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Immigrants earning in Canada: Age at immigration and acculturation

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Abstract

This paper uses 2006 Canadian census data to examine the effects of acculturation on the labour market performance of male immigrants in Canada (excluding Quebec). To achieve this, three variables that are supposed to affect the process of acculturation are incorporated in Mincer type earning regressions. These variables are age at immigration, country of birth and mother tongue. Results reveal that no matter where immigrants come from and whether or not they have English as their mother tongue, they do not have an earnings deficit if they arrive at a younger age. Younger immigrants acculturate more easily than older immigrants. Immigrants from the U.S., Europe and Oceania perform better in the labour market among all immigrants. Furthermore, the results that while not having English as mother tongue is a disadvantage to immigrants, it is not the sole reason why older male immigrants acculturate slowly—other factors that are specific to an immigrant's country of birth (*e.g.,* religion, cultural context) seem also to be playing a role.

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1. Introduction

Immigration is always a sensitive and important issue for an immigrant-receiving country. Canada has been a major immigrant-receiving country for a long time. According to the 2006 Canadian Census, immigrants represent approximately 19.8 percent of Canada's total population. Further, more than 250,000 new immigrants arrive in Canada every year (Citizenship and Immigration Canada, 2013). Due to the large number of immigrants in Canada and the considerable influence that immigrants have on the Canadian society and its economy, the process of assimilation and integration of immigrants has been of significant concern to policy makers and labour economists (Anisef, Phythian and Walters, 2007). Immigrants are at a disadvantage relative to natives. Several studies have explored the reasons for the observed immigrant-native wage gap and have suggested, accordingly, policies to address this issue. An issue often examined is whether or not immigrants can fully integrate or acculturate into the mainstreams of the host countries. A common view among authors such as Borjas (1987), Kossoudji (1989), Roy (1997), Schaafsma and Sweetman (2001), Gonzalez(2003), Coulombe, Grenier, and Nadeau (2011) and Coulombe, Grenier, and Nadeau (2012), is that the human capital acquired in an immigrant's country of birth is not equivalent to that acquired in the host country, especially if an immigrant is coming from a developing country, a poor country or a non-English-speaking country. The experience of immigrants varies widely across countries of origin both in terms of earnings and other social factors.

Some studies decompose the immigrant-native wage gap into an explained

component and an unexplained component (see, for example, Coulombe, Grenier, and Nadeau, 2012). The explained component is the part of the wage gap due to differences in attributes such as education, potential work experience and language skills between immigrants and natives. The unexplained component is the part of the wage gap due to differences in returns to attributes that can be caused by labour market discrimination or differences in human capital quality. These studies suggest that immigrants receive a lower return on human capital acquired in the host country than their native counterparts do, which could be explained by an "acculturation effect".

According to anthropologists, acculturation comprises those phenomena which result when groups of individuals having different cultures come into continuous first-hand contact with each other, subsequently resulting in changes in the original cultural patterns of either or both groups (Gordon, 1964 ; Herskovits, Redfield and Linton, 1936). Applied psychology papers define acculturation as the process of cultural and psychological change that follows intercultural contact. Cultural changes include alterations to a group's customs, its economic and political life. Psychological changes include: alterations in individuals' attitudes toward the acculturation process; their cultural identities; and their social behavior in relation to the groups in contact (Berry, Phinney, Sam, and Vedder, 2006). A number of papers have discussed whether acculturation has an impact on the economic success of immigrants. For example, Djajic (2003) argues that differences in social customs, values and attitudes set limitations on economic and social opportunities for immigrants. These differences

could prevent immigrants from reaching their full economic potential and earn full returns on their human capital investments. Immigrants who have more in common with natives can act more self-confidently both in the labour market and in social activities.

This study examines the effects of acculturation on the economic performance of immigrant males by incorporation three variables that are supposed to affect the process of acculturation into Mincer type earning regressions (Mincer, 1974). These variables are: age-at-immigration[1], country of birth and mother tongue. The data used in the analysis comes from the 2006 Canadian census. The focus is on Canadian natives and immigrant males who are between the ages of 18 and 64, not self-employed, and work full-time during the reference year. Four nested immigrant wage regression equations are estimated. The first regression ignores the possible impact of acculturation—it regresses the logarithm of earnings on years of schooling, years of work experience, mother tongue, marital status, CMA and province of residence. The second regression equation introduces a set of dichotomous variables to control for the countries of birth. The third regression replaces the set of country of birth dichotomous variables (in the second regression equation) by a set six age-at-immigration dichotomous variables interacted with the country of birth variables. The objective of this regression is to test whether the impact of country of birth varies depending on the age at the time of immigration. The fourth regression

[1] Although I am following Schaafsma and Sweetman (2001), one must be careful in interpreting the results of the effects of age-at-immigration because, as pointed out in Friedberg (1992), when using only one cross-section of data, one cannot identify age-at-immigration and years since migration individually. In other words, I might obtain similar results if I had used years since migration instead of age-at-immigration in the regressions, although the interpretation of the results would be different.

adds another set of interacted variables; this set corresponds to the age-at-immigration variables interacted with the mother tongue variable. The objective of this regression is to test whether the impact of age-at-immigration varies not only because of language skills, but also because of other cultural, country-specific factors.

There are many papers that examine the effects of age-at-immigration, country of birth and mother tongue on economic and social outcomes. They generally show that these variables have a significant influence on immigrant integration and assimilation. Since 1967, Canada has used a "point system" to assess the qualifications of prospective immigrants. Age is one of the variables for which points are given (Schaafsma and Sweetman, 2001). Underlying Canadian immigration policy is the notion that age-at-immigration should be considered seriously (although no points are allocated for age of children). Age-at-immigration affects labour market outcomes both directly and indirectly. A number of papers suggest that child immigrants have lower costs of adapting to the host country's mainstream culture than adult immigrants (see, for example, Beck, Corak, and Tienda, 2012) since they have not been as affected by their birth country's culture as immigrants who came later in life. Further, according to the "critical period hypothesis" proposed by cognitive scientists, immigrants who arrive at a younger age can learn a new language more easily and faster (Bleakley and Chin, 2004). Another advantage of immigrating at a younger age is that the individual acquires all or most of his or her education and/or work experience in the host country. Older-arriving immigrants, also have a relative disadvantage in the classroom (Gonzalez, 2003).

