

The employment of low-skilled men: Evidence from the Labour Force Survey,  
1976-2013

by Jingwei LIU

7156855

Major Paper presented to the  
Department of Economics of the University of Ottawa  
in partial fulfillment of the requirements of the M.A. Degree  
Supervisor: Professor Pierre R. Brochu

ECO 6999

Ottawa, Ontario

May 2014

## **Abstract**

Using Canadian Labour Force data from 1976 to 2013, this paper explores why the employment rate of the low-skilled males has been declining from 87% to 76%. I first provide a detailed characterization of how low-skilled males' employment rate has changed over time, and then explore the sources of change by looking at the labour force participation of the wives of these low-skilled men, considering females' employment changes is the main reason. I find that the low-skilled males employment rate declines substantially over 1976 to 2013 period. In addition, the percentage of low-skilled males who decide to leave the labour force has increased substantially, and so has their wives' employment rate. I therefore would have expected that the females' increasing labour force participation would have been an important explanation for the change in the employment of low-skilled males. However, the regression results show the opposite. I find that married low-skilled males who have wives that work will be more likely to be working, and less likely to leave the labour force.

Key words: low-skilled, employment rate, out of labour force

## 1. Introduction

The employment rate is considered to be one of the most important measures of labour market performance, one that directly reflects the development of the economy. In recent years, the decreasing employment rate of low-skilled males, from 87% to 76% during 1976-2013 period, has received much attention from scholars, such as Bowlus (1998), Emilia (2012) and Juhn and Murphy (1997). For example, Adshade (2012) and Morissette and Hou (2008) explain this phenomenon from the female's wage evolution and participation rate in the labour force. Beaulieu (2000) investigates how the reduction in international trade tariff can influence the employment rate and wage of the low-skilled workers in Canada. Insurance policy is considered to prolong the duration of the unemployment in a search model. Within this framework, Friesen (2002) finds workers will positively respond to this policy incentive and become more attached to the labour force. Some scholars also try to find the sources of change in employment rate by comparing the labour market structure with other countries', such as Bowlus (1998).

In this paper, I investigate the decline in the employment rate of low-skilled males using Canadian Labour Force (LFS) data from 1976 to 2013. I first provide a detailed characterization of its evolution over time, and then explore the source of change by looking at the labour force participation of the wives of these low-skilled men. There are three main findings in this paper. First, even though in general the employment rate in Canadian labour force has been increasing, the males and females' employment opportunities have been going in opposite directions as measured by the LFS data. Second, based on the marital status, I explore the evolution of the low-skilled males and their wives' employment rates over the years. Compared to the visible reduction for the employment rate of low-skilled males, there is substantial increase in the employment rate of females in the labour force. Third, another change in the Canadian labour force is that among all the not working low-skilled males, the number of low-skilled males who decide to leave the labour market has been

increasing. Combining these results, I would have expected that the development in the wives' performance in the labour force would be an important explanation of the worsening working condition of low-skilled males recently. However my regression results show the opposite. According to the regression results, if a low-skilled male is married and his spouse is employed in the labour force, the probability for him to be employed will be higher, and also he will be less likely to leave the labour force.

This paper is organized as follows. Section 2 reviews the literature. Section 3 describes the data, and Section 4 presents the employment rate patterns and some summary statistics. Section 5 outlines the empirical model and Section 6 reports the findings. Section 7 concludes.

## **2. Literature review**

Over the years, much attention has been focused on the problem that the employment rate of low-skilled men has been decreasing in plenty of countries. When exploring the reasons that attribute to this situation, multiple factors have been studied with empirical study, especially the participation rate and wage of female workers. With more and more females become important financial providers of their families, most scholars believe this change largely influences the low-skilled males' employment rate. The literature review is divided into three parts. In the first part, I present papers that have looked at the low-skilled men unemployment rate condition in Canada. Secondly, literatures about the evolution the females' wage as well as participation rate in the labour market are presented. In the last part I briefly list the studies focus on the relationship between females' wage and employment rate and males' performance in labour force.

### **2.1 Literature about the employment of low-skilled male and relevant factors**

Using CANSIM data over the 1983-1996 period, Beaulieu (2000) studies to what extent the Canada-U.S. Free Trade

Agreement (CUSTA) affects the employment rate and the relative wage of skilled and unskilled employees, through international trade tariff reduction. There are two main findings in Beaulieu's paper. First, the wages for both skilled and low-skilled workers' are barely affected by the reduction of tariff. Second, while the employment rate of the skilled workers remains unchanged, low-skilled workers' employment experiences a visible decline, which means that the low-skilled workers seem to be more adversely affected by the agreement. Beaulieu (2000) explains these two results that, before the tariff was reduced, the industries that were intensive in low-skilled workers were more protected than the industries were intensive in skilled workers.

Gera, Gu and Lin (2001) use data drawn from several micro-level surveys, including the Survey of Work History (SWH) for 1981, the Canadian Labour Market Activity Survey (LMAS) for 1986 to 1990 and the Survey of Labour and Income Dynamics (SLID) for 1993-1994, supplemented by monthly survey the LFS. The paper focuses on two main questions: have the skill requirements been rising in the Canadian labour market over the 1981-1994 period and is the rapid technology development related to the decreasing employment rate of low-skilled workers? There two main findings in this paper. First, the speed of skill upgrading in Canada was slower compared to that of other advanced countries during 1981-1994. Secondly, the technological change dramatically affects skill requirements in most industries in Canadian labour force. The increasing labour demands for skilled worker negative affected the low-skilled workers' employment rate.

Riddell and Song (2012) use data from the Canadian Workplace and Employee Survey (WES) from 1999 to 2005 to explore whether there is positive relationship between education level and adoption of technology. They find a positive relationship, but to what extent depends on the type of tasks performed. The study demonstrates that higher educational attainment enables the workers to carry out higher order tasks, but there is no evidence that shows a causal relationship

with routinized tasks. This paper implies that the education level can directly reflect the workers' skills and thus affect the employment chance.

Riddell and Song (2011a) rely on data from the LFS and the Canadian Census over the period 1976-1996 to assess the relationship between the educational attainment and the job search intensity, as well as the chance of re-employment. This paper shows that individuals with higher education would have more chance to be re-employed after a layoff, and are more actively attached to the labour market, willing to make efforts to be employed. This paper largely explains why the employment rate of low-skilled workers is now more negatively affected. Riddell and Song also find the same results for the U.S. labour market.

Riddell and Song (2011b) use data from the Current Population Survey (CPS) in 1980-2005 and the 1980 Census to study the relationship between educational attainment and incidence of unemployed, as well as re-employment chances in the U.S. labour force. They find a positive relationship between chances of re-employment and educational attainment among job seekers. In addition, higher educational attainment significantly reduces the incidence of unemployment.

Using Eurostat data from 2000 to 2010, Emilia (2012) studies the impact of education level on employment chances in the Romanian labour force. There are two main findings in this paper. First, the educational attainment and accumulation of human resource are the main causes of employment gap and difference in labour productivity. Secondly, higher education process enables the worker to adapt competitive advantages in labour force, increase the job security, as well as improve the chance of being re-employed.

Gibb and Walker (2011) use data drawn from the Formation and Outcome of Adult Learning during 1980s to 1990s and criticize Canada government's 10 federal policies about employment and training, as well as their claim to build a knowledge economy and innovative society. Gibb and Walker explain their views from the potential tensions may be

triggered from these programs between skilled and low-skilled workers. They illustrate that the government's imagined innovative and educated society contradicts the current material conditions in Canada society and would exert negative effect on employment rate of low-skilled workers. Clearly Gibb and Walker also notice that the effect of increasing skill requirements on the employment rate of low-skilled men.

Relying on the January and June LFS data in 1996 and 1997, Friesen (2002) studies the effects of the unemployment insurance policy on working hours in the Canadian labour force. By comparing these two years, her study shows a significant change in the working hour distribution after the introduction of the unemployment insurance policy in 1997. She finds that most workers would adjust their working hours in order to maximize the unemployment insurance benefits. This paper shows that workers will react to the new policy incentives and then affect the employment outcome in the labour force.

Fudge and MacPhail (2009) rely on data from CIC to study the employment rate of low-skilled immigrant workers since 1970s, supplemented by the statistics from the Temporary Foreign Worker Program (TFWP). The main findings in this paper are that although the TFWP attracts more temporary foreign workers to the Canadian labour force and also enlarges the proportion of low-skilled workers, the estimates show that this program effectively improves the low-skilled immigrants' employment rate to some extent. Meanwhile, this program helps to satisfy the labour demand in the Canadian labour force. Fudge and MacPhail (2009) argue that the increasing number of immigrants is one of the explanations for the decreasing employment rate of low-skilled workers.

Duncan and Trejo (2012) select male immigrants in the U.S. Census 2000 to study whether the increasing flow of immigrant is related to the declining employment rate in recent years. The main findings of this paper are that, first, immigrants account for surprisingly large fraction of low-skilled workers in the U.S. labour market. Second, among the

men who dropped out from high school, the immigrant men are more attached to the labour market and likely to make efforts to be employed than the native born. However, when it comes to the men with more than 12 years of education, there is no evident difference in employment rate or labour market attachment between natives and non-natives.

Bowlus (1998) uses data drawn from the 1986 and 1993 U.S. CPS and Canadian Survey of Consumer Finance (SCF) to examine the employment rate gap of young, low-skilled males in Canada and the U.S. Bowlus (1998) finds that the employment of young low-skilled males in Canada has been worsening over time, and this group of men can account for around 20% of the overall unemployment rate gap. The results of the study also show that Canadian low-skilled young males are more likely to experience seasonal or temporary job loss and transition to being unemployed compared to the U.S. low-skilled males, which are the main reasons of the lower employment rate for this group males in recent years.

## **2.2 Literature of the evolution of female participation in the labour force**

Adshade (2012) explores women's increasing participation in the labour force by presenting a dynamic general equilibrium model. This paper shows that, because of the rapid increase in the skill requirements, technology development and the division of labour in administration, although the males still occupy most job positions in manufacturing industries, female workers begin to occupy more and more clerical positions in the labour force. The main findings are that both females in clerical position and males in manufacturing industries both enjoyed higher wages in recent decades, which, to some extent, affected the pattern of household labour supply. As the demand for clerical workers is still expanding, it is possible that the employment rate of female workers will continue growing. The change of the females' employment rate and male-female labour supply pattern in a family may largely explain why less low-skilled males attach to the labour force recently.<sup>1</sup>

---

<sup>1</sup> In this paper I focus on females' employment status rather than females' wage as a complement.

Warman, Woolley and Worswick (2010) use data from the Full-time University Teaching Staff Data of Statistics Canada from 1970 to 2001, which provides the salaries of Canadian university teachers, to study the evolution of gender wage gap in Canadian universities. The findings in this paper are that, firstly, the distributional analysis shows that the salary of males and females have been converging from 1970 to 2000. Second, from the results of the cross-sectional analysis, the males and female's wage structures were much more similar than before. Warman, Woolley and Worswick (2010) believes that the existence of the gender wage gap can be largely explained from the men and women's rank and field. Besides although there was still wage gap that can't be explained, this part differential has been decreasing over time. Although professors in the university definitely not fall in "low-skilled" category, this paper still shows the growing female workers' wage and participation rate are main changes in the Canadian labour force now.

Relying on data from the General Household Survey (GHS) during late 1970s to the early 1990s, Harkness, Machin and Waldfogel (1997) study the changes in female workers' earning share in the family income. There are three main findings in this paper. Firstly, during 1979 to 1991, the importance of the wives' income in the family has dramatically increased. This condition is due to the increasing participation rate of female workers in the labour force and the downward pressure on the employment rate and earning of males, exerted by the demand shift in the labour force. Secondly, the increase of the employment rate and wage mainly happens to the low-income and middle-income families, while the changes in the high-income family the change is less visible. Thirdly, the earning of female, even low-paid, has become more important for the welfare of the low-income family. In conclusion, the authors believe that the pin money hypothesis, which refers female's earning in the family can only do non-essential purchases, like pins and buttons, is not valid nowadays.

Fortin and Schirle (2006) use data from the SCF covering the 1982-1997 period to investigate two problems: how women's improving performance in the labour market influences family income dispersion, and whether the increasing

participation rate of women improves the family's welfare. Fortin and Schirle (2006) find that during 1982 to 1997, the median family earnings, 90-10 and 50-10 differential all had substantially increase and these increases mainly came from the increasing participation rate of females and the changes in the wage structure in the family. Lastly, the increasing average educational attainment and work force age also led to the rising family income dispersion.

Beaudry and Lemieux (1999) use data from the SCF during 1976-1994 and study what contributes to the significant increase in the female labour force participation rate during the 1990s. By tracking a representative group of females who all enter the labour force at a given age, Beaudry and Lemieux (1999) try to explore a cohort's participation rate from three factors: macroeconomic effects (such as recessions or employment insurance changes), age or life cycle effects (whether females' participation rate in the labour force affected by their age) and cohort specific effects, which gives the cohort difference under same age and macroeconomic effect. They find that macroeconomic effects amplify the female's participation rate, but these are not the root cause. Cohort effect is believed to be the most important factor and more effective in explaining this phenomenon than cyclical factors.

### **2.3 Literature about how female's wage changes affect male's performance in the labour force**

Morissette and Hou (2008) rely on data from the Canadian Census of Population for 1981, 1991 and 2001 to study how women's wage evolves from 1980 to 2000 and to what extent Canadian wives' work hours is affected by the husbands' earning. The results of the study show that although there may be some uncertainty in the 1980s and the 1990s, there was a close link between Canadian wives' work hours and the wage of their husbands before 2000s. However, after 2000 the wives' participations in the labour force were less sensitive to the earning of husband, and more and more women have become important providers of the families financially. With increasing females participated in the labour force, adverse wage shock happened to the husbands can be offset to some extent. Morissette and Hou (2008) believe the fact that more

and more females being able to be financial providers of the family can, to some extent, explain why more low-skilled males quit job and choose to stay unemployed.

