A Study of the Performance of Highly-Educated Immigrants in the Canadian Labour Market

By Xiaoxiao Li

(6060246)

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 Gilles Grenier

ECO6999

September 2012

Ottawa, Ontario

Table of Content

Abstract

With 2006 Census data, this paper uses wages and salaries, employment, work in a professional occupation, and self-employment status as labour market outcomes to examine the economic performance of highly-educated immigrants in Canada. The aim is to identify the factors and determinants most likely leading to a successful integration in the Canadian labour market. Geographical, socio-demographic, immigration and educational characteristics are taken into account in the models. Those factors are examined for males and females respectively to see if the influences on outcomes differ by gender. This study finds that married male immigrants who received their doctoral degrees in science and technology in Canada or the U.S.A earned the highest income and are the most likely to work in a professional occupation. Similar characteristics apply to female immigrants; however, contrary to most studies, the presence of children is not a barrier for female access to a professional occupation. Furthermore, highly-educated immigrants with high qualifications are relatively more likely to engage in self-employment and, surprisingly, the country of origin does not significantly affect the likelihood of being self-employed for males.

1. Introduction

Canada is known as a traditional country of immigration with a broad policy to attract lots of skilled people from all around the world hoping to settle down and start a new life. Immigrants account for a large share of the population in Canada; they are one out of five (19.8%) of total population according to the 2006 Census and over 200,000 of them arrive in Canada each year. Furthermore, immigrants were responsible for more than two-thirds (69%) of Canadian population growth between 2001 and 2006 (Statistics Canada 2007). There are two main classes of immigrants: assessed and non-assessed. The assessed classes include the skilled worker class and the business class. The non-assessed classes can be divided into the family class and the refugee class.

In this paper, I focus on the skilled worker class since those immigrants are the largest group and are evaluated based on the likelihood of their success in the Canadian labour market. The labour market success of immigrants is both economically and socially desirable, no matter which point view is considered: the one of the immigrants themselves, or the sustainability of Canadian economic growth. In order to choose the potential immigrants who are indeed needed in the Canadian labour market, Canada developed the point system in 1967 and uses it to assess whether the applicants are qualified or not. Although the point system is not working perfectly, it does give us a general way to evaluate the applicants' potential in the Canadian labour market. According to the point system, there are several criteria used for the selection, with education being the most important component of the system, since well-educated immigrants are expected to integrate faster and to make a better contribution to the Canadian labour market.

Unlike the early immigrants who arrived in the 1950s and 1960s, those arriving in Canada since the 1970s have possessed relatively high educational levels, especially after the modification of the Canadian immigration targets in the 1990s, making an enormous contribution to the pool of individuals in Canada with high educational attainment (Reitz, 2007). By 2000,

there were major improvements in the educational attainments of immigrants coming to Canada (Picot, Hou and Coulombe, 2007). According to 2006 Census data, compared with the proportion of their domestic-born counterparts who had university degree 20%, more than twice of the very-recent immigrants had the same level of education (51%), which is also much higher than for the immigrants (28%) who arrived before 2001. Very-recent immigrants here refer to immigrants who landed in Canada after 2000 according to the 2006 Census data. However, despite the educational asset, immigrants suffer much higher unemployment rates and have lower earnings than Canadian-born workers with the same level of education.

A Statistics Canada report pointed out that "several indicators reflect difficulties that recent immigrants entering the Canadian labour market encounter". Upon the arrival, highly-educated immigrants meet lots of barriers and challenges during the transition process and the most barriers diminishes along with the time spent in Canada. Language problems, lack of Canadian work experience and foreign credential recognition problems are the main barriers. Compared with their Canadian-born counterparts, immigrants' employment and unemployment rates and their earnings are, in general, substantially different (Galarneau and Morissette, 2008: 5). Furthermore, Green and Worswick (2009) found that, between the early 1980s and mid-1990s, the relative (to domestic-born) declines in entry earnings were larger for university graduates than for high school graduates.

Recent immigrants with a high level of educational attainment were actually "more likely to enter into low income" than earlier arrivals (Picot, Hou and Coulombe, 2007: 26). The same study also found that 52% of immigrants below the low income level were skilled economic immigrants, and that 41% had university degrees. Low income is defined as family income below 50% of the median income of the total population, adjusted for family size. Furthermore, although the prevalence of low income has risen for recent immigrants in all age groups and at all educational levels, "the gap in the low-income rate between recent immigrants and the Canadian-born was highest among university graduates" (Picot, Hou and Coulombe, 2007: 10).

Some research has also examined whether the earning gap was the result of lower immigrant skill qualifications, of underutilization of immigrant skills, or of pay inequities. Using data from the 1996 Census, Reitz (2001) found that the underutilization of immigrant skills was the most significant factor.

Even though the earning gap is highest among the university-educated groups, it does not mean that high education deters immigrants from better performances in the labour market. There are more detailed factors that should be considered when measuring immigrants' performances. The purpose of this paper is to develop a better understanding of the performance of highly-educated immigrants in the Canadian labour market. More precisely, I want to figure out what factors contribute to these different performances and what kind of characteristics substantially affect immigrants' likelihood of being successful in the labour market. Four employment outcomes will be used to assess immigrants' economic performances: 1) level of wages or salary income; 2) employment rate; 3) whether or not they are working in a "professional" occupation; and 4) incidence of self-employment.

Using micro data from the 2006 Canadian Census, the sample of this study includes highly-educated (with bachelor degree or higher) immigrants aged between 18 and 64. Four main regression analyses will be presented related to the previous four outcomes. The first one will be an ordinary least squares regression on factors that influence highly-educated immigrants' income level. The other three regressions are linear probability regressions on factors that have an impact respectively on employment status, working in a professional occupation, and being self-employed. For all the regressions, the explanatory factors include geographic and socio-demographic characteristics, immigration situation, language ability, and education.

Some of the findings are as follows. Among the provinces or regions, Quebec is the only province that has significantly negative coefficients for all the outcome indicators, and living in large CMAs increases the likelihood of being employed. Similarly to other studies, married male immigrants have better performances and are more likely to be self-employed, but surprisingly,

the presence of children does not deter highly-educated female immigrants from accessing professional occupations. With regard to the immigration situation, time elapsed since landing has positive effect on the performances of immigrants. Undoubtedly, knowing neither English nor French is a liability in the Canadian labour market, but this disadvantage does not apply to the outcome of self-employment. Finally, immigrants who obtained their educational credentials in Canada or in the U.S.A have the highest income levels and are the most likely to work in professional occupations.

This paper consists of four sections. The next one is a literature review. Section 3 presents the methodology, which includes a discussion of the sample, of the variables and of the four regression models to be estimated. After that, the core part of the analysis of the results will be presented. The analysis consists of four parts in order to interpret and discuss the results of each model respectively. The last section is a conclusion that summarizes the key findings of this study.

2. Literature Review

There is not much literature conducted specifically on the labour market performance of highly-educated immigrants. However, with an increasing share of the highly-educated group among the immigrants, some relevant researches have been done recently. Not surprisingly, immigrants generally face more barriers than their domestic-born counterparts in the labour market. The main barriers include language skills, lack of Canadian work experience，failure to receive credit for work experience in other countries, problems related to the recognition of foreign credentials and lack of contact and network in the work force (Schellenberg and Maheux, 2007). However, as time goes on, a lot of difficulties diminish. Data from the Longitudinal Survey of Immigrants to Canada (LSIC) show that, four years after landing, the employment to population ratio of the immigrant cohort of 2001 was 68%, surpassing the Canadian average

employment rate of 62.7% in 2005; furthermore, compared to their pre-landing employment situation and to their situation two years after landing, the majority of immigrants felt that their employment condition was the same or had improved (Xue, 2008).

Nevertheless, some studies showed less delightful outcomes for immigrants especially for highly-educated immigrants. The educational credentials became less valuable, since the advantage of being university-educated over high school educated largely diminished by 2000. Actually, recent immigrants with a high level of education were more likely to end up in a low income situation than earlier cohorts. Furthermore, the most rapid increase in low-income rates since 2000 has occurred among recent immigrants with a university education. (Picot, Hou and Coulombe, 2007).

For immigrants entering after 2000, family welfare outcomes continued to deteriorate since low-income rates during their early years in Canada were higher than for those entering around or before 2000, in spite of the fact that they had higher educational attainment (Picot, Hou and Coulombe, 2007). The relative wage of university-educated male immigrants in Canada demonstrated a long-term decline (Bonikowska, Hou, and Picot, 2011). Changes in the composition of new immigrants with respect to age, language spoken at home, official language ability, source country, and region of residence, accounted for most of the observed change in relative earnings of university-educated immigrants in Canada during the1980s, but this was less true for the more recent cohorts (Bonikowska, Hou, and Pico, 2011).

