

# Potential output in Canada: 2020 reassessment

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## Abstract

After COVID-19, we expect potential output growth to stabilize around 1.2 percent. This is lower than the 2010–18 average growth of 1.8 percent. Relative to the April 2019 reassessment, the growth profile is revised down. Given the unknown course of the pandemic, uncertainty around these estimates is higher than in previous years.

*Topics: Potential output; Productivity; Labour markets*

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

## Résumé

Après la crise de la COVID-19, la croissance de la production potentielle devrait se stabiliser à environ 1,2 %, ce qui est inférieur à la croissance moyenne de 1,8 % observée de 2010 à 2018. Le profil de croissance a été revu à la baisse par rapport à celui établi lors de la réévaluation d'avril 2019. Comme l'évolution de la pandémie est inconnue, ces estimations sont empreintes d'une plus grande incertitude que dans les années précédentes.

*Sujets : Production potentielle; Productivité; Marchés du travail*

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

## Overview of the potential output profile

We present a summary of the annual reassessment of Canadian potential output. Several shocks have affected the Canadian economy since April 2019, with COVID-19 being the most significant. We therefore expect growth of potential output in Canada to decrease sharply in 2020 in the wake of the COVID-19 pandemic. Then, after rebounding in 2021, potential output is projected to grow by 1.5 and 1.2 percent in 2022 and 2023, respectively. This is lower than in the April 2019 reassessment.<sup>1</sup> **Table 1** summarizes the projection for potential output used in the October 2020 *Monetary Policy Report* (MPR).

**Table 1: Comparison of potential output estimates relative to April 2019**

Annual rates (percent)

	Potential output annual growth	Excluding containment effects		Revisions to the level of potential output
		Potential output annual growth	Range for potential output growth	
2020	-1.7 (1.7)	0.7	[0.1–1.3]	-3.5
2021	3.0 (1.8)	0.9	[0.2–1.6]	-2.3
2022	1.5 (1.9)	1.1	[0.3–1.9]	-2.6
2023	1.2	1.2	[0.2–2.2]	

Note: Estimates of annual growth rates of potential output from the April 2019 reassessment appear in parentheses.

Numbers may not sum due to rounding.

## Revisions to the potential output projection

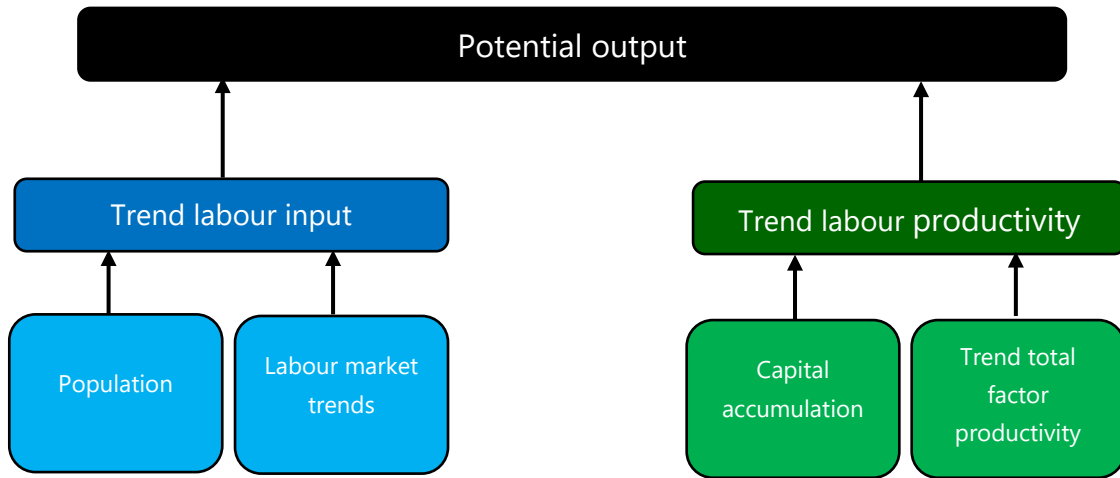
To assess potential output, we use a framework comprised of two blocks (**Figure 1**): one for trend labour input (TLI) and one for trend labour productivity (TLP). TLI is a function of population and labour market trends—trend employment rates (TER) and trend average hours worked (TAHW). TLP includes capital accumulation and other factors captured by trend total factor productivity (TFP).

