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Economic Projections for Canada and the
Provinces 2017-2038: An Update

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Economic Projections for Canada and the Provinces, 2017-2038: An Update

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Economic Projections for Canada and the Provinces, 2017-2038: An Update ¹

In 2015, the Centre for the Study of Living Standards (CSLS) prepared the report “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 2015 study for Canada and the provinces with new data from 2015, 2016 and 2017.

The report consists of four main sections. The first section presents new economic projections for Canada and the provinces for the 2017-2038 period.² This section includes discussion of the methodology behind the projections. The second section compares the updated projections for Canada and Ontario, given the current contemplation of economic and fiscal outlooks in this province, with the projections from the 2015 report for 2014-2038. The third section compares the CSLS projections for Canada and Ontario for the 2017-2040 period with projections from other forecasts. The fourth and final section summarizes the findings and concludes.

I. Updating of CSLS Economic Projections for Canada and the Provinces for 2017-2038

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. All figures are for the total economy. The forecast can be considered judgmental, and is not econometric based. The figures come from a deliberation by the forecasters that is grounded in both historical trends, and an analysis of likely developments. The forecasts for all variables come from 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:

¹This report was written by CSLS Executive Director Andrew Sharpe and CSLS Economist Cristina Blanco Iglesias, with assistance from Nicholas Mask. The authors would like to thank Don Drummond for comments. Email: andrew.sharpe@csls.ca.

²The 2017-2038 period uses 2017 as the base for compound growth rate calculations. This means that growth from 2017 to 2018 is included in the total period growth rate.

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

where Y is real GDP, H is total hours worked, and Y/H is labour productivity. Therefore, to project real GDP growth, we develop projections for the future advance of total hours worked and labour productivity growth. Growth in total hours work 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.³ 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.

Working Age Population

To project growth in the working age population, we rely on Statistics Canada's official population projections for the 2017-2038 period. In particular, we employ the medium (M1) scenario projection, which is based on demographic trends observed over the 1991-2011 period.⁴ At the national level, this scenario projects working age population growth of 0.87 per cent per year between 2017 and 2038.⁵ For Ontario the figure is 0.82 per cent, slightly below the national

³This is based on the assumption that the unemployment rate will remain fixed at its 2016 level. 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. Note that in 2017, the unemployment rate was thought to be roughly at the equilibrium level (no cyclical component in the unemployment rate). Hence, on average, the rate observed in 2017 is likely to remain constant over the long-term assuming no dramatic structural change in the Canadian economy.

⁴ The medium (M1) scenario is based on the following assumptions: interprovincial migration trends observed over the 1991-2011 period will persist in 2017-2038; the total fertility rate reaches 1.67 births per woman in 2021 and then remains constant; life expectancy reaches 89.1 years for females and 87.5 years for males in 2062; and the net international immigration rate reaches 0.56 per cent in 2022 and then remains constant. Refer to Drummond and Capeluck (2015); Appendix Table 8 for more information. Appendix Table 8 decomposes projected population growth by province and territory into the following components: natural increase, net international migration, and net interprovincial migration.

⁵ Drummond and Capeluck (2015) provide a sensitivity analysis with alternative population growth projections for the 2014-2038 – namely, the high- and low-growth scenarios. The high-growth scenario projects working age population growth of 1.2 per cent per year for the 2014-2038 period, while the low-growth scenario projects working age population growth of 0.7 per cent per year. As the working age population projection changed little between the 2014-2038 and 2017-2038 periods, this analysis is still relevant.

projection. It is interesting to note that Ontario's working age population growth was slightly above the national figure in the 2000-2017 period (1.41 per cent versus 1.28 per cent). See Table 1 in the Appendix to this report. The reversal of Ontario's growth advantage historically to a shortfall relative to Canada over the forecast period appears to reflect the falling share of Ontario in total immigration to Canada.

Labour Force Participation

The assumptions underlying the future path of participation rates are somewhat more complex.⁶ As previously mentioned, the projections for total hours worked are based on separate projections for growth in the size of the labour force (which, in turn, are based on population projections and assumptions regarding the future path of participation rates) *and* for growth in average hours worked.

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. 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).⁷

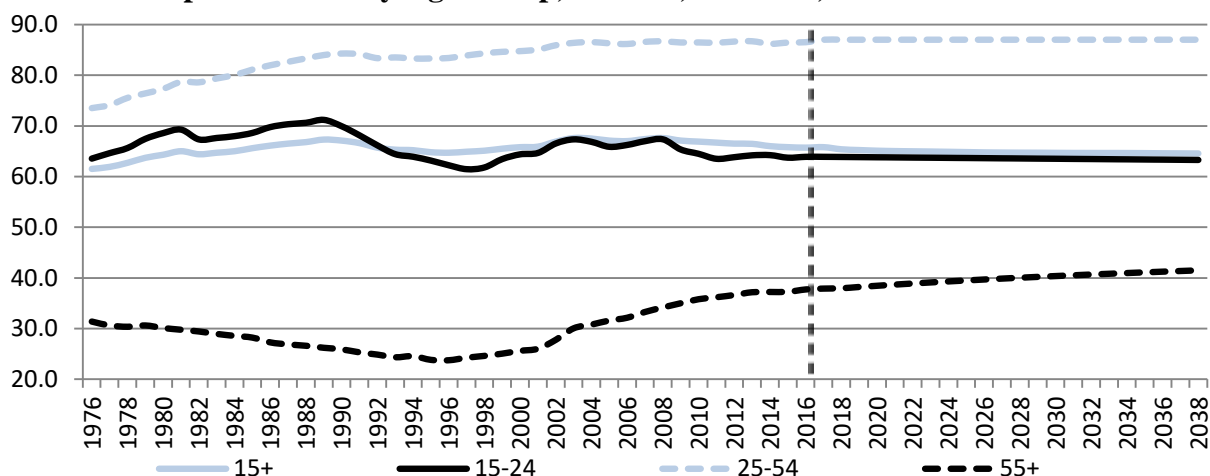
In particular, we made separate assumptions for the future growth in the participation rate of each age group at the national level and applied these growth rates to the prevailing participation rates of each age group at the provincial level. In other words, future trends in participation rates by age group in each province were assumed to be the same as trends in participation rates by age group for Canada as a whole. The different assumptions for the three age groups are briefly outlined below.

Chart 1 illustrates the underlying assumptions concerning the future path of participation rates in Canada for the three age groups. 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. However, we expect the participation rate for the young age group to continue its recent decline due to the increased emphasis on educational attainment and deteriorating prospects for low-skill workers. In particular, we assume that the participation rate for the young age group will decline in 2017-2038 at the same pace as in 2000-2017 (that is, -0.04 per cent per year). This means that the participation rate of the young age group will exhibit an average annual decrease of 0.04 per cent per year in all of the provinces.

⁶ 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.

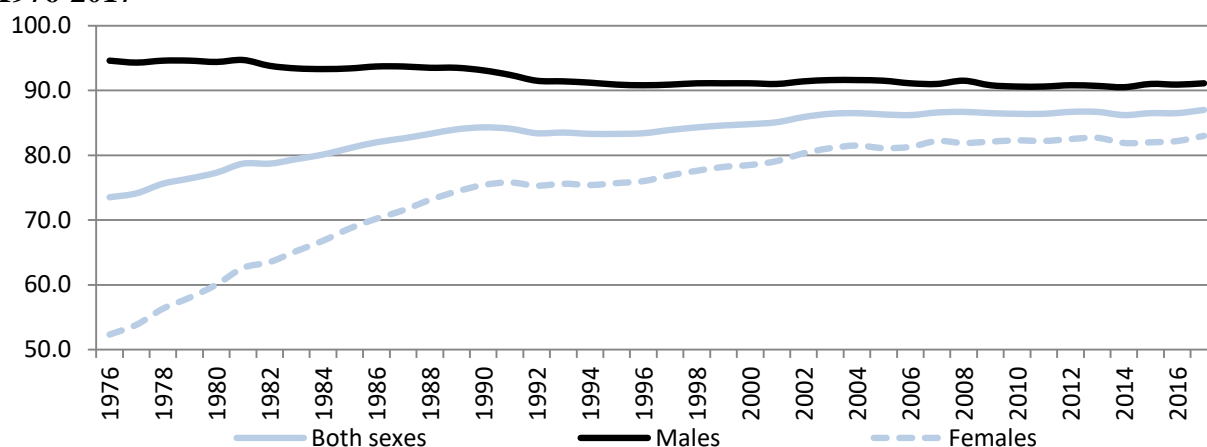
⁷ In contrast, to calculate labour productivity growth, we use hours worked data from the CPA (Canadian Productivity Accounts) as these estimates are more appropriate for estimating labour productivity growth than hours worked data from the LFS. However, we had to use hours worked data from the LFS to project growth in average hours worked by age group, as hours worked data from the CPA are not available by age group.

