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Economic Projections for Canada and the Provinces, 2019-2038

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Abstract

This report is an update of an earlier report by the CSLS in 2018, projecting real GDP growth for Canada and the provinces for the 2017-2038 period (Sharpe and Iglesias, 2018). The projections of this report are based on two additional years of historical data: 2018 and 2019. Two perspectives are explored in the report. First, the historical perspective, comparing current projections to the 2000-2019 period. Economic growth is projected to be slower over the next 20 years, down from 1.98 per cent per year over 2000-2019 to 1.71 per cent per year for the 2019-2038 period. Second, the earlier projections perspective, comparing current projections for the 2019-2038 period and the previous projections of the 2018 report for the 2017-2038 period. This report projects a growth rate of 1.71 per cent per year for 2019-2038, an increase of 0.15 percentage points over the earlier projection of 1.56 per cent for 2017-2038. An update in Statistics Canada's population projections assumptions, mainly due to higher immigration assumptions, was the driving factor for the differences between the two projections.

Economic Projections for Canada and the Provinces, 2019-2038

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Economic Projections for Canada and the Provinces, 2019-2038[1]

Executive Summary

This report is an update to the report "Economic Projections for Canada and the Provinces, 2017-2038: An Update" (Sharpe and Iglesias, 2018). This report incorporates two more years of historical data: 2018 and 2019. The Sharpe and Iglesias (2018) projections use historical growth trends for the 2000-2017 period while the current projections use historical growth trends for the 2000-2019 period. This report presents long-term economic projections for Canada for the 2019-2038 and 2038-2050 periods, with comparisons to the 2017-2038 period found in the 2018 report. In addition, the report presents projections for the provinces for the 2019-2038 period along with comparisons to the projections presented in the 2018 report for the 2017-2038 period.

The CSLS projections are based on a supply-side methodology where real GDP growth is broken down into labour productivity growth and labour supply growth (total hours worked growth). Labour supply growth can be further decomposed into three components: growth in the labour force participation rate, average hours worked and working age population. All historical data were taken from Statistics Canada and projections for the working age population were based on "Population Projections for Canada, Provinces and Territories, 2018 to 2068" by Statistics Canada, using the medium growth scenario (M1). Assumptions for the growth in labour productivity and the components of the labour supply remain largely the same as the 2018 report. However, there are changes in the assumptions regarding the future paths of the 55+ labour force participation rate and working age population growth, which have changed due to the updated assumptions in Statistics Canada's population projections.

Statistics Canada's "Population Projections for Canada, Provinces and Territories, 2018 to 2068" are of key interest, as it determines the future path of the working age population. The assumptions that Statistics Canada employs for Canada's population projections medium growth (M1) is as follows:

- The total fertility rate grows at a linear rate of 0.12 per cent annually, from 1.54 children per woman in 2019 to 1.59 children per woman in 2043 and remains constant thereafter.

- The life expectancy at birth reaches 83.2 years for males and 86.9 years for females in 2038, and 84.6 years and 88.1 years respectively in 2050, compared to 2019 estimates of 81.0 years and 84.2 years respectively.[2]

- The assumption for the immigration rate for Canada is based on trends observed in the 2008-2017 period. The base immigration rate for 2019 was 0.85 per cent and reaches a

[1] This report was written by Abrar Arif under the supervision of CSLS Executive Director Andrew Sharpe. The author would like to thank Don Drummond and Bert Waslander for comments. The online appendix of this report is available at http://www.csls.ca/reports/csls2022-01-onlineappendix.pdf. Email: abrar.arif@gmail.com

[2] An increase in life expectancy would increase both the relative and absolute shares of the 55+ age group.

high of 0.91 per cent in 2021, which is maintained until 2027, where it then drops to 0.83 per cent in 2043, remaining constant until 2068.

- The annual number of non-permanent residents (NPRs) is based on the extrapolation of the historical trend from 2008-2018. There are 1,104,522 NPRs in 2019, reaching a high of 1,397,060 in 2043 and remaining constant thereafter.[3]

- The net emigration rate is maintained at 0.15 per cent annually for the 2019-2068 period.

Sharpe and Iglesias (2018) used Statistics Canada population projections released in May 2015. However, the current population projections were updated in July 2020. Consequently, there are significant changes in the Statistics Canada working age projections between the two reports. First, the base year for the May 2015 edition was 2013, whereas the current projections use 2018 as the base year. In other words, an additional five years of historical data was incorporated into the projections. As a result, the assumptions pertaining to the rates of immigration, fertility, among other factors have changed. Most importantly, the previous projections held the immigration rate constant at 0.76 percent for the 2012-2038 period. Conversely, the current projections used trends observed in the 2008-2017 period, where the lowest rate of immigration was 0.85 per cent in 2019 and attained a peak of 0.91 per cent in the 2021-2027 period. The range of difference therefore was 0.09-0.15 percentage points per year, or an average of 0.13 percentage points during the 2019-2038 period. Hence, Statistics Canada's re-assessment of Canada's future paths for immigration was a key factor in the differences between the projections of the two reports.

Canada benefited relatively more from the baby boom phenomena (1946-1964), as the baby boom contributed to the higher shares of the prime age group (25-54), relative to the other age groups in the 1970-1999 period. Given that the prime age group has the highest participation rate among the three age groups, it positively impacted the overall participation rate. Yet, the same phenomena that historically benefited Canada can negatively affect Canada's future aggregate labour force participation rates.

Since 1997, the share of prime age group was falling while the share of the older age group was increasing. After 2003, the expanding shares of the older age group with historically low participation rates exerted downward pressure on the aggregate participation rate. The year 2019 is pertinent as the final cohort of the baby boomer population entered the older age group. Hence, the decline of the shares of the prime age group slows down, until the shares of the three main age groups (15-24, 25-54, and 55+) stabilize in 2038. In other words, the negative effects of aging on the participation rate have largely taken place.

Consequently, the aging phenomenon of the 55+ age group effectively ends after 2038. For instance, the 70+ sub age group share increases from 37.9 per cent to 52.7 per cent in 2038 and remains relatively the same at 51.4 per cent in 2050. Likewise, the decline of the 55-69 sub age group shares from 62.1 per cent in 2019 to 47.3 per cent in 2038 and remains relatively the same at 48.6 per cent in 2050. Therefore, post 2038, there is no longer a downward effect

[3] It is unclear how the LFS changes non-Permanent residence to permanent residence and whether non-permanent residence are considered part of the labour force.

imposed by an aging population, allowing the participation rate to have the sole role in growth in hours worked, and by extension, real GDP growth.

Future participation rates of the 55+ age group increase modestly due to increased higher educational attainment which delayed entry into the workforce and increased employment opportunities. In addition, a shift from full-time to part-time work, and a shift from traditional, blue-collar jobs to white-collar jobs also make for modest increases in labour force participation. Thus, the future growth of the 55+ labour participation rate becomes the main factor in the future growth of the aggregate labour force participation rate.

The report consists of four sections. The first section discusses the methodology and assumptions behind the economic projections of real GDP for Canada. The second section compares the updated projections for Canada with the projections from the 2018 report for the 2017-2038 period. This section also includes a discussion on projections beyond the year 2038 to the year 2050. The third section discusses the projections for the provinces for the 2019-2038 period along with comparisons to the provincial projections for the 2017-2038 period. The final section summarizes the findings and concludes.

The key findings of the report are presented below:

- The CSLS currently projects real output growth of 1.71 per cent for Canada for the 2019-2038 period, an increase of 0.15 percentage points compared to the projections in the 2018 report (1.56 per cent), based on labour productivity growth of 0.92 per cent and total hours worked growth of 0.79 per cent. The difference between projections reflects an increase in total hours worked growth of 0.20 percentage points, offset by a decrease in labour productivity growth of 0.05 percentage points.

- Further decomposing projected total hours worked growth for Canada between projections, the working age population growth increased by 0.16 percentage points, from 0.86 per cent in 2017-2038 to 1.02 per cent in 2019-2038, due to higher projections in the immigration rate. Labour force participation rate growth remained the same while average hours growth increased by 0.01 percentage points compared to the 2017-2038 projections.

- The shares of the three age groups will stabilize in 2038, such that the expanding 55+ age group will no longer downward pressure on the overall participation rate. Along with the increased growth of the participation rate of the five-year age groups in the 55+ age groups, total hours worked growth during the 2038-2050 period will increase to 0.97 per cent annual growth. Consequently, real GDP growth will increase to 1.89 per cent growth for the 2038-2050 period.

- The projected growth rate of real GDP over 2019-2038 is higher than in the previous report for 2017-2038 for all provinces except British Columbia. The reason for the projected decrease of British Columbia's real GDP growth is a decrease in labour productivity growth from 1.43 per cent for the 2017-2038 period to 1.35 per cent for the 2019-2038 period. Although Alberta has the lowest projected labour productivity growth of all the provinces at 0.68 per cent for the 2019-2038 period, it is also projected to have

the highest total hours worked growth of all the provinces at 1.84 per cent, resulting from having the highest net interprovincial migration rate of all the provinces during the projection periods.

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Economic Projections for Canada and the Provinces, 2019-2038

Introduction

In 2018, the Centre for the Study of Living Standards (CSLS) released the report "Economic Projections for Canada and the Provinces 2017-2038: An Update," (Sharpe and Iglesias, 2018), which was an update to the 2015 study "Long-term Fiscal and Economic Projections for Canada and the Provinces and Territories, 2014-2038," (Drummond and Capeluck, 2015) for the Council of the Federation. The objective of this report is to update the 2018 report for Canada with two more years of historical data: 2018 and 2019. The year 2020 was omitted for the analysis of trends due to the year being an anomaly given the Covid-19 pandemic.

The report consists of four main sections. The first section discusses the methodology behind the projections for Canada.[4] The second section compares the updated projections for Canada with the projections from the 2018 report for 2017-2038. This section includes a discussion on projections for Canada beyond the year 2038 to the year 2050. The third section discusses the projections for the provinces for the 2019-2038 period along with comparisons to the projections for the 2017-2038 period. The final section summarizes the findings and concludes.

I. Methodology

The CSLS projections are based on a supply-side methodology where potential real output growth is determined by trend labour productivity growth and potential labour supply growth, expressed in terms of total hours. This latter variable is in turn affected by the working age population growth, participation rate growth, and changes in average weekly hours. The forecast can be considered judgmental and is not based strictly on statistical analysis. The forecasts for all variables were prepared by the CSLS, with the exception of the population projections which are taken from Statistics Canada.

Real GDP growth can be decomposed into two components: 1) labour productivity growth (that is, growth in real GDP per hour worked); and 2) growth in total hours worked. The relationship is represented by the following equation:

$$\Delta In(Y) = \Delta \ln(Y/H) + \Delta \ln(H)$$

where Y is real GDP, H is total hours worked, and Y/H is labour productivity. The delta operator indicates average change per year. Delta applied to the natural logarithm (nl) gives the average annual percentage change in the variable between parentheses. Therefore, to project real GDP growth, we develop projections for the future changes of total hours worked

[4] The 2019-2038 period uses 2019 as the base for compound growth rate calculations. This means that growth from 2019 to 2020 is included in the total period growth rate. Population projections for provinces by Statistics Canada only go up to 2043.

and labour productivity growth. Growth in total hours worked can be further decomposed into employment growth and growth in average hours worked:

$$\Delta \ln(H) = \Delta \ln(H/E) + \Delta \ln(E)$$

where *H/E* is average hours worked and *E* is employment. Thus, to project growth in total hours worked, we make separate projections for the future paths of employment and average hours worked. We start by projecting labour force growth since employment tends to grow in line with the supply of labour over the long run.[5] The projections for labour force growth are based on separate projections for working age population growth and growth in the labour force participation rate. The relationship between labour force growth, working age population growth and growth in the participation rate is represented by the following equation:

$$\Delta \ln(E) \approx \Delta \ln(L) = \Delta \ln(L/N) + \Delta \ln(N)$$

where *L* is the labour force, *N* is the working age population (aged 15 years and over), and *L / N* is the participation rate.

A. Working Age Population

To project growth in the working age population for Canada, we rely on Statistics Canada's official population projections for the 2019-2038 period, and 2038-2050 period (Statistics Canada, 2020). In particular, we employ the medium (M1) scenario projection.[6] The medium-growth (M1) scenario contains five assumptions for Canada.

- The total fertility rate grows at a linear rate of 0.12 per cent annually, from 1.54 children per woman in 2019 to 1.59 children per woman in 2043 and remains constant thereafter.
- The life expectancy at birth reaches 83.2 years for males and 86.9 years for females in 2038, and 84.6 years and 88.1 years respectively in 2050, compared to 2019 estimates of 81.0 years and 84.2 years respectively.
- The assumption for the immigration rate for Canada is based on trends observed in the 2008-2017 period. The base immigration rate for 2019 was 0.85 per cent of the total population of Canada and reaches a high of 0.91 per cent in 2021, which is maintained until 2027, after which it then drops to 0.83 per cent in 2043, remaining constant until 2068.
- The annual number of non-permanent residents (NPRs) is based on the extrapolation of the historical trend from 2008-2018. There are 1,104,522 NPRs in 2019, and the number is projected to increase to a high of 1,397,060 in 2043 and remain constant thereafter.
- The net emigration rate is maintained at 0.15 per cent annually for the 2019-2050 period.

[5] This is based on the assumption that the unemployment rate will remain fixed at its 2019 level (5.7 percent). The relationship between growth in the participation, employment and unemployment rates is as follows:

$$\Delta \ln(PR) = \Delta \ln(ER) + \Delta \ln(1 - UR)$$

Where *PR* is the participation rate, *ER* is the employment rate, and *UR* is the unemployment rate.

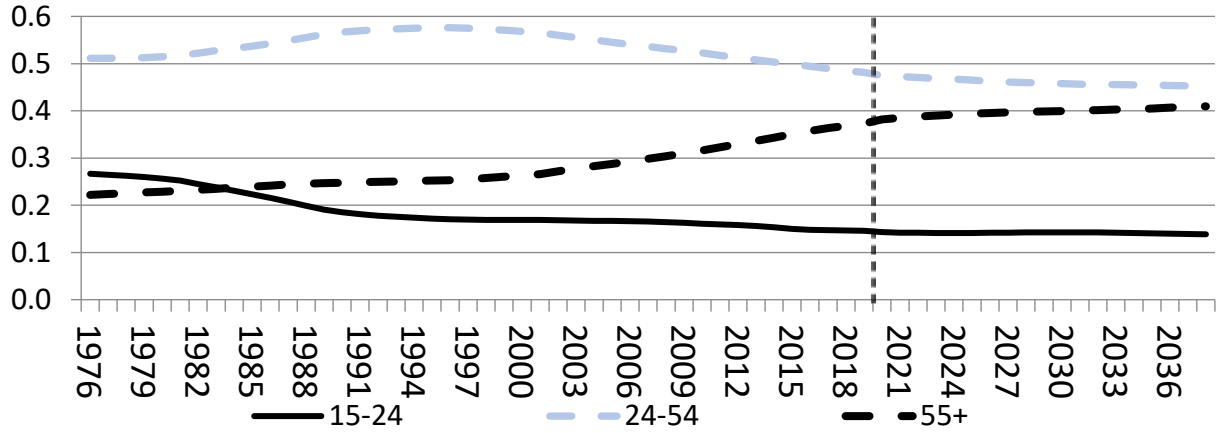
[6] There are four other types of medium growth scenarios, which all differ based on interprovincial migration. Beyond the medium growth scenario, there are four other potential scenarios with differing assumptions: low growth, high growth, slow aging, and fast aging. For a summary in long-term projection scenario assumptions, see Appendix Table 1

It should be noted that there is a 15-year lag by the birth year, as the working age population only accounts for people 15 years old and over. Although not significant, the increase in fertility from 1.54 in 2019 to 1.59 children per woman in 2038 can partially explain a pick-up in the growth of the working age population after 2034. Moreover, the projected life expectancy of men increases by 1.8 years, and that of women by 2.5 years from 2019 to 2038, which reduces the fall in the working age population both in absolute and relative terms. Finally, the immigration rate increases from 0.85 per cent in 2019 and reaches a high of 0.91 per cent in the 2021-2027 period, after which it slowly falls to 0.86 per cent in the year 2038. Consequently, at the national level, this scenario projects a working age population growth of 1.02 per cent per year for the 2019-2038 period.[7]

B. Labour Force Participation

The assumptions underlying the future path of labour force participation are somewhat more complex.[8] To project overall labour force growth, the labour force is broken down into three age groups: young workers (aged 15-24 years), prime-age workers (aged 25-54 years), and older workers (aged 55+ years). To project growth in the labour force, we made a series of assumptions regarding the future path of participation rates by age group and applied these participation rates to the official population projections from Statistics Canada.

Chart 1: Shares of the Working Age Population by Age Group, Canada, Per Cent, 1976-2038



Source: Statistics Canada Table 14-10-0327-01 and Authors Calculations

Even though we expect relatively stable participation rates for young and prime-age age groups and an increase in the participation rate of the older age group, the overall participation rate is expected to decrease over the 2019-2038 period (-0.07 per cent per year), driven by compositional changes in the labour force. More specifically, the evolving age structure of the 55+ age group will exert downward pressure on the overall labour force participation rate (Chart 6 Panel A). In particular, the share of the older age group in the working age population is

[7] The growth in the working age population is largely explained by the immigration rate. Factors beyond that are due to increase life expectancy.