Fortin and Lemieux (2000) use data from the CPS (1973-1998) to verify if the wage distribution changes of males and females are related. The main findings in this paper are that, firstly, the female-male wage ratio and male worker's wage inequality (in terms of 90/50 wage ratio) both increased more in 1980s and in 1970s and 1990s. In addition, females' rapid relative wage since 1970s was related to the evident change in men's inequality.

Based on data from the SCF for Canada and the CPS for the U.S. for the 1971 to 1999 period, Burbidge, Magee and Robb (2000) investigate the earning inequality of married couples in both countries. This paper finds that during the 1970s, the women married to low-income males were more likely to be attached to the labour force compared to those married to high-income males. Besides, in the 1970s and 1980s, the female's wage largely contributed to the narrowing down family income inequality. However, in the 1990s, when controlling both spouses' age and education level, the husband and wife's wage condition was less linked. Especially in Canada, the study shows that the increase in the male's wage was associated with increasing in his wife's earning. Their shows that the change in the spousal earning can dramatically increase the family inequality in Canada and the U.S.

Using 1968-1992 CPS data, Juhn and Murphy (1997) explore the changes in wage inequality and family supply in the U.S. They find that in the 1970s and 1980s, there was a slowdown of the employment rate and the wage of prime-age males. On the contrary, the employment rate of the wives increased to 66% in 1980s from 39% in 1970s, and the earnings rose to \$9000 from \$4000. Some scholars predict that these two phenomena are closely linked (e.g. Cancian, Danziger and Gottschalk (1993), Blackburn and Bloom (1995)). Secondly, based on the estimated results from the CPS, Juhn and Murphy (1997) also find that while the largest declines in employment and earning happened to the low-wage males, the

largest increases in employment rate and wage happen to the high-wage and middle-wage males' wives. They believe these two findings cast doubt on the prediction that the increasing participation rate of female in the 1980s is because the wives are unsatisfied with their husbands' wage or employment condition.

Breunig and Rospabe (2013) use the French 2002 Employment Survey dataset to study what factors can influence the gender earning gap in France. The male-female wage differentials are divided into two parts in this paper and each explained by the difference of characteristics of males and females. The authors believe that differences in gender characteristics difference play a vital role in the gender earning differential, and explaining from characteristics is a more effective and persuasive method than standard parametric techniques. The key findings of this paper are that, firstly, at the bottom of the income distribution, the unexplained earning differential does not exist. Second, the most important two determinants of the earning differential are occupation and part-time status. Education will not affect the gender wage gap once considering these two factors.

The literatures above focus on different aspects of the labour force and various factors that may lower the employment rate of the low-skilled male workers, which demonstrates that this trend is a complicated issue affected by multiple factors. But importantly, there is no denying the fact that the change in female workers' participation rate is an important driving element one cannot ignore. I will focus on the employment condition of the target male worker' spouse in Canada and verify if the female worker's increasing participation rate and wage affect their husband's attachment to the labour force.

### **3. Data description**

The data I use in this paper is drawn from the LFS and covers the 1976 to 2013 period. The LFS is a cross-sectional designed survey conducted in Canada, which aims to reflect the economic performance of the whole country by providing the estimates of employment, unemployment and the participation rate for the working age population. It should be noted

that institutionalized individuals, those living on reserves and full-time members of the armed forces are excluded from the LFS. The unit of observation in this survey is every working age individual who does not fall in the categories above. Although sample size has varied over time, it is in the order of 100,000 per month. Note that I also drop the individuals reside in territories because in the LFS there is no data provided.

The LFS is a rotating designed survey, each household remains in the sample for six consecutive months. This means that every month, one of six of the family will be replaced.<sup>2</sup> According to statistics from CANSIM, Statistics Canada uses the average of 12 months employment rates calculated from the LFS as the employment rate for the year. In this paper, by only relying on all the April and October LFS data during 1976 to 2013 to calculate the average employment rate as each year, I make sure that each family enters the sample only once (Brochu and Green, 2011).

I restrict my sample to all the males between the age of 20 and 54 years old. I set the lower age limit in order to exclude the respondents who are still full-time students, considering their main activities are not in the labour force. The ceiling age limit is imposed to abstract from the changes in the retirement age.<sup>3</sup> Furthermore, all the individuals in the sample who are self-employed or in the military are also excluded as well.<sup>4</sup>

For education I focus on the highest educational attainment of every individual. Similar with Brochu and Zhou (2009), I divide the population into three educational attainment categories: High School or less, Post-secondary and University and above. The High School or less category includes the respondents who have less than 8 years schooling, some secondary school, graduate from high school or have 13 years education, depending on the educational divide standards during the

---

<sup>2</sup> In another word, after a family enters the survey, this family will definitely be removed from the LFS after six months. In this paper I only use the April and October LFS to make sure that a family only enters the sample once.

<sup>3</sup> In this paper I assume that individuals over 20 years old have left school, and for future, I will further exclude full-time students directly. For the ceiling age limit, the retire age has been changing over the years, I choose 54 to be consistent with previous paper such as Brochu and Zhou (2009).

<sup>4</sup> The low-skilled males who are self-employed are beyond the scope of this paper, but these males' employment conditions are definitely interesting to look at.

survey period (See Appendix). The Post-secondary includes all the respondents in the sample who have some post-secondary or post-secondary diploma. The University category includes all respondents who graduate from university and above. When calculating the employment rate for low-skilled men I only keep the individuals who fall in the High School category. The LFS has changed the interview questions about the educational level in 1990, which may result in problematic time consistent statistics. According to the interview questions in the LFS, before 1990, the questions focused on the number of years of primary and secondary schooling, whereas after 1990, they focus on the highest grade of the respondents. For post-secondary education part, an important change is that the survey does not require that one had to graduate from high school to obtain post-secondary education or certificate. Besides, LFS lengthens the post-secondary education level list and divides the diploma and certificate category into more specific subcategories. The respondents who have post-secondary education may fit into categories such as no degree diploma, trade, vocational or apprenticeship certificate, college certificate, university diploma below bachelor's level, bachelor's degree and post-graduate degree (Gower, 1993). These two factors are the main reasons that result in the inconsistent statistics when comes to education level (see Appendix).

When I verify whether the wives' employment rate would affect the low-skilled males' employment rate, further restrictions on the marital status are imposed. I select only males who are married or living in common law. In 2000, the LFS also changed the interview questions about the respondent's marital status. The new interview questions provide two more categories, "Divorced" and "Single, never married", in order to present more detailed information. This change did not result in any sudden change in statistics, so one can consider the difference in questions as a minor problem. Besides, the low-skilled males whose spouses are absent from the dwelling or enrolled in the military are also excluded.

#### 4. Employment rate patterns

According to statistics from CANSIM, Statistics Canada uses the average of 12 months employment rates calculated from the LFS as the employment rate of the whole year. As previously mentioned, the LFS follows a rotational design, and as such, I only rely on all April and October LFS data during 1976 to 2013 and calculate the average of these two months employment rates as the employment rate of the year, which makes sure each individual only enters the sample once (Brochu and Green, 2011).

To verify this method is valid, I use the April and October LFS data to draw the employment rate pattern of whole country and see if it has similar trend with the results provided by CANSIM. The result shows that the average employment rates based on the April and October data basically fit the all months rate pattern (see Figure 1). So in this paper below, I will only use the survey statistics for April and October of each year to do the pattern analysis.

In order to have a basic overview about the employment rate of the whole society during 1976 to 2013, based on data drawn from the April and October LFS each year, Figure 2 presents the employment rates of males and females who fall into the working age restricted sample (20-54 years old) from 1976 to 2013. Consistent with the study result of Warman, Woolley and Worswick (2010), this figure shows that the males and females employment rate gap has been converging since 1976. There is an 82.05% reduction in the gender employment gap for this period, to 6.59% in 2013 from 36.71% in 1976. The decline during 1980s was more compared to 1990s and 2000s. Separately speaking, the males' employment rate had a little reduction during the reference period, from 85.07% in 1976 to 72.19% in 2013. On the contrary, the females' employment in the country experienced a huge increase. Overall, there was a 49.28% increase happened in 38 years, from 48.36% in 1976 to around 70.00% in 2013. This figure illustrates that one of the most significant changes happened in the Canadian labour force during 1976-2013 is the females' participation in the labour force. Obviously, with

more and more females being employed, it is reasonable to assume that the males' employment rate was negatively affected.

Figure 3 describes the evolution of female-to-male average earning ratio based on the statistics in CANSIM from 1976 to 2011.<sup>5</sup> Note that this figure only covers the period 1976 to 2011, since the CANSIM only provides statistics for these years. In general, apparently compared to the males' wage, females' wage condition has been increasing and the earning differential has been narrowing down. Despite of the fact that there is still gender wage gap exists in the Canadian labour force, the female-to-male wage ratio experienced a visible increase, from 46.8% in 1976 to 66.7% in 2011. This indicator increased faster during 1980s and 2000s, nearly 10% each decade, while during 1990s the change was smaller. With around 30% reduction in wage differential, it is safe to say that female workers' wage condition has been getting better. This result is consistent to the prior studies about the gender wage discrimination and female wage evolution (e.g. Warman, Woolley and Worswick (2010)).<sup>6</sup>

As I mentioned before, the divide standards in education the LFS uses from 1976 to 2013 are different (See Appendix). More recent data can better reflect the educational attainment patterns in Canada but also makes time-consistent education statistics problematic. The revised interview questions have a large impact on the data, thus there is an evident fall shown in Figure 4. However, the trend shown in Figure 4 still tells that during 1976-2013, the fraction of low-skilled males who only had high school education or less has been declining.

The employment rates of all males and low-skilled male are shown in Figures 5 and 6, using April and October LFS data and all months LFS data respectively. From Figure 5, one can see that the employment rates of low-skilled males share

---

<sup>5</sup> The LFS only provides hourly wage data, but I find that the earnings data provided in the CANSIM is more convincing.

<sup>6</sup> Note that Warman, Woolley and Worswick (2010) use data from the Full-time University Teaching Staff Data of Statistics Canada from 1970 to 2001.

the same declining pattern as for the all males sample. The employment rate of all males experienced a 5.34% decrease during 1976-2013. There are four sudden increases in 1979-1980, 1978-1988, 1998-1999 and 2006-2007 respectively, which can be explained from business cycles. Correspondently, the employment rate of low-skilled males also had four visible increases in the same periods, but the overall change was more evident, about 12.85%. Besides, Figure 5 shows that the employment rate gap of these two groups has been enlarging, which rose to 6.32% in 2013 from -0.17% in 1976. During 1976 to 1982 period, the employment rates of males and low-skilled males were almost indistinguishable, however, started from 1983, the difference began to increase. At last, the employment gap apparently grew faster in 1990s and 2000s than in 1980s. One can also draw similar conclusions from Figure 6, apparently these two figures also show that using data for April and October and all months data can both present the proper employment patterns.

In Figure 7, I draw the employment rate trends for low-skilled males in Western and Eastern Canada respectively. The Western Canada includes British Columbia, Alberta, Saskatchewan and Manitoba, while the Eastern Canada is consisted by New Brunswick, Newfoundland, Nova Scotia, Ontario, Prince Edward Island and Quebec. To compare the low-skilled males' employment rates of these two regions, I further restrict the province of the individuals are from in the LFS.

Comparing the two lines in Figure 7, the patterns of employment rate of both regions basically fit the employment rate of Canada shown in Figures 5 and 6. Despite of some ups and downs, the employment rate for low-skilled males has been declining, and four main sudden expansions happened in 1979-1980, 1987-1988, 1998-1999 and 2006-2007. The obvious differences in the employment rate patterns of these two regions are that, firstly, the changes in these four periods in the employment rate were more visible in eastern provinces. Secondly, the low-skilled males' employment rate in Western Canada was always higher than that in Eastern Canada, which can be directly explained from the geology and industry difference. For example, the oil industry in Alberta and the construction sector in British Columbia all demand more

low-skilled male workers (Fortin *et al.*, 2012).

Figure 8 shows the non-working low-skilled males' work status in 1980, 1990, 2000 and 2010 respectively according to the LFS. The four columns of each year are "Temporary layoff", "Job search", "Future start" and "Not in the labour force" from left to right.<sup>7</sup> Basically, the fractions of not working low-skilled males' status were similar in these 4 years. The number of individuals who fell in "Not in the labour force" and "Job research" categories were significantly higher than other two categories over the years, accounting for more than 50% and 30% of all the not working males. From this figure, it is obvious that most of the not working low-skilled males fell in the "Not in the labour force" category, which means most of the non-working low-skilled males decided to leave the labour force and stop seeking job, maybe because they believed there was no job available. Besides, this fraction has been increasing over the years. The second higher category is "Job search", which tells that there were about 30% to 40% not working low-skilled males making efforts to get employed. The percentages of "Temporary layoff" and "Future start" were much less visible compared to prior two categories, both only accounted for lower than 5% each year. In a word, the fraction of low-skilled males who left the labour force was surprisingly higher than other three categories, and this number has been increasing over the years. For these out of labour force low-skilled males, they must have other income to support themselves, such as the wage from the working wife, government support or investment income.

Since my goal is to figure out the relationship between low-skilled males' employment rate and the spouse participation rate in the labour force, I describe the changes of all males and low-skilled males' marital status in Figure 9. Due to the change of the interview questions of the LFS, the divide standards of the respondent's marital status were different in 2000. But according to the statistics, there were no sudden changes in the specific year, and this figure precisely tells how

---

<sup>7</sup> Temporary layoff means the employer stops the employee's work but does not end his/her employment.

the marital statuses of all males and low-skilled males have been changing over the years.

Figure 9 not only tells the changes of all males and low-skilled males' marital status, but also presents the marital status difference between these two groups. In general, the number of males and low-skilled males decides to get married has been decreasing. But obviously the decline for low-skilled males was more visible from the figure. Before 1990s, the marital status of males and low-skilled males were basically unchanged and similar quantitatively. After entering 1990s, the gap began to expand, from only 1.59% in 1989 to 8.54% in 2013. In 1990s and 2000s, the gap of the marital status of males and low-skilled males has been increasing at around 2% per decade. If considering the two lines in Figure 9 separately, the number of males who chose to get married did not experience much change during 1976 to 2013, only 4% less. By contrast, this number for low-skilled male seemed more evident, from 64.78% in 1976 to 52.83% in 2013 with an 18.45% reduction. Below I will only focus on the low-skilled males to see if their employment changes are related by their spouses' participation in the labour force.