Chart 1: Participation Rates by Age Group, Canada, Per Cent, 1976-2038



Source: Statistics Canada, CANSIM table 282-0087 and CSLS calculations

Chart 2: Participation Rates by Sex for Prime-age Workers (25-54), Canada, Per Cent, 1976-2017



Source: Statistics Canada, CANSIM table 282-0087

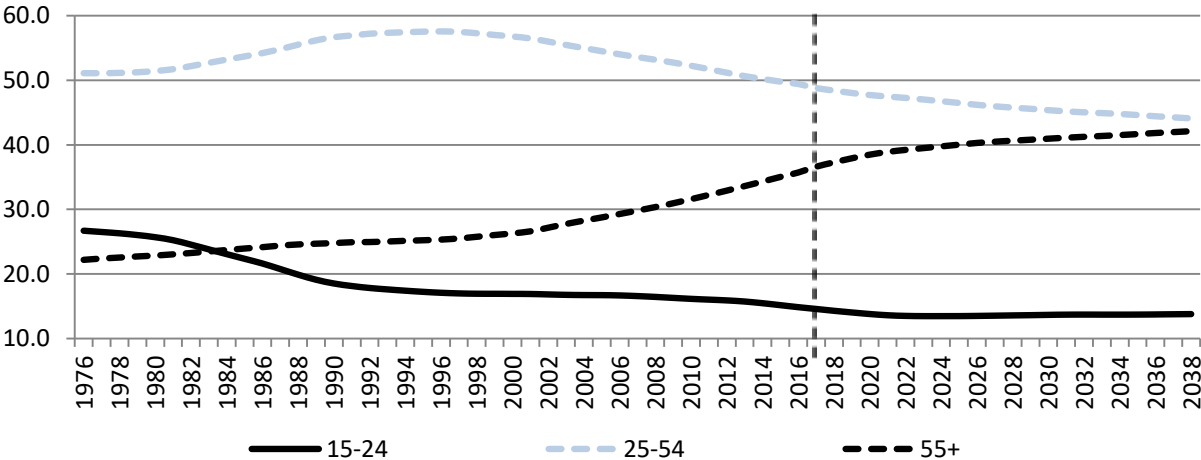
The participation rate for the prime-age age group is expected to remain constant over the projection period, as the historical gains in the participation rate for this group, which were driven by an increase in the participation of women in the labour market, appear to have been fully realized in the mid-2000s. More specifically, the participation rate for prime-age age group is assumed to remain at its 2017 level over the 2017-2038 period (Chart 1). Therefore, we assume that the participation rate for the prime-age age group will experience no change in all of the provinces.⁸

⁸We recognize that with an 8 percentage point gap between the prime age the female and male participation rates there is the possibility that the female rates may converge toward the male rate, especially given the priority the federal government has given to greater inclusion of women in the workforce. However, the male-female participation rate gap stopped falling in 2010 and we assume this post-2010 pattern of a stable gap continues. In any case, continued convergence would have only a small effect on future labour force growth. The lowest prime-age male-female participation rate gap in the world is in Slovenia at 3.1 percentage points in 2015. Canada's gap that year was 8.7 points. A reduction in Canada's gap by 5.6 points by 2038 to the level of the Slovenia would only boost overall labour force growth by 0.09 percentage points per year.

The participation rate for the older age group is assumed to increase over time, but at a diminishing rate, driven by changes to pension systems and increases in average life expectancy, among other factors. The projection for the older age group is based on an equation for a trend line for the national participation rate of the older age group in 2000-2017.⁹ In every province, the participation rate for the older age group is projected to increase at an average annual rate of 0.46 per cent in 2017-2038, down from 2.33 per cent over the 2000-2017 period.

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 decline over the 2017-2038 period (-0.07 per cent per year), driven by compositional changes in the labour force (Chart 3). In particular, the share of the older age group in the working age population is expected to increase markedly from 36.4 per cent in 2017 to 42.1 per cent in 2038, while the shares of the younger and prime-age age groups are expected to decline from 14.5 to 13.7 per cent and from 49.1 to 44.1 per cent, respectively.

Chart 3: Shares of the Working Age Population by Age Group, Canada, Per Cent, 1976-2038



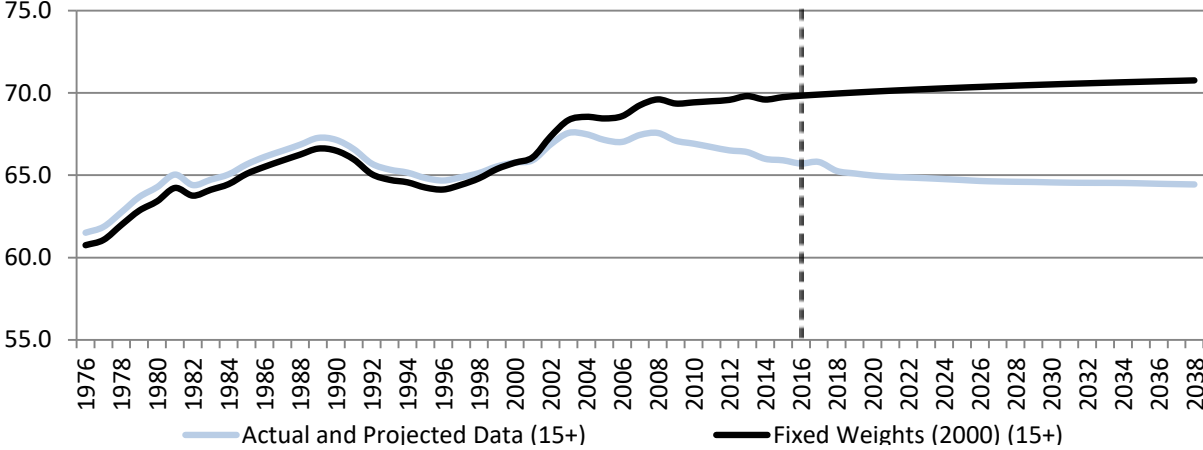
Source: Statistics Canada, CANSIM table 282-0087 and CSLS calculations

Chart 4 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. As expected, the aggregate participation rate would increase, driven by increases in the participation rate for the older age group. In particular, the participation rate would increase from 65.8 per cent in 2000 to 69.9 per cent in 2017 to 70.8 per cent in 2038. However, after allowing for changes in working age population shares, the participation rate stays at 65.8 per cent in 2000 and 2017, even though it increased to 66.0 per cent in 2014, and is expected to fall to 64.4 per cent in 2038. It is important to note that more than half of the contribution of ageing to the evolution of the aggregate participation rate – as shown by the gap between the two series– had

⁹ The equation for the trend line is as follows: $PR_t = 4.9623 \times \ln(t) + 23.434$ where PR_t is the participation rate in year t and $t = 1$ in 2000.

already taken place between 2000 and 2014. In fact, the gap between the two series was 4.1 percentage points in 2017, 64.8 per cent of the projected gap in 2038 (6.3 percentage points).

Chart 4: The Effect of the Age Structure on the Overall Participation Rate, Canada, Per Cent, 1976-2038



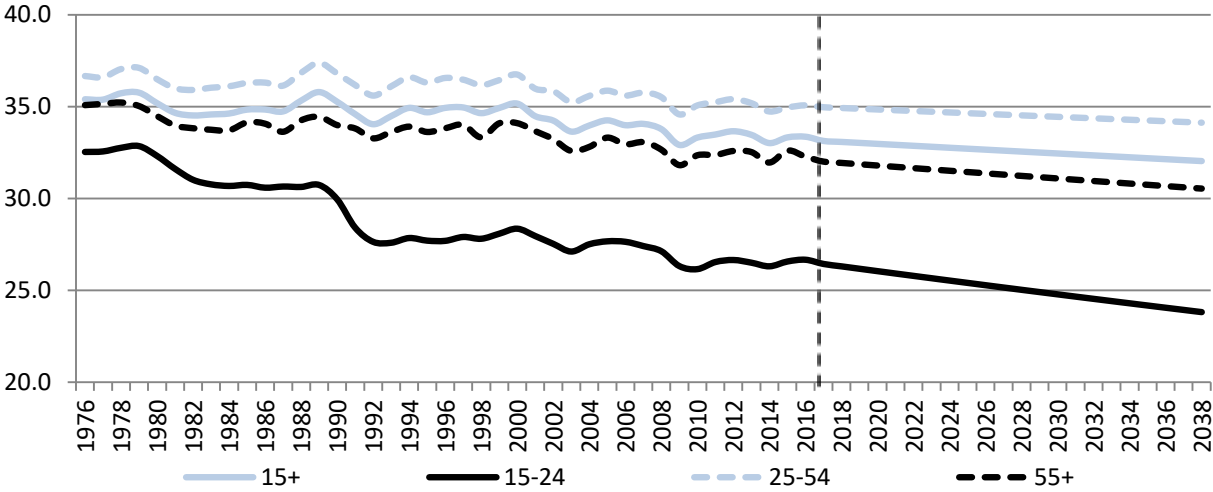
Source: Statistics Canada, CANSIM table 282-0087 and CSLS calculations

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. Growth in average hours worked by age group in each province was assumed to be the same as the growth in average hours worked by age group exhibited at the national level. In particular, average hours worked was assumed to vary in 2017-2038 at the same pace as in 1976-2017; that is, -0.50 per cent per year for the young age group, -0.12 per cent per year for the prime-age age group, and -0.22 per cent per year for the older age group. The sensitivity of the projections to the choice of period for average hours worked growth is illustrated in the fifth section. These assumptions are illustrated in Chart 5.

At the national level, growth in aggregate average hours worked is projected at -0.16 per cent per year for the 2017-2038 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 arrangements, which is in large part attributable to the evolution of the industrial composition of the economy (*i.e.* the servicification of the economy).

Chart 5: Average Hours Worked per Worker by Age Group, Weekly Hours, Canada, 1976-2038



Source: Statistics Canada, CANSIM table 282-0018 and CSLS calculations

Labour productivity

Compared with projecting future developments in total hours worked, projecting the future pace of labour productivity growth is considerably more difficult. Therefore, in the baseline projections, we assume that total economy labour productivity growth will be the same as the historical growth rates for the jurisdiction observed for the 2000-2017 period. The 2000-2017 period was chosen to project economic growth for three reasons: 1) it is a fairly long period; 2) it covers almost two complete business cycles, with one complete cycle in 2000-2007 and nine years of the current business cycle and; 3) it is believed that labour productivity trends in the last 17 years will be more representative of future productivity developments than those over a longer historical period.