[8] The population is divided into three age groups (15-24 years, 25-54 years, and 55+ years) to project growth in total hours worked. Different assumptions concerning growth in average hours worked and the evolution of participation rates are made for each group. This methodology is discussed in more detail later in this section.

expected to increase from 37.3 per cent in 2019 to 41.0 per cent in 2038, while the shares of the younger and prime-age age groups are expected to decline from 14.6 to 13.9 per cent and from 48.1 to 45.2 per cent, respectively.

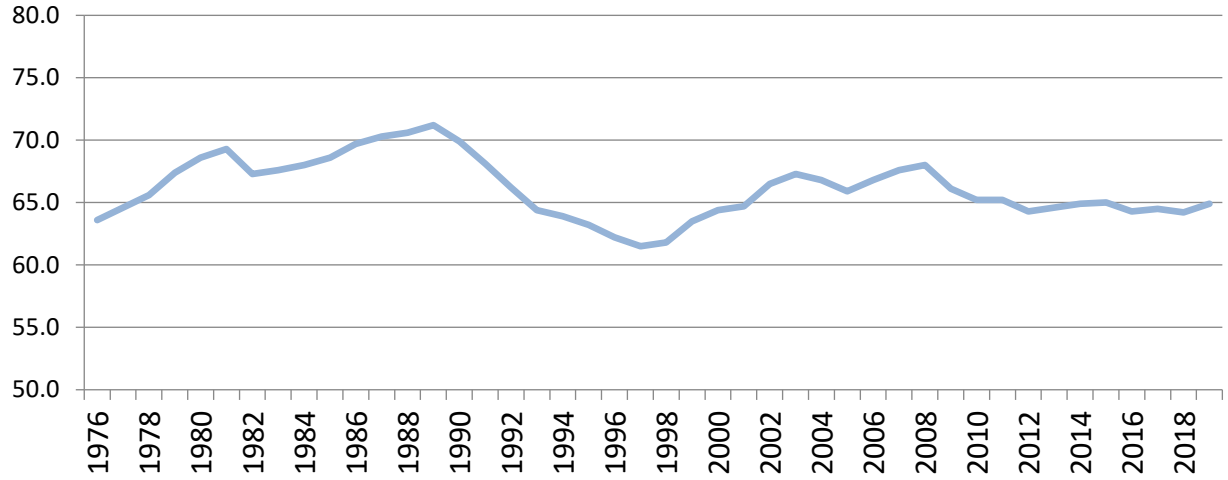
It is interesting to note that the growth rate of the share of the older age group (55+) increased significantly in 2000 and has effectively peaked in the year 2019, where the annual growth rate for the 2000-2019 period was 1.85 per cent while the projected annual growth rate for the 2019-2038 period is 0.50 per cent. In other words, the negative effects on the participation of the aging population have mostly already taken place. This can be largely explained by the baby boomer phenomenon, where the first cohort of baby boomers born in 1946 entered the 55+ age group in the year 2000 while the final cohort of baby boomers born in 1964 entered the 55+ age group in the year 2019. The baby boomer phenomenon and its effect on the labour force are discussed later in this report.

It is important to note that the participation rates and average hours worked estimates used to construct the projections for labour force growth are taken from the LFS (Labour Force Survey). The assumption for each age group along with the explanations will be listed below

i) 15-24 age group

In order to project participation rates for the 15-24 age groups, we assume that the participation rates for the 15-24 age group will increase at the same pace as the historical growth rate observed over the 2000-2019 period (0.04 per cent). Chart 2 illustrates the evolution of the 15-24 age group participation rate between 1976-2019

Chart 2: Participation Rate of 15-24 Age Group, Canada, Per Cent, 1976-2019



Source: Statistics Canada Table 14-10-0327-01 and Authors Calculations

The participation rate for the young age group appears to be largely cyclically-driven, falling during economic slowdowns (such as the early 1990s and late 2000s) and rising again in more prosperous periods. Empirically, recessions and times of economic uncertainty generally lower the young age group participation rate (Bernard, 2015). This is shown during the first major drop in the young age group participation rate due to the 1990-1992 recession, where the

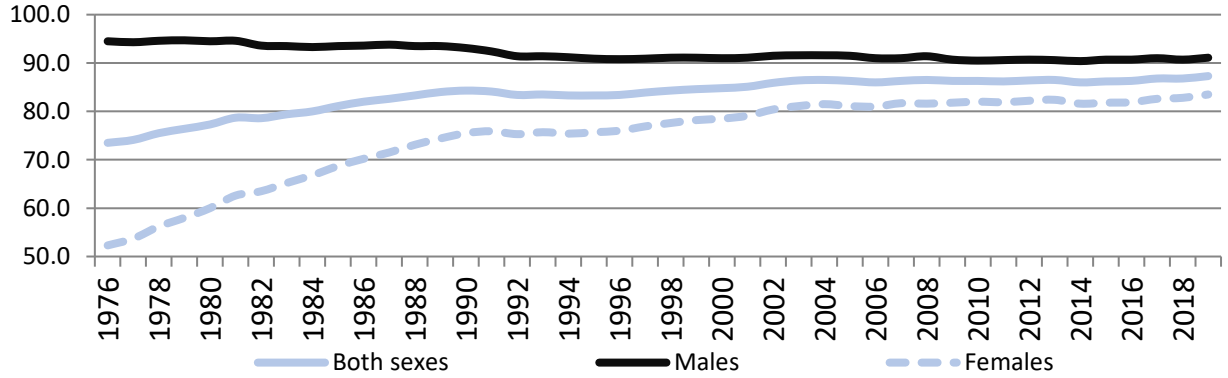
participation rate dropped significantly from 69.9 per cent in 1990 to 61.5 per cent in 1997. Likewise, from 2000 to 2008, the participation rate of the 15-24 age group increased from 64.4 per cent to 68.0 per cent, after which it drops back to 64.3 per cent in 2012 and remains relatively stable. Therefore, the main cause for the second drop in the participation rate was the 2008 recession.

Given that times of economic downturns result in overall lower employment opportunities, a larger number of young people enrol in post-secondary education in order to upgrade their qualifications to increase their employment opportunities. The year 2010 alone experienced a 5.23 per cent increase from 2009 levels. Increases in post-secondary enrollments lower the participation rate of the 15-24 age group as more people opt for full-time studies rather than both full-time and part-time employment. Therefore, there is a decrease in the participation rate. However, as the economy starts to recover, and the employment opportunities increase, the participation rate of the 15-24 year age group increases. The year 2019 experiences a slight pickup as the participation rate increases to 64.9 percent. Therefore, there is some potential for the 15-24 age group participation rate to grow.

ii) 25-54 age group

The participation rate of the 25-54 age group has been relatively constant since the 2000s. Chart 3 illustrates the participation rate by sex for prime-age workers. There was a slight increase in 2010 due to an increase in the female participation rate. Initially, the male and female participation gap was as large as 40.6 percentage points in 1976 and it dropped to 7.6 per cent in 2019. The speed of convergence between the male and female participation rates has slowed down considerably since 2010.

Chart 3: Participation Rates by Sex for Prime-age Workers (25-54), Canada, Per Cent, 1976-2019



Source: Statistics Canada Table 14-10-0327-01 and CSLS Calculations

However, our projections may underestimate the growth of the labour force participation rate for a number of reasons. It is important to note that there remains a 7.6 per cent gap between male and female participation rates in 2019 levels, where the male participation rate is 91.1 per cent while the female participation rate is 83.5 per cent. Table 1 depicts two scenarios with respect to the male and female participation rate gaps. In a scenario where the male and female participation rate gap were to disappear, where the female participation rate is equal to the male

participation rate, the 87.3 per cent overall participation rate for the prime-age group would increase to 91.1 per cent, or by 4.2 percentage points. In other words, this would have the effect of boosting the 15+ participation rate from 65.6 per cent to 67.4 per cent in 2019 levels, or by 1.8 percentage points.

Table 1: Participation Rate by Sex for Prime-age Workers, Canada, Per Cent

	2019 Level with Gap	2019 Level with Half of Gap Closed	2019 Level with Entire Gap Closed	(2019 No Gap) – (2019 with Gap)	**(2019 with Half of Gap Closed) – (2019 with Gap)**
	1	2	3	4 = 3 - 1	5 = 2 - 1
Both sexes (25-54)	87.3	89.2	91.1	3.8	1.9
Male	91.1	91.1	91.1	0.0	0.0
Female	83.5	87.3	91.1	7.6	3.8
Overall Participation Rate (15+)	65.6	66.5	67.4	1.8	0.9

Source: Statistics Canada Table 14-10-0327-01 and CSLS Calculations

In a more likely scenario, if half of the gap between the male and female participation rate closed, such that the female participation rate increases to 87.3 per cent in 2019 levels, this would have an effect of increasing the prime-age group participation rate to 89.2 per cent, or by 1.9 percentage points. Consequently, the overall participation rate would increase to 67.4 per cent, or by 0.9 percentage points.

Despite the convergence between the male and female participation rates, especially given the priority the federal government has given to the greater inclusion of women in the workforce, there are still systematic reasons that the male and female participation gap will remain. Therefore, we assume this post-2010 pattern of a stable gap continues. More specifically, the participation rate for prime-age age group is assumed to remain at its 2019 level over the 2019-2038 period (Chart 1).

iii) 55+ age group

The 55+ age group will be of a greater focus in this report, given that the future evolution of the 55+ age structure will be heavily influenced by aging of the baby boom cohort born during 1946-1964. Therefore, the method for calculating the participation rate for the 55+ age group is a bit more complex. In terms of labour force participation rate growth, the 55+ age group since the 2000s has surpassed all other age groups. However, the rate of growth of the participation rate has been decelerating since when? Hence, an extrapolation of the trends can potentially overestimate the growth of the age group. Table 2 Panel A illustrates the participation rates of the 55+ sub-age groups while Panel B highlights the growth rates of the participation rates in five time periods within 2000-2019 and three projection periods of four distinct age groups in the older age group: 55-59, 60-64, 65-69, and 70+. Table 3 illustrates the evolution of the 55+ age group by decomposing the age group further to 10 distinct five-year age groups.

Table 2: Participation Rates of 55+ by Sub-Age Groups, Canada

Panel A: Levels (Per Cent)

	55+	55-59	60-64	65-69	55-69	70+
	1	2	3	4	5	6
2000	25.6	62.7	36.2	11.4	39.5	3.6
2008	33.6	70.6	46.8	20.5	49.8	4.9
2013	36.7	73	52.4	24.9	53	6.4
2019	37.9	75.4	56.1	28.2	55.3	8
2038	39.7	83.5	69.6	41.8	65.9	16.2
2050	49.5	89.1	79.8	53.6	74.9	25.3

Panel B: Compound Annual Growth Rate

	55+	55-59	60-64	65-69	55-69	70+
	1	2	3	4	5	6
2000-2019	2.09	0.98	2.33	4.88	1.79	4.29
2000-2008	3.46	1.49	3.26	7.61	2.94	3.93
2008-2013	2.44	0.67	2.29	3.97	1.25	5.49
2008-2019	1.10	0.60	1.66	2.94	0.96	4.56
2013-2019	0.54	0.54	1.14	2.10	0.72	3.79
2019-2038	**0.25**	0.54	1.14	2.10	**0.92**	3.79
2019-2050	**0.86**	0.54	1.14	2.10	**0.98**	3.79
2038-2050	**1.89**	0.54	1.14	2.10	**1.08**	3.79

Source: Statistics Canada Table: 17-10-0057-01, Table 14-10-0327-01,14-10-0327-01, Table: 17-10-0057-01 and CSLS Calculations

Note: Due to data limitations of the LFS, there is no participation rate provided for sub age groups beyond 70+.

Table 3: Population Shares of 55+ by Sub-Age Groups, Canada, 2019-2050, Per Cent

Panel A: Relative to 55+ Population

	Share in 2019	Share in 2038	Share in 2050	CAGR (2019-2038)	CAGR (2019-2050)	CAGR (2038-2050)
	1	2	3	4	5	6
55+	**100**	**100**	**100**	**0.00**	**0.00**	**0.00**
55-69	**62.1**	**47.3**	**48.6**	**-1.42**	**-0.78**	**0.23**
55-59	23.2	17.0	17.1	-0.99	-0.98	0.05
60-64	21.2	15.4	16.3	-1.02	-0.84	0.47
65-69	17.7	14.9	15.2	-0.55	-0.49	0.17
70+	**37.9**	**52.7**	**51.4**	**1.07**	**0.98**	**-0.21**
70-74	14.4	15.1	13.4	0.15	-0.22	-0.97
75-79	9.8	14.7	11.9	1.30	0.62	-1.73
80+	**13.7**	**22.9**	**26.0**	**2.73**	**2.09**	1.08
80-84	6.7	11.4	10.5	1.75	1.48	-0.68
85-89	4.3	7.1	8.9	1.63	2.35	1.85
90-94	2.0	3.4	4.8	1.61	2.82	3.11
95-99	0.6	0.9	1.5	1.18	3.05	4.83
100+	0.1	0.1	0.3	1.52	3.69	5.63

Panel B: Relative to Working Age Population

	Share in 2019	Share in 2038	Share in 2050	CAGR (2019-2038)	CAGR (2019-2050)	CAGR (2038-2050)
	1	2	3	4	5	6
15+	100	100	100	0.00	0.00	0.00
55+	**38.7**	**41.0**	**42.7**	**0.31**	**0.32**	**0.34**
55-69	**24.0**	**19.4**	**20.8**	**-1.12**	**-0.47**	**0.57**
55-59	9.0	7.00	7.3	-1.32	-0.66	0.39
60-64	8.2	6.3	7.0	-1.36	-0.52	0.82
65-69	6.8	6.1	6.5	-0.60	-0.17	0.51
70+	**14.7**	**21.6**	**21.9**	**2.06**	**1.31**	**0.13**
70-74	5.6	6.2	5.7	0.56	0.09	-0.64
75-79	3.8	6.0	5.1	2.45	0.94	-1.40
80+	**5.3**	**9.4**	**11.1**	**3.05**	**2.42**	**1.42**
80-84	2.6	4.7	4.5	3.19	1.81	-0.35
85-89	1.7	2.9	3.8	2.99	2.68	2.20
90-94	0.8	1.4	2.1	2.96	3.15	3.46
95-99	0.2	0.4	0.7	2.25	3.38	5.19
100+	0.0	0.1	0.1	2.80	4.03	5.99

Source: Statistics Canada Table: 17-10-0005-01, Table: 17-10-0057-01 and Authors Calculations
Note: Due to limitations related to the LFS not disaggregating the 70+ age group, the Annual Demographic Estimates (QDE) were used for the year 2019.

All age groups within the 55+ age group exhibited high participation rate growth during the first business cycle 2000-2008 period of the post-2000 period. However, entering the second business cycle for the 2008-2019 period, all age groups except the 70+ age group in growth for the participation rate. The 70+ age group exhibits even higher growth within the second business cycle. Yet after 2013, all age groups within the 55+ age group show a relatively slower growth as the growth these age groups displayed in the early 2000s tapered off. An extrapolation using 2000-2019 will ultimately overestimate the increase in growth for each respective group's participation rate. Therefore, given the deceleration of the 55+ participation rate growth observed after the 2010s, the compound annual growth rate of the 2013-2019 period will be used for the projections of the 55+ age group.

Using 2013-2019 compound annual growth rates of the four distinct age groups, the aggregate 55+ participation rate growth translates into 0.25 per cent for the 2019-2038 period, 0.86 per cent for the 2019-2050 period, and 1.89 per cent for the 2038-2050 period. It is important to note that the growth rates of all the 55+ sub-age groups participation rates are either higher or equal to the aggregate participation rate growth of 0.54 per cent for the 2013-2019 period, and 0.25 per cent for the 2019-2038 projections.

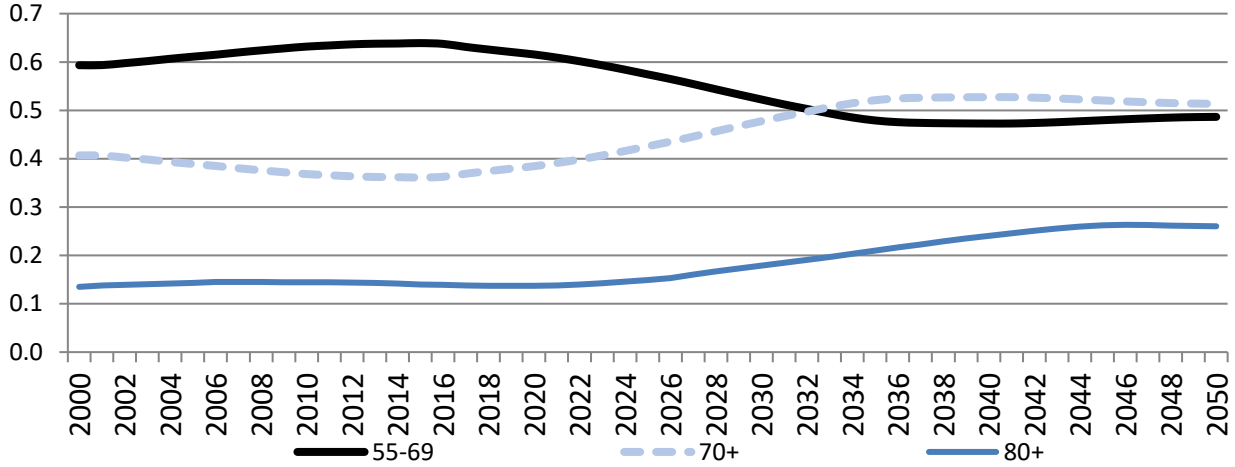
On the one hand, the 55+ sub-age groups show high growth in relative terms. However, in absolute terms, the percentage point increases are not as high. For instance, the 55-69 age group has an absolute increase of the participation rate of 10.5 percentage points from 55.3 per cent in 2019 to 65.9 per cent in 2038, but a decrease of 14.8 percentage points in its shares relative to the 55+ population. Likewise, the 70+ participation rate has an 8.2 per cent percentage

points increase from 8 per cent in 2019 to 16.2 per cent while its shares relative to the 55+ population increase by 14.8 per cent.

