The determinants of retirement in Canada

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Abstract

With 2006 Canadian census data, this paper examines the determinants of retirement in Canada among people aged 50 to 80 years old. Retirement is defined in two ways: fully retired (individuals who leave the labour force completely), and partly or fully retired (individuals who did not work or worked less than 26 weeks during the previous year). Geographical, socio-demographic, immigration and educational characteristics are taken into account in the regression models that explain retirement. Those factors are examined both for males and females and for immigrants and non-immigrants. The study finds that people who live in well-developed and growing areas are less likely to choose retirement. Similarly, people who are single are more likely to retire than couples or widows; however, females who live in a couple are more likely to retire than males in the same situation. In general, females show a higher probability to retire than males, potentially because of the different family responsibilities. Immigrants are less likely to choose retirement due to their relatively low income levels and because of the requirement for receiving retirement pensions.

1. Introduction

There have been tremendous demographic changes in the developed countries during the 20th century, with decreased fertility and substantial increases in average life expectancy at birth (Gordon, 2000). In Canada, there is an important growth in the number of elderly people. In 2006, according to the Census of the population, the 65-and-over individuals made up 13.7% of the total population of Canada. In 2011, there were almost 5 million seniors aged 65 years or more, and they accounted for a record high of nearly 14.8% percent of the population. This proportion has experienced sustainable growth since the beginning of the 1960s, when it was only 7.6%. The rapid aging is predicted to continue. In 2031, seniors are expected to account for 23% to 25% of the population, almost the double of their current proportion (Statistics Canada, 2005). Although the proportion of seniors in Canada is one of the lowest among the G8 countries (only higher than that of the United States and Russia), the baby boom in Canada was larger than in other countries. As a consequence, the 60 to 64 years old group experienced a rapid increase of 29.1% between 2006 and 2011, which is the highest among all of the 5 years age groups. This indicates that population aging will accelerate in Canada in the future.

In contrast, the number of children aged 14 years or less was 5.6 million according to the 2011 Census of the population and they accounted for 16.8% of the total population, compared to 17.7% in 2006. In 2011, people aged 15 to 64 accounted for 68.5% of the Canadian population, 42.4% of which being in the age group 45 to 64, a record high proportion. Thus, as the baby boomers are reaching the age of 65, the share of the working age population will significantly decrease.

Over the past 25 years, because of the growth of the working age population and increases in the participation rate, labour supply grew steadily. The growth in the

number of women in the labour force caused a rise in aggregate employment. However, as the growth in the working age population in Canada is projected to slow down substantially over the coming decades, there is a need to increase labour supply to meet the demand of the national economy.

Currently, some countries have already extended the statutory retirement age in order to induce people to supply more labour in exchange for more pension when they retire. Among the G8 countries, the United States, the United Kingdom, France, Italy and Germany have already increased their retirement ages (Milligan, 2012). And in Japan and Russia, the plan is being discussed. In fact, the Canadian federal government confirmed that a plan would gradually raise the Old Age Security (OAS) benefit and the Guaranteed Income Supplement (GIS) payments eligibility age from 65 to 67 starting in 2023.

Given the possible consequences of the above trends, it is important to examine the circumstances that determine whether someone stays in the labour force or leaves it. In this paper, I discuss the factors that affect individuals' choice of retirement and the differences in retirement decisions between females and males. I also compare the immigrants' and non-immigrants' retirement decisions. I use the Public use microdata file of the 2006 census to study behaviour with respect to retirement. I use ordinary least squares to explain the result, but I also check with a probit model since I have a dummy variable as dependent variable. The paper is divided in three main parts: the literature review; a presentation of the sample, variables and models; and a discussion of the results.

2. Literature Review

Several studies have focused on retirement circumstances in Canada and the United States. Both countries have similar characteristics which are relevant to the explanation of retirement. This literature review includes researches about developed countries, mostly the United States and Canada. I divide the literature into two parts: the meaning of retirement and the determinants of retirement.

2.1 The meaning of retirement

There is no precise definition of retirement in the academic literature. However, the concept of retirement is really important in analyzing labour markets. It would be very useful if the concept could be precisely measured in order to easily make helpful comparisons among different population groups or over different time horizons (Denton and Spencer, 2008). Unfortunately, this is not the case and researchers have defined retirement in different ways depending on the target of their studies.

Atchley (1982) considered "retirement as a process and a state (page 153)". By this he meant that retirement is an essential part of individuals' lives and that after retirement people live in another "life state" in which they do not need to work. In the definition of the *American Heritage Dictionary* (2011), retirement is a time point where individuals stop working completely. Purcell (2000) concluded that retirement can always be defined in relation to some characteristics, such as working status after the end of person's main career. Some of the retired individuals no longer participate in the paid labour market and get welfare and income from different kinds of pension plans. The retired also include the individual who enter the unpaid household labour force. However, some persons may not leave their work completely. They just reduce their working hours by moving into a semi-retired phase. Currently, many people

express the desire to become partially retired when they are near the end of their career. According to Gustman and Steinmeier (1984), “partial-retirement” is a state between fulltime work and complete retirement. Ruhm (1990) presents evidence showing that semi-retirement is very popular in the labour force. He notes that more than half of older individuals experience partial retirement at some point in their life. David and Rosemary (2011) also illustrate that many older workers prefer to keep working after age 65 in Canada. Older workers can be valuable resources with their years of experience to train younger replacement workers. Meanwhile, the state of semi-retirement may last longer than generally believed, some individual turning to full retirement only after 75 years of age.

There are several kinds of partial retirements. Some people just decrease their hours of work at the same job. Others choose to leave their previous job in order to take another job with fewer working hours. Many researchers observe that it is very common for workers to choose partial retirement when they are between fifty years old and their late sixties (Laise, 2013). Furthermore, there is another kind of retirement called reverse retirement which is prevalent in the labour force. If a job needs experience rather than physical effort, such as a university professor or a senior manager job, the individual often chooses to continue working after reaching the normal retirement age. Some individuals choose retirement at some point and decide to go back to work at a later stage, maybe in order to avoid boredom and to remain socially and mentally active (Stewart, 2000).

According to the ChartsBin Statistical Database (2014), 167 out of 228 countries and regions in the world provided a statutory retirement age in 2011. The statutory retirement age is the age at which working men or women are expected or required to cease work and are entitled to receive a standard set of benefits, such as the retirement pension plan, old age security, etc. More precisely, 64 countries and regions set the statutory retirement age for men at 60 years old, 44 set it at 65 years old and 33 set it

at 55 years old. The statutory retirement age for women is usually equal or a little bit less than that of men. For most developed countries such as Canada, the United States and the United Kingdom, the statutory retirement age is the same for males and females. From these data, it is obvious that requirements for retirement are very common all over the world. More precisely, the countries located in North America, Latin America, Oceania and Europe tend to have higher statutory retirement ages, while Asia and Africa have lower retirement ages, at age 60 or less in most countries such as China (60), India (58), Algeria (60) and Egypt (60). However, in most countries, especially the developed ones, when people have reached the statutory retirement age, they can choose to retire or not; that is to say, they are not forced to retire at the statutory retirement age. Thus, they have a chance to do full time work after they reach the retirement age or to move into a semi-retired phase. In Canada, the regular retirement age is 65 years old. However, the statutory age of retirement is expected to increase in the near future.