Figures 10 and 11 both summarize the males spouses' employment rates based on different restricted populations. Figure 10 shows all males and low-skilled males spouses' employment rates, no matter these males were employed, unemployed or not in the labour force. In Figure 11, two lines describe the employed and not working low-skilled males spouses' employment rates respectively. In order to get the accurate data, more sample restrictions are imposed on the male workers' spouses. There are two main reasons may result in the missing observations about the spouse work status in the LFS. First, for all the respondents are identified "married" or "living-common in law", but his/her spouse is absent from the dwelling during the reference time, the survey would fail to obtain the spouse working information. Secondly, if a respondent's spouse is in the military, the relevant information is missing as well. After dropping all the missing

observations, the employment rates of the spouse are shown in these two figures.<sup>8</sup>

Two main conclusions can be drawn from these two figures. First of all, there was a dramatic increase in the spouse employment rate, in all four different specifications. The statistics show that the spouse employment rates had evident increases, around 70% increase, for all four subgroups based on different restrictions. The all males spouses' employment rate increased to 78.74% in 2013 from 46.46% in 1976, experienced a 69.9% increase. The low-skilled and the employed low-skilled males spouses' employment rates both originated from around 45% percent and rose to 75% in 2013, the increases were 66.67% and 68.37% respectively. The not working low-skilled males spouses' employment rate achieved 58.25% in 2013 from 34.45% in 1976, the increase was 69.11%, slightly higher than that of employed low-skilled males spouse.

Secondly, it is obvious in Figure 11 that the employment rate of employed low-skilled males' spouse has always been higher than the not working low-skilled males'. This employment rate differential increased during 1990s and then decreased after 2003. In 1976, the employment rate differential of not working and employed males' spouse was 11.56%, and this number increased to 25.92% in 1999, which was the largest gap during 38 years. However, after 2000, this gap began to decline, and in 2013, the employment differential went back to 19.21%. These statistics show that if the low-skilled male is employed, the possibility of wife getting employed is higher, this phenomenon may due the fact that high-skilled male and female are more likely to get married. This finding is consistent with the study result of Juhn and Murphy (1997), who use 1968-1992 CPS data. But on the other hand, the declining employment rate gap after 2000s may also illustrated not working low-skilled males' spouses would make more efforts to be employed.

According to the employment patterns presented in Figures 1, 2, 5, 6 as well as 10 and 11, one can easily tell that there are

---

<sup>8</sup> For example, in April 2013, one observation is dropped because the spouse is enrolled in the military and 56 are excluded because the spouses are absent from the dwelling.

four periods that all employment rates had evident fluctuations, which are 1979-1981, 1987-1989, 1998-2000 and 2006-2008. Table 1 documents the employment rates based on different target populations across business cycles. By comparing these indicators during the same stage of the business cycle, the evolution of males and their spouses' employment during 1976 to 2013 can be better presented, minimizing the sensitivity of the results caused by the choice of study period. The relationship low-skilled males' employment rate and their wives' participation in the labour force can be further drawn.

Table 1 shows that overall, the employment rates for males have been declining, and on the contrary, more and more wives chose to participate in the labour force. Further, comparing the first and second row of the table, employment rate of low-skilled males had a more evident reduction than all the males', which is consistent with the finding in Figures 5 and 6. The reductions of the employment rate for the low-skilled males in western and eastern Canada were basically similar, but the employment rate in Western Canada has always been higher than Eastern Canada, which is consistent to the finding in Figure 7. Statistically, all the spouse's employment rates presented in row 5 to row 8 all show around 45% increase, which demonstrates the employment rate of females did have a significantly increase. Lastly, comparing the second and sixth row in Table 2, the employment rate of low-skilled males experienced a 8.83 decline, whereas their spouses' employment rate had a 45.81% increase. Based on the information provided in Table 1, one would easily see the changes in the low-skilled males and their spouses' employment rates. Same as Juhn and Murphy (1997) who explore the wage inequality and family supply in the U.S., I would expect that the changes of employment rates of low-skilled males and their spouses are closely linked.

From the statistics in Figure 8, there is no denying the fact that the percentage of not working low-skilled males who are out of the labour force has been increasing. Figures 12 and 13 are drawn to further explore if their wives' increasing

participation in the labour is an important influential factor. First, to have a better understanding about the changes in the percentages of low-skilled males who decide to leave the labour force, I divide the sample population into three groups according to the age, which are 20-29, 30-39 and 40-45 respectively.<sup>9</sup> Figure 12 shows that during the reference period, the three age groups low-skilled males shared the same trend that there were visible increase in the low-skilled males who decided to quit looking for jobs. For the subgroup aged 20-29, the percentage of low-skilled males who left the labour market was rose from 33.23% in 1976 to 62.43% in 2013, for the group aged 30-39 this number increased to 51.72% in 2013 from 31.95% in 1976, and this proportion for low-skilled males age 40-54 went up to 55.99% in 2013 from 43.35% in 1976. One evident fact is that the 40-54 subgroup had the highest percentage until the recently. In conclusion, the changes in the percentage of different age low-skilled males who decided to leave the labour force are basically the same in general. But comparing these three age groups, the low-skilled males aged 40-54 are more likely to leave the labour market.

In Figure 13, I combine the percentage of low-skilled males who leave the labour market and their spouses' employment rate together to verify if these two factors are linked. According to Figure 13, one can tell that with more and more low-skilled males decide quit looking for jobs, the employment rate of their spouses has substantial increase. With a change from 36.80% to 58.43% of low-skilled males left the labour force during 1976-2013, the employment rate of out of labour force low-skilled males' spouse had a 27.4% increase, from 27.76% to 55.16%. In this figure, the two lines are intertwined and the gap of these two indexes has always remain less than 5%, so I would expect that the reason why there were increasing low-skilled males decided to leave the labour market was their spouses were able to be the financial providers of their families.

---

<sup>9</sup> By dividing the sample population according to the age, one can see if low-skilled males' decisions to leave labour force are different at different age stages.

In Figure 12, the statistics show that the low-skilled males aged 40-54 were more likely to leave the labour market compared to the other two groups. I keep the 40-54 subgroup and replicate Figure 13 to see if I can obtain the same results. The patterns are shown in Figure 14. In this figure, the two lines tell similar information as Figure 13. With increasing low-skilled males aged 40-54 quitting labour market, which was 41.58% to 57.99% during 1976 to 2013, the employment rate of out of labour market males' spouse increased to 58.53%. Especially after 1986, the two percentages became much closer. Combine the results from Figures 13 and 14, I would expect that the spouse increasing participation rate can largely affect the low-skilled males' decision about leaving the labour force, as well as the employment rate.

Figure 15 shows the spouse employment rate of both employed and not working low-skilled males, who fell in age group 40-54. Same as Figure 11, more sample restrictions are imposed on the low-skilled males' spouse. The spouses who are absent from the dwelling or in the military are dropped. One can easily get similar information in Figure 15 as in Figure 11. First, the spouse employment rate had substantial increase during the reference time. The not working low-skilled males' spouse employment rate increased from 32.28% to 60.16% in 2013, experiencing an 86.37% increase. As for the employed males' spouse, this number went to 79.73% from 45.62% in 1976, the increase was around 74.77%. Second, the employment rate of employed males' spouse has always been higher than the not working males'. Besides, same as Figure 11, the fact that the spouse employment rate of not working low-skilled males was higher than the working low-skilled males support the literature on assortative matching (Juhn and Murphy 1997).

Comparing Figures 13 and 14, one can tell that percentage of low-skilled males who decided to leave the labour force and their spouses' employment rate do not vary across different age groups. So I believe that the most promising explanation for the declining of low-skilled males' employment rate would be their spouses' increasing participation in the labour market.

## 5. Empirical analysis

I examine low-skilled males' employment condition and their decision on leaving the labour force, both estimated by marital status, spouse employment condition, region, periods, seasonal period and age. The econometrics equation takes the following form:

$$Y_{it} = \beta_0 + \beta_1 \text{Married}_{it} + \beta_2 \text{Sp\_emp}_{it} + \beta_3 \text{April} + \text{Age}_{it} \beta_4 + \text{Period}_{it} \beta_5 + \text{Prov}_{it} \beta_6 + v_{it} \quad (1)$$

where  $Y_{it}$  in specification (1) is the dummy variable that equals to one if the low-skilled male  $i$  is employed at time  $t$  and zero otherwise; and in specification (2)  $Y_{it}$  is a dummy variable that equals to one if individual  $i$  leaves the labour force at time  $t$ , and zero otherwise. The  $\text{Married}_{it}$  variable represents the marital status, and equals one if individual  $i$  is married or in a common-law relationship, and zero otherwise. The  $\text{Sp\_emp}_{it}$  variable represents the spouse's employment condition and equals one if individual  $i$  is married and his wife has a job, and zero otherwise. Note that  $\text{Sp\_emp}_{it}$  will also equal zero if the individual is single. The  $\text{April}$  variable is the seasonal dummy, which equals one if it is April and zero if it is October. The  $\text{Age}_{it}$  vector consists of two age group dummies, which are 20-29 and 30-39, with 40-54 being the omitted age group.  $\text{Period}_t$  is a vector that consists of binary variables of 1979-1980, 1987-1988, 1998-1999, 2006-2007 and 2011-2012 respectively, with the period 1979-1980 being the omitted period.  $\text{Prov}_{it}$  is a vector of dummy variables for the province of residents, with Ontario being the omitted province. Finally,  $v_{it}$  represents other factors that can affect the chance of individual  $i$  being employed or the decision of leaving the labour force. In this paper, I focus on the marginal effects, i.e. what a low-skilled male's chance to be employed or probability of leaving the labour force will change if the independent variables are increased by 1 unit.<sup>10</sup>

---

<sup>10</sup> I also estimate the Probit model and the results are similar.

## 6. Results

### 6.1 Regression results

The OLS estimators results are shown in Table 2. According to Table 2, most of the coefficients are statistically significant at the 1% significance level. Besides, by comparing the coefficients magnitudes and the evolution of employment rate over the years, I believe most of the estimated coefficients are economically significant as well.

My priority is to explore if the wives' participation in the labour force can explain why the low-skilled males' employment rate has been declining, therefore the coefficients on *married* and *married & spouse is employed* would be extremely important. According to the estimate results, married low-skilled males are 5.30% more likely to be employed in the labour market than those single low-skilled males. Meanwhile, compared to the low-skilled males who are single, the married low-skilled males are 2.65% less likely to quit the labour force. The signs of the coefficients indicate that married low-skilled males would attach to the labour force more actively. The interpretations of the coefficients on *married & spouse is employed* would be further enlightening for showing the effect of having an employed wife as opposite to not working wife. The results show that a low-skilled male who has a working wife is 3.49% more likely to has a job and 1.54% less likely to leave the labour force, compared to the low-skilled males whose spouse does not have a job. The signs of this variable demonstrate that the working-wife actually has a further positive impact on her husband's attachment to the labour market.

The sum of the coefficients on *married* and *married & spouse is employed* tells the marginal effect on a low-skilled male who are single to a low-skilled males who is married and his spouse is employed. Compared to the single low-skilled males, the low-skilled males who have working wife would be 8.79% more likely to be employed and -4.91% less likely to leave the labour force. Apparently, these two parameters present opposite conclusion to the prediction that, the

increasing participation of the wives in the labour force is one of the most important influential factor for low-skilled males' performance in the labour force.

Another variable of interest is the *period* dummy. According to the estimate results, during 1987-1988, the low-skilled males are 2.56% less likely to be employed in the labour force, and for the 1998-1999 period the probability of finding a job is 2.57% less compared to another four periods. As for 2006-2007 period, low-skilled males are 2.02% less likely to find a job, and in 2011-2012 it is 2.20% less compared to other four categories. The likelihood of the low-skilled males to leave the labour force in 1987-1988 is 0.84% higher than the other four periods, and during 1998-1999 period this number is slightly higher, which is 1.08% more likely. During 2006-2007, a low-skilled male is 1.90% more likely to leave the labour force and 1.76% for 2011-2012, than other four periods. More importantly, the huge difference between coefficients on 1987-1988 period and 2011-2012 period indicates that the low-skilled males are more intended to quit the labour market over the years, which is consistent to the findings in Figures 8 and 13.

The seasonal dummy *April* captures the difference of likelihood of low-skilled males to find a job and leave the labour force during the reference months. When dealing with the data, I only keep the LFS in April and October. And according to the estimate results, the low-skilled males are 4.32% less likely to find a job in April than in October, and 0.96% more likely to leave the labour force.

The coefficients on different age groups present the likelihoods of low-skilled males to be employed in the labour market and leave the labour force at different age. For this categorical variable, I drop the 40-54 subgroup as omitted group. From the estimate results, the low-skilled males aged 20-29 are 5.70% less likely to be employed than other age groups and 2.78% more likely to leave the labour force. For the 30-39 age group, the likelihood of a low-skilled male to have a job is 1.17% less compared to other age groups, and only 0.05% more likely to leave the labour force. From the evident difference of

these two age groups I would expect that low-skilled males are more concentrated in the younger age group and work experience should be important for low-skilled males in finding jobs. Note that the coefficient on 30-39 age group is not statistical significant in specification (2).