Despite the fact that both the 70+ and 55-69 age groups increase in roughly the same magnitude percentage points wise, 14.8 per cent of the shares of the 55-69 age group with a higher participation rate (65.9 per cent in 2038) shifts to the 70+ age group shares with a significantly lower participation rate (16.2 per cent in 2038). In other words, the high participation growth rates for the 70+ are not enough to offset the low participation rate in absolute terms and the evolution of the 55+ age structure.

On the other hand, the 2038-2050 period provides some insight on what was to happen if the high growth of the 55+ sub-age groups participation rates were to persist. From 2038 to 2050, the shares of the 55-69 group and 70+ group saw almost no change. Therefore, there is no downward pressure caused by increasing shares 70+ age group in the aggregate 55+ participation rate as observed in the 2019-2038 period. Instead, the growth rates take the role in increasing the aggregate 55+ participation rate. As a result, the 55+ participation rate experiences 1.89 per cent growth for the 2038-2050 period, or 0.86 per cent growth for the 2019-2050 period.

Chart 4: Evolution of 55+ Sub-Age Groups Shares Relative to 55+



Source: Statistics Canada Table: 17-10-0005-01, Table: 17-10-0057-01 and CSLS Calculations

It is important to highlight that the final cohort of baby boomers has entered the 55+ group in 2019. Chart 4 illustrates the evolution of the 55+ Sub-age group shares relative to the 55+ age group. Initially, the share of the 55-59 age group was 62.1 per cent in 2019, but it falls to 47.3 per cent in 2038. On the other hand, the 70+ age group sees a significant change in shares from 37.9 per cent in 2019 to 52.7 per cent in 2038. Further, the biggest increases are seen in the age groups 80 and above, where the share nearly doubles, from 13.7 per cent in 2019 to 22.9 per cent in 2038. A holistic approach of using the growth rate for the entire 55+ age group will not take into account the shifts in the age structure of the 55+ age group.

In order to capture this change, we break down the 55+ age group further into four age groups: 55-59, 60-64, 65-69, and 70+ and assume that participation rates for each of the four age groups for the provinces will maintain the same growth rate observed nationally in the 2013-

2019 period.[9] That is: 0.54 per cent growth for the 55-59 age group; 1.14 per cent growth for the 60-64 age group, 2.10 per cent growth for the 60-64 age group; and 3.78 per cent growth for the 70+ age group.

The aggregate 55 + participation is projected to increase over time from 37.9 per cent in 2019 to 39.7 per cent in 2038, or grow 0.25 per cent annually in 2019-2038, down from 2.09 per cent average annual growth over the 2000-2019 period. There are a number of reasons that we believe will increase the participation rate of the 55+ age group during the projection period:

- Shifts from blue collar occupations to white collar occupations are contributing to the increase in the 55+ participation rate. White collar workers tend to have better overall health as there is a lower chance of workplace injury and less chance of a a white collar worker being worn out compared to blue collar workers. As a result, white collar workers tend to stay in work longer, compare to those in blue collar occupations who retire earlier, leading to an increasing 55+ participation rate.

- Tying into white collar workers, increases in higher education attainment result in people delaying their entry in the workforce, thereby prolonging the age of retirement. In addition, increased education leads to more employment opportunities. Blue collar workers are generally less educated than white collar workers. Therefore, the increase in education has an upward effect on the participation rate.

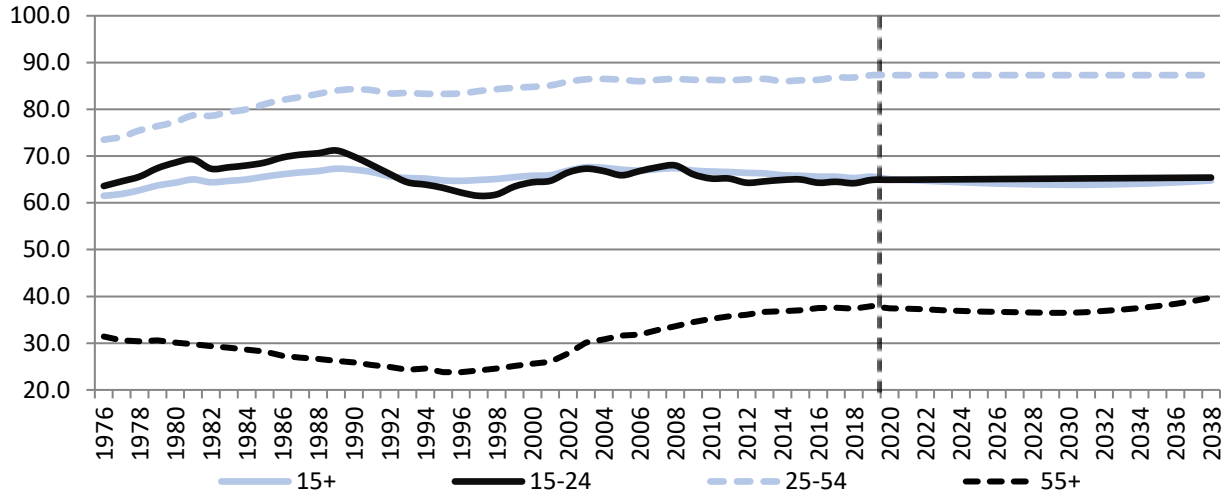
- There is a greater opportunity for part-time employment arrangements, which allows workers in the older age group to continue working, albeit with lower hours. The proportion of persons aged 55 and over in part-time employment was 13.3 per cent in 1976. That number increased to 22.7 per cent in 2019, highlighting the shifts from full-time arrangements to part-time arrangements during the period. This fact coupled with the increases in people working in the gig economy allows people to work longer due to increased flexibility contributing to part-time work i.e., Uber, etc.

- Changes in CPP and OAS maximize benefits at the age of 70. Therefore, people are more likely to postpone retirement to 70 years of age in order to maximize CPP and OAS benefits. Due to increased education attainment, workers are incentivized to work past the traditional age of retirement in order to fully maximize CPP benefits. From an actuarial perspective, life expectancy is projected to increase. Therefore, the opportunity cost of using OAS benefits later decreases.

[9] It should be noted that it would be ideal to further break down the 70+ age group three more 5-year age groups e.g.,70-74,75-79, 80+ as to not overestimate the influence of the 70+ age group and capture the influence of those distinct age groups on the aggregate participation rate. However, the LFS does not provide a disaggregation of age groups beyond the 70+ sub-age group..

iv) 15+ age group

Chart 5: Participation Rates by Age Group, Canada, Per Cent, 1976-2038



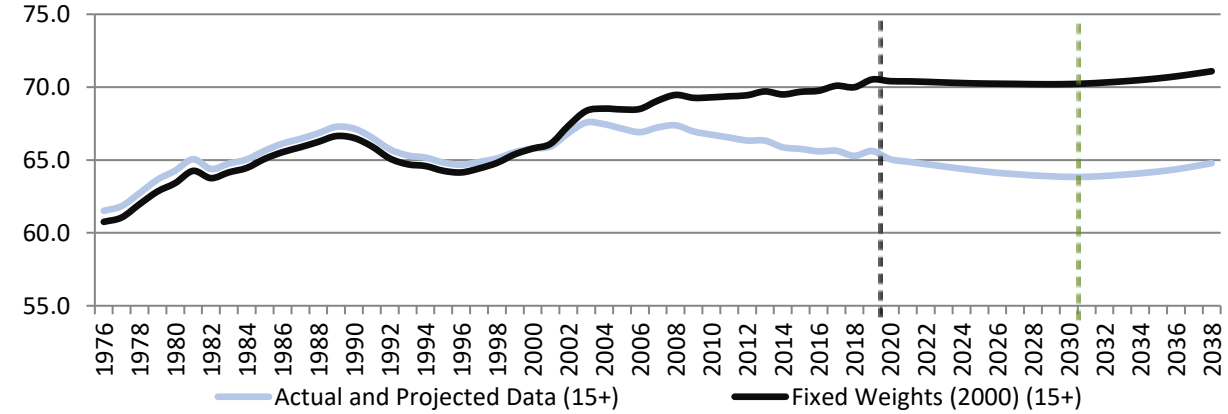
Source: Statistics Canada Table: 17-10-0057-01 (formerly CANSIM 052-0005), Table 14-10-0327-01, and CSLS Calculations

Projections for the overall labour participation rates (15+) are calculated using the M1 scenario working age population projections for 2019-2038. We based our projections of the overall participation rate using the projections for each age group individually) then using the weighted annual average of the evolving shares of the three age groups annually (calculated using Statistics Canada's official population projections for Canada) to project the overall participation rates in the 2019-2038 period. Using the methodology and assumptions discussed earlier, Chart 5 illustrates the underlying assumptions concerning the future path of participation rates in Canada for the three age groups.

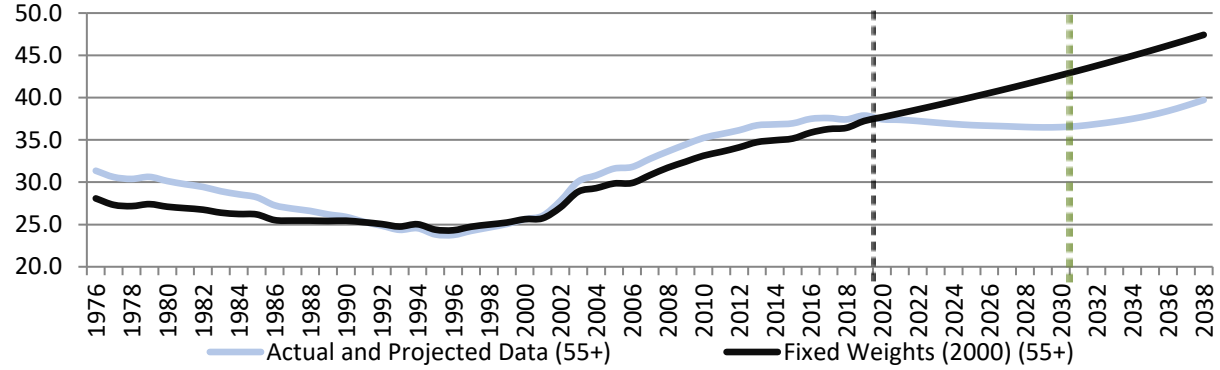
The Effect of Aging on the Participation Rate

Chart 6: The Effect of Aging on the Participation Rate, Canada, Per Cent, 1976-2038

Panel A: Overall (15+) Participation Rate



Panel B: 55+ Participation Rate



Source: Statistics Canada Table: 17-10-0057-01, Table 14-10-0327-01, and Authors Calculations

Chart 6, Panel A shows how the aggregate participation rate would evolve if the shares of the young, prime-age and older age groups in the working age population were fixed at their 2000 level while both the historical and projected participation rates for the three age groups change annually. As expected, the aggregate participation rate will increase under fixed weights, driven by increases in the participation rate for the older age group. In particular, the actual participation rate would increase from 65.8 per cent in 2000 to 70.5 per cent in 2019 to 71.1 per cent in 2038. However, after adjusting for the actual working age population shares, the participation rate slightly decreases from 65.8 per cent in 2000 to 65.6 per cent in 2019. It is also projected to fall to 64.8 per cent in 2038.

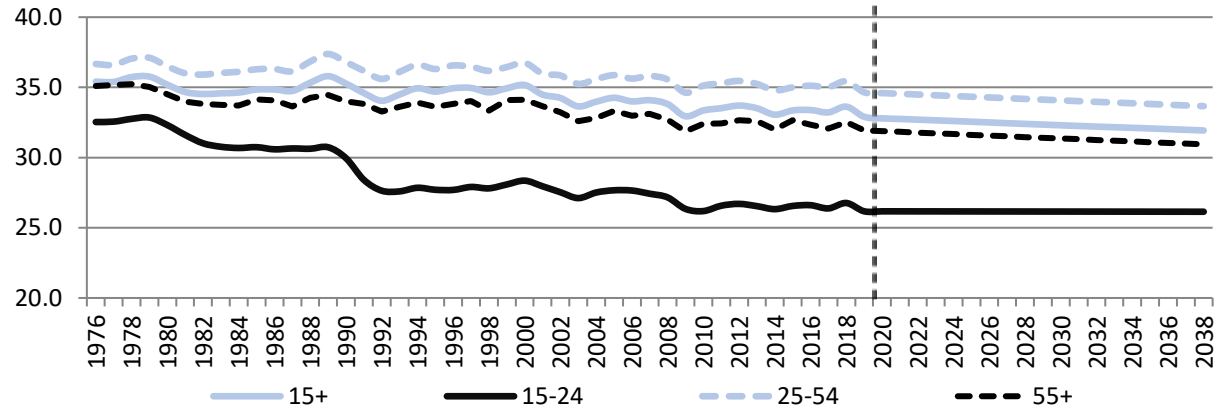
An interesting point to note is that when shares of the age groups remain constant at the 2000 level, the projected participation rate stagnates until 2033 until there is an uptake. Conversely, when taking into account the shares of the three age groups, the shift to the older age group exerts downward pressure on the overall participation rate, such that it reaches its lowest point in 2030 at 63.8 per cent. However, 2030 (dashed green line) also serves as an inflection point, where the downward trend of the overall participation rate reverses. This is explained by the increasing growth of the 55+ participation rate, ultimately offsetting the negative trend caused by the changing age structure.

Similarly, Chart 6, Panel B shows how the aggregate 55+ participation rate would evolve if the shares of the 55-59, 60-64, 65-69, and 70+ age groups remained fixed at their 2000 levels. Unsurprisingly, given that there would be no downward pressure caused by the increase of the 70+ age group shares, the participation rate would be 47.4 per cent in 2038 levels compared to 39.7 per cent if adjusted for the actual shares. It is important to note that as seen in Panel A, the decreasing participation rate of the 55+ age group ends in 2030, where it then rebounds. This implies that the weights of the shares, more specifically the 70+ age group share, were the reason for the decrease in both the 55+ participation rate and the overall 15+ participation rate.

C. Average Hours per Worker

In order to determine the future growth in total hours worked, we projected growth in average hours worked by age group and applied them to the projections for labour force growth by age group. In particular, average hours worked was assumed to grow in 2019-2038 at the same pace as in 2010-2019; that is, -0.01 per cent per year for the young age group, -0.15 per cent per year for the prime-age age group, and -0.17 per cent per year for the older age group. The sensitivity of the projections to the choice of the period for average hours worked growth is illustrated in the fifth section. These assumptions are illustrated in Chart 7.

Chart 7: Average Hours Worked per Worker by Age Group, Weekly Hours, Canada, 1976-2038



Source: Statistics Canada Table: 17-10-0057-01, and Authors Calculations

The decline in average hours worked has mostly tapered off since 2010. Looking more closely at the three age groups, the earlier decline was due to a shift from full-time to part-time work as more people in the 15-24 age group pursue higher education, resulting in lower average hours worked. Table 4 highlights the participation rate in education for five distinct years. From 2000 to 2019, Canada experiences a significant rise in the university participation rate, from 19 per cent to 30 per cent, or an increase by 11 percentage points. However, the 2000-2010 period fully realized the shift in the post-secondary participation rate, where many opt to remain or pursue postsecondary education thereby delaying their entry into the workforce. For instance, the 2000-2010 period experienced a growth rate of 2.85 per cent for postsecondary enrollment whereas the 2010-2019 period only experienced a growth rate of 0.15 per cent for post-secondary enrollment. This is important to note as students pursuing full-time studies will work part-time rather than full-time.

Table 4: Participation Rate in Education, 18-24 Years of Age, Canada, Per Cent

	1995 Level	2000 Level	2008 Level	2013 Level	2019 Level
	1	**2**	**3**	**4**	**5**
Total Participation Rate	42	43	44	47	48
Elementary/High School	9	9	7	6	5
College	15	15	14	16	14
University	**19**	**19**	**23**	**26**	**30**

Source: Statistics Canada Table: 37-10-0103-01
Note: This data series is in occasional frequency. There is a gap in data availability between 1995 to 2000, and 2000 to 2005. There is no data available before 1995.

In effect, given the increasing number of persons within the 15-24 age group pursuing post-secondary education, the proportion of workers in the 15-24 age group working in full-time arrangements compared to part-time arrangements fell. Initially, 56.4 per cent of persons in the 15-24 were employed full-time in 2000. However, that number fell to 51.5 per cent in 2010 and slightly fell to 51.1 per cent in 2019.

