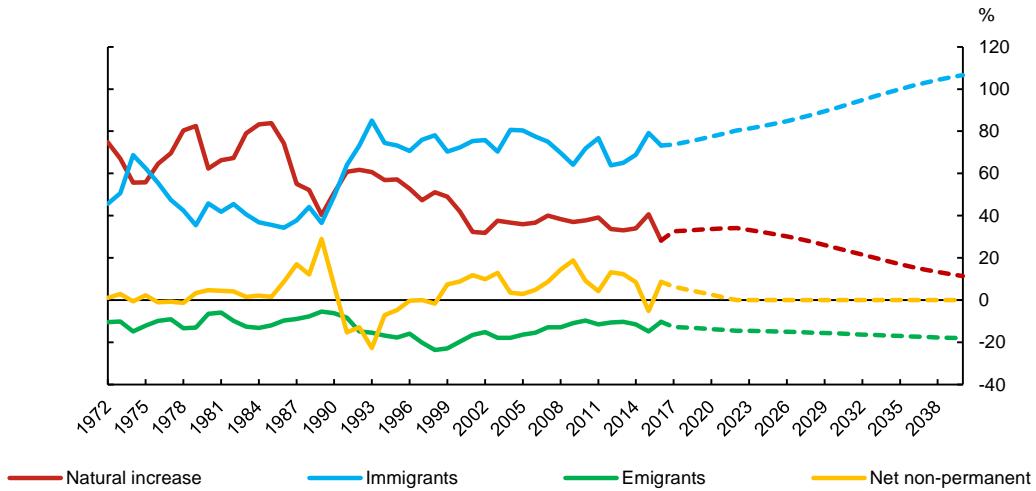


Sources: Statistics Canada and Bank of Canada calculations

Last observation: 2016, projection until 2060

Chart 9: Immigration is the main contributor to overall population growth (0+)

Annual data



Sources: Statistics Canada and Bank of Canada calculations

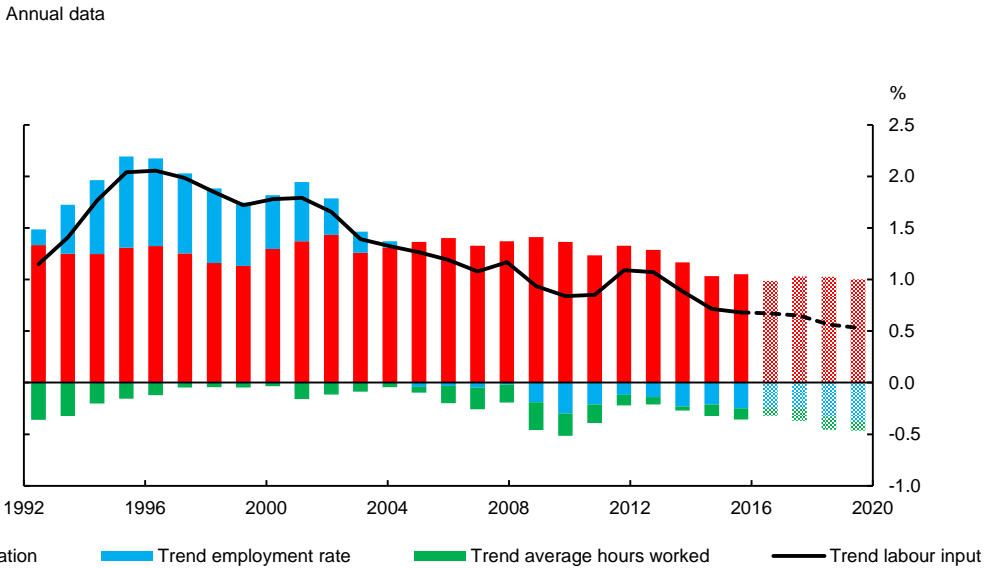
Last observation: 2016, Projection until 2040

In particular, over the past five years, immigrants have accounted for 70 per cent of the growth in the population, while natural increase contributed 34 per cent, and emigration subtracted 11 per cent (the remaining 8 per cent are attributed to net temporary residents). The average contribution of net immigration

(number of immigrants minus number of emigrants) was on average around 66 per cent. Moreover, according to Statistics Canada’s population projection, immigration will continue to be the main driver of population growth—the contribution of natural increase to population growth is projected to decline to less than 20 per cent by the 2030s, while the contribution of net immigration will explain more than 80 per cent of population growth.