As noted in the introduction of this paper, the Canadian population is becoming older and is experiencing a period which can be called "seniors boom". Canada has already moved into an aging society. In January, 2012, Prime Minister Stephen Harper said at the World Economic Forum (Davos, Switzerland) that the demographic changes in Canada are threatening the national retirement income system. In the 2012 budget (Budget 2012, Government of Canada), the government of Canada announced that qualification for age for Old Age Security (OAS) pension and Guaranteed Income Supplement (GIS) will increase from 65 to 67 gradually over six years, starting in April 2023. The expected deficiencies in the pension system could compel millions of Canadians to retire at a later age and to work longer than they expected.

Currently, the standard retirement age for both males and females is 65 in Canada. However, because of population aging and of the financial situation of retirement pensions, the age of retirement in Canada will rise in 2023. Meanwhile, Canada has

also experienced a trend towards early retirement where many people retired earlier than 65 years old, especially in some industries, such as nursing. Many researchers report that Canada is facing the shortage of nurses. O'brien-Pallas et al. (2003) noticed that almost 70 percent of registered nurses are aged 50 or more and that a certain number of them are retired by age 56 instead of the normal retirement age of 65. Therefore, it is obvious that the future of statutory retirement age is at least partly driven by changing demographics. "In Canada, these demographics include slowing population growth, rapid aging, declining rates of labour force participation, and slowing labour force growth" (Ibbott, Kerr and Beaujot, 2006, page 161). According to Bell (2010), some developed countries, such as Germany, Britain and Greece, have raised their retirement age recently. France also boosted its retirement age from 60 to 62 in an effort to slash the deficit and to tackle an unruly pension system. The new retirement age will take full effect by 2018.

2.2 The determinants of retirement

Several studies have discussed the factors that determine the decisions for individuals to choose retirement when they are under 65, or to choose to continue to work when they are over 65. The reasons for retiring reflect voluntary and involuntary circumstances. Obviously, the decision to retire is influenced by individual, family and institutional factors (Wolcott, 1998). Harpell (1985) noted that a dual-earner couple is the typical family in Canada. Hurd (1992) supported the idea that the retirement decision is a joint decision by husbands and wives. Usually, the members of a couple choose to retire within a short episode of time. In that context, in his book *The Road to Retirement*, Schellenberg (1994) listed four specific factors about spouses' joint decisions to retire: the timing of the spouse's retirement, the spouse's health, the spouse's income and pressure from the spouse to retire. The earlier the spouse chooses to retire, the worse the spouse's health, the higher the spouse's income and the more pressure from the spouse to retire, the higher the probability to retire. The most

notable finding was that for all of those factors, men were far less influenced by their spouse's situation than were women. Kieran (2001) further indicated that there are two factors that lead women to retire at an earlier age than men in Canada. First, there are relatively larger numbers of women than men working in the public sector. Second, there is an average two-year age difference between spouses. Comparing single and married women, Pleau (2010) showed that those that are divorced or separated are more likely to remain in the labour force because they need a stable income to support themselves.

Job satisfaction is an important component in people's lives. Happiness at work determines a person's choice to retire or not. Individuals prefer to extend their working life if they are satisfied with their job and committed to the institution or the company that they work for (Bleicken, 1990). Similarly, Brown (2012) recently demonstrated that higher levels of job satisfaction are negatively related to the decision of early retirement. This means that if people work in jobs that they really like, they will continue to work until they reach or go beyond the required age of retirement.

In addition, health affects people's decision to retire. If individuals cannot afford a high work load anymore, they will choose retirement or partial retirement. Marshall, Clarke and Ballantyne (2001), through analyzing a sample from a major Canadian telecommunication company, showed that there was a strong relationship between health and instability in the working life. Unpredicted health events always lead to losses in family income because of decreased labour supply. Actually, there are two opposing effects, the loss in income induces individuals to work longer while bad health induces them to retire. However, because the health condition does not allow them to work longer, they usually have no other choice than retirement. Coile (2004) concluded that health shocks, such as heart disease, result in real financial losses for families. Meanwhile, health shocks are also a significant source of financial risk for

the households in which some of members have already retired. Thus, it is obvious that health affects the financial situation which affects the decision to retire. However, Schirle (2007) used Canadian data to find that financial incentives and health can jointly affect the decisions to retire. The results showed that these two factors have significant effects on retirement, poor health increasing the probability of retirement by 25 percentage points.

There are also some studies about differences in the decision to retire between immigrants and non-immigrants in Canada. Dempsey (2005) divided the elder immigrants aged 60 years or more into three groups: long term elders who landed in Canada at ages 40 to 49 years, short-term elders who landed at ages 50 to 59 years, and immediate elders who landed at age 60 years or more. According to his analysis, long-term elders reported the highest annual incomes of all three groups and members of this group also had the lowest incidence of income from non-contributory retirement sources. Compton (2001) observed that immigrants who spent a long time in school are more likely to work longer in order to increase contributions to retirement plans. Besides, the OAS/GIS programs contain residency requirements that reduce the incentive to retire for recent immigrants.

When people retire, they need sources of income to support themselves. Those include not only the private savings during their working life but also the retirement pensions. The standard age to begin receiving a pension in Canada is 65. However, individuals can receive a permanently reduced CPP retirement pension when they choose retirement before 60. They can also take a permanently increased pension when they retire after age 65. The retirement pensions are really important when individuals make decisions to retire. In Canada, those include the Old Age Security System, the Canada/Quebec Pension Plan (the largest component of the income security system), the Guaranteed Income Supplement and Spouses Allowance, and some private pension benefits. Coile and Gruber (2007) suggested that “Social

Security policies which increase the incentives to work at older ages can significantly reduce the exit rate of older workers from the labour force (page 34)". However, there are also people who want to leave their job early once they can get the pension or if their savings are already high enough for their later life. Meanwhile, some kind of retirement may occur in some special occasions. Frenken (1991) demonstrated that early retirement may be the result of circumstances rather than a planned event. For example, when the financial crisis spread all over the world, the Labour Force Survey of Statistics Canada (2009, April 9) noted that in March 2009 the Canadian unemployment rate rose to 8%, its highest level in the previous seven years, and that middle aged men in the manufacturing and construction sectors had been disproportionately affected. Since it would be very hard for them to find a full time job during a recession, many of them were forced to retire by the reality of the circumstances.

To summarize, retirement is an issue that causes concerns all over the world mainly because of the demographics changes. According to the previous research, we know that age, health, job satisfactions and some other factors affect the decision of retirement. In this paper, I will try to compare the determinants of retirement between female and male and immigrants and non-immigrants.