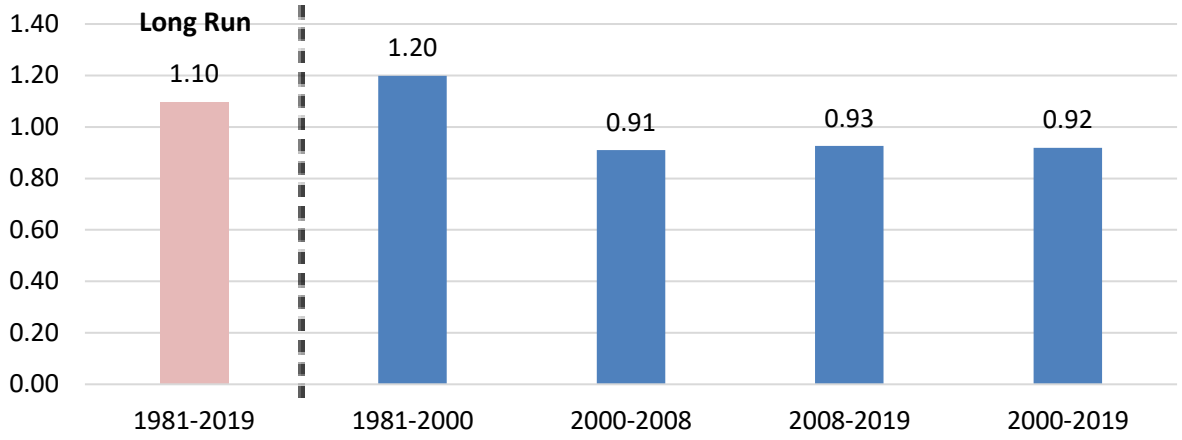
There is a similar pattern with respect to full-time and part-time work for the 25-54 and 55+ age groups, as the shifts from full-time to part-time arrangements for both these groups have stabilized since 2010, resulting in a relatively constant growth during the 2010-2019 period. Therefore, the extrapolation of average hours worked growth using a longer historical period will overestimate the decline in average hours worked growth, hence why the 2010-2019 period was used.

Growth in aggregate average hours worked is projected at -0.15 per cent per year for the 2019-2038 period, driven by falling average hours worked for every age group. This decline is expected to be driven by a continuation of the historical shift from full-time to part-time work, which is in large part attributable to the evolution of the industrial composition of the economy (i.e. the switch to jobs in the service sector and increased participation in the gig economy).

D. Labour Productivity

Compared to projecting future developments in total hours worked, projecting the future pace of labour productivity growth is considerably more difficult, as there is greater uncertainty about the future pace of technological advancements such as the advancements of artificial intelligence (AI) and automation.

Chart 8: Growth of Total Economy Output Per Hour in Canada, 1981-2019 (Compound Annual Growth Rate)



Source: Statistics Canada Table: 36-10-0480-01 and Authors Calculations

Labour productivity growth since 2000 has been somewhat weaker than in the 1980s and 1990s (0.92 per cent per year in 2000-2019 versus 1.20 per cent per year in 1981-2000). Chart 8 depicts the overall stability and slow down in the labour productivity growth. In both business cycles after the 2000s, labour productivity growth has been very similar, at 0.91 per cent in the 2000-2008 period and 0.93 per cent in the 2008-2019 period, which is both lower than labour productivity growth observed pre 2000s. Therefore, we assume that total economy labour productivity growth will be the same as the historical growth rates for the jurisdiction observed for the 2000-2019 period. The 2000-2019 period was chosen to project economic growth for three reasons:

- It is a fairly long period;
- It covers two complete business cycles, with one complete cycle in 2000-2008 and the second complete cycle in 2008-2019 and;
- It is believed that labour productivity trends in the last 19 years will be more representative of future productivity developments than those over a longer historical period (1981-2019), as since the 2000s, labour productivity growth was almost the same during the two business cycles.

It is also important to note that labour productivity growth was calculated using total economy (all industries) estimates of real GDP from the GDP by industry accounts for 2000-2019. In addition, the hours estimate used for these labour productivity calculations are total economy estimates of hours worked from the Canadian Productivity Accounts (CPA) instead of the Labour Force Survey (LFS), as the former generates more accurate estimates of labour productivity growth.

E. Summary of Assumptions

Table 5 summarizes the assumptions and methodology behind the various components of CSLS projections for economic growth for Canada.

Table 5: Summary of the Assumptions Behind the CSLS Projections for Economic Growth, Canada

Variable	Assumption
Labour productivity	We assume that total economy labour productivity growth will be the same as the historical growth rates observed over the 2000-2019 period, which is 0.92 per cent per year.
GDP deflator (inflation)	We assume that Canada will experience GDP deflator growth of 2.0 per cent per year.
Working age population	We employ the M1 scenario from Statistics Canada's official population projections for Canada.
Average hours worked	We assume that average hours worked decline at the same pace as in the in 2010-2019 (that is, -0.01 per cent for the 15-24 age group, -0.15 per cent for the 25-54 age group, and -0.17 per cent for the 55+ age group).
Participation rates	We assume that the participation rate for the 15-24 age group will increase at the same pace as in 2000-2019 (0.04 per cent). The participation rate for the 25-54 age group will remain at its 2019 level: and that the participation rate for the 55+ age group will increase over time, based on four five-year age groups (55-59, 60-64, 65-69, 70+) maintaining their 2013-2019 growth rates (0.54 per cent for 55-59, 1.14 per cent for 60-64, 2.10 per cent for 65-69 and 3.79 per cent for 70+). Overall, the 55+ participation growth rate is 0.25 per cent for the 2019-2038 period.

Note: It is assumed that all growth rates discussed in this summary are compound annual growth rates.

Table 6 presents estimates for the 2000-2019 period and projections for 2019-2038 for Canada for labour input growth (total hours), labour productivity growth, real output growth, and nominal GDP growth. These nominal GDP projections assume that Canada will experience inflation (defined as growth in the GDP deflator) of 2.0 per cent per annum over the 2019-2038 period. We assumed an inflation rate of 2.0 per cent because this is the midpoint of the 1-3 per cent CPI target range agreed upon by the Bank of Canada and the Minister of Finance, and we believe that this target will be maintained and broadly achieved until 2038.

Table 6: All Variables for Canada, (Compound Annual Per Cent Growth Rates)

	00-17	00-17 Revised	17-19	00-19	(00-19) – (00-17)	10-19	2017-2038 2018 Projection	2019-2038 Current Projection	(19-38) – (17-38)
	1	2	3	4	5 = 4-2	6	7	8	9 = 8-7
Real GDP	2.01	1.96	2.15	**1.98**	0.02	-	1.56	**1.71**	0.15
Labour Productivity	0.97	0.97	0.62	**0.92**	-0.05	-	0.97	**0.92**	-0.05
Total Hours Worked	1.03	1.03	1.52	**1.05**	-0.01	-	0.59	**0.79**	0.20
Nominal GDP	3.99	3.96	3.90	**3.95**	-0.01	-	3.59	**3.75**	0.16
GDP Deflator	1.94	1.94	1.71	**1.93**	0.01		2.00	**2.00**	0.00
Working Age Population	1.25	1.25	1.55	**1.28**	0.03	-	0.86	**1.02**	0.16
Participation Rate (15+)	0.00	-0.02	0.00	**-0.02**	0.00	-	-0.07	**-0.07**	0.00
15-24	-0.04	0.01	0.31	**0.04**	0.03	-	0.01	**0.04**	0.03
25-54	0.15	0.14	0.29	**0.15**	0.01	-	0.00	**0.00**	0.00
55+	2.33	2.29	0.40	**2.09**	-0.20	-	0.45	**0.25**	-0.20
Total Hours Worked (LFS)	0.93	0.93	1.43	**0.98**	0.05	-	0.59	**0.79**	0.20
Average Hours Worked (LFS)	-0.34	-0.34	-0.45	**-0.35**	-0.01	**-0.15**	-0.16	**-0.15**	0.01
15-24	-0.43	-0.43	-0.39	**-0.42**	0.01	**-0.01**	-0.50	**-0.01**	0.49
25-54	-0.28	-0.28	-0.53	**-0.31**	-0.03	**-0.15**	-0.12	**-0.15**	-0.03
55+	-0.36	-0.36	-0.22	**-0.35**	0.01	**-0.17**	-0.22	**-0.17**	0.05
Average Hours Worked (CPA)	-0.27		-0.38	**-0.28**	-0.01	**-0.15**	-	-	-

Source: Refer to Appendix Tables 2-12 for sources

II. CSLS Projections for Canada: 2019-2038

Section 2 of this report will present and discuss the CSLS projections for Canada in 2019-2038 and 2038-2050 using the methodology and assumptions stated in section one. Comparisons between the 2000-2019 period and 2019-2038 will be made, along with comparisons between the 2017-2038 period with the 2019-2038 period.

A. Comparisons of CSLS Projections for Canada: 2000-2019 versus 2019-2038

Table 7: Comparison of CSLS Projections for the 2000-2019 and 2019-2038 Periods for Canada (compound annual per cent growth rates)

	2000-2019	2019-2038	Period Change (percentage points)
	1	2	3 = 2 - 1
Real GDP	1.98	1.71	-0.27
Labour Productivity	0.92	0.92	0.00
Total Hours	1.05	0.79	-0.26
Working-age Population	1.28	1.02	-0.26
Participation Rate	-0.02	-0.07	-0.05
Average Hours	-0.28	-0.15	0.13

Source: Statistics Canada Table: 36-10-0480-01, Table 14-10-0327-01, Table: 17-10-0057-01 and Authors Calculations

Note: Estimates of labour productivity, total hours, and average hours for the 2000-2019 period were collected from the CPA. The participation rate and working age population estimates for the 2000-2019 period were collected from the LFS.

The CSLS projects real GDP growth of 1.71 per cent annually over the 2019-2038 period, a decrease of 0.27 percentage points compared to the average annual rate of 1.98 percent growth observed over that 2000-2019 period. While labour productivity growth remains the same for both periods at 0.92 per cent, there was a decrease in hours worked growth of -0.26 per cent, from 1.05 in 2000-2019 to 0.79 per cent for 2019-2038.

In particular, changes in the growth of the working age population were the main factor in the decrease in hours worked growth. 1.28 per cent growth annually was observed in the 2000-2019 period while being only 1.02 per cent growth for the 2019-2038 period, a decrease of -0.26 percentage points. The major reason being the decline in growth of the 55+ population, where the 2000-2019 period experiences an average annual growth of 3.16 per cent compared to 1.46 per cent growth in the 2019-2038 period.

In addition, growth in the labour force participation rate experiences a larger decrease, from -0.02 per cent growth in 2000-2019, to -0.07 per cent growth for the 2019-2038 period. The compositional changes in the working age population, where the increased shares of the 55+ age group are the main factor in the decrease in growth.

The decline in average hours growth decelerated from -0.28 per cent growth for the 2000-2019 period to -0.15 per cent growth for the 2019-2038 period. The decline in average hours worked growth has mostly tapered off since 2010.

B. Comparison of CSLS Projections for Canada: 2019-2038 versus 2017-2038

Given that the time periods are different, the differences between projections for the 2019-2038 period and 2017-2038 periods for Canada can mainly be attributed to changes in assumptions. This section of the report compares these two sets of projections (Table 9) and the reasons for the differences. Appendix Tables 1-14 in the detailed tables accompanying this report provide estimates of the growth rates for all variables in 2000-17, 2017-19, 2010-19 for hours worked and 2000-2019 from actual data as well as the projections from the 2018 report for 2017-2038 and the new projections for 2019-2038 for all variables.

There are several reasons for changes in the projections between 2017-2038 and 2019-2038.

- First, the addition of two years of data for 2018 and 2019 to the post-2000 period can change the historical trend between the 2000-2017 and 2000-2019 periods.

- Second, data revisions to the 2000-2017 period may also have changed growth rates in 2000-2017, and hence contributed to differences between the 2000-2017 and 2000-2019 periods.

- Third, the dropping of 2017 and 2018 from the projection period may have changed growth rates between 2017-2038 and 2019-2038 for the working age population, which unlike other variables, is based on a Statistics Canada projection and not the assumption related to the extrapolations of the historical period trends.

- Most importantly, the Statistics Canada population projections used in the 2018 report were made in 2015. The current Statistics Canada population projections have been updated for 2020, resulting in changes in the working age population projections.

Table 8: Comparison of CSLS Projections for the 2017-2038 and 2019-2038 Periods for Canada (compound annual per cent growth rates)

	2017-2038	2019-2038	Period Change (percentage points)
	1	2	3 = 2 - 1
Real GDP	1.56	1.71	0.15
Labour Productivity	0.97	0.92	-0.05
Total Hours	0.59	0.79	0.20
Working-age Population	0.86	1.02	0.16
Participation Rate	-0.07	-0.07	0.00
Average Hours	-0.16	-0.15	0.01

Source: Column 1: 2017-2038 projections from Sharpe and Iglesias (2018); Column 2: CSLS projections based on Statistics Canada data

The CSLS projects real GDP in Canada to increase at an average annual rate of 1.71 per cent over the 2019-2038 period, an increase of 0.15 percentage points compared to the average annual rate of 1.56 percent growth shown in the 2017-2038 projections. Given that the assumption of a 2.00 per cent GDP deflator remained the same across both projections, projected nominal GDP growth increased from 3.59 per cent to 3.75 per cent growth for the 2019-2038 period. As noted earlier, real GDP comprises of two principal components: labour productivity and total hours worked, with that latter determined by working age population growth, participation rate growth, and average hours growth. Table 8 depicts the projections for these five variables for the 2017-2038 and 2019-2038 periods for Canada, with differences between periods in order to highlight the reasons for the change to projections for the 2019-2038 period.

Despite a decrease in 0.05 percentage points in labour productivity growth between the two projections, the projected real GDP growth increased by 0.15 percentage points. The key driver for the increase was the increase in growth of hours worked from 0.20 percentage points from 0.59 per cent growth for the 2017-2038 period to 0.79 per cent growth for 2019-2038.

In particular, the working age population growth increased significantly by 0.16 percentage points, from 0.86 per cent growth in the 2017-2038 projection to 1.02 per cent growth for 2019-2038. The growth is completely attributed to a projected rise in immigrants to Canada due to increases in immigration targets. Statistics Canada re-assessed the assumptions related to immigration. The 2018 report used an older population projection from Statistics Canada "Population Projections for Canada (2013 to 2063), Provinces and Territories (2013 to 2038)". For instance, the current projection has a net international immigration rate for the medium growth scenario of 0.85 per cent in 2019, reaching a high of 0.91 per cent, compared to 0.76 per cent in 2019 for the old projections used in the 2018 report.

In addition, the average life expectancy is also projected to increase, meaning fewer deaths will drive down the working age population, thereby continuing the high growth of this subset of the working age population. Aggregating the changes in the working age population illustrates the 0.16 percentage points difference between the two projections.

In contrast, the overall labour force participation growth remained the same in both projections at -0.07 per cent growth for both the 2017-2038 and 2019-2038 period, despite the projected annual increases in the participation rate for the 55+ age group of 0.25 per cent and the projected increases in the participation rate for the 15-24 age group of 0.04 per cent. The increasing participation rate of the 55+ age group was not enough to offset the downward pressure created by the increasing shares of the older age group and decreasing shares of the prime-age group. It is important to note that while both the 15-24 and 25-54 age groups did not experience a change in their participation rate growth projections, the 55+ age group experiences a 0.20 per cent decrease from 0.45 per cent for 2017-2038 to 0.25 per cent in 2019-2038.

Third, average hours worked had a slight change, going from -0.16 per cent growth in the 2017-2038 period to -0.15 per cent growth in 2019-2038. The 0.01 percentage point change is only a minor difference caused mostly by the changing methodology between the two reports. Particularly, the 15-24 age group average hours worked had a significant change from the projected -0.50 per cent growth for the 2017-2038 period to -0.01 per cent growth for the 2019-2038 period. Previously, the 2018 report used the 1976-2017 compound annual growth rates for its projection. As discussed in the methodology section, the main cause of this decline was due to shifts from full-time to part-time arrangements as more people in the 15-24 age group pursue higher education.

Given the increasing number of persons within the 15-24 age group pursuing post-secondary education, the proportion of workers in the 15-24 age group working in full-time arrangements compared to part-time arrangements fell. Initially, 78.9 per cent of persons in the 15-24 were employed full-time in 1976. However, that number fell to 43.2 per cent in 2010 and remained at 43.4 per cent in 2019 as the majority of 15-24 workers opted in for part-time employment.[10] The proportion of full-time workers and part-time workers has effectively stabilized since 2010. Therefore, -0.50 per cent growth rate projected for the 2017-2038 period is mostly exaggerated and too great of decline in average hours worked and should not be the norm in future projections as its more likely that the decline in average hours for the 15-24 age group will plateau.

On the other hand, there was a 0.03 percentage points decrease for the average hours worked of the prime age group from -0.12 per cent growth for the 2017-2038 period to -0.15 per cent growth for the 2019-2038 period. In contrast, the behavioural changes of the 55+ age group with respect to labour increased the projections of growth. The projected average hours worked growth for the prime age group decrease while the opposite remains true for the 55+ age group, experiencing a 0.05 percentage points increase from -0.22 per cent growth annually to -0.17 per cent growth.