There are large numbers of studies that examined the economic outcomes of immigrants over the past several decades. Starting from the original cross-section evidence of immigrant assimilation in the U.S. (Chiswick1978), later studies conducted by Baker and Benjamin (1994), Bloom, Grenier and Gunderson (1995) and Grant (1999) used quasi-panel approaches to examine the earnings behaviour of immigrants arriving in Canada prior to1990 and concluded that the entry earnings of recent immigrants have been declining since the early 1970s. A subsequent study by Green and Worswick (2009) found that the declining entry earnings do not

apply only to immigrants, but also to Canadian-born recent entrants in the labour force since 1990s. However, the cross-cohort declines for immigrants are substantially larger than those of the Canadian-born. Substantial declines in returns to foreign experience play an important role in the deterioration in entry earnings across immigrant cohorts. And the declining return to foreign experience is strongly related to shifts in the source country composition of immigration (Green and Worswick, 2009). Furthermore, the authors pointed out that, without a substantial improvement in the educational composition of immigrants since the 1990s, immigrants' entry earnings would have been even lower.

Some studies, such as Friedberg (2000), Schaafsma and Sweetman (2001) and Green and Worswick (2002), emphasized the importance of accounting for where immigrants' human capital was acquired. Labour market outcomes of internationally-educated immigrants are highly related the transferability of skills acquired via the education system in the source country. Plante (2010), Mata (2008) and Gilmore and Le Petit (2008) reached the conclusion that immigrants who completed their highest level of postsecondary education in Canada have better labour market outcomes than most internationally-educated immigrants. And internationally-educated immigrants who completed their postsecondary education in a Western country had higher employment rates than immigrants with a Chinese, Pakistani or South Korean degree. Ewoudou (2011) also indicates that, in the absence of Canadian postsecondary schooling, highly-educated immigrants do not benefit from their length of time as permanent residents.

Immigrant workers receive lower returns to years of schooling and experience than their native born counterparts (Ferrer and Riddell, 2004). This study also found that immigrants' educational credentials appear to be valued in the Canadian labour market and that the earnings gap between immigrants and the native-born is narrowed (or at least not widened) by completion of educational programs no matter where the credentials obtained. The conclusion suggested that investing in post-migration education was a way for the adult immigrants to re-establish their human capital in the host country.

Sweetman and McBride (2004) find that immigrants with a Canadian degree experience better labour market outcomes in terms of earnings, hours worked per week and weeks worked per year than internationally-educated immigrants. They conclude that, with respect to acquired schooling, Canadian education plays a critical role in the successful economic integration of immigrants to Canada.

Banerjee and Verma (2011) and Adamuti-Trache and Sweet (2007) reported similar results by analysing adult immigrants' participation in post-secondary education. Their researches used data from the Longitudinal Survey of Immigrants to Canada (LSIC) and the main findings are that well educated immigrants who have an undergraduate degree are more likely to take part in education programs, and that immigrants who came from western countries are less likely to enrol in post-secondary education. Furthermore, it is still controversial whether gender has influence or not on post-migration education.

The labour market performance of immigrants to Canada has also been examined in terms of the education-job skill match. These studies initially focused on how a given level of education affects the quality of the match; recently, there was more interest in the relationship between job skills match/mismatch and field of study. Robst (2007) finds that graduates from occupation-specific programs have a much higher degree of match than those in more general academic programs, which is attributed to the fact that such programs provide specific skills meant for specific occupations. However, Boyd and Schellenberg (2007) show that recent immigrants whose training in engineering or medicine was completed in a foreign institution are less likely than the Canadian-born with a similar education obtained in Canada to be employed in an occupation matching their educational credentials. A more comprehensive study conducted by Plante (2011) examined the characteristics and determinants associated with the likelihood of being employed in an occupation related to the field of study or in an occupation requiring similar or higher skill levels among paid workers aged 25 to 64. This analysis reaffirmed that the region where credentials were obtained clearly impacts on the likelihood of being employed in

associated or equivalent occupations. These paid workers and internationally-educated immigrants were generally less likely than their Canadian-educated counterparts and the Canadian-born with a postsecondary education to be employed in target occupations. The same study also indicates that the likelihood of being employed in the corresponding field or in an equivalent occupation is not entirely attributed to the effect of time elapsed since landing, but that it also depends on a range of other factors, such as characteristics of immigrants including landed time periods, labour market conditions, language skills, Canadian work experience, quality of education, and barriers to recognition of international credentials and work experience. Specifically, this study found that the male immigrants aged 35 to 54, living in a married or common-law relationship, having pre-school children, living in population centres, not belonging to a visible minority group, working full-time full year and able to converse both official language, are the most likely to work in the best corresponding or an equivalent occupation.

Self-employment is another noteworthy aspect in the examination of the labour market performance of immigrants since self-employment is an important source of labour market opportunities. . New entrepreneurs are either 'pulled' into self-employment to develop a business idea and gain more flexibility, or 'pushed' into self-employment because of lack of job opportunities in the open market (Hou and Wang, 2011). Studying the motivation of self-employment is a key to understand the labour market integration of many immigrants. Most studies suggest that immigrants engage in self-employment as a means of self-preservation when facing unfavorable competition in the open labour market, or are attracted by business opportunity in the immigrant enclave economy (Li, 2001). Several studies showed that immigrants are more likely to be self-employed than their Canadian-born counterparts. In 2006, about 17% of immigrant working men age 20 to 64 were self-employed, compared with 12% of Canadian-born men (Hou and Wang, 2011). Both immigrants and the Canadian-born have experienced an increase in self-employment since the early 1980s. By the late 2000s, about 19% of the immigrant workers were self-employed, compared with 15% of the Canadian-born. The

higher average age of immigrants accounted for about one-half of the difference in self-employment rates between immigrants and the Canadian-born. For the involuntary self-employment, according to the survey conducted by Hou and Wang, 2001, immigrants (33%) were more likely than non-immigrants (20%) to report that they entered self-employment due to a lack of job opportunities in the paid labour market. Two Studies conducted by Li (2001) and Hou and Wang (2011) both found that the likelihood of being engaged in self-employment increased the longer immigrants have been in Canada, and that the older age of established immigrants accounted for two-thirds of the differences in self-employment rates between recent and more established immigrants. As for the characteristics of immigrants that are associated with a higher probability to engage in self-employment, the married male immigrants who came from western countries, who have kids, and are highly-educated are more inclined to be self-employed. Li (2001) concluded that immigrants who have better qualifications are more likely to manage to enter into self-employment no matter whether they are driven or attracted to self-employment.

To summarize the literature, several studies concluded that Canadian education plays a critical role in the successful economic integration of immigrants to Canada, because years of schooling in most source countries of Canadian immigration are discounted in Canada. It is widely accepted that, with respect to the general performance in the Canadian labour market, educated immigrants, especially the recent ones, have higher employment rate, inferior income and lower rate of education job skill match than Canadian-born counterpart with similar socio-demographic characteristics. Established immigrants with post-secondary education are more likely to be self-employed than the domestic-born. Specifically, the place where credentials were obtained, language ability, time elapsed, marital status and province of residence all have a clear influence on labour market outcomes. However, there are factors that still remain unclear such as gender, visible minority status and some relevant factors excluded from these studies.

Further, no study was conducted that only focused on highly-educated immigrants from the perspective of self-employment in the Canadian labour market.

3. Data and Methodology

3.1 Sample

Most Canadian studies on immigration used data from the Longitudinal Survey of Immigrants to Canada (LSIC), the Canadian Census or the Longitudinal Immigration Database (IMDB). These three data sources contain different samples and information. LSIC is a database of immigrants who landed in Canada between October 1, 2000, and September 30, 2001, maintained by Citizenship and Immigration Canada. The Census is one of the primary sources of information on the demographic, social and economic characteristics of Canadians on one specific day once every five years (Statistics Canada, 2007). The IMDB is an administrative database combining immigration and taxation records for immigrants who obtained landed immigrant status since 1980 and filed at least one tax return since 1982. Compared with LSIC and IMDB, the census not only has a large number of respondents but also includes immigrants and domestic-born, and the 2006 Census took good account of some characteristics of education. Detailed information on field of study and location of study is important for this paper; therefore the data source used in this paper is Statistic Canada's 2006 Census of Population.