We expect various factors to contribute to lower potential output growth (**Chart 1**). Revisions to the projection reflect a combination of these, some related to COVID-19 and some not. Those related to COVID-19 explain most of the change in potential output growth over 2020–22. We discuss each of the factors separately below.<sup>2</sup> **Box 1** summarizes the revisions to the level of potential output.

<sup>1</sup> See Brouillette et al. (2019) for details about the 2019 reassessment of potential output in Canada.

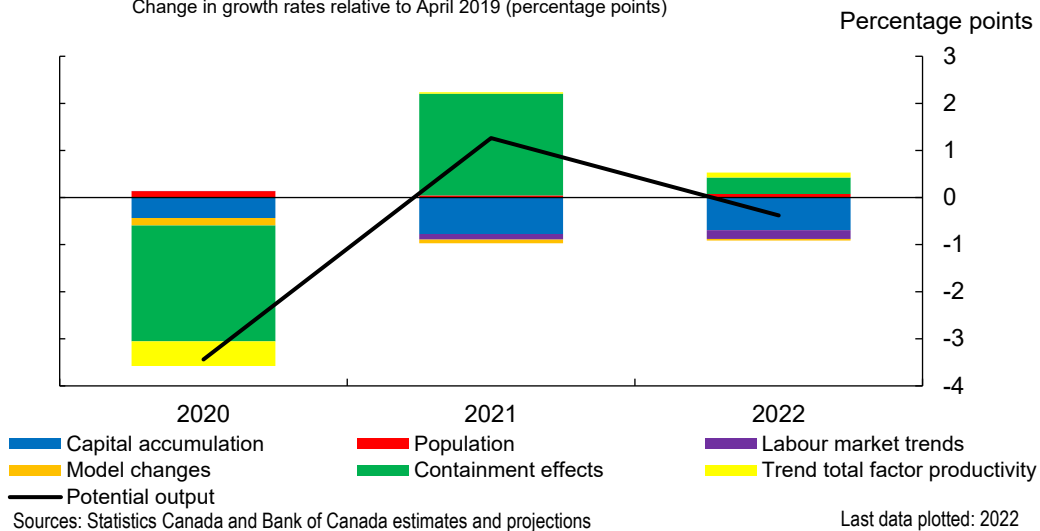
<sup>2</sup> The negative revisions due to model changes are explained by improvements made to the forecast of government capital expenditures. In our framework, we use the capital stock for the whole economy, including both the private sector and government. Capital stock is determined using the perpetual inventory method.

Figure 1: Components of potential output growth



**Chart 1: Potential output growth is mostly revised down for 2020–22**

Change in growth rates relative to April 2019 (percentage points)



## Containment effects

Brinca, Duarte and Faria e Castro (2020) note that “A supply shock is anything that reduces the economy’s capacity to produce goods and services, at given prices. Lockdown measures preventing workers from doing their jobs can be seen as a supply shock.” As such, the combination of mandatory closure of businesses and stay-at-home orders can be considered a negative supply shock. This negative supply shock greatly constrained the productive capacity of the economy in the second quarter of 2020. However, most of the measures to contain the virus were lifted starting in the third quarter of 2020, when the reopening of the economy

began. The effects of the containment measures are now much smaller, although they are expected to last until the end of 2021.<sup>3</sup>

To isolate the effects of containment on supply, we conduct an accounting exercise to break down into different components the decline in gross domestic product (GDP) since the fourth quarter of 2019.<sup>4</sup> Isolating the various demand factors (such as foreign demand, business and consumer confidence and policy support) results in the profile shown in **Chart 1-A** in **Box 1**.

