

The Effect of Recession on Youth Unemployment Rate: Canada and Nova Scotia

By

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Abstract

Youth unemployment rates have increased greatly after the 1990-1992 recession and even more so after the 2007-2008 financial crisis. With youth education levels increasing, there is a strong reason to study why youth in the labour market were affected more in the recent crisis than in the 1990s. Youth are currently faced with unpaid internships, temporary contracts, lower wages and underemployment. Researchers are left wondering what the current youth are lacking to obtain the same economic opportunities that their parents with the same education levels had. To assess the impact of recession on youth unemployment rate, a general overview of the trends indicates a rise in youth unemployment rates during recession. After the latest recession of 2008-08, youth unemployment rate has not yet gone back to its pre-recession level. To isolate the impact of recession from that of other determinants of unemployment rate, a regression model is estimated with unemployment rate lagged by one year, GDP per capita, labour force participation rates of females and seniors and minimum wage rate. Cross section and time series annual data based on Labour Force Surveys and National Income Accounts are pooled for the period 1991-2014 for the ten provinces of Canada. Separate models are estimated for the overall youth in the labour force, for those who have acquired high school education and for those who have acquired post-secondary education. Estimates of the model indicate that while youth unemployment rates were affected by economic recessions nationally, there was no effect of recession on youth unemployment rate in Nova Scotia which may be due to the dominance of those industries in the provincial economy which are not affected significantly by economic cycles.

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I. Objective of the Study

The objective of this study is to investigate the effect of recession on the unemployment rate of youth workers; those aged 15-24 years, in Canada and in Nova Scotia. First, a review of recent trends and the literature on youth unemployment rate is provided. This review is followed by an investigation of the impact of economic recession on youth unemployment rate by controlling for the effect of other determinants of unemployment rate using regression analysis. Studying the difference between Canada and Nova Scotia is important because the province of Nova Scotia has a smaller economy that offers fewer opportunities to its youth than do most of the provinces outside of Atlantic Canada. Declining population growth over the past 25 years has created added challenges for the economy of this province, thereby further reducing the economic opportunities for the youth.

The data used in this analysis are based on the annualized Canadian Labour Force Surveys (LFS), conducted quarterly by Statistics Canada. These data are available in the Canadian Socioeconomic Database (CANSIM) created by Statistics Canada. Separate regression models are estimated using data for all youth, for those who have acquired high school education, and for those who have acquired post-secondary education. These estimations are conducted separately for Canada and for Nova Scotia.

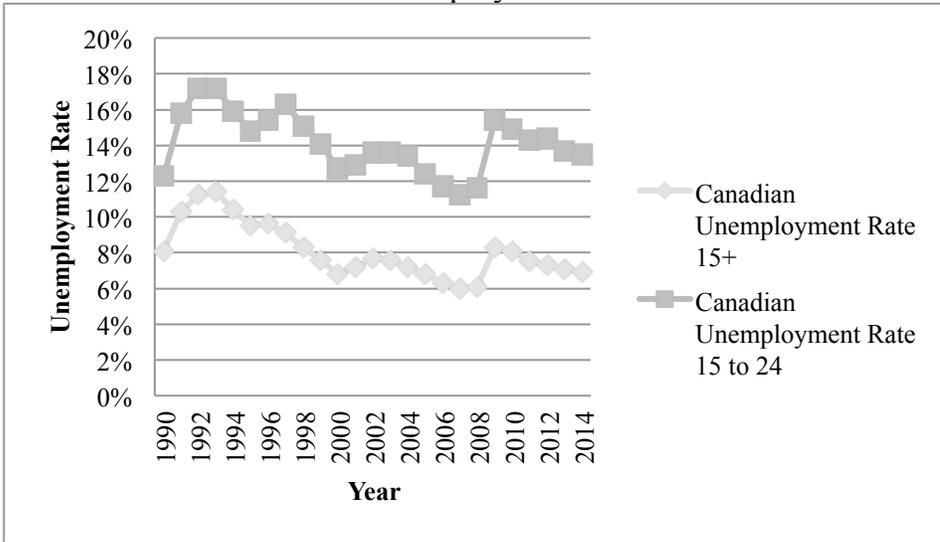
II. Youth Unemployment Rates in Canada and Nova Scotia: A Review of Recent Trends and Literature

Canadian unemployment data are affected by the trends observed in larger provinces such as Alberta, British Columbia, Ontario and Quebec. With about 43 percent of its population being rural, Nova Scotia comprises numerous rural communities whose members have very high unemployment rates that continue to rise as rural economies shrink largely due to migration of population towards urban areas within the province and to other provinces. Youth who wish to stay in their hometowns face substantial disadvantage as their towns begin to lose their industries and labour force.

Unemployment rate is one of the indicators of the state of the economy. It is important to study the unemployment rate separately for youth as they form an important component of the labour force with long-term attachment. Their current performance in labour market can determine their future performance and hence the future economic growth.

Canadian labour market data show youth are facing an unemployment rate double that of the overall adult population, those aged 15 and over, as shown in Chart 1 below. It is apparent that youth and the overall adult unemployment rates increased significantly at the time of recession in 1990-1992 and in 2007-2008. These were the two major recessions that occurred over the last two decades.

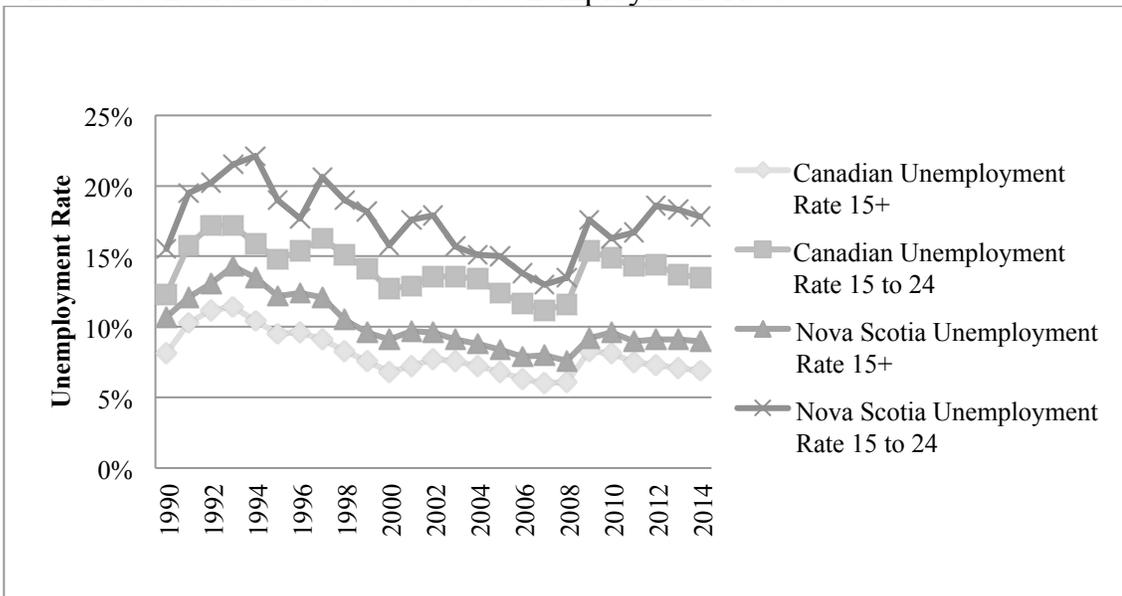
Chart 1: Youth and Adult Unemployment Rates In Canada



Source: Statistics Canada (CANSIM, Table 282-0004).