Labour productivity growth experienced since 2000 has been somewhat weaker than experienced in the 1980s and 1990s and over the 1981-2017 period (e.g. 0.98 per cent per year in 2000-2017 versus 1.20 per cent per year in 1981-2000 and 1.13 per cent per year in 1981-2017).

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 2000-2017. In addition, the hours estimates 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.

Table 1 summarizes the assumptions and methodology behind the various components of CSLS projections for economic growth. Provincial projections apply the historical national growth rates for both the age-specific participation rates and age-specific trends in average hours, combined with the projection changes in the provincial age structure. Provincial projections for working age population growth are based on official Statistics Canada projections for the

provinces. Projections for labour productivity for a province are assumed to be the same as productivity growth in the province over the 2000-2017 period.

Table 1: Summary of the Assumptions Behind the CSLS Projections for Economic Growth

Variable	Assumption
Labour productivity	We assume that total economy labour productivity growth will be the same as the historical growth rates by province observed over the 2000-2017 period.
GDP deflator (inflation)	We assume that all of 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 and territories.
Average hours worked	We assume that average hours worked in every province will decline at the same pace as at the national level in 1976-2017 (that is, -0.50 per cent for the 15-24 age group, -0.12 per cent for the 25-54 age group, and -0.22 per cent for the 55+ age group).
Participation rates	We assume that, in every province, the participation rate for the 15-24 age group will decline at the same pace as at the national level in 2000-2017 (-0.04 per cent); that the participation rate for the 25-54 age group will remain at its 2017 level; and that the participation rate for the 55+ age group will increase over time, but at a diminishing rate, based on trends observed at the national level in 2000-2017.

Source: Updated from Drummond and Capeluck (2015)

CSLS Economic Projections for Canada and the Provinces for 2017-2038

Table 2 presents estimates for the 2000-2017 period and projections for the 2017-2038 period for labour input growth (total hours), labour productivity growth, and real output growth in Canada and the provinces.¹⁰ Table 3 presents actual data and projections for nominal GDP growth for Canada and the provinces for the 2000-2017 and 2017-2038 periods respectively.

These nominal GDP projections are based on the assumption that all of the provinces will experience inflation (defined as growth in the GDP deflator) of 2.0 per cent per annum over the 2017-2038 period.¹¹ We assumed an inflation rate of 2.0 per cent because this is the current

¹⁰The projections for smaller and less diversified jurisdictions are much more uncertain than those for larger and more diversified jurisdictions. For example, the outlook for small, resource-dependent jurisdictions like Newfoundland and Labrador is greatly dependent on the performance of a small number of sectors (*e.g.* mining and oil and gas extraction) and even projects. However, the projections for resource-dependent jurisdictions do not take into account the sectoral composition of the economy or the outlook for particular projects and sectors. The addition of a small number of natural resource projects to such an economy may have significant implications for both labour productivity growth and labour input growth.

¹¹See Drummond and Capeluck (2015) for a sensitivity analysis that uses historical inflation rates by province and territory from the 2000-2014 period, which ranged from 1.8 per cent per year in British Columbia to 4.1 per cent per year in Newfoundland and Labrador. For Ontario, the average growth of GDP deflator was 1.78 per cent over the period 2000-2014. As the average inflation experienced in Canada over the 2000-2017 period at 1.94 per cent, is not far from the 2.0 per cent assumption this analysis is still relevant. For more details see Appendix Table 7.

target rate of inflation 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 2038.¹²

As the focus of this report is Canada, and to a lesser degree, Ontario historical trends and projections for these two jurisdictions will be highlighted. Canada experienced real GDP growth of 2.01 per cent per year in the 2000-2017 period, with similar contributions from total hours (1.03 per cent) and labour productivity (0.97 per cent). Real GDP growth for Ontario was 1.81 per cent, 0.20 percentage points lower than for Canada, with growth in hours worked and labour productivity 0.14 and 0.06 percentage point lower respectively.

In the 2017-2038 forecast period real GDP growth for Canada falls to 1.56 per cent because of the fall in total hours growth due to slower working age population growth. Labour productivity growth is assumed to be the same as in the 2000-2017 period. The same dynamic is at play at the national level as real GDP for Ontario is projected to fall to 1.46 per cent, again due to the fall in total hours growth. The relative relationships between Ontario and Canada persist, as Canada again has faster growth in real GDP, total hours, and labour productivity.

¹² While the Bank of Canada targets a growth rate for the Consumer Price Index (CPI) rather than a growth rate for the GDP deflator, we believe that these two inflation measures will move in line with each other over much of the 2017-2038 period. In 2000-2017, growth in the GDP deflator was slightly higher than growth in the CPI at the national level (1.94 per cent versus 1.86 per cent per year) due to increases in commodity prices. Note that, in theory, the GDP deflator increases less rapidly than the CPI since the former is chain linked whereas the latter is fixed weighted (albeit with the weights adjusted over time).

Table 2: Long-term Growth in Hours Worked, Labour Productivity and Real GDP Canada and the Provinces, 2000-2017 and 2017-2038 (compound annual per cent growth rates)

	2000-2017			2017-2038		
	Hours Worked	Labour Productivity	Real GDP	Hours Worked	Labour Productivity	Real GDP
	1	2	3	4	5	6
Canada	1.03	0.97	2.01	0.59	0.97	1.56
Newfoundland and Labrador	0.63	1.63	2.27	-1.08	1.63	0.54
Prince Edward Island	0.67	1.07	1.75	0.55	1.07	1.63
Nova Scotia	0.20	1.04	1.24	-0.39	1.04	0.65
New Brunswick	0.22	1.01	1.23	-0.37	1.01	0.64
Quebec	0.92	0.72	1.65	0.28	0.72	1.00
Ontario	0.89	0.91	1.81	0.55	0.91	1.46
Manitoba	0.69	1.55	2.25	0.81	1.55	2.37
Saskatchewan	0.79	1.18	1.98	0.47	1.18	1.66
Alberta	1.93	0.71	2.66	1.50	0.71	2.23
British Columbia	1.29	1.43	2.74	0.76	1.43	2.20

Note: Since real GDP at market prices estimates for 2017 are not yet available for the provinces we use preliminary annual growth estimates from Statistics Canada to approximate real GDP at market prices for the provinces for 2017. Contributions may not add due to rounding. Labour productivity is defined as real GDP per hour worked.

Source: Column 1: Statistics Canada. Table 36-10-0480-01 (former CANSIM Table 383-0033 (CPA total hours worked))

Column 2: Calculated using columns 1 and 3.

Column 3: Statistics Canada. Table: 36-10-0104-01 (formerly CANSIM 380-0064; for Canada 2017); Table: 36-10-0222-01 (formerly CANSIM 384-0038; for 2000-2017); and Table: 36-10-0434-01 (formerly CANSIM 379-0031)

Columns 4-6: CSLS calculations based on Statistics Canada data

Table 3: Long-term Growth in Real GDP, the GDP Deflator, and Nominal GDP, Canada and the Provinces, 2000-2017 and 2017-2038 (compound annual per cent growth rates)

	2000-2017			2017-2038		
	Real GDP	GDP Deflator	Nominal GDP	Real GDP	GDP Deflator	Nominal GDP
	1	2	3	4	5	6
Canada	2.01	1.94	3.99	1.56	2.00	3.59
Newfoundland and Labrador	2.27	2.92	5.25	0.54	2.00	2.55
Prince Edward Island	1.75	2.27	4.06	1.63	2.00	3.66
Nova Scotia	1.24	1.85	3.11	0.65	2.00	2.67
New Brunswick	1.23	2.03	3.29	0.64	2.00	2.65
Quebec	1.65	1.86	3.54	1.00	2.00	3.02
Ontario	1.81	1.79	3.64	1.46	2.00	3.49
Manitoba	2.25	1.99	4.28	2.37	2.00	4.42
Saskatchewan	1.98	3.08	5.12	1.66	2.00	3.69
Alberta	2.66	2.30	5.02	2.23	2.00	4.27
British Columbia	2.74	1.67	4.46	2.20	2.00	4.24

Note: Since real and nominal GDP at market prices estimates for 2017 are not yet available we use preliminary annual growth estimates from Statistics Canada and the National Bank of Canada to approximate real and nominal GDP at market prices for the provinces for 2017. Contributions may not add due to rounding. Contributions may not add due to rounding.

Source: Column 1-3: Statistics Canada. : Statistics Canada. Table: 36-10-0104-01 (formerly CANSIM 380-0064; for Canada 2017); Table: 36-10-0222-01 (formerly CANSIM 384-0038; for 2000-2017); and Table: 36-10-0434-01 (formerly CANSIM 379-0031)

Columns 4-6: CSLS calculations based on Statistics Canada data

II. Comparison of CSLs Projections for Canada and Ontario: 2017-2038 versus 2014-2038

The differences between projections for the 2017-2038 period and 2014-2038 periods for Canada and Ontario are relatively small, but still important. This section of the report compares these two sets of projections (Table 4) and the reasons for the differences. Appendix Tables 1-8 in the detailed tables accompanying this report provide estimates of the annual growth rates for all variables in 2000-14, 2014-17 and 2000-2017 from actual data as well as the projections from the 2015 report for 2014-2038 and the new projections for 2017-2038 for all variables.