The research sample is drawn from the 2006 Census Public Use micro data according to the following criteria:

1) Individuals aged from 25 to 64 that can be considered as the core-working age group;
2) Individuals with a bachelor degree or a higher level of education that can be referred to as the highly-educated group.

Those criteria are chosen to concur with the purpose of this paper, which is to identify the characteristics of the highly-educated immigrants that have influence on performance in Canadian labour market. There are four employment outcomes (to be defined more precisely in the next sub-section) that will be used as indicators to examine the performance of highly-educated immigrants in the Canadian labour market. The total sample includes 33,926 immigrants who satisfied the criteria above in the 2006 census. Males account for 51% of the sample, and female for 49%. The population under study in each analysis differs depending on the indicator that is examined. The first analysis presented here is on wages and salary income. For this regression, I have dropped the outliers who reported wages and salaries less than $500 or over $200,000 a year and I also excluded the individuals who did not work at all, which narrowed the sample size to 12,277 for males and 11,048 for females. Nevertheless, note that self-employed individuals are not excluded here. The second model is for employment status and includes respondents who neither had part-time job nor full-time job; therefore the sample size is larger than the one of the first model. The third model is about working in a professional occupation and has smaller samples than the second model, because the occupation information of some individuals is not available in the Census. Furthermore, the population used in the last outcome, that is, self-employment status, is also slightly different from the others because I use the "place of birth" instead of "place of study" to examine the self-employment decision and I dropped the respondents who are immigrants but born in Canada. Those immigrants did not accept Canadian citizenship when they were born so they are not representative and besides, their numbers are very small.

3.2 Variables

For the purpose of this study, the following four employment outcomes are used to assess the performance of highly-educated immigrants in the Canadian labour market. These

employment outcomes are designed to capture different aspects and scopes of performance of the highly-educated immigrants in the Canadian labour market. Besides the outcome variable #1, I will introduce another indicator in the descriptive statistics, high employment income, which indicates whether respondents earn employment income higher than the median. The other outcome variables are all dummy variables. I start with outcome variable #2 that is the employment status during the census reference week in 2006. I indicate whether the respondents are employed or not regardless of whether they are in the labour force or not. The outcome variable #3 indicates if respondents have been working in a professional occupation since January 1, 2005. Those include occupations in senior management, business and finance, natural and applied science, health, social science, education, government services, religion, art and culture, based on the National Occupational Classification. The last outcome variable #4 is the status of self-employment. Self-employment accounts for a considerable fraction of labour market activity of Canadian immigrants. The high rates of immigrant self-employment are motivated either by entrepreneurial opportunity of self-employment or lack opportunities in paid jobs. The respondents are labeled as self-employed if their self-employment income is other than zero, whether negative or positive.

Descriptive statistics of the dependent variables in this study are shown in the Table 1 below. Beside of the sample of highly-educated immigrants I study in this paper, I also present same employment information on the Canadian-born and compare with immigrants.

Table 1. Descriptive Statistics for the outcome variables used in the models (distribution of percentage by positive employment outcome)

	High employment income		Employment		Professional occupations		Self-employment	
	N=70,375	N=33,926	N=70,375	N=33,926	N=64,133	N=29,222	N=70,375	N=33,926
Outcome variables	Canadian -born	Immigrants	Canadian -born	Immigrants	Canadian -born	Immigrants	Canadian -born	Immigrants
Positive outcome	63.99%	46.09%	85.04%	78.42%	71.17%	55.71%	16.34%	15.98%

Note: The reason of same number of observations for High employment income and Employment in Table 1 is that the high employment income is based on all immigrants regardless of whether they worked or not.

As we can see above, there are gaps between immigrants and their domestic-born counterparts in the Canadian labour market for all indicators except self-employment and the gap is wider when it comes to whether earn high employment income and work in professional occupation. Note that, unlike Hou and Wang (2011) found that immigrants were more likely be self-employed than Canadian-born counterparts, I find that Canadian-born are actually more likely involved in self-employment. The different results may be because I only focused on highly-educated respondents. That drives me to examine what attributes of immigrants lead to a better performance in Canadian labour market among the highly-educated group. Immigrants will always be separated by gender to see if these factors have same impact for males and females.

The following six main categories define the independent variables: geographic, socio-demographic, immigration, language ability, labour market activity and education. The geographic variables have two components: province/regions, and large census metropolitan area. I group the provinces into 6 categories based on where the respondents are living. Newfoundland and Labrador, Prince Edward Island, Nova Scotia, New Brunswick, Northwest Territories, Yukon and Nunavut are classified as Eastern and Northern Canada. Manitoba and Saskatchewan are defined as Central Canada. The other provinces are defined individually and Ontario is set as the reference group. The large census metropolitan areas are defined as a dummy variable in this research. This paper defines the areas where the ratio of the population over the total Canadian population exceeded 2 percent as large census metropolitan areas. Quebec, Montreal, Ottawa-Gatineau, Toronto, Hamilton, Winnipeg, Calgary, Edmonton and Vancouver are included in the large census metropolitan areas.

The socio-demographic factors include five categories that are marital status, having children aged 0 to 14 in the family, age, age squared and visible minority. For the age variable, I

refer it to mid-point of each age group in the codebook of the public use data. In addition to age, the relevant variable "age squared" is introduced to see if the effect of age diminishes over time as we expect, since generally speaking, people gain experience, knowledge and have better judgment with age increases, while this positive effect decreases as time goes on.

The immigration variables have been classified into three categories, which are years since immigration, years since immigration squared, and place of birth. Moreover, "place of birth" is used only in the last model of self-employment analysis. In the rest of the regressions, I will adopt the variable of location of study since large number of researches have suggested that cultural factors associate with immigrants' country of origin may contribute to self-employment; a regression cannot have "place of birth" and "location of study" both because of the high correlation. The variable "years since immigration" represents the differences between 2006 and the year when the respondent immigrated to Canada. Noteworthy here, the variable "years since immigration squared" has been added to see if the effect of years since migration diminishes over time. This variable is supposed to influence the immigrants' labour market performance. Chiswick (1978) argues that as time passes, the immigrants obtain knowledge of the host countries, and may get related job skills, which all help them establish themselves and narrow the gap of income between them and the native-born. That suggests that the coefficient of the years since immigration should be positive and that the coefficient of years since immigration squared should be negative.

Place of birth is the last immigration variable. Several studies point out that the international transferability of human capital skills is directly related to the particular country of origin (Chiswick and Miller, 1994). The extent of the difficulties that immigrants have in the labour market depends on their place of birth. This variable has 8 sub-categories: U.S.A., Other Americas, Europe and Oceania, Africa, Central and Middle Asia, Eastern Asia, Southeast Asia and Southern Asia. U.S A. was chosen as a reference among these 8 countries and regions.

The next category of independent variables is language ability. Knowledge of official languages is used to determine if respondents are able to conduct a conversation in one or both official languages. Four sub-categories of language ability are English only, French only, both English and French, and neither English nor French. This study uses the English only as the reference group. I want to have a better understanding of how the language abilities affect the highly-educated immigrants' performance in the Canadian labour market.

Considering labour market activities, the variable used is part-time or full-time work in 2005. The immigrants whose work are full-time have this variable take the value 0 as reference and those whose weeks are part-time have the variable take the value 1. This variable will only be used in the first analysis of wages and salary income.

Last but not least, the educational variables, which are the central component in this study, have three categories that are major field of study, highest degree, and location of study. The major field of study classification is based on the CIP Canada 2000 and I reclassified it into 5 sub-categories: Arts, Management, Sciences and Technologies, Health and Fitness, and Other fields of study. Arts are made up of education, visual and performing arts, communications, humanities, social and behavioural sciences and law according to the codebook of 2006 Census. Management includes business, management and public administration. Physical and life sciences and technologies, mathematics, computer and information sciences, and architecture, engineering, and related technologies are classified as sciences and technologies. Health, parks, recreation and fitness are defined as health and fitness. Other fields of study consist of agriculture, natural resources and conservation, personal, protective and transportation services. I chose the major field of study in sciences and technologies as the reference group. This paper includes only the highly-educated immigrants who have a bachelor or higher degree. In order to have a better understanding of the effect of educational attainment among them, I classify three sub-categories: bachelor degree, master degree and doctoral degree, and I set bachelor degree as

reference. Furthermore, location of study is a set of dummy variables consisting of seven categories that are Canada, U.S.A., Other Americas, Europe, Eastern Asia, Southern and Southeast Asia and Other countries and regions, with Canada being set as reference. This set of dummy variables are used in all the analyses except the self-employment model (where place of birth is used). The purpose of these variables is to provide more detailed information on the effects of the different places where immigrants have acquired their highest degrees on the performance of highly-educated immigrants in the Canadian labour market.