Youth unemployment rates for overall adults and youth in Canada and in Nova Scotia are compared in Chart 2. The national rates are reproduced from Chart 1 to allow for easy comparison. It is observed that both nationally and provincially, the unemployment rates of youth have been below the overall adult rate. Nova Scotia’s unemployment rates have been consistently higher than the national rates.

Chart 2: Canadian and Nova Scotia Unemployment Rates



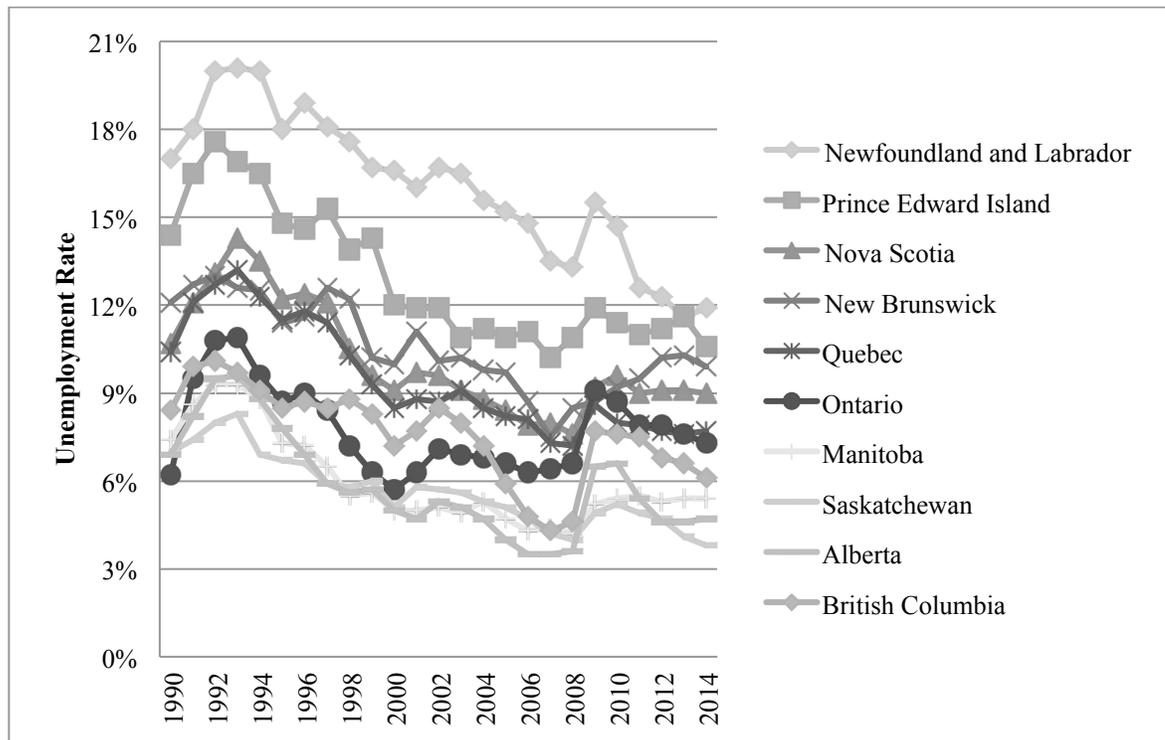
Source: Statistics Canada (CANSIM, Table 282-0004).

A number of economic factors affect youth unemployment rates. Hence, to study the impact of recessions on youth unemployment, this study will control for the impacts of some main factors, including economic growth as captured in GDP per capita, labour force participation rates of females and seniors, adult and youth unemployment rates, and education levels of youth and adults. The rationale for including each of these variables in a regression model will be provided in Section III.

III. Economic Recessions and Unemployment Rate Trends among Youth and Adults

An economy is facing recession when growth in its Gross Domestic Product (GDP) decreases for more than two consecutive quarters (Ragan and Lipsey, 2008, p. 458). Over the period of this study, two major recessions occurred, one during 1991-92 and the other during 2007-08. According to Ben Bernanke, a famous US economist, the global economy faced the worst financial crisis in history, including the Great Depression, in the months of September and October of 2008 (Worstell, 2015). It is perhaps for this reason that the 2007-08 recession is now termed as the “financial crisis”, a term that will also be used in this study when discussing the 2007-08 recession. The crisis caused economists, politicians, and citizens to focus on creating more jobs and lowering the adult unemployment rate. Reducing the adult unemployment rate was one of the key labour market policies for economic recovery and by 2014; overall unemployment rates reached levels similar to the levels present just before the crisis. The unemployment rates in Canada vary by provinces due to differences in the strengths of provincial economies. The overall annual provincial unemployment rate data for Canada are presented in Chart 3 to provide a comparison of the annual provincial unemployment rates in Canada.

Chart 3: Canadian Unemployment Rates by Province



Source: Statistics Canada (CANSIM, Table282-0004).

Earlier, Chart 2 compared data on youth and overall adult unemployment rates in Canada and Nova Scotia. Canadian Youth experienced slower decline than adults after the 2007-08 crisis. However, in Nova Scotia, their unemployment rate rose from 17.6 percent in 2009 to 17.8 percent. On the other hand, the adult unemployment rate fell in Canada and Nova Scotia from 2009 to 2014.

Nationally, from 2000 to 2014, the Canadian average unemployment rate for both sexes who were in their prime working age group, 25 to 54 years, was about 6 percent, which is less than half of the 13.3 percent average unemployment rate that youth aged 15 to 24 experienced during this period (based on CANSIM Table 282-0004). During the same time period, the average unemployment rate for both sexes aged 25 to 54 resident in Nova Scotia was about 7.5 percent for all education levels, which was also less than half of the

youth unemployment rate that stood at about 15.4 percent on average in the province (based on CANSIM Table 282-0004, 2015). The average labour force participation rate for youth in Canada was 61.6 percent over this period and decreased in each year after 2008, which was the year at the peak of financial crisis. After significant layoffs, youth are likely to pursue further schooling in order to increase their future job prospects. The labour force participation rate of those aged 25 to 54 years remained steady at around 86 percent (based on CANSIM Table 282-0004).