3. Sample, Variables and Model

3.1 Sample

This paper focuses on the factors that affect retirement. In order to do that, I chose Statistics Canada's 2006 Census of Population. The Public use microdata file (PUMF) on individuals contains a total of 844,476 records, representing 2.7% of the Canadian

population. In order to analyse behaviour regarding retirement, I use a sample of individuals aged between 50 years old and 80 years old. Individuals choosing to retire before age 50 are likely to have special problems such as serious diseases which are not the subject of my analysis. Although some experienced professors in universities or senior managers may retire late, the large majority are retired by age 80. With those restrictions in the data, there are 245,611 individuals in the sample, out of which females account for 51.76% and immigrants account for 26.85%.

3.2 Variables

Given the different possible definitions of retirement, I define the dependent variable in two ways. First, I use the definition that retirement is a time point where individuals stop working completely and define the dummy dependent variable "Retired" as taking the value of one for individuals who are not in the labour force and the value of zero for those who are in the labour force during the week prior to the census. It is assumed that in the majority of cases, individuals have worked before, but there can be a small minority who never worked. Second, I define another dependent variable based on the number of weeks worked during the previous year to include those who are partly retired as well as those who are fully retired. If the individual did not work or worked no more than 26 weeks during the previous year, it means he/she chose to retire, at least in part. Table 1 shows the mean values of those dependent variables. Tables 2, 3, 4 and 5 show some descriptive statistics for the dependent variables. They summarize the proportions of fully retired and fully or partly retired for males and females and for immigrants and non-immigrants.

Table 1: Mean values of the dependent variables

	Fully Retired		Fully or Partly Retired	
	Number	Percentage	Number	Percentage
Yes	123,480	50.27	131,363	53.48
No	122,131	49.73	114,248	46.52
Total	245,611	100.00	245,611	100.00

Table 2: Descriptive statistics of Fully retired for females and males

	Fully retired					
	Yes		**No**		**Total**	
	Number	**Percentage**	**Number**	**Percentage**	**Number**	**Percentage**
Female	72,724	57.21	54,399	42.79	127,123	100.00
Male	50,756	42.84	67,732	57.16	118,488	100.00

Table 3: Descriptive statistics of Partly or Fully retired for females and males

	Fully or Partly retired					
	Yes		**No**		**Total**	
	Number	**Percentage**	**Number**	**Percentage**	**Number**	**Percentage**
Female	76,066	59.84	51,057	40.16	127,123	100.00
Male	55,297	46.67	63,191	53.33	118,488	100.00

Table 4: Descriptive statistics of Fully retired for immigrants and non-immigrants

	Fully retired					
	Yes		No		Total	
	Number	Percentage	Number	Percentage	Number	Percentage
Immigrants	34,090	51.70	31,849	48.30	65,939	100.00
Non-immigrants	89,390	49.75	90,282	50.25	179,672	100.00

Table 5: Descriptive statistics of Partly or Fully retired for immigrants and non-immigrants

	Fully or Partly retired					
	Yes		No		Total	
	Number	Percentage	Number	Percentage	Number	Percentage
Immigrants	36,186	54.88	29,753	45.12	65,939	100.00
Non-immigrants	95,177	52.97	84,495	47.03	179,672	100.00

The independent variables are divided into the following seven main categories: geographic, family composition, demographic, immigration, language, education, and income.

The geographic variables have two components: large census metropolitan area and province/regions, which are defined as dummy variables. This paper defines the four highest total GDP cities in Canada as large census metropolitan areas (The State of Canada's Cities and Communities, 2012). They are Toronto, Vancouver, Montreal and Ottawa-Gatineau. I aggregate the other metropolitan areas and the regions that are

not in metropolitan areas into a group named "Not in large metropolitan areas" as the reference category. It is expected that the individuals who lived in those CMAs which have more economic activities are more likely to work. I group the provinces based on their geographic locations. Newfoundland and Labrador, Prince Edward Island, Nova Scotia and New Brunswick are defined as the Atlantic Provinces. Manitoba, Saskatchewan and Northern Canada (including Yukon Territory, Northwest Territories and Nunavut) constitute Central and Northern Canada. Ontario, Quebec, Alberta and British Columbia are individually defined. All the province variables are dummy variables and Ontario is set as the reference group.

The family composition variable is a dummy variable defined as whether or not there are children aged from 0 to 24 in the census family. The families who have children may need to save more money to support their children's study. Thus, individuals with children at home are expected to choose retirement at later age.

There are four demographic variables which are age, age squared, legal marital status and sex. Since the codebook has age in five-year groups, I define age as the mid-point of each age group between 50 to 80 years old. The descriptive statistics for age are shown in table 6. There is 25.8% of the sample which is aged between 50 to 55 years old, which accounts for the highest proportion among the five-year age groups; the lowest proportion is individuals aged between 75 to 80 years old, which only accounts for 9.4%. I also introduce the variable "age squared" to see whether the effect of age on the decision to retire changes over time.

The marital status variables are classified into 3 groups: Couple, Single/Separated, and Widowed. According to the 2006 Public use microdata, I define the people who are now married or living in common law as Couple, and the people who are divorced, separated or never married as Single/Separated. Widowed is defined separately since widowed people are likely to have more resources than divorced and separated people

if they receive inheritance or pension from the deceased spouse. This may affect the decision to retire. The Sex variable is defined as a dummy variable. According to Moen (2013), there are two reasons for women to choose to retire earlier than men. The first one is that women experience poorer health which has been shown to push them out of the workforce. Besides, "women are more likely than men to experience involuntary retirement as a result of corporate layoffs or buyouts (Moen, 2013)". Another key reason is that elder women often have responsibility to take care of their parents, husband, children and grandchildren, which encourage women to lean out of full-time work and even exit the labour market.

Table 6: Distribution by age group

Age group	Frequency	Percentage	Age group	Frequency	Percentage
50-54	63,349	25.79	**65-69**	32,902	13.4
55-59	55,902	22.76	**70-74**	27,797	11.32
60-64	42,618	17.35	**75-79**	23,052	9.39
Total				**245,611**	**100**

The immigration variables are classified into three which are the immigrant status (a dummy variable), the number of years since immigration (2006 minus year of immigration) and the number of years since immigration squared. The number of years since immigration is the difference between 2006 and the year during which the respondent became a landed immigrated in Canada. It is defined when the immigrant status dummy variable equal to 1. The additional variable "number of years since immigration squared" is used to examine whether the effect of years since immigration diminishes over time or not.

The language variable is a dummy variable that takes the value one if a person can speak English, French or both, and the value zero if a person can speak neither English nor French. In fact, in my sample group, there are 97.3% of the respondents

who can speak English or French. Almost all the Canadian born know at least one of these two languages, but this is not the case for immigrants. As we can see in Table 7, only 0.16% of the non-immigrants have no knowledge of French or English, while the percentage is 9.50% for the immigrants.