The containment effects in the second quarter of 2020 explain the large negative revision to potential output growth in 2020 (**Chart 1**, green bars). As the containment effects fade rapidly, potential output growth rebounds in 2021. The removal of containment effects by the end of 2021 explains the small positive revision to potential output in 2022 from this source (the small green bar for 2022 in **Chart 1**).

## Population

Two opposing forces explain the revision to population growth over the projection horizon. On the one hand, we have observed strong inflows of non-permanent residents in recent years—mainly foreign workers participating in the International Mobility Program and international students. These inflows call for an upward revision to the projection of population growth relative to April 2019. On the other hand, we expect the closure of the Canadian border in 2020 to restrict the inflow of immigrants and non-permanent residents, partially offsetting the upward momentum from before the pandemic (**Chart 2**).

This revised population profile leads to an overall increase in the expected growth rate of population in 2020 (**Chart 1**, red bars). Relative to April 2019, this adds about 0.1 percentage points to potential output growth over 2020–22.

## Labour market trends

The loss of about 3 million jobs between February and April 2020 created a massive wave of transitions in the labour market. While the recovery remains underway, there is a risk that some groups may be left behind because of the expected uneven nature of the recovery.

Hiring activity is expected to remain subdued in services sectors where physical distancing is difficult, such as retail, personal services, travel, and food and accommodation. For instance, women and youth are among those who experienced the sharpest drop in their employment rate and average hours worked (see **Chart A-1** and **Chart A-2** in the **Appendix**). Furthermore,

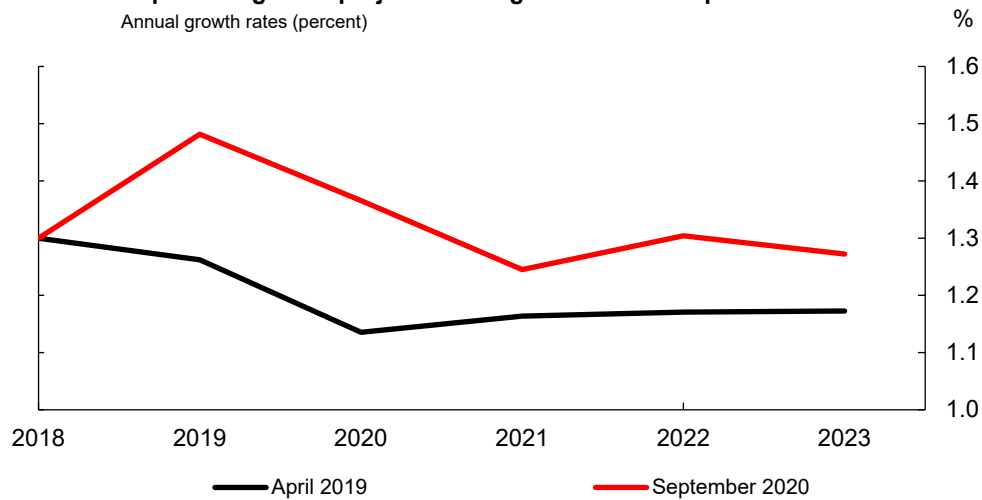
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<sup>3</sup> One example of the continuing constraints on productive capacity is the physical distancing rules imposed by public health officials. A restaurant that can seat patrons at only 50 percent of its tables cannot operate at its potential, even if demand for its services has returned and labour is available to fully staff all tables.

<sup>4</sup> It is easier to think about the effect of containment measures on the level of potential output rather than on the growth of potential output. Once the level effect is determined, it can be translated into a growth effect.

the burden of child care may force some women to stay home if schools and daycares cannot remain fully operational.<sup>5</sup>

**Chart 2: Population growth projection is higher relative to April 2019**  
Annual growth rates (percent)



Sources: Statistics Canada and Bank of Canada estimates and projections

Last data plotted: 2023

Spells of prolonged unemployment could lead to diminished labour market opportunities due to factors such as loss of human capital and lack of work experience. Eventually, workers from groups at risk could drop out of the labour force, leading to a persistent decline in hours worked and employment. There is thus a significant risk that this unprecedented labour market shock may translate into a lower potential output profile.