There are a number of reasons for changes in the projections between 2014-2038 and 2017-2038. First, the addition of three years of data for 2015, 2016 and 2017 to the post-2000 historical period can change the historical trend between the 2000-2014 and 2000-2017 periods. Second, data revisions to the 2000-2014 period may also have changed growth rates in 2000-2014, and hence contributed to differences between the 2000-2014 and 2000-2017 periods. Third, the dropping of 2015, 2016 and 2017 from the projection period may have changed growth rates between 2014-2038 and 2017-2038 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.

Changes to Projections for Canada

The CSLs projects real GDP in Canada to increase at an average annual rate of 1.56 per cent over the 2017-2038 period, the same growth rate projected for the 2014-2038 period in the 2015 study. As there has been no change in the assumption for the GDP deflator growth of 2.00 per cent per year, nominal GDP growth is also the same as previously projected.

While there is no difference in the real GDP growth in Canada in 2017-2038 relative to 2014-2038, there have been changes in the factors that determine real GDP, namely projections for labour productivity and labour supply or total hours. This latter variable is in turn a function of projections for working age population growth, participation growth, and average hours.

Table 4 shows the projections for these five variables for the 2014-2038 and 2017-2038 periods for Canada, with differences between periods. Contrary to the case for Ontario, Canada's projected annual labour productivity growth goes down by 0.02 percentage points. The productivity projection for 2017-2038 for Canada is based on national historical productivity growth in the 2000-2017 period given by the Canadian Productivity Accounts produced by Statistics Canada, which was 0.97 per cent per year. This was down from 0.99 per cent in the 2000-2014 period that was used in the 2015 projection for the 2014-2038 period.

The reason for this 0.02 percentage point downward trend in productivity growth in 2000-2017 was weaker productivity growth from 2014 to 2017 (0.72 per cent annually) (Appendix Table 5).

The downward change in labour productivity growth for Canada was offset by faster growth in total hours (0.03 percentage points per year, up to 0.59 per cent in 2000-2017 from 0.56 per cent in 2000-2014). This development was a consequence of slower rates of decline in average hours (-0.18 per cent to -0.16 per cent) and the participation rate (-0.09 per cent to -0.07 per cent) being only partly offset by slower growth in working age population (0.88 per cent to 0.86 per cent).

Changes to Projections for Ontario

This report projects real GDP in Ontario to advance at an average annual 1.46 per cent over the 2017-2038 period, 0.04 percentage points higher than the 1.42 per cent growth rate projected for the 2014-2038 period in the 2015 study. As there has been no change in the assumption for the GDP deflator growth of 2 per cent per year, nominal GDP growth is down by a similar magnitude between the two forecast periods.¹³

This appears a trivial change but small differences in growth rates can result in large differences through compounding over time. For example, at 1.46 per cent growth, the real GDP level in 2038 will be 35.6 per cent higher than in 2017 and 0.84 per cent higher than a scenario where the growth rate is 1.42 per cent. Ontario real GDP is estimated to be around \$1,300 billion 2016 dollars in 2038 so a difference of 0.84 per cent is equivalent to \$11 billion dollars just in 2038. When this difference is accumulated over the total 2017-2038 period, the gain is much greater, around \$108 billion 2016 dollars. Very small differences can indeed matter.

The 0.04 percentage points higher projection for real GDP growth in Ontario in 2017-2038 relative to 2014-2038 reflects developments in the factors that determine real GDP, namely projections for labour productivity and labour supply or total hours. This latter variable is in turn a function of projections for working age population growth, participation growth, and average hours.

¹³As an exponent function is used to apply the 2 per cent GDP deflator growth to real GDP levels, nominal GDP growth rates are not exactly 2 percentage points higher than real GDP growth rates.

Table 4: Comparison of CSLS Projections for the 2014-2038 and 2017-2038 Periods for Canada and Ontario (compound annual per cent growth rates)

Canada			
	2014-2038	2017-2038	Period Change (percentage points)
	1	3	4=3-1
Real GDP	1.56	1.56	-0.01
Labour Productivity	0.99	0.97	-0.03
Total Hours	0.56	0.59	0.03
Working-age Population	0.88	0.86	-0.02
Participation Rate	-0.09	-0.07	0.02
Average Hours	-0.18	-0.16	0.02

Ontario			
	2014-2038	2017-2038	Period Change (percentage points)
	1	2	3=2-1
Real GDP	1.42	1.46	0.04
Labour Productivity	0.88	0.91	0.03
Total Hours	0.53	0.55	0.02
Working-age Population	0.85	0.82	-0.02
Participation Rate	-0.09	-0.08	0.01
Average Hours	-0.18	-0.16	0.02

Source: Column 1: 2014-2038 projections from Drummond and Capeluck (2015); Column 2: CSLS projections based on Statistics Canada data

Table 4 shows the projections for these five variables for the 2014-2038 and 2017-2038 periods for Ontario, with differences between periods. It is higher projected labour productivity growth that accounts for most of the increase in the real GDP growth projection. The productivity projection for 2017-2038 for Ontario is based on the province's historical productivity growth in the 2000-2017 period given by the Canadian Productivity Accounts produced by Statistics Canada, which was 0.91 per cent per year. This was up 0.03 percentage points from 0.88 per cent in the 2000-2014 period that was used in the 2015 projection for the 2014-2038 period.

The increase in trend labour productivity growth between 2000-2014 and 2000-2017 reflects the strong productivity performance in Ontario between 2014 and 2017 at 1.40 per cent per year (Appendix 5). We hope that this three-year productivity growth rate is sustainable and this certainly should be the objective of economic policy. But, more realistically, we believe that a long-term average growth rate, in this case 2000-2017, better reflect the likely future productivity path of the Ontario economy.

The change in labour productivity was accompanied by faster growth in total hours (0.02 percentage points, up to 0.55 from 0.53) since slower growth in the working age population (0.85 to 0.82) was offset by a slower decline in participation rates (-0.09 to -0.08) and in average hours (-0.18 to -0.16).

III. Comparison of CSLS Projections for Canada and Ontario: 2017-2040 with Other Forecasters

This section compares the long-term CSLS projection for Canada and Ontario with those from other forecasters. The first sub-section compares the CSLS projections for real output, labour productivity and labour input for Canada with projections from Finance Canada, the Parliamentary Budget Office and the Conference Board of Canada. The second section sub-section provides a similar comparison of CSLS projections for Ontario. with projections done by the Ontario Ministry of Finance, the Financial Accountability Office of Ontario, the University of Toronto, and the Conference Board of Canada.

Projections for Canada

Long-term projections for Canada are prepared by the Conference Board of Canada, the Institute for Policy Analysis at the University of Toronto, and the Parliamentary Budget Office (Table 5). This section reviews these projections and compares them to those of the CSLS.

Table 5: Comparison of Economic Projections for Canada, 2017-2040

	Conference Board of Canada	Finance Canada	Parliamentary Budget Office	CSLS
Nominal GDP	3.8	3.8	3.7	3.6
GDP Deflator	2.0	2.0	2.0	2.0
Real GDP	1.8	1.8	1.7	1.6
Labour Productivity	1.1	1.2	1.1	1.0
Labour Supply	0.7	0.6	0.6	0.6

Note: For the Conference Board, the projections reported correspond to the arithmetic mean of the annual growth projections from 2017 to 2040. For the case of Finance Canada, nominal GDP growth estimates correspond to the arithmetic mean of the annual growth projections reported for the periods 2022-23, 2025-26, 2030-31, 2035-36 and 2040-41, and all the other projections correspond to weighted averages of the projected annual rate of growth for the periods 2017-22, 2023-35, and 2036-55. For the Parliamentary Budget Office, growth rates from the 2023-2091 were assumed to apply to the 2023-2040 sub-period. Sources: Finance Canada (2017), PBO (2017), Conference Board (2017)

Conference Board of Canada

The Conference Board is projecting real GDP growth for Canada of 1.8 per cent per year for the 2017-2040 period, slightly less than its projection for Ontario. It also projects labour force growth of 0.7 per cent, implying labour productivity growth of 1.1 per cent.

Finance Canada

In December 2017 Finance Canada released an update on its long-term projections to 2055 using the medium term forecast in the 2017 Fall Economic Statement as a starting point. Table 6 shows the real GDP projections and the determinants. Real GDP growth is expected to advance at an average rate of 1.8 per cent over the 2017-2055 period, down from 2.7 per cent in 1970-2016. Almost all of this fall is due to much slower labour supply growth, at 0.6 per cent, down more than 0.9 percentage point from 1.5 per cent in 1970-2017. In contrast, labour productivity growth for the 2017-2055 period is projected at 1.2 per cent, the same rate of increase as in 1970-2016.

The 0.9 percentage point decline in labour supply growth is largely accounted for by the 0.7 percentage point fall in working age population growth from 1.5 percent to 0.8 per cent between 1970-2016 and 2017-2055. The 0.5 percentage fall in aggregate participation rate growth from 0.3 per cent to -0.2 per cent also contributed to the slowing of the labour supply

growth. These two factors were offset by a slower pace of decline in average hours per worker, -0.0 per cent in 2017-2055 versus -0.2 per cent in the 1970-2016 period and the stability of the unemployment rate, which had fallen in 1970-2016.