It is important to note that population growth is the main driver of the positive TLI growth, whereas both trend employment and trend average hours worked are declining and therefore subtracting from growth (**Chart 10**).

Chart 10: Trend labour input growth is projected to decline, largely due to population aging



Source: Bank of Canada calculations

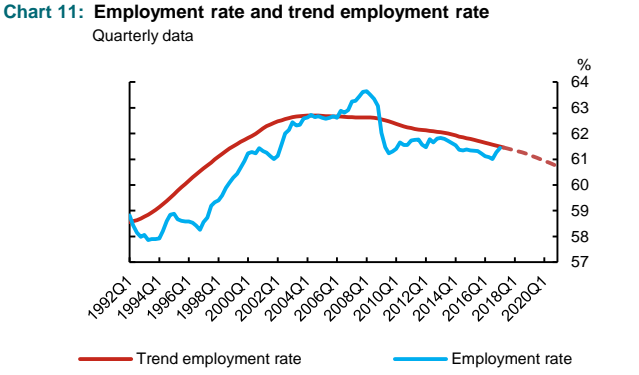
Last data plotted: 2020

Population aging and TLI

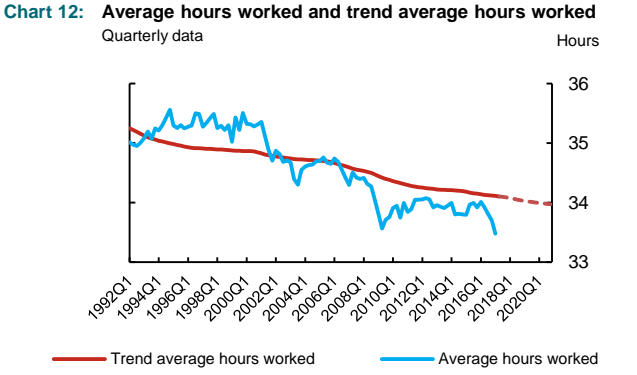
Continuing population aging, along with a slowdown in the growth of the working-age population, explains the declining growth rates of TLI over 2016–20. An increasing participation of older workers, a projected increase in the educational attainment of workers and stronger immigration targets only partially compensate for these negative demographic trends. Both the trend employment rate and trend average hours worked are projected to decline (**Chart 11** and **Chart 12**). Population aging is the main driver of the decline in the trend employment rate. An increasing proportion of older workers, who have lower trend employment rates, leads to a decline in the aggregate trend employment rate (for instance, the employment rate in 2016 was 81.4 per cent for prime-age workers, while only 35.5 per cent for older workers). Along with population aging (since older workers tend to work fewer hours), changes in the composition of employed

workers also explain the decline in the trend average hours worked. For instance, there is a rising share of employment in the service sector, where the number of weekly hours worked tends to be smaller—average weekly hours worked in 2016 were 32.6 hours in the services sector and 38.5 hours in the goods sector.

Overall, we estimate that population aging (the changing age-structure of the Canadian population) will subtract around 0.5 percentage points from TLI growth annually over the projection horizon, or more than 2 percent from its level in 2020.



Source: Statistics Canada and Bank of Canada calculations Last data plotted: 2020Q4



Source: Statistics Canada and Bank of Canada calculations Last data plotted: 2020Q4