The categorical variable *province* describes the low-skilled males' employment conditions and likelihood of leaving the labour force across the different regions. The magnitudes of the coefficients show the great difference among all the provinces. From the estimate results, the low-skilled males reside in Newfoundland have the lowest probability of finding a job in Canada, which is 23.18% less compared to other provinces. Besides, the Prince Edward Island and New Brunswick low-skilled males also have visible disadvantage of being employed, in which provinces low-skilled males are around 15% less likely to have a job compared to other provinces. Apparently Manitoba and Alberta both create a better environment for low-skilled men to find jobs, in which they are 0.19% and 0.34% more likely to be employed compared to all other categories. However, the coefficients on both provinces are not statistical significant. The results for leaving the labour market are basically similar. The estimate coefficients show that the low-skilled males live in Manitoba evidently less likely to leave the labour force compare to other provinces, who are 0.48 less likely to leave the labour force. Besides, low-skilled males from Alberta, Saskatchewan and British Columbia are only 0.11%, 0.20% and 0.39% more likely to leave the labour force respectively, which evidently lower than other eastern provinces. The highest point happens in the Newfoundland, in which the low-skilled males are 12.30% more likely to quit finding jobs. It should be noted that among coefficients of province dummies in specification (2), British Columbia is statistical significant at 5% significance level, and Saskatchewan and Alberta are both not statistical significant. These estimate results are consistent to the conclusion I get from Figure 7, which shows the decline of the employment rate of low-skilled males are concentrated in the eastern Canada. So I would expect that the geology and industry differences also play important roles in the probability of being employed for low-skilled males. Some advanced industries in the western Canada, such as oil

sand industry in Alberta and the construction sector in British Columbia, may largely slow down the speed of decline in low-skilled males' employment rate (Fortin *et al.*, 2012).

## 6.2 Robustness checks

In this section, I check the sensitivity of the findings by adding the controls sequentially. The results for two specifications are presented in Tables 3 and 4 respectively. Table 3 focuses on the low-skilled males being employed and Table 4 focuses on low-skilled males leaving the labour market. In both tables, Column (1) gives the marginal effect without any control, which only includes the low-skilled males' marital status and the spouses' employment condition. Column (2) adds the seasonal control. Column (3) presents the marginal effects with age and seasonal controls. Column (4) shows the estimate results including seasonal, age and period controls and Column (5) gives the marginal effects with all the controls, which is also the results previously discussed in Section 6.

The findings presented in Tables 3 and 4 are essentially unchanged when I added the controls sequentially compared to the regression results as shown in Column (5), which is not surprising, given the marginal effects shown in Column (1) are basically same as the results shown in the Column (5). The differences of the magnitudes between each step are all less than 2%. Besides, most of the coefficients in Tables 3 and 4, especially *married* and *married & spouse is employed* are statistically significant.

The problem of endogeneity may arise due to three reasons: omitted variable, reverse causality and measurement error. As for the model in my paper, the data I adopt in my paper is from the LFS, so I assume measurement error should not be considered as a major problem. As for the independent variables I use to explore the marginal effect, I believe none of these variables will be highly correlated. However, I believe the endogeneity may arise in this model because of the omitted variable, which will affect the coefficient of the explanatory variables, and thus the estimate results are imprecise.

Firstly, as mentioned before, the magnitudes of the coefficients on eastern and western provinces show visible differences, which can be explained from the geology (e.g. natural resource) and industry difference. Besides, according to the estimate coefficients on the different age groups, low-skilled males who are between 30-39 are more likely to find a job compared to the males who aged 20-29. Therefore, I believe for low-skilled males, working experience or skills should also be an important component for the probability of a low-skilled male finding a job.

## **7. Conclusion**

In the paper I use LFS data during the 1976-2013 period to explore the reasons why the employment rate of low-skilled males has been decreasing from 87% to 76%. In order to explain this phenomenon, I make plenty figures to have a better overview of the evolution of employment rate of low-skilled males, and then do empirical analysis based on data drawn from the LFS during 1976-2013. The figures and empirical analysis are all restricted to the low-skilled males aged 20-54 who are not self-employed, in the military or full-time students.

There are three main findings in this paper. First, overall the Canada employment rate has been getting better, but the employment rates of males and females have been changing in different directions (See Bowlus (1998), Emilia (2012) and Juhn and Murphy (1997)). Secondly, based on the marital status, I explore low-skilled males and their spouses' employment rates during the reference period. Compared to the evident decline in the employment rate of low-skilled men, the employment rate of spouses experienced a substantial increase. Last but not least, another evident change is that there has been increasing number of unemployed low-skilled males decided to leave the labour market. Combining these results, I would have expected that the development in the wives' performance in the labour force is an important explanation of the worsening working condition of low-skilled males. However my regression results show the opposite. According to the regression results, the working-wife will positively affect a low-skilled male's attachment to the labour force and

reduce the probability of leaving the labour force.

## References

- Adshade, M. (2012) "Female Labour Force Participation in an Era of Organizational and Technological Change" *Canadian Journal of Economics*, Vol.45, NO.3, Pages 1188-1219
- Beaudry, P., and T. Lemieux (1999) "Evolution of the Female Labour Force Participation Rate in Canada, 1976-1994: A Cohort Analysis" *Canadian Business Economics*, Vol.7, NO.2, Pages 57-70
- Beaulieu, E. (2000) "The Canada-U.S. Free Trade Agreement and Labour Market Adjustment in Canada" *Canadian Journal of Economics*, Vol.33, NO.2, Pages 540-563
- Blackburn, M., and D. Bloom (1995) "Changes in the Structure of Family Income Inequality in the U.S. and Other Industrialized Nations during the 1980s" *Research in Labor Economics*, Vol.14, Pages 141-170
- Bowlus, A. J. (1998) "A Panel Data Analysis of the US-Canadian Nonemployment Rate Gap among Young, Low Skilled Males" *Canadian Public Policy*, Vol.24, NO.1, Pages 192-209
- Breunig, R., and S. Rospabe (2013) "The Male-female Wage Gap in France: Differences across the Wage Distribution" *Australian Journal of Labour Economics*, Vol.16, NO.1, Pages 155-199
- Brochu, P., and L. Zhou (2009) "Is Job Insecurity on the Rise? Evidence from Canadian Perception Data" *Canadian Journal of Economics*, Vol.42, NO.4, Pages 1305-1325
- Brochu, P., and D. Green (2011) "The Impact of Minimum Wages on Quit, Layoff and Hiring rates" *IFS Working Paper 06/11*, Institute for Fiscal Studies
- Burbidge, J., L. Magee, and A. Robb (2000) "Married-couple Family Earnings Inequality in Canada and the U.S." *McMaster University Discussion Paper*
- Cancian, M., S. Danziger, and P. Gottschalk (1993) "Working Wives and Family Income Inequality among Married Couples" In *Uneven Tides: Rising Inequality in America*, edited by S. Danziger and P. Gottschalk, Pages 195-221
- Duncan, B., and S. J. Trejo (2012) "The Employment of Low-skilled Immigrant Men in the United States" *American*

*Economic Review*, Vol.102, NO.3, Pages 549-554

Emilia, H. (2012) “The Relationship between Employment and Economic Development in Romania: A County Level Analysis” *Ovidius University Annals, Economic Sciences Serie22s*, Vol.12, NO.1, Pages 340-345

Fortin, N., D. Green, T. Lemieux, K. Milligan, and W. C. Riddell (2012) “Canadian Inequality: Recent Developments and Policy Options” *Canadian Public Policy*, Vol.38, NO.2, Pages 121-145

Fortin, N., and T. Lemieux (2000) “Are Women’s Wage Gains Men’s Losses? A Distributional Test” *American Economic Review*, Vol.90, NO.2, Pages 456-460

Fortin, N., and T. Schirle (2006) “Gender Dimensions of Changes in Earnings Inequality in Canada” In *Dimensions of Inequality in Canada*, edited by J. Kesselman and D. Green, Vol.1, Pages 307-346

Friesen, J. (2002) “The Effect of Unemployment Insurance on Weekly Hours of Work in Canada” *Canadian Journal of Economics*, Vol.35, NO.2, Pages 363-384

Fudge, J., and F. MacPhail (2009) “The Temporary Foreign Worker Program in Canada: Low-skilled Workers as an Extreme Form of Flexible Labour” *Comparative Labor Law and Policy Journal*, Vol.31, NO.1, Pages 101-139

Gera, S., W. Gu, and Z. Lin (2001) “Technology and the Demand for Skills in Canada: An Industry-level Analysis” *Canadian Journal of Economics*, Vol.34, NO.1, Pages 132-148

Gibb, T., and J. Walker (2011) “Educating for a High Skills Society? The Landscape of Federal Employment, Training and Lifelong Learning Policy in Canada” *Journal of Education Policy*, Vol.26, NO.3, Pages 381-398

Gower, D. (1993) “The Impact of the 1990 Changes to the Education Questions on the Labour Force Survey” Labour and Household Surveys Analysis Division Staff Report, Statistics Canada

Harkness, S., S. Machin, and J. Waldfogel (1997) “Evaluating the Pin Money Hypothesis: The Relationship between Women’s Labour Market Activity, Family Income and Poverty in Britain” *Journal of Population Economics*, Vol.10, NO.2, Pages 137-158

Juhn, C., and K. Murphy (1997) “Wage Inequality and Family Labor Supply” *Journal of Labor Economics*, Vol.15, NO.1,

Morissette, R., and F. Hou (2008) “Does the Labour Supply of Wives Respond to Husbands’ Wages? Canadian Evidence from Micro Data and Grouped Data” *Canadian Journal of Economics*, Vol.41, NO.4, Pages 1185-1210

Riddell, W. C., and X. Song (2011a) “Education, Job Search and Re-employment Outcomes among the Unemployed” *IZA Discussion Papers 6134*, Institute for the Study of Labor (IZA)

Riddell, W. C., and X. Song (2011b) “The Impact of Education on Unemployment Incidence and Re-employment Success: Evidence from the U.S. Labour Market” *Labour Economics*, Vol.18, NO.4, Pages 453-463

Riddell, W. C., and X. Song (2012) “The Role of Education in Technology Use and Adoption: Evidence from the Canadian Workplace and Employee Survey” *IZA Discussion Papers 6377*, Institute for the Study of Labor (IZA)

Warman, C., F. Woolley, and C. Worswick (2010) “The Evolution of Male-female Earnings Differentials in Canadian Universities, 1970-2001” *Canadian Journal of Economics*, Vol.43, NO.1, Pages 347-372

## **Appendix: Educational categories used by the LFS in 1976-1989 and 1990- 2013**

As I mentioned before, the divide standards in education that the LFS used from 1976 to 2013 were different. This change can better reflect the changed education patterns in Canada but also makes time consistent education statistics problematic. The percentage of the low-skilled males with high school education or less of all males as the highest education level is presented in Figure 4. The studied population includes the individuals who have 0-13 year's education or who graduate from high school according to different divide standards. Obviously there was a visible sudden decrease, from 62.87% in 1989 to 52.55% in 1990, in the figure, and this reduction can be explained from the LFS interview questions.

Prior to 1990, the LFS obtains the respondent's educational attainment through two part questions: number of years of primary and secondary schooling and what is his/her post-secondary education level. According to the respondents' elementary and secondary schooling years, the LFS codes them into 6 categories: no schooling, 1 to 8 years education, 9 or 10 years education, 11 years of education, 12 years education and 13 years education. Then the LFS will interview the respondents about their post-secondary education, only under the condition that the post-secondary education requires a high school graduation. After 1990, to cope with the changing education patterns in Canada, the LFS revised the interview questions. The respondents' primary and secondary schoolings are based on the highest grade and fit into three categories: Grade 0-8, Grade 9-10 and Grade 11-13, and whether he/she manages to graduate from high school is also interviewed. For post-secondary education part, an important change is that it did not require that one had to graduate from high school to obtain post-secondary education or certificate. Besides, LFS lengthened the post-secondary education level list and divided the diploma and certificate category into more specific subcategories. The respondents who have post-secondary education may fit into categories such as no degree diploma, trade, vocational or apprenticeship certificate, college certificate, university diploma below bachelor's level, bachelor's degree and post-graduate degree.

The sudden jump in Figure 4 can be explained from the following two reasons. Firstly, the more detailed certificate

categories may encourage the respondents to finish the interview more accurate. The statistics showed that there was an evident reduction in the fraction of people who reported no post-secondary certificate or training (Gower, 1993). Secondly, prior to 1990, the interview questions created a situation that all the respondents who obtained a certificate or diploma should at least have accomplished 11 years of schooling. But in the new classification, although this was still reasonable for college or university diploma, the new post-secondary category did not require a high school graduation education. This resulted in a substantial increase in the percentage of post-secondary categories and also a large reduction in the fraction of respondents only with high school education or less. Despite of the sudden change caused by the interview questions, the changing percentage in Figure 4 still tells that during 1976-2013, the fraction of people only had high school education or less has been declining.