Table 6: Finance Canada Real GDP Growth Projection, Average Annual Growth Rates Per cent, unless otherwise indicated

	1970-2016	2017-2022	2023-2035	2036-2055
Real GDP	2.7	2.0	1.7	1.8
Contributions of (percentage points):				
Labour Supply	1.5	0.7	0.4	0.6
Working-age Population	1.5	1.0	0.9	0.7
Labour Force Participation	0.3	-0.3	-0.4	-0.1
Unemployment Rate	-0.1	0.2	0.0	0.0
Average Hours per Worker	-0.2	-0.1	-0.1	0.0
Labour Productivity	1.2	1.3	1.2	1.2

Note: Contributions may not add due to rounding.
Sources: Statistics Canada; Finance Canada (2017)

Parliamentary Budget Office

The Parliamentary Budget Office (PBO) made its most recent long-term forecast for the Canadian economy in its 2017 Fiscal Sustainability Report in October 2017 (PBO, 2017). As shown in Table 7, real GDP is projected to increase 1.9 per cent per year in 2017-2022 and 1.7 per cent per year in 2023-2091. Assuming that the second growth rate applies to the 2023-2040 sub-period, average growth for the 2017-2040 period is 1.7 per cent. One notes that this is close to the Finance Canada forecast, and to the CSLS forecast.

The PBO projects labour input growth to increase 0.6 per cent per year in 2017-2022 and 0.6 per cent per year in 2023-2091. Assuming that the second growth rate applies to the 2023-2040 sub-period, average growth for the 2017-2040 period is 0.6 per cent.

The PBO projects labour productivity growth to increase 1.3 per cent per year in 2017-2022 and 1.1 per cent per year in 2023-2091. Assuming that the second growth rate applies to the 2023-2040 sub-period, average growth for the 2017-2040 period is 1.1 per cent.

Table 7: Summary of Parliamentary Budget Office Economic Projection for Canada, Average Annual per cent Growth rates

%	1982-2016	2017-2022	2023-2091
Real GDP	2.4	1.9	1.7
Labour Input	1.2	0.6	0.6
Labour Productivity	1.1	1.3	1.1
Nominal GDP	5.0	4.0	3.7
CPI Inflation	2.6	2.1	2.0

Source: Statistics Canada and Parliamentary Budget Office (2017).

University of Toronto

According to the Ministry of Finance Long Term Survey of Economic Forecasts, the University of Toronto is forecasting real GDP growth of 2.1 per cent per year for the 2017-2040 period, higher than the four forecasts in Table 5, whose maximum real growth rate forecast is 1.8 per cent. Unfortunately, no information is available on the split between employment and output per worker growth. Based on the University of Toronto forecast for Ontario where labour productivity accounted for 50 per cent of output growth and employment the other 50 per cent, labour productivity growth in Canada would be expected to be roughly the same as labour supply growth at 1.05 per cent.

Global Insight

Global Insight is forecasting real GDP growth of 2.0 per cent per year for Canada for the 2017-2040 period, again slightly higher than the other four forecasts in Table 5, whose maximum real growth rate forecast is 1.8 per cent. Unfortunately, no information is available on the split between employment and output per worker growth.

Oxford Economics

Oxford Economics is forecasting real GDP growth of 1.7 per cent per year for Canada for the 2017-2040 period, similar to the forecasts from the Conference Board, the PBO, and the Finance Canada. Unfortunately, no information is available on the split between employment and output per worker growth.

Comparison with CSLS projections

Table 5 compares the projections from Finance Canada, the Conference Board of Canada, and the Parliamentary Budget Office (PBO) for growth of nominal and real GDP, labour productivity, and labour supply or input for Canada for the 2017-2040 period with those of the CSLS. The first observation is that the disparity between the CSLS projections and those of the other forecasters is much smaller than for the Ontario projections. A second observation is that for the two organizations that have projections for both Ontario and Canada, namely the CSLS and the Conference Board, the relative performances of the two jurisdictions are reversed. While

the Conference Board projections of real output and labour productivity growth are higher for Ontario than Canada, the CSLS estimates are slightly higher for Canada than Ontario. A third observation is that while the CSLS real GDP and productivity projections for Canada are lower than those of the other three forecasters, this is not the case for labour supply for two of the forecasters.

The Conference Board of Canada and Finance Canada both project annual real output growth for Canada of 1.8 per cent for the 2017-2040 period while the PBO projects a slightly lower real output growth of 1.7 for the same period. The CSLS is close behind at 1.6 per cent. In contrast, the CSLS projection for real GDP growth for Ontario was well below those of the other forecasters.

The slightly slower CSLS real output growth projection for Canada, relative to the three other forecasters, reflects slower labour productivity growth. Finance Canada projects labour productivity growth of 1.2 per cent for the 2017-2040 period. The Conference Board of Canada and the PBO both project 1.1 per cent. The CSLS is close behind at 1.0 per cent.

Again the 0.1-0.2 percentage point lower CSLS labour productivity growth projection for 2017-2040 for Canada relative to other forecasters is based on the assumption that the actual rate of labour productivity growth in the 2000-2017 period, namely 1.0 per cent, will continue for the next two and one half decades.

Productivity growth is notoriously difficult to forecast because of many factors, especially technological shocks, and we recognize that there is consequently much uncertainty associated with productivity forecasts. We provide three reasons to justify our assumption of the continuation of the 2000-2017 trend. First, forecasts have very frequently overestimated productivity growth in the past, and we want not to repeat that mistake. Second, we feel that the productivity growth in 2000-2017 period will more accurately capture future productivity growth than productivity growth based on a longer period because trends before 2000 are less relevant to the future. Third, like Gordon (2016), we are unconvinced that technological change over the next quarter century will be as fundamental as in the pre-2000 period when General Purpose Technologies (GPTs) such as electricity and ICT boosted productivity growth. A continuation of the current trend seems the most realistic scenario. We do recognize that productivity growth is to some degree endogenous and that a sustained demand shock could raise productivity growth. However, we discount the likelihood of such a development.

The CSLS projection for labour input growth for Canada for the 2017-2040 period at 0.6 per cent is identical to the estimates of two of the other forecasts, with Finance Canada and the PBO both at 0.6 per cent and the Conference Board at 0.7 per cent. Note that, unlike other forecasters, Finance Canada does take into account the downward trend in the average hours worked over its projection horizon. They assume -0.1 annual change in the variable, which is smaller than our assumption of -0.16 annual change. It is interesting to note that the CSLS forecast for labour input growth for Canada and Ontario are the same, while the other three other forecasters all have lower labour input growth for Canada than for Ontario.

Table 8: Comparison of Economic Projections for Ontario, 2017-2040

	Ontario Finance	Conference Board	University of Toronto	Financial Accountability Office of Ontario	CSLS
Nominal GDP	4.2	4.0	4.2	3.9	3.5
GDP Deflator	2.2	2.0	2.0	1.8	2.0
Real GDP	2.0	2.0	2.2	2.0	1.5
Labour Productivity	1.2	1.1	1.1	1.1	0.9
Labour Supply	0.8	0.9	1.1	0.9	0.6

Note: As many forecast are only to one decimal, all estimates in this section are only at one decimal for consistency. Contributions may not add due to rounding. 2017-2040 CSLS estimates are assumed to be the same as 2017-2038 estimates.

Source: Columns 1-4: Provided by the Economic and Revenue Forecasting and Analysis Branch of the Ministry of Finance.

Column 5: CSLS projections based on Statistics Canada data.

Comparisons for Ontario

In addition to the long-term projections for nominal and real GDP growth made for Ontario made by the Centre for the Study of Living Standards in this report, projections to 2040 are made by the Ontario Ministry of Finance, Conference Board of Canada, the University of Toronto and the Financial Accountability Office of Ontario (Table 8). Projections to 2027 are made by the Centre for Spatial Economics.

Conference Board of Canada

The Conference Board of Canada (2018) projects nominal GDP growth of 4.0 per cent per year for Ontario for the 2017-2040 period, well above the 3.5 per cent CSLS projection. As both organizations assume that the GDP deflator will increase at 2.0 per cent per year, the 0.5 percentage point difference is due to differences in projections for real GDP growth (2.0 per versus 1.5 per cent). This gap in real growth rates reflects differences in assumptions for both labour input and labour productivity growth.

The Conference Board projects that labour input, proxied by employment as no estimates of total hours are given, will advance 0.9 per cent per year over the 2017-2040 period. This is considerably higher than the CSLS projection of 0.6 per cent for labour input. One reason for this

difference is that the CSLS estimate is based on total hours which accounts for changes in average hours worked. As shown in Table 4 average hours are expected to fall 0.16 per cent per year over the 2017-2038 period.

The Conference Board projection implies labour productivity growth (output per worker) of 1.1 per cent for the 2017-2040. This projection of labour productivity comes out of a production function approach to potential output involving estimates of total factor productivity and capital accumulation. The labour productivity estimate is 0.2 percentage points higher than the CSLS Ontario labour productivity estimate of 0.9 per cents, which is a projection of Ontario's actual labour productivity growth from 2000 to 2017.

This robust labour productivity projection is driven by strong capital accumulation and multi-factor productivity growth.¹⁴ Indeed, the Conference Board forecasts TFP to increase at 0.6 per cent over the 2017-2040 period, well above the performance in the 2000-2017. Indeed, Statistics Canada reports that aggregate MFP in the Canada actually fell 0.2 per cent per year between 2000 and 2016¹⁵ (CANSIM Table 383-0021). Caution should be exercised however in comparing the Statistics Canada estimate with the Conference Board TFP forecast as the official estimate is for the business sector, not the total economy, and is based on a different methodology. Despite these differences, the contrast is stark.