2.4 Hysteresis

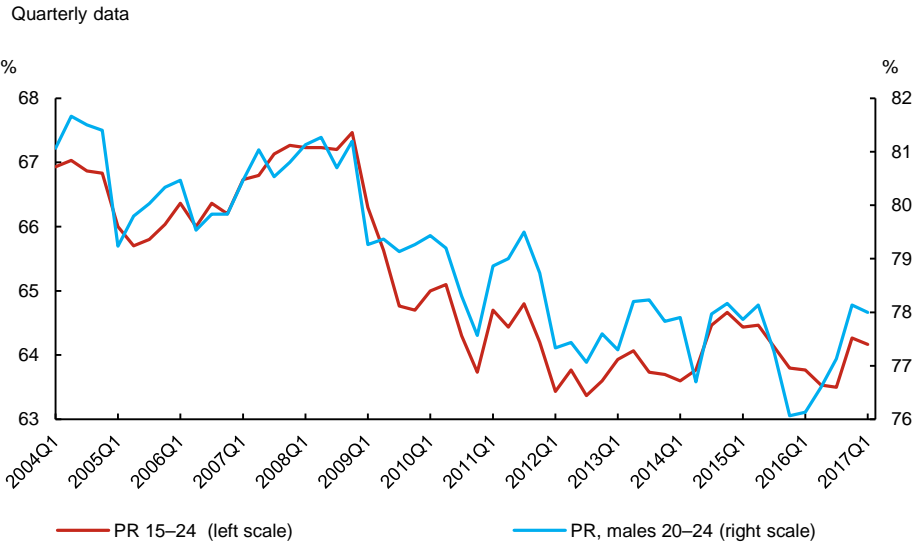
The baseline estimates take a neutral view on the extent to which labour market hysteresis has taken hold in the Canadian economy. We define hysteresis as when what first appear to be cyclical factors that have little effect on potential output become structural factors and thereby affect the level of potential output. In the current context, this applies to the lingering effects of the Great Recession—mainly in the labour market—and the possibility that the skills of those currently detached from the labour market (through either involuntary part-time work or complete detachment from the labour market) have deteriorated to the point that their reintegration into the labour market would be hindered due to skills mismatch. This is labour market hysteresis, the main form of hysteresis addressed in this note.

As is depicted in **Chart 11** and **Chart 12**, actual values of both the employment rate and average hours worked declined significantly following the 2008–09 recession and remain below their pre-recession levels. This is particularly evident when we look at the participation rates of youth—and especially young males—which remain lower than their pre-recession average (**Chart 13**). However, the estimated trends do not entirely follow the prolonged weak data, and the decline in these trends over recent years and the projection is associated with structural factors, such as population aging and changes in the sectoral composition of the economy. For example, the youth employment rate remains substantially below trend, suggesting that our TLI estimates do not have significant levels of hysteresis (**Chart 14**). Therefore, we do not assume that

hysteresis has taken hold to the point that the labour input gap, and thus the output gap, has closed at any time in past years.

In Section 3.3 below, we return to the issue of labour market hysteresis and explore the consequences of different assumptions concerning the extent of hysteresis in the labour market and the impact of these different scenarios on the outlook for TLI and potential output growth. In particular, we construct bounds around the baseline projection reflecting different degrees of hysteresis over the projection.

Chart 13: Following the last recession, the youth participation rate (PR) has declined, although it ticked up in the last quarter

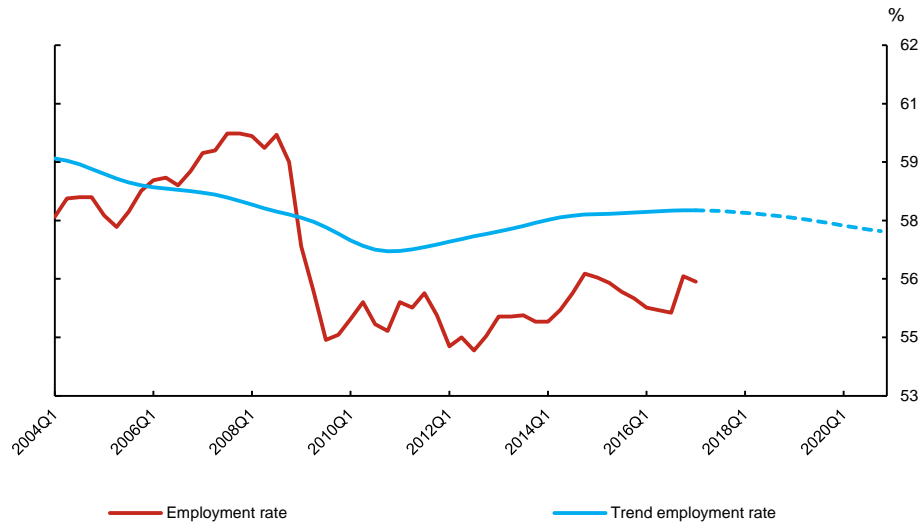


Source: Statistics Canada

Last observation: 2017Q1

Chart 14: Employment rate for 15–24 age group remains below trend

Quarterly data



Sources: Statistics Canada and Bank of Canada calculations

Last data plotted: 2020Q4

2.5 Comparison with other projections

Several other institutions produce projections for the growth rate of Canadian potential output. **Table 2** presents the projections developed by the Parliamentary Budget Officer (PBO 2016), the Organisation for Economic Co-operation and Development (OECD 2016) and the International Monetary Fund (IMF 2017). While it can be informative to compare projected growth rates, an important caveat is that these numbers are presented independently from each organization’s view of the current level and recent history of potential output; this must be taken into account when interpreting the projections in the near term.

