

**West/Central Asian and Middle Eastern Immigrants  
and Their Labor Market Earnings in Canada**

*by*

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## **1: Abstract**

This paper examines the labor market earnings of male immigrants from the West/Central Asia and the Middle East in Canada. In particular, this research examines whether the factors of years since migration, education, knowledge of the official language, province and cities of residence, religion and age affect the earnings level of the immigrants. This paper uses immigrants from United Kingdom as a comparison group. Using the Canadian Census Public Use Microdata File (PUMF): Individuals File, it focuses on a period of 15 years—from 1991 to 2006.

The findings of this paper show that year since migration, different levels of education, province and cities of residence, knowledge of the official language(s), religion and age are significantly associated with the level of earnings. Besides quantifying the impact of the mentioned variables, I measure the impact of age and years since migration to Canada on an immigrant's relative earnings and on the rate at which his relative earnings rise/fall with both age and time since arrival.

Based on the given years census files, this research shows that most of the immigrants from the selected region live near to the mean of earnings. This paper concludes that, compared to those whose first language is not English, the Canadian labor market prefers workers who are native English speakers. In addition, this study concludes that having university level education leads to a better job with higher earnings. This study recommends further research on different immigrant groups, their economic wellbeing, and how their living conditions can be improved.

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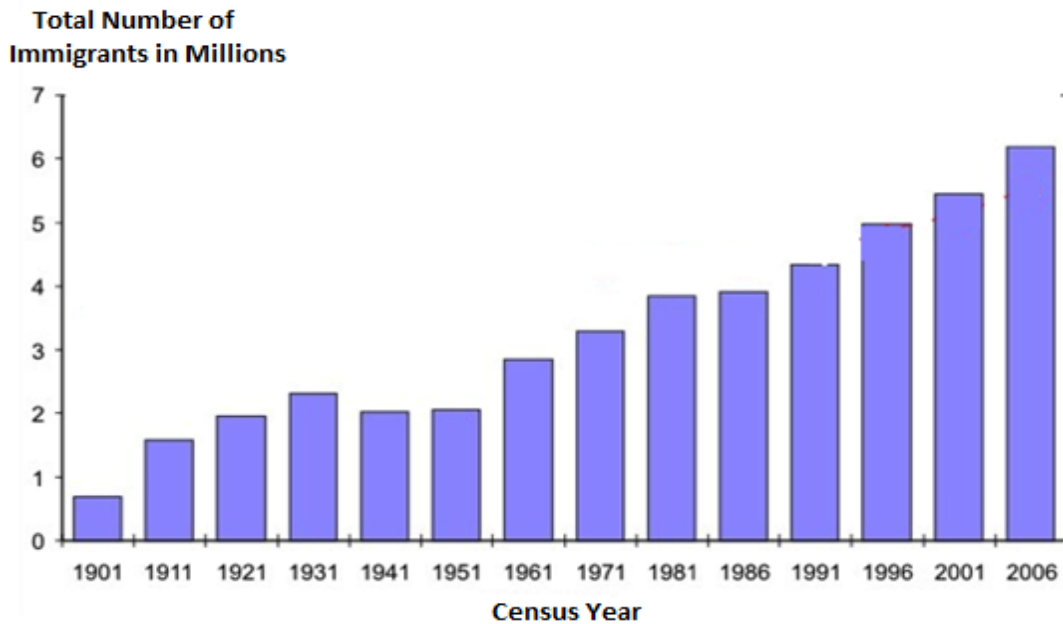
## 2: Introduction

There are about 214 million migrants worldwide. This is about 3.1 percent of the World's population. Among them, 27 million (12.4 percent) are youth between the ages of 15 to 24 (United Nations, 2011). Canada is one of the countries that have a large immigrant population. By 2006, more than six million of the people living in Canada were born outside the country (Statistics Canada, 2011). This makes 19.8 percent of the entire population of Canada, which is the highest proportion of foreign-born population in the last 7 decades.

Canada has remained a country of immigrants throughout its history. The historical colonization of this country by both English and French made it easy for early immigrants from colonizing countries to migrate to Canada. Immigration is one of the resources in shaping the population needs of Canada. Canada has adopted a multicultural policy, encouraging diverse immigrant groups, irrespective of the country of origin, to move to Canada. Under this policy, assurances are given so that different immigrant groups can maintain their culture and traditions in Canada (see Figure 1). Immigrants in Canada can largely be categorized into three groups:

- a) ***Economic Immigrants***: High profile skilled workers and people with sufficient business experience as permanent residents along with accompanying dependants.
- b) ***Family Class***: Family members sponsored by Canadian citizens and permanent residents under various government programs.
- c) ***Refugees***: Those immigrants who come to Canada based on their need for protection.

Figure 1: Total Number of Immigrants to Canada in Millions



(Source: Statistics Canada, 2011)

In 2010, Canada accepted 280,681 permanent landed immigrants. Among these immigrants, 186,913 (67 percent) were economic immigrants; 60,220 (22 percent) were family class immigrants; 24,696 (9 percent) were Refugees; and 8,845 (2 percent) were others. As a diverse country, every year for the last ten years, Canada has received approximately 250,000 immigrants. Foreign trained professionals represent an increasingly large portion of the Canadian labor market (Citizenship and Immigration Canada, 2010).

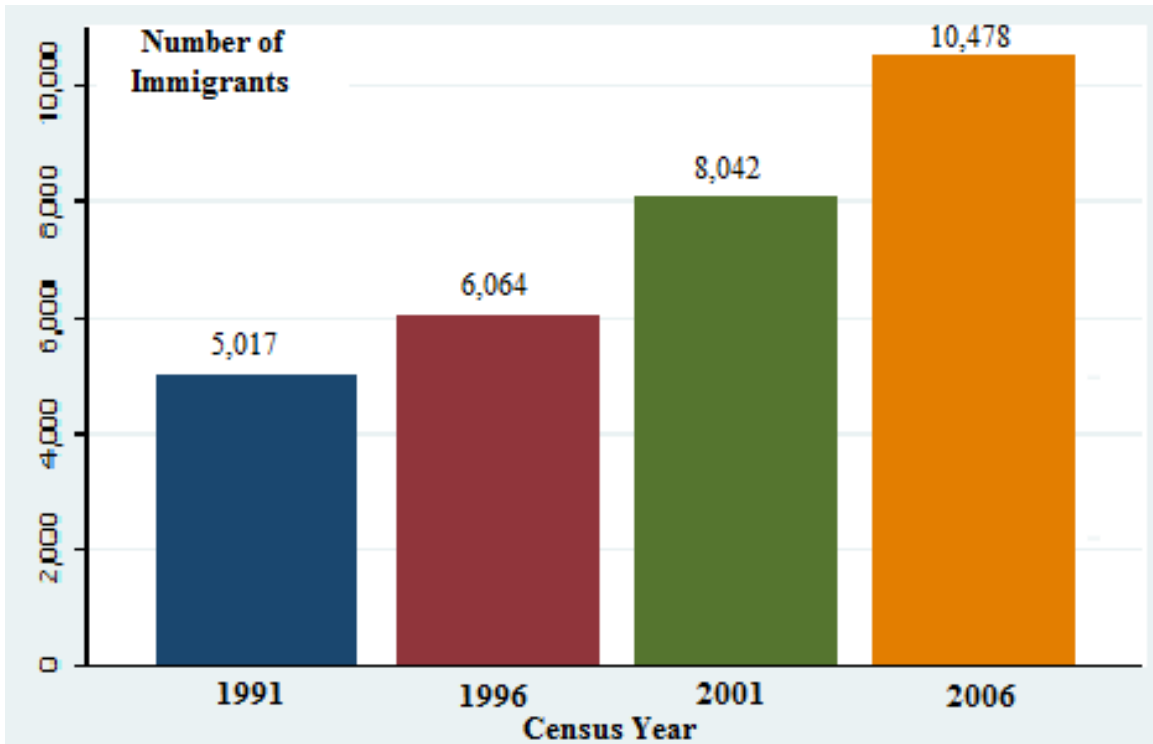
Immigrants to Canada come from different regions of the world. It is mentioned on the Immigration and Citizenship Canada (2010) website that from the whole inflow of immigrants in the year 2010, 66,693 (23.8 percent) were immigrants from Africa and the Middle East, 135,006 of immigrants living in Canada (48.1 percent) were from Asia and Pacific, 28,355 (10.1 percent) were from South and Central America, 9,243

(3.3 percent) from United States and 41,319 (14.7 percent) were from Europe and the United Kingdom.

The adoption of multicultural policy by the Canadian federal government has accelerated immigration from different regions, including the West/Central Asian and Middle Eastern countries. Canadian immigration also encourages skilled workers and investors as immigrants, who can contribute to the economy by different means. One of the main reasons for Canada accepting immigrants, besides shaping the population, is the potential contribution of immigrants to the Canadian economy.

There have been a number of studies on different immigrant groups in Canada, such as Chinese, Iranian, South American and Europeans. These studies, in particular, focused on integration, wellbeing and economic hurdles of the immigrant groups. However, little research has been done on emigrants and emigration from the West/Central Asia and the Middle East region. The present study focuses on the immigrants to Canada coming from the West/Central Asia and the Middle East region. Based on the Public Use Microdata Files of Census Canada in 1991, 1996, 2001 and 2006 the total immigrant population from the region selected for this study, was respectively 5,017; 6,064; 8,042; and 10,478 (see Figure 2).

Figure 2: West/Central Asian and Middle Eastern Stock of Immigrants in Canada in Given Years from the Census Files



(Source: Statistics Canada, 1991, 1996, 2001, 2006)

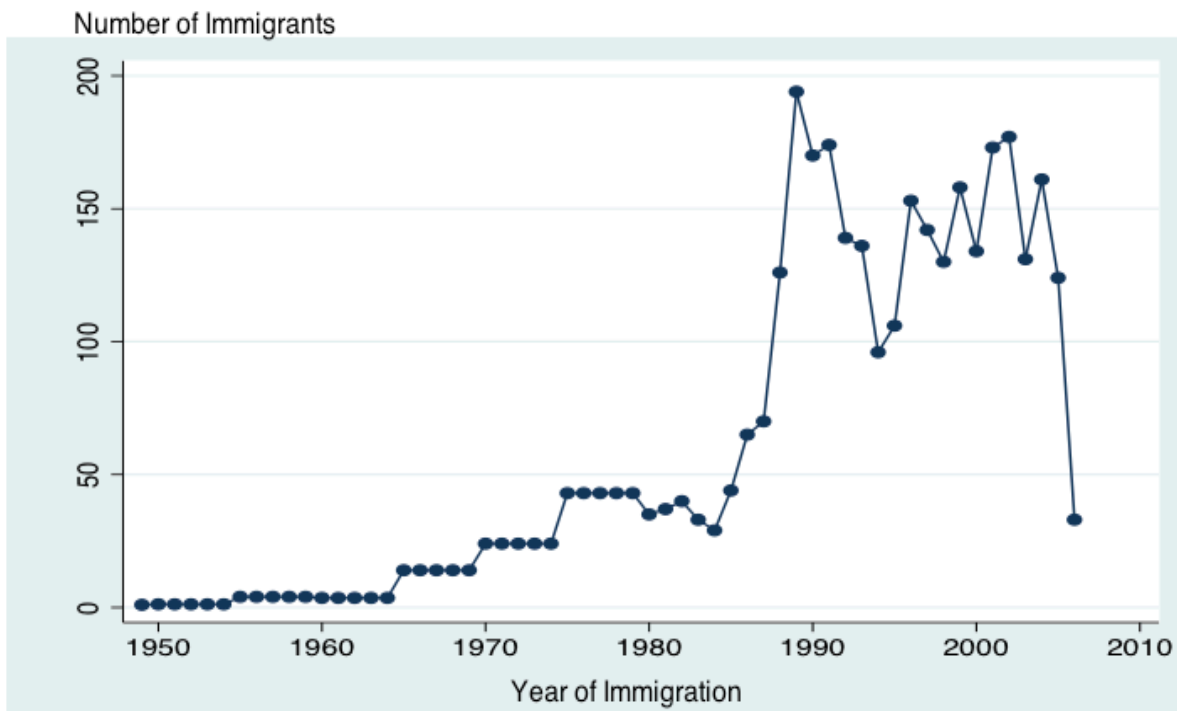
As per Statistics Canada, the West/Central Asia and Middle East regional grouping is a region of these countries: *Afghanistan - Azerbaijan - Bahrain - Armenia - Cyprus - Georgia - Iran - Iraq - Israel - Jordan - Kazakhstan - Kuwait - Kyrgyz Republic - Lebanon - Oman - Qatar - Saudi Arabia - Syria - Tajikistan - Turkey - Turkmenistan - United Arab Emirates - Uzbekistan - West Bank and Gaza (Palestine) and Yemen.*

According to Statistics Canada Census files (2006), 5.97 percent of total immigrants in Canada in the year 2006 were from the West/Central Asia and the Middle East. This vast region of 26 countries is politically, socially and economically diverse; however, it shares many of the same religious rituals and cultural values.



Most of the immigration from the West/Central Asia and the Middle East started after the 1970s (see Figure 3). As this region is politically and socio-economically very diverse, people of these countries have different reasons for emigration. The Islamic revolution in Iran followed by the Iran-Iraq war, war in Afghanistan, the Israeli and Palestinian tensions in the West Bank, and the collapse of the Communist block were some of the political reasons for emigration from this region.

Figure 3: Number of Immigrants and Year of Immigration from West/Central Asia and the Middle East since 1949



(Source: Statistics Canada, 2006)

The pursuit of better opportunities in the West and dictatorships and monarchies in most countries in the West/Central Asia and the Middle East also led people to emigrate from this region. Moreover, in the Arab countries, the main causes of

emigration were social oppression, civil rights violation, and religious strictness.

Furthermore, Canada's immigration policy before World War II, particularly eligibility of immigrants based on the country of origin, was one of the most important factors for the low rate of immigration from this region. Distance and transportation costs also cannot be ignored in the lack of immigration from the West/Central Asia and the Middle East. In the case of Europe's Jewish population, particularly after the Second World War, the formation of Israel to a great extent reduced their immigration to North America below what it otherwise might have been.

Most of the people in the West/Central Asia and the Middle East follow Islamic principles (except Israel which is a Jewish state). The region is considered to be a part of the world with a long tradition. Unlike most of the other prominent religions, Islam does not separate religious practices from politics. Islam (and to some extent the Jewish religion) are considered to govern socio-economic values and behavior of its followers, such as how one should work, dress and behave socially.

Islamic impact on the daily lives of people in the West/Central Asia and the Middle East has a direct effect on their economic wellbeing. Toni and Lauren (2013) pointed out that, in addition to regulating "personal status law," Islam also guides financial dealings both at individual and social levels. However, Bhindai and Ardito (2013) pointed out that a gap in implementation of Islamic laws could be observed. In fact, introduction of the modern financial systems and resistance to modernization brought about conflicts within Islamic societies and Muslim groups.

For instance, payment of interest has been one of the main issues raised by Muslims as a criticism of modern banking. Interest, in any form, is banned under Islamic

laws; hence, all the financial transactions are bypassing the modern business models. To accommodate religious ease, many large global banks such as Citigroup, HSBC, and Deutsche Bank have developed Islamic banking systems to meet the demand of their Muslim clients. The Islamic financial system works on a shared equity system, and investment in banned products like weapons, alcohol, tobacco, gambling, pornography and pork are not allowed (Novethic, 2009).

The different educational background of the people from this region exposes them to different labor market experiences in Canada. Those immigrants from West/Central Asia and the Middle East, who study in Canadian educational institutions after immigration, have better economic opportunities. This is because they have Canadian credentials, proficiency in the English language, and they can readily integrate in social life. However, those coming to Canada under the family class group may not be as successful as they were expecting.

### **3: Statement of Research Questions**

The purpose of this study is to examine the contribution of immigrants from the West/Central Asian and the Middle East region to the Canadian economy. In this study, I look at the earnings of the immigrants from the West/Central Asian and the Middle East region. I analyze the impact of different variables like years since migration, age, level of education and knowledge of Canada's Official Languages, particularly English, on the earnings levels of immigrants. This paper compares the earning of the immigrants coming from the West/Central Asian and Middle Eastern region, with the immigrants coming from English speaking countries (in this paper I use United Kingdom as a basis of comparison) in order to check earnings differences among them.

The questions posed for this study are:

- 1) Do years since migration, age, education and knowledge of official languages influence earnings of the immigrants coming from the West/Central Asia and the Middle East region?
- 2) Is the earnings level of immigrants from the West/Central Asia and the Middle East region different from that of English speaking immigrants' groups (e.g., immigrants from UK)?

In this paper, I analyze the earnings levels of West/Central Asian and Middle Eastern immigrants from the time they enter Canada. Looking at immigration from a statistical point of view, this paper examines a period of 15 years from the 1991 Census to the 2006 Census.

## **4: Literature Review**

### **4.1: Immigration**

Immigration is the movement and settlement of people from one country or region to another country or region (Agnes and Guralnik, 1999). According to the National Geographic Society (2005), the purpose of migration usually involves seeking “permanent” or “semi permanent residence”. Semi-permanent residence is described as a seasonal voluntary or involuntary movement of labor across political boundaries. Though there is no one exact definition for the term “migration,” the Glossary on Migration defines it as:

A process of moving, either across an international border, or within a State. It is a population movement, encompassing any kind of movement of people, whatever its length, composition and causes; it includes migration of refugees, displaced persons, uprooted people, and economic migrants. (International Organization on Migration, 2004)

The International Organization of Migration (2004) considers movements across borders as personal choices. Ravenstein (1885), one of the early writers on modern migration, divided the decision-making process, in terms of migration, into “push” and “pull” factors. As per his analysis, both of these factors are important in making a decision to migrate. Some of the prominent “push” factors/reasons are political, such as civil war, social injustice, and poverty.

On the other hand, labor market needs—for both skilled and unskilled labor—demographic needs—in terms of sustaining or increasing population levels—and the

attraction of rich economies are the “pull” factors that attract people to move from the less economically stable zones of the world to more prosperous economies.