To illustrate this point, we use data from the Labour Force Survey. We calculate changes in employment rates and hours worked between the first eight months of 2019 and the first eight months of 2020 based on age and gender. We then assume that a fraction of the observed decline in hours and employment in the data translates to long-term effects on potential output.<sup>6</sup> We use these results to guide our adjustment of group-specific TAHW and TER. Our preliminary assessment suggests that potential output growth in 2022 should be revised down by about 0.2 percentage points (**Chart 1**, purple bars).<sup>7</sup>

## Capital accumulation

The outlook for business investment has been revised down significantly since April 2019, leading to reduced capital accumulation through the projection horizon (**Chart 1**, blue bars).

<sup>5</sup> The relatively lower level of specialized skills required to work in these severely hit service sectors makes them an easy entry into the workforce. A sluggish recovery in these sectors could thus prevent job searchers from other groups with marginal labour market attachment from entering or re-entering the labour market. Older workers may also reduce their labour supply because of the higher health risk associated with contracting COVID-19.

<sup>6</sup> See the **Appendix** for additional details.

<sup>7</sup> Our reassessment of the labour market trends incorporates the latest 2019 Labour Force Survey data, which did not lead to revisions to potential output growth. The revisions mainly arise from the permanent effects related to the COVID-19 shock.

Over 2019, global uncertainty, trade tensions and challenges in the oil and gas sector were the main factors explaining the downgrade to the projection for business investment. The revision in 2020 reflects a combination of the decline in oil prices in March and the slowdown in economic activity associated with the COVID-19 crisis. This slower pace of capital accumulation relative to what was expected at the time of the April 2019 reassessment implies a downward revision to potential output growth of  $-0.7$  percentage points on average over 2021–22.

## Trend total factor productivity

Given the magnitude and uniqueness of the current crisis, we expect that the pandemic will have persistent effects that surpass capital accumulation and TLI (**Chart 1**, yellow bars). To account for these effects, we lowered trend TFP over the projection horizon.

When containment measures were introduced, disruption of work routines (adjusting to remote work, caring for children at home) created a negative productivity shock that slowed potential output growth. This initial shock is calibrated based on the observed decline of trend TFP in the period following the severe acute respiratory syndrome (SARS) outbreak in 2003.

In the long run, the shock to the labour market could lead to a loss in intangible capital and an increased mismatch in skills due to ending of work relationships and the misallocation of resources. The calibration of these longer-term effects is based on the relationship observed during the global financial crisis between corporate non-performing loans and TLP as well as estimates from Mourougane (2017) regarding the persistent effects crises have on potential output.

Since the combination of the short- and long-run impacts on trend TFP is constant through the projection horizon (**Chart 1-A** in **Box 1**, yellow bars), most of the impact on revisions to potential output growth are visible in 2020. We assess that this channel accounts for about  $-0.5$  percentage points of downward revision to potential output growth in 2020.