C. Projections from 2038 to 2050

While the focus of this report is for 2019-2038 projections, this section of the report will investigate extending the previous projections from 2038 to 2050 for Canada. The year 2038 is of particular importance as it is the year where changes in the shares of the four age groups within the 55+ age group stabilize (Chart 4), while the participation rates of the 55+ four sub-age

[10] Source: Statistics Canada, Table: 14-10-0327-03

groups experience rapid growth. Chart 6 Panel A and B both depict the reversal of the decline in participation. As shares of the four age groups within the older age group remain the same, the participation rates of each respective age group hold more significance. The continued assumption that the participation rate growth experienced at 2013-2019 for the 55+ four sub-age groups persist to 2050 creates interesting results, as it gives the opportunity of the 55+ age group to push against the downward pressure caused by the evolving age shares.

Table 9: Comparison of CSLS Projections for the 2019-2038 and 2019-2050 Periods for Canada (compound annual per cent growth rates)

	2019-2038	**2019-2050**	**2038-2050**	**(19-50) – (19-38)**	**(38-50) – (19-38)**
	1	2	3	4 = 2 - 1	5 = 3 - 1
Real GDP	1.71	1.78	1.89	0.07	0.18
Labour Productivity	0.92	0.92	0.92	0.00	0.00
Total Hours	0.79	0.85	0.97	0.06	0.18
Working-age Population	1.02	0.89	0.69	-0.13	-0.33
Participation Rate	-0.07	0.11	0.44	0.18	0.51
Average Hours	-0.15	-0.15	-0.15	0.00	0.00

Source: Refer to Appendix Tables 2-12

The difference between the 2019-2038 period and the 2019-2050 period is significant due to the growth projected in the 2038-2050 period. Real GDP growth grows from 1.71 per cent to 1.89 per cent in 2038-2050 despite no changes in labour productivity, due to a significant increase in hours worked of 0.18 percentage points. While the working age population growth fell significantly from 1.02 per cent in the 2019-2038 period to 0.69 per cent growth in the 2038-2050 period, total hours worked experienced a boost from 0.79 per cent growth in 2019-2038 to 0.97 percent growth in 2038-2050, attributed by the significant growth in the participation growth rate of the 55+ age group. Table 10 will decompose the 55+ age group by the shares of the four age groups.

Table 10: Evolving Shares of 55+ by Age Groups, Canada, 2000-2050 (Per Cent)

	55+ (Relative to WAP)	55-59 (Relative to 55+)	60-64 (Relative to 55+)	65-69 (Relative to 55+)	55-69 (Relative to 55+)	70+ (Relative to 55+)
	1	2	3	4		5
2000 Level	26.3	24.2	19.5	17.7	61.3	38.7
2008 Level	30.4	26.0	21.8	16.2	64	36.0
2013 Level	33.6	25.7	21.6	17.8	65.1	34.9
2019 Level	37.3	23.2	21.2	17.7	62.1	37.9
2038 Level	41.0	17.0	15.4	14.9	47.3	52.7
2050 Level	42.7	17.1	16.3	15.2	48.7	51.3

Source: Statistics Canada Table: 17-10-0057-01, Table 14-10-0327-01, and CSLS Calculations
Note: Estimates for the 2000-2019 period are based on LFS data. Table 3 Panel B is based on ADE data.

The growth of the 55+ participation rate from 2019 to 2038 (19 years) was slow, with a 1.8 percentage points increase, despite the significant increases in the participation rates for the 55-59 age group (83.5 per cent or 8.1 percentage points increase), 60-64 (69.6 per cent or 21.9 percentage points increase), 65-69 (41.8 per cent or 20.5 percentage points increase) and 70+ (16.2 per cent or 10.9 percentage points increase) age groups. However, from 2038 to 2050 (12 years), the 55+ age group experiences a 9.8 percentage points increase, a major difference.

There are several reasons that this change was caused in the 2038-2050 period. Looking at Table 10 depicts the change in shares of the 55+ age group. One figure that attracts attention is the changes in shares from 2019 to 2038, then 2038 to 2050. In particular, the 55-59 age group experiences a significant drop from a 23.2 per cent share of the 55+ age group to 17 per cent share in 2038 while the opposite occurs for the 70+ age group, experiencing a 14.8 percentage points increase of 37.9 per cent in 2019 to 52.7 in 2038. Historically, given that the 70+ group has the lowest participation rates among all age groups, the increasing 70+ age group to bring down the overall participation rate of the 55+ age group as it is more than half of the share of the 55+ age group. Yet, the 70+ age group also has the highest participation rate growth of all age groups. After 2038, the shares of the four age groups in the older age group stabilize, which allows the participation growth rate of the respective age group in becoming the main driving factor in the growth rate of the 55+ participation rate.

As discussed earlier in section one, the behavioral changes of the 55+ age group due to flexibility part-time arrangements, shifts from blue collared work to white collared work, and higher education attainment delaying entry in the workforce and increases in employment opportunities, we can make a reasonable assumption that there is ample room for growth for the four distinct age groups in the 55+ age group, especially within the 70+ age group. At the 2019 level, the 70+ age group participation rate is 8.0 per cent. That number becomes 16.2 per cent at the 2038 level and 25.3 per cent at the 2050 level. In addition, the participation rate of the 65-69 age group is 28.2 per cent in the 2019 level to 41.8 per cent at the 2038 level and 53.6 per cent at the 2050 level. The potential for growth of these age groups with historically low participation rates exists. Therefore, under the guise that the historical 2013-2019 growth rates holds until 2050, along with the ever-changing age structure of Canada's population, the 55+ age group will play a stronger role in the future of Canada's labour force, and by extension, Canada's economy.

III. CSLS Projections for the Provinces: 2019-2038

A. Methodology for Provincial Projections

This section of the report will discuss the projections for the provinces for the 2019-2038 period. While the methodology used for Canada's projections is largely the same for the provinces, there are some slight variations.

- Firstly, we will assume that labour productivity will be the same as the historical growth rates observed over the 2000-2019 period for each province respectively.
- The working age population will follow assumptions made for each province. Table 11 will highlight the key assumptions pertaining to Statistics Canada's population projections for the provinces.[11]
- The assumptions for the three age groups made for future growth in both the average hours worked and labour force participation rate for the national level will be applied at the provincial level, such that the provinces follow the same growth rates observed at the national level.

Table 11: Summary of Key Statistics Canada's Population Projections Assumptions (M1 Scenario), Provinces, Per Cent

Region	Historical			Projected (2038)		
	Interprovincial Migration (1991-2016)	Fertility Rate (2019)	Distribution of Total Immigrants (2019)	Interprovincial Migration	Fertility Rate	Distribution of Total Immigrants
Newfoundland and Labrador	-0.49	1.35	0.35	-0.49	1.38	0.31
Prince Edward Island	-0.10	1.51	0.57	-0.10	1.54	0.54
Nova Scotia	-0.14	1.42	1.52	-0.14	1.45	1.27
New Brunswick	-0.19	1.54	1.22	-0.19	1.57	1.05
Quebec	-0.13	1.60	14.73	-0.13	1.63	16.77
Ontario	-0.03	1.48	45.04	-0.03	1.51	41.89
Manitoba	-0.39	1.87	4.21	-0.39	1.90	4.78
Saskatchewan	-0.30	1.95	4.73	-0.30	1.99	4.4
Alberta	0.53	1.64	13.39	0.53	1.67	14.67
British Columbia	0.24	1.32	14.02	0.24	1.34	14.12

Source: "Population Projections for Canada (2018 to 2068), Provinces and Territories (2018 to 2043)" Statistics Canada

[11] Table 11 does not include assumptions related to life expectancy. For a detailed breakdown on Statistics Canada's population projection assumptions for the provinces, see Online Appendix Tables 1A-1D

B. Summary of Assumptions for the Provinces

Table 12: Summary of the Assumptions Behind the CSLS Projections for Economic Growth, All Provinces

Variable	Assumption
Labour productivity	We assume that total economy labour productivity growth will be the same as the historical growth rates observed over the 2000-2019 period for each province respectively
GDP deflator (inflation)	We assume that all the provinces will experience GDP deflator growth of 2.0 per cent per year.
Working age population	We employ the M1 scenario from Statistics Canada's official population projections for Canada and the provinces.
Average hours worked	We assume that average hours worked decline for all the provinces at the same pace nationally as in 2010-2019 (that is, -0.01 per cent for the 15-24 age group, -0.15 per cent for the 25-54 age group, and -0.17 per cent for the 55+ age group).
Participation rates	We assume that the participation rate for all the provinces by age group will follow the annual growth rates observed at the national level. Such as, the 15-24 age group will increase at the same pace as in 2000-2019 (0.04 per cent). The participation rate for the 25-54 age group will remain at its 2019 level for each province respectively: and the participation rate for the 55+ age group will increase over time, based on five-year four age groups (55-59, 60-64, 65-69, 70+) maintaining their 2013-2019 compound annual growth rates. That is 0.54 per cent for 55-59, 1.14 per cent for 60-64, 2.10 per cent for 65-69 and 3.79 per cent for 70+. This results in a 0.25 per cent growth for the 55+ age group.

Table 13: Long-term Growth in Hours Worked, Labour Productivity and Real GDP, Provinces, 2000-2019 and 2019-2038 (Compound Annual Per Cent Growth Rates)

Region	Indicator	2000-2019 (Historical)	2019-2038 (Projected)	(2019-2038) – (2000-2019)
		1	2	3 = 2 - 1
Newfoundland and Labrador	**Real GDP**	**2.01**	**0.91**	**-1.00**
	Labour Productivity	1.52	1.52	0.00
	Total Hours Worked	0.49	-0.60	-1.09
	Working-age Population	0.20	-0.26	-0.46
	Participation Rate	0.24	-0.15	-0.39
	Average Hours	-0.14	-0.15	-0.01
Prince Edward Island	**Real GDP**	**2.01**	**2.23**	**0.22**
	Labour Productivity	1.18	1.18	0.00
	Total Hours Worked	0.82	1.05	0.23
	Working-age Population	1.05	1.26	0.21
	Participation Rate	-0.02	0.06	0.08
	Average Hours	0.09	-0.15	-0.24
Nova Scotia	**Real GDP**	**1.36**	**1.01**	**-0.35**
	Labour Productivity	1.06	1.06	0.00
	Total Hours Worked	0.30	-0.05	-0.35
	Working-age Population	0.46	0.26	-0.20
	Participation Rate	0.05	-0.17	-0.22
	Average Hours	-0.23	-0.15	0.08
New Brunswick	**Real GDP**	**1.12**	**0.94**	**-0.18**
	Labour Productivity	1.03	1.03	0.00
	Total Hours Worked	0.09	-0.08	-0.17
	Working-age Population	0.38	0.25	-0.13
	Participation Rate	-0.04	-0.20	-0.16
	Average Hours	-0.20	-0.15	0.05
Quebec	**Real GDP**	**1.75**	**1.12**	**-0.63**
	Labour Productivity	0.83	0.83	0.00
	Total Hours Worked	0.91	0.28	-0.63
	Working-age Population	0.91	0.57	-0.34
	Participation Rate	0.15	-0.13	-0.28
	Average Hours	-0.15	-0.15	0.00
Ontario	**Real GDP**	**1.82**	**1.68**	**-0.14**
	Labour Productivity	0.77	0.77	0.00
	Total Hours Worked	1.04	0.91	-0.13
	Working-age Population	1.43	1.09	-0.34
	Participation Rate	-0.17	-0.05	0.12
	Average Hours	-0.11	-0.15	-0.04
Manitoba	**Real GDP**	**2.10**	**2.56**	**0.46**
	Labour Productivity	1.49	1.49	0.00
	Total Hours Worked	0.60	1.05	0.45
	Working-age Population	1.03	1.08	0.05

	Participation Rate	-0.10	0.05	0.15
	Average Hours	-0.19	-0.15	0.04
Saskatchewan	**Real GDP**	**1.82**	**2.59**	**0.77**
	Labour Productivity	1.04	1.04	0.00
	Total Hours Worked	0.77	1.53	0.76
	Working-age Population	0.89	1.41	0.52
	Participation Rate	0.13	0.16	0.03
	Average Hours	-0.17	-0.15	0.02
Alberta	**Real GDP**	**2.46**	**2.54**	**0.08**
	Labour Productivity	0.68	0.68	0.00
	Total Hours Worked	1.77	1.84	0.07
	Working-age Population	2.15	1.92	-0.23
	Participation Rate	-0.10	0.00	0.10
	Average Hours	-0.37	-0.15	0.22
British Columbia	**Real GDP**	**2.62**	**2.15**	**-0.47**
	Labour Productivity	1.35	1.35	0.00
	Total Hours Worked	1.25	0.79	-0.46
	Working-age Population	1.48	1.01	-0.47
	Participation Rate	0.10	-0.06	-0.16
	Average Hours	-0.09	-0.15	-0.06

Source: See Online Appendix Tables 1-14

Note: The decompositions for the indicators of total hours worked may not add up completely. This may be due to rounding errors or differences due to using a mix of data sources including the CPA and LFS.

C. Provincial Projections: 2019-2038

This section will discuss in detail the changes of the historical growth rates for the 2000-2019 period to the projected growth rates for the 2019-2038 period. It is important to note that the projected labour productivity growth for each province remains the same as the growth rate for the 2000-2019 period. In other words, changes in projected real GDP growth are due to changes in hours worked growth, which in turn is due to changes in growth of the working age population, labour force participation rate and average hours worked.

Newfoundland and Labrador was the most notable province in that it had the lowest projected total hours worked growth in all of the provinces at -0.60 per cent growth for the 2019-2038 period, which resulted in the lowest projected real GDP growth of all provinces at 0.91 per cent for the 2019-2038 period. All of the Atlantic provinces except for Prince Edward Island are projected to experience negative growth in hours worked. Prince Edward Island is the only Atlantic province that benefits from a positive migration rate, allowing it to be the only Atlantic province to have a projected real GDP growth that is higher compared to the national average.

All western provinces except for British Columbia are projected to experience an increase in real GDP growth compared to the 2000-2019 period for the 2019-2038 period: Manitoba (2.10 per cent to 2.56 per cent), Saskatchewan (1.82 per cent to 2.59 per cent), and Alberta (2.46 per cent to 2.54 per cent). The reason behind British Columbia's real GDP slowdown is due to a decrease in the growth of the working age population, from 1.48 per cent in the 2000-2019 period, to 1.01 per cent for the projection period.

Another point to highlight is Alberta's real GDP growth. Despite having the highest projected hours worked growth in all of Canada (1.84 per cent), it has the lowest projected labour productivity growth in all of Canada as well (0.68 per cent). Despite the large gap between the two, Alberta still manages to increase its real GDP growth during the projection period.

The following subsections discuss the projections for each province in detail.

i) Newfoundland and Labrador

Newfoundland and Labrador is projected to have the largest decrease in real GDP growth compared to the 2000-2019 period out of all the provinces. Although Newfoundland and Labrador experiences a real GDP growth of 2.01 per cent annually during the 2000-2019 period. Real GDP growth falls to a measly 0.91 per cent growth annually during 2019-2038, decreasing by 1.10 percentage points.

In particular, there was a significant decrease in total hours worked from its historical growth rate of 0.49 per cent for the 2000-2019 period to -0.60 per cent growth for the 2019-2038 period, or a -1.09 percentage points decrease. Consequently, Newfoundland has the lowest projected hours worked growth in all of the provinces. During the projection period, Newfoundland has the lowest net-migration rate of all the provinces at -0.49 per cent, as people, primarily in the younger age groups leave the province to other provinces seeking better employment opportunities. Consequently, Newfoundland and Labrador's population age

structure is projected to evolve such that the older age group surpasses all other age groups in population size.

In contrast, the projected labour productivity growth of 1.52 per cent is the highest among all of Canada due to the mining and oil and gas extraction industry. Despite having the highest labour productivity growth in all of Canada, it falls short to offset the negative effect caused by the projected growth in hours worked as projected real GDP growth is the lowest in all of all Canada (0.91 per cent).

ii) Prince Edward Island

Prince Edward Island (PEI) is projected to experience real GDP growth of 2.23 per cent growth for the 2019-2038 period, or a 0.22 percentage points increase from its 2.01 per cent growth during the 2000-2019 period. More specifically, hours worked growth increased from the historical 0.82 per cent annual growth during 2000-2019 to 1.05 per cent growth annually for the 2019-2038 period, or an increase of 0.23 percentage points.

The increase in hours worked growth is due to an increase in the working age population growth from 1.05 per cent 2000-2019 to 1.26 per cent in 2019-2038, or 0.21 percentage points. However, average hours worked decreased by -0.24 percentage points from 0.09 per cent growth for the 2000-2019 period to -0.15 per cent growth for 2019-2038. Also, the labour force participation rate increase from -0.02 per cent growth in 2000-2019 to 0.06 per cent growth for the projection period.