In the post financial crisis period, the youth unemployment rate in Canada continued to increase, increasing by about 3.8 percentage points during 2009-14. In the year 2014, it stood at 15.4 percent. In contrast, the unemployment rate among workers aged 25 to 54 years rose from 5.1 percent to 7.1 percent in this period. One explanation for the significant difference in the unemployment rates of the two demographic groups is that during an economic recession youth are the first to be laid off due to their lack of experience, seniority, knowledge of the workplace and union strength. It is less costly for an employer to hire for an entry level position than it is to hire a new employee to replace a senior employee who has accumulated firm specific human capital and is a valuable asset. Another reason why the youth unemployment rate increased more than the adult unemployment rate is because youth are fighting for experience and were accepting unpaid internships and temporary jobs that are not secure. Often these positions pay less than industry average or do not pay at all. This makes it far easier for employers to lay off youth because when youth unemployment rates increase, youth wages decrease due to slack in the labour market which gives employers the opportunity to offer more unpaid internships due to the increase in competition between youth looking to gain experience.

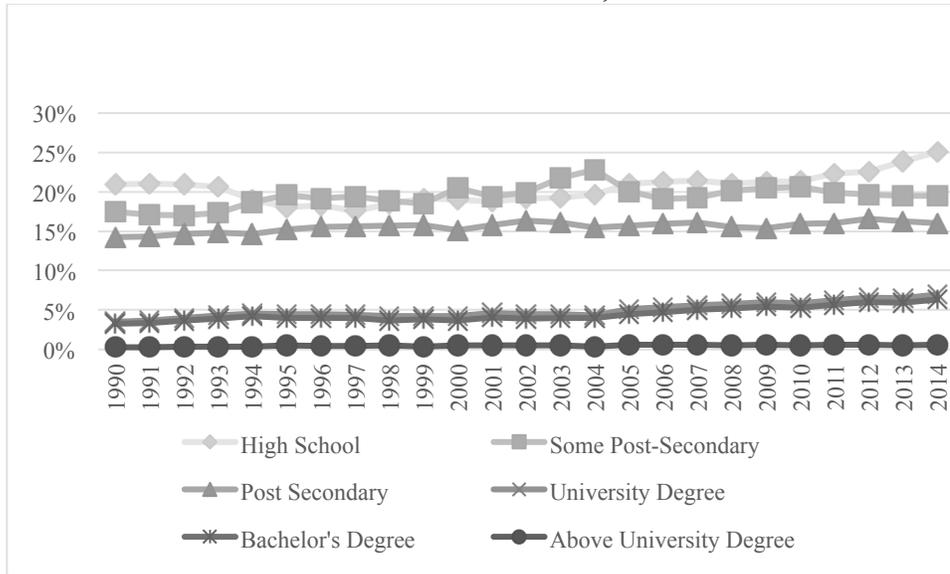
After a recession, youth experience wage scarring due to the low wages or unpaid internships that they are forced to accept. According to Karen Foster “Today’s young workers already constitute an entire cohort that will never afford the standard of living of their parents or even their grandparents” (Goar, 2012). The most cited paper on this topic was *The Long-Term Effects of Youth Unemployment* by Thomas Mroz (Goar, 2012) He stated that youth who were out of work for six months fell 2.3 percent behind their peers and after four years they had still not caught up (Goar, 2012).

As was observed in the previous Charts, youth unemployment in Canada has been slow to recover after the 2007-08 crisis. In fact, Nova Scotia youth are experiencing a higher unemployment rate than they did during the 2007-2008 crisis. Youth are twice as likely to be laid off compared to their adult counterparts, 60.4 percent of youth in 2012 were employed one month and unemployed the next month because they were laid off (Bernard, 2013). This is because it is less expensive to replace a new worker compared to an experienced worker. According to Bernard, the monthly layoff rate for youth increased from about 3 percent in 2007 to 4 percent in 2009 after the recession ended. The monthly layoff rate for youth as of 2012 had not decreased to the 2007 level. (Bernard, 2013)

IV. Youth Education Levels and their Unemployment Levels in Canada and Nova Scotia

Education levels among Canadian youth have increased from 1990 to 2011. As shown in Chart 4, there was a more rapid rise in the percentage of those holding university degrees since 2004.

Chart 4: Canadian Youth Education Levels, 1990-2014



Source: Statistics Canada (CANSIM, Table 282-0004).

However, the proportion of youth in low skilled occupations has remained unchanged over this time period (Certified General Accountants Association of Canada, CGAAC, 2012). The improvement in youth’s jobs has been minor compared to their improvements in educational attainments. The CGAAC study also found that the gap in unemployment rates for youth who hold post-secondary certificates and university degrees is decreasing. Another striking finding of the CGAAC study was that 24.6 percent of all youth who held university degrees, and were employed in full-time jobs in 2005, were underutilized as they were employed in occupations that did not require university education. If they were able to utilise their educational credentials within their communities in a way that meets their expectations, they would be encouraged to stay in the communities where they belonged and contributed to the economy.

Some studies have also found that youth in Canada are taking time off from school in order to work and earn money so that they can pay for their education (Flanders, 2014). This phenomenon may be partly responsible for an increase in their graduation age and

leaving them out of the university or bachelor’s degree statistics in their youth (Flanders, 2014). The percentage of youth having some postsecondary education decreased significantly from 22.79 percent to 19.07 percent from 2004 to 2006. It has averaged at around 20 percent. The rise of university degree holders may also have caused this percentage to decline. According to Employment and Social Development Canada (ESDC, 2012), 53.6 percent of Canadians aged 15 and older held trade certificates, college diplomas and university degrees as of 2012. The 25 to 44 years age group was the top achiever in terms of educational attainment. About 69.2 percent of individuals in this age group were postsecondary graduates. The ESDC study did not cover the youth age group in particular, but their reported data also show a significant rise in youth education levels. One study conducted by the Higher Education Quality Council of Ontario found that 61 percent of Canadians who were 15 year old wanted to complete one or more university degrees with 34 percent of them wanting to acquire more than one degree (Cheung, 2007).

Although youth education levels have increased significantly over the past two decades, their unemployment rates have increased at all educational levels, as is shown in Table 1 below.

Table 1: Youth Unemployment Rates by Education Level 2007-2014 (%)

Education level	2007	2008	2009	2010	2011	2012	2013	2014
High School Graduate	9.5	10.7	14.6	14.1	13.1	12.8	12.8	12.5
Some Postsecondary	8.9	9.3	13.1	12.8	12	12.4	12.4	12.5
University Degree	7.7	6.5	8.1	8.3	8.6	10	9.2	9.8

Source: Statistics Canada (CANSIM, Table 282-0004).