Poverty is also considered as one of the main factors for migration; however, Tapinos (1990) negated the generalization of it by arguing that migration, particularly at the international level, depends on resources, and the poor may not be able to have acquired resources in order to migrate. In their paper, Black and Sward (2009) reported that disadvantaged people are not the ones who migrate.

There is a relationship between migration, poverty and its eradication; however, poverty, on its own, is not a driver for migration (Van Hear and Nyberg-Sorensen, 2002). Though the relationship between development and migration is debatable, many authors have argued that economic development could either slow down or expedite migration. It could expedite migration by providing resources, enabling people to move (Spaan et al., 2005; Skeldon, 2008; Faist, 2008; and de Haas, 2010). There are also a number of other micro-level factors influencing the decision to emigrate, such as household decision-making and social networking (Van Hear, Bakewell, and Long, 2012).

Increase in international migration is considered to be the result of increased globalization. Economic historians have described the period of free trade and free capital mobility, from 1870 to 1913, as the “first wave of globalization,” which brought about a huge flow of mass migration (Hatton and Williamson, 1998).

Around 60 million people moved to European countries, from countries with lesser resources, where they found better opportunities. The First and Second World Wars halted the international migration process. After the 1950s, the second phase of globalization started, but during this time the destination countries were not only in

Europe (Solimano, 2004).

Massey et al. (1993) pointed out that Europe was the source of immigrants to “immigrant-receiving countries,” like Australia, Canada and the USA, until 1945. However, after 1945, Europe has become an immigrant-receiving continent. The authors pointed out that the migration from Europe changed to migration from Asia, Africa and Latin America. Immigrants are moving from poor countries—with inadequate education, low incomes and negligible social mobility—to the developed countries where they believe more opportunities exist.

Though immigration is considered to cause a “brain-drain” in the country of origin, Djajić (1986) argued that remittances of immigrants have a positive impact on the country of origin. Based on the Rivera-Batiz (1982) model, Djajić showed that if exceeding a certain point, remittances benefit the remaining residents. He went further and pointed out that the positive effects of remittances will not be limited only to the recipients but also to those who are not the direct recipients. Sending remittances to the countries of origin has become a common practice in the post-Second World War era. The magnitude of remittances has been substantial. In the case of a number of developing countries, these flows constitute a significant fraction of the total national foreign-exchange earnings.

Similarly, Akbari (1989) pointed out that immigrants benefit host countries. Focusing on Canada as a case study, he argued that immigrant households on average are a source of public fund transfer to non-immigrant households. Examining major public services and payment of taxes, by both average immigrant and non-immigrant households in Canada, Akbari argued that credit transfers are substantial and that this invalidates the

belief that immigrants impose a net cost on society. Partridge and Furtan (2006) argued that immigrants increase both import and export trade flows as well.

## **4.2: Economic Performance of Immigrants**

There are more economic opportunities for the immigrants and immigrants contribute to the economy of the host country (George, 1994). However, immigrants still economically underperform (Wang and Lo, 2004). Wang and Lo pointed out that this is because: 1) most of the immigrants are from the developing countries with lower educational levels; 2) inability of employers in processing foreign credentials; 3) immigrants' lack of linguistic proficiency; 4) economic recessions in the host country; and 5) host country's local labor market conditions which are related to the geographical variation in economic structure and level of development.

Ferrer and Riddell (2004) argued that the differences in the economic well being of immigrants and natives are because of the migration decisions. They elaborated that, if immigrants are highly skilled and educated, they may gain from migrating and this will affect the overall average of immigrants' earnings. However, if the decision to migrate is because of some political turmoil or wish for a better life, in this case the impact may be negative on their earnings.

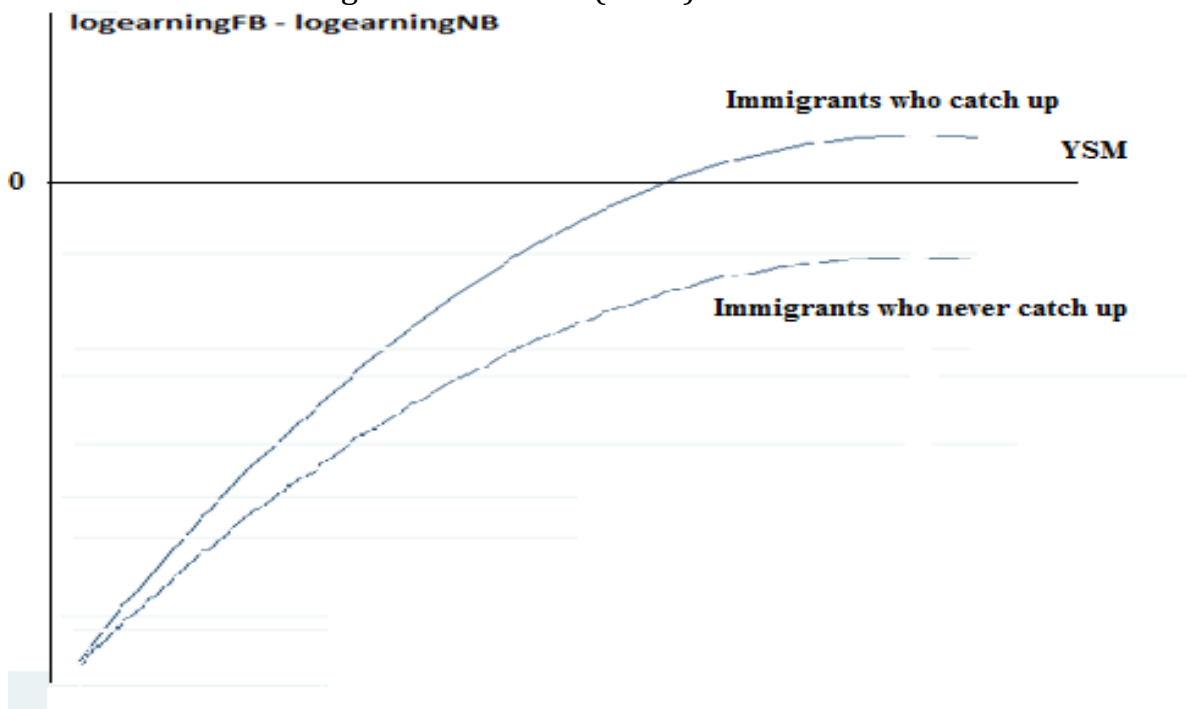
Depreciation of skills—as most of the skills have country-specific components (knowledge of institutions, culture and customs, establishment of networks, etc.) — might cause the market value of immigrants' skills, obtained in foreign countries, to fall below that of natives. In this case, the gradual accumulation of local human capital by



immigrants tends to close the earnings differential (Ferrer and Riddell, 2004). Chiswick (1978) argued that the economic success of immigrants' is based on their acquired skills in the host country.

Chiswick (1978) analyzed the earnings differential between foreign-born male workers and native-born workers. Among many factors that he considered in his analysis i.e., country of origin, citizenship, the factor of years since migration was the focus of his study. He finds out that at the initial stages immigrants' earnings is less than that of the native-born workers, but their rate of convergence of the two earnings levels is high, and within 10 to 15 years of immigration their earnings not only catch up on average to those of native-born male workers but also exceed them. For his analysis, he uses the log differences of foreign-born workers and native-born workers as a function of years since migration (see Figure 4).

Figure 4: Chiswick (1978) YSM Curve



(Source: Chiswick, 1978)

The curve shows that immigrants generally start at lower wages than native-born workers, and with a rather higher rate of earnings change they catch up within 10 to 15 years and cross the zero earnings differential line in some instances. It is also possible that some of the male immigrants will never catch up to the earnings of native-born male workers; that is the YSM curve will never cross zero differential line (see Figure 4).

### **4.3: Education, Knowledge of Official Language(s) and Age**

One of the reasons that people migrate to Canada is for career development. Prior to immigration, skilled workers are tested on a points-based scale. These individuals' ability to integrate and enter the Canadian labor market is demonstrated based on their education, language proficiency and skills (Fang, 2012). Among immigrants who arrived in Canada from 2000-2009, approximately 48.3 percent had university degrees, with breakdown rates for bachelor's degree, master's degree, and doctoral degrees at 32.3 percent, 13.2 percent, and 2.8 percent respectively (Citizenship and Immigration Canada, 2009).

There are several foreign credential assessment services across Canada. In addition to the Canadian Association of Social Workers (CASW), other agencies that offer assessment services include the International Qualifications Assessment Service (IQAS) in Alberta, the International Credential Evaluation Service (ICES) in British Columbia, Academic Credentials Assessment Service (ACAS) in Manitoba, Comparative Education Service (CES), International Credential Assessment Service of Canada (ICAS), and World Education Services (WES) in Ontario.

One of the biggest concerns of immigrants in the host country is the valuation of their home-earned credentials. Ferrer and Riddell (2004), in their study, mentioned that the return on immigrants' skills and education is, to some extent, a policy issue, particularly in Canada. The results contrast to the widely believed perception that educational return to immigrants is very low in comparison to that of the natives. Their finding showed that the educational discrimination does not apply to the immigrants holding diplomas and degrees.

Ferrer and Riddell also found that immigrants' credentials do appear to be valued in the Canadian labor market. Compared to immigrants without having higher education, immigrants with degrees earn more. Even in some cases, immigrants' gains were greater than for the native-born Canadians, having the same level of education. However, Wang and Lo's (2004) findings were totally opposite to that of Ferrer and Riddell. They pointed out that credentials from a developing country are less valued than those obtained in more-developed countries. They also mentioned that, in some cases, the credentials from developing countries are not recognized at all.

In their study, Wang and Lo argued that there was no difference in earnings between immigrants with lower education and those with university degrees. This reflects the immediate employment of immigrants. Immigrants with higher education may stay unemployed for a period of time or work as low-income employees. This might also be considered as a drawback to the immigrants' assimilation rate. Immigrants start work with lower wages, compared to natives of the same age, experience and education.

Fang (2012) pointed out that, upon their entry, skilled workers' expectations from the labor market are very high. However, they are disappointed shortly after they arrive.

This is because their documents, which are already approved by the immigration authorities, are not readily valued in the Canadian labor market. Therefore, skilled workers in this category experience a lot of problems and end up working for lower wages and at lower-skill jobs.

Knowledge of official languages of the host country is an important factor in both social integration of immigrants and their economic wellbeing. It is a medium through which newcomers find access to the social networks and opportunities along with labor market information, which further increases immigrants' productivity (Boyd and Cao, 2009).

Boyd (2009) argues that there is a direct relation between language proficiency, productivity and wage increases. Official language limitations restrict immigrants from fully using their educational credentials and past experience. Even the most highly educated immigrants with lower language proficiency get lower-paid jobs. Budría and Swedberg (2012) relate lower official language proficiency to the increase in poverty among immigrant families. They also relate lower proficiency in official languages to lower rates of social and cultural integration.

Age is also one of the prominent factors in shaping economic and social welfare of immigrants. Åslund, Anders and Skans (2009) argued that social integration encompasses both educational and economic wellbeing. Corak (2011) advances that there is a direct link between experience of early years of age and adults' social and economic success. Immigrants' age at the time of landing affects their education outcome and performance. Cortes (2006) and Gonzales (2003) in their studies discussed that immigrants' age at arrival is related to their educational attainment in the host country.

They further argue that immigrants in their early ages have higher percentage of total schooling in the host country compared to those who migrate in later years of their age which will affect their labor market earnings, as host country educational credentials are valued higher in labor market.

## **5: Methodology**

The purpose of this paper is to examine the effects of years since immigration, education, knowledge of the official languages and age on the earnings of the immigrants to Canada from West/Central Asia and the Middle East. Furthermore, the standard way to measure economic success is through examining gradual earnings increases in the years that one spends in the host country (Chiswick, 1978). Therefore, this paper examines immigrants' earnings following their arrival in Canada over a period of 15 years from the 1991 census to the 2006 census.

In addition to analyzing descriptive data, for the purpose of this paper, regression analysis is used to quantify the effect of each variable on the natural log of earnings. To examine labor market earnings of West/Central Asian and Middle Eastern immigrants, we used earnings from wages and salaries income as a dependent variable. After examining the earnings of immigrants from the selected region, we compare it to that of immigrants in the control group. Census Canada combines the various sources of income into five categories:

- 1) wages and salaries,

- 2) self-employment income both non-farm and farm,
- 3) government transfer payments,
- 4) investment income, and
- 5) other income (retirement pensions and other money income).

For the analysis in this paper, I use the wages and salaries variable to quantify earnings of immigrants from West/Central Asia and the Middle East. This category refers to gross wages and salaries before deductions for income tax, pensions, unemployment insurance, etc. This variable is limited to a non-zero positive number lower than 200,000 and shows the actual amount received in the year before the census was taken.

## 6: Model Specification

Regression analysis is an effective tool to estimate relationships between dependent and independent variables. Regression analysis will help us understand how the typical value of the dependent variable changes when any one of the independent variables varies, while the other independent variables are held fixed. Our model specification for this purpose is as follows:

$$\begin{aligned}
 \log(\text{earnings}) = & \beta_0 + \beta_1 \text{IMMIGRANT} + \beta_2 \text{WCA\&ME} + \beta_3 \text{UKIMMI} + \beta_4 \sum \text{PROV}_i \\
 & + \beta_5 \sum \text{RELIGION}_i + \beta_6 \text{AGE} + \beta_7 (\text{AGE})^2 + \beta_8 \text{YSM} + \beta_9 (\text{YSM})^2 + \beta_{10} \sum \text{LANGUAGE}_i \\
 & + \beta_{11} \sum \text{EDUCATION}_i + \beta_{12} \sum \text{CITIES}_i + \beta_{13} \sum \text{INTERACTION}_i + \mu_i
 \end{aligned}$$

where the respective right-hand side variables are explained below and  $\mu_i$  is an additive error term.

## 7: Variables Description

In our model specification *earnings* is a non-zero positive number less than 200,000 and expressed in logarithmic form so as to capture the differences in percentage terms. IMMIGRANT is a dummy variable that takes the value of 1 if the respondent is an immigrant, and 0 otherwise. *WCA&ME* is a dummy variable that represents immigrants from West/Central Asia and the Middle East if it takes value of 1. *UKIMMI* dummy variable is used to identify our comparison group, immigrants from the United Kingdom. It takes a value of 1 if the respondent is from the United Kingdom, and 0 otherwise.

Geographic coverage of the population is divided into the Provinces, Territories and Census Metropolitan Areas (CMA). *PROV* is a variable that is defined to recognize the province in which the respondent resides. Followings are the provinces listed in the census data files: *Newfoundland, Prince Edward Island, Nova Scotia, New Brunswick, Quebec, Ontario, Manitoba, Saskatchewan, Alberta, British Columbia and Yukon/Northwest Territories*. From the above-mentioned provinces, residents of Yukon/Northwest Territories are dropped out of the Estimation Sample, because the wages in these territories are higher than in the rest of the country and living expenses are also much higher for many items such as food and housing. Adding this category to our Estimation Sample will create an upward bias. I then grouped the rest of the provinces into five different categories, not only according to geographic criteria, but also on the

basis of economic similarities and earnings levels. A dummy variable is then created for each category of provinces, which are:

- 1- PROV1: Newfoundland, Prince Edward Island, New Brunswick and Nova Scotia
- 2- PROV2: Quebec
- 3- PROV3: Manitoba or Saskatchewan
- 4- PROV4: Alberta
- 5- PROV5: British Columbia.

Ontario is not included in the categories as it is used as the default province for wage comparison.

Religion is one of the control variables added to our Estimation Sample. The census microdata files from Statistics Canada have the following religion categories: *Christianity* and all its forms (e.g., *Catholic, Anglican, Baptist, Jehovah's Witness, Protestants, Lutheran*, and etc), *Jewish, Buddhist, Hindu, Islam, Sikh*, no religion and others. They are all divided into seven categories for the analysis in this paper. The categories are:

- 1- religion1: Christianity and all its forms
- 2- religion2: Jewish
- 3- religion3: Buddhist
- 4- religion4: Hinduism
- 5- religion5: Islam
- 6- religion6: Sikhism
- 7- religion7: No religion and others.



From the above categories Christianity and all its forms (*religion1*) is used as the default religion for comparison purposes; hence is dropped from our regression.

*AGE* is one of our main variables. The census files from Statistics Canada contain individuals from all ages. Looking at the labor market dynamics, we restrict our age group in our estimation sample to be between 25 and 59. The quadratic form of the AGE variable,  $(AGE)^2$  is used to capture the effect of an increase in age over time on earnings as suggested by the standard human capital model (Benjamin, Gunderson, Thomas and Craig Riddell, 2007). *YSM* in our analysis shows the effect of each year since migration on the earnings of an immigrant.  $(YSM)^2$  captures the concave quadratic relation of earnings and year since migration (Chiswick, 1978).

*LANGUAGE* shows the ability of the respondent in knowing the official languages and their effect on the earnings; the census files divide this variable into the four categories *English*, *French*, *Both English and French*, and *Neither English nor French*. For the analysis in this paper, we drop English from our regression variables and use it as the default variable for comparison. The rest are divided as follows:

- 1- FrenchOnly: Respondents who speak only French
- 2- BothEnglishFrench: Respondents who speak both English and French
- 3- NeitherEnglishFrench: Respondents who speak neither of the official languages.

*EDUCATION* captures educational attainment of the immigrant. This variable is also divided into the different levels of schooling in the census files. Followings are the education categories: elementary school up to grade 5, elementary school up to grade 8,

grades 9-13, high school graduation certificate, trades certificate or diploma, non-university degree with or without trade certificate, other non-university certificates, university without certificate or diploma, university with other certificate or diplomas, university with bachelor or 1st professional degree, university with certificate or diploma above bachelor, university with masters degree and university with earned doctorate. Based on the similarity, I have combined them in fewer categories, which are as follows:

- 1 - elementary school up to grade 8
- 2 - high school not completed
- 3 - all other non-university certificates and diplomas above high school
- 4- all other university certificates and diplomas below bachelor
- 5 - bachelor and above bachelor degrees
- 6 - masters and doctorates.