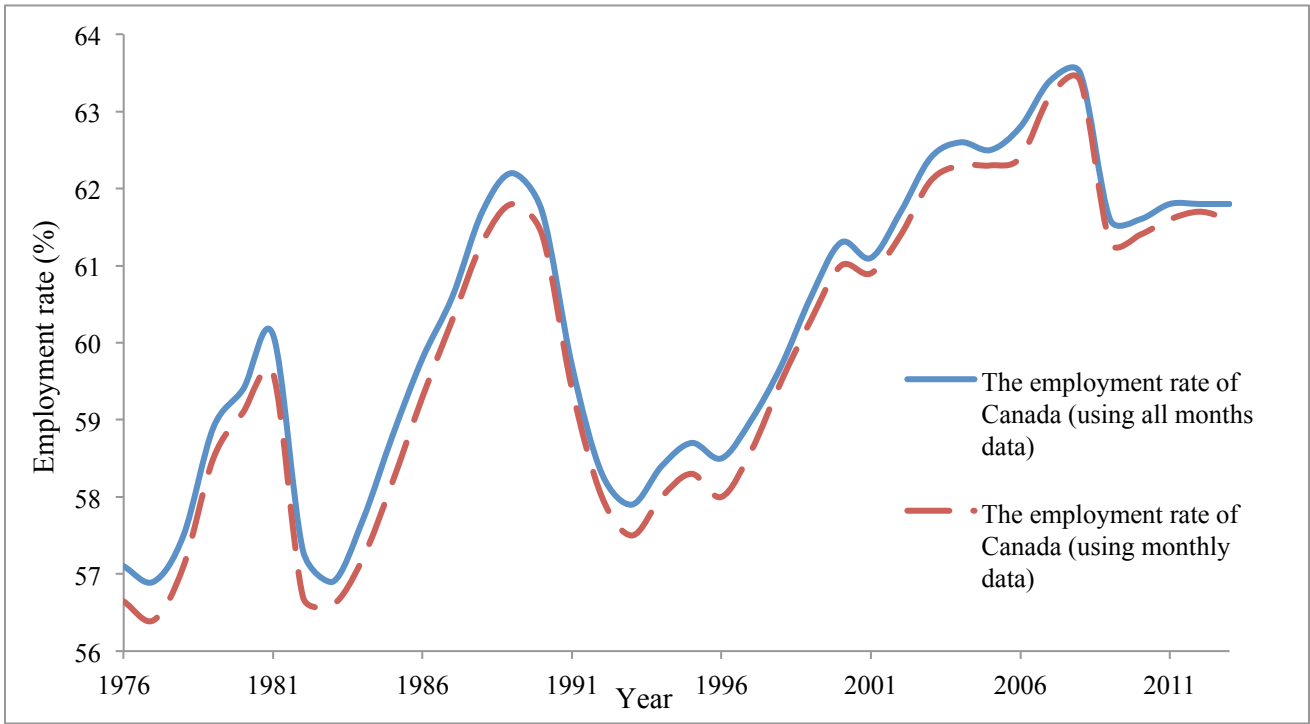


Figure 1: *The employment rate of Canada, 1976-2013*

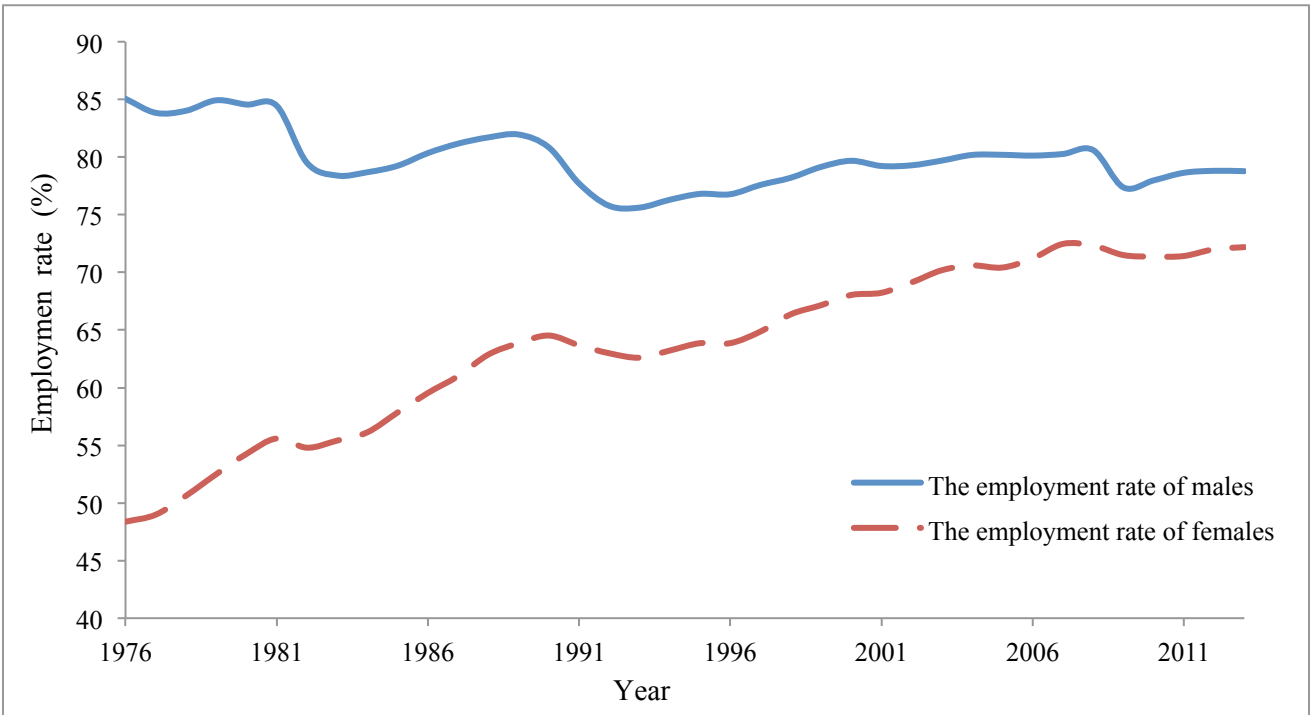


Figure 2: *The employment rate of males and females in Canada, 1976-2013*

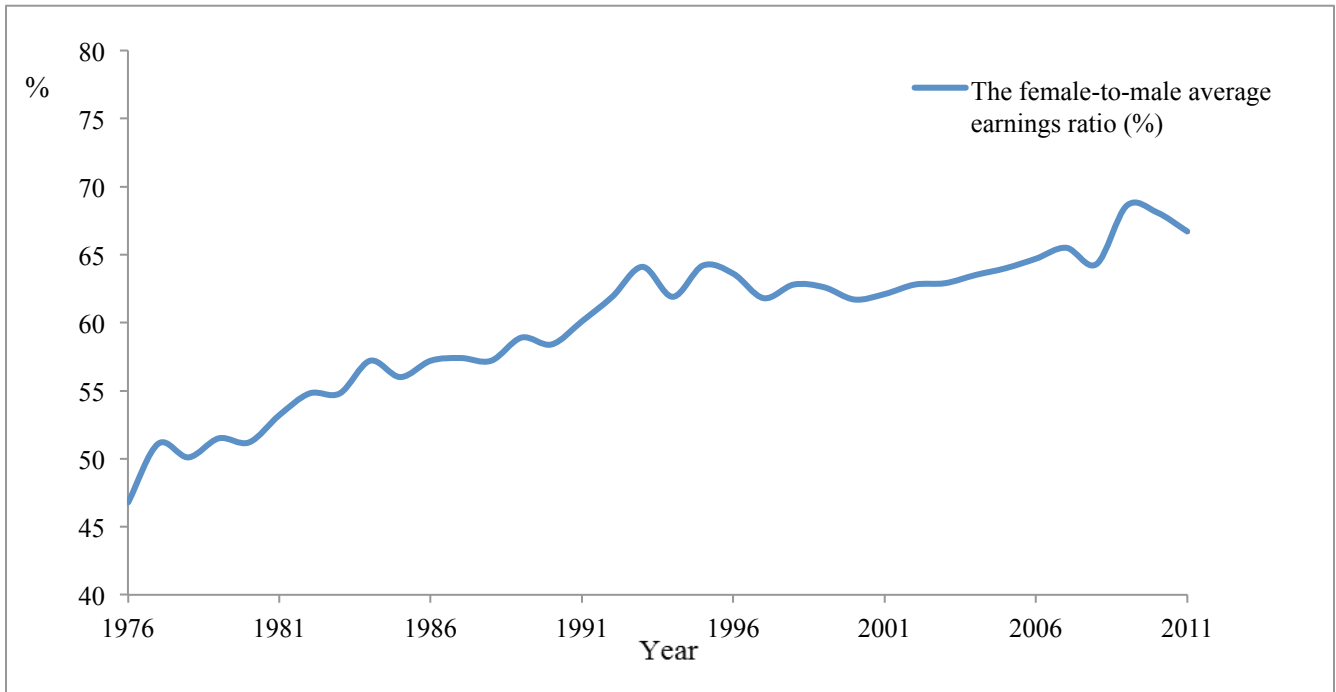


Figure 3: *The female-to-male average earnings ratio (%)*, 1976-2011<sup>11</sup>

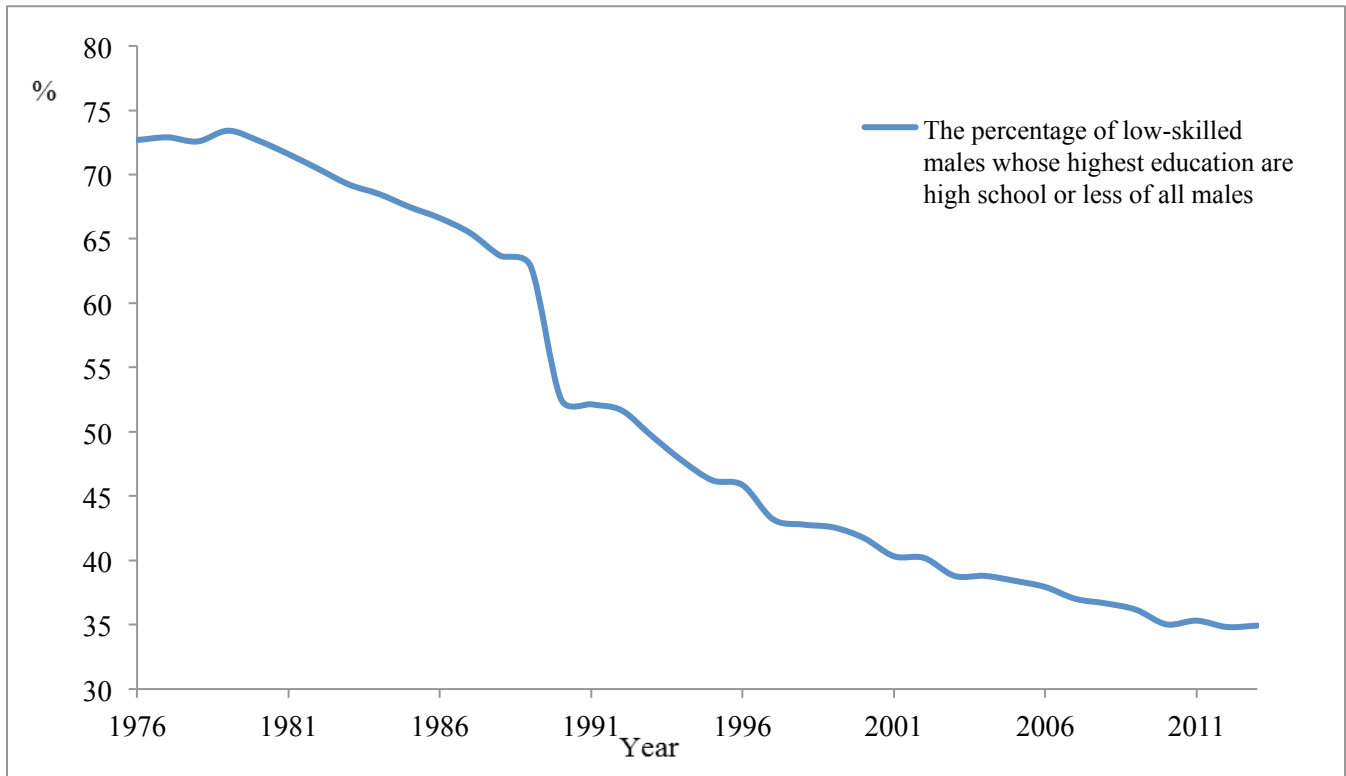


Figure 4: *The percentage of low-skilled males whose highest education are high school or less of all males*, 1976-2013

<sup>11</sup> The statistics in Figure 3 are obtained from the CANSIM, for the rest figures the statistics are calculated using the LFS data.

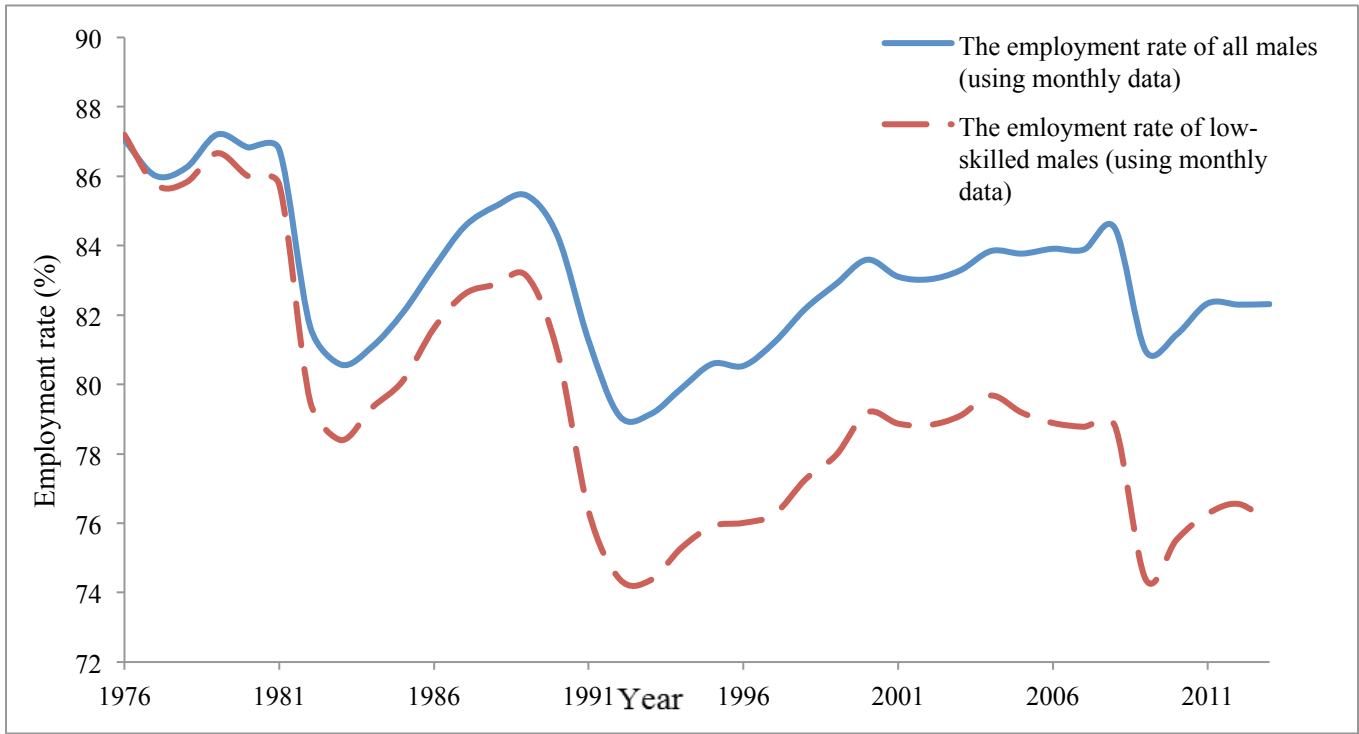


Figure 5: *The employment rate of all males and low-skilled males (using monthly data), 1976-2013*