Rising educational attainments of youth, despite their rising unemployment rates, gives some indication that Canadian youth are trying to meet labour market needs by enhancing their education. According to Statistics Canada in the 2007/08 academic year, 978,480 Canadian students were enrolled in undergraduate and graduate programs. This number was double the amount of students who were in university in 1980. (Statistics Canada, 2009) This is not a pure demographic increase. There were 3 percent less youth in Canada in 2010 compared to 1980. Part of the increase in university degree enrolments could be due to the increase in scholarships and bursary programs, but this is likely offset by the increase in tuition prices as the average tuition in Canada has increased three-fold from \$1,464 in the early 1990s to \$5,581 according to the Canadian Federation of Students. (Canadian Federation of Students, 2013)

According to estimates provided by Statistics Canada and Association of University and Colleges of Canada (AUCC, 2011) Canadian students aged 18-21 comprised 52 percent of all full-time university students in 2010. This composition of youth enrolment in university degree programs is expected to fall over the current decade due to the decrease in population aged 18-21 years. Those in the 22 to 24 years age group contributed about 23.7percent of full-time university enrolments. All combined, youth made up about 76 percent of all full-time university students in Canada. Even with youth population decreasing in Newfoundland and Labrador, and in Quebec, youth enrolment numbers among the 18-21 year age group in those two provinces grew much higher than the decline in their population (AUCC, 2011). According to AUCC in 2011 the number of jobs filled by university graduates increased from 1.9 million in 1990 to 4.4 million in 2010 (AUCC, 2011). From 2004 to 2010, employment growth for bachelor's degree

holders was 28 percent compared to 17 percent for college graduates and 4 percent for high school graduates which provided evidence that medium to high paying jobs for higher education levels were being created at a significant rate.

Western Canada experienced significant growth of university graduates. From 2004 to 2010 about 76 percent of new jobs in British Columbia were filled by university graduates, while the rest were filled by college graduates (AUCC, 2011). In Alberta from 2004 to 2010, university graduates filled 58 percent of new jobs while college graduates filled 31 percent, with all other education levels filling the remaining 11 percent of positions. Saskatchewan had similar patterns during the same time period, with 50 percent of new jobs filled by university graduates and 31 percent by college graduates (AUCC, 2011).

Human Resources and Skills Development Canada in 2011 had projected that 1.4 million new jobs will be created over the 2008 to 2017 period and 75 percent of these jobs are expected to require postsecondary education (AUCC, 2011). AUCC also predicted that 4.1 million jobs will open up due to retirements and 70 percent of these jobs will require postsecondary education. Jobs requiring postsecondary education are projected to grow at an average of 1.6 percent per year compared to one percent or less for other jobs as per HRSDC prediction (AUCC, 2011).

The recent rise in educational attainments of Canadian youth does not necessarily mean that they are also adequately equipped to meet labour market needs. In fact, the number of well-educated youth who see themselves as overqualified for most available jobs is increasing. According to Richard Brisbois et al (2015), new vocational programs need to

be developed to help educated youth properly enter the labour market and to encourage professional trades. The current labour market demand is for highly skilled and educated workers which youth are trying to meet by enhancing their education, but they are enrolling in degree programs that have accumulated a larger labour supply of graduates than jobs demanded in that field (Brisbois, et al, 2015). Youth in the current generation are not able to acquire the careers that their parents and grandparents were able to acquire without having significantly higher education in most cases (Brisbois, et al, 2015).

Economic challenges for Nova Scotia youth

Nova Scotia's youth are faced with challenges typical to smaller provinces. An important focus of the now famous Ivany Report (Ivany et al., 2014) is the challenges faced by the youth in Nova Scotia. Nova Scotia is home to the largest percentage of seniors in its total population. The latest census data indicate that about 17 percent of its population comprises of those who are aged 65 and above. This percentage is expected to grow if the trends forecasted in Table 2 persist.

Table 2: Projected Population Change by Age Group and Region, Nova Scotia, 2009 to 2034

	< 20 Yrs	20 - 64 Yrs	>64 Yrs	Total Population
Nova Scotia	-30%	-21%	41%	-4%
Cape Breton	-29%	-26%	44%	-13%
Northern Valley	-26%	-20%	50%	-10%
Southwest	-4%	-2%	42%	-6%
HRM	-37%	-9%	40%	-6%
	-2%	-13%	49%	1%

Source: Ivany et al. (2014).

The Ivany report also noted that Nova Scotia has had a net out-migration of population from 1971 to 2012. A majority of the out-migrants were young skilled workers and educated youth who seek economic opportunities elsewhere in the country (Ivany et al., 2014).

Low fertility rates, outmigration of population and the growing percentage of seniors in total population are most likely to result in adverse effects on economic growth of Nova Scotia. The adverse economic effects arise from a decline in market for goods and services, due to a decline in the demanders of goods and services when population shrinks. Shrinking population of consumers would result in a decline of business investments thereby reducing job opportunities. A decline in the population of youth would also reduce the availability of workers who can do the types of jobs that elderly cannot do. Of course, rising population of seniors can also create a shift in the composition of demand for goods and services thereby stimulating economic activity, but youth are too impatient to wait for this to happen. Hence, it is important for the province to develop appropriate programs to reduce outmigration of population in general and of youth in particular, and makes employers aware of the importance of retaining youth in the labour force. Besides protecting the decline of human capital, youth retention is also important to care for the elderly population. By protecting the decline of labour force, youth retention will also help maintain the population of taxpayers thereby preventing the current public debt from rising. The Ivany report also recognized that Nova Scotia has a highly educated labour force and that the province's youth are enrolling in post-secondary education, but are faced with higher unemployment rates since the past recession of 2007-

08. It was also discussed in the previous section that the youth unemployment in Canada and in Nova Scotia increased since the Financial Crisis of 2007-2008.

The effect of the removal of mandatory retirement

Employers begin to hold on to existing talent instead of hiring new talent after a country experiences a recession. This makes it difficult for youth to enter into the labour market. But, even with these practices, youth with higher education levels are performing better post 2007-08 recession than the low-skilled. The lower-skilled and disadvantaged youth are also much more prone to wage scarring after a financial crisis than youth with college and university degrees.