In the census files for the year 2006, the first and second categories are combined under elementary school and separate categories for “university below bachelor” and “medicine, dentistry and veterinary” are added. Each of these categories is analyzed separately in comparison with those who have graduated high school; hence high school is dropped from our regression as the default category.

Not only provinces, but also different cities have different opportunities with a direct effect on the levels of earnings of individuals. Metropolitan areas are considered to have more opportunities than rural areas. The census files have identified the following metropolitan areas in the data: *Halifax, Quebec, Montreal, Sherbrooke, Trois-Riviere, Ottawa-Hull, Oshawa, Toronto, Hamilton, St. Catharines, Niagara, Kitchener, London, Windsor, Sudbury, Thunder Bay, Winnipeg, Regina, Saskatoon, Calgary, Edmonton,*

*Vancouver*, and *Victoria*. In order to differentiate between the effects of big, medium and small rural area cities, I have divided these cities into two categories, big cities and medium-size cities. Their effect on earnings is compared with the rural areas or small cities.

1- Big Cities: Montreal, Toronto and Vancouver

2 - Medium Cities: the rest of the cities listed above.

An *INTERACTION* variable is used to quantify the effect of two variables occurring at the same time. In the present analysis, it refers to the interaction of the years-since-migration or YSM variable and the source country dummies for UK or West/Central Asia and the Middle East and will show each of these source region's separate adjustment rates.

In total there are 34 variables in our regression formulation, in which one is the dependent variable and 33 are independent variables.

## **8: Data Sources and Restrictions**

This study uses the Public Use Microdata File (PUMF): Individual File from the Census of Canada to form an Estimation Sample. The PUMF gathers information on the total number of immigrants from all over the world to Canada. This study focuses on the period covered by the census years 1991, 1996, 2001 and 2006. The database includes information on individuals' earnings (wages and salaries), Canadian official languages

proficiency, age, level of education, years of immigration, province of residence, religion and more. I analyze these variables separately to quantify each one's effect on earnings.

The data for analysis is filtered based on the "Place of Birth" variable through which we identify the origin/place of birth of the respondent if immigrant or not, and if the immigrant is from East/Central Asia and the Middle East. Information related to the native language of the immigrants was also part of the database. However, this study uses the Place of Birth category since languages in the selected region are not confined to a particular country or region. For instance, Arabic is a language that is spoken not only in the Middle East but also in some African countries. Therefore, the home language attribution will not be relevant to this study.

As West/Central Asia and the Middle East are culturally different from North America, the primary living unit is the family. Usually the adult male members of the household lead families, and they are mostly the only breadwinners of the unit. Adult females are usually the housekeepers and the service providers in the household. They take care of the children's wellbeing, food, and other chores in the household. Hence, because of their active involvement within the household they are not likely to work in the labor market, which decreases their contribution to the household earnings. For this reason, the empirical analysis of this paper focuses just on male earners. Looking at the labor market dynamics, we also consider the age group for this study between 25 and 59.

We also filter our Estimation Sample on whether a respondent is a full time student or not; respondents who are full time students will not be able to join the labor market full time and their earnings level will be lower which will cause a downward bias in our results. Also, we will exclude respondents who are living in Yukon-Northwest

Territories from our Estimation Sample; this is because the wages in these areas are higher than the rest of the country and living expenses are also very high.

All the earnings are in “log” form and are non-zero positive numbers. Having earnings in logarithmic form can help address possible heteroscedasticity of the regression error term. The distribution of log earnings is also much more a normal or symmetric distribution than the highly skewed distribution of raw earnings levels. Hence, the following restrictions are imposed on our Estimation Sample:

- 1- Estimation Sample will only contain male respondents
- 2- Age group of the respondents should be between 25 and 59
- 3- Respondent shouldn't be a full time student
- 1- Respondent shouldn't be residing in Yukon-Northwest Territories
- 2- Earnings (wages and salaries) should be non-zero positive and not more than 200,000.

## **9: Statistical Analysis of the Data**

The total numbers on stocks of existing immigrants in Canada from West/Central Asia and the Middle East, and their categories according to Census files for years 1991, 1996, 2001 and 2006 in course of 15 years are as follows:

Table 1: Figures on Stock of Existing Immigrants from West/Central Asian and Middle Eastern Population in Canada in Given Years from the Census files

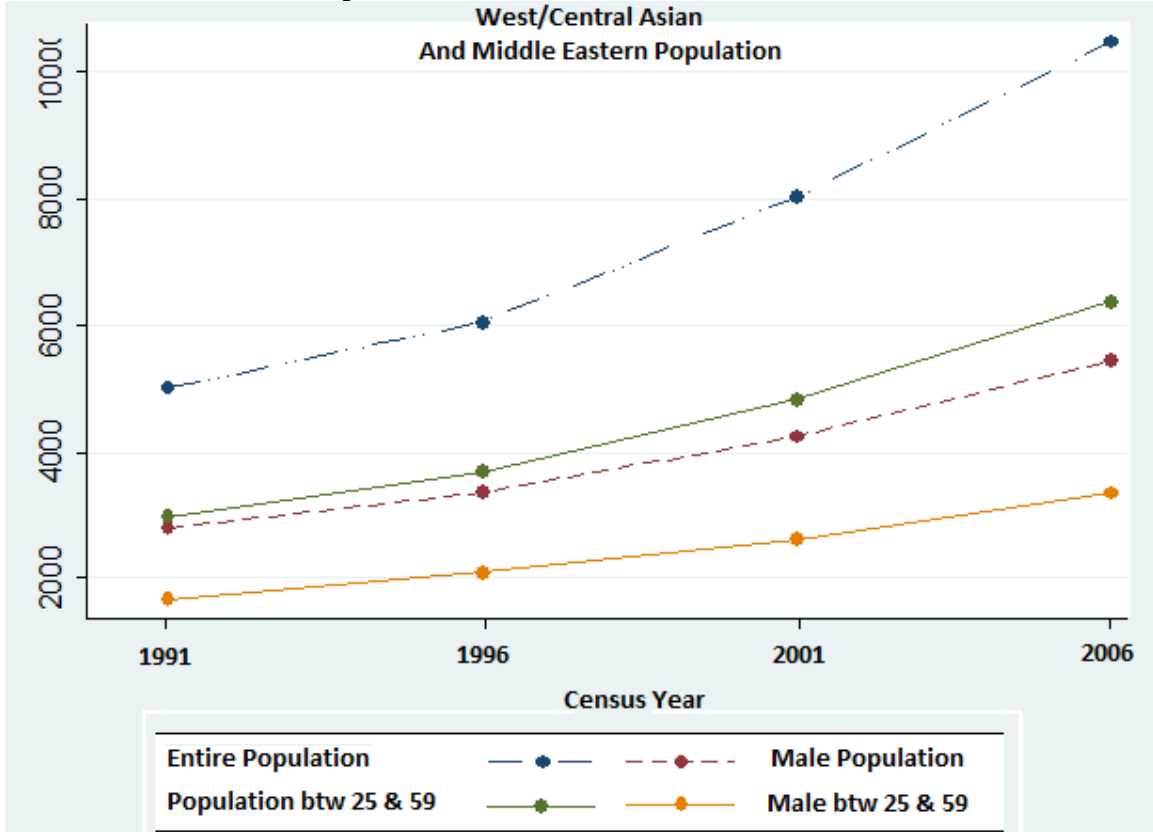
Year	Male and Female Population all ages	Male Population all ages	Male and Female Population between ages 25 - 59	Male Population between ages 25 - 59
1991	5,017	2,781	2,949	1,651
1996	6,064	3,331	3,666	2,080
2001	8,042	4,252	4,848	2,601
2006	10,478	5,448	6,388	3,327

(Source: Statistics Canada, 1991, 1996, 2001, 2006)

Looking at the labor market dynamics, we considered only those who are able to work in the labor market as soon as they immigrate to Canada. Therefore, we limited our observation and included immigrants between the ages 25 to 59.

The increase in the number of male immigrants from the West/Central Asia and the Middle East between the ages of 25 to 59 is comparatively low (see Figure 5). It is 429 persons between the years 1991 and 1996. This is approximately 86 immigrants every year; 521 persons between the years 1996 and 2001. This equals to 104 persons per year; and 726 persons between the years 2001 and 2006, which shows an average of 145 persons per year. These statistics imply that with the passage of time, there has been a substantial increase in male immigrants from this selected region.

Figure 5: Increase in Stock of Existing Immigrants from West/Central Asian and Middle Eastern Population in Canada in Given Years from the Census files



(Source: Statistics Canada, 1991, 1996, 2001, 2006)

### 9.1: Earnings

Table 2 shows the mean earnings of male immigrants as whole, male immigrants from West/Central Asia and the Middle East and from United Kingdom based on the Census files in the give years.

Table 2: Mean Earnings of Immigrant Population, West/Central Asian and Middle Eastern and UK Male Immigrants from Census Canada Files

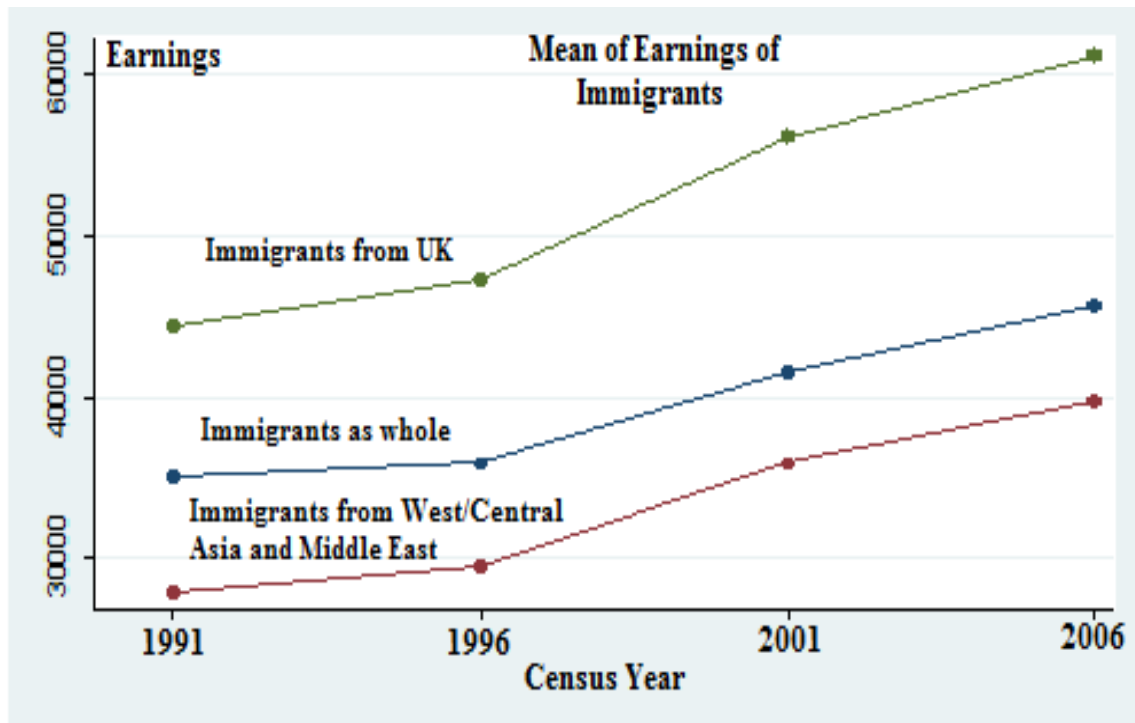
Year	Mean of Earnings of Male Immigrants (in dollars) From		
	Stock of Immigrants' Population	West/Central Asia and the Middle East	United Kingdom
1991	35,089.63	27,906.31	44,551.47
1996	35,935.13	29,519.18	47,383.55
2001	41,676.91	35,928.96	56,188.88
2006	45,828.91	39,838.25	61,201.94

(Source: Statistics Canada, 1991, 1996, 2001, 2006)

West/Central Asia and the Middle East immigrants' earnings is considerably lower than for immigrants as whole. In 1991, the mean of the earnings of the selected immigrants was \$27,906.31, which is slightly increased in 1996 to \$29,519.18. While in 2001, it was \$35,928.96 and 2006 it reached to \$39,838.25. These figures are not only lower than that of our comparison group but also lower than the mean earnings of immigrants as whole (see Figure 6).



Figure 6: Mean Earnings of Immigrant Population, West/Central Asian and Middle Eastern and UK Male Immigrants from Census Canada Files



(Source: Statistics Canada, 1991, 1996, 2001, 2006)

Based on the 1991 Census files, the earnings of 46.98 of percent immigrants from West/Central Asia and the Middle East, was below 20,000 (see Table 3). In the same year 23.16 percent of such immigrants reported their earnings level between 20,000 and 40,000. Furthermore, earnings of 8.09 percent immigrants from the selected region was between 40,000 and 50,000. Only 5.16 percent reported their earnings level between 50,000 to 60,000. While 2.96 percent between 60,000 and 70,000 and 3.84 percent reported an annual earning over 70,000.

Looking at the immigrants from the United Kingdom of the same characteristics based on the Census files of the given year, only 14.23 percent have an earnings of below 20,000. Among them 34.95 percent of immigrants reported an earning between 20,000 and 40,000; 18.53 percent of respondents between 40,000 and 50,000, other 13.15

percent of immigrants from UK reported an earning between 50,000 and 60,000. Only 7.69 percent reported an earning between 60,000 and 70,000 and a number as high as 11.44 percent of the respondent reported an earning over 70,000 (see Table 3).

Table 3: Percentage of Male Immigrants from West/Central Asia and the Middle East and Male Immigrants from UK Falling into Different Categories of Earnings, 1991

Earnings Level (dollars)	Percentage of Male Immigrants from West/Central Asian and the Middle Eastern	Percentage of Male Immigrants from United Kingdom
Below 20,000	46.98	14.23
20,000 – 40,000	23.16	34.95
40,000 – 50,000	8.09	18.53
50,000 – 60,000	5.16	13.15
60,000 – 70,000	2.96	7.69
Over 70,000	3.84	11.44

(Source: Statistics Canada, 1991)

In 1996 as per the census files, there is a very minor change in the distribution of earnings levels. 45.84 percent of respondents from the selected region reported an earnings level below 20,000 (see Table 4). Around 30 percent reported their earnings level between 20,000 and 40,000. Another 8.31 percent were between 40,000 and 50,000. In addition, 5.51 percent reported their earnings level between 50,000 to 60,000. Only 2.98 percent between 60,000 and 70,000 and 7.35 percent reported an earning over 70,000 per year.

While the figures are different for our comparison group, immigrants from the UK, only 17.12 percent of immigrants reported an earning below 20,000. Above them 27.9 percent reported their earnings level between 20,000 and 40,000; around 15.53 percent reported earnings between 40,000 to 50,000. While the percentage of immigrants in higher earnings decrease among West/Central Asians and Middle Eastern immigrants, in case of immigrants from UK the percentage increases. 13.87 percent reported earnings between 50,000 to 60,000; 9.34 between 60,000 to 70,000; and a large number of 16.24 percent reported earnings above 70,000 (see Table 4).

Table 4: Percentage of Male Immigrants from West/Central Asia and the Middle East and Male Immigrants from UK Falling into Different Categories of Earnings, 1996

Earnings Level	Percentage of Male Immigrants from West/Central Asian and the Middle Eastern	Percentage of Male Immigrants from United Kingdom
Below 20,000	45.84	17.12
20,000 – 40,000	30.00	27.9
40,000 – 50,000	8.31	15.53
50,000 – 60,000	5.51	13.87
60,000 – 70,000	2.98	9.34
Over 70,000	7.35	16.24

(Source: Statistics Canada, 1996)

In 2001, 34.06 percent of immigrants from the selected region were below 20,000 while this figure was 12.87 percent for immigrants from UK; 34.87 percent were between

20,000 and 40,000 while 23.35 percent of male immigrants from UK fall in this category (see Table 5). Around 9.23 percent from West/Central Asia and the Middle East and 14.58 percent from UK were between 40,000 and 50,000. Above them, 7.42 percent of immigrants from West/Central Asia and the Middle East reported their earnings levels between 50,000 to 60,000 and 12.87 percent immigrants from UK reported in the same category. 4.67 and 10.56 percents occur between 60,000 and 70,000 respectively, and 9.73 and 25.77 percent reported earnings over 70,000 per year (see Table 5).

Table 5: Percentage of Male Immigrants from West/Central Asia and the Middle East and Male Immigrants from UK Falling into Different Categories of Earnings, 2001

Earnings Level (dollars)	Percentage of Male Immigrants from West/Central Asian and the Eastern	Percentage of Male Immigrants from United Kingdom
Below 20,000	34.06	12.87
20,000 – 40,000	34.87	23.35
40,000 – 50,000	9.23	14.58
50,000 – 60,000	7.42	12.87
60,000 – 70,000	4.67	10.56
Over 70,000	9.73	25.77

(Source: Statistics Canada, 2001)

In 2006, 32.55 percent of earnings from the selected region was less than 20,000 per year and 28.68 percent of such immigrants reported their earnings level between 20,000 and 40,000 (see Table 6). Around 10.76 percent were between 40,000 and 50,000

and 7.35 percent were between 50,000 to 60,000. The remaining 5.68 percent of immigrants had earnings between 60,000 and 70,000 and 14.97 percent reported earnings over 70,000 per year. The percentages are different for male immigrants from the UK. They are, in an increasing order, with 10 percent below 20,000 while 17.69 percent occur between 20,000 and 40,000, and 11.72, 11.81 and 11.81 reported their earnings between 40,000 to 70,000. A huge number of immigrants from UK, i.e., 34.33 percent, reported their earnings above 70,000.