Another key determinant of the acculturation process is the country of birth. Some studies show that earnings vary substantially across countries of birth. The range of immigrant source countries in Canada is wide and includes both rich countries and developing countries. The human capital quality of adult immigrants who come from rich countries is expected to be better than that of than those who come from developing countries (Coulombe, Grenier, and Nadeau, 2012; Roy, 1997). Borjas (1987) suggests that the economic and cultural distance between the home country and the host country has a negative impact on the earnings of immigrants. For example, American immigrants and European immigrants to the U.S. perform better economically and socially than immigrants from the rest of the world. However, the country of origin is not only associated with the quality of human capital but also related to the cultural context, language skills, race and so on. Since an individual's acculturation in the labour market is dependent on his/her language skills[2], older immigrants whose English is not the mother tongue face a substantial disadvantage in the labour market.

The results of my study reveal that the age-at-immigration effect supersedes the effects of country of birth and of English not being the mother tongue on male immigrant earnings. Specifically, the earnings of male immigrants who arrive at a younger age are nearly the same as those of natives, no matter where the immigrants come from or whether their mother tongue is English or not. The earnings

[2] For example, Bleakey and Chin (2004) demonstrate that a one unit increase in English ability considerably raises earnings and educational attainment.

disadvantage of immigrants keeps increasing with the age-at-immigration. This disadvantage is more serious for immigrants who are not from America, Europe and Oceania. Another key result of my study is that the mother tongue of older immigrants is not the sole reason why their earnings are lower than those of Canadian natives; differences in culture also plays a role.

The paper is organized as follows. Section 2 presents a review of the literature on the effects of age-at-immigration, country of birth and mother tongue on immigrant earnings. Section 3 discusses the data used in the paper. Section 4 discusses the methodology and presents the econometric models. Section 5 reports the results and Section 6 concludes.

2. Literature review

This section examines the literature on the effects of age-at-immigration, mother tongue and country of birth on the economic performance and social outcomes of immigrants in Canada and other developed countries that attract large quantities of immigrants.

The labour economic literature shows that the variable, country of birth, is an important determinant of an immigrant's earnings as it is a key factor in the process of acculturation or assimilation. Indeed, one's country of birth relates to many significant factors (such as culture, mother tongue, religion and the quality of human capital) that can affect the labour market performance of immigrants in the host country. Some

papers estimate the wage gap between immigrants and natives based on the returns to human capital acquired by the immigrants in their country of birth which may be of different quality than that acquired in the host country. For example, Coulombe, Grenier, and Nadeau (2012), using data from the Statistics Canada 2006 census and restricting the sample to individuals aged 18 to 64, analyze the determinants of the wage gap between immigrants and Canadian natives. They use GDP per capita in the country of birth as an indicator of the human capital quality and include it in the immigrants wage regression. The results of their study reveal that the returns to education and work experience significantly increase along with the GDP per capita of an immigrant's country of birth. This result can be interpreted as demonstrating that the level of human capital quality is higher for immigrants from richer or developed countries. The intuition is that a developed country should offer a higher quality of education and work experience than a poor or developing country. The wage gap between immigrants from developed countries and Canadian natives is narrower than that between immigrants from poorer regions and Canadian natives.

Borjas (1987), using data from the U.S 1970 and 1980 censuses and restricting the sample to males aged 25 to 64, analyzes the earnings of American immigrants from forty-one countries. The study argues that the difference between the earnings of immigrants who are comparably skilled but who come from different countries can be attributed to differences in the political and economic conditions in the home countries at the time of immigration. The list of regressors in Borjas' regression includes per capita GNP and continent dummies. The results reveal that controlling

for observed skills, differences in countries of origin can explain over two-thirds of the variance in the mean incomes of immigrants in the U.S. Borjas also finds that immigrants from wealthier regions like Western European countries have better economic performance than immigrants from in Asia or Africa. Borjas' study thus suggests that the cultural and economic distance between the U.S. and an immigrant's country of birth has a negative impact on an immigrant's earnings.

Another empirical study that examines the impact of the country of origin on an immigrant's earnings is that of Roy (1997), who uses data from the 1981 Canada's census and restricts the sample to males who have at least 30 weeks of work during the reference year of 1980 and 30 hours or more of work during the reference week. Roy finds that in 1980, the occupational profiles of immigrants greatly varied across countries of origin: a relatively large number of immigrants from the U.S. were in professional, technical and managerial jobs; immigrants from Asian region were concentrated in the service and clerical occupations while immigrants from Europe were generally in construction trades and in machining and product fabrication. Roy's empirical result suggests that an additional year of university education raises the average weekly earnings by $29.90 for Canadian natives, $35.80 for American immigrants, $29.50 for immigrants from Europe, and only $15.60 for immigrants from Third World countries (all figures are in 1980 dollars), and Roy does not make a difference between a year of university acquired in an immigrant's country of birth and a year of university acquired by an immigrant in Canada. The other result in Roy's paper discusses the substitutability between immigrants and Canadian natives

in the labour market. It shows that U.S. immigrants and Canadian natives are generally substitutes in the labour market, European immigrants and Canadian are substitutes in certain occupations and the immigrants from Third World countries are substitutes for Canadian born persons in only a few occupations[3]. Canada and the U.S. have similar labour market profiles as regards to the work language, institutional structure and office culture; it is not surprising that the immigrants from the U.S. have the best labour market performance among all immigrants.

Several papers in the literature analyze the direct effect of age at immigration and show how this factor affects the labour market performance of immigrants. Some papers combine age at immigration with country of origin. For example, Friedberg (1992) examines the effect of age at immigration on the earnings of immigrants in the U.S. To do that, she uses microdata from the 1970 and 1980 U.S. censuses and groups male immigrants who have a full-time job during the reference year into eight regions of origin according to, among other things, the economic development and income distribution of these regions. She uses a difference-in-difference model to estimate the effect of age-at-immigration on immigrant earnings and on the earnings difference between early and recent arrival cohorts, and to examine immigrant-native earnings convergence. One of the results of her analysis is that earnings are roughly the same