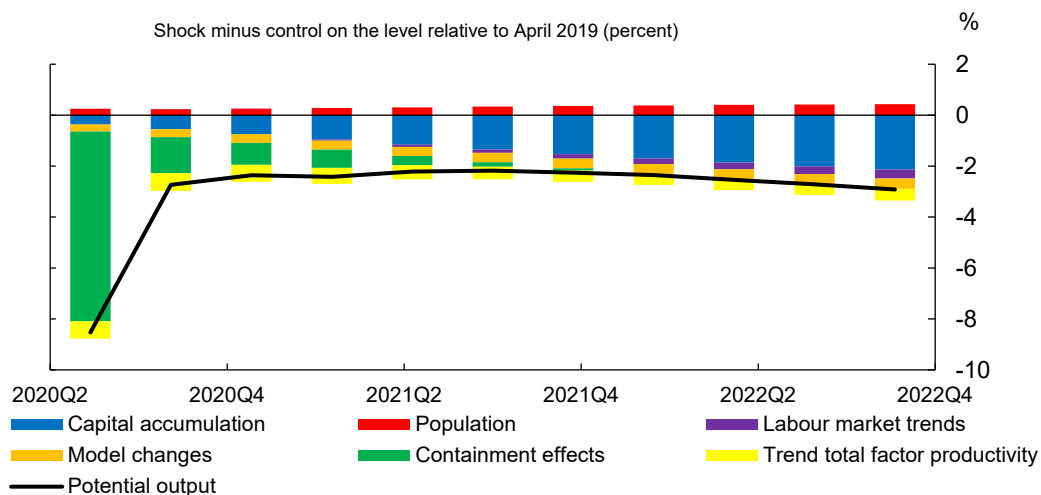


## Box 1: Revisions to the level of potential output

The above section presents the revisions to potential output in terms of annual growth rates. In this Box, we present the same revisions, but on the level of potential output. **Chart 1-A** presents the decomposition. A few observations stand out:

- We see that containment measures (green bars) affect the level of potential output mainly in the second quarter of 2020 and fade out rapidly, although some effects remain in 2021.
- Trend total factor productivity (TFP) has a negative contribution over the projection horizon. This is due to the disruption of work routines in the second quarter of 2020 and to the impact of real factors, such as skills mismatch and costly reallocation of both workers and economic activity across sectors. On average, trend TFP lowers the level of potential output by 0.5 percent between 2020 and 2022.
- Capital accumulation is lower because of a weaker investment profile due to global uncertainty, trade tensions, low oil prices and the slowdown in economic activity associated with the pandemic. We expect weaker capital accumulation to reduce potential output by 2.1 percent by the fourth quarter of 2022.
- The higher level of population has a positive impact on the level of potential output of about 0.4 percent by the fourth quarter of 2022. This results from the strong population increase observed before COVID-19 that was partly offset by lower immigration due to the pandemic.
- We expect labour market trends to weigh on the level of potential output throughout the projection horizon, contributing to -0.4 percent of the decline by the fourth quarter of 2022.

**Chart 1-A: Containment effects are concentrated in 2020Q2, fading out rapidly after**



Sources: Statistics Canada and Bank of Canada estimates and projections

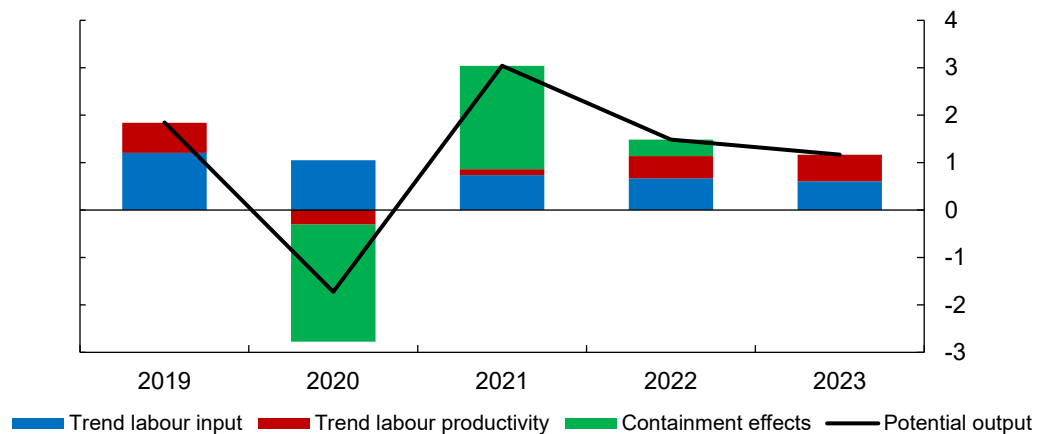
Last data plotted: 2022Q4

## Dynamics over the projection horizon

The revisions to the growth rates are distorted over 2020 and 2021 due to the short-lived but substantial supply effect resulting from the measures to contain the spread of COVID-19.

**Chart 3** shows the contributions to growth of TLP and TLI separate from the containment effect. As shown in **Box 1**, the containment effects are mostly a level effect concentrated in the second quarter of 2020.