Table 7: Percentage of Immigrants and Non-immigrants who can speak French or English or neither of them

	Immigrants		**Non-immigrants**	
	number	percentage	number	percentage
French or English	59,676	90.50	179,384	99.84
None of them	6,263	9.50	288	0.16
Total	65,939	100.00	179,672	100.00

There are two independent variables that are related to education: the major field of study (based on the CIP Canada 2000) and the number of years of education. I choose the major field of study as a proxy of occupation, or the kind of work that an individual does. If an individual is retired and has not worked for a certain time, the occupation is coded as "not available" in the census data, while information on the major field of study is available. I aggregate the major fields of study into five groups: Arts (which includes education, visual and performing arts, communications technologies); Social Science (which includes social and behavioural sciences, law business, management and public administration); Technology (which includes physical and life sciences, technologies, mathematics, computer, information sciences, architecture, engineering and related technologies); and Other fields of study (which includes other subjects). In addition, I choose no-postsecondary certificate, diploma or degree as the reference variable (for which no field of study is defined). The variable for the years of education is defined from the information on the highest certificate,

diploma or degree. The correspondence is shown in Table A1 of the Appendix.

The Other income variable is defined as the difference between the before-tax total individual income and the before-tax total wages in units of $100,000. Since the dependent variable is related to work, wages are endogenous and this variable shows the money received not from work, which can be assumed to be exogenous to the decision to retire.

3.3 Model

The regression models can be written as:

$$\text{Dependent variable}_i = \alpha_0 + \alpha_1 (\text{geographic variables})_i + \alpha_2 (\text{family composition variable})_i + \alpha_3 (\text{demographic variables})_i + \alpha_4(\text{immigration variables})_i + \alpha_5 (\text{language ability})_i + \alpha_6 (\text{income variable})_i + \alpha_7 (\text{education variables})_i + \mu_i$$

The dependent variables refer to two outcomes: 1) fully retired (not in the labour force the week before the Census), and 2) fully or partly retired (having worked 26 weeks or less during the previous year).

I aim at identifying the characteristics that affect people's choice of retirement. The ordinary least squared linear regression method is used even though the dependent variable is a dummy variable. This facilitates the interpretation of the results. In the next section I also show the regressions with the probit method. The results are very similar. To account for heteroscedasticity, robust standard errors are presented.

This analysis is first done for a sample that combines males and females. In an additional analysis, I compare females and males in terms of the determinants of their choice of retirement. I choose fully retired as the dependent variable in my research. Thus, there are two separate regressions for females and males.

In a further analysis, I explore the differences between immigrants and non-immigrants in their behaviour towards retirement. Because of pension requirements, immigrants may want to increase their working years in order to get higher level of retirement pensions. Besides, the immigrants' backgrounds such as education, language ability also affect their choice of retirement. However, in this paper, I try to find the differences in retirement behaviour between the immigrants and non-immigrants while comparing the female group and male group separately.

4. Regression Analysis

4.1 Retired and Fully or Partly Retired Regression

Table 8 presents the first regression model which combines the females and males together. The contents in the table include the estimated coefficient, robust standard errors and significance levels

Table 8: Ordinary least squares linear regression of Fully Retired and Fully or Partly Retired

	Dependent Variables					
	Fully Retired			Fully or Partly Retired		
	Coefficient estimates	s.e.	Sig.	Coefficient estimates	s.e.	Sig.
Independent Variables						
Geographic variables						
Province/regions *Reference: Ontario*						
Atlantic	0.0476	0.0033	***	0.0913	0.0035	***
Québec	0.0536	0.0028	***	0.0650	0.0028	***
Alberta	-0.0887	0.0319	***	-0.0820	0.0033	***
British Columbia	-0.0008	0.0035		0.0141	0.0036	***
Central and North Canada	-0.0639	0.0036	***	-0.0551	0.0040	***
Large Census Metropolitan Area *Reference: Not living in large cma*						
Montreal	-0.04748	0.0032	***	-0.0513	0.0033	***
Ottawa-Gatineau	-0.0029	0.0047		-0.0105	0.0048	*
Toronto	-0.0381	0.0030	***	-0.0377	0.0046	***
Vancouver	-0.0158	0.0045	***	-0.0257	0.0044	***
Socio-demographic variables						
Age	0.0781	0.0017	***	0.0679	0.0017	***
Age^2	-0.0004	0.0000	***	-0.0003	0.0000	***
Marital status						

Reference: Single or Separated						
Couple	0.0093	0.0020	***	-0.0043	0.0019	*
Widowed	0.0229	0.0030	***	0.0134	0.0032	***
Presence of children						
Reference: Do not have kids between 0 to 24						
Have kids between 0 to 24	-0.0720	0.0024	***	-0.0730	0.0025	***
Sex						
Reference: Male						
Female	0.1231	0.0018	***	0.1130	0.0018	***
Immigration variables						
Reference: Non-immigrants						
Immigrants	-0.0288	0.0045	***	0.0127	0.0049	**
Years since immigration	0.0028	0.0003	***	0.0008	0.0003	***
Years since immigration^2	0.0000	0.0000	***	0.0000	0.0000	***
Language ability						
Knowledge of official language						
Reference: Neither English nor French						
English or French	-0.1255	0.0050	***	-0.1295	0.0050	***
Education variables						
Field of study						
Reference: Non-postsecondary degree						
Arts	-0.0083	0.0038	*	0.0113	0.0039	***

Social Science	-0.0542	0.0032	***	-0.0426	0.0033	***
Technology	-0.0252	0.0030	***	-0.0112	0.0032	***
Other fields	-0.0538	0.0034	***	-0.0454	0.0035	***
Education years	-0.0109	0.0004	***	-0.0132	0.0004	***
Income variables						
Income-Wages	0.0395	0.0023	***	0.0506	0.0025	***
	F(25,245293) = 10247.97			F(25,245293) = 8389.44		
	R-Squared=0.3679			R-Squared=0.3310		
	Number of obs=245319			Number of obs=245319		

Note: * p<.05; ** p<.01; *** p<.001

First, I focus on the regression of "Fully Retired". From the table, individuals who live in the "big four" cities are less likely to be retired than the people who live in other areas. For example, the people who live in Toronto are 3.8 percentage points less likely to be retired. The coefficients for Montreal, Toronto and Vancouver are also negative and statistically significant. Those four largest cities have well developed economies and also have a stable growth rate. Presumably, more job opportunities for the people and higher wages make the elder extend their working life. Besides, individuals who live in these cities are already familiar with competitive work environment and fast-paced life. They adapted to this kind of life gradually. It is hard to let them stop working and stay at home for a whole day. Thus, they are less likely to choose retirement compared to the relative smaller areas.