[3] "U.S.-born immigrants had large and statistically significant job displacement effects on Canadians in "natural sciences, engineering, and mathematics" and " managerial, administrative, and related occupations." They had complementary skills in teaching and related occupations." (Roy,1997, p.159). "Canadians and European-born were substitutes in clerical occupations, services, and processing occupations. They had skills that were complementary with those of the Canadian born in "natural sciences, engineering, and mathematics" and transportation equipment operating occupations." (Roy, 1997, p. 158). "Canadians and immigrants from the Third World countries were found to be substitutes in "machining, product fabricating, assembling, and repairing" and to smaller extent in transportation occupations. For all other occupation categories, immigrants were neither substitutes nor were they complementary with the Canadian-born workforce." (Roy, 1997, p. 159)

for all those who arrive as children, but diverge among those who arrive as adults. For example, she finds that the average wage of immigrants who came to the U.S. at age 30 is 11.6 percentage points lower than that of immigrant who came at age 10. Furthermore, she finds that the importance of this effect varies across countries of birth. Age at immigration is an important determinant of earnings for immigrants who are from East Asian countries and for Mexicans and Hispanics, but is an insignificant one for immigrants from Western Europe. Another key result of Friedman's study is that different age-at-immigration explain about one-quarter of the difference in earnings between early and recent arrival cohorts. She finds that the earnings gap between the 1975-79 cohort and the 1950 base cohort decreases from 27.9 percent to 20.3 percent after controlling for age-at-immigration in the wage regressions. Another result of the paper shows that the immigrant-native earnings convergence rate is smaller after controlling for age at immigration.

Age-at-immigration has similar effects on immigrants' earnings in the Canadian labour market. Using data from the 1986, 1991, and 1996 Canadian censuses and restricting the sample to males aged 16 to 64 who worked more than 40 weeks in the reference year, Schaafsma and Sweetman (2001) estimate the impact of age-at-immigration on immigrant earnings. They find that starting from age 5, immigrants' earnings (relative to Canadian native's earnings) decline nearly monotonically. For those immigrating after 24 years of age, relative earnings are significantly lower than those who immigrated before age 5. The comparison of the returns to schooling and work experience across age-at-immigration groups in their paper provides information

on how age-at-immigration affects economic performance. In their study, Schaafsma and Sweetman (2001) find that the return to work experience for immigrants who arrive between the ages of 20 and 29 is only about two-thirds of the return to experience for those who come before age 10. Meanwhile, the return to pre-immigration schooling is about two-thirds of the return to post-immigration schooling for immigrants who arrive after age 19. However, the results indicate that the returns to schooling and work experience for those who come to Canada before age 10 are about the same as those for Canadian natives. The results for the mother tongue variable show that having English as mother tongue can enhance earnings for those who immigrate after age 10, particularly for those who arrived after age 35.

As educational attainment is an important determinant of immigrant earnings, some research examines the relationship between age-at-immigration and years of schooling and compares the return to domestic schooling with that of foreign schooling. Gonzalez (2003), using data from the 1980 and 1990 5 percent US Censuses PUMS files and limiting the sample to men aged 25 to 64 employed in the private sector during the reference year, finds that age-at-immigration has a large negative effect on educational attainment for Mexican immigrants who come to the U.S after they are 9 years of age. However, he finds that for immigrants from Latin America, Africa, the Middle East countries and Asia, coming to the U.S. at a later age has no negative effect on years of schooling. Further, he finds that the wage gap between immigrants with a high level of American education and those with a relatively low level of American education is between 10 percent and 12 percent.

Another paper that examines the importance of age at immigration on social outcomes is that of Beck, Corak, and Tienda (2012). Based on child development theory , Beck, Corak, and Tienda (2012) argue that the chances of being a high school dropout increase significantly for every year a child immigrates after the age of eight. They use data from the 2000 U.S. Census and limit the sample to individuals born outside the U.S., aged 35 to 55, and who arrived in the U.S. before turning 18. The empirical study uses two-stage regression to estimate the impact of several indicators associated with integration or acculturation on the high school dropout rate, including age-at-immigration and country of birth. They find that for every year of arrival after age eight, immigrants from other countries than Canada are two percent more likely than immigrants from Canada to drop out of high school.

Beck, Corak, and Tienda (2012) also examine several social outcomes that they think are associated with aspects of social identity including English-language proficiency, fertility, and the national origin and linguistic capability of the spouse. They find that, compared to immigrants coming from Canada, immigrants who immigrated to the U.S. from non-English-speaking countries when they were children are much less likely to report being good at speaking English, much less likely to be married to an English-speaking person, and more likely to be married to someone from the same source country.

Language skills are keys for the successful integration of immigrants into the host country's labour market and mainstream society and they also affects the quality of learning in school. Many economists describe the role of language skills as an

essential input to the production of human capital, especially for immigrants. The ability to learn a new language falls with age. The empirical study performed by Bleakley and Chin (2004) is based on the "critical period hypothesis" proposed by cognitive scientists in the psychobiological literature. According to this hypothesis, it is easier for individuals to learn a new language when they are young than when they are old. Using data from the 1990 U.S Census and restricting the sample to immigrants who arrived in the U.S. when they were under 18 years of age, Bleakley and Chin (2004) find that immigrants from non-English-speaking countries who arrive before they are 8 or 9 years old acquire English speaking skills that are comparable to those of immigrants from English-speaking countries, but that immigrants who arrive in the U.S. when they are older have significantly poorer language skills. For immigrants from English-speaking countries or whose mother tongue is English, the effects of age-at-immigration on earnings are very small. They also find that a one unit increase in English–speaking ability raises earnings by 39 percent and raises educational attainment by four years[4].

Another paper by Bleakley and Chin (2010) examines the effects of English-speaking skills on several indicators of social assimilation or acculturation (such as marriage, fertility and residential location choices) among U.S immigrants. The data base and econometric method are the same as in their first paper. The result for marriage outcomes shows that immigrants with better English skills have a lower probability of being married. However, when they are married, the spouse also has

[4] "The English-speaking ability measures is coded as 0 for not speaking English at all, 1 for speaking English not well, 2 for speaking English well and 3 for speaking English very well." (Bleakley and Chin, 2004, p.483)

better English language skills, more education and higher earnings, and is also more likely to have a different country of birth. The results for fertility outcomes indicate that immigrants who have better English speaking skills tend to have fewer children. The results for residential location outcomes indicate that immigrants with better English-language skills are significantly less likely to live in "ethnic enclaves".

In summary, this review of the literature demonstrates the importance of the effects of age-at-immigration, country of birth and mother tongue on the economic performance and social outcomes of immigrants.

This paper reinforces the conclusions already reached in the literature. In fact, I find that the influence of age-at-immigration seems far more important than the effects of country of origin and mother tongue on the labour market integration of immigrants. If the immigrants arrive in the host country as children, their economic performance are similar to that of native people no matter where the immigrants come from and whether their mother tongue is English or not. The effects of country of birth and English language skills generally only matter for immigrants who came to the host country at a later age.