Table 6: Percentage of Male Immigrants from West/Central Asia and the Middle East and Male Immigrants from UK Falling into Different Categories of Earnings, 2006

Earnings Level (dollars)	Percentage of Male Immigrants from West/Central Asian and Middle Eastern	Percentage of Male Immigrants from United Kingdom
Bellow 20,000	32.55	10.00
20,000 – 40,000	28.68	17.69
40,000 – 50,000	10.76	11.72
50,000 – 60,000	7.35	11.81
60,000 – 70,000	5.68	11.81
Over 70,000	14.97	34.33

(Source: Statistics Canada, 2006)

## 9.2: Knowledge of Official Language(s)

Based on the census files in the given years, immigrants from the West/Central Asia and the Middle East region have considerable command over official language(s) in Canada. The census files show that more than half (63.89 percent) of these immigrants possess the required Canadian language skills in 1991 (see Table 7). Around 3.73 percent of them in the same year reported required linguistic skills in French, while 30.52 percent reported having a command over both English and French languages. Only a negligible percentage (1.87) of the respondents reported no skills in either of the official languages.

Table 7: Knowledge of Canada's Official Language(s) in Percentage between Male Immigrants from West/Central Asia and the Middle East

Year	English	French	Both English and French	Neither English nor French
1991	63.89	3.73	30.52	1.87
1996	66.75	2.54	29.22	1.49
2001	68.87	2.37	27.07	1.68
2006	70.19	2.47	26.40	0.94

(Source: Statistics Canada, 1991, 1996, 2001, 2006)

Furthermore, the proportion of these immigrants possessing the required Canadian language(s) skills has been increasing. In the 1996 Census files 66.75 percent of the respondents reported sufficiency in the English language (see Table 7), 2.54 percent reported having French language skills, 29.22 percent reported skills in both languages

and 1.49 percent, which translates to only 17 persons, reported skills in neither of the official languages.

As per Census files in 2001 these numbers increased and 68.87 percent reported skills in the English language (see Table 7), 2.37 percent in French and 27.07 percent reported proficiency in both languages. Only 1.68 percent of immigrants were those with no skills in either of the languages. In 2006, a very sizeable number of 70.19 percent reported proficiency in English (see Table 7), 2.47 percent in French, 26.40 percent in both languages and only 0.94 percent in either of the languages.

### **9.3: Educational Qualifications**

Immigrants from the West/Central Asia and the Middle East, in particular those registered in the 1991 census, had an educational distribution listed in Table 8. Among the immigrants from the region, at the time of immigration, 47.02 percent had some form of university level education. Among them, immigrants with College or University education with or without any certificate, diploma or degree were 13.55 percent, while 12.47 percent of them had bachelor's degrees or first professional degree and diploma beyond a bachelor's, and 12 percent were university educated with master or doctorate degrees.

20.71 percent of the immigrants of the selected region had some sort of non-university formal trade certificate, 8.37 percent were with elementary school certificates up to the grade 8, and 11.12 percent couldn't finish high school. It is also worth mentioning that 12.78 percent of them were high school graduates.

Looking at the immigrants from the same region in following census years, one can see that besides sustaining the educational ability, they have increased their attainment in terms of education. In 1996, the number of immigrants with elementary school attainment was around 6.38 percent, non-high school graduates was 11.02 percent, high school graduates were 12.69 percent, the non-university diploma and certificates holders increased to 21.26 percent and the university degree holders increase to 48.63 percent from 1991 to 1996. Among them 14.43 percent were with college or university certificates or diplomas, 22.75 percent were bachelor or above bachelor degree holders, and 11.46 percent were masters or doctorate degrees holders (see Table 8).

In the same way in 2001, only 15.97 percent of the immigrants had elementary and secondary school education (see Table 8), 11.60 percent had a high school graduation certificate, 20.59 percent had college and trade certificates, while the university education attainment level increased to 51.84 percent, which is approximately half the population. Among them, 14.41 percent had college or university degrees, 26.45 percent had bachelor and above bachelor degrees and certificates, and 10.98 percent had masters or doctorate degrees.

In 2006 (see Table 8), 12.26 percent didn't report any schooling (counted as elementary school) or had an elementary school education, 19.69 percent reported high school graduation, 6.76 percent reported trade certification and diplomas, 14.14 percent reported college or non-university certifications or diplomas, 6.43 percent reported university education below a bachelor, 27.39 percent reported bachelor degrees and above, 1.47 percent held medicine, dentistry or veterinary degrees and 11.85 percent had masters or doctorates.



This shows that, based on the human capital perspective, male immigrants from West/Central Asia and the Middle East are generally well educated.

**Table 8: Educational Attainment of West/Central Asian and Middle Eastern Male Immigrants in Percentage from Census Files in Given Years**

Year	1991	1996	2001	2006
Elementary School	8.37	6.38	5.24	12.26
High School, not Finished	11.12	11.02	10.73	-
High School Graduate	12.78	12.69	11.6	19.69
Non-University Certificates	20.71	21.26	20.59	6.76
University Certificates	13.55	14.43	14.41	6.43
Bachelor Degree	12.47	22.75	26.45	27.39
Masters and Doctorates	12	11.46	10.98	11.85
College, CEGEP	-	-	-	14.14
Medicine, Dentistry, Veterinary Certificates	-	-	-	1.47

(Source: Statistics Canada, 1991, 1996, 2001, 2006)

## 9.4: Age Range

According to the census file for 1991 (see Table 9), out of the 1,016 West/Central Asian and Middle Eastern male immigrants around 79.80 percent were between ages of 25 and 47. The remaining 20.20 percent were between 48 and 59. This number stayed pretty much the same in 1996. In this year 81.63 percent of the immigrants from West/Central Asia and the Middle East were between the ages of 25 to 47, and the remaining 18.37 percent were from 48 to 59. However, this number decreased to 76.04 percent in 2001, and increased to 78.54 percent in 2006. Thus, immigrants from West/Central Asia and the Middle East represent a large proportion of workers ready to take part in labor market and contribute to the Canadian economy.

Table 9: Age Distribution of Male Immigrants from West/Central Asia and the Middle East in Percentage

Year	Male Immigrants Between Ages of 25 - 47	Male Immigrants Between Ages of 47 - 59
1991	79.80	20.20
1996	81.63	18.37
2001	76.04	23.96
2006	78.54	21.46

(Source: Statistics Canada, 1991, 1996, 2001, 2006)

## 10: Regression Analysis

### 10.1: 1991

The 1991 Census Public Use Microdata Files (PUMFs) on Individuals contains data based on a 3% sample of the population enumerated in the census. It provides information on the demographic, social and economic characteristics of the Canadian population. The dataset contains 119 variables and 808,654 observations. After applying the restrictions on our sample, the Estimation Sample used in the present study remains with 161,249 observations. All our results are analyzed at the 1% and 5% significant levels. Our regression results for 1991 indicate that 12.48 percent of the response variable variation ( $R^2$ ) is explained by our model.

For this census year, all 33 variables as described above, are included in the regression equation. These variables are expected to have systematic impacts on earnings levels. The results of the regression (see Table 10) show that, holding all else constant, the relative earnings of an immigrant in Canada who is between the ages of 25 and 59, is 74.56 percentage points lower in the year of arrival than that of a native born worker in the same age range. In the same way, if an immigrant is from West/Central Asia and the Middle East, his earnings will be 34.23 percentage points lower still compared to the native born earnings. While looking at our comparison group, the results show that if an immigrant is from United Kingdom, holding all other factors constant, his earnings will be 80.60 percentage points higher than an immigrant on average and 6.04 percentage points higher in their year of arrival than a native-born worker of similar characteristics. This means that immigrants from United Kingdom on average migrate when they are offered well paid jobs before leaving their home country.

One of the most important variables affecting earnings is the choice of the provinces where one lives. Having Ontario as the default province, holding everything else constant, if a person lives in Newfoundland, Prince Edward Island, New Brunswick or Nova Scotia, his earnings will on average be 25.72 percentage points lower than a person who lives in Ontario. Similarly, living in Quebec means that the earnings of a male worker will be 14.97 percentage points lower, and in Manitoba or Saskatchewan earnings will be 21.36 percentage point lower. Being in Alberta means they will be 6.45 percentage points lower, and if one lives in British Columbia the worker's earnings will be 5.92 percentage points lower than someone who lives in Ontario. These results are all significant at both the 1% and 5% levels.

I also use variables for religion as a control variable in this analysis. Dummies are created for all major religions with Christianity and all its forms/branches used as the default variable for comparison purposes. The results shows that, controlling for all other factors and keeping them constant, if someone is Jewish, his earnings will on average be higher by 1.07 percentage point, but this result is not statistically significant at either the 1% or 5% levels. If a person is Buddhist his earning will on average be 7.5 percentage points lower than a person who is Christian. This result is only significant at the 5% level. In the same way, Hindus have 6.49 percentage points lower earnings, and this result is also only significant at the 5% level. Muslims have 14.29 percentage points lower earnings, Sikhs have 7.13 percentage points lower earnings (which is only significant at 5%), and followers of other religions or no religion have 7.62 percentage point lower earnings comparing to Christians.

Table 10: Regression Results

Variable	1991	1996	2001	2006
Immigrant	-0.746 (44.39)**	-0.871 (50.68)**	-0.774 (46.54)**	-0.889 (36.57)**
W/C Asian and Middle Eastern Immigrants	-0.342 (5.58)**	-0.233 (3.19)**	-0.063 (1.00)	-0.361 (3.76)**
UK Immigrants	0.806 (13.62)**	0.849 (12.30)**	(1.00) (10.91)**	0.873 (7.82)**
Province: Newfoundland, Prince Edward Island, New Brunswick and Nova Scotia	-0.257 (29.50)**	-0.311 (30.33)**	-0.332 (31.73)**	-0.297 (20.02)**
Province: Quebec	-0.150 (16.33)**	-0.181 (16.85)**	-0.183 (17.36)**	-0.186 (12.01)**
Province: Manitoba or Saskatchewan	-0.214 (23.03)**	-0.209 (19.37)**	-0.217 (20.25)**	-0.153 (9.67)**
Province: Alberta	-0.065 (7.96)**	-0.083 (8.90)**	0.006 (0.68)	0.144 (11.42)**
Province: British Columbia	-0.59 (8.06)**	-0.050 (6.12)**	-0.079 (9.67)**	-0.073 (6.25)**
Religion: Jewish	0.011 (0.47)	-	0.019 (0.75)	-
Religion: Buddhist	-0.075 (2.50)*	-	-0.154 (6.01)**	-
Religion: Hindu	-0.065 (2.23)*	-	-0.093 (3.82)**	-
Religion: Islam	-0.143 (5.57)**	-	-0.249 (11.39)**	-
Religion: Sikh	-0.071 (2.39)*	-	-0.047 (1.75)	-
Religion: Others & No Religion	-0.076 (11.98)**	-	-0.071 (10.59)**	-
Age	0.103 (49.76)**	0.125 (50.10)**	0.109 (44.96)**	0.151 (42.46)**
Age Square	-0.001 (43.11)**	-0.001 (43.66)**	-0.001 (40.43)**	-0.002 (41.75)**
Year Since Migration (YSM)	0.047 (27.83)**	0.050 (28.73)**	0.041 (26.03)**	0.055 (23.65)**
YSM Square	-0.001 (18.37)**	-0.001 (18.50)**	-0.001 (16.53)**	-0.001 (17.20)**
Language: French Only	-0.073 (6.64)**	-0.083 (6.38)**	-0.109 (8.45)**	-0.039 (2.08)*
Language: English and French	0.010 (1.26)	0.021 (2.33)*	-0.003 (0.38)	0.011 (0.81)
Language: Neither English nor French	-0.106 (3.52)**	-0.115 (3.47)**	-0.242 (7.09)**	-0.324 (6.68)**

Education: Elementary	-0.408 (41.42)**	-0.373 (29.46)**	-0.344 (24.99)**	-0.218 (18.43)**
Education: Secondary	-0.166 (21.82)**	-0.190 (21.06)**	-0.155 (17.29)**	-
Education: Non-University Certificates and Diplomas	0.065 (9.37)**	0.075 (9.48)**	0.104 (13.42)**	0.127 (11.19)**
Education: College and University	0.118 (12.97)**	0.140 (13.37)**	0.158 (15.60)**	0.226 (20.97)**
University: Bachelor	0.350 (41.41)**	0.383 (40.44)**	0.420 (46.04)**	0.378 (32.69)**
University: Graduate	0.500 (40.56)**	0.550 (40.47)**	0.554 (42.57)**	0.535 (30.29)**
Education: Dentistry, Veterinary	-	-	-	0.007 (0.11)
University Below Bachelor	-	-	-	0.232 (11.94)**
YSM * W/C Asian and Middle East	0.034 (3.72)**	0.011 (1.06)	0.002 (0.31)	0.019 (1.71)
(YSM) <sup>2</sup> * W/C Asian and Middle East	-0.001 (3.29)**	-0.000 (0.94)	-0.000 (0.43)	-0.000 (1.44)
YSM * UK	-0.044 (8.52)**	-0.040 (7.22)**	-0.033 (6.01)**	-0.044 (5.38)**
(YSM) <sup>2</sup> * UK	- 0.001 (6.05)**	0.000 (4.65)**	0.000 (3.74)**	0.001 (4.42)**
Big Cities	0.143 (24.32)**	0.101 (14.86)**	0.127 (18.76)**	0.099 (9.59)**
Medium Size Cities	0.112 (19.78)**	0.081 (12.36)**	0.098 (15.09)**	0.110 (12.04)**
Constant	7.926 (190.62)**	7.443 (147.25)**	7.977 (161.00)**	7.259 (99.54)**
R <sup>2</sup>	0.12	0.12	0.10	0.05
N	161,249	150,933	156,500	145,086

- \* p<0.05;      - \* p<0.05      - \* p<0.05;      - \* p<0.05;  
- \*\* p<0.01      - \*\* p<0.01      - \*\* p<0.01      - \*\* p<0.01

(Source: Statistics Canada, 1991, 1996, 2001, 2006)

Language is one of the main factors in finding a job in the labor market. For this analysis I have used three dummies, where English only is the default language. Keeping all other factors constant, if a person knows only French his earnings will be 7.31 percentage points lower than a person who knows only English. Knowing both English and French increases earnings by 0.97 percentage points but this is not statistically significant at either the 1% or 5% levels. And having no knowledge of either English or French decreases earnings on average by 10.61 percentage points.

Education is another main explanatory variable that is assumed to have a positive impact on earnings levels of the population. Using high school graduation certificate as the default, keeping all other factors constant, having only an elementary school completion certificate will decrease earnings by 40.77 percentage points; if secondary school is not completed earnings will be 16.63 percentage point lower on average than a high school graduate. All other educational attainments higher than a high school graduation certificate are associated with higher levels of earnings. Holding all other factors constant, if one has non-university certificate or diploma including training and vocational studies his earnings will be 6.47 percentage points higher than someone with a high school certificate. Also having a college or university certificate or diploma increases earnings by 11.83 percentage points on average. A bachelor degree and certificate higher than a bachelor increases earnings by 34.99 percentage points and graduate degrees including masters and doctorate increase earnings by 50.04 percentage points.

Not only provinces but also different cities have different opportunities that have a direct effect on the level of earnings of individuals. Living in big cities (Montreal,

Toronto and Vancouver), keeping all other factors constant will increase earnings by 14.28 percentage points, and living in medium sized cities will increase earnings by 11.19 percentage points compared to those who live in very cities or rural areas.

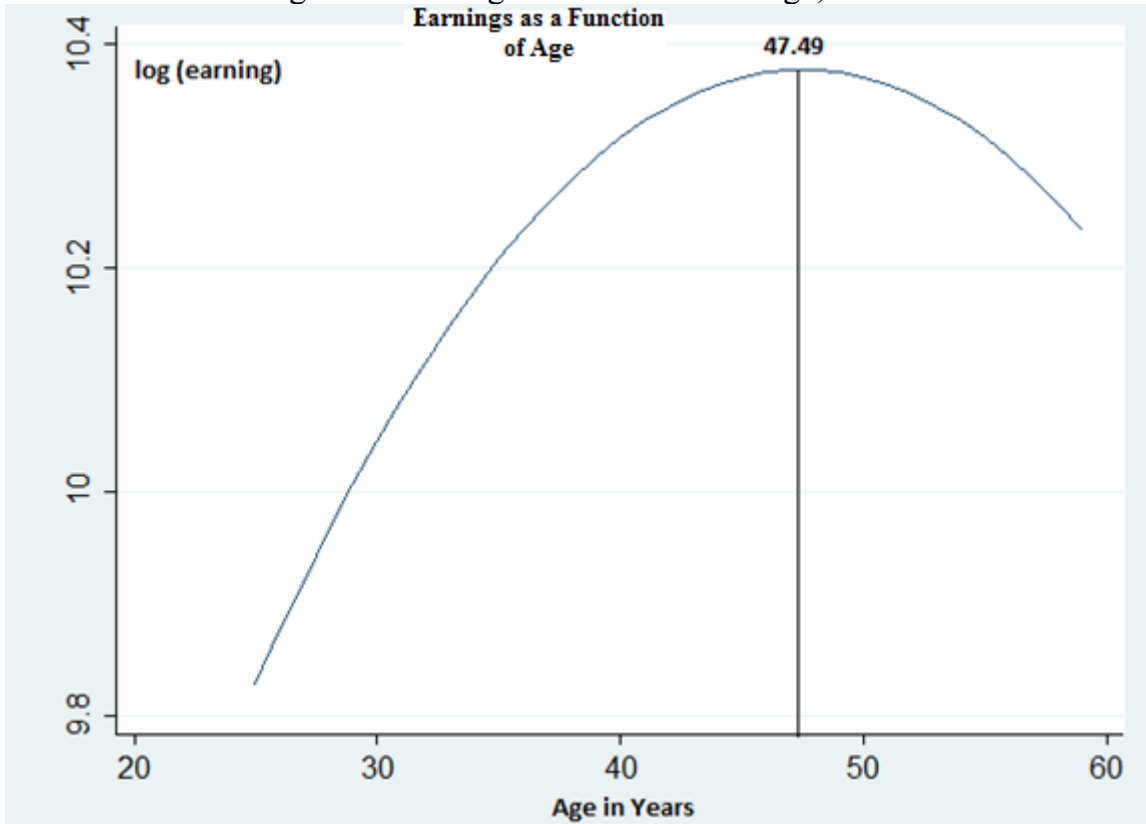
### **10.1.1: AGE**

One of the basic assumptions in the earnings equation is that there exists a non-linear increasing concave relationship between age and earnings. That is, as age increases earnings also increase, but at a slower and slower rate. This effect is captured by a quadratic function of age, which includes both age and age-squared. A positive effect of age and a negative effect of age-squared (as in our regression results) means that as people get older the effect of age is decreased. To add such non-linearity in our regression model, we add a quadratic version of the continuous variable age to the model. Together age and age-square describe a monotonic relationship up until a peak earnings level (see Figure 7).