Table 2: A comparison of potential output growth projections				
	Potential Output Growth			
	April 2017 MPR	PBO (October 2016)	OECD (November 2016)	IMF (January 2017)
2016	1.3	1.2	1.4	1.3
2017	1.3	1.2	1.4	1.9
2018	1.4	1.5	1.3	2.0
2019	1.5	1.7		
2020	1.6	1.9		

3. Alternative Scenarios for Potential Output Growth

The baseline estimates for potential output growth rely on many assumptions about future conditions. To put our projection in perspective, and to establish reasonable bounds around the baseline estimates, we consider a number of alternative scenarios that could materialize with some reasonable probability. The impacts of the various scenarios are presented in **Table 3**, and the details are provided below.

	On potential output growth, in percentage points					On the level,¹² in per cent
	2016	2017	2018	2019	2020	2020
Baseline potential output growth	1.3	1.3	1.4	1.5	1.6	
3.1 Reduction in interprovincial trade barriers	0	0	+0.1	+0.3	+0.2	+0.6
3.2 Increasing global protectionism	0	-0.2	-0.3	-0.3	-0.2	-1.0
3.3 Labour market hysteresis: lower bound	-0.3	-0.2	-0.2	-0.1	-0.1	-1.3
3.3 Labour market hysteresis: upper bound	+0.1	+0.1	+0.1	+0.1	+0.1	+1.2
3.4 Population and immigration: low scenario	0	-0.1	-0.2	-0.2	-0.2	-0.6
3.4 Population and immigration: high scenario	0	+0.1	+0.1	+0.1	+0.1	+0.4

3.1 Reduction in interprovincial trade barriers

The recent announcement by the federal and provincial governments concerning the planned reduction in internal trade barriers, which will take effect on 1 July 2017, could have a significant impact on the productive capacity of the Canadian economy. Lowering interprovincial trade costs (which also includes measures such as the reduction in costs associated with uniform certification, licensing and regulation) will directly affect productivity growth in a number of ways.

While the ultimate impact of the Canadian Free Trade Agreement (CFTA) remains unclear at this point, a significant reduction in internal trade barriers could have an impact on trend productivity through the liberalization of the wholesale and retail, finance, agriculture and mining, and food and textiles sectors, as these sectors account for a large share of internal trade (Albrecht and Tombe 2016). Furthermore, these sectors are important inputs into many other sectors in the Canadian economy, and there is much evidence

¹² For scenarios 3.3 (labour market hysteresis, lower- and upper-bound scenarios), the cumulative effect on the level in 2020 is larger than the sum of the effects on annual growth rates over 2016–20 because these scenarios also affect potential output estimates before 2016. Scenarios 3.1, 3.2 and 3.4 start after 2016; however, annual impacts on growth rates may not add up to the cumulative effect on the level in 2020 due to rounding.

to suggest that liberalization of intermediate imports drives the majority of the productivity gains from trade liberalization (see, for example, Amiti and Konings 2007).

To assess the likely impact of reduced interprovincial trade barriers, we consider a scenario in which interprovincial trade barriers are lowered by 10 per cent starting in 2018 (allowing for a one-year implementation delay). This would constitute an important, broad-based reduction in trade barriers (beyond what is in the CFTA), and assumes smooth implementation. Given this, we would expect the growth rate of potential output to increase on average by 0.2 percentage points over the projection period. We currently treat this as an alternative scenario: the agreement has been signed, but uncertainty surrounds the ultimate timing and the magnitude of the effects.

3.2 Increasing global protectionism

There is an increasing tide of global protectionism, as evidenced by the demise of the Trans-Pacific Partnership deal, discussion of possible new tariffs, and plans for important trade agreements, such as NAFTA, to face new scrutiny and renegotiation. This has important implications for our baseline estimates of TLP since we implicitly assume the pace of trade liberalization will be similar to the historical mean.

To assess the likely impact of increased global protectionism, we estimate a scenario where the United States imposes a 20 per cent tariff on all regions of the world, which we take as a reasonable upper bound on increased protectionism. We find that potential output growth would on average be 0.2 per cent lower over the projection horizon due to decreased investment.