Meanwhile, the provincial variables show that the individuals who live in the Atlantic Provinces and Quebec are more likely to be retired than those who live in Ontario. People in Alberta and in the Central and Northern areas of Canada tend to retire less compared to Ontario. For example, the people who live in Alberta are 8.9 percentage points less likely to be retired than those in Ontario. According to Alberta Canada

(2013), the Alberta economy grew strongly by 3.8% in 2009 and Alberta has led all provinces in economic growth over the past 20 years, with an average annual GDP growth of 3.7% per year. Because of the high growth rate of GDP, labour demand in Alberta tends to excess supply. Labour can be attracted by high real wages so that individuals are induced to work longer (the substitution effect exceeds the income effect, people choosing to work more instead of enjoying leisure). Thus through the analysis of the geographic variables, we can conclude that the individuals may choose to forego retirement when they lived in well-developed and high growth regions.

Socio-demographic factors also affect the choice of retirement. The individuals who are married or widowed are more likely to be retired than the single or separated ones. Widowed individuals are 2.3 percentage points more likely to choose retirement, which is consistence with my hypothesis that they can receive inheritance or pension right from deceased spouse. Similarly, couples can share their incomes, while single or separated individuals have to live with their own incomes. There are two possible reasons for them to work longer. The first one is that they may need money to support themselves after retirement because no one else provides financial aid for them except the government of Canada. The second reason is that they do not usually need to take responsibility of taking care of a family. They tend to work with their colleagues instead of staying at home alone. Therefore, it makes economic sense that single or separated individuals are more likely to retire late.

The coefficient estimate for the presence of children is -0.0719, meaning that the individual who does not have children is 7.2 percentage points more likely to be retired than the one who has children. Parents have the obligation to raise their children. Although they can get pensions from the government, it may not be enough especially when the children go to university. According to Statistic of Canada (2012), the average age of Canadian women who gave birth in 1991 was 27.7 years. Thus, when the children start going to university or college the parents are already near 50

years old.

The coefficient estimates of the age variables are statistically significant. It is obvious that individuals are more likely to be retired the older they are. It is worth to note that the coefficient of age square is -0.0004. The negative value indicates that there is a diminishing effect of age. In order to calculate the real effect in the age between 50 and 79, one can take the derivative with respect to age in the regression function (the coefficient of age + 2*coefficient of age squared). Using the formula, the "real effect" of all the ages is shown in appendix, table A2. The effect for the individuals aged 50 is 0.0381, which means that at age 50, if age increases by one year, individuals are 3.8 percentage points more likely to retire than someone who is 49. At age 60, an individual is 3.0 percentage points more likely to retire than someone who is 59.

Gender is also an important independent variable that affects the retirement decision. The coefficient estimate of female is 0.1230 which means females are 12.3 percentage points less likely to be in the labour force than males. The result is consistent with the previous research. Females have responsibility to take care of the family. It would make some females prefer not to be in the labour force in order to take a better care of the family. Besides, females may suffer workplace discrimination so that they would be more likely to be laid off when employers experience a decrease in their activities.

Among the immigration variables, the coefficient estimate of immigrants is -0.0288 which means that the immigrants tend to more likely to work than non-immigrants at the time of arrival. In order to save more money for their post-retirement life, they need to work longer. Besides, the retirement pension plans require individuals to work at least 10 years before retirement. Some immigrants arrived in Canada at older ages, thus they tend to work longer. In order to demonstrate this, we can see the coefficient estimate of number of years since immigration is 0.0028 which means that each additional year in Canada makes an immigrant 0.3 percentage points more likely to be

retired. The coefficient estimate of knowledge of the official languages is -0.1255, which indicates that individuals who can speak English or French are 12.6 percentage points less likely to be retired than the individuals who cannot.

The education variables are also important in the decision to retire. The coefficient estimate of years of education is -0.0109 which means one more year of education makes an individual 1.1 percentage points less likely to be retired. Education increases the human capital which leads to a higher real wage. People can save more money for the post-retirement life. This means that the substitution effect of the wage rate exceeds the income effect. Furthermore, all the coefficient of the field of study variables are negative, indicating that people in all the fields are less likely to be retired than individuals who have non-postsecondary degree.

The coefficient estimate of other income (in units of $100,000) is 0.0395. As an illustration, this means that a $100,000 increase in non-wage income raises the probability of being retired by 3.95 percentage points. Individuals who can get more out of salary income usually have another businesses or other method to get money. Thus, they can afford to retire early compare to the individuals who have lower non-salary income.

To summarize, an individual has a higher probability to be retired with the following characteristics: a female who lives in a developed and high growth area, has a low education level, is not an immigrant, has a bad knowledge of the Canadian official languages, and lives with a spouse or is a widow with no children.

When we take fully or partly retired as the dependent variable, most of the results are the same but we can find some interesting differences. According to Table 8 we can see that of the signs of coefficient estimates of the provincial variables are the same for all the provinces. Similarly, the individuals who live in the large four cities are

less likely to partially retire compared to the other areas. Thus, no matter how we define retirement, those geographic factors have similar effects.

About the marital status, the coefficient estimate of couple in the second regression is -0.0043, which is different from the result of the first regression. This means that couples choose to work more compared to the single or separated. It does make sense because, although they have less financial burden for supporting themselves, they may be willing to work for several weeks per year not only for money but also to alleviate the boredom of retirement life.

In the second regression, the coefficient estimate for immigrants is 0.0127, which is different from the first regression. This means that immigrants are slightly more likely to choose full or partial retired than non-immigrants. Actually, it is hard for immigrants to find a full time job because of language, culture or working experience. Thus, some of them work a limited number of weeks during the year.

From the analysis above, we can conclude that the two different definitions of retirement lead to very similar results.

4.2 Probit regression and Ordinary Least Square regression

In statistics, a probit model is a type of regression where the dependent variable is dummy variable. The purpose of the model is to estimate the probability that an observation with particular characteristics will fall into a specific one of the categories. The probit model is a type of binary choice model.

The ordinary least square model is a simple binary choice model. According to Hugo (2009), the OLS method has some advantages compared to the probit method despite the unboundedness problem. Actually, if the error term in the latent variable equation

is not totally normal, probit estimates are inconsistent. Besides, OLS may be more robust to specification errors. In this section, I compare the two different methods for the regression on fully retired. Table 9 shows the results.