One point to note is that Prince Edward Island is the only Atlantic province in Canada projected to have a positive hours worked growth, attributed by strong projected population growth in the 15-24 age group and 25-54 age groups (0.98 per cent and 0.86 per cent), being the only Atlantic province to have positive population growth in these age groups. This is due to increased international immigration in the province, receiving 36 per cent more immigrants in proportion to its population compared to the rest of the provinces during the projection period. Prince Edward Island is the only Atlantic province to project higher real GDP growth compared to the national average.

iii) Nova Scotia

Nova Scotia's real GDP growth falls from 1.36 per cent growth it experienced during the 2000-2019 period to 1.01 per cent growth for the 2019-2038 period, or a -0.35 percentage points decrease. This fall was due to a decline compared to its hours worked growth from 0.30 per cent growth in 2000-2019 to -0.05 per cent growth for 2019-2038 period,

Growth in the working age population falls from 0.46 per cent in 2000-2019 to 0.26 per cent in 2019-2038, or a -0.20 percentage points increase. In addition, growth in labour force participation rate decreases from 0.05 per cent in 2000-2019 to -0.17 per cent in 2019-2038, or a 0.22 percentage points decrease. Conversely, average hours worked increases from its growth of -0.30 per cent annually to -0.15 per cent growth for the 2019-2038 period, or a 0.15 percentage points increase.

iv) New Brunswick

New Brunswick's real GDP growth falls from its growth experienced during 2000-2019 of 1.12 per cent to 0.94 per cent annually for the 2019-2038 period, or a -0.18 percentage points decrease. Hours worked growth fell from 0.03 per cent in 2000-2019 to -0.08 per cent for the projected period or -0.11 percentage points. More specifically, projected growth in both the working age population (0.38 per cent for 2000-2019 and 0.25 per cent for 2019-2038) and labour force participation rate (-0.04 per cent for 2000-2019 and -0.20 per cent for 2019-2038) decline from its historical rates by -0.13 percentage points and -0.16 percentage points respectively. However, changes in projected average hours worked offsets somewhat the decline in the other two components, increasing by 0.05 percentage points (-0.20 per cent for 2000-2019 and -0.15 per cent for 2019-2038)

Increases in the net international immigration allow New Brunswick to increase its working age population growth by 0.23 percentage points, from 0.02 per cent growth for 2017-2038 to 0.23 per cent growth for 2019-2038. However, Nova Scotia, Newfoundland and Labrador along with New Brunswick need to follow PEI's footsteps in order to combat woeful projected economic performance in the Atlantic

v) Quebec

Quebec, as the second most populous province in Canada, has a sizeable impact on Canada's economic outlook. Quebec has a projected real GDP growth of 1.12 per cent, 0.63 percentage points lower compared to 2000-2019 (1.75 per cent). Hours worked had a sizeable fall, from 0.91 per cent growth for the 2000-2019 period to 0.28 per cent growth for the 2019-2038 period, or a 0.63 percentage points decrease. Consequently, projected real GDP

The main culprit for the large decrease in hours worked growth is due to a significant fall in working age population growth from 0.91 per cent in 2000-2019 to 0.57 per cent for the projection period. In addition, growth in the labour force participation rate fell from 0.15 per cent historically to -0.13 per cent growth for the projection period.

vi) Ontario

The largest province population wise, accounting for 39 per cent of Canada's population, is Ontario. Therefore, Ontario's economic projections will have a larger influence on Canada's economic outlook. Ontario experiences a slowdown in real GDP growth from 1.82 per cent in 2000-2019 to 1.68 per cent during the projection period, or a 0.14 percentage points decrease compared to the 2000-2019 growth rate or 1.82 per cent. In particular, hours worked growth is projected to decline by 0.13 percentage points from 1.04 per cent in 2000-2019 to 0.91 per cent in 2019-2038.

Canada and Ontario experience similar real GDP growth of 1.71 per cent and 1.68 per cent respectively during the projection period. While Canada experiences a projected labour productivity growth of 0.92 per cent, Ontario experiences a weaker 0.77 per cent growth rate for the 2019-2038 period, or a 0.15 percentage points difference, only beaten by Alberta (0.68 per cent) as the worst performer in labour productivity growth in Canada. Despite Ontario's poor

labour productivity growth, the difference is offset by a strong increase in total hours worked, attributed by a greater increase in the working age population relative to the rest of Canada.

The effects of international immigration allow Ontario to experience one of the higher working age population growth rates among all provinces, only surpassed by Alberta (1.92 per cent), and Saskatchewan (1.41 per cent). Consequently, Ontario experiences a higher working age population growth rate compared to Canada's of 1.09 per cent growth and 1.02 per cent growth, respectively. Moreover, there is a minor difference in participation rate growth for Canada is -0.07 per cent growth compared to Ontario's -0.05 per cent growth. The difference can largely be explained by the phenomena described earlier, where the continued international migration shifts Ontario to a younger age structure compared to the rest of Canada.

vii) Manitoba

Manitoba experiences an increase in projected real GDP of 2.56 per cent for the 2019-2038 period from its historical growth of 2.10 per cent for 2000-2019, or a 0.46 percentage points increase, beating the national average. This increase was due to an increase in both projected growth of labour force participation rate and average hours worked of 0.15 percentage points and 0.16 percentage points respectively.

In addition, Manitoba benefits from higher growth rates among the younger age group and prime age groups, due to having the highest projected international migratory rates in Canada. Moreover, given that those that immigrate into Canada will be younger, the province will equally experience high fertility rates. Manitoba also has a younger population compared to Canada as a whole, as the shares of the age groups barely change with the 55+ age group having a 34.9 per cent share in 2019 and 36.7 per cent of the share in 2038. In contrast, Canada 55+ age group held a share of 36.8 per cent at 2019 levels and a 41.0 per cent share in 2038 levels.

Furthermore, Manitoba has one of the highest labour productivity growth in Canada, only beaten by Prince Edward Island, at 1.49 per cent. As a result, Manitoba experiences the second highest projected real GDP growth in Canada at 2.56 per cent growth.

viii) Saskatchewan

Saskatchewan experiences the largest increase of projected real GDP growth among all the provinces, from 1.82 per cent growth annually during the 2000-2019 period to 2.59 per cent growth during the projection period. This is attributed to a significant increase in hours worked growth of 1.53 per cent during the projection period compared to its historical growth of 0.77 per cent, or a 0.66 per cent increase.

Similar to Manitoba, Saskatchewan receives a higher proportion of the distribution of immigrants relative to its population which offsets the negative interprovincial migration rate. Consequently, Saskatchewan is compositionally younger compared to the rest of Canada. Hence, Saskatchewan experiences the second higher projected hours worked growth in all of Canada at 1.53 per cent as the working age population grows from its historical 0.89 per cent growth to 1.41 per cent growth during the projection period.

ix) Alberta

Alberta experiences a slight increase in real GDP growth in the projection period compared to the growth rate observed during 2000-2019, increasing from 2.46 per cent to 2.54 per cent, or a 0.08 percentage points increase. Alberta's case among all of the Canadian provinces is worthy to note. Although Alberta has the highest projected hours worked growth in all of Canada (1.84 per cent), it has the lowest projected labour productivity growth in all of Canada as well (0.68 per cent).

On the one hand, Alberta is projected to be the fastest growing province in all of Canada with respect to hours worked growth, which is indicative of its working age population growth of 1.92 per cent for the 2019-2038 period. More specifically, the young age group is projected to grow 1.74 per cent while the prime age group is expected to grow 1.59 per cent for the 2019-2038 period, the highest in all of Canada. Alberta benefits both from positive net international migration and the highest net interprovincial migration rate out of all the provinces, exhibiting the fastest growing population in Canada. Moreover, Alberta experiences only a minor shift in shares due to an aging population, but not to the same extent as the rest of Canada, where 68.4 per cent of the population is aged 15-54 in 2019 and 64.7 per cent of the population is age 15-54 in 2038. Most of the population is still in the age prime to work, resulting in the highest projected hours worked in Canada, even surpassing the 1.50 per cent hours worked growth projected for the 2017-2038 period, projecting a 1.84 per cent annual growth for the 2019-2038 period.

On the other hand, Alberta has the lowest projected labour productivity growth in all of Canada (0.68 per cent), mostly indicative of its reliance on the oil and gas extraction sector. The sector is subjected to economic and political volatility. With growing sentiments for greener, renewable energy sources along with political barriers impeding the growth of this sector, the future potential of productivity growth in the oil and gas extraction sector are likely to be poor. Therefore, a shift in Alberta's economy to be less reliant on this declining sector is a must if it aims to increase its labour productivity growth in the future.

x) British Columbia

British Columbia experiences a slowdown in real GDP growth from having the highest real GDP growth of the provinces of 2.62 per cent growth observed in the 2000-2019 period to 2.15 per cent growth in the 2019-2038 period, or a 0.47 percentage points decrease. The decrease from its historical highs was due to a decrease in the historical growth of the working age population from 1.48 per cent to 1.01 per cent for the current projection period. Regardless, British Columbia projected real GDP growth is higher compared to the national average.

Despite having both a positive net international migration and the positive net interprovincial migration rate, it is not enough to sustain the high working age population growth it experienced during the 2000-2019 period.

IV. Risks

The economic projections rely on a number of assumptions pertaining to the path of future growth of labour productivity, labour force participation rate, and average hours worked. Therefore, the projections can be subjected to considerable uncertainty and should be interpreted with caution. This section will review the potential risks of the projections.

Labour Productivity Growth

One important assumption made regarding the future path of real GDP growth is the assumptions on labour productivity growth. In particular, we assumed that labour productivity growth will follow its growth rate observed during the 2000-2019 period. While labour productivity growth has mostly stabilized since the 2000s, it is not out of the realm of possibility that Canada can experience a potential labour productivity shock, or a productivity boom, which would result in higher productivity growth relative to historical levels.

For instance, labour productivity growth increased substantially at the onset of the COVID-19 pandemic due to a larger magnitude in the fall of hours worked compared to output. However, structural shifts from industries that are non-essentials that are less productive to essential business also contributed to the highest increase in productivity growth since 1981. Another change resulting from the pandemic was the wide-spread shift from in-office work to work from home. While it is not clear yet whether the shift to work from home models had a permanent increase in productivity, it should not be ignored (Wang, 2021).

Moreover, unforeseen advancements made in artificial intelligence and/or automation can result in higher productivity due to more output for fewer hours worked. Therefore, the assumption that historical labour productivity growth holds in the future can potentially underestimate actual productivity growth in the future. Therefore, this is a potential upward risk in labour productivity growth.

Labour Force Participation Rate Growth

Another assumption made to project hours worked was the future path of the labour force participation rate. A risk related to the projections concerning labour participation rate growth stems from the assumption surrounding the participation growth of the 55+ four sub-age groups. More specifically, it is possible that the high growth rates observed in the 2013-2019 period will not persist during the projection period, which can impose a downward risk to labour force participation rate growth.

In particular, the 70+ sub-age group participation rate growth can potentially be overestimated as it does not capture specific sub age groups above 80. The Labour Force Survey does not disaggregate the 70+ age group. Those aged 80 and overwork far less compared to those 70-79. Given that the 80+ subset of the population experiences the highest population growth with respect to its shares, the 80+ age group has a larger influence in shares of the 70+ age group. Therefore, the future growth of the 70+ age group can potentially be overestimated, which imposes a downward risk to participation rate growth.

In addition, there can be an underestimation of labour force participation due to potential growth in disadvantaged groups that have historically lower participation rates to the average

e.g., Indigenous peoples and disabled persons. At 2019 levels, the participation rate of the prime-age indigenous population is 78.9 per cent, or 8.4 percentage points lower compared to the national average (87.3 per cent). Therefore, there is potential that the gap can be abated, which can impose an upward risk to the labour force participation rate projections.

Statistics Canada's Population Projections:

Statistics Canada's population projections are used in projecting the labour supply and its composition. One major component in population growth pertains to immigration levels for the provinces and Canada. However, future immigration levels are subjected to potential uncertainty due to changes in government both federally and provincially. Given that immigration levels are based on immigration targets set by the government, targets can potentially change. The projection horizon is 31 years for Canada (2019-2050) and 19 years for the provinces (2019-2038). Within these periods there can be a minimum of four federal elections between 2019-2038. Therefore, there can be changes in immigration targets as a result.

For instance, the changes in projections shown in the 2018 report for the 2017-2038 and the current projections for the 2019-2038 period are completely due to changes in working age population growth due to new immigration assumptions in the 2020 Statistics Canada's population projections. The span between the two population projections was only 5 years. Therefore, changes in populations projections have considerable uncertainty, which can be a downward or upward risk to working age population growth.

Provincial Assumptions:

This report assumes that the provinces will follow the national trend for average hours worked growth and labour force participation rate growth for all young and prime age groups, and the four 55+ sub age groups. This can impose both an upward and downward risk to average hours worked growth and participation rate growth for each province respectively.

Potential Demand Shocks

Potential negative and positive demand shocks due to periods of recessions or unforeseen circumstances such as the COVID-19 pandemic are not considered in the economic projections, which can alter the potential of real GDP growth.

V. Conclusion

This report first updates the long-term economic projections for Canada and the provinces made by Sharpe and Iglesias (2018) with data from 2018 and 2019. The report then discusses these projections for Canada for the 2019-2038 period. In addition, the report investigates extending the projections for Canada from 2038 to 2050. Comparisons were made with the projections from the 2018 report for the 2017-2038 period. Moreover, projections for the province were discussed as well.

While much of the methodology used in the study remains unchanged from that used in the 2018 report, the changes in projecting average hours worked, changes in projecting the 55+ participation rate taking into account the subset age groups, and the additional two years of historical data had a created variations between both the 2018 report and current projections.

Despite the projected increases in immigration for the 2019-2038 period, the CSLS projects real GDP growth of 1.71 per cent for Canada for the 2019-2038 period, a decrease of 0.21 percentage points compared to the observed 1.98 per cent in 2000-2019. based on labour productivity growth of 0.92 per cent and total hours worked growth of 0.79 per cent. This is due to the downward pressure caused by the increasing shares of the older age population, causing a slowdown in the projected participation rate growth from -0.02 per cent in 2000-2019 to -0.07 per cent in 2019-2038.

However, after 2038, the shares of the three age groups mostly stabilize, allowing for the high growth of the four 55+ sub-age group participation rates to take a prominent role in increasing hours worked growth. Therefore, the 2038-2050 period is projected to experience real GDP growth of 1.89 per cent, 0.17 percentage points higher than the 2019-2038 period.

Furthermore, all the provinces similarly experienced Canada's increased real GDP growth, except for British Columbia, which fell by 0.05 percentage points compared to the 2018 report.

The key conclusion of the report is that the compositional changes of Canada's labour force will play an influential role in the outlook of Canada's economy. If the growth of the 55+ participation rate maintains its course, Canada can avoid a slowdown in real GDP growth.