The coefficient on age squared is clearly statistically significant and indicates that the relationship between age and earning is non-linear. The positive coefficient for age and the negative one for age squared would indicate a monotonic increasing function of wage by age until a turning point is reached, after which point the function starts to decrease.



Figure 7: Earnings as a Function of Age, 1991



(Source: Statistics Canada, 1991)

### 10.1.2: Slope of the Age-Earnings Function

To find the percentage changes in earnings at the different values of age we differentiate our estimated regression equation with respect to the age:

$$\text{Log (earning)} = \beta_0 + \beta_1 \text{ AGE} + \beta_2 (\text{AGE})^2 + \dots +$$

$$\frac{\partial \log(\text{earning})}{\partial \text{AGE}} = \beta_1 + 2 (\beta_2 * \text{AGE})$$

where the coefficient of age  $\hat{\beta}_1 = 0.1032634$  and the coefficient of age-squared  $\hat{\beta}_2 = -0.0010871$ . We can check the changes or slopes at four different values of age; i.e., 25, 35, 45 and 55.

$$\text{At age 25: } (0.1032634 - (2*0.0010871)*(25)) = 0.049$$

$$\text{At age 35: } (0.1032634 - (2*0.0010871)*(35)) = 0.027$$

$$\text{At age 45: } (0.1032634 - (2*0.0010871)*(45)) = 0.0054$$

$$\text{At age 55: } (0.1032634 - (2*0.0010871)*(55)) = - 0.0163$$

This calculation shows that at first the earnings increase rapidly with increase in age, while after some times the rate of change slows down and even goes negative. At the age 25, the rate of change in earning is 4.9 percent; at age 35 this rate decreases to 2.7, at the age of 45 it is 0.54 percent and at the age of 55 the rate of change is -1.63 percent. These results show that the point at which the earnings peaks is somewhere between the ages of 45 to 55.

### 10.1.3: Age of Peak Earnings

To find the age at which the earnings peaks, we solve the above equation for age by taking its derivative with respect to age and setting it equal to zero:

$$\text{Log (earning)} = \beta_0 + \beta_1 \text{ AGEP} + \beta_2 (\text{AGEP})^2 + \dots +$$

$$\frac{\partial \log(\text{earning})}{\partial \text{AGEP}} = \beta_1 + 2 (\beta_2 * \text{AGEP}) = 0$$

$$\text{AGEP} = - \beta_1 / 2\beta_2$$

as  $\hat{\beta}_1 = 0.1032634$  and  $\hat{\beta}_2 = - 0.0010871$ , substituting them in above we get,

$$\text{AGEP} = - 0.1032634 / 2*(-0.0010871)$$

$$\text{AGEP} = 47.49$$

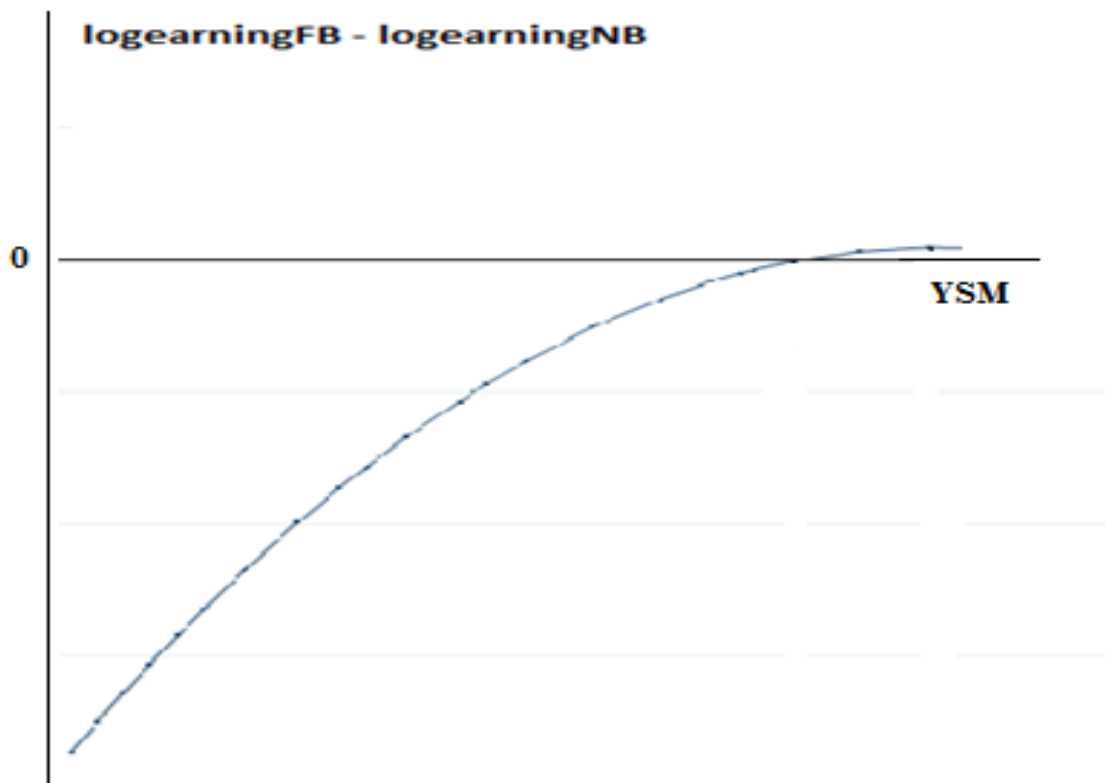
This means a man's earnings peaks on average at the age of 47.5 and declines afterward (see Figure 7).

### 10.1.4: Years Since Migration

Years since migration also appears in the regression equation as a quadratic variable. Years since migration show the degree to which the earnings gap between immigrants and native-born typically narrows over time (Chiswick, 1978). To find the effect of years since migration on earnings, we subtract the log of earnings of native born from that of the immigrants, and then graph this difference or percentage gap against YSM (see Figure 8). All the terms in subtraction will cancel out and only following equation will remain:

$$\log(\text{earning}_{FB}) - \log(\text{earning}_{NB}) = \beta_1 \text{IMMIGRANT} + \beta_2 \text{YSM} + \beta_3 (\text{YSM})^2$$

Figure 8: Earnings as a Function of years since migration, 1991



(Source: Statistics Canada, 1991)

### 10.1.5: Slope of the YSM-Earning Function

The rate of change in the earnings gap after each year of immigration calculation is as follows:

$$\text{Log (earnings-FB)} - \text{Log (earnings-NB)} = \text{GAP}$$

$$\text{GAP} = \beta_1 \text{ IMMIGRANT} + \beta_2 \text{ YSM} + \beta_3 (\text{YSM})^2$$

$$\frac{\partial \text{GAP}}{\partial \text{YSM}} = \beta_2 + 2 (\beta_3 * \text{YSM})$$

where  $\hat{\beta}_2 = 0.0473229$  and  $\hat{\beta}_3 = -0.0007304$ . We check the slope at 4 different values of YSM; that is at 1, 10, 20, and 30.

$$\text{At YSM}=1: 0.0473229 - 2 (0.0007304) (1) = 0.0459$$

$$\text{At YSM}=10: 0.0473229 - 2 (0.0007304) (10) = 0.0327$$

$$\text{At YSM}=20: 0.0473229 - 2 (0.0007304) (20) = 0.0181$$

$$\text{At YSM}=30: 0.0473229 - 2 (0.0007304) (30) = 0.0035$$

The decreasing result implies that the YSM effect has the same pattern as that of age; the gap narrows but at a slower and slower rate.

### 10.1.6: Catch up Time for Immigrants as a Whole

Catch up of immigrant earnings to that of Canadian-born workers occurs when the ordinate of the YSM curve becomes zero. To find out the catch up time, we use the following equation:

$$\text{GAP} = \beta_1 (\text{YSM})^2 + \beta_2 \text{ YSM} + \beta_3 \text{ IMMIGRANT} = 0$$

where  $\hat{\beta}_1 = -0.0007304$ ,  $\hat{\beta}_2 = 0.0473229$  and  $\hat{\beta}_3 = -0.7456904$ . To solve this equation we use the quadratic solution formula and find the catch up year:

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

where  $a = \beta_1$ ,  $b = \beta_2$  and  $c = \beta_3$

$$-0.0007304 * (YSM)^2 + 0.0473229 * YSM - 0.7456014$$

$$\frac{-0.0473229 \pm \sqrt{(0.0473229)^2 - 4(-0.7456014)(-0.0007304)}}{2(-0.0007304)}$$

$$\frac{-0.0473229 \pm \sqrt{0.00223946 - 0.00217835}}{-0.0014608}$$

$$\frac{-0.0473229 \pm \sqrt{0.00006111}}{-0.0014608}$$

$$\frac{-0.0473229 \pm 0.00781729}{-0.0014608}$$

***YSM = 27.04*** (minimum value of the solutions)

This is the solution value that is relevant because it is the minimum amount of time taken by an immigrant on average to catch up to the earnings of a Canadian-born worker.

### **10.1.7: Catch up Time for West/Central Asian and Middle Eastern Immigrants**

To check the catch up time for immigrants from West/Central Asia and the Middle East, we use the interaction variables in the regression. Using quadratic formula we do the following calculations:

$$\beta_1 \text{ IMMIGRANT} + \beta_2 \text{ WCAandME} + \beta_3 \text{ YSM} + \beta_4 (\text{YSM})^2 + \beta_5 \text{ Interact1} + \beta_6$$

$$\text{Interact2} = 0$$

where  $\text{Interact1} = \text{YSM} * \text{WCAandME}$  and  $\text{Interact2} = (\text{YSM})^2 * \text{WCAandME}$ .

Taking the similar terms common, we get:

$$(\beta_1 + \beta_2) + (\beta_3 + \beta_5) \text{YSM} + (\beta_4 + \beta_6) (\text{YSM})^2 = 0.$$

Re-organizing the above equation:

$$(\beta_4 + \beta_6) (\text{YSM})^2 + (\beta_3 + \beta_5) \text{YSM} + (\beta_1 + \beta_2) = 0.$$

We have  $\hat{\beta}_1 = -0.7456904$ ,  $\hat{\beta}_2 = -0.3423649$ ,  $\hat{\beta}_3 = 0.0473229$ ,  $\hat{\beta}_4 = -0.0007304$ ,  $\hat{\beta}_5 = 0.0342815$  and  $\hat{\beta}_6 = -0.00091$ .

To solve this equation we use the quadratic formula and find the number of years needed for an immigrant from West/Central Asia and the Middle East to catch up with the earnings of a native born male worker:

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

we also have,

$$a = (\hat{\beta}_4 + \hat{\beta}_6) = (-0.0007304 - 0.00091) = -0.0016404,$$

$$b = (\hat{\beta}_3 + \hat{\beta}_5) = (0.0473229 + 0.0342815) = 0.0816044, \text{ and}$$

$$c = (\hat{\beta}_1 + \hat{\beta}_2) = (-0.7456904 - 0.3423649) = -1.0880553.$$

Hence,

$$-0.0016404 * (\text{YSM})^2 + 0.0816044 * \text{YSM} - 1.0880553$$

$$\frac{-0.0816044 \pm \sqrt{(0.0816044)^2 - 4(-0.0016404)(-1.0880553)}}{2(-0.0016404)}$$

$$\frac{-0.0816044 \pm \sqrt{0.00665928 - 0.00713938}}{-0.0032808}$$

$$\frac{-0.0816044 \pm \sqrt{-0.0004801}}{-0.0032808}$$

The negative square root or imaginary value implies that there are no real valued solutions for the equation. For our results, this means that immigrants from West/Central Asia and the Middle East will not catch up in terms of earnings to those of native born in their lifetime. It is possible that people who immigrate under these circumstances are hoping for a better life for their next generation.

### 10.1.8: UK Immigrants' Catch up Time

To check the catch up time for immigrants from United Kingdom, we use the third and fourth interaction terms. Same as that of immigrants from West/Central Asia and the Middle East, we use the quadratic formula to find the solutions and do following calculations:

$$\beta_1 \text{ IMMIGRANT} + \beta_2 \text{ UKIMMI} + \beta_3 \text{ YSM} + \beta_4 (\text{YSM})^2 + \beta_5 \text{ Interact3} + \beta_6 \text{ Interact4} = 0$$

where  $\text{Interact3} = \text{YSM} * \text{UKIMMI}$  and  $\text{Interact4} = \text{YSMSQUARE} * \text{UKIMMI}$ .

We have  $\hat{\beta}_1 = -0.7456904$ ,  $\hat{\beta}_2 = 0.8060794$ ,  $\hat{\beta}_3 = 0.0473229$ ,  $\hat{\beta}_4 = -0.0007304$ ,  $\hat{\beta}_5 = 0.0443535$  and  $\hat{\beta}_6 = 0.0006487$ . Taking the similar terms common, we get:

$$(\beta_4 + \beta_6) (\text{YSM})^2 + (\beta_3 + \beta_5) \text{ YSM} + (\beta_1 + \beta_2) = 0.$$

Using quadratic formula and find the number of years needed for an immigrant from the UK to catch up with the earnings of a native born male worker:

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

we also have,

$$a = (\hat{\beta}_4 + \hat{\beta}_6) = (-0.0007304 + 0.0006487) = -0.0000817,$$

$$b = (\hat{\beta}_3 + \hat{\beta}_5) = (0.0473229 + 0.0443535) = 0.0916764, \text{ and}$$

$$c = (\hat{\beta}_1 + \hat{\beta}_2) = (-0.7456904 + 0.8060794) = 0.060389.$$

Hence,

$$-0.0000817 * (YSM)^2 + 0.0916764 * YSM + 0.060389$$

$$\frac{-0.0916764 \pm \sqrt{(0.0916764)^2 - 4(-0.0000817)(0.060389)}}{2(-0.0000817)}$$

$$\frac{-0.0916764 \pm 0.09178397}{-0.0001634}$$

$$YSM = -0.6583231$$

This value is in line with the regression analysis, which indicated that an immigrant from the UK at the year of arrival has 6.04 percentage points higher earnings than a native-born worker of similar characteristics.



## 10.2: 1996

The 1996 Census Public Use Microdata Files (PUMFs) on Individuals contains samples of responses to the census questionnaire and is based on a 2.8% sample of the actual population of the census. It provides information on the demographic, social and economic characteristics of the Canadian population. The dataset contains 122 variables and 792,448 observations. For the study purposes in this paper, the Estimation Sample is formed with the same restrictions mentioned above which decreases the number to 150,933 observations. All our results are analyzed at the 1% and 5% significance levels. Our regression results indicate that 11.75 percent of variation in the response variable ( $R^2$ ) is explained by our model. Again, the regression results are provided in Table 10.

The census file for the year 1991 does not contain the variable on religion in its questionnaire. With the exclusion of variables on religion, our model contains 28 variables for analysis. Holding all other factors constant, the earnings of an immigrant in Canada who is between the ages of 25 and 59, is estimated to be 87.1 percentage points lower in their year of arrival than that of a native born in the same age range. If the immigrant was born in West/Central Asia and the Middle East, his earnings will be 23.3 percentage points lower still, and if an immigrant is from the English speaking United Kingdom, his earnings will be 84.9 percentage points higher than for immigrants as a whole or 2.2 percent lower than for Canadian-born workers.

The choice of provinces of residence could affect average level of earnings. Having Ontario as the default province, holding everything else constant, if a person lives in Newfoundland, Prince Edward Island, New Brunswick or Nova Scotia, his earnings

will be 31.1 percentage points lower on average; in Quebec earnings is 18.1 percentage points lower; in Manitoba or Saskatchewan it is 20.9 percentage points lower, in Alberta it is 8.3 percentage points lower; and choosing to live in British Columbia ones earning is 5 percentage points lower than someone who lives in Ontario on average. These results are all significant at both 1% and 5% levels.

Comparing to English speakers, keeping all other factors fixed, the earnings of a person who knows only French is 8.3 percentage points lower, and knowing neither English nor French lowers earning by 11.5 percentage points. The results of the regression show that if a person knows both English and French his earnings will on average be increased by 2.1 percentage points. It is obvious that knowing official languages has a positive impact on the workers' earnings levels.

Higher education is usually well valued in the labor market. For our analysis, using high school graduation certificate as the default education category, keeping all other factors constant, having only elementary school education or if secondary school is not completed, the earning will be 37.3 percentage and 19 percentage points lower, respectively. All education higher than our default category has a positive impact on the earnings level. Having a non-university certificate increases earnings levels by 7.5 percentage points, college and university degrees increase earnings by 14 percentage points, holding a bachelor degree by 38.8 percentage points, and a graduate degree increases earnings by 55 percentage points.

Most of the immigrants are living in big cities, which are assumed to have better labor market opportunities than medium or smaller sized cities. Our analysis is supportive of this assumption. Living in big cities (Montreal, Toronto and Vancouver), keeping all

other factors constant, earnings will be increased on average by 10.1 percentage points, and living in medium sized cities earnings is increased by 8.1 percentage points comparing to those who live in very small cities or rural areas.

### **10.2.1: AGE**

Age and earnings have a strong non-linear relation (see Figure 9). With an increase in age earnings increases at a slower and slower rate up to a certain point after which it begins to decline. The non-linear relation between age and earnings is captured by a quadratic function of age, which is age-squared. A positive coefficient on age and a negative coefficient on age-squared describes a monotonic relationship with a maximum value.