3. Data and Descriptive Statistics

3.1 Data

This section presents a description of the data and the variables used in the paper as well as descriptive statistics of the sample.

The data is from the Statistics Canada 2006 Census Public Use Microdata file on individuals, which contains 844,476 records, or 2.7 percent of the Canadian population. This database provides a large sample of immigrants and detailed information on their country of birth, age-at-immigration and mother tongue among other variables.

In order to effectively measure the economic performance of the individuals in the sample, the sample is restricted to males aged between 18 and 64, who worked (full-time) more than 29 hours per week and more than 48 weeks per year in 2005, and who were not self-employed. In addition, observations from Quebec and Northern Canada are excluded from the sample in order to focus on the effects of English language skills. Further, individuals whose annual employment income is less than $1000 are also removed from the sample. Due to these exclusions, the sample size shrinks to 68,296 Canadian natives and 17,483 immigrants. Similar restrictions have been imposed by other researchers (see, for example, Coulombe, Grenier, and Nadeau 2012, and Nadeau 2013), although they do not exclude Quebec residents.

The dependent variable is the natural logarithm of weekly earnings. Weekly earnings are calculated as annual employment income received during 2005 divided by the number of weeks worked in 2005. The total list of regressors include: years of schooling; potential work experience; potential work experience squared; marital status; census metropolitan area; province of residence; country of birth; age-at-immigration; and mother tongue other than English.

The census does not provide direct information on the number of years of schooling and potential work experience. Following, among others, Coulombe, Grenier, and Nadeau (2012) and Nadeau (2013), the number of years of schooling is computed based upon the highest certificate, degree or diploma obtained (see table A1 in appendix). Potential work experience is calculated as Age minus the estimated number of years of schooling minus 6.

With regards to the country of birth, countries are grouped into six categories, primarily based upon their geographic location and similarities in economic development and cultural circumstances: the U.S.; Latin America and Caribbean; Europe and Oceania; Africa and West Asia; East Asia and Southeast Asia; and South Asia.

Age at immigration is also separated into six groups: less than 5 years old; 5 to 14 years old; 15 to 19 years old; 20-29 years old; 30 to 34 years old; and 35 to 64 years old. These six age groups basically correspond to those used in Schaafsma and Sweetman (2001).[5]

The definition of the remaining independent variables used in the models is specified in Table A2 in the Appendix.

[5] Schaafsma and Sweetman (2001) indicate that immigrants who arrive before age 13 obtain most or all of their schooling and all work experience in Canada, and also are the most easily acculturated into the mainstream. Those who arrive between the ages of 15 and 19 have fewer years of schooling than those who immigrated at younger and older ages. Those who arrived between 20 to 29 years old receive all or most of their education abroad and probably was in their first job in Canada when the process of acculturation began. Those who immigrated after age 34 likely obtained all of their schooling outside of Canada and have a fair amount of work experience abroad, which make this group be the most challenged one from an acculturation point of view.

3.2 Summary descriptive tatistics

Table 1 reports descriptive statistics for the 18 to 64 year-old Canadian born and immigrant males in the sample (in total and by country of birth) are summarized in Table 1. The difference between the mean variable values of the Canadian-born and all immigrant males are also provided in Table 1, a positive sign represents a disadvantage for the male immigrant group in the sample. There is a positive wage gap between the Canadian born and immigrant males as other papers have found before. Male immigrants on average earn 4.5 percent less than Canadian natives or about $45.5 dollars less per week, although the immigrants are endowed with more years of schooling and more years of work experience.

Another four relatively large differences between the Canadian natives and immigrant males are in the level of urbanization, marital status, province of residence and mother tongue. Almost 76.4 percent of immigrant males report being married in 2005 compared to only 57.8 percent of male Canadian natives. With regards to place of residence, male immigrants are more likely to live in a large census metropolitan area and in Ontario or British Columbia: in 2005, about 92.9 percent of immigrant males were living in a large census metropolitan area compared to only 65.3 percent of male Canadian natives. About 68.0 percent and 18.1 percent of immigrants were living Ontario and British Columbia compared to 48.2 percent and 18.1 percent of natives respectively.

Table 1: Common Characteristics of Immigrant and Canadian Born[6]									
		Immigrant							
Variables	Canadian Born (1)	All Immigrants (2)	Diff (1)-(2)	United States	Latin America and Caribbean	Europe and Oceania	Africa and W. Asia	E. Asia and S.E. Asia	S. Asia
Weekly Earnings ($)	1247.3	1201.8	45.5	1651.829	1021.381	1404.8	1277.3	976.54	1038.8
Ln Weekly Earnings	6.877	6.832	0.045	7.093	6.738	6.993	6.785	6.680	6.712
Years of Schooling	13.08	13.85	-0.77	14.87	12.92	13.53	14.49	14.15	14.30
Years of Experiences	21.67	24.83	-3.16	24.81	24.15	28.1	21.82	22.83	22.24
Married (%)	57.8	76.4	-18.6	73.1	65.1	77.3	70.8	76.9	87.2
CMA (%)	65.3	92.9	-27.6	76.9	93.3	87.5	96.5	99.0	98.1
Mother-tongue is not English (%)	9.9	68.4	-58.4	5.5	38.5	61.3	76.4	90.3	86.4
Ontario (%)	48.2	68.0	-19.8	47.9	83.9	67.9	72.8	57.8	75.4
Atlantic (%)	10.6	0.6	10	5.8	0	0.8	0.4	0.05	0
Prairies (%)	9.4	2.8	6.6	4.3	4.3	3.1	1.3	3.1	0.9
Alberta (%)	16.7	10.5	6.2	14.9	6.3	10.9	12.2	11.9	8.1
British Columbia (%)	15.1	18.1	-3.0	27.0	5.5	17.2	13.3	27.2	15.6
Sample	68296	17483		670	2051	6460	1584	4281	2437

Note: [6]Males between the ages of 18 and 64 outside Quebec and Northern Canada, working more than 29 hours per week and more than 48 weeks per year in 2005. No self employed. The statistics difference is the Canadian born statistics minus immigrant statistics. *Source:* Calculations from Statistics Canada 2006 census data.

About language, approximately 68.4 percent of immigrant males in the sample reported that their mother tongue is not English in 2005 while only 9.9 percent of natives did not report English as their mother tongue.