**Chart 3: Potential output will slow down due to lower trend labour input growth**  
Annual contribution to potential output growth (percentage points)



Sources: Statistics Canada and Bank of Canada estimates and projections

Last data plotted: 2023

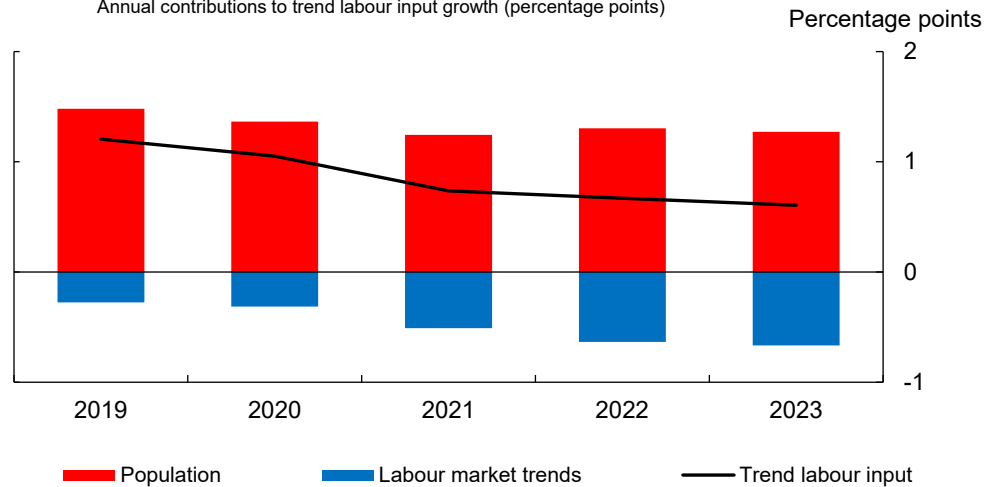
We expect TLI's contribution to potential output growth to decrease in 2020 and 2021 due to the reduced inflow of immigrants and non-permanent residents. After 2021, we expect population to increase in line with its pre-pandemic growth rate. TLI growth in 2022 and 2023 is held back by the negative contribution of TER and TAHW (**Chart 4**, blue bars). Population aging remains the main factor explaining the negative contribution of TER to TLI growth. In contrast, most of the expected decline in TAHW reflects structural factors, such as the secular decline in average hours worked and higher employment in the services sector. This slowdown caused by TER and TAHW is amplified because labour market effects described in the previous section could linger.

In the short run, TLP growth slows because of the sharp decline in the outlook for business investment due to the COVID-19 pandemic. Over the rest of the projection horizon, capital deepening is expected to increase, supported by favourable financial conditions, reduced business uncertainty and an expected recovery in foreign demand. TLP's contribution to potential output growth will, however, increase only marginally between 2022 and 2023 because trend TFP growth is held down slightly by the persistent effects discussed in the previous section.

Overall, excluding containment effects, potential output growth averages 1.0 percent over 2020–23, below the 2010–18 average of 1.8 percent.<sup>8</sup> This is due to both TLP and TLI growth dropping below their 2010–18 average by 2022 (**Table 2**).

**Chart 4: Labour market trends are dragging down trend labour input growth**

Annual contributions to trend labour input growth (percentage points)



Sources: Statistics Canada and Bank of Canada estimates and projections

Last data plotted: 2023

**Table 2: Potential output growth excluding containment effects**

Annual rates (percent)

	Potential output growth	Trend labour input	Trend labour productivity
2010–18	1.8 (1.8)	0.9 (0.9)	0.9 (0.9)
2019	1.8 (1.8)	1.2 (1.1)	0.6 (0.7)
2020	0.7 (1.7)	1.1 (0.8)	-0.3 (0.9)
2021	0.9 (1.8)	0.7 (0.8)	0.1 (1.0)
2022	1.1 (1.9)	0.7 (0.8)	0.5 (1.1)
2023	1.2	0.6	0.6

Note: Estimates of annual growth rates of potential output from the April 2019 reassessment appear in parentheses.