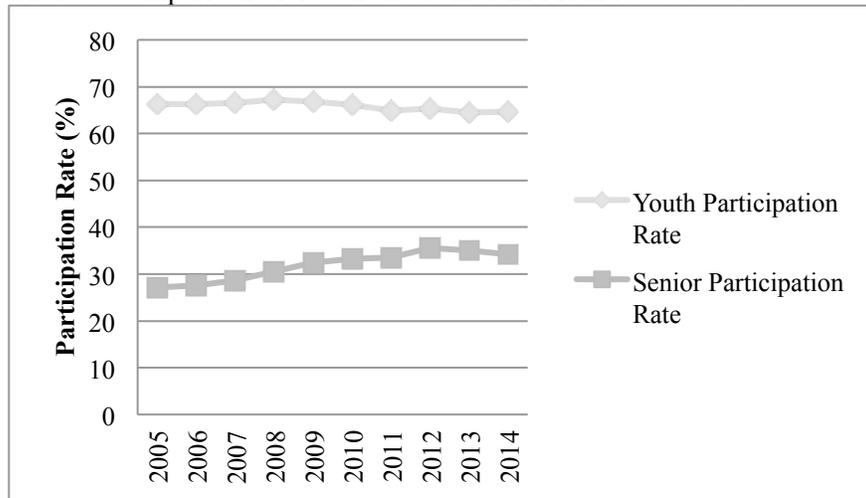
The removal of mandatory retirement in 2012 has made it more difficult for youth to enter into the labour market. This is because 25 percent of seniors are re-entering the labour force in low paid sales and service occupations (MacEwen, 2012). In addition to the increase in participation in these occupations, 33 percent of all employees over 65 are low-wage (MacEwen, 2012). These low wage positions are normally taken by youth to build up their experience in the labour market. It has become a waiting game for youth in some industries waiting for the old age population to retire to create opportunities for the people working under them who could move into their role. Seniors in big firms are retiring early and youth are concentrated in entering the service sector in smaller firms (Auer, P. & Fortuny, M, 2000). This is assuming that the elderly population in the labour force is not in entry level rather they are in management or senior management positions. When they push off retirement, it can slow down the development of middle management, experienced workers and entry level workers because each position is

unable to move into the next role in their development plan. This causes youth who graduate from postsecondary and bachelor's degrees to wait for entry levels to open up in these industries.

From 2006 to 2011 the senior population aged 65+ increased by 14.1 percent in Canada according to the 2011 Census and according to the AUCC the 65+ population will double from 2010 to 2030 (AUCC, 2011). This is expected to create growth in finance, social and health care service industries to help support the old age population. Some specific jobs such as those of social workers, financial advisors, nurses and doctors all require different levels of postsecondary education which youth have and are continuing to obtain. This is especially true in Nova Scotia where seniors (those aged 65 years and over) comprised 16.6 percent of population the highest in Canada in 2011 (AUCC, 2011).

Nova Scotia is currently not equipped to handle the change required to meet the demand of elderly population, as seen from the example of 2,400 seniors currently waiting on average 13 months to get long term care in nursing homes (Mellor, 2013). Having a senior population this large that remains in the labour force is one of the factors that causes youth unemployment rate to remain the highest in Canada as seen in Chart 5.

Chart 5: Comparison of Youth and Senior LFPR in Nova Scotia



Source: Statistics Canada (CANSIM, Table 282-0004).

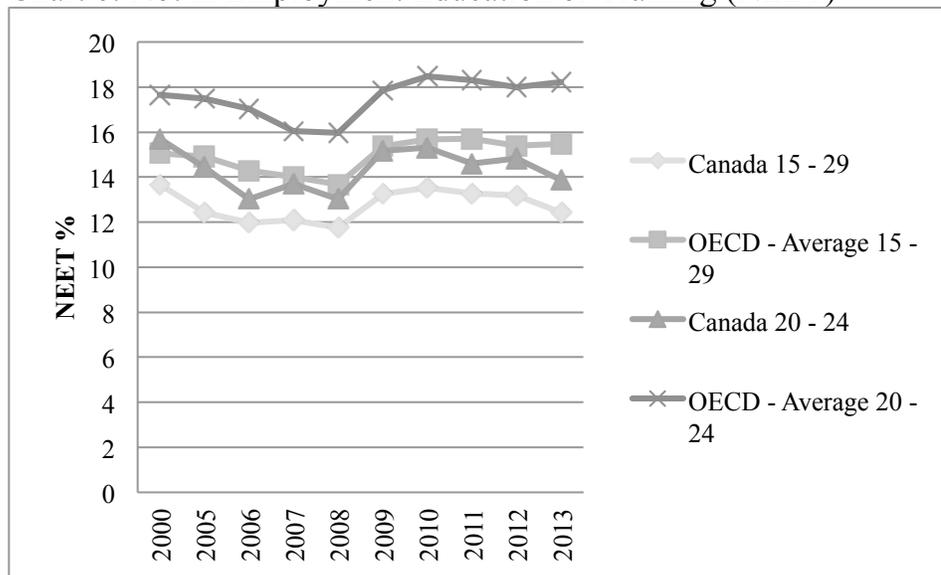
Chart 5 illustrates the labour force participation rate (LFPR) of seniors by province. Over the past 10 years, LFPR of Nova Scotia seniors has increased by 7.1 percentage points while LFPR of youth in the province went down by 1.6 percentage points. There is a correlation between the two, but as indicated above, youth and seniors are not always substitutes. An established senior professional can normally not be replaced by a youth who had recently graduated from university. On the other hand, 1 in 3 seniors over 65 have gone back to work in low wage positions (MacEwen, 2012). The proportion of seniors in low paid sales and service occupations is 25 percent (MacEwen, 2012). This creates competition for youth looking to enter workforce in the sales and service industry. According to Organization for Economic Cooperation and Development (OECD), youth who struggle to find work are at significant risk of falling into the “Neither employment, education or training category (NEET)” (OECD, 2015a). The decrease in youth participation rate in Nova Scotia would mean that youth are either going back to school, migrating out of the province, or leaving the labour force. This phenomenon is of concern

to economic policymakers in Nova Scotia because of its negative economic implications as discussed earlier.

Participation, unemployment, and neither employment, education or training (NEET) rates for youth and labour force

From 2000 to 2014, the average participation rate for youth in Canada with a bachelor's degree averaged around 80 percent compared to a participation rate of 90 percent for workers aged 25 to 54 who hold a bachelor's degree (based on CANSIM Table 282-0004, 2015). The 20 percent of Canadians who are not in the labour force are either enrolled in educational institutions, unemployed or no longer looking for work. The not in employment, education or training (NEET) statistics is an indicator of how youth are performing in the labour market. According to the NEET statistics provided by the OECD Canada's youth aged 20 to 24 are performing better than in other OECD countries with an average NEET rate of approximately 14 percent for Canadian youth compared to a 17 percent average for the entire OECD. Canadians aged 15 to 29 also performed better than the OECD average with a NEET rate of 11.74 percent compared to the OECD average of 13.66 percent in the same age group (2008 data) (OECD, 2015). After the financial crisis, the percentage of people in the NEET category and the age group 15 to 29 and 20 to 24 in both Canada and the rest of the OECD countries increased as shown in Chart 6.