Table 1 also provides the descriptive statistics for immigrants when they are grouped into six country/region of birth categories. From these statistics, it appears that immigrant males who come from the U.S., Europe and Oceania, and Africa and West Asia have, on average, higher earnings than other immigrant males, including Canadian born males. All immigrant males are endowed with more years of schooling and more years of potential work experience than their Canadian born counterparts, except for Latin American and Caribbean immigrants who only have about 12.9 years of schooling (compared to 13.1 years for Canadian born males). However, although immigrants from Latin America and the Caribbean region are those with the lowest educational attainment, it is the immigrants who come from East Asia and Southeast Asia who earn the least among all of immigrant groups. Nearly 90 percent of East Asian and Southeast Asian immigrant males do not have English as a mother tongue while only 5.5 percent of immigrants from the U.S. report that English is not their mother tongue. Overall, due to the similarity in terms of economic development, cultural context and labour market institutions, it is not surprising that immigrants from the U.S., Europe and Oceania perform the best among all immigrants.

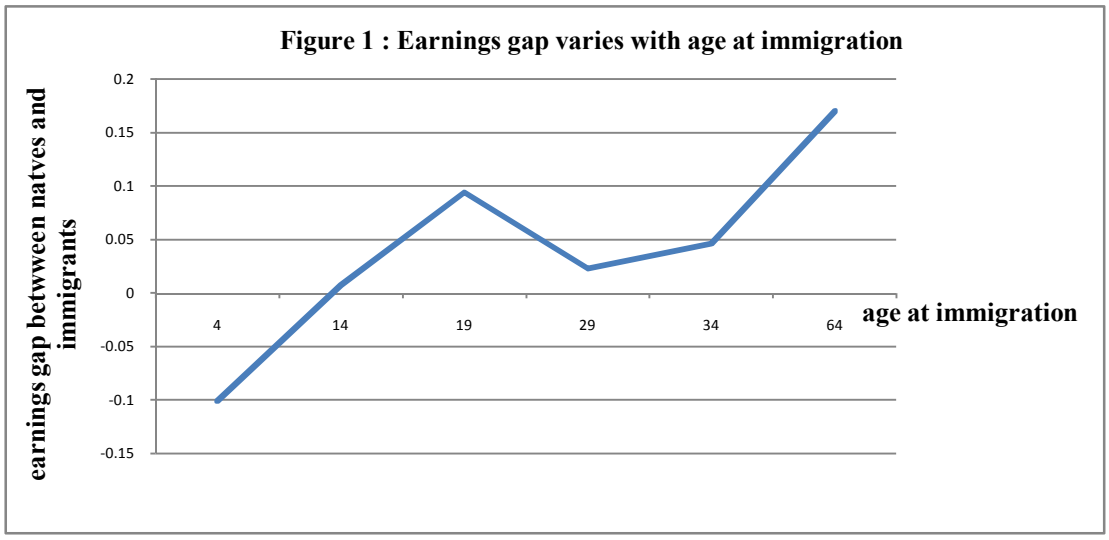

Figure 1 presents the relationship between the age-at-immigration and the earnings gap between Canadian born and immigrant males. The earnings gap is defined as the average logarithm of weekly earnings of Canadian born minus that of Canadian immigrant males. Except for immigrants who arrived in their late teens (that is, between 15 and 19), the earnings gap increases monotonically with the age-at-immigration. This is consistent with the results found in Schaafsma and Sweetman (2001). Schaafsma and Sweetman (2001) indicate that immigrants who arrived in their late teens have on average lower earnings than those who immigrated at a younger age and those who immigrated at a slightly older age, because they have fewer years of schooling than those who immigrated at younger and older ages. Immigrants who immigrated before age 4, on average, earn 10.1 percent more than Canadian natives and 14.6 percent more than immigrant males as a whole. Immigrant males who arrived after 34 years old on average earn 17 percent less than Canadian natives and 12.5 percent less than male immigrants as a whole.

4. Econometric Model and Methodology

This section provides an overview of the econometric models used in the paper. The statistical framework is the ordinary least square regression (OLS). There are four econometric models. The first one runs earnings regressions separately for each of immigrants and the Canadian born. The remaining three models concentrate on the earnings regressions of immigrants to measure the acculturation effect. The econometric models take the following form:

- *Model 1*

Let the subscripts *N* and *I* respectively denote Canadian natives and Immigrants. Then, I model weekly wages (expressed as a natural logarithm) as

$$(1)\ \ln w_I = \alpha_1^I YS + \alpha_2^I EXP + \alpha_3^I EXP^2 + \alpha_4^I NMTNEN + X'\beta^I + \epsilon^I$$

$$(2)\ \ln w_N = \alpha_1^N YS + \alpha_2^N EXP + \alpha_3^N EXP^2 + \alpha_4^N NMTNEN + X'\beta^N + \epsilon^N$$

Where *YS* denotes the number of years of schooling; *EXP* denotes the number of years of potential work experience; *NMTNEN* is a dichotomous variable that takes on a value of one if the individual's mother tongue is not English; *X* denotes other control variables (that is, marital status, CMA, province, and a constant term); α, β are coefficient vectors to be estimated; ϵ denotes error term.

The objective of *Model 1* is to estimate a basic specification of a human capital earnings regression for each of immigrant and Canadian native males to measure the differences in returns to human capital variables between the two groups.

- *Model 2*

The second model introduces six region/country of birth dichotomous variables C_i (i=1,2….6) defined as the U.S. (the reference group); Latin America and Caribbean; Europe and Oceania; Africa and West Asia; East Asia and Southeast Asia; and South Asia.

$$(3)\ \ln w_I = \alpha_1^I YS + \alpha_2^I EXP + \alpha_3^I EXP^2 + \alpha_4^I NMTNEN + X'\beta^I + \sum_{i=2}^{6} \gamma_i C_i + \epsilon^I$$

The objective of Model 2 is to examine the impact of country of birth on immigrant earnings. This is a first attempt at measuring which groups can acculturate better than others. The $\gamma's$ are the coefficients of interest of this model.

- *Model 3*

The third model allows for the impact of country of birth to vary depending on the age at immigration. To achieve that, the age-at-immigration dichotomous variables interact with the country-of-birth dichotomous variables. Specifically,

$$(4)\ \ln w_I = \alpha_1^I YS + \alpha_2^I EXP + \alpha_3^I EXP^2 + \alpha_4^I NMTNEN + X'\beta^I + \sum_{j=1}^{6}\sum_{i=1}^{6} \theta_{ji} AGE_j \cdot C_i + \epsilon^I$$

(Note: $AGE_1 \cdot C_1$ is omitted in this regression)

Where AGE_i is a vector of age-at-immigration dichotomous variables (as I discussed in the data section). In this regression, the reference category is U.S. immigrants who immigrated before age 5 ($AGE_1 \cdot C_1$). The objective of this model is to see if the country-of-birth effect varies depending on age-at-immigration and infer

about the effects of acculturation. The θ's are the coefficients of interest of this model.