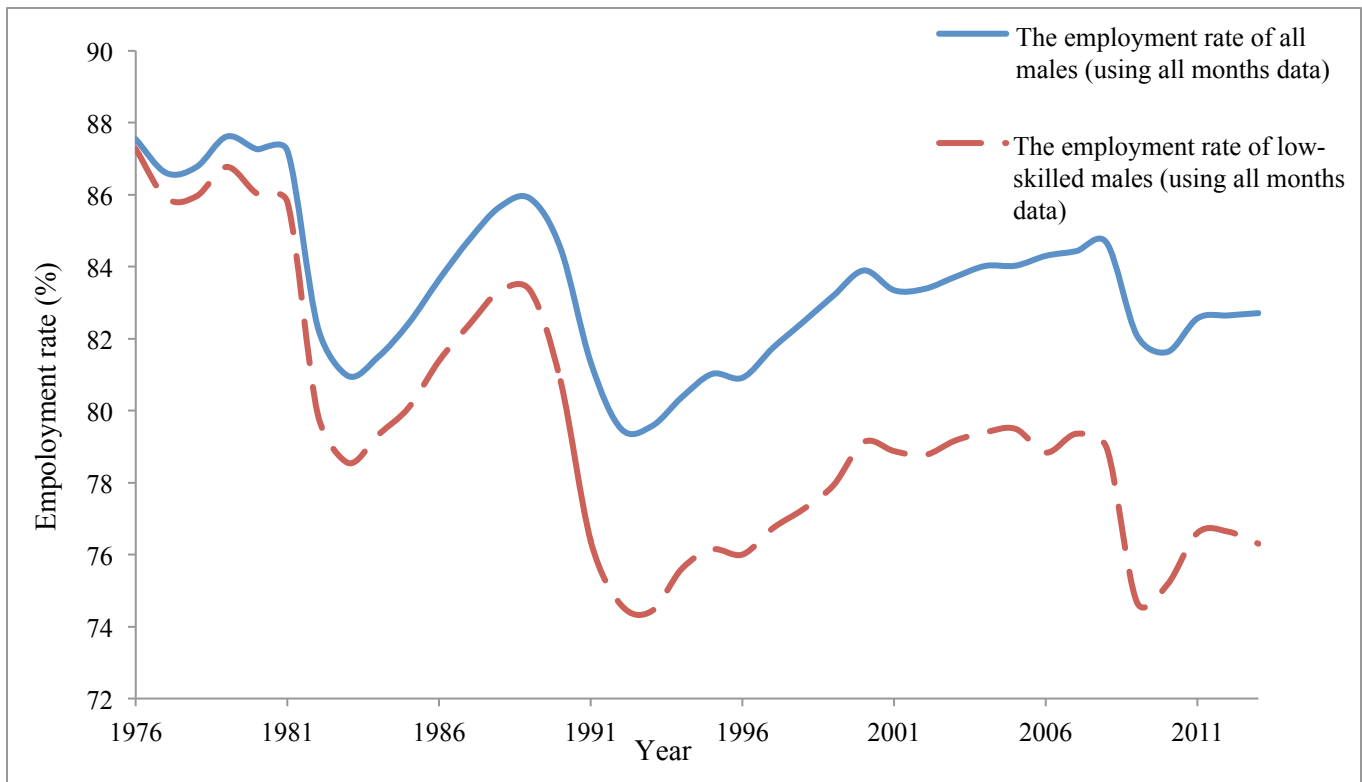


Figure 6: *The employment rate of all males and low-skilled males (using all months data), 1976-2013*

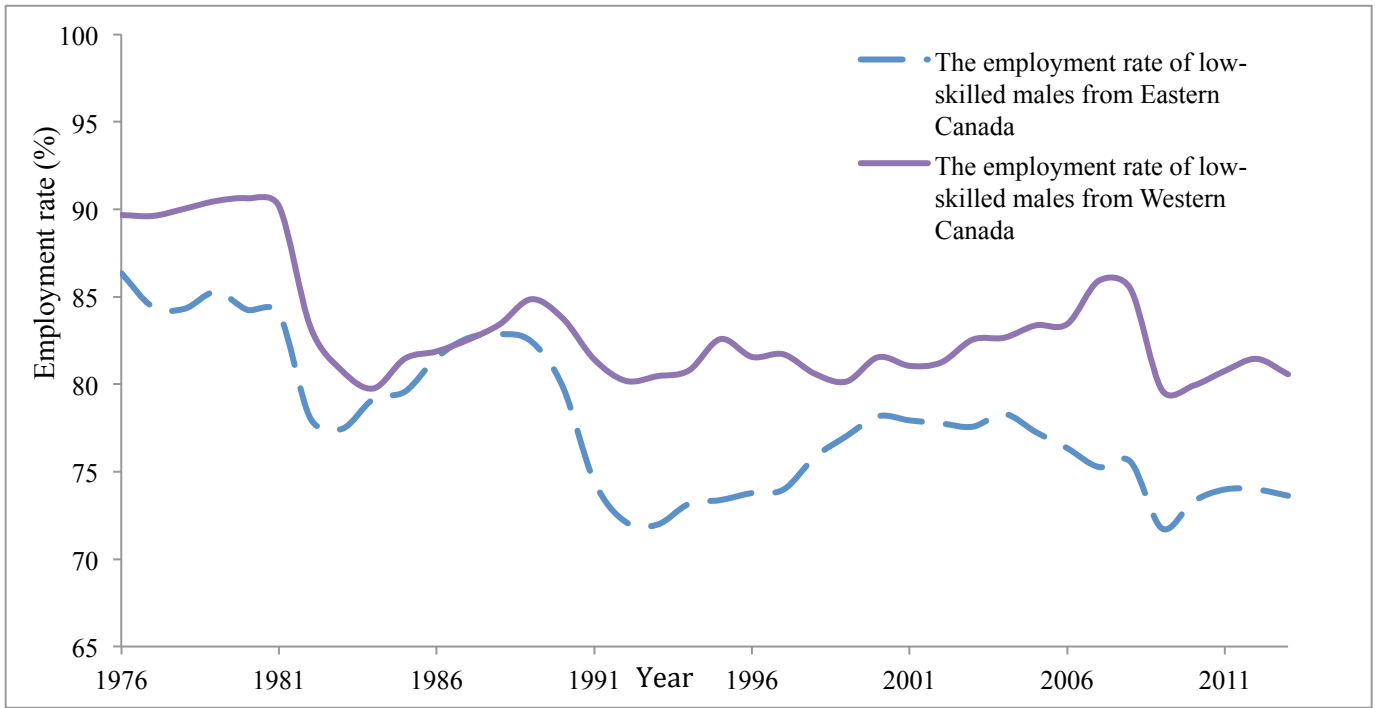


Figure 7: The employment rate of low-skilled males from Western and Eastern Canada, 1976-2013