3.3 Models

The regression models can be written as:

$$\text{Outcome}_i = \alpha_0 + \alpha_1 \text{ (geographic variables) }_i + \alpha_2 \text{ (socio-demographic variables) }_i + \alpha_3 \text{ (immigration variables) }_i + \alpha_4 \text{ (language ability) }_i + \alpha_5 \text{ (labour activities) }_i + \alpha_6 \text{ (education variables) }_i + \mu_i$$

The dependent variables of outcome_i are respectively the natural logarithm of annual wages and salary income, status of employment, working in professional occupations, and being self-employed. Both the α parameters and the independent variables in the equation are vectors, with the exception of α_0. However, the independent variables in each category differ depending on the models.

In the first regression analysis of this study, I aim at identifying the characteristics that significantly affect immigrants' wages and salary income. The outcome variable is the natural logarithm of annual wages and salary income and ordinary least squares linear regression is the chosen method to examine the outcome variable.

For the other regression analyses, the outcome variables are all dummy variables and I still use ordinary least squares linear regression as the method of analysis. This is the linear

probability model, which assesses whether, other things being equal, highly-educated immigrants with certain characteristics are more or less likely to have better performances in the Canadian labour market than those in the reference group.

In the second regression analysis, I focus on the factors that influence immigrants' employment status. The outcome variable "employed" is a dummy that indicates whether the immigrants are working or not in the reference week according to the 2006 census. Immigrants who were working get a value 1; otherwise, a value 0 is allocated.

The geographic variables, the socio-demographic variables, the language ability variables and the education variables are the same information as in the first regression analysis. Unlike the first regression, independent variables exclude the part-time or full-time work. The sample size is also larger than in the previous model because respondents who did not work are included.

In the third regression analysis, I want to dig deeper into the performance of immigrants in the labour market. Here I use as the outcome variable whether the highly-educated immigrants work in a high status occupation, which I refer to as a "professional occupation". Similarly to the last outcome variable, immigrants who worked in these occupations will be allocated the value 1; otherwise, the value 0 is allocated. The independent variables are the same as in the second regression analysis.

The last regression analysis uses the outcome variable of "self-employed". Self-employment is another aspect to examine the performance of immigrants in the labour market since self-employment is an important source of labour market opportunities for immigrants. They are either voluntarily self-employed because of entrepreneurial values, or involuntarily self-employed because of lack of paid job opportunities in the open market. However, I do not differentiate their motives in this study. Like in the previous two outcomes,

the immigrants who reported self-employment income other than 0 get the value1; otherwise, the value 0 is allocated. Most independent variables are the same as in the second and third regression analyses, except that I use "place or birth" to replace "location of study", since "place of birth" contains more information than "location of study" needed in this part.

4. Regression Analysis

4.1 Outcome 1: wages and salary income regression for highly-educated immigrants

Table 2 presents the results of the first regression model respectively for males and females. The contents include the estimated coefficients, standard errors and significance levels.

Table 2. Ordinary least squares linear regression of log of annual wages and salary income

	Immigrants					
	Male			Female		
	coff.	s.e.	sig.	coff.	s.e.	Sig
Wages and salaries per year (log value)						
Geographic variables						
Province/regions						
Reference: Ontario						
Eastern and Northern Canada	-0.0836	0.0737		-0.0584	0.0716	
Québec	-0.2560	0.0306	***	-0.2240	0.0312	***
Central Canada	-0.1630	0.0511	***	-0.0374	0.0497	
Alberta	0.0265	0.0282		-0.0488	0.0288	
British Columbia	-0.1222	0.0220	***	-0.0342	0.0219	
Large Census Metropolitan Area						

Reference: Not living in large cma						
Living in large cma	-0.0048	0.0270		0.0390	0.0273	
Socio-demographic variables						
Age	0.0680	0.0076	***	0.1024	0.0074	***
Age^2	-0.0007	0.0001	***	-0.0011	0.0001	***
Marital status						
Reference: not married						
Married	0.1001	0.02188	***	-0.0160	0.0192	
Presence of children						
Reference: Do not have kids between 0 to 14						
Have kids between 0 to 14	0.0760	0.0190	***	-0.0380	0.0190	*
Visible minority						
Reference: not visible minority						
Visible minority	-0.1075	0.0210	***	0.02180	0.0219	
Immigration variables						
Years since immigration	0.0159	0.0009	***	0.0158	0.0009	***
Years since immigration^2	-0.0000	0.0000	***	-0.0000	0.0003	***
Language ability						
Knowledge of official language						
Reference: English						
French only	-0.1826	0.0653	**	-0.1884	0.0652	**
Both English and French	0.0397	0.0267		0.0593	0.0253	**
Neither English nor French	-0.3260	0.1059	***	-0.4146	0.0980	***
Labour activity						
Reference: full time						

Part-time	-1.3750	0.0315	***	-1.1064	0.0203	***
Education variables						
Field of study						
Reference: sciences and technologies						
Arts	-0.2393	0.0209	***	-0.1052	0.0212	***
Management	-0.1135	0.0214	***	0.0064	0.0242	
Health and fitness	-0.1302	0.0364	***	0.1940	0.0284	***
Other fields	-0.2066	0.0539	***	-0.1443	0.0672	*
Education level						
Reference: Bachelor degree						
Above bachelor and master degree	0.0301	0.0171		0.0548	0.0174	**
Doctor degree	0.2393	0.0316	***	0.0819	0.0398	*
Location of study						
Reference: in Canada						
U.S.A	0.0169	0.0345		-0.0246	0.0379	
Other Americas	-0.2291	0.0481	***	-0.4154	0.0483	***
Europe	-0.0339	0.0282		-0.1660	0.0293	***
Eastern Asia	-0.3711	0.0335	***	-0.4711	0.0351	***
Southern and Southeast Asia	-0.2678	0.0268	***	-0.4091	0.0265	***
Others countries and regions	-0.1948	0.0343	***	-0.2590	0.0372	***
	R-Squared=0.2600			R-Squared=0.3408		
	Number of obs=12277			Number of obs=11048		

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

In terms of the geographic variables, both males and females bear lower level of wages and salary income in Quebec, compared to the reference of Ontario. Specifically, males have 26% lower income level in Quebec and females have 22% lower income. Moreover, by comparing the

coefficients for all the regions, the lowest income level occurs in Quebec. Males living in Central Canada and British Columbia are also shown to have lower level of earnings than the reference group. However, there is no significant evidence that these decreases are also taking place among the female group. The coefficients of Alberta are not significant for both males and females, which indicates there is no difference between living in Alberta and living in Ontario holding other variables equal. Furthermore, whether for males or females, the estimated coefficients for the variable "large census metropolitan area" are insignificant.

With respect to the socio-demographic variables, age and age^2 both have significant effect on the income level for both genders; specifically, the older the immigrants are, the higher their income, which can be explained by experience increases along with age; the positive age effect deceases with time since the coefficient of age squared is negative. In terms of marital status and the presence of children, for males, there is positive effect on income when the man is married and has kids. According to Fertig and Schurer (2007), the presence of children could motivate a family father to become more ambitious in his career, which is consistent with the results. However, the presence of children has a negative effect on income for females since they usually have to take the responsibility of taking care of kids; therefore less energy and time are allocated to work. However, there is no significant evidence of differences in the annual income between female immigrants who are married and those who are not. An interesting result has to do with visible minority. It has significant effect on the wages for both groups but with different directions: for males, being visible minorities will lower wages by 11%, while, for females, belonging to visible minorities does not affect income level.

All the immigration variables examined in this model are significant for both genders. In terms of the "years since immigration", the estimated coefficient is similar for both groups: 0.0159 for males and 0.0158 for females. The positive value indicates that the longer the immigrant has been in Canada, the more he or she will earn because of improvements in the

knowledge of local cultures and official languages and of more local working experiences. Specifically, one more year in Canada will increase by about 1% of the immigrant's annual income. In terms of the "years since immigration squared", its negative value indicates that the positive effect of "years since immigration" on annual income diminishes over time. The results show that the effects of both "years since immigration" and "years since immigration squared" are about the same for both males and females.

The following variables are related to language ability. For both groups, the results show that there is significant negative effect on annual income for those who only have the knowledge of French. The reason is that immigrants only know French living outside Quebec wound definitely suffer in the labour market. For females, knowing both English and French leads to a substantial increase of about 6% in annual wage income, but for males, there is no difference in income between knowing both official languages and knowing English only. Without surprise, the males who lack knowledge in both official languages lose about 33% of their income compared to the immigrants who only has the knowledge of English, and females lose about 41% of their income compared to English only immigrants. This indicates that having capability in official languages benefit females more than males.