- *Model 4*

This model allows for the language skills effect to vary depending on age at immigration (in addition to allowing for the country of birth effect varying across age at immigration). To achieve this, I replace the *NMTNEN* (mother tongue is not English) variable in *Model 3* by a set of six age-at-immigration dichotomous variables interacted with *NMTNEN*. Thus, the earnings regression equation becomes

$$(5)\ln \mathrm{w}_I = \alpha_1^I YS + \alpha_2^I EXP + \alpha_3^I EXP^2 + X'\beta^I + \sum_{j=1}^{6} \varphi_j AGE_j NMTNEN + \sum_{j=1}^{6}\sum_{i=1}^{6} \theta_{ji} AGE_j C_i + \epsilon^I$$

(Note: $AGE_1 \cdot C_1$ is omitted in this regression)

The objective of this model is to gauge the importance of language compared to that of other cultural factors in the acculturation effect. The φ's and the θ's are the coefficients of interest of this model.

5. Empirical Results

This section provides the details of the results for the four models provided. The estimated coefficients are reported in Table 2. The estimated coefficients for the Canadian born category are based on *Model 1*. The estimated coefficients for the immigrant category are displayed in Table 2 for each model in turn.

Table 2: Estimated Coefficients										
	Canadian born		**Immigrants**							
			Model1		***Model 2***		***Model 3***		***Model 4***	
Variables	Coef.	t-ratio	Coef.	t-ratio	Coef.	t-ratio	Coef.	t-ratio	Coef.	t-ratio
Years of Schooling	0.079	83.1	0.066	36.52	0.066	36.33	0.075	40.62	0.075	40.7
Experiences	0.051	59.9	0.035	17.18	0.035	17.2	0.045	22.02	0.046	22.3
Experiences Square	-0.0008	-45.1	-0.0005	-13.3	-0.0005	-14.5	-0.0007	-17.4	-0.0007	-17.7
Married (Ref: Single)	0.235	45.8	0.136	10.5	0.151	11.66	0.179	13.96	0.179	13.97
CMA (Ref: Non CMA)	0.068	13.4	-0.098	-4.85	-0.019	-0.95	0.0001	0.01	0.003	0.13
Mother-tongue is not English (NMTNEN)	-0.026	-3.32	-0.200	-18.0	-0.144	-11.92	-0.115	-9.52		
Region of residence (Ref: Ontario)										
Atlantic	-0.229	-28.3	-0.039	-0.58	-0.096	-1.43	-0.117	-1.76	-0.117	-1.77
Prairies	-0.152	-18.5	-0.159	-5.19	-0.169	-5.58	-0.185	-6.22	-0.184	-6.19
Alberta	0.069	10.53	0.007	0.4	0.005	0.31	0.001	0.07	0.002	0.14
British Columbia	-0.036	-5.26	-0.127	-9.44	-0.117	-8.67	-0.127	-9.59	-0.126	-9.49
Country of birth(Ref: the United States)										
L. America & Caribbean					-0.177	-5.86				
Europe and Oceania					0.047	1.70				
Africa and W. Asia					-0.167	-5.25				
E. Asia and S.E. Asia					-0.228	-7.72				
S. Asia					-0.236	-7.67				
Age at immigration 0-4										
L. America & Caribbean							0.045	0.55	0.024	0.30
Europe and Oceania							0.065	1.08	0.041	0.67
Africa and W. Asia							0.095	0.98	0.070	0.72
E. Asia and S.E. Asia							0.141	1.86	0.099	1.27
S. Asia							0.051	0.49	0.020	0.19
NMTNEN									-0.041	-1.24
Age at immigration 5-14										
The United States							0.056	0.72	0.054	0.70
L. America & Caribbean							-0.123	-1.89	-0.160	-2.42
Europe and Oceania							0.063	1.05	0.010	0.16
Africa and W. Asia							0.089	1.23	0.030	0.41
E. Asia and S.E. Asia							0.006	0.09	-0.077	-1.14
S. Asia							0.27	0.36	-0.048	-0.62
NMTNEN									-0.009	-0.36
Age at immigration 15-19										
The United States							0.161	1.40	0.1667	1.47
L. America & Caribbean							-0.110	-1.58	-0.115	-1.64
Europe and Oceania							0.068	1.08	0.044	0.65
Africa and W. Asia							-0.081	-1.06	-0.107	-1.32
E. Asia and S.E. Asia							-0.075	-1.16	-0.109	-1.48
S. Asia							-0.078	-1.07	-0.110	-1.37
NMTNEN									-0.071	-1.82

Table 2: Estimated Coefficients (continued)										
	Canadian born		Immigrants							
			Model1		*Model 2*		*Model 3*		*Model 4*	
Variables	Coef.	t-ratio	Coef.	t-ratio	Coef.	t-ratio	Coef.	t-ratio	Coef.	t-ratio
Age at immigration 20-29										
The United States							-0.056	-0.78	-0.047	-0.66
L. America & Caribbean							-0.154	-2.44	-0.134	-2.11
Europe and Oceania							0.047	0.79	0.078	1.27
Africa and W. Asia							-0.138	-2.14	-0.104	-1.56
E. Asia and S.E. Asia							-0.194	-3.17	-0.156	-2.44
S. Asia							-0.145	-2.34	-0.107	-1.66
NMTNEN									-0.149	-6.59
Age at immigration 30-34										
The United States							-0.013	-0.13	-0.007	-0.06
L. America & Caribbean							-0.251	-3.53	-0.197	-2.75
Europe and Oceania							0.005	0.08	0.082	1.24
Africa and W. Asia							-0.267	-3.78	-0.174	-2.30
E. Asia and S.E. Asia							-0.309	-4.90	-0.202	-2.88
S. Asia							-0.309	-4.66	-0.206	-2.86
NMTNEN									-0.224	-6.41
Age at immigration 35-64										
The United States							0.021	0.21	0.031	0.31
L. America & Caribbean							-0.315	-4.56	-0.252	-3.56
Europe and Oceania							-0.146	-2.31	-0.046	0.68
Africa and W. Asia							-0.395	-5.81	-0.291	-4.01
E. Asia and S.E. Asia							-0.518	-8.33	-0.401	-5.84
S. Asia							-0.520	-8.11	-0.412	-5.97
NMTNEN									-0.234	-7.21
Constant	5.107	339.3	5.591	142.6	5.626	121.5	5.279	77.09	5.261	76.85
No of Observations	68296		17483		17483		17483		17483	
R Squared	0.2432		0.1333		0.1609		0.1899		0.1922	