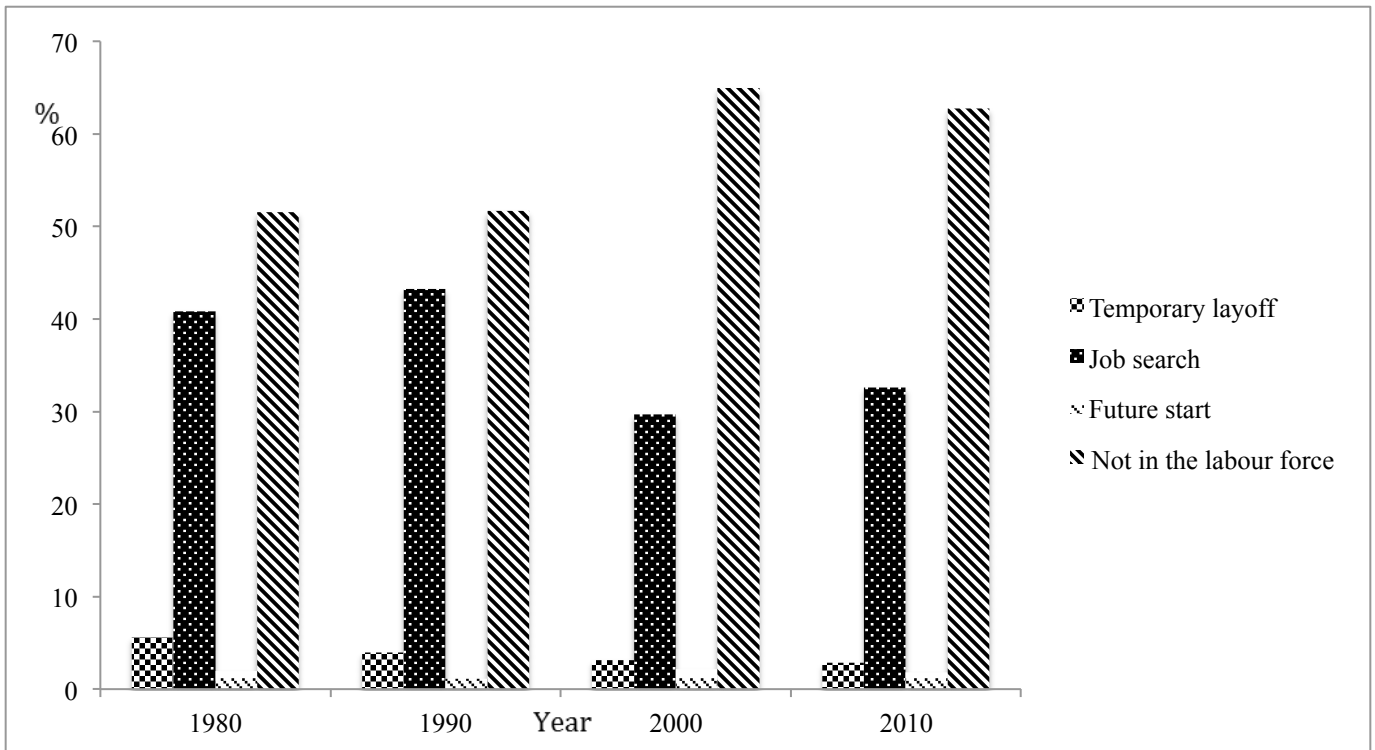


Figure 8: The work status of not working low-skilled males

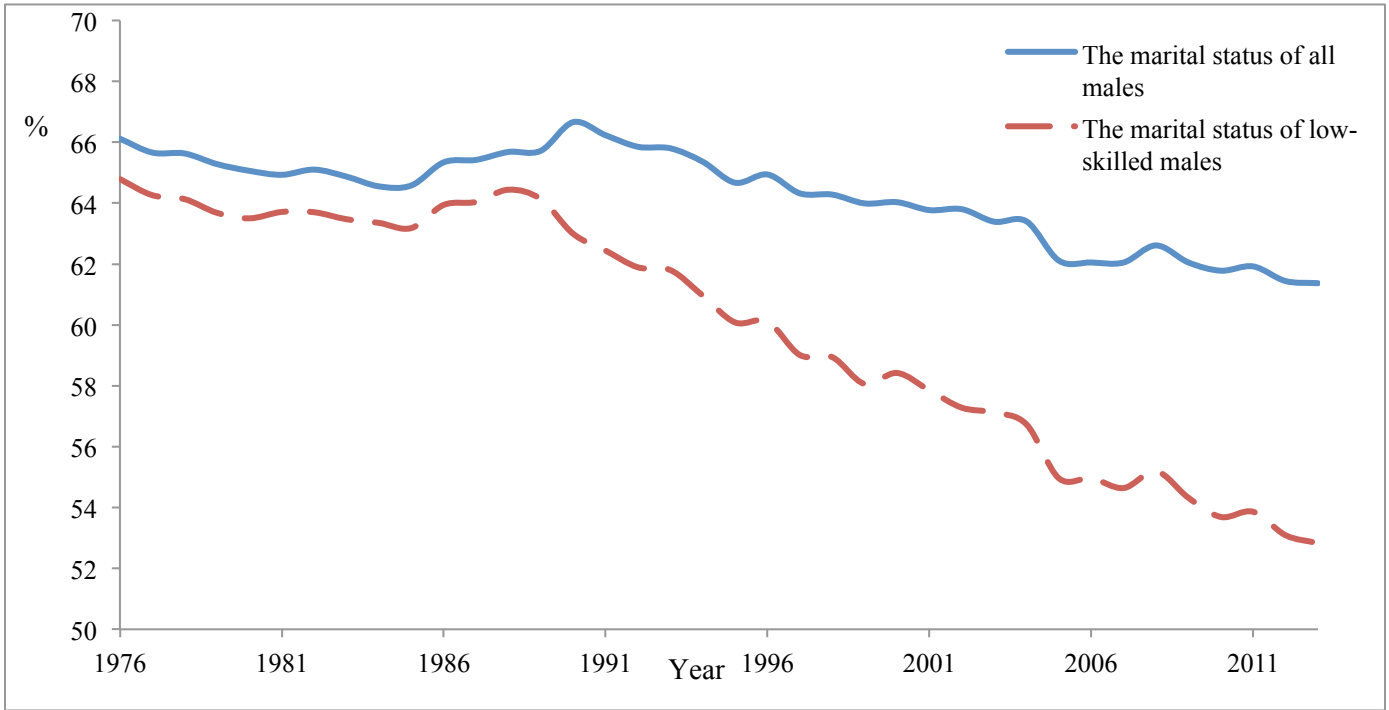


Figure 9: *The marital status of all males and low-skilled males, 1976-2013*

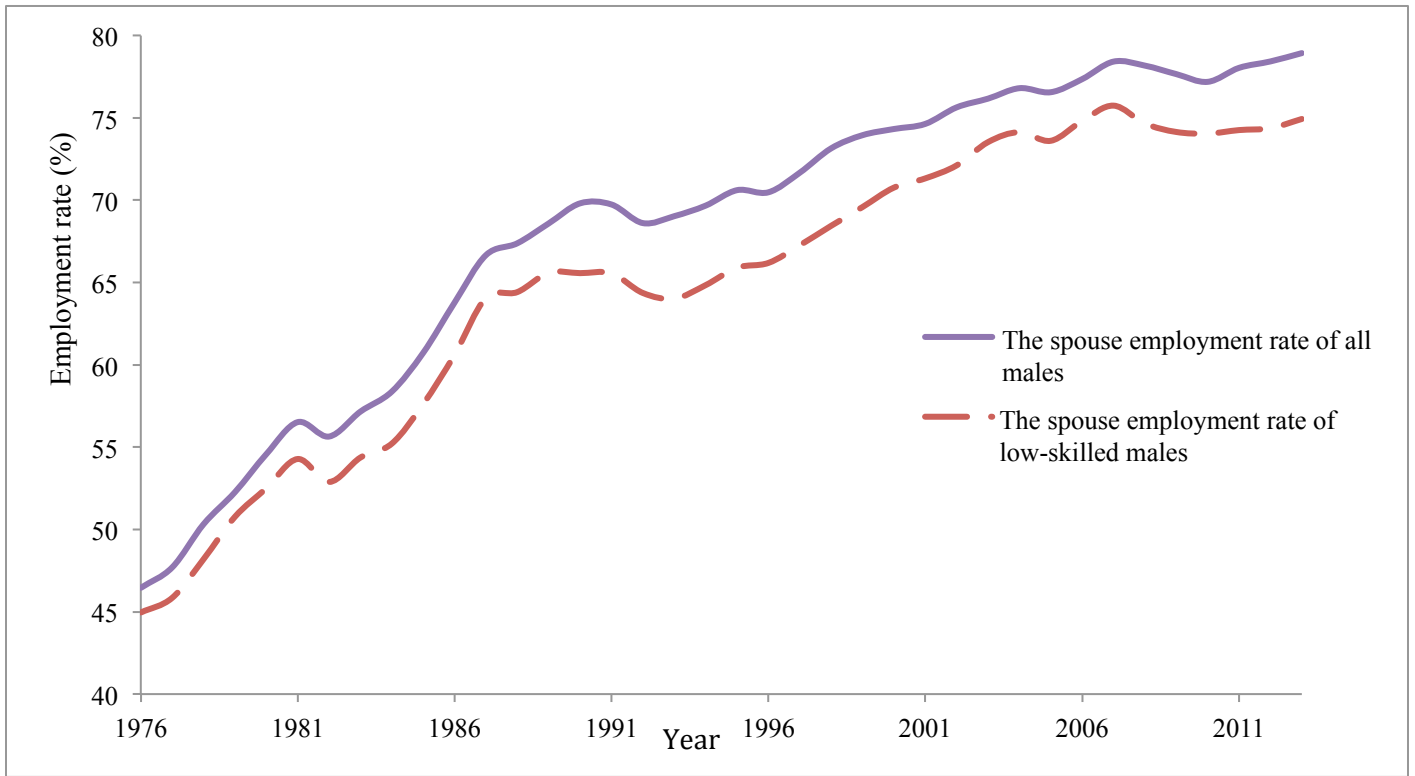


Figure 10: *The spouse employment rate of all males and low-skilled males, 1976-2013*

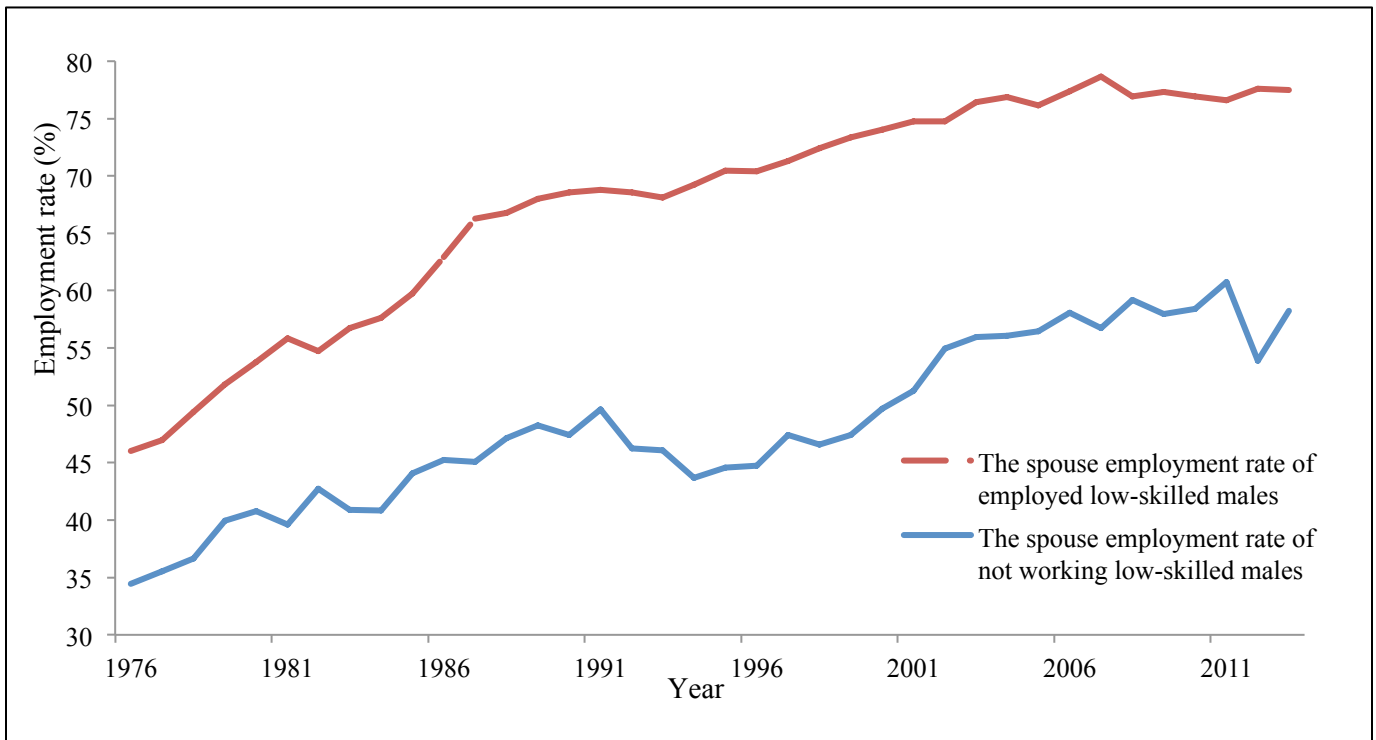


Figure 11: *The spouse employment rate of employed and not working low-skilled males, 1976-2013*

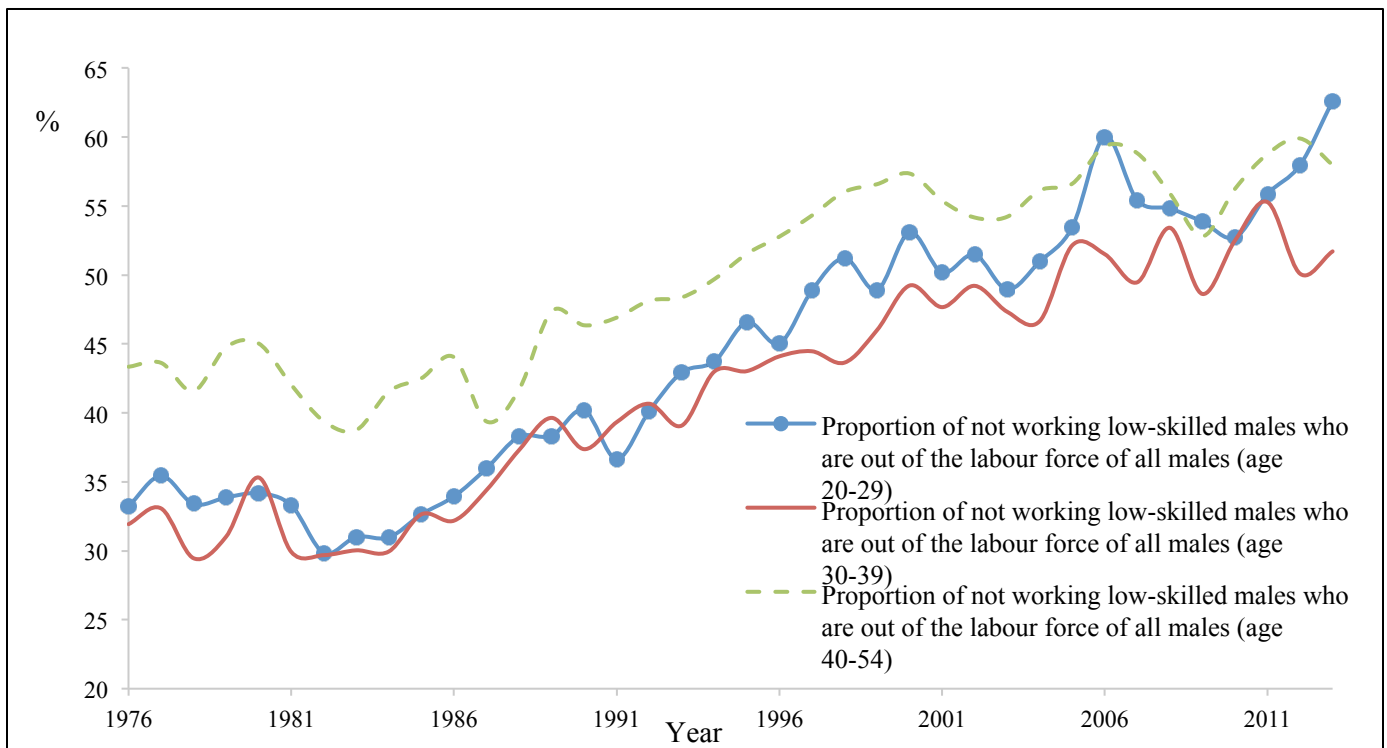


Figure 12: *Proportion of not working low-skilled males who are out of labour force of all males, 1976-2013*

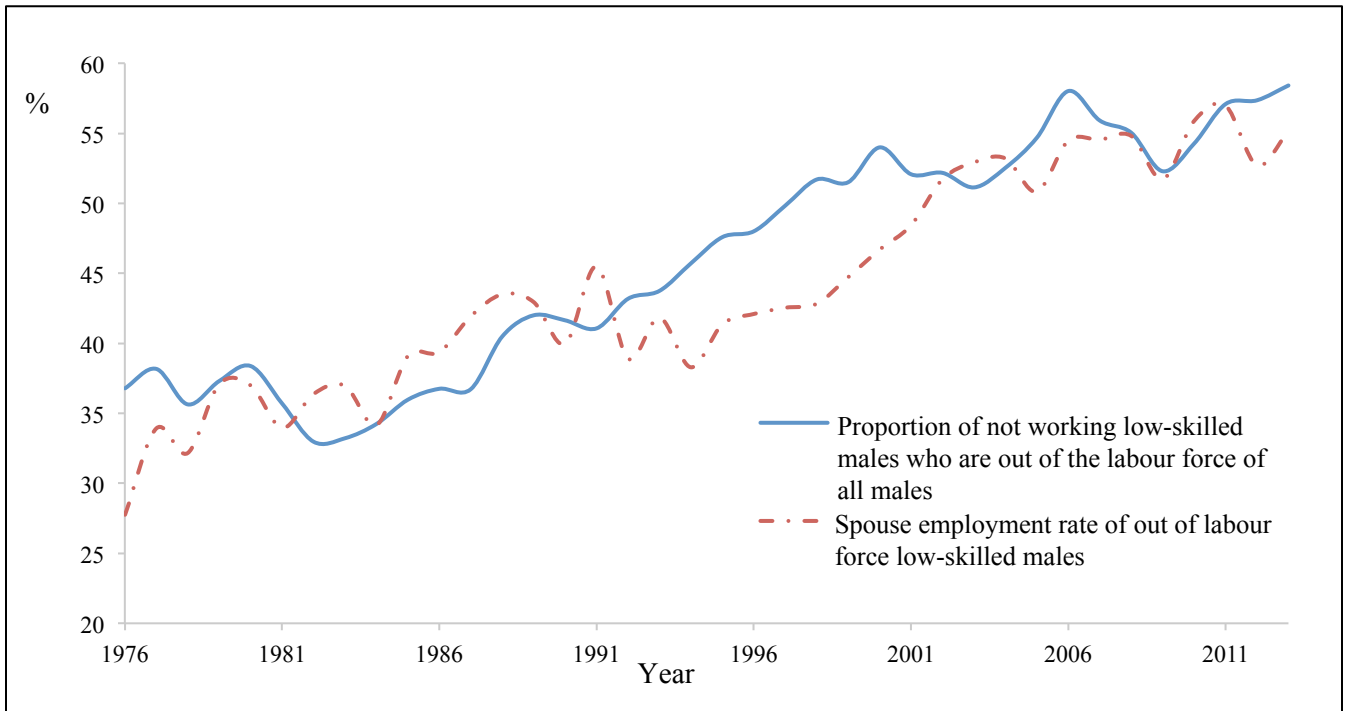


Figure 13: *Proportion of not working low-skilled males who are out of labour force of all males and spouse employment rate, 1976-2013*