3.3 Labour market hysteresis

As mentioned in Section 2.4, labour market hysteresis refers to the idea that prolonged weakness in labour markets, initially seen as cyclical, can become structural deficiencies as the skills of those removed from the labour market begin to deteriorate, which eventually affects their ability to reintegrate into the labour market. In the baseline assumptions we allow for some hysteresis in the sense that the level of TLI decreases slightly in the years following the recession. However, we do assume that there has been a prolonged gap between TLI and actual total hours worked, implying that workers can still be reabsorbed into the labour market should demand pick up.

In this subsection, we consider two alternative hysteresis scenarios. The first assumes that there has been no labour market hysteresis and that the level of TLI is such that the recession had no effect on the trend and TLI continued to grow at its pre-recession rate, after accounting for demographic factors, such as an aging population and the slowdown in population growth. This scenario thus suggests a higher bound for the baseline estimate. In the second scenario we examine, there has been a significant level of labour market hysteresis that has not been fully captured by our baseline estimates. In other words, the baseline scenario might overestimate underlying trends by taking an overly optimistic view on the potential employability of marginally detached workers, as evidenced by the continued detachment of youth workers. This scenario thus provides a lower bound for the baseline estimate.

In the no-hysteresis or upper-bound scenario, we remove any impact on our estimate of the trend from the persistently weak data since the recession. TLI growth rates would be 0.1 percentage points higher over the projection period, leading to potential output growth being higher by less than 0.06 percentage points.

In the high-hysteresis or lower-bound scenario, we assume that the persistently weak labour demand (seen in a weak job-offer rate since the 2008–09 recession) reflects hysteresis in the labour market, and we therefore lower our projected trend of this variable accordingly. As a result, under this scenario the trend employment rate for youth is expected to be lower and closer to its current actual values than in the baseline estimation, thus reflecting a higher degree of hysteresis in youth labour market participation. Under this scenario, TLI growth rates would be -0.2 percentage points lower, resulting in potential output growth being -0.12 percentage points lower.

Overall, these scenarios show that our baseline projection represents a middle-point view on the degree of hysteresis in the labour market.

3.4 Alternative population and immigration scenarios

The baseline projection uses the medium-population-growth scenario provided by Statistics Canada. In this subsection, we evaluate the impact of low- and high-growth population scenarios on TLI and potential output. The low-growth scenario assumes an immigration rate at a level of 5.0 per 1,000, while the high-growth immigration scenario assumes an immigration rate at a level of 10.0 per 1,000. It is important to note that the high-growth scenario corresponds to substantially more admissions than what is proposed in the upper limit of the current IRCC plan (a number of 305,000 immigrants, corresponding to a rate of 8.4 per 1,000); however, it is slightly lower than the increase up to 450,000 proposed by the Advisory Council on Economic Growth. Although it has at times been discussed as a possible immigration target, a level of 10.0 per 1,000 has very seldom been reached. Therefore, these low- and high-growth immigration scenarios, as constructed by Statistics Canada, seem reasonable for the assessment of TLI and potential output. In addition to different immigration targets, the low-growth population scenario assumes lower fertility, higher mortality, higher emigration and a lower number of non-permanent residents. The high-growth population scenario assumes higher immigration targets, higher fertility, lower mortality, lower emigration and a higher number of non-permanent residents. As a result of these underlying assumptions, the low-growth population scenario implies a higher degree of population aging, while the high-growth population scenario implies a lower degree of population aging.

Under the high-growth population scenario, TLI growth rates would be higher by 0.1–0.2 percentage points over the projection horizon (namely, they would be increasing slightly from 0.7 per cent in 2016 to 0.8 per cent in 2020). In contrast, under the low-growth population scenario, TLI growth rates would be lower by 0.1–0.4 percentage points (declining from 0.7 per cent in 2016 to 0.2 per cent by 2020). The impact of these scenarios on potential output growth is in the range of -0.2 to 0.1 percentage points over the projection horizon.

3.5 Establishing uncertainty around the baseline projection

All of the above alternative scenarios are taken into consideration to establish uncertainty bounds around the baseline estimates of potential output growth, which are presented in **Table 4**.

Table 4: Uncertainty around projection for potential output growth (%)				
	2017	2018	2019	2020
Range for potential output	1.0–1.6	1.1–1.7	1.1–1.9	1.1–2.1
Midpoint of the range	1.3	1.4	1.5	1.6

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