As expected, the immigrants who reported that the weeks they worked in 2005 were part-time weeks had much lower salary income than those who answered that the weeks were full-time. For males, the part-time annual salary income is significantly lower than the full-time income. For the females, the part-time effect is also significant and the decrease in annual income is lower than that of the male group.

There are two categories of variables to capture education information. The first one is the field of study. For both groups, those who majored in arts experience significant lower income than the reference group who majored in sciences and technologies. Specifically, males and females experience 24% and 11% lower income than the reference group respectively and

females have small gap than males. Males who majored in management and other fields of study also experienced lower income than the reference group, but there is no significant evidence shown this is true for females. Immigrants who majored in health and fitness have significant differences in income, but in opposite directions; males bear 21% lower income than the reference group, but females have 19% higher income than their counterparts. Secondly, unsurprisingly, the higher the level of education the immigrant has, the higher the income he or she reaches. Male income increases by 3% for a degree above the bachelor or a master, and by 24% for a doctoral degree. Similarly, females increase their income by 5% by having a master level education and by 8% for a doctoral degree.

The last variable is location of study, which is a set of dummy variables that indicates where respondents achieved their highest education, with the reference group being Canadian-educated immigrants. The only positive coefficient occurs for U.S.A-educated male immigrants, but there is no significant statistical difference with immigrants who obtained credentials in Canada. This is also true for females. Immigrants who got their highest education in any other region bear lower income for both males and females, with females having a wider gap than males. Furthermore, immigrants with credentials from countries in Eastern Asia have the lowest income level among all countries. Surprisingly, female immigrants who obtained credentials from Europe have 17% lower income than their Canadian counterpart but for males, there is no significant statistical difference. The disadvantage related to location of study explains why more and more immigrants decide to go back to school after their arrival. It is not only because they are more motivated, but also because they realize that Canadian diplomas are much preferred than the credentials that they have obtained in their countries of origin.

To summarize, the key findings of this analysis are: 1) Highly educated immigrants living in Quebec have lower income levels than those living in other regions of Canada; 2) Female immigrants with children experience lower income levels than those without children and being

a visible minorities is even an advantage for female; 3) Capability in official languages is more like an asset for females than for males; 4) The income level of females is less affected by their field of study than that of males; 5) Higher education levels benefit the immigrants through higher income; 6) Immigrants who obtained their highest education in Canada and the U.S.A have higher income level than those who got credential in other countries.

4.2 Outcome 2: working regression for highly-educated immigrants

Table 3 presents the results of the second regression model respectively for males and females.

Table 3. Ordinary least squares linear probability regression of employment

	Immigrants					
	Male			Female		
	coff.	s.e.	sig.	coff.	s.e.	Sig
Employed						
Geographic variables						
Province/regions						
Reference: Ontario						
Eastern and Northern Canada	-0.0053	0.0263		-0.0285	0.0307	
Québec	-0.0652	0.0105	***	-0.0600	0.0131	***
Central Canada	0.0112	0.0191	***	0.0401	0.0227	
Alberta	0.0151	0.0103		-0.0045	0.0126	
British Columbia	-0.0119	0.0076		-0.0155	0.0092	
Large Census Metropolitan Area						
Reference: Not living in large cma						
Living in large cma	0.0473	0.0095	***	0.0499	0.0166	***

Socio-demographic variables						
Age	0.0387	0.0026	***	0.0681	0.0030	***
Age^2	-0.0005	0.0000	***	-0.0008	0.0000	***
Marital status						
Reference: not married						
Married	0.0482	0.0077	***	-0.0407	0.0084	***
Presence of children						
Reference: Do not have kids between 0 to 14						
Have kids between 0 to 14	0.0120	0.0068		-0.1022	0.0082	***
Visible minority						
Reference: not visible minority						
Visible minority	-0.0285	0.0074	***	-0.0147	0.0095	
Immigration variables						
Years since immigration	0.0024	0.0003	***	0.0031	0.0004	***
Years since immigration^2	-0.0000	0.0000	***	-0.0000	0.0000	***
Language ability						
Knowledge of official language						
Reference: English						
French	-0.1157	0.0218	***	-0.0722	0.0259	**
Both English and French	0.0050	0.0093		0.0280	0.0110	**
Neither English nor French	-0.2365	0.0284	***	-0.1966	0.0295	***
Education variables						
Field of study						
Reference: sciences and technologies						
Arts	-0.0137	0.0073	*	-0.0264	0.0090	**

Management	0.0045	0.0076		0.0029	0.0105	
Health and fitness	-0.0323	0.0123	**	0.0141	0.0123	
Other fields	-0.0057	0.0186	***	-0.0497	0.0289	
Education level						
Reference: Bachelor degree						
Above bachelor and master degree	-0.0100	0.0060		-0.0030	0.0075	
Doctor degree	0.0535	0.0116	***	-0.0060	0.0161	
Location of study						
Reference: in Canada						
U.S.A	-0.0058	0.0120		-0.0246	0.0158	**
Other Americas	-0.0075	0.0174		-0.0606	0.0204	**
Europe	0.0083	0.0098		-0.0248	0.0126	*
Eastern Asia	-0.1000	0.0097	***	-0.1462	0.0144	***
Southern and Southeast Asia	0.0117	0.0097		-0.0462	0.0115	***
Others countries and regions	-0.0612	0.0117	***	-0.1417	0.0150	***
	R-Squared=0.0636			R-Squared=0.0796		
	Number of obs=16848			Number of obs=16148		

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

Only Quebec shows significant negative coefficients among all the province/region variables. In other words, the immigrants in Quebec are about 6% less likely to work during the reference week than their counterparts. Males living in Central Canada are more likely to work than those in Ontario. As we know, Central Canada did not attract as many immigrants as other popular provinces; therefore, there could be more job opportunities for highly-educated immigrants there. Furthermore, living in large CMAs increases the likelihood of working since large CMAs have more job opportunities than other areas. Living in large CMAs has different

impact on various dependent variables. As noted in the first regression, living in large CMAs does not influence the income level.

With respect of socio-demographic variables, age and age^2 all have a significant effect on the likelihood of being employed; specifically, age has a positive effect meaning that the older the immigrants are, the more likely they have a job, which can be explained by experience increases as time passes; the positive age effect is deceasing with time since the coefficient of age^2 is negative. In terms of marital status and the presence of children, being a married female who has kids significantly decrease the likelihood of having a job. This could happen for the same reasons that were noted in the first analysis. Furthermore, male immigrants who belong to visible minorities have a lower probability of having a job, but it is not true for females. This result is consistent with the one of outcome #1, which suggests that males may face more problems due to racial discrimination than females.

In terms of language ability, the respondents who can conduct a conversation only in French have a lower probability of having a job. Similarly to the potential reason mentioned in the first analysis, as I have controlled for Quebec, this follows from the fact that the sample is dominated by immigrants who live outside Quebec. Speaking only French is obviously a liability when looking for a job out of Quebec. Furthermore, female immigrants who have the knowledge of both English and French are more likely to work, while that language asset does not seem to be valued for males; this is consistent with the result of the first model. Without doubt, immigrants who lack official languages ability are stopped from getting a job in the host country. The variable "neither English nor French" is significantly negative, with a coefficient of -0.2365 for males and -0.1966 for females. Males without language ability meet more barriers than females in finding a job in the Canadian labour market.

The immigration variables (years since immigration, years since immigration squared) are significant. The sign of the estimated coefficients of "years since immigration" and "years since

immigration squared" are positive and negative respectively. The same reason as in first analysis can explain this finding.

There are three categories to capture the education information as in the first regression. For both genders, those who majored in arts experience a lower probability of working than their counterparts who majored in technologies. Males who majored in health and fitness and other fields also experience lower likelihood of working than the reference group, but there is no significant evidence that this is true for females. After analyzing the fields of study, I find that the probability of having a job is not closely related to the studying fields, as most coefficients are not significant. This is different from the income model. Secondly, compared with immigrants who have a bachelor degree, having a master degree does not raise the probability of getting a job for both groups. However, for males, having a doctoral degree does increase the probability of having a job. The advantage of having a higher education level in being employed is not as obvious as it was in receiving a higher income.

The last variable of location of study is now analyzed. For males, only the highly-educated immigrants who got their degree from Eastern Asia and Other countries and regions are less likely to work than the reference group who were educated in Canada. The males got educational credentials from all countries other than these two have same likelihood of having a job as the Canadian-educated immigrants. However, females who obtained their degree outside Canada, including the U.S. and Europe, all suffer a lower probability of having a job.