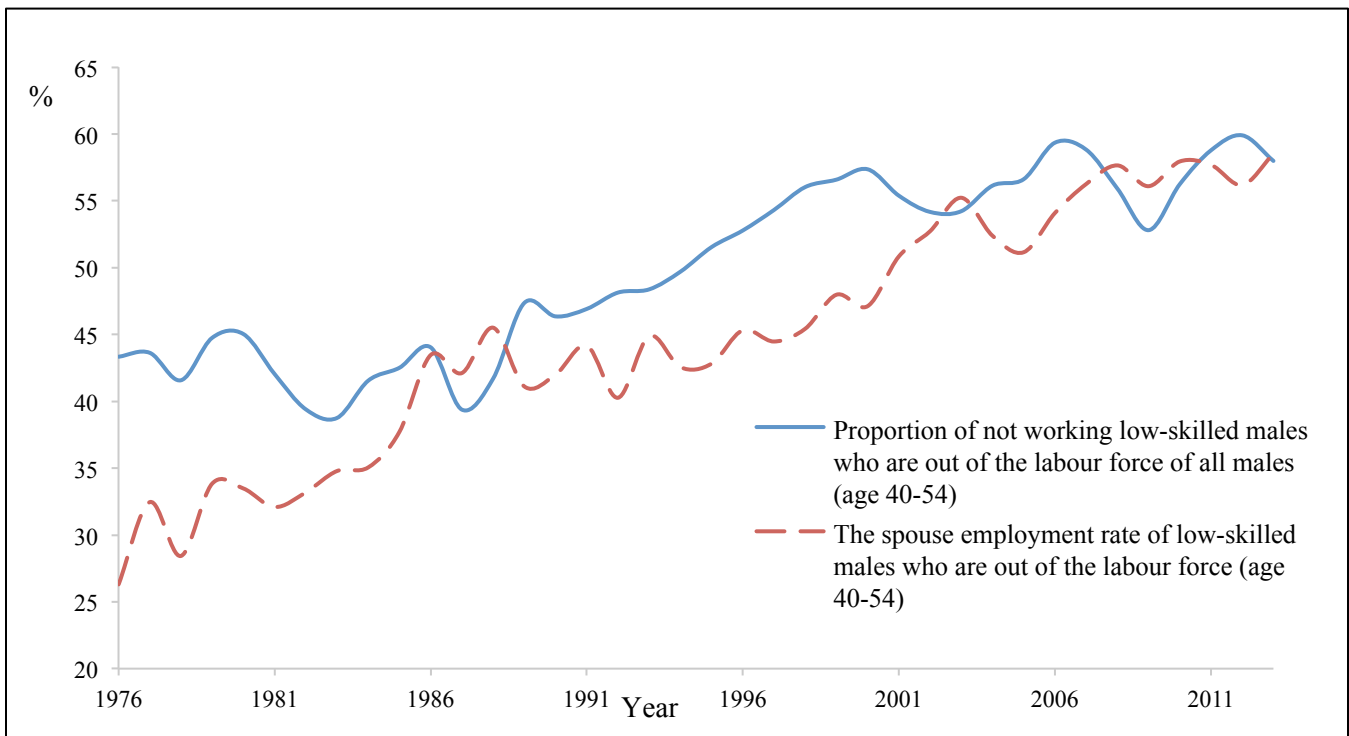


Figure 14: *Proportion of not working low-skilled males who are out of labour force of all males and spouse employment rate (age 40-54), 1976-2013*

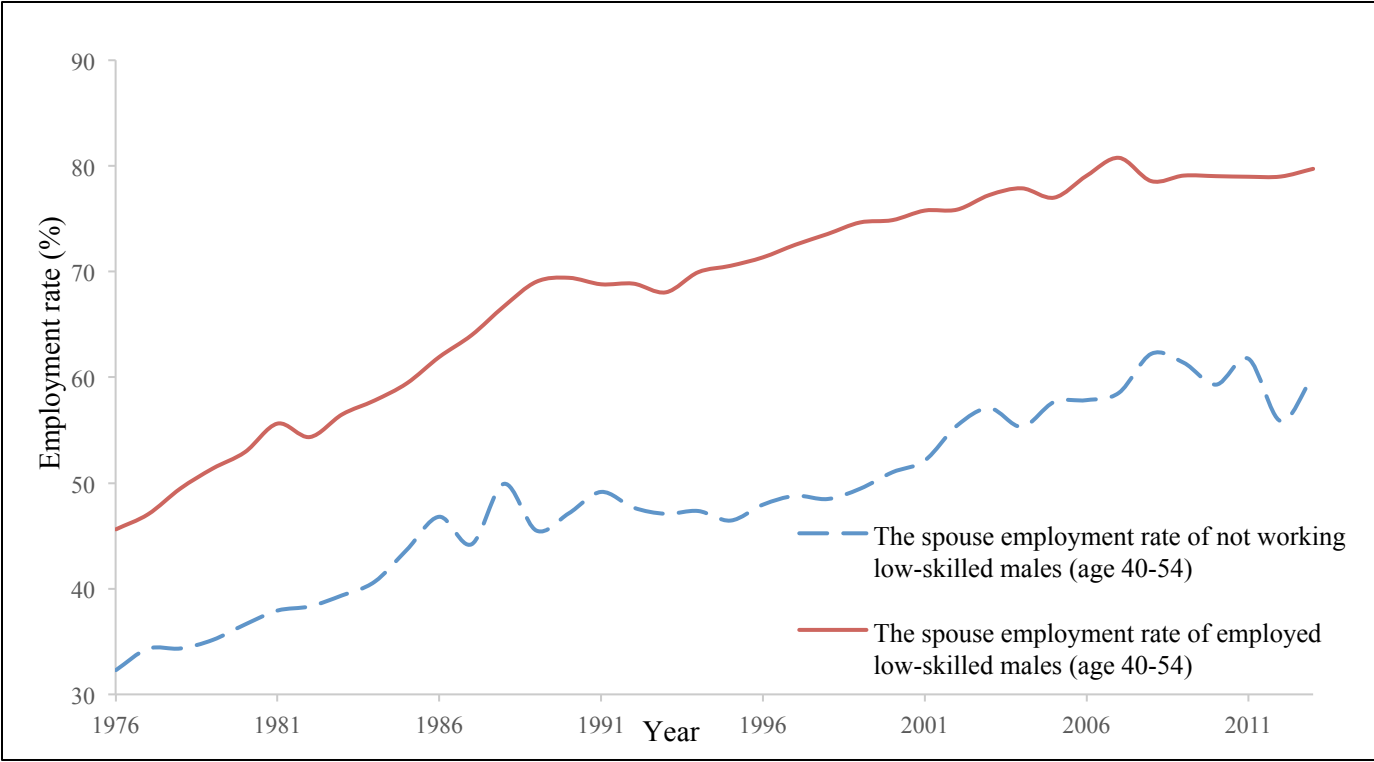


Figure 15: *The spouse employment rate of employed and not working low-skilled males (age 40-54), 1976-2013*

Table 1: Employment rate across business cycles (%)

	E1979,1980	E1987,1988	E1998,1999	E2006,2007
Males	87.03 (0.34)	84.86 (0.36)	82.54 (0.38)	83.9 (0.37)
Low-skilled males	86.32 (0.34)	82.81 (0.38)	77.62 (0.42)	78.7 (0.41)
Low-skilled males in Eastern Canada	84.75 (0.36)	82.75 (0.38)	76.43 (0.42)	75.78 (0.43)
Low-skilled males in Western Canada	90.57 (0.29)	82.98 (0.38)	80.39 (0.40)	84.71 (0.36)
Spouse (males)	53.43 (0.50)	66.31 (0.47)	73.55 (0.44)	77.89 (0.41)
Spouse (low-skilled males)	51.63 (0.50)	63.25 (0.48)	69.00 (0.46)	75.28 (0.43)
Spouse (not working low-skilled males)	39.98 (0.49)	46.06 (0.50)	47.18 (0.50)	57.27 (0.49)
Spouse (employed low-skilled males)	52.82 (0.50)	65.64 (0.47)	72.89 (0.44)	78.05 (0.41)

Note: Standard errors are in the parentheses. The employment rate is weighted over two consecutive years as to reduce the sensitivity of the results of the choices of start and end years.

Table 2: OLS regression results: coefficients and standard errors

Variables	Employed	Out of the labour force
Married	0.0530 *** (0.0026)	-0.0265 *** (0.0016)
Married & spouse is employed	0.0349 *** (0.0020)	-0.0154 *** (0.0012)
April	-0.0432 *** (0.0018)	0.0096 *** (0.0011)
20-29	-0.0570 *** (0.0023)	0.0278 *** (0.0015)
30-39	-0.0117 *** (0.0030)	0.0005 (0.0012)
1987-1988	-0.0256 *** (0.0230)	0.0084 *** (0.0014)
1998-1999	-0.0257 *** (0.0026)	0.0108 *** (0.0016)
2006-2007	-0.0202 *** (0.0028)	0.0190 *** (0.0019)
2011-2012	-0.0220 *** (0.0030)	0.0176 *** (0.0020)
Newfoundland	-0.2318 *** (0.0048)	0.1230 *** (0.0036)
Prince Edward Island	-0.1619*** (0.0058)	0.0471 *** (0.0037)
Nova Scotia	-0.0735 *** (0.0037)	0.0243 *** (0.0023)
New Brunswick	-0.1312 *** (0.0037)	0.0640 *** (0.0026)
Quebec	-0.0418 *** (0.0025)	0.0134 *** (0.0016)
Manitoba	0.0019 (0.0030)	-0.0048 *** (0.0018)
Saskatchewan	-0.0085 *** (0.0030)	0.0020 (0.0020)
Alberta	0.0034 (0.0028)	0.0011 (0.0019)
British Columbia	-0.0130 *** (0.0030)	0.0039 ** (0.0020)
Constant	0.9171 *** (0.0030)	0.0354 *** (0.0019)
Observations	233,033	233, 033
R <sup>2</sup>	0.0478	0.0263

Note: Standard errors are in the parentheses. All regressions are weighted, \*\*\* represents significant at 1% significance level, \*\* represents significant at 5% significance level, \* represents significant at 10% significance level.

Table 3: Robustness check results: Employed

Variable: Employed					
	(1)	(2)	(3)	(4)	(5)
Married	0.0682 *** (0.024)	0.0686 *** (0.0024)	0.0495 *** (0.0025)	0.0453 *** (0.0026)	0.0530 *** (0.0026)
Married & spouse is employed	0.0404 *** (0.0020)	0.0398 *** (0.0020)	0.0389 *** (0.0020)	0.0420 *** (0.0020)	0.0349 *** (0.0020)
April		-0.0433 *** (0.0018)	-0.0434 *** (0.0018)	-0.0434 *** (0.0018)	-0.0432 *** (0.0018)
20-29			-0.0542 *** (0.0023)	-0.0558 *** (0.0023)	-0.0570 *** (0.0023)
30-39			-0.0110 *** (0.0020)	-0.0110 *** (0.0020)	-0.0117 *** (0.0030)
1987-1988				-0.0261 *** (0.0023)	-0.0256 *** (0.0023)
1998-1999				-0.0245 *** (0.0026)	-0.0257 *** (0.0026)
2006-2007				-0.0175 *** (0.0028)	-0.0202 *** (0.0028)
2011-2012				-0.0177 *** (0.0029)	-0.0220 *** (0.0030)
Newfoundland					-0.2318 *** (0.0048)
Prince Edward Island					-0.1619 *** (0.0058)
Nova Scotia					-0.0735 *** (0.0037)
New Brunswick					-0.1312 *** (0.0037)
Quebec					-0.0418 *** (0.0025)
Manitoba					0.0019 (0.0030)

Saskatchewan					-0.0085 *** (0.0030)
Alberta					0.0034 (0.0028)
British Columbia					-0.0130 *** (0.0030)
Constant	0.8198 *** (0.0024)	0.8414 *** (0.0019)	0.8757 *** (0.0023)	0.8940 *** (0.0028)	0.9171 *** (0.0030)
Observations	233,033	233,033	233,033	233,033	233,033
R <sup>2</sup>	0.0217	0.0261	0.0306	0.0316	0.0478

Note: Standard errors are in the parentheses. All regressions are weighted, \*\*\* represents significant at 1% significance level, \*\* represents significant at 5% significance level, \* represents significant at 10% significance level.

Table 4: Robustness check results: Out of the labour force

Variable: Out of the labour force					
	(1)	(2)	(3)	(4)	(5)
Married	-0.0373 *** (0.0016)	-0.0374 *** (0.0016)	-0.0277 *** (0.0016)	-0.0231 *** (0.0016)	-0.0265 *** (0.0016)
Married & spouse is employed	-0.0164 *** (0.0011)	-0.0162 *** (0.0011)	-0.0159 *** (0.0011)	-0.0186 *** (0.0012)	-0.0154 *** (0.0012)
April		0.0097 *** (0.0011)	0.0097 *** (0.0011)	0.0097 *** (0.0011)	0.0096 *** (0.0011)
20-29			0.0253 *** (0.0015)	0.0274 *** (0.0015)	0.0278 *** (0.0015)
30-39			-0.009 (0.0012)	0.0003 (0.0017)	0.0005 (0.0012)
1987-1988				0.0087 *** (0.0014)	0.0084 *** (0.0014)
1998-1999				0.0105 *** (0.0016)	0.0108 *** (0.0016)
2006-2007				0.0181 *** (0.0019)	0.0190 *** (0.0019)
2011-2012				0.0161 *** (0.0020)	0.0176 *** (0.0020)
Newfoundland					0.1230 *** (0.0036)
Prince Edward Island					0.0471 *** (0.0037)
Nova Scotia					0.0243 *** (0.0023)
New Brunswick					0.0640 *** (0.0026)
Quebec					0.0134 *** (0.0016)
Manitoba					-0.0048 *** (0.0018)

Saskatchewan					0.0020 (0.0020)
Alberta					0.0011 (0.0019)
British Columbia					0.0039 ** (0.0020)
Constant	0.0761 *** (0.0012)	0.0712 *** (0.0014)	0.0564 *** (0.0015)	0.0442 *** (0.0018)	0.0354 *** (0.0019)
Observations	233,033	233,033	233,033	233,033	233, 033
R <sup>2</sup>	0.0130	0.0135	0.0164	0.0173	0.0263

Note: Standard errors are in the parentheses. All regressions are weighted, \*\*\* represents significant at 1% significance level, \*\* represents significant at 5% significance level, \* represents significant at 10% significance level.