Numbers may not sum due to rounding.

## Uncertainty around the base-case scenario

Given the unknown course of the pandemic and its large economic impacts, the uncertainty around our estimates of potential output is high. In this section, we highlight some positive and negative risks to our outlook. We assess that, by 2023, potential output growth could be as much as 1 percentage point higher or lower than our baseline forecast (**Table 1**).

<sup>8</sup> The analysis of global potential output is consistent with this notion of abstracting from containment effects. See Chen et al. (forthcoming) for details.

## Positive risks

A positive risk could emerge if an effective treatment or vaccine becomes widely available sooner than expected. If this were to happen, business investment would rebound sharply as demand picks up and the labour market recovers fully. This scenario adds about 0.4 percentage points to potential output growth by 2023 and accounts for about half the positive risk over 2021–23. Moreover, as physical distancing rules are lifted, most of the negative effects of the pandemic on labour productivity ease, likely eliminating several of the lingering effects on labour market attachment. Under this scenario, we estimate that potential output growth would increase by a further 0.4 percentage points by 2023.<sup>9</sup>

## Negative risks

A possible negative risk to our outlook is a sharp increase in the number of COVID-19 cases over the coming quarters. This scenario would lead to lower immigration, such as lower inflows of international students and foreign workers, who have contributed to the strong population growth observed in recent years. This reduces potential output growth by about 0.3 percentage points in 2021.<sup>10</sup> While business investment recovers slowly in our base-case scenario, an even slower recovery could further weigh on capital accumulation. If aggregate demand remains weak, investment plans would be postponed or cancelled as some businesses close and others adopt a wait-and-see approach. This slowdown could remove about 0.4 percentage points from potential output growth by 2023.

Our base-case scenario incorporates lingering effects on labour market trends. It is possible that these lasting negative effects may be larger than expected. By 2023, potential output growth could be 0.1 percentage points lower than forecast because of slower labour market growth.

The various government programs that were necessary to offset income losses of millions of jobless workers could also reduce potential output growth. An increase in income replacement rates generally incites unemployed individuals to temper their labour supply. We estimate this could reduce potential output growth by about 0.4 percentage points in the short run.

Public debt has increased drastically at all levels of government since March 2020. High levels of debt restrict the capacity of governments to spend in the future, especially on infrastructure, and higher taxes may restrain labour supply in the long run. Reinhart and Rogoff (2010) and, more recently, Swamy (2020) show that an elevated and rising debt-to-GDP ratio lowers long-term economic growth. Reinhart and Rogoff (2010) find that median economic growth falls by 1 percentage point when this ratio is greater than 90 percent, while Swamy (2020) suggests that an increase in this ratio of 10 percentage points implies a decline of 0.23 percentage points

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<sup>9</sup> As in previous years, replacing our base-case population projection with a high population growth scenario from Statistics Canada would add about 0.2 percentage points to potential output growth by 2023. In the negative scenario, a low population growth would remove about 0.2 percentage points from growth by 2023.

<sup>10</sup> The impacts from lower immigration flows are mostly felt into 2020 and 2021. Beyond 2021, population inflows are assumed to return to their pre-COVID levels.

in average growth. While these effects are more likely to materialize well beyond the projection horizon, we assume that the negative scenario is severe enough to start slowing potential output growth by 2023, removing 0.2 percentage points from growth.