To sum up this section, which examined the characteristics associate with the likelihood of being employed and in comparison with the first income model, the marked differences arise with regard to the independent variables of living in large CMAs, fields of study and education level. The major findings in this section are: 1) Immigrants living in Quebec are less likely to work than immigrants in other regions of Canada, and living in large CMAs increases the probability of being employed; 2) Female immigrants with children experience a lower

likelihood of having a job and married males are more likely report being employed. Further, visible minority status does not impact on the chances of being employed for females; 3) Capability in official languages contributes more to the likelihood of being employed for males than for females; 4) Generally speaking, the field of study does not affect the odds of being employed and high level of education does not significantly increase the probability of being employed; 5) The location where immigrants got their educational credentials generally does not significantly affect the likelihood of having a job for males, but females are more influenced by the location of study in term of status of employment.

4.3 Outcome 3: professional occupation regression for highly-educated immigrants

Table 4 presents the results of the third regression model respectively for males and females.

Table 4. Multiple ordinary least squares linear regression of working in professional occupation

	Immigrants					
	Male			Female		
	coff.	s.e.	sig.	coff.	s.e.	Sig
Professional occupation						
Geographic variables						
Province/regions						
Reference: Ontario						
Eastern and Northern Canada	0.0695	0.0362		0.0935	0.0381	*
Québec	-0.0481	0.0143	***	-0.0600	0.0159	
Central Canada	-0.0182	0.0256		-0.0153	0.0269	
Alberta	0.0327	0.0137	*	-0.0237	0.0150	
British Columbia	-0.0244	0.0103	*	0.0149	0.0111	

Large Census Metropolitan Area						
Reference: Not living in large cma						
Living in large cma	-0.0140	0.0129		-0.0011	0.0141	
Socio-demographic variables						
Age	0.0056	0.0036		0.0098	0.0038	**
Age^2	-0.0001	0.0000		-0.0001	0.0000	**
Marital status						
Reference: not married						
Married	0.0340	0.0105	***	-0.0183	0.0099	
Presence of children						
Reference: Do not have kids between 0 to 14						
Have kids between 0 to 14	0.0023	0.0090		0.0068	0.0098	
Visible minority						
Reference: not visible minority						
Visible minority	-0.0221	0.0100	*	-0.0264	0.0112	*
Immigration variables						
Years since immigration	0.0038	0.0004	***	0.0046	0.0005	***
Years since immigration^2	-0.0000	0.0000	***	-0.0000	0.0000	***
Language ability						
Knowledge of official language						
Reference: English						
French	-0.0540	0.0308		-0.0298	0.0331	
Both English and French	0.0357	0.0126	**	0.0509	0.0129	***
Neither English nor French	-0.1170	0.0456	**	-0.0946	0.0438	*
Education variables						

Field of study						
Reference: sciences and technologies						
Arts	-0.0789	0.0100	***	-0.0755	0.0109	***
Management	-0.0178	0.0102		-0.0349	0.0126	**
Health and fitness	-0.0397	0.0165	*	0.0764	0.0147	***
Other fields	-0.2235	0.0250	***	-0.1769	0.0342	***
Education level						
Reference: Bachelor degree						
Above bachelor and master degree	0.1187	0.0081		0.1359	0.0090	***
Doctor degree	0.2926	0.0149	***	0.2295	0.0192	***
Location of study						
Reference: in Canada						
U.S.A	-0.0215	0.0161		0.0267	0.0191	
Other Americas	-0.2188	0.0231	***	-0.2070	0.0247	***
Europe	-0.0973	0.0098	***	-0.1584	0.0149	***
Eastern Asia	-0.1130	0.0157	***	-0.1767	0.0178	***
Southern and Southeast Asia	-0.3270	0.0130	***	-0.3325	0.0138	***
Others countries and regions	-0.1044	0.0159	***	-0.1569	0.0188	***
	R-Squared=0.1402			R-Squared=0.1680		
	Number of obs=15226			Number of obs=12736		

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

The previous analysis only tries to identify the attributes of the highly-educated immigrants that increase their chances of having a job, but it did not differentiate for the kind of job they held, specifically, whether they worked as raw labour or in an occupation that indeed requires a high level of education. In this part, I will focus on the professional occupations that mostly require high level of education.

In terms of the geographic variables, highly-educated male immigrants living in Alberta have higher odds of working in a professional occupation. As we know, Alberta is one of the provinces that experiences high-speed development and that adopted lots of policies to attract a highly-educated labour force. Hence, immigrants might have a higher probability of finding a better job in Alberta than in other provinces. However, male immigrants living in Quebec and British Columbia all experience lower probability to work in professional occupation than their counterparts in Ontario; note that living in Quebec bear the lowest probability among all provinces. Comparing with the second model, the results I get here reaffirm the finding that immigrants in Quebec are also less likely to get a job. For females, living in most provinces has the same probability of employment in a professional occupation as in Ontario; the exception is Eastern and Northern Canada, where they have slightly higher chance to have a professional occupation. Living in large CMAs does not affect the odds of getting a professional occupation. Comparing with the second analysis, living in large CMAs definitely increases the chance to get a job because of large demands for labour, but when it comes to professional occupations, the differences become insignificant.

With respect to socio-demographic variables, unlike the two analyses above, age and age^2 do not affect the probability of having a professional occupation for males. However, these two variables do have a significant impact on the odds of having professional occupation for females. Specifically, for female, the positive effect of age still holds and this positive effect diminish with time. In terms of marital status and the presence of children, being a married female who has kids does not significantly affect the odds of having a professional occupation, which is different from the previous two outcomes, as most studies showed that the presence of children impedes the labour market performance of females. I find that this traditional perspective does not hold any more regarding access to professional occupations. However, similarly to the two analyses above, being a male in a married relationship increases the probability of having a professional job. Furthermore, the immigrants who belong to visible minorities have a lower

probability of having a professional job and it is true for both genders. It seems that the advantage of being a female who belongs to a minority no longer exist when only professional occupation are considered.

As in the two models above, the immigration variables (years since immigration, years since immigration squared) are still significant and the results are similar for both genders. The sign of the estimated coefficients of "years since immigration" and "years since immigration squared" are positive and negative respectively, probably for reasons similar as those mentioned in the last two analyses. This is mainly because immigrants learn the host country' cultures and languages during the time spent in that country, which helps them adapt to local labour markets. This reason seems even more important for this outcome since most professional occupations not only require specialized skills, but also years of Canadian experience. The positive value of the estimated coefficient for the "years since immigration" indicates that the longer the immigrants have stayed in Canada, the more likely they are to work in professional occupations. And the negative coefficient of years since immigration squared term shows that the above positive effect becomes smaller as time goes on.

In terms of language ability, the respondents who can conduct a conversation only in English have no significant differences in the probability of participation in professional occupations from those people who can conduct a conversation only in French. Furthermore, immigrants who have the knowledge of both English and French are more likely to have professional jobs. This indicates that the capability of both official languages is an asset that helps immigrants get access to the higher positions in the job market. Certainly, immigrants who lack ability of both official languages are stopped from having a professional occupation.

Males in all fields of study experience a lower probability of working in a professional occupation than the reference group who majored in sciences and technologies, with the exception of those who majored in management where there is no difference. Females who

majored in health experience a higher likelihood than the reference group, but the other fields of study all bear lower probabilities than the reference group. This study suggests that the instructional programs in which the immigrants study considerably affect the likelihood of having a professional job. Also, compared with immigrants who have a bachelor degree, although having a master degree does not raise the odd of getting a professional job for males, immigrants who have a doctoral degree have a much higher probability of working in professional occupations for both genders. The results demonstrate the value of high education since the likelihood of working in professional occupations increased considerably after completing higher education credentials.

The last variable is location of study. As the table shows, only immigrants who got their degree from the U.S.A have the same chance of having a professional job as those who were educated in Canada. All the other international-educated immigrants experience lower probability of having a professional job, but the coefficients fluctuate a lot, ranging from -0.0973 for male immigrants with credentials from Europe to -0.3325 for female immigrants with credentials from Southern and Southeast Asia.

Compared to the results of outcome #1 and outcome #2, the striking differences are that the positive effect of age and the negative effect of age^2 for males not longer hold, living in Quebec is not a disadvantage for females and Speaking French does not lower the probability of working in professional occupation; and most importantly, the presence of kids does not stop females from getting a professional job.