Table 9: Regression for the fully retired with ordinary least squares method and probit method

	Dependent Variables: Fully Retired					
	OLS			Probit		
	Coefficient estimates	s.e.	Sig.	Coefficient estimates	s.e.	Sig.
Independent Variables						
Geographic variables						
Province/regions *Reference: Ontario*						
Atlantic	0.0476	0.0033	***	0.1725	0.0122	***
Québec	0.0536	0.0028	***	0.1935	0.1000	***
Alberta	-0.0887	0.0319	***	-0.3288	0.0121	***
British Columbia	-0.0008	0.0035		-0.0068	0.0127	
Central and North Canada	-0.0639	0.0036	***	-0.2363	0.0136	***
Large Census Metropolitan Area *Reference: Not living in large cma*						
Montreal	-0.4748	0.0032	***	-0.1686	0.0117	***
Ottawa-Gatineau	-0.0029	0.0047		-0.0069	0.0171	
Toronto	-0.0381	0.0030	***	-0.1390	0.0110	***
Vancouver	-0.0158	0.0045	***	-0.0484	0.0164	**

Socio-demographic variables						
Age	0.0781	0.0017	***	0.0797	0.0077	***
Age^2	-0.0004	0.0000	***	0.0002	0.0000	**
Marital status *Reference: Single or Separated*						
Couple	0.0093	0.0020	***	0.0162	0.0071	*
Widowed	0.0229	0.0030	***	0.1554	0.0131	***
Presence of children *Reference: Do not have kids between 0 to 24*						
Have kids between 0 to 24	-0.0720	0.0024	***	-0.2625	0.0088	***
Sex *Reference: Male*						
Female	0.1231	0.0018	***	0.4486	0.0066	***
Immigration variables						
Reference: Non-immigrants						
Immigrants	-0.0288	0.0045	***	-0.1358	0.0175	***
Years since immigration	0.0028	0.0003	***	0.0131	0.0012	***
Years since immigration^2	0.0000	0.0000	***	-0.0002	0.0000	***
Language ability						
Knowledge of official language *Reference: Neither English nor French*						
English or French	-0.1255	0.0050	***	-0.5629	0.0236	***

Education variables						
Field of study						
Reference:						
Non-postsecondary degree						
Arts	-0.0083	0.0038	**	-0.0301	0.0134	**
Social Science	-0.0542	0.0032	***	-0.1920	0.0113	***
Technology	-0.0252	0.0030	***	-0.0858	0.0110	***
Other fields	-0.0538	0.0034	***	-0.1947	0.0119	***
Education years	-0.0109	0.0004	***	-0.0388	0.0015	***
Income variables						
Income-Wages	0.0395	0.0023	***	0.1192	0.0080	***
	F(25,245293) = 10247.97			Wald chi2(25)= 71325.66		
	R-Squared=0.3679			Pseudo R-squared=0.3129		
	Number of obs=245319			Number of obs=245319		

Note: * p<.05; ** p<.01; *** p<.001

The probit coefficient estimates are not comparable to the OLS coefficient estimates, but the statistical significant levels can be compared. Both the F test for the OLS regression and the Wald test for the probit regression show that the regression is statistically significant. The R-squared is equal to 0.3679 and the pseudo R-squared is 0.3129. When we focus on the independent variable, if we choose 5% significant level, the p-value indicates that only two variables, British Columbia and Ottawa-Gatineau, are not statistically significant in the OLS regression. Similarly, in the probit regression, the same two variables are not statistically significant. It is worth to note that, all the signs of the coefficients are the same in the two regressions. This indicates that the effects on retirement of the different explanatory variables are similar when we regress the model using the two different methods.

In conclusion, the results of OLS and probit are similar and we could explain the effects of the independent variables using either of them. In this paper, I choose the ordinary least square model which is more familiar to me and also easy to interpret.

4.3 Fully Retired regression with females and males separately

As we discussed in Section 4.1, some of the determinants of retirement are different between fully retired and fully or partly retired. However, in order to study the different effect between females and males, I only choose fully retired as dependent variable.

Table 10 shows the results of the regressions for males and females separately.

Table 10: Ordinary least squares linear regression of Fully Retired for females and males

	Conditions					
	Male			**Female**		
	Coefficent estimates	**s.e.**	**Sig.**	**Coefficient estimates**	**s.e.**	**Sig.**
Independent Variables						
Geographic variables						
Province/regions *Reference: Ontario*						
Atlantic	0.0418	0.0049	***	0.0554	0.0047	***
Québec	0.0412	0.0040	***	0.0656	0.0038	***
Alberta	-0.1051	0.0044	***	-0.0720	0.0045	***
British Columbia	-0.0065	0.0050		0.0042	0.0049	
Central and North Canada	-0.0707	0.0052	***	-0.0566	0.0050	***

Large Census Metropolitan Area *Reference: Not living in large cma*						
Montreal	-0.0442	0.0047	***	-0.0511	0.0044	***
Ottawa-Gatineau	0.0009	0.0068		-0.0085	0.0064	
Toronto	-0.0364	0.0042	***	-0.0410	0.0041	***
Vancouver	-0.0103	0.0063		-0.0225	0.0063	***
Socio-demographic variables						
Age	0.0406	0.0024	***	0.1110	0.0023	***
Age^2	-0.0001	0.0000	***	-0.0006	0.0000	***
Marital status *Reference: Single or Separated*						
Couple	-0.0413	0.0029	***	0.0565	0.0028	***
Widowed	0.0191	0.0061	**	0.0468	0.0036	***
Presence of children *Reference: Do not have kids between 0 to 24*						
Have kids between 0 to 24	-0.0777	0.0030	***	-0.0524	0.0038	***
Immigration variables						
Reference: Non-immigrants						
Immigrants	-0.0341	0.0061	***	-0.0173	0.0068	**
Years since immigration	0.0028	0.0005	***	0.0028	0.0005	***
Years since immigration^2	0.0000	0.0000	***	0.0000	0.0000	***
Language ability						
Knowledge of official						

language *Reference: Neither English nor French*						
English or French	-0.1390	0.0085	***	-0.1153	0.0062	***
Education variables						
Field of study *Reference: Non-postsecondary degree*						
Arts	0.0078	0.0057		-0.0171	0.0052	**
Social Science	-0.0468	0.0047	***	-0.0539	0.0043	***
Technology	-0.0193	0.0036	***	-0.0560	0.0076	***
Other fields	-0.5340	0.0053	***	-0.0496	0.0044	***
Education years	-0.0076	0.0005	***	-0.0157	0.0006	***
Income variables						
Income-Wages	0.0215	0.0022	***	0.1626	0.0063	***
	F(24,118304) = 4433.73 R-Squared=0.3613 Number of obs=118329			F(24,126965) = 4890.78 R-Squared=0.3599 Number of obs=126900		

Note: *p<.05; ** P<.01; *** p<.001

The F tests for both female and male regressions show that the regressions are statistically significant. The R-squared values of 0.36 in both regressions mean that the explanatory variables can explain the dependent variable well.

I compare the coefficient estimates of the two regressions according to the kinds of variable. The first one includes the geographic variables. We can see that when we analyze the province and large census metropolitan variables, the coefficients show the same signs in those two regressions. It turns out that females and males in the

same area have no difference in their retirement decision. For example, in Toronto, the males are 3.6 percentage points less likely to retire while female are 4.1 percentage points less likely to do the same.