## Appendix: The persistent effects of COVID-19 on the labour market

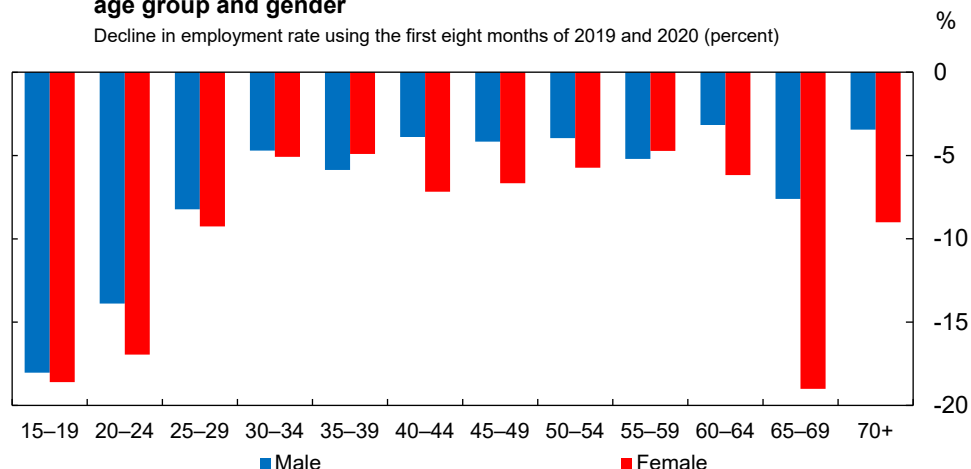
We use data from the Labour Force Survey to calculate changes in employment rates and hours worked between the first eight months of 2019 and the first eight months of 2020 based on age and gender. While the decline in average hours worked and in the employment rate has been broad, women and youth are experiencing more severe declines (**Chart A-1** and **Chart A-2**).

We use this evidence to guide our adjustment of group-specific TAHW and TER. We assume that a fraction of the observed decline in hours and employment in the data translates to long-term effects on potential output.

Estimating this pass-through is, however, difficult given that the recovery is underway. The framework of DeLong and Summers (2012) may nevertheless provide a reasonable preliminary estimate. In this framework, a prolonged period of weakness—measured by the output gap—can have permanent effects on future potential output and GDP. DeLong and Summers bound this pass-through between 0 and 20 percent. Applying this framework to the labour market, we thus conservatively assume that 5 percent of the observed drop in the data is passed on to the trends. The peak impact of the shock is reached in 2023.

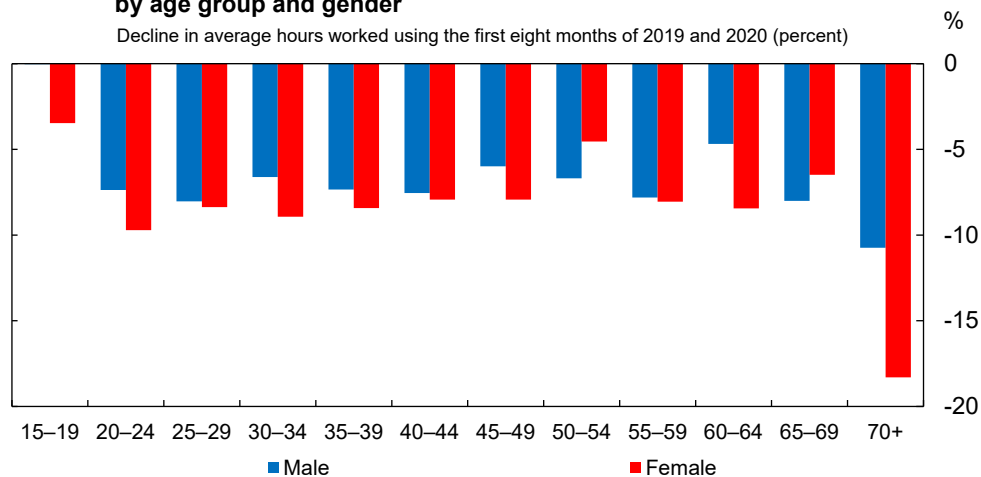
Based on this exercise, we expect that, by the fourth quarter of 2022, the level of TLI will be lower by 0.9 percent relative to April 2019. This will lead to a decline of 0.5 percent in the level of potential output.

**Chart A-1: The decline in the employment rate between 2019 and 2020 varies by age group and gender**



Sources: Statistics Canada and Bank of Canada estimates and calculations

**Chart A-2: The decline in the average hours worked between 2019 and 2020 varies by age group and gender**



Sources: Statistics Canada and Bank of Canada estimates and calculations

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