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Online Appendix Tables:

Appendix Table 1: Summary of Statistics Canada Short-Term Projection Scenario Assumptions, Canada

Component	Historic (2019)	Projection assumptions (2038)		
		Low growth	Medium growth	High growth
Fertility (period total fertility rate)	1.54	1.4	1.58	1.74
Immigration (rate per thousand)	8.2	6.8	8.6	10.9
Life expectancy at birth, males	81.0	81.9	83.2	84.3
Life expectancy at birth, females	84.2	85.8	88.1	88.2
Non-permanent residents (number)	1,104,522	1,080,910	1,388,313	1,896,577
Emigration (gross migraproduction rate per thousand)	1.2	1.3	1.7	2.3
Return emigration (rate per thousand)	0.8	0.8	1	1.3
Net temporary emigration (rate per thousand)	0.8	0.8	0.8	0.8

Note: The low-growth (LG) and high-growth (HG) scenarios bring together assumptions that are consistent with either lower or higher population growth than in the medium-growth scenarios at the Canada level. For example, assumptions that entail high fertility, low mortality, high immigration, low emigration and high numbers of non-permanent residents are the foundation of the high-growth scenario. More information is available at "Population Projections for Canada (2018 to 2068), Provinces and Territories (2018 to 2043)"

Source: "Population Projections for Canada (2018 to 2068), Provinces and Territories (2018 to 2043)" Statistics Canada

Appendix Table 1A: Period total fertility rate, Provinces, By Assumptions

Region	Historic (2019)	Projected (assumptions) (2038)		
		Low	Medium	High
	number of children per woman			
Newfoundland and Labrador	1.35	1.23	1.38	1.54
Prince Edward Island	1.51	1.37	1.54	1.72
Nova Scotia	1.42	1.29	1.45	1.62
New Brunswick	1.54	1.39	1.57	1.76
Quebec	1.60	1.44	1.63	1.82
Ontario	1.48	1.34	1.51	1.68
Manitoba	1.87	1.69	1.90	2.13
Saskatchewan	1.95	1.77	1.99	2.23
Alberta	1.64	1.49	1.67	1.87
British Columbia	1.32	1.19	1.34	1.50

Source: "Population Projections for Canada (2018 to 2068), Provinces and Territories (2018 to 2043)" Statistics Canada

Appendix Table 1B: Life expectancy at birth, Male, By Provinces, By Assumptions

Region	Historic (2019)	Projected (assumptions) (2038)		
		Low	Medium	High
	In Years			
Newfoundland and Labrador	77.8	81.9	81.4	82.5
Prince Edward Island	80.2	79.5	83.4	84.5
Nova Scotia	78.5	81.4	82.1	83.2
New Brunswick	78.9	80.1	82.5	83.5
Quebec	80.9	80.5	83.8	84.9
Ontario	80.6	81.9	83.7	84.8
Manitoba	78.2	81.8	81.8	82.9
Saskatchewan	78.2	79.9	81.9	83.0
Alberta	79.5	79.9	82.9	84.0
British Columbia	80.5	81	83.9	84.9

Source: "Population Projections for Canada (2018 to 2068), Provinces and Territories (2018 to 2043)" Statistics Canada

Appendix Table 1C: Life expectancy at birth, Female, By Provinces, By Assumptions

Region	Historic (2019)	Projected (assumptions) (2038)		
		Low	Medium	High
	In Years			
Newfoundland and Labrador	82	83.6	85.3	86.6
Prince Edward Island	84.1	85.2	86.9	88.2
Nova Scotia	82.8	84.4	86	87.3
New Brunswick	83.2	84.6	86.2	87.5
Quebec	84.4	85.3	86.9	88.2
Ontario	84.6	85.5	87	88.4
Manitoba	82.4	84	85.6	86.9
Saskatchewan	82.9	84.4	86	87.3
Alberta	84	85.3	87	88.3
British Columbia	84.8	85.8	87.5	88.8

Source: "Population Projections for Canada (2018 to 2068), Provinces and Territories (2018 to 2043)" Statistics Canada

Appendix Table 1D: Average Net Interprovincial Migration Rates Observed, Various Reference Periods, by province

Region	1991/1992 to 2016/2017 period			Average net migration rates for each scenario				
				M1	M2	M3	M4	M5
	Average	Average (-)	Average (+)	1991/1992 to 2016/2017	1995/1996 to 2010/2011	2003/2004 to 2008/2009	2009/2010 to 2016/2017	2014/2015 to 2016/2017
	percent							
N.L.	-0.49	-0.67	-0.27	-0.49	-0.62	-0.29	0.04	-0.07
P.E.I.	-0.10	-0.22	0.01	-0.10	-0.12	-0.36	-0.25	-0.05
N.S.	-0.14	-0.20	-0.09	-0.14	-0.15	-0.24	-0.09	0.04
N.B.	-0.19	-0.24	-0.13	-0.19	-0.18	-0.21	-0.19	-0.15
Que.	-0.13	-0.15	-0.11	-0.13	-0.12	-0.12	-0.12	-0.14
Ont.	-0.03	-0.06	0.00	-0.03	-0.01	-0.12	-0.03	0.03
Man.	-0.39	-0.43	-0.34	-0.39	-0.36	-0.43	-0.38	-0.43
Sask.	-0.30	-0.44	-0.17	-0.30	-0.27	-0.09	-0.12	-0.43
Alta.	0.53	0.36	0.70	0.53	0.72	0.76	0.31	-0.07
B.C.	0.24	0.08	0.37	0.24	0.05	0.26	0.22	0.46

Appendix Table 1E: Distribution of Total Immigrants by Province, Per cent

	2019			2038		
Region	**Historic**	**Proportion of Population Relative to Canada**	**Immigration Distribution Relative to Population (Base = 100)**	**Projected**	**Proportion of Population Relative to Canada**	**Immigration Distribution Relative to Population (Base = 100)**
	(1)	**(2)**	**(3) = (1)/(2)*100**	**(3)**	**(4)**	**(5) = (3)/(4)*100**
Newfoundland and Labrador	0.35	1.39	25.14	0.31	1.06	29.11
Prince Edward Island	0.57	0.42	136.15	0.54	0.43	126.78
Nova Scotia	1.52	2.58	58.91	1.27	2.23	56.89
New Brunswick	1.22	2.07	59.03	1.05	1.78	58.85
Quebec	14.73	22.61	65.13	16.77	20.69	81.04
Ontario	45.04	38.68	116.44	41.89	39.32	106.53
Manitoba	4.21	3.64	115.55	4.78	3.70	129.03
Saskatchewan	4.73	3.12	151.69	4.4	3.39	129.92
Alberta	13.39	11.60	115.41	14.67	13.66	107.43
British Columbia	14.02	13.55	103.47	14.12	13.41	105.32

Source: "Population Projections for Canada (2018 to 2068), Provinces and Territories (2018 to 2043)" Statistics Canada, Statistics Canada Table: 17-10-0005-01

Appendix Table 2: Working Age Population (compound annual per cent growth rates)

	00-17	17-19	00-19	(00-19) – (00-17)	2017-2038 (2018 Projection)	2019-2038 Projection	2019-2050 Projection	(19-38) – (17-38)
	1	2	3	4 = 3-1	5	6	7	8
Canada	**1.25**	1.55	**1.28**	**0.03**	**0.86**	**1.02**	**0.89**	0.16
NFLD	**0.25**	-0.21	**0.20**	-0.05	-0.52	-0.36		0.16
PEI	**0.88**	2.47	**1.05**	0.17	0.85	1.26		-0.28
NS	**0.38**	1.14	**0.46**	0.08	-0.01	0.26		0.27
NB	**0.34**	0.75	**0.38**	0.04	0.02	0.25		0.23
Quebec	**0.89**	1.14	**0.91**	0.03	0.58	0.57		-0.01
ON	**1.37**	1.90	**1.43**	**0.06**	**0.82**	**1.09**		0.27
MAN	**1.00**	1.28	**1.03**	0.03	1.03	1.08		0.05
SAS	**0.90**	0.85	**0.89**	-0.01	0.72	1.41		0.69
ALB	**2.22**	1.54	**2.15**	-0.07	1.77	1.92		0.15
BC	**1.43**	1.85	**1.48**	0.04	1.02	1.01		-0.01

Note: Projections for Provinces are from 2019-2043
Source: Column 1-3: Statistics Canada. Table 14-10-0327-01
Column 5: CSLS report, Sharpe and Iglesias (2018)
Projections Column 6-7: Table 17-10-0057-01

Appendix Table 2A: Working Age Population (15-24) (compound annual per cent growth rates)

	00-17	17-19	00-19	(00-19) – (00-17)	2019-2038 Projection	2019-2050 Projection
	1	2	3	4 = 3-1	5	6
Canada	0.45	1.09	**0.51**	0.07	0.78	**0.65**
NFLD	-1.84	-0.71	**-1.72**	0.12	-1.09	
PEI	-0.19	4.52	**0.30**	0.49	0.98	
NS	-0.63	0.69	**-0.49**	0.14	-0.05	
NB	-1.20	0.18	**-1.06**	0.14	0.00	
Quebec	-0.31	-0.36	**-0.31**	-0.01	0.57	
ON	0.98	1.82	**1.07**	0.09	0.62	
MAN	0.70	0.86	**0.71**	0.02	1.05	
SAS	-0.29	0.30	**-0.23**	0.06	1.61	
ALB	0.93	0.83	**0.92**	-0.01	1.74	
BC	0.61	1.84	**0.74**	0.13	0.76	

Note: Projections for Provinces are from 2019-2043
Source: Column 1-3: Statistics Canada. Table 14-10-0327-01
Column 4: Calculated using Columns 3 and 1
Projections Column 5-6: Table 17-10-0057-01

Appendix Table 2B: Working Age Population (25-54) (compound annual per cent growth rates)

	00-17	17-19	00-19	(00-19) – (00-17)	2019-2038 Projection	2019-2050 Projection
	1	2	3	4 = 3-1	5	6
Canada	0.37	0.72	0.40	0.04	0.72	**0.61**
NFLD	-0.99	-2.24	-1.12	-0.13	-1.22	
PEI	-0.26	1.60	-0.06	0.19	0.86	
NS	-0.91	0.13	-0.80	0.11	-0.11	
NB	-0.98	-0.62	-0.94	0.04	-0.30	
Quebec	-0.12	0.45	-0.06	0.06	0.17	
ON	0.43	1.07	0.50	0.07	0.82	
MAN	0.36	0.77	0.40	0.04	0.89	
SAS	0.59	0.13	0.54	-0.05	1.29	
ALB	1.75	0.55	1.62	-0.13	1.59	
BC	0.48	1.01	0.54	0.06	0.64	

Note: Projections for Provinces are from 2019-2043
Source: Column 1-3: Statistics Canada. Table 14-10-0327-01
Column 4: Calculated using Columns 3 and 1
Projections Column 5-6: Table 17-10-0057-01

Appendix Table 2C: Working Age Population (55+) (compound annual per cent growth rates)

	00-17	17-19	00-19	(00-19) – (00-17)	2019-2038 Projection	2019-2050 Projection
	1	2	3	4 = 3-1	5	6
Canada	3.20	2.85	3.16	-0.04	1.46	**1.30**
NFLD	3.19	2.13	3.08	-0.11	0.56	
PEI	3.11	2.68	3.06	-0.05	1.57	
NS	2.72	2.36	2.68	-0.04	0.70	
NB	2.99	2.37	2.92	-0.07	0.80	
Quebec	3.07	2.50	3.01	-0.06	1.00	
ON	3.22	3.05	3.20	-0.02	1.58	
MAN	2.26	2.19	2.25	-0.01	1.35	
SAS	2.02	2.10	2.03	0.01	1.48	
ALB	4.12	3.66	4.07	-0.05	2.52	
BC	3.44	2.93	3.38	-0.05	1.51	

Note: Projections for Provinces are from 2019-2043
Source: Column 1-3: Statistics Canada. Table 14-10-0327-01
Column 4: Calculated using Columns 3 and 1
Projections Column 5-6: Table 17-10-0057-01

Appendix Table 3: Shares of the Working Age Population by Age Group, Canada, Per Cent

	1976 Level	1997 Level	2019 Level	CAGR 00-19	2038 Level	2050 Level	CAGR (2019-2038)
	1	2	3	4	5	6	7
15-24	26.7	17.0	14.6	-0.76	13.8	13.4	-0.28
25-54	51.1	57.5	48.5	-0.87	45.2	43.9	-0.33
55+	22.2	25.5	36.8	1.85	41.0	42.7	0.50

Source: Column 1: Statistics Canada. Table 14-10-0327-01 and CSLS Calculations
Column 2-4: CSLS Calculations

Appendix Table 4: Shares of the Working Age Population by Age Group, Provinces, Per Cent

		2019	2038	2050
		1	2	3
	15-24	14.5	13.9	13.4
Canada	25-54	47.8	45.2	43.9
	55+	37.7	40.9	42.7
	15-24	12.2	10.6	-
NFLD	25-54	44.1	37.4	-
	55+	43.7	52.0	-
	15-24	15.0	16.1	-
PEI	25-54	40.0	36.4	-
	55+	45.0	47.5	-
	15-24	13.4	12.6	-
NS	25-54	43.6	40.6	-
	55+	43.0	46.7	-
	15-24	12.6	12.0	-
NB	25-54	43.6	39.3	-
	55+	43.8	48.7	-
	15-24	12.9	12.9	-
QC	25-54	46.5	43.1	-
	55+	40.5	43.9	-
	15-24	15.4	14.1	-
ON	25-54	47.7	45.4	-
	55+	37.0	40.5	-
	15-24	16.6	16.5	-
MB	25-54	48.5	46.9	-
	55+	34.9	36.7	-
	15-24	15.4	15.9	-
SK	25-54	49.1	48.0	-
	55+	35.6	36.1	-
	15-24	15.0	14.5	-
AB	25-54	53.4	50.2	-
	55+	31.6	35.3	-
	15-24	14.1	13.4	-
BC	25-54	47.2	44.0	-
	55+	38.8	42.6	-

Source: Statistics Canada Table 17-10-0057-01, CSLS Calculations

Appendix Table 5: Labour Force Participation Rate (compound annual per cent growth rates)

	00-17	17-19	00-19	(00-19) – (00-17)	2017-2038 2018 Projection	2019-2038 Projection	2019-2050 Projection	(19-38) –(17-38)
	1	2	3	4 = 3 - 1	5	6	8	
Canada	**-0.02**	**0.00**	**-0.02**	**0.00**	**-0.07**	**-0.07**	**0.11**	0.00
NFLD	0.33	-0.51	0.24	-0.09	-0.36	-0.15	-	0.21
PEI	-0.09	0.61	-0.02	0.07	-0.09	0.06	-	0.15
NS	0.02	0.33	0.05	0.03	-0.17	-0.17	-	0.00
NB	-0.03	-0.16	-0.04	-0.01	-0.18	-0.20	-	-0.02
Quebec	0.15	0.15	0.15	0.00	-0.09	-0.13	-	-0.04
ON	**-0.21**	**0.15**	**-0.17**	**0.04**	**-0.08**	**-0.05**	-	0.03
MAN	-0.09	-0.22	-0.10	-0.01	-0.01	0.05	-	0.06
SAS	0.16	-0.07	0.13	-0.02	-0.03	0.16	-	0.19
ALB	-0.02	-0.77	-0.10	-0.08	-0.04	0.00	-	0.04
BC	0.10	0.08	0.10	0.00	-0.06	-0.06	-	0.00

Note: Projections for Provinces are from 2019-2043
Source columns 1-3: Statistics Canada. Table 14-10-0327-01
Column 5: CSLS report, Sharpe and Iglesias (2018)
Column 6: Based on CSLS calculation

Appendix Table 5A: LFPR (15-24) (compound annual per cent growth rates)

	00-17	17-19	00-19	(00-19)-(00-17)	2017-2038	2019-2038	(19-38)-(17-38)
	1	2	3	4 = 3 - 1	5	6	7 = 6 - 5
Canada	**0.01**	**0.31**	**0.04**	**0.03**	**0.04**	**0.04**	**0.00**
NFLD	1.57	-1.30	1.26	-0.31	0.04	0.04	0.00
PEI	0.01	1.52	0.17	0.16	0.04	0.04	0.00
NS	0.18	4.43	0.62	0.44	0.04	0.04	0.00
NB	0.13	3.05	0.44	0.30	0.04	0.04	0.00
Quebec	0.60	1.83	0.72	0.13	0.04	0.04	0.00
ON	**-0.45**	**0.24**	**-0.38**	**0.07**	**0.04**	**0.04**	**0.00**
MAN	-0.39	-0.30	-0.38	0.01	0.04	0.04	0.00
SAS	-0.01	-0.38	-0.05	-0.04	0.04	0.04	0.00
ALB	-0.32	-1.66	-0.46	-0.14	0.04	0.04	0.00
BC	0.53	-0.82	0.39	-0.14	0.04	0.04	0.00

Source columns 1-3: Statistics Canada. Table 14-10-0327-01
Column 5: CSLS report, Sharpe and Iglesias (2018)
Column 6: Based on CSLS calculation

Appendix Table 5B: LFPR (25-54) (compound annual per cent growth rates)

	00-17	17-19	00-19	(00-19)-(00-17)	2017-2038 (2018 Projection)	2019-2038	(19-38)-(17-38)
	1	2	3	4 = 3 - 1	5	6	7 = 6 - 5
Canada	**0.14**	**0.29**	**0.15**	**0.02**	**0.00**	**0.00**	**0.00**
NFLD	0.58	0.00	0.52	-0.06	0.00	0.00	0.00
PEI	0.05	0.11	0.05	0.01	0.00	0.00	0.00
NS	0.29	0.47	0.31	0.02	0.00	0.00	0.00
NB	0.32	0.29	0.32	0.00	0.00	0.00	0.00
Quebec	0.38	0.11	0.35	-0.03	0.00	0.00	0.00
ON	**-0.03**	**0.41**	**0.02**	**0.05**	**0.00**	**0.00**	**0.00**
MAN	-0.05	-0.17	-0.06	-0.01	0.00	0.00	0.00
SAS	0.03	0.34	0.06	0.03	0.00	0.00	0.00
ALB	0.03	0.17	0.04	0.02	0.00	0.00	0.00
BC	0.22	0.57	0.26	0.04	0.00	0.00	0.00

Source columns 1-3: Statistics Canada. Table 14-10-0327-01
Column 5: CSLS report, Sharpe and Iglesias (2018)
Column 6: Based on CSLS calculation

Appendix Table 5C :LFPR (55+) (compound annual per cent growth rates)

	00-17	17-19	00-19	(00-19)-(00-17)	2017-2038 (2018 Projection)	2019-2038 Revised	2019-2050 Revised	(19-38)-(17-38)
	1	2	3	4 = 3 - 1	5	6		7 = 6 - 5
Canada	**2.29**	**0.40**	**2.09**	**-0.20**	**0.45**	**0.25**	**0.86**	**-0.20**
NFLD	3.52	2.10	3.37	-0.15	0.45	0.36	-	-0.09
PEI	2.80	1.61	2.68	-0.13	0.45	0.50	-	0.05
NS	3.14	-0.87	2.71	-0.43	0.45	-0.06	-	-0.51
NB	3.04	-0.72	2.64	-0.40	0.45	0.01	-	-0.44
Quebec	2.57	0.73	2.38	-0.20	0.45	0.05	-	-0.40
ON	**2.09**	**0.53**	**1.92**	**-0.17**	**0.45**	0.24	**-**	-0.21
MAN	2.08	0.52	1.91	-0.17	0.45	0.49	-	0.04
SAS	1.99	0.12	1.79	-0.20	0.45	0.77	-	0.32
ALB	2.00	-1.43	1.63	-0.37	0.45	0.46	-	0.01
BC	2.14	0.65	1.98	-0.16	0.45	0.29	-	-0.16