Next, I compare the socio-demographic variables. The age variables need to be adjusted in order to get the real effects. Those are shown in Table 11. From the table we can see that when individuals are 50 years old, the males show an increase of 3.1 percentage points in the probability to retire for each additional year of age, while it is 5.1 percentage points for females. The effect is larger for females up to age 70. However, at age 70, the value is nearly the same between females and males. This means that the age diminishing effect for females is larger than for males.

Table 11: The adjusted coefficients of age

Age	Adjusted Coefficient		Age	Adjusted Coefficient		Age	Adjusted Coefficient	
	Male	Female		Male	Female		Male	Female
50	0.0306	0.0510	**60**	0.0286	0.0390	**70**	0.0266	0.0270
51	0.0304	0.0498	**61**	0.0284	0.0378	**71**	0.0264	0.0258
52	0.0302	0.0486	**62**	0.0282	0.0366	**72**	0.0262	0.0246
53	0.0300	0.0474	**63**	0.0280	0.0354	**73**	0.0260	0.0234
54	0.0298	0.0462	**64**	0.0278	0.0342	**74**	0.0258	0.0222
55	0.0296	0.0450	**65**	0.0276	0.0330	**75**	0.0256	0.0210
56	0.0294	0.0438	**66**	0.0274	0.0318	**76**	0.0254	0.0198
57	0.0292	0.0426	**67**	0.0272	0.0306	**77**	0.0252	0.0186
58	0.0290	0.0414	**68**	0.0270	0.0294	**78**	0.0250	0.0174
59	0.0288	0.0402	**69**	0.0268	0.0282	**79**	0.0248	0.0162

The coefficient estimates of couple present interesting differences in signs between these two regressions. For males, the coefficient estimates is -0.0413 which means

that a male is 4.1 percentage points less likely to choose retirement when he has a wife or a common law relationship than when he lives alone. However, for the females, the coefficient estimates is 0.0565 which means that a female is 5.7 percentage more likely to choose retirement when she has a husband or in a stable common law relationship. The difference between males and females suggests that when a family exists, males tend to spend more time working in order to provide more money for the family, while females may take more responsibility to take care of the house. The household tasks are usually assigned differently according to the characteristics of males and females. When the husband earns most of the income, like in traditional families, he has the responsibility to support the wife and needs to work more. The wife in the same situation can count on her husband's income and withdraw from the labour force. This can also explain the different coefficient estimates for the presence of children. Males are 7.8 percentage points more likely to work, while the same probability for female is 5.2 percentage points.

The effect of years of education is also different in these two regressions. For males, one more year of education makes them 0.8 percentage points less likely to choose retirement, while the value for females is 1.6%, nearly double the value for males. It means that the decision for females is much more affected by education than that of males.

The last variable is before-tax income minus before-tax wages. The coefficient estimates for males is 0.0215 which means that a $100,000 increase in non-salary income will make them 2.2 percentage points more likely to choose retirement. For females, the value is 16.3 percentage points, which is much higher than for males. The females are more likely to be satisfied because of the relative higher income. However, males are more likely to pursue the success in their careers; the higher income induces them to continue hard work in order to earn more.

In conclusion, most of the differences are due to the characteristics of males and females with respect to marital status and family responsibilities. Females usually assume the responsibility to take care of the family while males need to work to provide the financial support to the family.

4.4 Regression for Immigrant and Non-immigrant Males and Females

In this section, I analyze the differences in the decision to retire between immigrants and non-immigrants. I again divide the sample between females and males. In each group, I compare the immigrants and non-immigrants. The four regressions follow the conditions as follow: (1) male non-immigrants (2) male immigrants (3) female non-immigrants (4) female immigrants. Table 12 shows the result of regression (1) and (2). Table 13 shows the result of regression (3) and (4).

Table 12: Regressions on full retirement for non-immigrants and immigrants, males

	Conditions: Male					
	Non-immigrants (1)			**Immigrants (2)**		
	Coefficient estimates	**s.e.**	**Sig.**	**Coefficient estimates**	**s.e.**	**Sig.**
Independent Variables						
Geographic variables						
Province/regions *Reference: Ontario*						
Atlantic	0.0400	0.0052	***	0.0186	0.0185	
Québec	0.0366	0.0042	***	0.0473	0.1734	**
Alberta	-0.1125	0.0051	***	-0.0842	0.0089	***
British Columbia	-0.0085	0.0057		-0.0009	0.0101	

Central and North Canada	-0.0740	0.0057	***	-0.0564	0.0132	***
Large Census Metropolitan Area *Reference: Not living in large cma*						
Montreal	-0.0365	0.0051	***	-0.0623	0.0181	**
Ottawa-Gatineau	0.0074	0.0079		-0.0138	0.0137	
Toronto	-0.0527	0.0060	***	-0.2288	0.0065	***
Vancouver	-0.0299	0.0082	***	0.0069	0.0109	
Socio-demographic variables						
Age	0.0531	0.0029	***	0.0071	0.0047	
Age^2	-0.0002	0.0000	***	0.0002	0.0000	***
Marital status *Reference: Single or Separated*						
Couple	-0.0500	0.0033	***	-0.0097	0.0065	
Widowed	0.0132	0.0071	***	0.0427	0.0122	**
Presence of children *Reference: Do not have kids between 0 to 24*						
Have kids between 0 to 24	-0.0818	0.0035	***	-0.0707	0.0058	***
Immigration variables						
Reference: Non-immigrants						
Years since immigration	***	***	***	0.0026	0.0005	***
Years since immigration^2	***	***	***	0.0000	0.0000	***
Language ability						

Knowledge of official language *Reference: Neither English nor French*						
English or French	-0.1229	0.0417	***	-0.1309	0.0092	***
Education variables						
Field of study *Reference: Non-postsecondary degree*						
Arts	0.0315	0.0069	*	-0.0376	0.0106	***
Social Science	-0.0337	0.0058	***	-0.0682	0.0087	***
Technology	-0.0042	0.0043		-0.0858	0.0110	***
Other fields	-0.0353	0.0064	***	-0.0486	0.0067	***
Education years	-0.0104	0.0007	***	-0.0860	0.0099	***
Income variables						
Income-Wages	0.0320	0.0027	***	0.0011	0.0037	
	F(21,86302) = 3581.04 R-Squared=0.3540 Number of obs=86324			F(23,31981) = 1409.49 R-Squared=0.3863 Number of obs=32005		

Note: * p<.05; ** p<.01; *** p<.001

The F-test for the two regressions shows that they are statistically significant. The R-squared are 0.3540 and 0.3863 respectively. This means that the explanatory variables explain the dependent variables well in these two regressions.

First, I compare the geographic variables of the regression (1) and (2). We can see that the signs of coefficient estimates about the provincial variables and large census metropolitan areas variables are the same in these two regressions and the values of

the coefficient estimates show little differences.