University of Toronto

The projections for Ontario for the 2017-2040 done by the Institute for Policy Analysis at Rotman School of the University of Toronto are similar to those of the Conference Board, with nominal GDP growth of 4.2 per cent for the 2017-2040 period, GDP deflator growth of 2.0 per cent and real GDP growth of 2.2 per cent. The University of Toronto projects the same labour productivity growth as the Conference Board at 1.1 per cent, and slightly higher labour input growth at 1.1 per cent.¹⁶ Again the U of T estimates for productivity and labour supply are higher than the CSLS estimates.

Ontario Ministry of Finance

The report on the long-term economic prospects for Ontario released by the Ontario Ministry of Finance in March 2017 is similar to that produced by the Conference Board for nominal output growth, the GDP deflator and real output. In the base case scenario, it projects nominal GDP growth of 4.2 per cent, a GDP deflator growth of 2.2 per cent, and real GDP growth of 2.0 per cent for the 2017-2040 period. The Ontario Ministry of Finance projects labour

¹⁴ Multifactor factor productivity, also known as total factor productivity is the increase in output not accounted for by the growth in labour and capital inputs. It is calculated at the rate of growth of real output minus the weighted growth rate of inputs where the weights are the income shares of capital and labour.

¹⁵ CANSIM Table 383-0021 reports multifactor productivity, value-added, capital input and labour input in the aggregate business sector and major sub-sectors, by North American Industry Classification System (NAICS)

¹⁶ They are less explicit about the assumption they make regarding the average hours worked. Like other forecasters, they seem to implicitly assume that the variable does not continue its downward trend over time.

force growth of 0.8 per cent and labour productivity growth of 1.2 per cent.¹⁷ This productivity growth assumption is based on the actual productivity growth for Ontario from 1982 to 2015.

The Ontario Ministry of Finance does recognize the uncertainty associated with its productivity assumption and includes a high-productivity growth scenario with output per hour averaging 1.6 per cent over the 2017-2040 period and a low productivity scenario at 0.8 per cent growth. This latter scenario is consistent with the CSLS scenario.

Financial Accountability Office of Ontario

In their 2017 Fall Ontario Economic Outlook the Financial Accountability Office of Ontario reports long term projections of nominal and real GDP and labour supply almost identical to those of the Conference Board, at 3.9 per cent, 2.0 per cent and 0.9 per cent respectively. This implies labour productivity growth of 1.1 per cent over the 2017-2040 period. Their real GDP estimates are also equivalent to those from The Ontario Ministry of Finance, but 0.5 percentage points higher than the CSLS projected real GDP.

Centre for the Study of Spatial Economics

The long-term projections from the Centre for Spatial Economics (CSE) only go to 2027 so cannot be compared with the projections for 2017-2040 from the other organizations. But it is interesting to note that over the 2017-2025 period the CSE projections for nominal GDP, the GDP deflator, real GDP, and employment were very similar to those by the Conference Board, the University of Toronto, and the Ontario Ministry of Finance. This may imply that over the 2027-2040 period the same relationship would hold.

Comparison with CSLS projections

Table 8 summarizes the projections for growth of nominal and real GDP, GDP deflator, labour productivity, and labour supply or input for Ontario for the 2017-2040 period. An interesting pattern emerges. The projections from the Ontario Ministry of Finance, the University of Toronto, the Financial Accountability Office of Ontario and the Conference Board are relatively similar while the CSLS projections are slightly lower, except for the GDP deflator.

The Ontario Ministry of Finance, the Conference Board, and the University of Toronto all project nominal output growth of 4.0 per cent per year or more for the 2017-2040 period for Ontario. In contrast, the CSLS projects only 3.5 per cent, a major difference of at least 0.5 percentage points. Since the GDP deflator growth across forecasters ranges in 1.8-2.2, the contrast between the CSLS projected real output and the rest of forecasters also holds. The highest projection for real output comes from the University of Toronto, with annual growth of 2.2 percentage points, followed by the Ontario Ministry of Finance, the Conference Board and the Financial Accountability Office of Ontario, all with 2.0 per cent projections. Projecting annual real output growth of 1.5 per cent, the CSLS estimate is the most conservative of all the

¹⁷In their public document presenting their long-term projections, there is no mention of how average hours worked would develop over time. Hence, they too appear to assume no change in the average hours worked over the projection horizon.

forecasters. Needless to say, the lower CSLS forecast has very important fiscal implications for the Ontario government, which are beyond the scope of this report.

The slower CSLS real output growth projection for Ontario, relative to the three other forecasters, reflects both slower labour input growth, and slower labour productivity growth, with the former stemmed from our assumption of falling average hours worked over time.

Most of the other forecasters do not appear to consider a scenario in which average hours worked continues its well-established downward trend over time whereas we assume -0.16 annual change in the variable over the projection horizon. It seems that their forecasts are based on the assumption that the average hours worked remains constant.

Labour productivity growth for the four forecasters is 1.1-1.2 per cent compared to only 0.9 per cent for the CSLS, labour input growth is 0.8-1.1 per cent compared to 0.6 per cent. The 0.2-0.3 percentage point lower CSLS labour productivity growth projection for 2017-2040 for Ontario relative to other forecasters is based on the assumption that the actual rate of labour productivity growth in the 2000-2017, namely 0.9 per cent, will continue for the next two and one half decades.

The reasons for the 0.2-0.5 percentage lower CSLS labour supply growth relative to those of the three other forecasters are more difficult to identify as data on the three drivers of labour supply (working age population, labour force participation, and average hours worked) appear not readily available from the three other forecasters. One likely factor is the inclusion of the average hours terms in the CSLS calculation of total labour input. Given the downward trend of 0.16 percentage points for average hours per worker projected for the 2017-2040 period by the CSLS, based on the 1976-2017 historical trend, total hours worked will increase at a slower rate in the CSLS projection than in projections which do not have an average hours variable. Another possible reason for the weaker CSLS labour supply growth may be that this projection is based on a disaggregation of trends for participation rates and average hours worked into three age groups and the use of projections of the future shares of these age groups in the total working age population to calculate total labour supply growth.

IV. Conclusion

This report first updates the long-term economic projections for Canada and the provinces made by Drummond and Capeluck (2015) with data from 2015, 2016 and 2017.¹⁸ The report then discusses these projections for Canada and Ontario for the 2017-2038 period, comparing them with the 2015 projections for the 2014-2038 period. It also compares the projections for these jurisdictions with those of three other forecasters. The key findings of the report are highlighted below.

¹⁸ An earlier update based on 2015 and 2016 data was produced in the fall of 2017. See Sharpe (2017).

- As the basic methodology used in the study is unchanged from that used in the 2015 study, the updating of the projections based on three additional years of historical data has little impact on the projections.
- The CSLS currently projects real output growth of 1.6 per cent for Canada for the 2017-2038 period, based on labour productivity growth of 1.0 per cent and labour input growth of 0.6 per cent.
- For Ontario the CSLS projections are close to those for Canada. Real output growth is projected to advance 1.5 per cent based on 0.9 per cent labour productivity growth and 0.6 per cent for labour input growth.
- The CSLS real GDP projection for Canada for the 2017-2040 period of 1.6 per cent per year is slightly less rosy than those of other forecasters. The Conference Board of Canada, Finance Canada and the Parliamentary Budget office all forecast 1.7-1.8 real output growth for Canada, 0.1-0.2 percentage points above the CSLS projection.
- The lower CSLS real output projection for Canada compared to the other forecasters is largely due to slower labour productivity growth (0.1-0.2 points below the other forecasters). Two of the other forecasters had the same growth rate for labour supply (0.6 per cent) and the other was only 0.1 percentage point higher.
- The CSLS real GDP projection for Canada for the 2017-2038 period was the same as that for the 2014-2038 period, but there were changes in the projected growth of the factors that determine real GDP, with projections for labour productivity annual growth decreasing (0.02 percentage points) and total hours annual growth increasing (0.03 percentage points).
- The CSLS real GDP projection for Ontario for the 2017-2040 period of 1.5 per cent per year is considerably less rosy than those of other forecasters. The Conference Board of Canada, the University of Toronto, the Ontario Ministry of Finance and the Financial Accountability Office of Ontario all forecast 2.0-2.2 per cent real output growth for the province, 0.5-0.7 percentage points above the CSLS projection.
- The lower CSLS real output projection for Ontario compared to other forecasters is due to both slower labour productivity growth (0.2-0.3 points below the other forecasters) and slower labour supply growth (0.2-0.5 percentage points below the other forecasters).

The key conclusion of the report is that it is the productivity assumption that is of paramount importance for economic projections. The CSLS is more pessimistic about the outlook for labour productivity growth, and hence real output growth, for Ontario, and to a lesser degree Canada, than other forecasters because it believes that the best guide to productivity growth over the next quarter century is the productivity performance of the economy over the recent past (2000-2017).

References

Conference Board of Canada (2017) “Provincial Outlook: Long-term Economic Forecast 2017”

Drummond, Don and Evan Capeluck (2015) “Long-term Fiscal and Economic Projections for Canada and the Provinces and Territories, 2014-2038,” CSLs Research Report 2015-08, July, prepared for the Council of the Federation, <http://www.csls.ca/reports/csls2015-08.pdf>

Finance Canada (2017) “Update of Long-term Economic and Fiscal Projections” December.

Gordon, Robert (2016) *The Rise and Fall of American Growth: US Living Standards Since the Civil War* (Princeton University Press).

Ontario Ministry of Finance (2017) “Ontario’s Long-Term Report on the Economy,” March 1.

Parliamentary Budget Office (2017) “Fiscal Sustainability Report, 2017” October 5.