Chart 6: Not in Employment Education or Training (NEET)



Source: OECD (2015a).

The NEET rate is important, especially in the age group 20 to 24 years old. Most youth enrol in post-secondary education at age 18 and finish their certificate, diploma or bachelor's degree by the time they are 22. If the NEET rate is high for this age group then it may be indicating that youth are not getting employed when they have finished their education. There are many downsides to youth who are in the 20 to 24 years age group being in the NEET statistic. Youth, who become discouraged after failing to find work, especially those who have already obtained post-secondary education and end up in the NEET statistic are more likely to partake in welfare programs or engage in criminal activity (OECD, 2015b).

V. Factors that Impact Youth Unemployment Rates in an Economic Recession

According to Verick (2012), the three major factors that can impact youth unemployment in a recession are: (i.) the degree of economic contraction (ii.) the sectoral composition of

employment prior to an economic contraction and (iii.) the institutional structures of the labour market. Youth find it harder to find employment after an economic contraction due to hiring freezes and they are more likely to be laid off first when job cuts occur. This makes their unemployment rate more sensitive to economic contraction than the adult unemployment rate (Choudhry, et al., 2012).

This prediction was found to be true in Canada in the post- 2007-2008 financial crisis period. Canada experienced a smaller economic contraction (recession) compared to its neighbour, the United States. However, youth in Canada were greatly affected by the financial crisis as is seen in Chart 5. The increase in youth unemployment rate because of the crisis was about double that of the adult unemployment rate. The effect on Nova Scotia youth was longer lasting as they appear to be still suffering from the effects of the financial crisis. Their unemployment rate continues to be higher than in 2009 and the adult unemployment rate was lower in 2014 than it was in 2009 as shown in Chart 5. The sectoral composition of employment prior to the crisis is important to analyze in Canada because it can help explain if youth in different provinces performed differently because of the sectoral change in their economies. In terms of youth unemployment rate, one can see that each province has performed differently after the financial crisis. The provinces experiencing low youth unemployment rates were the provinces with thriving industries that offer high quality jobs in the oil and natural resource industries. These provinces were Manitoba, Saskatchewan, Alberta and British Columbia. All of these provinces have significant natural resource industries and some other industries to create jobs for adults. Another example of this is the large decrease in youth unemployment rate in Newfoundland and Labrador where the rate has decreased significantly after the 1990-

1992 recession and the 2007-2008 financial crisis. Nova Scotia has not performed well after the financial crisis and has a youth unemployment rate in 2014 almost the same as soon after the financial crisis. This is likely due to the structural make up of Nova Scotia. Nova Scotia relies heavily on the public sector for economic growth. Pulp paper is becoming less profitable creating job losses and the forestry and fishing sectors are not creating enough jobs to make up for not having a strong oil and gas industry (Canadian Broadcasting Corporation, 2015).

VI. The Econometric Model and Data used for its Estimation

The previous section reviewed some broad trends and literature on the youth unemployment rates in Canada and Nova Scotia over the period 1991 – 2014. Changes observed since the financial crisis of 2007-08 were also analyzed in light of available literature. In the present section, an econometric analysis of youth unemployment rate will be conducted for Canada and Nova Scotia. The Canadian data are pooled across the ten provinces for the period 1991-2014. Several factors affect the youth unemployment rate. Hence, it is important to isolate the effect of economic cycles on unemployment rates by controlling as much of those factors as possible. In the present study, four important determinants of youth unemployment rates are identified. These include, GDP per capita, female labour force participation rate, senior's labour force participation rate, minimum wage and lagged unemployment rate of youth. The rationale for including each variable is discussed below.

GDP per capita

Differences in GDP per capita reflect differences in economic conditions across Canadian provinces. Since annual data are used in this study, they also capture the effect of economic growth on the unemployment rate. A rising GDP per capita is an indicator of good economic times when spending by the general public is high and business investment is rising. Hence, one would expect employment levels to be rising and unemployment will be falling. One would therefore expect a negative relationship between the GDP per capita and unemployment rate.

Female labour force participation

Declining fertility rates, increased introduction of anti-discriminatory programs, and changing social attitudes towards women's work are often suggested as possible factors for a rise in female participation in labour force that has been observed over the past four decades (Benjamin, et. al, 2012, p. 35 and Gunderson, 1976). Increasing entry of women in the labour force has increased competition for youth for the kind of jobs they do. A large percentage of female labour force is employed in the retail, service and in entry level jobs. According to the Status of Women Canada (2015), as of the year 2012, 55 percent of all jobs in the service sector, and only 22 percent of jobs in the goods-producing sector, were filled by women. Women also had a low representation in skilled trades representing only 5% of the workforce. These jobs are also popular among youth workers because of their lack of experience in the labour force and also because many of them may be giving preference to pursuing education at that age. Hence, female labour may be viewed as substitute for youth labour.

Previous work in labour supply literature has found that women are strong substitutes for youth (Grant and Hamermesh, 1981) in the United States. The LFPR of female workers should be an important control variable while determining the effect of recessions on youth unemployment. We expect the youth unemployment rate to be positively related to the LFPR of female workers in Canada.

Labour force participation of seniors

Youth are unable to obtain relevant work experience before entering the labour force to match the experience of adults. This puts youth at a competitive disadvantage when applying for jobs that are at entry level which experienced seniors also want. Adults could be applying for these positions because they are looking to switch industries or are returning to the labour force. In our review of youth unemployment rates, it was discussed that the abolishment of mandatory retirement in Canada may be partly responsible for rising LFPR of seniors. Hence one would expect this variable to affect youth unemployment rate positively.

Minimum wage

In Canada, the responsibility for enacting and enforcing labour laws, including the minimum wage, rests with the ten provinces as well as the three territories . Economic theory suggests that if minimum wage is set above market equilibrium wage, it will result in a reduction in the demand for low-wage labour, while increasing the supply of labour in the market (Benjamin et. al, 2012). The imbalance in supply and demand for labour results in unemployment at any given minimum wage. A hike in minimum wage rates could also reduce employment opportunities especially for those youth who have

acquired lower levels of education (high school or less). It should not affect youth with higher education levels as much unless underemployment and unemployment rates are high.

Minimum wage varies across Canadian provinces and territories. The highest minimum wage is offered in North West Territories while the lowest wage is tied between the provinces of Alberta and Saskatchewan. (Government of Canada, 2015) Hence, keeping other determinants of unemployment rate constant, one would expect the unemployment effect of minimum wage to vary as it varies by province and over the years. Hence, a positive coefficient of the minimum wage variable is expected in the unemployment rate model.