Source: Calculations from Statistics Canada 2006 census data

From Table 2, we observe that the estimated returns to human capital variables conform to what has been found in other papers (see for example, Coulombe, Grenier, and Nadeau, 2012; Nadeau, 2013; Schaafsma and Sweetman, 2001): whether for immigrants or the Canadian born, earnings increase with the total number of years of schooling and total number of years of potential work experience. However, for immigrants, estimated returns to human capital variables are lower than for Canadian born individuals. For example, in *Model 1* the returns to years of schooling and years of potential work experience (evaluated at zero years of potential work experience) for the Canadian born are 7.9% and 5.1% respectively, while for immigrants are 6.6% and 3.5%, and these are all statistically significant. Furthermore, the same conclusion is reached even after controlling for country of birth (see *Model 2* results). After adding the effect of age-at-immigration in the regressions, which are *Model 3* and *Model 4*, the returns to human capital are higher, but still lower than Canadian born. However, the difference between these results is statistically insignificant at the 1 percent level.

It is noteworthy that living in a CMA results in a 6.8 percent earning premium for a Canadian native, but has a significantly negative effect upon the wages of immigrants who then earn 9.8 percent less than non-CMA communities. From the previous summary statistics, we can observe that nearly 93 percent of immigrants live in a CMA. This is in line with the results estimated by Schaafsma and Sweetman (2001) and Roy (1997). Nevertheless, this negative effect becomes smaller and not statistically significant when country-of-birth variables are added to the regressions.

With regards to the marital status and province variables, all other things being equal, married individuals and individuals in Ontario or Alberta generally earn higher wages.

With regards to the language effect on earnings, since I focus on Canada outside Quebec where English is the predominant language, it is not surprising that the average earnings of those whose mother tongue is not English is significantly lower than those whose mother tongue is English. For example, in *Model 1*, immigrants whose mother tongue is not English earn about 20 percent less on average than those whose mother tongue is English. However, *Model 4*'s results shows that the impact of not knowing the majority language varies substantially depending on the age-at-immigration. Indeed, we observe that the younger immigrants arrive, the smaller is the disadvantage of not having English as their mother tongue. Specifically, we observe that immigrants who arrive before they are 15 are not statistically significantly disadvantaged for not having English as their mother tongue. On the other hand, immigrants who arrive at age 15 or older earn on average statistically significantly less if their mother tongue is not English (the disadvantage ranges from -7.1 percent for those who immigrated between the ages of 15 and 19 to -23.4 percent for those who immigrated after age 35). This result is consistent with the "critical period hypothesis" of Bleakley and Chin (2004) and Schaafsma and Sweetman (2001).

Model 2 presents the pure effect of country of birth while *Model 3* and *Model 4* show the mixed effect of the country of birth interacted with age-at-immigration. Due

to the similarity in terms of economic development and cultural surroundings between Canada and the U.S., the U.S. is selected as the country reference group in *Model 2*. As expected, the average wage of immigrants from Latin America and Caribbean, Africa and West Asia, East Asia and Southeast Asia and South Asia are all statistically significantly lower than that of American immigrants. For example, immigrants from Asian regions earn on average about 23 percent less than U.S. immigrants. It is worthwhile to note that immigrants from Europe and Oceania enjoy a 4.7 percent earning premium over their U.S. counterparts (although this premium is barely statistically significant at the 5 percent level). This result is in line with Borjas (1987), Roy (1997) and Coulombe, Grenier, and Nadeau (2012).

Both *Model 3* and *Model 4* incorporate the age-at-immigration/country of birth interaction variables. The reference group for these interaction variables is U.S. immigrants who arrived before age 4. These interaction variables allow us to observe how the country-of-birth effect varies depending on age-at-immigration. The general pattern of these variations is basically the same across the two models. First, we note that age-at-immigration does not have any statistically significant impact on earnings for U.S. immigrants. Indeed, an F-test of the hypothesis that the estimated coefficients associated with each age-at-immigration group for the U.S. are jointly the same and equal to zero fails to be rejected at the 5% level of significance. This result is consistent with the notion that U.S. immigrants and Canadian natives are considered substitutes in the Canadian labour market (Roy 1997).

Second, for immigrants from Europe and Oceania who arrived before age 35,

their average earnings are all higher than that of their U.S. counterparts, although not statistically significantly for any specific age category. Nevertheless, a joint test of the hypothesis that the effects of age-at-immigration on the earnings of immigrants from Europe and Oceania who arrived before age 35 are similar to those associated with U.S. immigrants in the same age categories is rejected at the 5 percent level of significance. Further, the impact of country of birth on earnings is much more negative for immigrants from Europe and Oceania who arrived at age 35 or older than for immigrants from the U.S. who arrived after at age 35 or older. This result should not be too surprising as the Europe and Oceania group contains some European countries that are quite culturally different from the U.S. (and Canada).

Third, for immigrants from the other country categories, which are Latin America and the Caribbean, Africa and West Asia, East Asia and Southeast Asia, and South Asia, the effect of country of birth on earnings is uniformly statistically negligible if immigrants arrived before age 20 while it becomes increasingly substantial as immigrants arrived at age 20 or older. Immigrants who arrived at age 35 or older hold the greatest disadvantage: immigrants within that group earn between 31.5 percent and 52.0 percent less than immigrants who arrive from the U.S. at age 4 or younger. To check whether age-at-immigration affects earnings the same way across these four country groups, I conduct for each age-at-immigration category, a joint F-test of the hypothesis that country-of-birth has the same effect on earnings. This hypothesis is rejected at the 5% level of significance only for the 35 or greater age-at-immigration category. This suggests that from a labour market point of view,

the immigrant acculturation/assimilation process is the same across all nontraditional source countries as long as immigrants arrive before age 35. For example, as long as they arrive before age 35, immigrants from Asia acculturate/assimilate as easily as immigrants from Latin America and the Caribbean. And, if they arrive before they are 20, they acculturate/assimilate as easily as immigrants from the U.S.