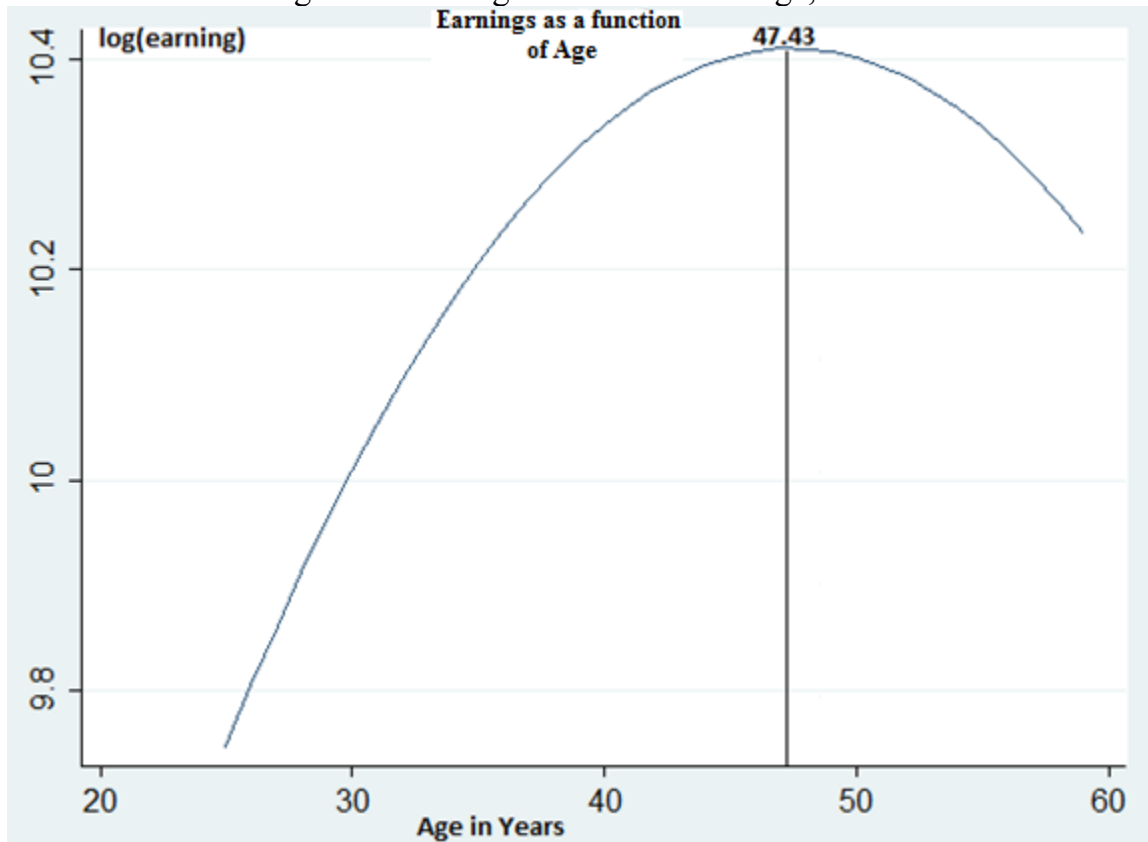
### **10.2.2: Slope of the Age-Earnings Function**

To find the percentage changes in earnings at the different years of age we differentiate our model with respect to the age:

$$\text{Log (earning)} = \beta_0 + \beta_1 \text{ AGEP} + \beta_2 (\text{AGEP})^2 + \dots +$$

$$\frac{\partial \log(\text{earning})}{\partial \text{AGEP}} = \beta_1 + 2 (\beta_2 * \text{AGEP})$$

Figure 9: Earning as a Function of Age, 1996



(Source: Statistics Canada, 1991)

where the coefficient of age  $\hat{\beta}_1 = 0.125118$  and the coefficient of age-squared  $\hat{\beta}_2 = -0.001319$  We can check the changes at four different years of age 25, 35, 45 and 55:

$$\text{At age 25: } (0.125118 - (2 \cdot 0.001319) \cdot (25)) = 0.059$$

$$\text{At age 35: } (0.125118 - (2 \cdot 0.001319) \cdot (35)) = 0.032$$

$$\text{At age 45: } (0.125118 - (2 \cdot 0.001319) \cdot (45)) = 0.006$$

$$\text{At age 55: } (0.125118 - (2 \cdot 0.001319) \cdot (55)) = -0.0199$$

Based on the results it can be concluded that at the beginning earnings rapidly increase due to the increase in age, though after some times the rate of change slows down and at some point it even goes negative. At the age 25, 35, 45 and 55 the rate of change in earning is 5.9, 3.2, 0.6, and -1.99 percent, respectively. On the basis of the above results we can assume that the peak point of earning is somewhere between the ages of 45 to 55.

### 10.2.3: Age of Peak Earnings

To find the age at which the earnings peaks, we solve the above equation for the value of age by taking its derivative and setting it equal to zero.

$$\text{Log (earning)} = \beta_0 + \beta_1 \text{ AGEP} + \beta_2 (\text{AGEP})^2 + \dots +$$

$$\frac{\partial \log(\text{earning})}{\partial \text{AGEP}} = \beta_1 + 2 (\beta_2 * \text{AGEP}) = 0$$

$$\text{AGEP} = - \beta_1 / 2\beta_2$$

As  $\hat{\beta}_1 = 0.125118$  and  $\hat{\beta}_2 = - 0.001319$ , substituting them in above we get,

$$\text{AGEP} = - 0.125118 / 2*(- 0.001319)$$

$$\text{AGEP} = 47.43.$$

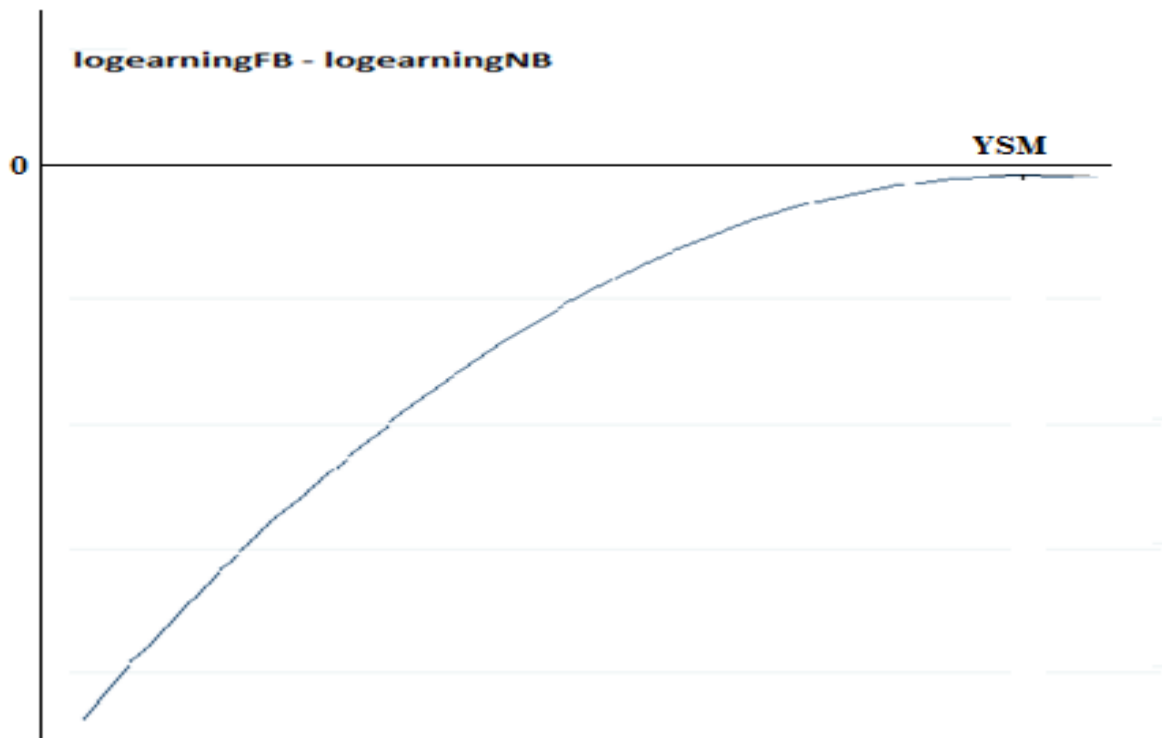
The age at which the earnings of a male worker peaks is 47.43 years (see Figure 9).

### 10.2.4: Years Since Migration

Years since migration appears as a quadratic variable, which is used for finding out the effect of each year of immigration if any, and the number of years after immigration that an immigrant needs in order to get his earnings to the level of those who are native born. To find the effect of years since migration on earning, we subtract the log of earning of native born from that of the immigrants. All other terms cancel out and only followings will remain:

$$\log(\text{earning}_{FB}) - \log(\text{earning}_{NB}) = \beta_1 \text{IMMIGRAN} + \beta_2 \text{YSM} + \beta_3 (\text{YSM})^2$$

Figure 10: Earnings as a Function of YSM, 1996



(Source: Statistics Canada, 1996)

### 10.2.5: Slope of the YSM-Earning Function

The rate of change in earnings after each year of immigration declines. The decreasing result implies that the YSM effect has the same pattern as that of age; the gap narrows but at a slower and slower rate. The results show that the rate of change of earnings after the first year of immigration is 4.9 percent, while this rate slows down gradually. At the 10<sup>th</sup> year of immigration the rate of change in earnings of an immigrant is 3.6 percent, at the 20<sup>th</sup> years of immigration the rate of change is 2.1 percent, and at the 30<sup>th</sup> year this rate decreases to 0.67 percent.

### 10.2.6: Catch up Time for Immigrants as a Whole

Catch up occurs when the ordinate of the YSM curve becomes zero (i.e., the earning gap between immigrants and Canadian-born workers disappears). Using the quadratic formula we try to find the solution that represents catch up time:

$$\beta_1 (\text{YSM})^2 + \beta_2 \text{YSM} + \beta_3 \text{IMMIGRANT} = 0$$

where  $\hat{\beta}_1 = -0.0007254$ ,  $\hat{\beta}_2 = 0.0502215$  and  $\hat{\beta}_3 = -0.8710303$

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$-0.8710303 + 0.0502215 * \text{YSM} - 0.007254 * (\text{YSM})^2$$

$$\frac{-0.0502215 \pm \sqrt{(0.0502215)^2 - 4(-0.8710303)(-0.007254)}}{2(-0.0007254)}$$

$$\frac{-0.0502215 \pm \sqrt{0.002522195 - 0.025273815}}{0.0014508}$$

$$\frac{-0.0502215 \pm \sqrt{-0.02275162}}{0.0014508}$$

The result yields an imaginary number, which means no real-valued solution exists. i.e., immigrants' earnings never catch up to that of Canadian- born, as shown in the Figure 10 (within their working lifetime).

### 10.2.7: Catch up Time for West/Central Asian and Middle Eastern Immigrants

Using the interaction terms we can find out the catch up time of immigrants from West/Central Asia and the Middle East. Using the quadratic formula we yield following results:

$$\beta_1 \text{ IMMIGRANT} + \beta_2 \text{ WCAandME} + \beta_3 \text{ YSM} + \beta_4 (\text{YSM})^2 + \beta_5 \text{ Interact1} + \beta_6$$

$$\text{Interact2} = 0$$

where Interact1 = YSM\*WCAandME and Interact2 = (YSM)<sup>2</sup>\*WCAandME.

Taking the similar terms common, we get:

$$(\beta_1 + \beta_2) + (\beta_3 + \beta_5) \text{ YSM} + (\beta_4 + \beta_6) (\text{YSM})^2 = 0$$

re-organizing the above equation:

$$(\beta_4 + \beta_6) (\text{YSM})^2 + (\beta_3 + \beta_5) \text{ YSM} + (\beta_1 + \beta_2) = 0$$

we have  $\hat{\beta}_1 = -0.8710303$ ,  $\hat{\beta}_2 = -0.2334651$ ,  $\hat{\beta}_3 = 0.0502215$ ,  $\hat{\beta}_4 = -0.0007254$ ,  $\hat{\beta}_5 = 0.0108841$ , and  $\hat{\beta}_6 = -0.000264$ .

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$



we also have,

$$a = (\hat{\beta}_4 + \hat{\beta}_6) = (-0.0007254 - 0.000264) = -0.0009894 ,$$

$$b = (\hat{\beta}_3 + \hat{\beta}_5) = (0.0502215 + 0.0108841) = 0.0611056 , \text{ and}$$

$$c = (\hat{\beta}_1 + \hat{\beta}_2) = (-0.8710303 - 0.2334651) = -1.1044954.$$

Hence,

$$\begin{aligned} & -0.0009894 * (YSM)^2 + 0.0611056 * YSM - 1.1044954 \\ & \frac{-(0.0611056) \pm \sqrt{(0.0611056)^2 - 4(-0.0009894)(-1.1044954)}}{2(-0.0009894)} \\ & \frac{-0.0611056 \pm \sqrt{0.00373389 - 0.0043712}}{-0.0019788} \\ & \frac{-0.0611056 \pm \sqrt{-0.0006373}}{-0.0019788} \end{aligned}$$

The negative square root value implies that there are no real valued solutions for the equation and that immigrants from West/Central Asia and the Middle East will not catch up in terms of earnings to those of native born in their working lifetime.

### 10.2.8: UK Immigrants' Catch up Time

To check the catch up time for immigrants from United Kingdom, we use the third and fourth interaction terms. Using quadratic formula we do following calculations:

$$\begin{aligned} & \beta_1 \text{ IMMIGRANT} + \beta_2 \text{ UKIMMI} + \beta_3 \text{ YSM} + \beta_4 (\text{YSM})^2 + \beta_5 \text{ Interact3} + \beta_6 \text{ Interact4} \\ & = 0 \end{aligned}$$

where Interact3=YSM\*UKIMMI and Interact4=YSMSQUARE\*UKIMMI.

we have  $\hat{\beta}_1 = -0.8710303$ ,  $\hat{\beta}_2 = 0.849391$ ,  $\hat{\beta}_3 = 0.0502215$ ,  $\hat{\beta}_4 = -0.0007254$ ,  $\hat{\beta}_5 = -0.397345$ , and  $\hat{\beta}_6 = 0.0004837$ .

Using the quadratic solution formula we find the number of years needed for an immigrant from UK to catch up with the earnings of a native born male worker:

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

We also have,

$$a = (\hat{\beta}_4 + \hat{\beta}_6) = (-0.0007254 + 0.0004837) = -0.0002417,$$

$$b = (\hat{\beta}_3 + \hat{\beta}_5) = (0.0502215 - 0.397345) = -0.3471235, \text{ and}$$

$$c = (\hat{\beta}_1 + \hat{\beta}_2) = (-0.8710303 + 0.849391) = -0.0216393.$$

Hence,

$$-0.0002417 * (\text{YSM})^2 - 0.3471235 * \text{YSM} - 0.0216393$$

$$\frac{-(-0.3471235) \pm \sqrt{(-0.3471235)^2 - 4(-0.0002417)(-0.0216393)}}{2(-0.0002417)}$$

$$\frac{0.3471235 \pm \sqrt{0.120473803}}{-0.0004834}$$

$$\frac{0.3471235 \pm 0.347093364}{-0.0004834}$$

$$\text{YSM} = -0.062341746$$

This is again consistent with the earnings of UK immigrants actually being above that of Canadian-born workers on average.

### **10.3: 2001**

The 2001 Census Public Use Microdata Files (PUMFs) on Individuals is based on 2.7% data from Census Canada. It provides information on the demographic, social and economic characteristics of the Canadian population. The dataset contains 140 variables and 801,055 observations. After applying the same restrictions mentioned above on our sample, the Estimation Sample remains with 156,500 observations. All our results are analyzed at 1% and 5% significance levels. The regression results indicate that 10.44 percent of variation in the response variable ( $R^2$ ) is explained by our model. The regression results are provided in Table 10.

For this year, including the dependent variable, there are 34 variables in the regression equation. Holding all other factors constant, the relative earnings of an immigrant in Canada who is between the ages of 25 and 59, is estimated to be 77.4 percentage points lower in their year of arrival than a native born male worker of the same characteristics. A West/Central Asian and Middle Eastern immigrant's earning falls 6.3 percentage points lower still than the native born, but this result is not significant at either 5% or 1% levels. On the other hand an immigrant from the United Kingdom, has 80.8 percentage points higher earnings than for immigrants as whole and 3.4 percent higher than a Canadian born male worker.

If a respondent lives in Newfoundland, Prince Edward Island, New Brunswick or Nova Scotia, the earnings levels will on average be 33.2 percentage points lower, in Quebec 18.3 percentage points lower, in Manitoba or Saskatchewan it is 21.7 percentage

points lower, and in British Columbia one's earning is 7.9 percentage points lower than someone who lives in Ontario. In Alberta the earnings is 0.6 percentage points higher than in Ontario, but this result is not significant at either the 5% or 1% levels.

Looking at the effect of religion on earnings, using Christianity and all its forms as the default for comparison, keeping all other factors constant, if someone is Jewish, his earnings will be increased by 0.19 percentage points on average, but this result is not statistically significant at either the 1% or 5% levels. If a labor market male worker is Buddhist his earnings will be 15.4 percentage points lower than a person who is Christian. In the same way Hindus have 0.93 percentage points lower earnings, Muslims have 24.9 percentage points lower and the earnings of Sikhs is 4.7 percentage points lower (which is not significant), and followers of other religions or no religion have 7.1 percentage points lower earnings on average compared to the Christians.