The primary findings of this section are: 1) The province of residence and whether living or not in large CMAs do not affect the likelihood of working in professional occupation, except for male immigrants living in Quebec; 2) Female immigrants with children not longer have a lower likelihood of having a professional job and the positive age effect still hold for female; 3) Capability in both official languages is an asset for highly-educated immigrants to be employed

in professional occupation; 4) Unlike the results of outcome #2, the field of study does affect much the likelihood of working in professional occupation, and having a doctoral degree significantly increases the probability of being employed; 5) The location of study has influence on the likelihood of working in a professional occupation.

4.4 Outcome 4: self-employment regression for highly-educated immigrants

Table 5 presents the results of the last regression model respectively for males and females.

Table 5. Ordinary least squares linear probability regression of self-employment

	Immigrants					
	Male			Female		
	coff.	s.e.	sig.	coff.	s.e.	Sig
Self-employed						
Geographic variables						
Province/regions						
Reference: Ontario						
Eastern and Northern Canada	-0.0032	0.0284		-0.0438	0.0235	
Québec	-0.0537	0.0114	***	-0.0210	0.0100	*
Central Canada	-0.0658	0.0206	***	-0.0421	0.0173	*
Alberta	-0.0600	0.0117	***	-0.0176	0.0096	
British Columbia	0.0028	0.0083		0.0336	0.0070	***
Large Census Metropolitan Area						
Reference: Not living in large cma						
Living in large cma	0.0134	0.0073		0.0090	0.0089	
Socio-demographic variables						
Age	0.0054	0.0028		0.0074	0.0023	***

Age^2	-0.0000	0.0000		-0.0001	0.0000	*
Marital status						
Reference: not married						
Married	0.0378	0.0083	***	0.0001	0.0063	
Presence of children						
Reference: Do not have kids between 0 to 14						
Have kids between 0 to 14	0.0134	0.0073		0.0003	0.0062	
Visible minority						
Reference: not visible minority						
Visible minority	-0.0379	0.0122	**	-0.0423	0.0109	***
Immigration variables						
Years since immigration	0.0015	0.0003	***	0.0013	0.0003	***
Years since immigration^2	-0.0000	0.0000	***	-0.0000	0.0000	***
Place of Birth						
Reference: U.S.A						
Other Americas	-0.0114	0.0205		-0.0456	0.0165	**
Europe and Oceania	0.0050	0.0153		-0.0520	0.0118	***
Africa	-0.0160	0.0195		-0.0482	0.0166	**
Central and middle Asia	0.0432	0.0196	*	-0.0531	0.0165	***
Eastern Asia	-0.0063	0.0197		-0.0228	0.0162	
Southeast Asia	-0.0185	0.0194		-0.0599	0.0158	***
Language ability						
Knowledge of official language						
Reference: English						
French	-0.0367	0.0238		-0.0057	0.0199	

Both English and French	-0.0022	0.0102		0.0180	0.0084	*
Neither English nor French	-0.0149	0.0305		-0.0145	0.0224	
Education variables						
Field of study						
Reference: sciences and technologies						
Arts	0.0427	0.0079	***	0.0247	0.0069	***
Management	0.0272	0.0081	***	0.0118	0.0080	
Health and fitness	0.1411	0.0133	***	0.0346	0.0094	***
Other fields	0.0704	0.0201	***	0.0158	0.0220	
Education level						
Reference: Bachelor degree						
Above bachelor and master degree	0.0202	0.0065	**	0.0129	0.0057	*
Doctor degree	0.0555	0.0120	***	0.1281	0.0123	***
		R-Squared=0.0385		R-Squared=0.0366		
		Number of obs=16841		Number of obs=16136		

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

Unlike the other three models discussed above, the outcome #4 of self-employment is not by itself an indicator of the degree of good performance of highly-educated immigrants in the Canadian labour market. It is more like another way to examine the accomplishment of immigrants in Canadian labour market. Immigrants are either driven to start their own businesses because they cannot find paid jobs in the open market, or are attracted to be self-employed because of better opportunities. Besides, how successful their businesses have been is not considered for this study and the purpose of this part is only to find out attributes of the highly-educated immigrants leading them to engage in self-employment.

In terms of the geographic variables, highly-educated male and female immigrants living in Quebec, Central Canada and Alberta have lower odds of working as self-employed as their counterparts living in Ontario. Living in large CMAs does not affect the odds of choosing to be self-employed for both genders, suggesting that, although large CMAs have more job opportunities, for immigrants to decide to engage in self-employment, this advantage of living in large CMAs may be diminished due to the more fierce competition that comes along.

With respect of socio-demographic variables, age and age^2 do not affect the likelihood of working as self-employed for males. However, these two variables do have significant effects for female. In terms of marital status and the presence of children, being a married female who has kids does not affect the odds of working as self-employed. However, being in a married relationship does increase the probability of running their own business for males, which is consistent with the results in the other parts of this paper. Furthermore, for both males and females, the immigrants who belong to visible minorities have a lower probability of engaging in self-employment.

In addition to the immigration variables used above, the variable "place of birth" is added instead of "location of study" used in other three models to examine the extent of country of origin affect on the likelihood of engagement in self-employment. There are several studies that provided reasons why the country of origin affects the likelihood of immigrants to start their own business. The most important theories include protected market and ethnic enclave, ethnic strategies and interaction theory, and social capital and networks (Portes and Bach 1985; Light and Rosenstein 1995; Renzulli, Aldrich and Moody 2000). The detailed reason will not be discussed in this paper. Like the other models, "years since immigration" and "years since immigration squared" are also significant in both samples and the odds are quite close. The sign of estimated coefficients of "years since immigration" and "years since immigration squared" are positive and negative respectively. The results demonstrate that the positive effect of time spent

in Canada also hold for self-employment. As for a set of dummy variable of "place of birth", males from different origins all have similar odds of being self-employed, with the exception of those from Central and middle Asia who have a slightly higher probability than their counterparts who came from the U.S.A. Nevertheless, the decision of females to engage in self-employment relates more with their country of origin than that of males. Specifically, males, except those from Eastern Asia, all have the same chance to be self-employed as the reference group; however, females from all other regions are less likely to be self-employed than their counterparts from the U.S.A.

In terms of language ability, the proficiency in official languages is not a barrier for highly-educated immigrants when they decide to open their own business. They all have the same probability to be self-employed, probably because many of the self-employed work in the enclave economy. However, there is an exception that females who are able to master both official languages are more likely to choose self-employment than those who can only conduct a conversation in English. This indicates that lack of official languages will not stop highly-educated immigrants from starting their own business and that ability in official languages is more valuable for females than for males.

There are two sub-categories to capture the education information. The first one is the field of study. For males all fields experience higher probability of opening their own business than reference group who majored in sciences and technologies. Females who majored in Arts and health experience higher likelihood than the reference group to open their own business. This finding is complementary to the result of the same variable of outcome #2 and outcome #3. As mentioned before, males who majored in technologies are more likely to be employed and work in professional occupation, and therefore they are less likely to choose to be self-employed since they have great career future. Noteworthy for female who majored in health, they also have good career future in the open market, but they choose to be self-employed. The reason might be that

the entrepreneurial values and economic opportunities motivate them to be self-employed. Secondly, compared with immigrants who have a bachelor degree, having a master or doctoral degree raises the odds of being self-employed for both groups, which is consistent with the study conducted by Li (2001).

This section examined the determinants associated with the likelihood of engagement in self-employment and the key findings are: 1) Immigrants living in Ontario are more likely to start their own business than those from other regions, and living in large CMAs does not affect the likelihood of self-employment; 2) The presence of children does not affect the odds of being self-employed, and a positive age effect holds for female also. Furthermore, the status of visible minority lowers the probability of self-employment; 3) The impact of country of origin on the likelihood of being self-employed occurs mainly for females and specifically, immigrants who came from the U.S.A are more likely to be self-employed; 4) Inability in official languages is not an obstacle for immigrants from starting their own enterprise; 5) Immigrants who majored in sciences and technologies have a lower likelihood of engaging in self-employment; 6) Higher education levels motivate immigrants to start their own business.

Summary and conclusion

There have been considerable improvements in the educational attainment of immigrants since the 1970s. The successful performance of immigrants in the Canadian labour market is in the interest of both the Canadian public and of the immigrants. In this paper, the 2006 Canadian census public use micro data is used to assess the factors that are the most likely to affect highly educated immigrants' chances of being successful in the labour market. Four different indicators are used to measure the successful integration of immigrants in the Canadian labour market. The first three outcomes of wage and salaries income, being employed, and working in professional occupation are indicators of good performance; the fourth outcome of

self-employment is used as a complementary indicator of the labour market choices of immigrants in Canada. Here are some key findings of my paper:

1. Geographically, immigrants living in Quebec perform worse in the outcomes of income level, likelihood of being employed, and self-employment. Furthermore, male immigrants living in Quebec also have a lower probability of working in a professional occupation. On the other hand, living in large CMAs is advantageous for the employment of highly-educated immigrants.