Source columns 1-3: Statistics Canada. Table 14-10-0327-01
Column 5: CSLS report, Sharpe and Iglesias (2018)
Column 6: Based on CSLS calculation

Appendix Table 5D: LFPR (55-59) (per cent)

	2019 Level	CAGR 2013-2019	2038 Level	2050 Level	CAGR (2019-2038)
	1	2	3	4	5
Canada	**75.4**	**0.54**	83.5	**89.1**	**0.54**
NFLD	69.3	0.82	76.8		0.54
PEI	77.3	-0.61	85.6		0.54
NS	70.8	-0.02	78.4		0.54
NB	72.5	0.73	80.3		0.54
Quebec	75.3	0.73	83.4		0.54
ON	**74.8**	0.52	82.9		0.54
MAN	77.5	0.13	85.9		0.54
SAS	78.7	-0.04	87.2		0.54
ALB	77.7	-0.04	86.1		0.54
BC	76.2	1.00	84.4		0.54

Source columns 1: Statistics Canada. Table 14-10-0327-01
Column 2-4: Based on CSLS calculation

Appendix Table 5E: LFPR (60-64) (per cent)

	2019 Level	CAGR 2013-2019	2038 Level	2050 Level	CAGR (2019-2038)
	1	2	3	4	5
Canada	56.1	**1.14**	69.6	79.8	1.14
NFLD	47.7	0.28	59.2	-	1.14
PEI	64	0.00	79.4	-	1.14
NS	51.4	0.43	63.8	-	1.14
NB	53.3	1.31	66.2	-	1.14
Quebec	51.5	2.12	63.9	-	1.14
ON	57.4	1.15	71.2	-	1.14
MAN	56.7	0.12	70.4	-	1.14
SAS	60.8	-0.46	75.5	-	1.14
ALB	62.5	-0.75	77.6	-	1.14
BC	57.4	1.86	71.2	-	1.14

Source: Columns 1: Statistics Canada. Table 14-10-0327-01
Column 2-5: Based on CSLS calculation

Appendix Table 5F: LFPR (65-69) (per cent)

	2019 Level	CAGR 2013-2019	2038 Level	2050 Level	CAGR (2019-2038)
	1	2	3	4	5
Canada	28.2	**2.10**	41.8	53.6	2.10
NFLD	21.3	1.92	31.6	-	2.10
PEI	33.3	-1.52	49.4	-	2.10
NS	23.9	2.67	35.4	-	2.10
NB	21.6	0.63	32.0	-	2.10
Quebec	23.4	4.18	34.7	-	2.10
ON	28.7	1.15	42.6	-	2.10
MAN	29.2	-0.17	43.3	-	2.10
SAS	36.4	-0.09	54.0	-	2.10
ALB	36.3	0.75	53.8	-	2.10
BC	30.5	3.79	45.2	-	2.10

Source columns 1: Statistics Canada. Table 14-10-0327-01
Column 2-5: Based on CSLS calculation

Appendix Table 5G: LFPR (70+) (per cent)

	2019 Level	CAGR 2010-2019	2038 Level	2050 Level	CAGR (2019-2038)
	1	2	3	4	5
Canada	8	**3.79**	16.2	25.3	3.79
NFLD	5.3	7.68	10.7	-	3.79
PEI	10.2	2.69	20.7	-	3.79
NS	6.7	1.30	13.6	-	3.79
NB	7.2	4.91	14.6	-	3.79
Quebec	6.1	3.72	12.4	-	3.79
ON	8.3	3.89	16.8	-	3.79
MAN	8.7	1.20	17.6	-	3.79
SAS	12.1	3.40	24.5	-	3.79
ALB	10.5	0.32	21.3	-	3.79
BC	8.6	6.79	17.4	-	3.79

Source columns 1: Statistics Canada. Table 14-10-0327-01
Column 2-5: Based on CSLS calculation

Appendix Table 6: Total Hours Worked All jobs (LFS Average Hours Based), (Compound Annual Per Cent Growth Rates)

	00-17	17-19	00-19	(00-19)-(00-17)	2017-2038 2018 Projection	2019-2038 Projection	2019-2050 Projection
	1	2	3	4 = 3 - 1	5	6	8
Canada	0.93	1.43	0.98	0.05	**0.59**	0.79	**0.85**
NFLD	0.52	0.56	0.52	0.00	-1.08	-0.60	-
PEI	0.60	4.01	0.96	0.35	0.55	1.05	-
NS	0.08	2.47	0.33	0.25	-0.39	-0.05	-
NB	0.19	-0.23	0.15	-0.04	-0.37	-0.08	-
Quebec	0.76	1.71	0.86	0.10	0.28	0.28	-
ON	0.79	1.80	0.90	0.11	**0.55**	0.91	-
MAN	0.62	0.30	0.58	-0.03	0.81	1.05	-
SAS	0.64	0.65	0.64	0.00	0.47	1.53	-
ALB	1.67	0.35	1.53	-0.14	1.50	1.84	-
BC	1.42	1.42	1.42	0.00	0.76	0.79	-

Note: Projections for Provinces are from 2019-2043
Source columns 1-3: Statistics Canada. Table 14-10-0327-01
Column 5: CSLS report, Sharpe and Iglesias (2018)
Column 6, 7, and 8: CSLS calculation based on Statistics Canada data

Appendix Table 7: Hours Worked by Age Group (LFS), Canada (Compound Annual Per Cent Growth Rates)

Canada (National Averages)	1976-2017	1976-2019	(1976-2019) - (1976-2017)	00-17	17-19	00-19	(00-19) - (00-17)	(2010 - 2019)	2017-2038 2018 Projection	(19-38) Projection	(19-38) - (17-38)
15-24	-0.50	-0.50	0.01	-0.43	-0.39	-0.42	0.01	-0.01	-0.50	-0.01	0.49
25-54	-0.12	-0.13	-0.01	-0.28	-0.53	-0.31	-0.03	-0.15	-0.12	-0.15	-0.03
55+	-0.22	-0.22	0.00	-0.36	-0.22	-0.35	0.01	-0.17	-0.22	-0.17	0.05
Total (all ages)	-0.16	-0.17	-0.01	-0.34	-0.45	-0.35	-0.01	-0.15	-0.16	-0.15	0.01

Source: Statistics Canada. Table 14-10-0327-01, CSLS Calculations

Appendix Table 8: Average Hours Worked (LFS), Canada and Provinces (Compound Annual Per Cent Growth Rates)

	00-17	17-19	00-19	(00-19) - (00-17)	(2010-2019)	2017-2038 2018 Projection (1976-2017 national level)	2019-2038 Revised (2010-2019 national level)	(19-38)-(17-38)
	1	2	3	4 = 3 - 1	5	6	7	8 = 7 - 6
Canada	**-0.33**	**-0.47**	**-0.35**	**-0.02**	**-0.15**	**-0.16**	**-0.15**	**-0.01**
NFLD	-0.12	-0.31	-0.18	-0.06	-0.01	**-0.16**	-0.15	-0.01
PEI	-0.37	0.27	-0.27	0.10	0.34	**-0.16**	-0.15	-0.01
NS	-0.29	0.36	-0.27	0.02	-0.18	**-0.16**	-0.15	-0.01
NB	-0.28	-0.89	-0.30	-0.02	-0.17	**-0.16**	-0.15	-0.01
Quebec	-0.39	-0.07	-0.38	0.01	-0.13	**-0.16**	-0.15	-0.01
ON	**-0.31**	**-0.46**	**-0.36**	**-0.05**	**-0.10**	**-0.16**	**-0.15**	**-0.01**
MAN	-0.33	-0.75	-0.32	0.01	-0.08	**-0.16**	-0.15	-0.01
SAS	-0.39	-0.53	-0.35	0.04	-0.20	**-0.16**	-0.15	-0.01
ALB	-0.44	-0.95	-0.40	0.04	-0.37	**-0.16**	-0.15	-0.01
BC	-0.21	-0.73	-0.29	-0.08	-0.15	**-0.16**	-0.15	-0.01

Note: Projections for Provinces are from 2019-2043
Source: Columns 1-3, 5: Statistics Canada. Table: 14-10-0033-01)
Column 4: Calculated using column 1 and 3
Column 6: CSLS report, Sharpe and Iglesias (2018)
Column 7: Based on CSLS calculation
Column 8: Calculated using column 6 and 7

Appendix Table 9: Total Hours Worked (CPA based) All Jobs, Canada and Provinces (Compound Annual Per Cent Growth Rates)

	00-17	17-19	00-19	(00-19)-(00-17)	(2010-2019)
	1	2	3	4 = 3 - 1	5
Canada	**1.03**	**1.52**	1.05	**0.02**	1.14
NFLD	0.63	0.36	0.49	-0.14	0.13
PEI	0.67	3.18	0.82	0.15	1.62
NS	0.20	2.24	0.30	0.10	0.03
NB	0.22	0.14	0.09	-0.13	-0.25
Quebec	0.92	1.42	0.91	-0.01	0.99
ON	0.89	2.09	1.04	**0.15**	1.37
MAN	0.69	0.43	0.60	-0.09	0.66
SAS	0.79	1.17	0.77	-0.02	0.80
ALB	1.93	0.62	1.77	-0.16	1.14
BC	1.29	1.40	1.25	-0.04	1.45

Source: Column 1: CSLS report, Sharpe and Iglesias (2018)
Columns 2, 3 and 5: Statistics Canada. Table: 36-10-0480-01
Columns 4: Based on Columns 3 and 1

Appendix Table 10: Average Hours Worked Total Economy (CPA) (Compound Annual Per Cent Growth Rates)

	00-17	17-19	00-19	(00-19)-(00-17)	(10-19)	2017-2038 (1997-2017 national level)	2019-2038 (2010-2019 national level)	(19-38)-(17-38)
	1	2	3	4 = 3 - 1	5	6	7	8 = 7 - 6
Canada	-0.27	-0.38	**-0.28**	-0.01	-0.16	-0.25	**-0.15**	0.10
NFLD	-0.17	-0.50	-0.21	-0.04	-0.14	-0.25	-0.15	0.10
PEI	-0.30	-0.54	-0.40	-0.1	0.09	-0.25	-0.15	0.10
NS	-0.25	0.14	-0.30	-0.05	-0.23	-0.25	-0.15	0.10
NB	-0.23	-0.53	-0.36	-0.13	-0.20	-0.25	-0.15	0.10
Quebec	-0.38	-0.36	-0.33	0.05	-0.15	-0.25	-0.15	0.10
ON	**-0.29**	-0.18	-0.22	0.07	-0.11	**-0.25**	**-0.15**	0.10
MAN	-0.27	-0.62	-0.31	-0.04	-0.19	-0.25	-0.15	0.10
SAS	-0.20	-0.01	-0.23	-0.03	-0.17	-0.25	-0.15	0.10
ALB	-0.24	-0.68	-0.16	0.08	-0.37	-0.25	-0.15	0.10
BC	-0.13	-0.76	-0.45	-0.32	-0.09	-0.25	-0.15	0.10

Note: Projections for Provinces are from 2019-2043
Source: Columns 1-3: Statistics Canada. 1
Column 4: Based on Columns 3 and 1
Column 6: CSLS report, Sharpe and Iglesias (2018)
Column 7: Based on CSLS calculation

Appendix Table 11: Labour Productivity (CPA Hours Based), (Compound Annual Per Cent Growth Rates)

	00-17 (2018 Report)	17-19	00-19	(00-19)-(00-17)	2017-2038 (2018 Projection)	2019-2038 Projection	(19-38) - (17-38)
	1	2	3	4 = 3 – 1	5	6	7 = 6 - 5
Canada	**0.97**	**0.62**	**0.92**	**-0.05**	**0.97**	**0.92**	**-0.05**
NFLD	1.63	-0.18	1.52	-0.11	1.63	1.52	-0.11
PEI	1.07	0.57	1.18	0.11	1.07	1.18	0.11
NS	1.04	-0.13	1.06	0.02	1.04	1.06	0.02
NB	1.01	0.70	1.03	0.01	1.01	1.03	0.02
Quebec	0.72	1.37	0.83	0.11	0.72	0.83	0.11
ON	**0.91**	**0.32**	**0.77**	**-0.14**	**0.91**	**0.77**	**-0.14**
MAN	1.55	0.60	1.49	-0.06	1.55	1.49	-0.06
SAS	1.18	-0.91	1.04	-0.14	1.18	1.04	-0.14
ALB	0.71	0.41	0.68	-0.03	0.71	0.68	-0.03
BC	1.43	1.28	1.35	-0.08	1.43	1.35	-0.08

Note: Projections for Provinces are from 2019-2043
Source columns 2-4: Statistics Canada Table: 36-10-0480-01
Column 1 & 7: CSLS report, Sharpe and Iglesias (2018)
Column 8: CSLS calculations based on Statistics Canada data

Column 9: Calculated using columns 7 and 8

Appendix Table 12: Real GDP (Compound Annual Per Cent Growth Rates)

	00-17	17-19	00-19	(00-19)-(00-17)	2017-2038 2018 Projection	2019-2038 Projection	2019-2050 Projection	(19-38) - (17-38)
	1	2	3	4 = 3 - 1	5	6	7	8
Canada	**2.01**	**2.15**	**1.98**	**-0.03**	**1.56**	**1.71**	**1.79**	**0.15**
NFLD	2.27	0.18	2.01	-0.26	0.54	0.91	-	0.37
PEI	1.75	3.77	2.01	0.26	1.63	2.23	-	0.60
NS	1.24	2.11	1.36	0.12	0.65	1.01	-	0.36
NB	1.23	0.84	1.12	-0.11	0.64	0.94	-	0.30
Quebec	1.65	2.81	1.75	0.10	1.00	1.12	-	0.12
ON	**1.81**	2.41	1.82	**0.01**	**1.46**	**1.68**	-	**0.24**
MAN	2.25	1.04	2.10	-0.15	2.37	2.56	-	0.19
SAS	1.98	0.25	1.82	-0.16	1.66	2.59	-	0.93
ALB	2.66	1.03	2.46	-0.20	2.23	2.54	-	0.31
BC	2.74	2.69	2.62	-0.12	2.20	2.15	-	-0.05

Note: Projections for Provinces are from 2019-2043
Sources: Column 1 & 5: CSLS report, Sharpe and Iglesias (2018)
Columns 2-3: Statistics Canada. Table: 36-10-0222-01
Column 4: Based on Column 1 and 3
Column 6-7: CSLS calculation based on Statistics Canada.
Column 8: Calculated using Column 6 and 5 for provinces, and Column 7 and 5 for Canada.

Appendix Table 13: GDP Deflator (Compound Annual Per Cent Growth Rates)

	00-17	17-19	00-19	(00-19)-(00-17)
	1	2	3	4 = 3 -1
Canada	**1.94**	**1.71**	**1.93**	**0.01**
NFLD	2.92	2.25	2.86	-0.06
PEI	2.27	1.44	2.23	-0.04
NS	1.85	1.56	1.82	-0.03
NB	2.03	2.45	2.09	-0.06
Quebec	1.86	1.99	1.91	0.05
ON	**1.79**	1.52	1.78	**-0.01**
MAN	1.99	0.71	1.87	-0.12
SAS	3.08	1.39	2.88	-0.10
ALB	2.30	2.01	2.20	-0.10
BC	1.67	1.89	1.74	0.07

Sources: Column 1: CSLS report, Sharpe and Iglesias (2018)
Columns 2 - 3: Statistics Canada. Table: 36-10-0222-01
Column 4: Based on Columns 1 and 3

Appendix Table 14: Nominal GDP, (Compound Annual Per Cent Growth Rates)

	00-17	17-19	00-19	(00-19)-(00-17)	2017-2038 2018 Projection	2019-2038 Projections	2019-2050 Projections
	1	2	3	4	5	6	7
Canada	**3.99**	3.90	**3.95**	-0.04	3.53	3.68	**3.75**
NFLD	2.25	2.43	4.93	2.68	3.47	3.79	-
PEI	4.06	5.26	4.28	0.22	3.94	4.51	-
NS	3.11	3.71	3.21	0.1	2.51	2.85	-
NB	3.29	3.31	3.23	-0.06	2.68	3.05	-
Quebec	3.54	4.86	3.70	0.16	2.88	3.05	-
ON	3.64	3.97	3.63	-0.01	3.28	3.49	-
MAN	4.28	1.76	4.01	-0.27	4.41	4.48	-
SAS	5.12	1.64	4.75	-0.37	4.79	5.55	-
ALB	5.02	3.06	4.71	-0.31	4.58	4.79	-
BC	4.46	4.64	4.40	-0.06	3.90	3.92	-
					Constant two per cent inflation		
Canada					3.59	3.75	**3.92**
NFLD					2.56	2.92	-
PEI					3.63	4.28	-
NS					2.71	3.03	-
NB					2.78	2.96	-
Quebec					3.22	3.14	-
ON					3.44	3.71	-
MAN					4.38	4.61	-
SAS					3.90	4.65	-
ALB					4.35	4.59	-
BC					4.18	4.19	-

Sources: Columns 1 - 3: Statistics Canada Table: 36-10-0222-01
Column 5: CSLS report, Sharpe and Iglesias (2018)
Column 6: Based on CSLS calculation