Appendix Tables

Appendix Table 1: Working Age Population (compound annual per cent growth rates)

	00-14	14-17	00-17	(00-17) – (00-14)	2014-2038	2014- 2038	2017-2038	(17-38) – (14-38)
	1	2	3	4 = 3-1	5	6	7	8 = 7-5
Canada	1.33	1.05	1.28	-0.05	0.88	0.88	0.86	-0.02
NFLD	0.24	0.12	0.22	-0.02	-0.47	-0.47	-0.52	-0.05
PEI	0.87	0.85	0.86	0.00	0.88	0.88	0.85	-0.03
NS	0.41	0.40	0.41	0.00	0.03	0.03	-0.01	0.04
NB	0.28	0.16	0.26	-0.02	0.05	0.05	0.02	-0.03
Quebec	1.04	0.63	0.96	-0.07	0.59	0.59	0.58	-0.01
ON	1.45	1.21	1.41	-0.04	0.85	0.85	0.82	-0.03
MAN	0.95	1.24	1.00	0.05	1.03	1.03	1.03	0.00
SAS	0.95	0.95	0.95	0.00	0.71	0.71	0.72	0.01
ALB	2.55	1.47	2.36	-0.19	1.78	1.78	1.77	-0.01
BC	1.27	1.29	1.27	0.00	1.05	1.05	1.02	-0.03

Source: Column 1-3: Statistics Canada. CANSIM Table 282-0002

Column 5: CSLsreport, Drummond and Capeluck (2015)

Projections Column 6-7: CANSIM Table 052-0005 and CSLs calculations

Appendix Table 2: Labour Force Participation Rate (compound annual per cent growth rates)

LFPR (all)							
	00-14	14-17	00-17	(00-17) -(00-14)	2014-2038	2017-2038	(17-38)-(14-38)
	1	2	3	4 = 3 - 1	5	6	7 = 6 - 5
Canada	0.02	-0.12	0.00	-0.02	-0.09	-0.07	0.02
NFLD	0.68	-1.11	0.36	-0.32	-0.35	-0.36	-0.01
PEI	0.20	-1.28	-0.07	-0.27	-0.07	-0.09	-0.02
NS	0.18	-0.50	0.06	-0.12	-0.20	-0.17	0.03
NB	0.18	-0.94	-0.01	-0.19	-0.20	-0.18	0.02
Quebec	0.18	0.09	0.16	-0.02	-0.11	-0.09	0.02
ON	-0.13	-0.49	-0.19	-0.06	-0.09	-0.08	0.01
MAN	-0.01	-0.30	-0.06	-0.05	-0.03	-0.01	0.02
SAS	0.31	-0.29	0.20	-0.11	-0.03	-0.03	0.00
ALB	0.05	-0.15	0.01	-0.04	-0.04	-0.04	0.00
BC	-0.17	1.05	0.05	0.22	-0.09	-0.06	0.03

Source columns 1-3: Statistics Canada. CANSIM table 282-0087

Column 5: CSLS report, Drummond and Capeluck (2015)

Column 6: Based on CSLS calculation

Appendix Table 3: Average hours worked (compound annual per cent growth rates)

Canada	1976-2014	1976-2017	(76-17) -(76-14)	00-14	14-17	00-17	(00-17) -(00-14)	2014-2038	2017-2038	(17-38) -(14-38)
(National Averages)	1	2	3=2-1	4	5	6	7=6-4	8	9	10=9-8
15-24	-0.56	-0.50	0.06	-0.53	0.16	-0.41	0.12	-0.56	-0.50	0.06
25-54	-0.14	-0.12	0.02	-0.40	0.22	-0.29	0.11	-0.14	-0.12	0.02
55+	-0.24	-0.22	0.02	-0.46	0.05	-0.37	0.09	-0.24	-0.22	0.02
Total (all ages)	-0.18	-0.16	0.02	-0.45	0.19	-0.34	0.11	-0.18	-0.16	0.02

Source: CANSIM Table 282-0018 and CSLS calculations

Appendix Table 4: Total Hours Worked (all jobs) LFS average hours based (compound annual per cent growth rates)

	00-14	14-17	00-17	(00-17)- (00-14)	2014- 2038	2017- 2038	(17- 38)- (14-38)
	1	2	3	4 = 3 - 1	5	6	7 = 6 - 5
Canada	0.89	1.33	0.97	0.08	0.56	0.59	0.03
NFLD	1.15	-2.27	0.54	-0.61	-1.09	-1.08	0.01
PEI	0.82	-0.31	0.62	-0.20	0.58	0.55	-0.03
NS	0.23	-0.15	0.16	-0.07	-0.41	-0.39	0.02
NB	-0.02	0.83	0.13	0.15	-0.40	-0.37	0.03
Quebec	0.66	1.78	0.86	0.20	0.24	0.28	0.04
ON	0.71	1.50	0.85	0.14	0.53	0.55	0.02
MAN	0.50	1.24	0.63	0.13	0.78	0.81	0.03
SAS	1.01	-0.52	0.74	-0.27	0.44	0.47	0.03
ALB	2.35	-0.45	1.85	-0.50	1.49	1.50	0.01
BC	0.77	3.21	1.20	0.43	0.73	0.76	0.03

Source columns 1-3: Statistics Canada. CANSIM table 282-0018

Column 5: CSLs report, Drummond and Capeluck (2015)

Column 6: Based on CSLs calculation

Appendix Table 5: Labour Productivity (compound annual per cent growth rates)

CPA hours based						
	00-14	00-14 Revised	14-17	00-17	(00-17)-(00-14)	(00-17)-(00-14)
	1	2	3	4	5 = 4 - 2	6 = 4 - 1
Canada	0.99	1.02	0.72	0.97	-0.05	-0.02
NFLD	1.66	1.17	3.39	1.63	0.46	-0.03
PEI	1.01	0.99	2.61	1.07	0.09	0.06
NS	1.11	0.98	1.63	1.04	0.06	-0.07
NB	1.16	1.07	1.30	1.01	-0.06	-0.15
Quebec	0.96	0.71	0.23	0.72	0.00	-0.24
ON	0.88	0.84	1.40	0.91	0.07	0.03
MAN	1.54	1.46	1.26	1.55	0.08	0.01
SAS	1.42	1.05	1.38	1.18	0.13	-0.24
ALB	0.80	0.64	-0.13	0.71	0.07	-0.09
BC	1.40	1.51	0.90	1.43	-0.09	0.03

Source columns 2-4: Statistics Canada. CANSIM table 383-0033 (CPA Total hours worked) and CANSIM table 282-0038 (Real GDP).

Column 1 & 7: CSLs report, Drummond and Capeluck (2015)

Column 8-9: Based on CSLs calculation

Appendix Table 6: Real GDP, all industries (compound annual per cent growth rates)

	00-14	00-14 Revised	14-17	00-17	(00-17)-(00-14)	2014- 2038	2017- 2038	(17-38)-(14-38)
	1	2	3	4	5 = 4 - 1	6	7	8 = 7 - 6
Canada	2.03	2.05	1.80	2.01	-0.02	1.56	1.56	0.00
NFLD	2.54	2.60	-0.61	2.27	-0.27	0.55	0.54	-0.01
PEI	1.82	1.64	1.86	1.75	-0.07	1.60	1.63	0.03
NS	1.40	1.27	1.12	1.24	-0.16	0.70	0.65	-0.05
NB	1.14	1.11	1.58	1.23	0.09	0.76	0.64	-0.12
Quebec	1.59	1.61	1.80	1.65	0.06	1.20	1.00	-0.20
ON	1.67	1.61	2.77	1.81	0.14	1.42	1.46	0.04
MAN	2.17	2.27	2.05	2.25	0.08	2.33	2.37	0.04
SAS	2.35	2.31	0.22	1.98	-0.37	1.87	1.66	-0.21
ALB	3.21	3.43	-1.12	2.66	-0.55	2.30	2.23	-0.07
BC	2.44	2.55	3.32	2.74	0.30	2.14	2.20	0.06

Source columns 2 - 4: Statistics Canada. CANSIM table 379-0030 (provincial) 379-0038 (national)

Column 1 & 6: CSLS report, Drummond and Capeluck (2015)

Column 7-8: Based on CSLS calculation

Appendix Table 7: GDP Deflator (compound annual per cent growth rates)

	00-14	14-17	00-17	(00-17)- (00-14)
	1	2	3	4=3-1
Canada	2.21	0.70	1.94	-0.27
NFLD	3.74	-1.22	2.92	-0.82
PEI	2.30	2.13	2.27	-0.03
NS	1.83	1.44	1.85	0.02
NB	2.02	1.81	2.03	0.01
Quebec	1.86	1.59	1.86	0.00
ON	1.82	1.77	1.79	-0.03
MAN	2.13	1.30	1.99	-0.14
SAS	4.21	-1.57	3.08	-1.13
ALB	3.44	-2.70	2.30	-1.14
BC	1.69	1.60	1.67	-0.02

Source columns 2 - 3: Statistics Canada. CANSIM table 384-0038

Column 1: CSLS report, Drummond and Capeluck (2015)

Appendix Table 8: Nominal GDP (compound annual per cent growth rates)