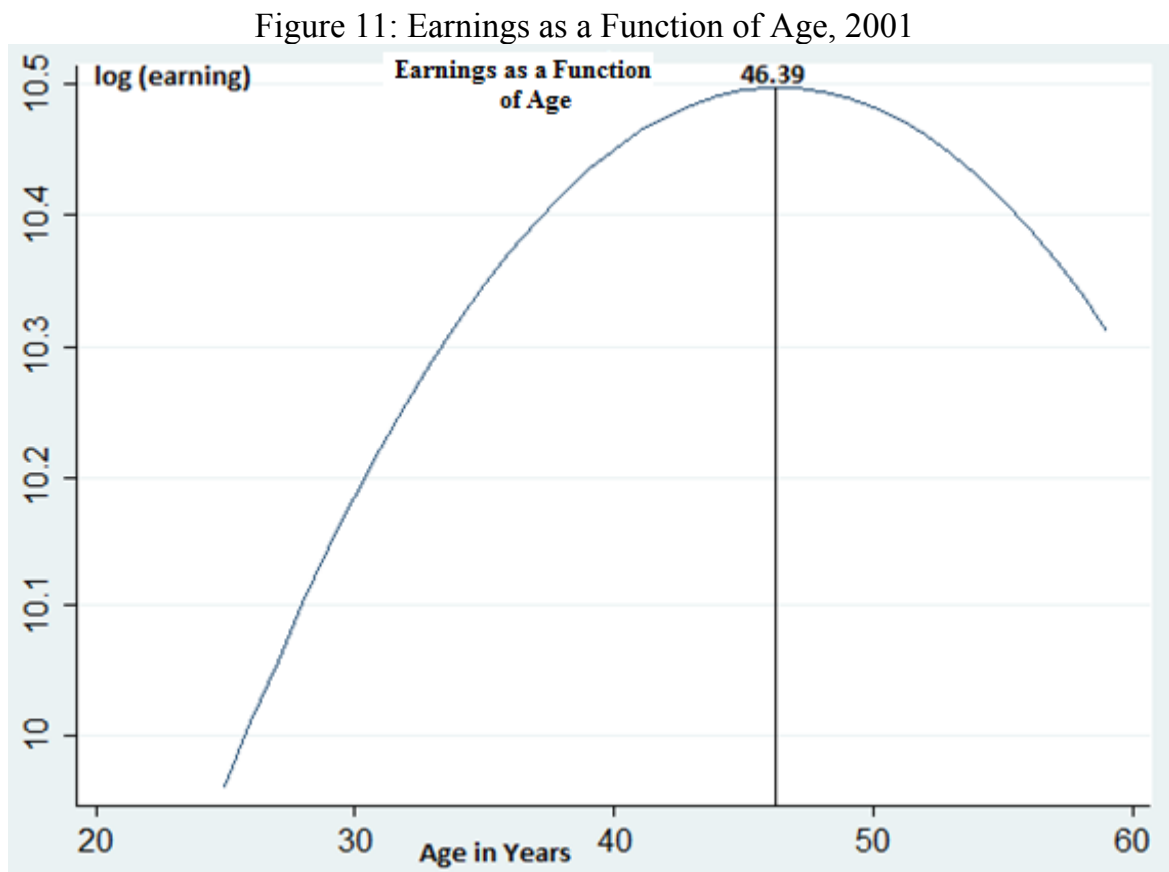
Compared to the English speakers, keeping all other factors fixed, the earnings of a person who knows only French is 10.9 percentage points lower, knowing English and French decreases earnings by 0.3 percentage points (which is not significant at either the 5% or 1% levels). The results of the regression show that if a person knows neither English nor French, his earnings will be decreased by 24.2 percentage points on average compared to the English speaking male worker.

For our analysis using high school graduation certificate as the default, keeping all other factors constant, having only elementary and secondary school education will decrease earnings by 34.4 and 15.5 percentage points, respectively. Having a non-university certificate or diploma, college or university degree, bachelor and graduate degrees will increase the earnings by 10.4, 15.8, 42.2 and 55.4 percentage points on

average, respectively. Bigger cities have better labor market opportunities than small or medium sized cities. Using small cities and rural areas as the default variable for comparison, living in a big city increases one's earnings by 12.7 percentage points, while medium cities will increase earnings by 9.8 percentage points on average compared to the small cities and rural areas.

### 10.3.1: AGE

Age and earning have non-linear relation. A positive effect of age and a negative effect of age-squared describes a monotonic relationship with one inflection point.



(Source: Statistics Canada, 2001)

### 10.3.2: Slope of Age-Earning Function

To find the percentage changes in earnings at the different stages of age we differentiate our model with respect to the age.

$$\text{Log (earning)} = \beta_0 + \beta_1 \text{ AGE} + \beta_2 (\text{AGE})^2 + \dots +$$

$$\frac{\partial \log(\text{earning})}{\partial \text{AGE}} = \beta_1 + 2 (\beta_2 * \text{AGE})$$

where the coefficient of age  $\hat{\beta}_1 = 0.108727$  and the coefficient of age-squared  $\hat{\beta}_2 = -0.001172$ . We can check the changes at four different stages of age 25, 35, 45 and 55:

$$\text{At age 25: } (0.108727 - (2*0.001172)*(25)) = 0.05$$

$$\text{At age 35: } (0.108727 - (2*0.001172)*(35)) = 0.03$$

$$\text{At age 45: } (0.108727 - (2*0.001172)*(45)) = 0.003$$

$$\text{At age 55: } (0.108727 - (2*0.001172)*(55)) = -0.02$$

From the above results it can be seen that at the beginning earnings rapidly increase due to the increase in age, though after some times the rate of change slows down and at some point it even goes negative. At the ages 25, 35, 45 and 55 the rate of change in earnings is 5, 3, 0.3, and -2 percent, respectively. On the basis of the above results we can assume that the peak point of earnings is somewhere between the ages of 45 to 55.

### 10.3.3: Age of Peak Earnings

To find the age at which the earning peaks, we find the value of age from the above equation by taking its derivative and setting it equal to zero:

$$\text{Log (earning)} = \beta_0 + \beta_1 \text{ AGEP} + \beta_2 (\text{AGEP})^2 + \dots +$$

$$\frac{\partial \log(\text{earning})}{\partial \text{AGEP}} = \beta_1 + 2 (\beta_2 * \text{AGEP}) = 0$$

$$\text{AGEP} = \beta_1 / 2\beta_2$$

As  $\hat{\beta}_1 = 0.108727$  and  $\hat{\beta}_2 = -0.001$ , substituting them in above we get,

$$\text{AGEP} = 0.108727 / 2 * (-0.001)$$

$$\text{AGEP} = 46.39$$

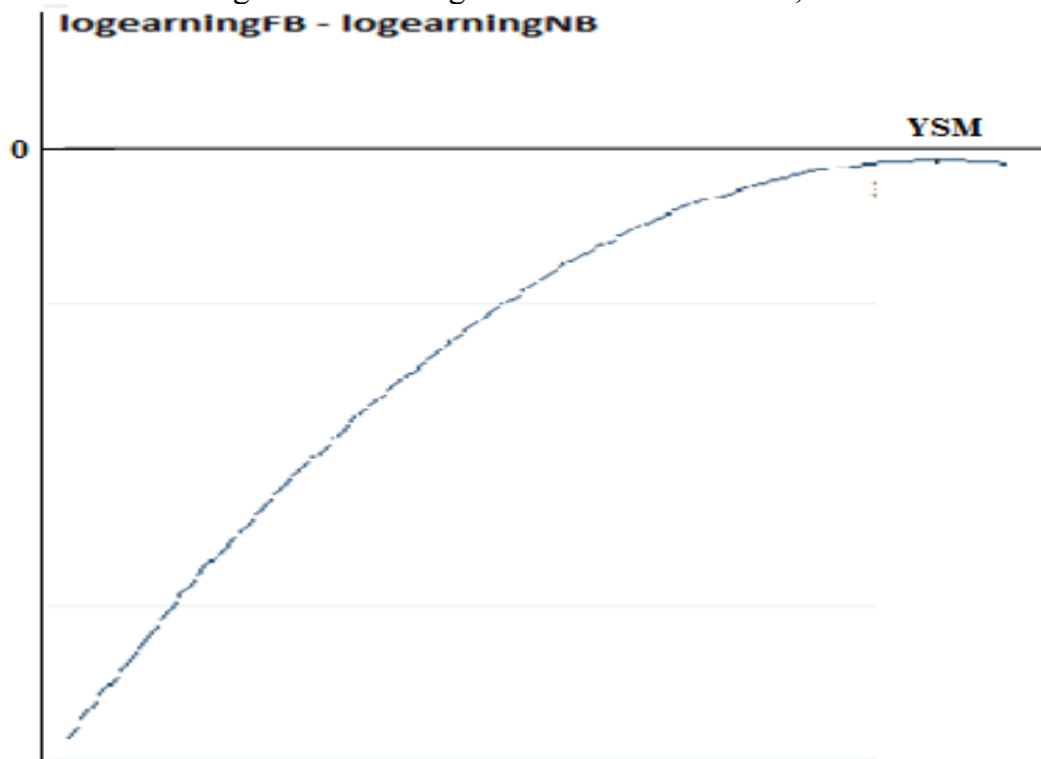
This means a male worker's earnings peaks on average at the age of 47.5 and declines afterward (see Figure 11).

### 10.3.4: Years Since Migration

Subtracting the log of earning of native born from that of the immigrants, all other terms cancel out and only followings will remain:

$$\log(\text{earning}_{FB}) - \log(\text{earning}_{NB}) = \beta_1 \text{ IMMIGRAN} + \beta_2 \text{ YSM} + \beta_3 (\text{YSM})^2$$

Figure 12: Earnings as a Function of YSM, 2001



(Source: Statistics Canada, 2001)

### 10.3.5: Slope of the YSM-Earning Function

The rate of change in earnings after each year of immigration declines. The decreasing result implies that the YSM effect has the same pattern as that of age; the gap narrows but at a slower and slower rate. The results show that the rate of change of earnings after the first year of immigration is 4 percent, while this rate slows down gradually. After 10 years of immigration the rate of change in earnings of an immigrant is 3 percent, and after 20 and 30 years of immigration it is 1.9 and 0.8 percent, respectively.



### 10.3.6: Catch up Time for Immigrants as a Whole

As the YSM curve ordinates become zero, catch up occurs. To find out the catch up time, we use the following equation;

$$\beta_1 \text{ IMMIGRANT} + \beta_2 \text{ YSM} + \beta_3 (\text{YSM})^2 = 0$$

where  $\hat{\beta}_1 = -0.774385$ ,  $\hat{\beta}_2 = 0.04136$  and  $\hat{\beta}_3 = -0.0005589$ .

Using quadratic formula we can find the catch up year:

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$-0.0005589 * (\text{YSM})^2 + 0.04136 * \text{YSM} - 0.774385 = 0$$

$$\frac{-0.04136 \pm \sqrt{(0.04136)^2 - 4(-0.774385)(-0.0005589)}}{2(-0.0005589)}$$

$$\frac{-0.04136 \pm \sqrt{(0.04136)^2 - 4(-0.774385)(-0.0005589)}}{0.0011178}$$

$$\frac{-0.04136 \pm \sqrt{0.00171065 - 0.00173122}}{0.0011178}$$

$$\frac{-0.04136 \pm \sqrt{-0.00002057}}{0.0011178}$$

Having no real valued solution implies that immigrants will on average not catch up in terms of earnings to those of native born in their working lifetime (see Figure 12).

### 10.3.7: Catch up Time for West/Central Asian and Middle Eastern Immigrants

Using the interaction terms we can seek to find out the catch up time of immigrants from West/Central Asia and the Middle East. Using the quadratic formula yields following results:

$$\beta_1 \text{IMMIGRANT} + \beta_2 \text{WCAandME} + \beta_3 \text{YSM} + \beta_4 (\text{YSM})^2 + \beta_5 \text{Interact1} + \beta_6 \text{Interact2} = 0$$

where  $\text{Interact1} = \text{YSM} * \text{WCAandME}$  and  $\text{Interact2} = (\text{YSM})^2 * \text{WCAandME}$ .

Taking the similar terms common, we get:

$$(\beta_1 + \beta_2) + (\beta_3 + \beta_5) \text{YSM} + (\beta_4 + \beta_6) (\text{YSM})^2 = 0.$$

Re-organizing the above equation:

$$(\beta_4 + \beta_6) (\text{YSM})^2 + (\beta_3 + \beta_5) \text{YSM} + (\beta_1 + \beta_2) = 0$$

We have  $\hat{\beta}_1 = -0.774385$ ,  $\hat{\beta}_2 = -0.063098$ ,  $\hat{\beta}_3 = 0.04136$ ,  $\hat{\beta}_4 = -0.0005589$ ,  $\hat{\beta}_5 = 0.0023535$ , and  $\hat{\beta}_6 = -0.0000817$ , so that

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

we also have,

$$a = (\hat{\beta}_4 + \hat{\beta}_6) = (-0.0005589 - 0.0000817) = -0.0006406,$$

$$b = (\hat{\beta}_3 + \hat{\beta}_5) = (0.04136 + 0.0023535) = 0.0437135, \text{ and}$$

$$c = (\hat{\beta}_1 + \hat{\beta}_2) = (-0.774385 - 0.063098) = -0.837483.$$

Hence,

$$-0.0006406 * (\text{YSM})^2 + 0.0437135 * \text{YSM} - 0.837483$$

$$\frac{-(0.0437135) \pm \sqrt{(0.0437135)^2 - 4(-0.0006406)(-0.837483)}}{2(-0.0006406)}$$

$$\frac{-0.0437135 \pm \sqrt{0.00191087 - 0.002145966}}{-0.0012812}$$

$$\frac{-0.0437135 \pm \sqrt{-0.000235096}}{-0.0012812}$$

Again the imaginary value implies no real solution(s) for the equation. This means that immigrants from West/Central Asia and the Middle East same for immigrants as whole, will not catch up to the earnings of native born in their working lifetime.

### 10.3.8: UK Immigrants' Catch up Time

To check the catch up time for immigrants from United Kingdom, we use the third and fourth interaction terms. Using the quadratic formula we do the following calculations:

$$\beta_1 \text{ IMMIGRANT} + \beta_2 \text{ UKIMMI} + \beta_3 \text{ YSM} + \beta_4 (\text{YSM})^2 + \beta_5 \text{ Interact3} + \beta_6 \text{ Interact4} = 0$$

where Interact3=YSM\*UKIMMI and Interact4=YSMSQUARE\*UKIMMI.

We have  $\hat{\beta}_1 = -0.774385$ ,  $\hat{\beta}_2 = 0.808379$ ,  $\hat{\beta}_3 = 0.04136$ ,  $\hat{\beta}_4 = -0.0005589$ ,  $\hat{\beta}_5 = -0.0325062$ , and  $\hat{\beta}_6 = 0.0003532$ . The solution formula is:

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

where we also have,

$$a = (\hat{\beta}_4 + \hat{\beta}_6) = (-0.0005589 + 0.0003532) = -0.0002057,$$

$$b = (\hat{\beta}_3 + \hat{\beta}_5) = (0.04136 - 0.0325062) = 0.0088538, \text{ and}$$

$$c = (\hat{\beta}_1 + \hat{\beta}_2) = (-0.774385 + 0.808379) = 0.033994.$$

$$-0.0002057 * (\text{YSM})^2 + 0.0088538 * \text{YSM} + 0.033994$$

$$\frac{-0.0088538 \pm \sqrt{(0.0088538)^2 - 4(-0.0002057)(0.033994)}}{2(-0.0002057)}$$

$$\frac{-0.0088538 \pm 0.0103131}{-0.0004114}$$

$$YSM_1 = -3.5471568$$

The negative value again indicates that an immigrant from UK at the year of arrival on average has higher earnings level than a native-born worker of similar characteristics

#### **10.4: 2006**

The 2006 Census Public Use Microdata Files (PUMFs) on Individuals contains 844,476 records, representing 2.7% of the Canadian population. It provides information on the demographic, social and economic characteristics of the Canadian population. The dataset contains 123 variables. After applying the restrictions (same as on other datasets) on our sample, the Estimation Sample remains with 145,086 observations. All our results are analyzed at the 1% and 5% significance levels. 5.40 percent of the response variable variation ( $R^2$ ) is explained by our model. The  $R^2$  is lower than for the previous census results because for the 2006 the age variable was provided in a limited number of discrete intervals rather than as a continuous variable.

For this year, including the dependent variable, there are a total of 29 variables in our regression equation. Holding all other factors constant, the relative earnings of an immigrant in Canada who is between the ages of 25 and 59, is 88.9 percentage points lower on average than that of a native born in the same age range. If an immigrant is from

West/Central Asian and Middle Eastern his earning fall 36.1 percentage points lower than the native born while an immigrant from the United Kingdom, has 87.3 percentage points higher earnings than for immigrants as whole and 1.6 percentage points lower on average than a native born male worker.

If a respondent lives in Newfoundland, Prince Edward Island, New Brunswick or Nova Scotia, the earnings levels will be 29.7 percentage points lower, in Quebec 18.6 percentage point lower, in Manitoba or Saskatchewan it is 15.3 percentage point lower, in Alberta the earnings is 14.4 percentage points higher and in British Columbia one's earnings is 7.3 percentage points lower on average than someone who lives in Ontario.

Compared to English speaking workers, keeping all other factors fixed, earnings of a person who knows only French is 3.9 percentage points lower, and knowing English and French increases earnings by 1.1 percentage points on average (which is not significant at either 5% or 1% levels). The results also show that if a person knows neither English nor French his earnings will be decreased by 32.4 percentage points than someone who speaks English.

Keeping high school graduation certificate as the default, having all other factors constant, if a respondent has an elementary level education, his earnings will be lower by 21.8 percentage points, while a trade diploma will increase earnings on average by 12.7 percentage points than someone with only a high school graduate diploma. Having a college, CEGEP or non-university certificate or diploma increases earnings on average by 22.6 percentage points, a below bachelor degree education increases earnings by 23.2 percentage points, bachelor degree will increase earnings by 37.8 percentage points, and a graduate degree will increase earnings by 53.5 percentage points on average. In 2006, a

category of medical, dentistry and veterinary degrees is also included in the educational attainment categories. Our regression results show that having a medical, dentistry or veterinary degree increases earnings by 0.7 percentage points on average but this result is not significant at either the 1% or 5% levels (likely due to paucity of observations).

The difference of living in big and medium sized cities and their impacts on earnings is captured by big cities and medium cities dummies. Keeping small cities and rural areas as default for comparison, if a person lives in big cities his earnings is higher by 9.87 percentage points, and living in a medium sized city will increase his earnings by 11.03 percentage points on average than those who choose to live in smaller cities and rural areas.

#### **10.4.1: AGE**

Age and earnings are non-linearly related, which means that an increase in age has a positive on earnings of a male worker which slows down and even turns to be negative after a certain point of age (see Figure 13 where the use of age intervals midpoints is evident).