In addition to the above independent variables, a one-year lagged dependent variable is also included in the model to account for any long-term tendencies in the youth unemployment rate. To study the impact of recession, a dummy variable is introduced to identify the two major recessions that occurred during 1991-92 and 2007-08 and a minor one in 2001.

Youth with different education levels face very different employment prospects. This makes it important to study the effects of recessions on youth of all education levels. For example a youth with high school education without any experience may not be able to get a job over a Bachelor's degree graduate with the same experience level. In an efficient labour market, these youth would normally not be competing for the same positions. But, in the current labour market, youth are facing unemployment rates twice as high as their adult competitors. This is causing youth to take jobs that they are overqualified for and

also accept a wage reduction. This creates more competition for high school graduates because postsecondary and university graduates will be applying for the same positions. In this study, separate unemployment rate equations are estimated for overall youth, youth who have high school education and for those youth who have acquired post-secondary education. This strategy for estimation allows for the comparison of the impact of each of the determinants of youth unemployment rate that are included in the econometric model.

The final econometric model is specified as below:

$$(1) YUR_{it} = \alpha_1 + \alpha_2 YUR_{it-1} + \alpha_3 GDP_{it} / Pop_{it} + \alpha_4 Fem_{it} + \alpha_5 Senior_{it} + \alpha_6 Recession_{it} + U_{it}$$

Where:

YUR_{it} = Youth unemployment for all education levels in province i in the year t.

YUR_{it-1} = Youth unemployment rate lagged by one year.

GDP_{it} / Pop_{it} = Gross Domestic Product per capita in province i in the year t.

Fem_{it} = Female labour force participation rate in province i in the year t.

$Senior_{it}$ = Labour force participation rate of seniors (those aged 65 and over) in province i in the year t.

$Recession_{it}$ = Dummy variable that takes on a value 1 during recessions in the years 1990, 1991, 1992, 2007, 2008 and zero otherwise.

U_{it} = Error term.

The above model is estimated separately for overall youth, for youth who have high school education and for youth who have post-secondary education. Data for youth

unemployment rates at each education level came from the Labour Force Survey (CANSIM 282-0004). All youth education was a composition of education levels of 0-8 years to above a bachelor's degree. Due to the age range for youth being 15 to 24 years, it is likely that there will be a large portion of youth with less than high school education and a lesser portion of youth who have attained some postsecondary education.

The high school education level results will be slightly skewed because youth aged 15 to 16 and most 17 year olds cannot obtain high school education because they are not old enough to graduate.

The post-secondary education group is a combination of all youth with some post-secondary education and university degree graduates. The two were combined due to the lack of youth unemployment rates available for university degree holders, especially in Atlantic Canada and the Prairie provinces. When there were data present for some post-secondary and university graduates an average youth unemployment rate was taken. If university graduate youth unemployment rates were not available, the some post-secondary youth unemployment rate was used. The extent of bias introduced due to this manipulation is expected to be low since the missing observations are for smaller provinces where the population of university degree holders among youth workers is expected to be small.

The female labour force participation rate data are also based on the labour force survey as are the senior's labour force participation rate data which are for employed labour force aged 55 and over.

The GDP per capita data are obtained from CANSIM Tables 384-0038 and 051-0001 and are based on Canadian National Accounts data compiled at Statistics Canada. Minimum wage data came from the Labour Program division of the Government of Canada (Government of Canada).

The recessionary periods were 1990, 1991, 1992, 2007 and 2008 according to the C.D. Howe Institute (C.D. HOWE Institute Business Cycle Council).

Estimation results for all of Canada are presented in Tables 3 through 5 and for Nova Scotia in Tables 7 through 9. While Canadian estimation is performed on a time series data pooled across the ten provinces, Nova Scotia estimations are based on time series data for the 25 year period.

Table 3: Regression Results for All Youth, Canada

Variable	Estimated Coefficient	(s.e.)
Constant term	0.046908*	0.02712
YUR_{it-1}	0.92218	0.02957
GDP_{it}/POP_{it}	-0.0002149**	0.00009914
Fem_{it}	-0.075518	0.04823
$Senior_{it}$	0.045067	0.03864
$Recession_{it}$	0.017662**	0.002019
$Wage_{it}$	0.00013027	0.0008099

$R^2 = 0.92$; F-value = 502.45; No. of observations = 250

* Denotes significance at 10% level.

** Denotes significance at 5% level.

Table 3 results, for all youth in Canada, may be viewed as for a youth with an average education level in a population of those who have acquired high school or more education. The equation explains about 92 percent of variations in their unemployment rate and F-value indicates that the joint effect of the independent variables is statistically significant due to the F-value being larger than the critical value of 3.17. In addition to the constant term, statistically significant at 5 percent level of significance, GDP per capita

and the recession variables are statistically significant, although at 10 percent level of significance, and their coefficients have expected signs. Our variable of interest is the dummy variable for recession whose coefficient indicates that the youth unemployment rate during a recession rises by about 0.02 percent, keeping the effect of other variables in the model constant. However, when economic growth occurs (GDP per capita rises), the unemployment rate does not fully recover as indicated by the smaller coefficient of the GDP per capita variable. The statistically significant effect of constant term indicates there are variables other those included in the model that have effect on the youth unemployment rate.

Table 4: Regression Results for High School Graduates, Canada

Variable	Estimated Coefficient	(s.e.)
Constant term	0.51769**	0.0617
YUR_{it-1}	0.35977**	0.06468
GDP_{it} / POP_{it}	-0.00048094**	0.0002017
Fem_{it}	-0.77782**	0.1138
$Senior_{it}$	0.15059*	0.08616
$Recession_{it}$	0.0076361	0.005293
$Wage_{it}$	0.0015611	0.001746

$R^2 = 0.69$; F-value = 89.376; No. of observations = 250

* Denotes significance at 10% level.

** Denotes significance at 5% level.

Table 4 results are for those Canadian youth who have acquired high school education. About 69 percent of variations in their unemployment rate is explained by the regression and F-value shows the significance of the regression model. The positive sign and statistical significance of lagged unemployment rate variable at 10 percent level of significance indicates persistence of unemployment rate of youth who have acquired only high school education. GDP per capita and female our force participation rate are also significant at 10 percent level of significance. The negative sign of labour force

participation rate of females indicates that female labour complements youth in the labour force. LFPR of seniors is statistically significant at 5 percent level of significance. The positive sign of this variable indicates a substitution of youth as more seniors enter or remain in the labour force. Recession and minimum wage variables do not affect the unemployment rate of youth under this educational category.