	Historical Provincial Rates						
	00-14	14-17	00-17	(00-17)- (00-14)	2014- 2038	2017- 2038	(17- 38)- (14-38)
	1	2	3	4 = 3-1	5	6	7
Canada	4.28	2.53	3.99	-0.29	3.81	3.53	-0.28
NFLD	6.47	-0.48	5.25	-1.22	4.64	3.47	-1.17
PEI	4.12	4.44	4.06	-0.06	3.89	3.94	0.05
NS	3.14	2.58	3.11	-0.03	2.66	2.51	-0.15
NB	3.14	3.66	3.29	0.15	2.92	2.68	-0.24
Quebec	3.47	3.45	3.54	0.07	3.12	2.88	-0.24
ON	3.46	4.59	3.64	0.18	3.22	3.28	0.06
MAN	4.41	3.48	4.28	-0.13	4.55	4.41	-0.14
SAS	6.63	-1.13	5.12	-1.51	6.12	4.79	-1.33
ALB	6.88	-3.58	5.02	-1.86	5.74	4.58	-1.16
BC	4.24	5.28	4.46	0.22	3.95	3.90	-0.05
	Constant 2 per cent inflation						
Canada					3.59	3.59	0.00
NFLD					2.56	2.55	-0.01
PEI					3.63	3.66	0.03
NS					2.71	2.67	-0.04
NB					2.78	2.65	-0.13
Quebec					3.22	3.02	-0.20
ON					3.44	3.49	0.05
MAN					4.38	4.42	0.04
SAS					3.90	3.69	-0.21
ALB					4.35	4.27	-0.08
BC					4.18	4.24	0.06

Source columns 1 - 3: Statistics Canada. CANSIM table 384-0038

Column 5: CSLS report, Drummond and Capeluck (2015)

Column 6: Based on CSLS calculation of GDP deflator

Appendix Table 9A: LFPR (15-24) (compound annual per cent growth rates)

	00-14	14-17	00-17	(00-17)- (00-14)	2014- 2038	2017- 2038	(17-38)- (14-38)
	1	2	3	4 = 3 - 1	5	6	7 = 6 - 5
Canada	-0.02	-0.15	-0.04	-0.02	-0.02	-0.04	-0.02
NFLD	1.67	1.26	1.60	-0.07	-0.02	-0.04	-0.02
PEI	0.11	-0.54	0.00	-0.11	-0.02	-0.04	-0.02
NS	0.28	-0.52	0.14	-0.14	-0.02	-0.04	-0.02
NB	0.30	-0.93	0.07	-0.23	-0.02	-0.04	-0.02
Quebec	0.69	-0.36	0.51	-0.18	-0.02	-0.04	-0.02
ON	-0.47	-0.64	-0.50	-0.03	-0.02	-0.04	-0.02
MAN	-0.40	-0.77	-0.46	-0.06	-0.02	-0.04	-0.02
SAS	0.12	-0.87	-0.06	-0.18	-0.02	-0.04	-0.02
ALB	-0.33	-0.51	-0.36	-0.03	-0.02	-0.04	-0.02
BC	0.03	2.64	0.49	0.46	-0.02	-0.04	-0.02

Source columns 1-3: Statistics Canada. CANSIM table 282-0087

Column 5: CSLS report, Drummond and Capeluck (2015)

Column 6: Based on CSLS calculation

Appendix Table 9B: LFPR (25-54)(compound annual per cent growth rates)

	00-14	14-17	00-17	(00-17)- (00-14)	2014- 2038	2017- 2038	(17-38)- (14-38)
	1	2	3	4 = 3 - 1	5	6	7 = 6 - 5
Canada	0.12	0.31	0.15	0.03	0.00	0.00	0.00
NFLD	0.81	-0.35	0.71	-0.10	0.00	0.00	0.00
PEI	0.18	-0.58	-0.02	-0.20	0.00	0.00	0.00
NS	0.38	0.05	0.27	-0.11	0.00	0.00	0.00
NB	0.44	-0.11	0.42	-0.02	0.00	0.00	0.00
Quebec	0.31	0.81	0.36	0.05	0.00	0.00	0.00
ON	-0.01	-0.03	-0.02	-0.01	0.00	0.00	0.00
MAN	-0.01	-0.11	-0.04	-0.03	0.00	0.00	0.00
SAS	0.04	0.06	0.09	0.05	0.00	0.00	0.00
ALB	0.00	0.21	0.01	0.01	0.00	0.00	0.00
BC	0.08	0.89	0.12	0.04	0.00	0.00	0.00

Source columns 1-3: Statistics Canada. CANSIM table 282-0087

Column 5: CSLS report, Drummond and Capeluck (2015)

Column 6: Based on CSLS calculation

Appendix Table 9C: LFPR (55+)(compound annual per cent growth rates)

	00-14	14-17	00-17	(00-17)- (00-14)	2014- 2038	2017- 2038 Revised	(17- 38)- (14-38)
	1	2	3	4 = 3 - 1	5	6	7 = 6 - 5
Canada	2.71	0.60	2.33	-0.38	0.50	0.45	-0.05
NFLD	4.74	-1.88	3.55	-1.20	0.50	0.45	-0.05
PEI	3.90	-1.91	2.85	-1.05	0.50	0.45	-0.05
NS	3.76	0.63	3.20	-0.56	0.50	0.45	-0.05
NB	3.79	-0.32	3.05	-0.74	0.50	0.45	-0.05
Quebec	3.00	0.62	2.58	-0.43	0.50	0.45	-0.05
ON	2.60	0.16	2.17	-0.44	0.50	0.45	-0.05
MAN	2.57	0.61	2.23	-0.35	0.50	0.45	-0.05
SAS	2.62	-0.20	2.10	-0.50	0.50	0.45	-0.05
ALB	2.51	0.12	2.08	-0.43	0.50	0.45	-0.05
BC	1.96	2.63	2.08	0.12	0.50	0.45	-0.05

Source columns 1-3: Statistics Canada. CANSIM table 282-0087

Column 5: CSLS report, Drummond and Capeluck (2015)

Column 6: Based on CSLS calculation

Appendix Table 10A: Average hours worked (LFS) (compound annual per cent growth rates)

	00-14	14-17	00-17	(00-17)- (00-14)	2014-2038 (1976- 2014 national level)	2017-2038 (1976- 2017 national level)	(17-38)- (14-38)
	1	2	3	4 = 3 - 1	5	6	7 = 6 - 5
Canada	-0.45	0.19	-0.34	0.11	-0.18	-0.16	0.02
NFLD	-0.16	-0.21	-0.17	-0.01	-0.18	-0.16	0.02
PEI	-0.36	-0.17	-0.32	-0.01	-0.18	-0.16	0.02
NS	-0.37	-0.26	-0.35	0.02	-0.18	-0.16	0.02
NB	-0.48	0.93	-0.23	0.15	-0.18	-0.16	0.02
Quebec	-0.60	0.45	-0.42	0.18	-0.18	-0.16	0.02
ON	-0.49	0.30	-0.35	0.14	-0.18	-0.16	0.02
MAN	-0.40	0.31	-0.28	0.12	-0.18	-0.16	0.02
SAS	-0.34	-0.32	-0.34	0.00	-0.18	-0.16	0.02
ALB	-0.26	-0.63	-0.33	-0.07	-0.18	-0.16	0.02
BC	-0.41	0.51	-0.25	0.16	-0.18	-0.16	0.02

Source columns 1-3: Statistics Canada. CANSIM table 282-0018

Column 5: CSLS report, Drummond and Capeluck (2015)

Column 6: Based on CSLS calculation

Appendix Table 10B: Average hours worked all jobs (CPA), all industries (compound annual per cent growth rates)

	00-14	14-17	00-17	(00-17)- (00-14)	2014- 2038 (1997- 2014 national level)	2017- 2038 (1997- 2017 national level)	(17-38)- (14-38)
	1	2	3	4 = 3 - 1	5	6	7 = 6 - 5
Canada	-0.30	-0.16	-0.27	0.02	-0.32	-0.25	0.07
NFLD	-0.09	-0.62	-0.18	-0.09	-0.32	-0.25	0.07
PEI	-0.32	0.10	-0.25	0.07	-0.32	-0.25	0.07
NS	-0.25	-0.57	-0.31	-0.06	-0.32	-0.25	0.07
NB	-0.31	0.59	-0.15	0.16	-0.32	-0.25	0.07
Quebec	-0.47	0.03	-0.38	0.09	-0.32	-0.25	0.07
ON	-0.39	0.05	-0.31	0.08	-0.32	-0.25	0.07
MAN	-0.26	-0.06	-0.22	0.04	-0.32	-0.25	0.07
SAS	-0.07	-0.63	-0.17	-0.10	-0.32	-0.25	0.07
ALB	0.02	-0.83	-0.13	-0.15	-0.32	-0.25	0.07
BC	-0.17	-0.20	-0.18	0.00	-0.32	-0.25	0.07

Source columns 1-3: Statistics Canada. CANSIM Table 383-0033

Column 5: CSLS report, Drummond and Capeluck (2015)

Column 6: Based on CSLS calculation

Appendix Table 11: Total Hours Worked (CPA based) All Jobs (compound annual per cent growth rates)

	00-14	14-17	00-17	(00-17)- (00-14)
	1	2	3	4 = 3 - 1
Canada	1.02	1.09	1.03	0.01
NFLD	1.32	-2.55	0.63	-0.69
PEI	0.89	-0.34	0.67	-0.22
NS	0.35	-0.50	0.20	-0.15
NB	0.16	0.51	0.22	0.06
Quebec	0.78	1.60	0.92	0.15
ON	0.80	1.35	0.89	0.10
MAN	0.65	0.88	0.69	0.04
SAS	1.16	-0.92	0.79	-0.37
ALB	2.52	-0.77	1.93	-0.59
BC	0.99	2.70	1.29	0.30

Source columns 1-3: Statistics Canada. CANSIM Table 383-0033