#### **10.4.2: Slope of the Age-Earning Function**

To find the percentage changes in earnings at the different stages of age we differentiate our model with respect to the age.

$$\text{Log (earning)} = \beta_0 + \beta_1 \text{ AGE} + \beta_2 (\text{AGE})^2 + \dots +$$

$$\frac{\partial \log(\text{earning})}{\partial \text{AGE}} = \beta_1 + 2 (\beta_2 * \text{AGE})$$

where the coefficient of age  $\hat{\beta}_1 = 0.1510476$  and the coefficient of age-squared  $\hat{\beta}_2 = -0.00176$ . We can check the changes at four different stages of age 25, 35, 45 and 55:

$$\text{At age 25: } (0.1510476 - (2*0.00176)*(25)) = 0.063$$

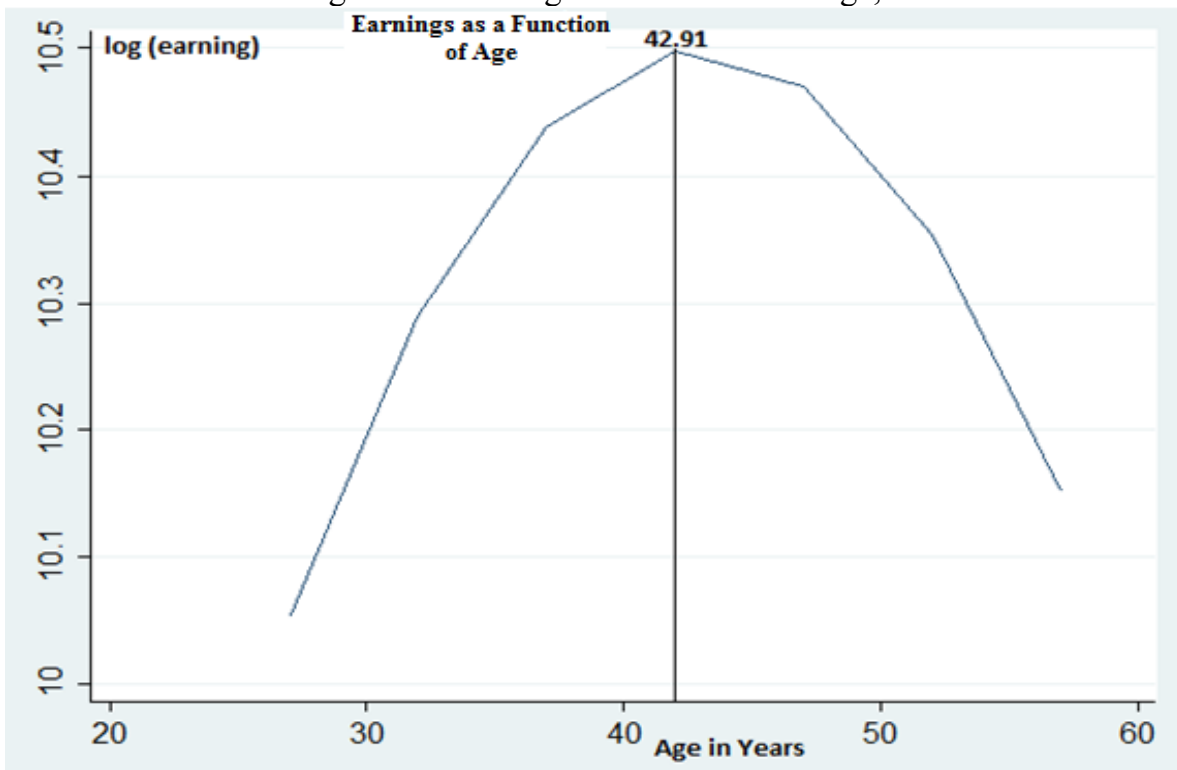
$$\text{At age 35: } (0.1510476 - (2*0.00176)*(35)) = 0.029$$

$$\text{At age 45: } (0.1510476 - (2*0.00176)*(45)) = -0.007$$

$$\text{At age 55: } (0.1510476 - (2*0.00176)*(55)) = -0.043$$

At the age 25, 35, 45 and 55 the rate of change in earning is 6.3, 2.9, 0.7, and -4.3 percent, respectively. On the basis of the above results we can assume that the peak point of earning is somewhere between the ages of 35 to 45.

Figure 13: Earnings as a Function of Age, 2006



(Source: Statistics Canada, 2006)

### 10.4.3: Age of Peak Earnings

To find the age at which the earnings peaks, we find the value of age from the above equation by taking its derivative and setting it equal to zero.

$$\text{Log (earning)} = \beta_0 + \beta_1 \text{ AGEP} + \beta_2 (\text{AGEP})^2 + \dots +$$

$$\frac{\partial \log(\text{earning})}{\partial \text{AGEP}} = \beta_1 + 2 (\beta_2 * \text{AGEP}) = 0$$

$$\text{AGEP} = \beta_1 / 2\beta_2 .$$

As  $\hat{\beta}_1 = 0.151$  and  $\hat{\beta}_2 = -0.002$ , substituting them in above we get,

$$\text{AGEP} = 0.1510476 / 2 * (-0.00176)$$

$$\text{AGEP} = 42.91$$

The age at which earnings of a male worker peaks, is 42.91 years (see Figure 13).

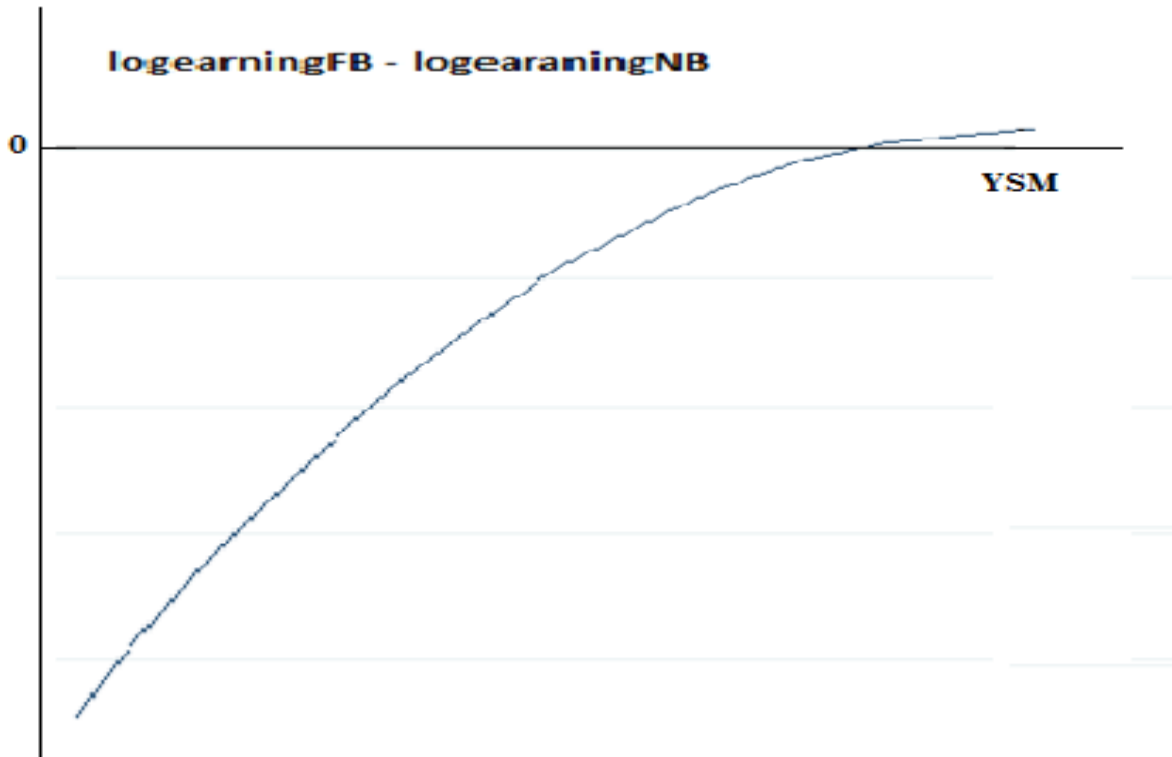
### 10.4.4: Years Since Migration

Subtracting the log of earnings of native born (logearningNB) from the log of earnings of immigrants (logearningFB), we get following equation:

$$\log(\text{earningFB}) - \log(\text{earningNB}) = \beta_1 \text{ IMMIGRAN} + \beta_2 \text{ YSM} + \beta_3 (\text{YSM})^2$$



Figure 14: Earnings as a Function of Age, 2006



(Source: Statistics Canada, 2006)

#### 10.4.5: Slope of the YSM-Earning Function

The rate of change in earnings after each year of immigration declines. The gap of earnings differences narrows but at a slower and slower rate. The results show that the rate of change of earnings after the 1<sup>st</sup>, 10<sup>th</sup>, 20<sup>th</sup>, and 30<sup>th</sup> years of immigration are 5.3, 3.8, 2.2 and 0.6 percent, respectively.

### 10.4.6: Catch up Time for Immigrants as a Whole

To find out the catch up time, we use the following equation:

$$\beta_1 \text{IMMIGRANT} + \beta_2 \text{YSM} + \beta_3 (\text{YSM})^2 = 0$$

where  $\hat{\beta}_1 = -0.8894898$ ,  $\hat{\beta}_2 = 0.0546602$  and  $\hat{\beta}_3 = -0.0008118$ .

Using the quadratic solution formula we can find the catch up year;

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$-0.0008118 * (\text{YSM})^2 + 0.0546602 * \text{YSM} - 0.8894898$$

$$\frac{-0.0546602 \pm \sqrt{(0.0546602)^2 - 4(-0.8894898)(-0.0008118)}}{2(-0.0008118)}$$

$$\frac{-0.0546602 \pm \sqrt{0.00298774 - 0.00288835}}{-0.0016236}$$

$$\frac{-0.0546602 \pm \sqrt{0.00009939}}{-0.0016236}$$

$$\frac{-0.0546602 \pm 0.00996945}{-0.0016236}$$

$$\text{YSM} = 27.53$$

From the two values yielded by the solution formula, only the minimum is relevant as it is the amount of time taken by an immigrant to catch up to the earnings of a Canadian-born worker.

### 10.4.7: Catch up Time for West/Central Asian and Middle Eastern Immigrants

Using the interaction terms we can find out the catch up time of immigrants from West/Central Asia and the Middle East. Using the quadratic formula we obtain the following results:

$$\beta_1 \text{IMMIGRANT} + \beta_2 \text{WCAandME} + \beta_3 \text{YSM} + \beta_4 (\text{YSM})^2 + \beta_5 \text{Interact1} + \beta_6 \text{Interact2} = 0$$

where  $\text{Interact1} = \text{YSM} * \text{WCAandME}$  and  $\text{Interact2} = (\text{YSM})^2 * \text{WCAandME}$ .

Taking the similar terms in common, we get:

$$(\beta_1 + \beta_2) + (\beta_3 + \beta_5) \text{YSM} + (\beta_4 + \beta_6) (\text{YSM})^2 = 0.$$

Re-organizing the above equation:

$$(\beta_4 + \beta_6) (\text{YSM})^2 + (\beta_3 + \beta_5) \text{YSM} + (\beta_1 + \beta_2) = 0$$

we have  $\hat{\beta}_1 = -0.8894898$ ,  $\hat{\beta}_2 = -0.3605986$ ,  $\hat{\beta}_3 = 0.0546602$ ,  $\hat{\beta}_4 = -0.0008118$ ,  $\hat{\beta}_5 = 0.0189086$ , and  $\hat{\beta}_6 = -0.0003858$ .

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

we also have,

$$a = (\hat{\beta}_4 + \hat{\beta}_6) = (-0.0008118 - 0.0003858) = -0.0011976,$$

$$b = (\hat{\beta}_3 + \hat{\beta}_5) = (0.0546602 + 0.0189086) = 0.0735688, \text{ and}$$

$$c = (\hat{\beta}_1 + \hat{\beta}_2) = (-0.8894898 - 0.3605986) = -1.2500884.$$

Hence,

$$\begin{aligned}
& -0.0011976 * (YSM)^2 + 0.0735688 * YSM - 1.2500884 \\
& \frac{-(0.0735688) \pm \sqrt{(0.0735688)^2 - 4(-0.0011976)(-1.2500884)}}{2(-0.0011976)} \\
& \frac{-0.0735688 \pm \sqrt{0.005412368 - 0.005988423}}{-0.0023952} \\
& \frac{-0.0611056 \pm \sqrt{-0.000576055}}{-0.0019788}
\end{aligned}$$

The imaginary value implies that immigrants from West/Central Asia and the Middle East on average will not catch up in terms of earnings to those of native born in their working lifetime.

#### 10.4.8: UK Immigrants' Catch up Time

To check the catch up time for immigrants from United Kingdom, we use the third and fourth interaction terms. Using the quadratic formula we do following calculations:

$$\begin{aligned}
& \beta_1 \text{ IMMIGRANT} + \beta_2 \text{ UKIMMI} + \beta_3 \text{ YSM} + \beta_4 (\text{YSM})^2 + \beta_5 \text{ Interact3} + \beta_6 \text{ Interact4} \\
& = 0
\end{aligned}$$

where Interact3=YSM\*UKIMMI and Interact4=YSMSQUARE\*UKIMMI.

We have  $\hat{\beta}_1 = -0.8894898$ ,  $\hat{\beta}_2 = 0.8734817$ ,  $\hat{\beta}_3 = 0.0546602$ ,  $\hat{\beta}_4 = -0.0008118$ ,  $\hat{\beta}_5 = -0.0435847$ , and  $\hat{\beta}_6 = 0.0006185$ .

We also have

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$a = (\hat{\beta}_4 + \hat{\beta}_6) = (-0.0008118 - 0.0006185) = -0.0014303,$$

$$b = (\hat{\beta}_3 + \hat{\beta}_5) = (0.0546602 - 0.0435847) = 0.0110755, \text{ and}$$

$$c = (\hat{\beta}_1 + \hat{\beta}_2) = (-0.8894898 + 0.8734817) = -0.0160081.$$

Hence,

$$-0.0014303 * (\text{YSM})^2 + 0.0110755 * \text{YSM} - 0.0160081$$

$$\frac{-0.0110755 \pm \sqrt{(0.0110755)^2 - 4(-0.0014303)(-0.0160081)}}{2(-0.0014303)}$$

$$\frac{-0.0110755 \pm 0.005575048}{-0.0028606}$$

$$\text{YSM} = 1.922831626$$

Immigrants from the UK will catch up to the earnings of native-born workers on average in approximately two years after their arrival.

## **11: Discussion and Conclusion**

This paper quantified the statistical significance of factors such as language proficiency, educational level and age on earnings of male immigrants in general and West/Central Asian and Middle Eastern in particular. Results are both in descriptive statistical form and regression analysis.

The descriptive data shows that most of the immigrants from the Central/West Asia and the Middle East region are living with relatively low earnings levels even though their knowledge of the official languages of Canada and educational level was quantitatively the same as that of native or immigrants from UK. The data also shows that the number of immigrants learning Canadian languages increased over the period of time covered by the analysis. One of the restrictions in analyzing linguistic proficiency of the immigrants from West/Central Asia and the Middle East is that the PUMF files only give us information on English language knowledge rather than proficiency of the language. It does not say whether knowledge of the language includes written and verbal proficiency. The data on language is also self-reported.

Related to the education variable, descriptive data shows that male immigrants from West/Central Asia and the Middle East were well educated. Overall, West/Central Asian and Middle Eastern immigrants had similar or higher educational qualifications to those possessed by the immigrant population of the comparison group from the United Kingdom.

In terms of age, the majority of the immigrants from the West/Central Asia and the Middle East region were between 25 and 47 years of their age, which represent a

large proportion of workers ready to take part in labor market and contribute to the Canadian economy.

Descriptive analysis of this paper supports the argument by Wang and Lo (2005) who said that there was no difference in earnings between immigrants with lower education and those with university degrees. However, the regression results negate Wang and Lo arguments and shows that different levels of education affect earnings in a positive way. The regression results of this paper are in line with Budria and Swedberg (2012), Boyd and Xingshan (2009) and Boyd (1999) who hypothesized that official language proficiency increases productivity and hence wage, and support the findings that official language proficiency, years of schooling and to some extent age are associated positively with the level of earnings both for immigrants and the native population.

Looking at the educational level, age group and knowledge of Canada's official languages, West/Central Asia and the Middle East immigrants' earnings levels on average are lower than expected. Based on the descriptive data from the Canadian Census of 1991, 1996, 2001 and 2006, this paper argues that living in Canada for longer periods of time, having educational credentials (mostly from the country of origin) and having host-country language skills all increase earnings levels of immigrants, but a substantial earnings gap remains for immigrants from the selected region. Regression analysis, in this paper shows that being an immigrant is generally associated with lower levels of earnings than for native-born workers.

This paper suggests that the Canadian government should focus on providing vocational/trade certificate programs for immigrants. This will increase opportunities for

immigrant communities to find jobs and contribute to the Canadian economy. In fact, increases in the immigrants' earnings should be considered as one of the main factors influencing the assimilation of the immigrants into the Canadian economy, as discussed by Pitkin and Myers (2010).

Looking at the data from 15 years over four census files, our regression analysis shows that the gap between earnings of immigrants from West/Central Asia and the Middle East and immigrants from the United Kingdom (our comparison group) remains substantial. Though Chiswick (1978), Akbari and DeVoretz (1992), and Bloom and colleagues (1995) estimated that assimilation of immigrants takes 15 years, this paper shows that for the general population of immigrants over the more recent period, it takes more than 25 years to equal their earnings to those of the native population. However, for immigrants from West/Central Asia and the Middle East, first generation immigrants who are the focus of this paper are simply not able to catch up in their working lifetime.

This paper recommends further research on the subject. Particularly, further research is needed to quantify and compare immigrants as a whole who are better off in terms of earnings with those immigrants whose earnings are below average. A number of shortcomings of analysis in this paper should also be mentioned. First, this research only focuses on a limited set of variables. Secondly, this study did not include women and number of family members. It should also be mentioned that this study only uses the PUMF databases rather than any genuinely longitudinal databases.



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