2. Instead of regarding the presence of children as a barrier for female immigrants to have good performance in the Canadian labour market, this study finds that female immigrants with children have the same likelihood of working in professional occupation and of being self-employed as those without children. Belonging to a visible minority is not a liability for female immigrants with respect to outcomes associate with good performance.

3. As expected, the coefficients of years since immigration and years since immigrantion^2 are respectively positive and negative. The time spent since landing helps immigrants overcome the difficulties they faced when they came to Canada.

4. Compared to the knowledge of English only, being able to conduct conversation in both official languages increases the likelihood of having a professional job. Highly-educated immigrants who know neither of Canada's official languages are not less likely than those who know English only to engage in self-employment.

5. When examining the impact of the educational variables on the performance of immigrants, this study finds that immigrants who majored in sciences and technologies generally have better performance and are less likely to be self-employed than those who majored in other fields of study. Moreover, the performance of male immigrants is more affected by field of study than that of females. Compared to a bachelor education, immigrants having a doctoral degree have higher odds of working in professional occupation and of starting their own business

6. The regions where credentials were obtained have a clear influence on the likelihood of having good performance in the Canadian labour market. Immigrants with credentials from Canada and the U.S.A showed the highest income level and the highest likelihood of working in a professional occupation.

7. Instead of location of study, place of birth was used in the regression on self-employment. The impact is different for males and females. Generally, highly-educated male immigrants from all countries have same probability of being self-employed. In contrast, female immigrants from all the regions other than Eastern Asia experienced a lower likelihood of being self-employed.

References

Adamuti-Trache, M., & Sweet, R. (2007). Adult Immigrant's Participation in Post-Secondary Education. Paper presented at the 9th National Metropolis Conference, Toronto, March 2007.

Baker, M., & Benjamin, D. (1994). The Performance of Immigrants in the Canadian Labor market. *Journal of Labor Economics*, 12(3): 369-405.

Banerjee, R., & Verma, A. (2011). Post-migration Education among Recent Adult Immigrants to Canada. *Journal of International Migration and Integration*, 13(1): 59-82.

Bloom, D.E., Grenier, G., & Gunderson, M. (1995). The Changing Labour Market Position of Canadian Immigrants. *Canadian Journal of Economics*, 28(4b): 987-1005.

Bonikowska, A., Hou, F., & G. Picot. (2011). Do Highly Educated Immigrants Perform Differently in the Canadian and U.S. Labour Markets? *Statistics Canada Catalogue no. 11F0019M*. Analytical Studies Research Branch Research Paper Series. No. 329.

Boyd, M., & Schellenberg, G. (2007). Re-accreditation and the Occupation of Immigrant Doctors and Engineers. *Canadian Social Trends*, Catalogue No. 11-008, Ottawa: Statistics Canada.

Chiswick, B.R. (1978). The Effect of Americanization on the Earnings of Foreign-born Men. *Journal of Political Economic*, 86(5): 897-921.

Chiswick, B.R., & Miller, P.W. (1994). The Determinants of Post-Immigration Investments in Education. *Economics of Education Review*, 13(2): 163-177.

Ewoudou, J. (2011). Location of Study and the Labour Market Success of Immigrants to Canada. Research paper. Catalogue No. 81-595-M. Ottawa. Statistics Canada.

Ferrer, A., & Riddell, W.C. (2004). Education, Credentials and Immigrant Earnings. *Canadian Journal of Economics*, 44(1): 186-216.

Fertig, M., & Schurer, S. (2007). Labour Market Outcomes of Immigrants in Germany: The Importance of Heterogeneity and Attrition Bias. *IZA Discussion Papers 2915*, Institute for the Study of Labor (IZA).

Friedberg, R.M. (2000). You Can't Take It with You? Immigrant Assimilation and the Portability of Human Capital. *Journal of Labor Economics*, 18(2): 221-51.

Galarneau, D., & Morissette, R. (2008). Immigrants' Education and Required Job Skills. Perspectives, Catalogue No. 75-001-X. Ottawa: Statistics Canada.

Gilmore, J., & Le Petit, C.L. (2008). The Canadian Immigrate Labour Market in 2007: Analysis by Region of Postsecondary Education. Analytical Studies Research Paper Series Catalogue No. 71-606-X2008004. Ottawa: Statistics Canada.

Grant, M.L. (1999). Evidence of new immigrant assimilation in Canada. *Canadian Journal of Economics,* 32(4): 930-955.

Green, D., & Worswick, C. (2009). Entry Earnings of Immigrant Men in Canada: The Roles of Labour Market Entry Effects and Returns to Foreign Experience. Study prepared for Citizenship and Immigration Canada.

Green, D., & Worswick, C. (2002). Earnings of Immigrant Men in Canada: The Roles of Labour Market Entry Effects and Returns to Foreign Experience. Research paper, Strategic Research and Review, Citizenship and Immigration Canada.

Hou, F., & Wang, S. (2011). Immigrants in Self-Employment. Component of Statistics Canada Catalogue no. 75-001-X. Ottawa: Statistics Canada.

Li, P.S. (2001). Immigrants' Propensity to Self-Employment: Evidence from Canada. *International Migration Review*. 35(4):1106-1128.

Light, I., & Rosenstein, C. (1995). Expanding the Interaction Theory of Entrepreneurship. *The Economic Sociology of Immigration.* Alejandro Portes, editor. Russell Sage Foundation. Pp. 166-212.

Mata, F. (2008). Exploring Linkages Between the Country of Postsecondary Education Completion and Labour market Activity of Immigrants in Canada. Working Paper No. 08-09. Centre of Excellence for Research on Immigration and Diversity, Metropolis British Columbia.

Picot, G., Hou, F., & Coulombe, S. (2007). Chronic Low Income and Low-income Dynamics Among Recent Immigrants. Statistics Canada. Canadian Labour Market and Skills Researcher Network. Working Paper Number: 26.

Portes, A., & Bach, R.L. (1985). *Latin Journey: Cuban and Mexican Immigrants in the United States.* University of California Press. Pp 995-997.

Plante, J. (2010). Characteristics and Labour Market Outcomes of Internationally-Educated Immigrants: Results from the 2006 Census. Analytical Studies Research Paper Series Catalogue No. 81-595-M-No.084. Ottawa: Statistics Canada.

Plante, J. (2011). Integration of Internationally-Educated Immigrants into the Canadian Labour Market: Determinants of Success. Analytical Studies Research Paper Series Catalogue No. 81-595-M-No.094. Ottawa: Statistics Canada.

Reitz, J.G. (2001). Immigrant Skill Utilization in the Canadian Labour Market: Implications of Human Capital Research. *Journal of International Migration and Integration,* 2(3): 347-378.

Reitz, J.G. (2007). Immigrant Employment Success in Canada, Part I: Individual and Contextual Causes. *Journal of International Migration and Integration,* 8(1): 11-36.

Renzulli, L.A., Aldrich, H., & Moody, J. (2000). Family Matters: Gender, Networks, and Entrepreneurial Outcomes. *Social Forces,* 79(2): 523-46.

Robst, J. (2007a). Education and Job Match: The Relatedness of College Major and Work. *Economics of Education Review*, 26(4): 397-407.

Schaafsma, J., & Sweetman, A. (2001). Immigrant Earnings: Age at Immigration Matters. *Canadian Journal of Economics*, 34(4): 1066-1099.

Schellenberg, G., & Maheux, H. (2007). Immigrants' Perspectives on Their First Four Years in Canada: Highlights from Three Waves of the Longitudinal Survey of Immigrants to Canada. Ottawa, ON: *Canadian Social Trends*, Statistics Canada.

Statistics Canada. 2007. "Census of Population." September 21, 2009. <http://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=3901&lang=en&db=imdb&adm=8&dis=2>

Sweetman, A., & McBride, S. (2004). Postsecondary Field of Study and the Canadian Labour Market Outcomes of Immigrants and Non-immigrants. Analytical Studies Branch Research Paper Series. Catalogue No. 11F0019MIE-233. Ottawa: Statistics Canada.

Xue, L. (2008). Initial Labour Market Outcomes: A Comprehensive Look at the Employment Experience of Recent Immigrants during the First Four Years in Canada. Ottawa. Citizenship and Immigration Canada.