Table 5: Regression Results for Post-Secondary Youth, Canada

Variable	Estimated Coefficient	(s.e.)
Constant term	0.30218**	0.04583
YUR_{it-1}	0.32847**	0.06021
GDP_{it} / POP_{it}	-0.00016469	0.0002026
Fem_{it}	-0.40636	0.08732
$Senior_{it}$	-0.0037225	0.06497
$Recession_{it}$	0.000013298	0.004333
$Wage_{it}$	0.0029189	0.001219

$R^2 = 0.63$; F-value = 69.877; No. of observations = 250

* Denotes significance at 10% level.

** Denotes significance at 5% level.

Table 5 results are for youth who have acquired post-secondary level of education. The R^2 value indicates that 63 percent of variations in their unemployment has been captured in this regression. F-value indicates the independent variables are jointly significant. Besides the constant term, only the lagged unemployment rate is significant at 10 percent level indicating persistence of their unemployment.

Table 6: Regression Results for All Youth, Nova Scotia

Variable	Estimated Coefficient	(s.e.)
Constant term	-0.29284	0.2212
YUR_{it-1}	0.6124**	0.2484
GDP_{it} / POP_{it}	-0.01114**	0.003261
Fem_{it}	1.276**	0.537
$Senior_{it}$	-0.60376*	0.3447
$Recession_{it}$	0.012281	0.008689
$Wage_{it}$	0.022203**	0.009211

$R^2 = 0.76$; F-value = 9.581; No. of observations = 25

* Denotes significance at 10% level.

** Denotes significance at 5% level.

Estimations of the unemployment equation are based on time series data for the period 1991– 2014. Table 6 results of the estimation are for the overall youth population in Nova Scotia who have acquired at least high school education. About 76 percent of variations in their unemployment rate is captured by this regression and the F-value indicates statistical significance of this regression. Only the constant term and recession variable are not statistically significant at 5 or 10 percent levels of significance. Recession was a significant determinant of youth unemployment fate at national level. Positive sign of female LFPR and negative sign of senior LFPR indicates that female labour is complementary to, while senior labour is substitute to, the youth in Nova Scotia. At the national level, females and seniors did not affect youth unemployment rate and neither did their lagged unemployment rate.

Table 7: Regression Results for High School Graduates, Nova Scotia

Variable	Estimated Coefficient	(s.e.)
Constant:	0.18715	0.2974
YUR_{it-1}	0.25376	0.1729
GDP_{it}/POP_{it}	-0.0083512**	0.003175
Fem_{it}	0.1866	0.6452
$Senior_{it}$	-0.26173	0.4874
$Recession_{it}$	-0.0021608	0.01055
$Wage_{it}$	0.02057**	0.01028

$R^2 = 0.52$; F-value = 3.233; No. of observations = 25

* Denotes significance at 10% level.

** Denotes significance at 5% level.

The results for high school youth in Nova Scotia are presented in Table 7 where only the GDP per capita and minimum wage rate are statistically significant at 10 percent level of significance.

Table 8: Regression Results for Post-Secondary Youth, Nova Scotia

Variable	Estimated Coefficient	(s.e.)
Constant:	-0.041953	0.2126
YUR _{it-1}	-0.01839	0.03225
GDP _{it} / POP _{it}	-0.009574**	0.004447
Fem _{it}	0.90458	0.6283
Senior _{it}	-0.59045	0.496
Recession _{it}	0.03009139	0.01213
Wage _{it}	0.017609	0.01241

$R^2 = 0.4655$; F-value = 2.613; No. of observations = 25

* Denotes significance at 10% level.

** Denotes significance at 5% level.

For youth with post-secondary education, only the GDP per capita variable is statistically significant at 10 percent level of significance. All other variables are insignificant. The R^2 value is the least in their case.

VII. Interpretations of Results, Conclusions and Some Directions for Future Study

Analysis of youth unemployment rate trends conducted in this study show that the overall adult and youth unemployment rates in Canada and in Nova Scotia rose significantly during the recessions of 1991-92 and 2007-08. After the last recession, which has come to be known commonly as global financial crisis, the unemployment rates have not yet returned to their pre-recession levels. This is despite the rising trend in youth educational attainment. In fact, youth have experienced higher unemployment rates at all educational levels. Smaller provinces experience higher rates of youth unemployment resulting in their outmigration towards larger provinces, especially towards Alberta whose oil boom since 2009 attracted youth workers from other provinces, especially the Maritime provinces. Net outmigration of population, largely of high skilled youth, has been a chronic issue in all Atlantic provinces.

The unemployment rates of youth have been below the overall adult rate nationally, and in Nova Scotia, over the past 25 years. Nova Scotia's unemployment rate has been consistently higher than the national rate over this period.

The youth unemployment rate was also studied using regression analysis. Nationally, youth unemployment rate is affected by recession and the growth in GP per capita helps to recover the rate but slowly. In Nova Scotia, past recessions did not affect youth unemployment rates. This may be because youth in this province are mostly hired in industries that are not affected strongly by recession, such as agriculture and service industries. Youth unemployment in this province is also affected by labour force participation rates of females and seniors and by the level of minimum wage rate. While female labour tends to substitute youth in the labour force of the province, seniors tend to complement them. This may be because female labour is mostly doing jobs that require experience about the same as youth perhaps due to discrimination as female education levels have also increased over time, or because of choice as females have to withdraw from the labour force at different points in their life cycle to undertake household responsibilities. With respect to seniors, they may be engaged in self-employment where they hire youth workers or are employed in businesses where youth workers are hired alongside in supportive positions. The differential impact of minimum wage could be reflective of differential attitudes of youth. These possibilities may be studied in a future study.

Regression results for youth workers who have acquired high school education also indicate no effect of recession nationally and in Nova Scotia. Economic growth, female and senior labour force participation rates affect their unemployment rates significantly

but in case of these workers, females tend to be complements while seniors tend to be substitutes. In Nova Scotia, economics growth and minimum wage also affect youth unemployment of high school graduates in the predicted directions.

Finally, the results for Canadian youth with post-secondary education show only the lagged dependent variable to be significant indicating their unemployment is more persistent and is affected by variables that are not in the model. In Nova Scotia, they appear to be affected only by variations in economic growth as reflected in GDP per capita.

The overall conclusion of this study is that the periods of economic recession increased the overall youth unemployment rate in Canada but not in Nova Scotia. These results appear to be different when simple trends of unemployment rates are observed during periods of recession. This is because the regression analysis controlled for other determining factors of unemployment rates.

The regression analysis conducted in this study for Canada used time series data pooled across a cross section of ten provinces. In a future study, this study may be modified by accounting for the fixed and random effects that may vary across provinces in Canada.

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