When I compare the age variables, the adjusted coefficient estimate for non-immigrants is 0.0331 at year 50, which means that getting one year older increases the probability of non-immigrants to choose retirement by 3.3 percentage points. However, for the immigrants the probability is just 2.7 percentage points. The gap between the two groups indicates that the retirement decision for a male non-immigrant is more influenced by age. The non-immigrants often have stable jobs and have worked in Canada for a very long time. They can anticipate a retirement pension when they retire. However, because of the requirement of the pension, the immigrants may need to work longer in Canada in order to get a full pension. This may lead to the result that the immigrants are less impacted by age.

The coefficient estimate of couple variables in (1) is -0.05 which means that married non-immigrant males are 5 percentage points more likely to work. The same value for immigrants is only -0.0097 which suggests that marital status is less important for them. The coefficient estimates of presence of children are nearly the same in these two regressions, -0.0818 and -0.0707 respectively.

The education, language and field of study variables do not show much difference between the two groups of males. However, the coefficient estimate of years of education for male non-immigrants is -0.0104, while the same coefficient estimate for male immigrants is -0.0860. The value is nearly eight times larger than for non-immigrants. Actually, the immigrants who have higher education level are expected to earn high level of wages. However, when they come to Canada, sometimes it is hard to find a suitable job with a satisfactory salary due to insufficient language ability, difference of culture and lack of working experience in Canada. In order to get the money as they are supposed, they work longer. However, to a non-immigrant, it is much easier to find a suitable job and they can retire relative

earlier compared to the immigrants.

Now, I compare female immigrants and non-immigrants. Table 13 shows the results of the ordinary least square regression.

Table 13: Regressions of full retirement for non-immigrants and immigrants, females

	Conditions: Female					
	Non-immigrants			Immigrants		
	Coefficient estimates	s.e.	Sig.	Coefficient estimates	s.e.	Sig.
Independent Variables						
Geographic variables						
Province/regions *Reference: Ontario*						
Atlantic	0.0571	0.0049	***	0.0070	0.0185	
Québec	0.0652	0.0040	***	0.0031	0.0212	
Alberta	-0.0708	0.0053	***	-0.0729	0.0090	***
British Columbia	0.0050	0.0056		0.0034	0.0098	
Central and North Canada	-0.0571	0.0055	***	-0.0571	0.0131	***
Large Census Metropolitan Area *Reference: Not living in large cma*						
Montreal	-0.0045	0.0047	***	-0.0021	0.0219	
Ottawa-Gatineau	-0.0067	0.0072		-0.0050	0.0136	
Toronto	-0.0598	0.0057	***	-0.0250	0.0064	***

Vancouver	-0.4887	0.0082	***	0.0058	0.1064	
Socio-demographic variables						
Age	0.1152	0.0027	***	0.0967	0.0046	
Age^2	-0.0007	0.0000	***	-0.0005	0.0070	***
Marital status						
Reference: Single or Separated						
Couple	0.0498	0.0032	***	0.0781	0.0059	
Widowed	0.0345	0.0042	***	0.8000	0.0072	**
Presence of children						
Reference: Do not have kids between 0 to 24						
Have kids between 0 to 24	-0.0561	0.0044	***	-0.0468	0.0071	***
Immigration variables						
Reference: Non-immigrants						
Years since immigration	***	***	***	0.0022	0.0005	***
Years since immigration^2	***	***	***	0.0000	0.0000	***
Language ability						
Knowledge of official language						
Reference: Neither English nor French						
English or French	-0.0994	0.0308	**	-0.1159	0.0070	***
Education variables						
Field of study						
Reference: Non-postsecondary degree						

Arts	0.0067	0.0061		-0.0736	0.0097	***
Social Science	-0.0399	0.0051	***	-0.0862	0.0082	***
Technology	-0.0457	0.0096		-0.0858	-0.0874	***
Other fields	-0.0334	0.0052	***	-0.0486	-0.0867	***
Education years	-0.0189	0.0008	***	-0.0086	0.0011	***
Income variables						
Income-Wages	0.1877	0.0076	***	0.1048	0.0024	***
	F(21,93157) = 4200.34			F(23,31981) = 1299.24		
	R-Squared=0.3621			R-Squared=0.39419		
	Number of obs=93179			Number of obs=33811		

Note: * p<.05; ** p<.01; *** p<.001

From Table 13 we can see that excluding the variables that are not statistically significant, the signs of the coefficient estimates between female immigrants and non-immigrants are the same. This indicates that the various variables have similar effects on their decision to retire. Compared to the regressions on males, which present several differences between immigrants and non-immigrants, females seem to have similar behaviour, perhaps because their responsibilities at home are similar. Even if immigrants face more financial pressures, males usually take the main responsibility of earning income and females have the obligation to take care of the home.

5. Conclusion

In this paper, I have used the ordinary least squares and probit methods to examine the determinants of individuals' decision to retire and I then compared between females and males, and between immigrants and non-immigrants. Here are some key findings

of the paper:

(1) People who live in a well-developed metropolitan area, such as Toronto, or in a province experiencing high GDP growth, such as Alberta, tend to work more compared to those who live in other areas.

(2) The probability to retire increases with age at a declining rate.

(3) Both females and males who are married or widowed are more likely to choose retirement because they have less financial pressure to support their post-retirement life. In the couples, males are less likely to retire because they take the responsibility of earning income.

(4) Males tend to work more than females. This can be attributed to the different responsibilities that they take. Females take care of the family and are more likely to choose to stay home. However, males have to earn the money in order to support their family spending.

(5) Individuals with more education tend to work more than those who have less education. They can make more money during their working ages due to the relative high skill jobs. Meanwhile, individuals who have larger non-salary income tend to retire earlier.

(6) Immigrants work more than non-immigrants. The behaviour of females about retirement is similar between immigrants and non-immigrants. However, male immigrants tend to work longer than non-immigrants, perhaps due to more financial pressure.

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Appendix:

Table A1: Distribution of education years

Education years	Frequent	Percentage	Cumulative Percentage
0	951	0.39	0.39
8	67,104	27.32	27.71
12	58,192	23.69	51.40
13	36,528	14.87	66.27
14	31,560	12.85	79.12
15	12,428	5.06	84.18
16	22,174	9.03	93.21
17	4,874	1.98	95.20
18	8,600	3.50	98.70
22	3,200	1.30	100.00
Total	245,611	100.00	

Table A2: adjusted coefficient of age in Regression Analysis 4.1

Age	Adjusted coefficient	Age	Adjusted coefficient	Age	Adjusted coefficient
50	0.0381	**60**	0.0301	**70**	0.0221
51	0.0373	**61**	0.0293	**71**	0.0213
52	0.0365	**62**	0.0285	**72**	0.0205
53	0.0357	**63**	0.0277	**73**	0.0197
54	0.0349	**64**	0.0269	**74**	0.0189
55	0.0341	**65**	0.0261	**75**	0.0181
56	0.0333	**66**	0.0253	**76**	0.0173
57	0.0325	**67**	0.0245	**77**	0.0165
58	0.0317	**68**	0.0237	**78**	0.0157
59	0.0309	**69**	0.0229	**79**	0.0149