As was discussed before, older immigrants may be less capable to adjust to the linguistic and cultural challenges than younger immigrants. Overall, age-at-immigration has a significant negative effect on earnings of immigrants who come from Latin American and Caribbean countries, Africa and West Asia, East Asia and Southeast Asia, and South Asia, but has no impact on U.S. immigrants and a slight influence on immigrants from Europe and Oceania.

To test whether these acculturation/assimilation patterns are language related, *Model 4* adds age-at-immigration/language interaction variables to *Model 3*. If poor language skills is the only or main reason why immigrants earn less as they arrive later in life, then we should expect the coefficients of the age-at-immigration/country of birth interaction variables in *Model 4* to be close to zero. It turns out that although these coefficients are smaller in magnitude than they were in *Model 3*, they still have the same pattern (especially for the 20 and older age categories for the non-traditional source countries). These results suggest that language proficiency is not the only factor that can slow down the labour market acculturation/assimilation process. Other factors that are specific to an immigrant country of birth (e.g., religion, cultural context) seem to also be at play.

6. Conclusion

This paper uses 2006 Canada census data to examine the wage gap between immigrants and Canadian born individuals and the "acculturation effect" on immigrant earnings. The analysis is restricted to males living outside Quebec. I use country of origin, mother tongue and age-at-immigration as indicators of the acculturation effect and the coefficients associated with these indicators in Mincer-type regressions to examine how they affect labour market earnings.

A number of results stand out. First, the returns to immigrants' human capital are lower than on Canadian natives' human capital. However, after controlling for age-at-immigration, the difference in returns to human capital between immigrants and Canadian born individuals becomes statistically insignificant at the 1 percent level.

Second, I find that immigrants whose mother tongue is not English have on average a substantial earnings deficit relative to their counterparts whose mother tongue is English. But, after controlling for age-at-immigration, I find that this earning deficit is statistically significant only for those who immigrated at age 15 or older. In other words, if an immigrant arrived in Canada at a relatively young age, not having English as their mother tongue would not have a significant impact upon their earnings.

Third, I find that while immigrants from traditional source countries (i.e. the U.S., Europe and Oceania) have on average better labour market performance than

immigrants from other source countries, it is true only for immigrants who arrived after they were 20.

Fourth, I find that immigrants who arrived between the ages of 21 and 34 have the same labour market assimilation patterns across non-traditional source countries. In other words, for example, from a labour market point of view, immigrants from South Asia who arrive between the ages of 20 and 24 assimilate as fast as immigrants from Latin American and the Caribbean countries. Finally, I observe that the labour market assimilation/acculturation pattern differs across non-traditional countries of origin only for immigrants arriving after the age of 34.

To summarize, the results of this study are generally consistent with those in the literature on the effects of age at arrival and acculturation on earnings in Canada and other immigrants-receiving countries. The results suggest that no matter where an immigrant comes from and whether or not he has English as his mother tongue, he does not have an earnings deficit as long as he arrives at a young age; the theory being that younger individuals acculturate more easily. Further, while language skills is an important factor of acculturation/assimilation in the job market, it is not the only one—other factors that are specific to an immigrant's country of birth (e.g., religion, cultural context) seem also to be playing a role in that process.

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Appendix

Table A1: Construction of Number of Years of Schooling Variable

Highest certificate, degree or diploma obtained	Estimated years of schooling
No certificate	8
High school certificate	12
Trade, apprenticeship, college or CEGER certificate or diploma from a program of three months to less than one year	13
Trade, apprenticeship, college or CEGER certificate or diploma from a program of one year or less than two years	14
University certificate or diploma below bachelor level	15
University bachelor level	16
University certificate or diploma above bachelor level	17
Masters	18
Doctorate (including medicine, density and similar programs)	22

Note: *Source: Statistics Canada 2006 census data*

Table A2: Variable definitions

Dependent Variable	**Definition**
Log of weekly earning	Log of the annual employment income divided by the number of weeks worked in the reference year
Independent variables	**Definitions**
Years of schooling	See table A1
Years of potential work experience	Age-years of schooling-6
Married	Legally married=1, otherwise=0
Single	Divorced, separated, single and widowed=1, otherwise=0 **(reference group)**
Mother tongue is not English (*NMTNEN*)	Respondent did not report English as mother tongue=1, otherwise=0
Mother tongue is English	Respondent report English as mother tongue=1, otherwise=0 **(reference group)**
CMA	All large CMAs=1, otherwise=0
Non CMA	Other census metropolitan areas and rural areas=1, otherwise=0 **(reference group)**
Ontario	Ontario=1, otherwise=0 **(reference group**)
British Columbia	British Columbia=1, otherwise=0
Atlantic	Newfoundland, Prince Edward Island, Nova Scotia, New Brunswick=1, otherwise=0
Alberta	Alberta=1, otherwise=0
Prairies	Manitoba, Saskatchewan=1, otherwise=0
Country of origin	
the U.S. *(C_1)*	United States of America=1, otherwise=0 (**reference group**)
Latin America and Caribbean *(C_2)*	Central America, Jamaica, other Caribbean and Bermuda, South America=1, otherwise=0
Europe and Oceania *(C_3)*	Germany, other Northern and Western Europe, Poland, other Eastern Europe, Italy, Portugal, other Southern Europe, Oceania=1, otherwise=0
Africa and West Asia *(C_4)*	Eastern Africa, Northern Africa, other Africa, West Central Asia and the Middle East=1, otherwise=0

East Asia and Southeast Asia *(C_5)*	China, Hong Kong, other Eastern Asia, Philippines, other Southeast Asia =1, otherwise=0
South Asia *(C_6)*	India, Pakistan, other Southern Asia=1, otherwise=0
Age at immigration	
0-4 *(AGE_1)*	0 to 4 years=1, otherwise=0
5-14 *(AGE_2)*	5 to 9 years, 10 to 14 years=1, otherwise =0
15-19 *(AGE_3)*	15 to 19 years =1, otherwise=0
20-29 *(AGE_4)*	20 to 24 years, 25-29 years =1, otherwise=0
30-34 *(AGE_5)*	30 to 34 years =1, otherwise=0
35-64 *(AGE_6)*	35 to 39 years, 40 to 44 years, 45 to 49 years, 50 to 54 years, 55 to 59 years, 60 years and over =1, otherwise=0

Note: *Source: Statistics Canada 2006 census data*