THREE ESSAYS ON THE ECONOMICS OF IMMIGRATION – TU, JIONG

THREE ESSAYS
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Abstract

The three essays in this thesis conduct empirical research on the economics of immigration using data from the Canadian Censuses. In the first paper, I analyze the impact of immigration on native-born Canadians' wage growth by combining an area approach and a skill approach. The estimated effects of immigration from both a first difference regression and a two-stage regression are either statistically insignificant or significantly positive. The results indicate that there is no evidence for a negative impact of the large immigrant influx during the 1990s on the wage growth of natives. The second essay examines the impact of residence in an ethnic enclave on male immigrants' labour force activities. For recent immigrants who arrived in Canada within ten years, the intensity of enclave residence is found to be negatively associated with their labour force participation rate, but positively correlated with their employment probability. However, living in an enclave has no significant effect on the labour force activity of old immigrants whose years-since-migration is more than twenty. These findings are robust to probit and instrumental variable estimations. In the third essay, I examine the returns to education for first, second and third generation immigrant men. Multivariate regression results indicate that the third generation with at least postsecondary education earn more than the equally educated first and second generations. However, the third generation do not have a wage premium over the second generation when they have high school education and lower. I explain the well-educated second generation's difficulty in translating their intellectual ability into productivity by their ethnic and linguistic distance from the Canadian mainstream, and by negative city-specific effects. I then suggest that immigrant assimilation policies that target the well-educated first and second generations should be designed to promote the acceptance of their human capital by the Canadian labour market.

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Chapter 1 Introduction

Canada has been a major host country for immigrants since the early twentieth century. In 1962 immigration policy shifted the basis for admission from applicants' nationalities to their human capital characteristics, such as age, education, fluency in English or French, and arranged employment in Canada. This policy was refined in 1967 by allocating points to applicants based on these observable characteristics, thereby establishing a prototype of the present points system. The points system opened the door for new entrants from a variety of areas and cultures. Later in the 1980s, when the fertility rate was not high enough for population replacement in Canada, immigration became a tool for population growth and adjustment of age structure of labour force. As a result, a substantial number of working-aged immigrants with above-average educational attainments flowed into this country. Citizenship and Immigration Canada's statistics show that a total of 6.5 million foreign-born have landed in Canada as permanent residents from 1962 to 2000. According to censuses, the stock of immigrants has increased to 18 percent of the population in 2001 and 20 percent in 2006.

Given the large share of foreign born population in Canada, a great deal of research has been conducted on the economics of immigration. However, most of the literature focuses on the earnings of immigrants, and other aspects of the labour market outcome are less explored. My thesis seeks to fill this knowledge gap by studying three interesting questions about immigration and the Canadian labour market.

The first topic stems from the large number of new immigrants admitted in the 1990s: how has this influx of immigrants affected native-born Canadians' labour market outcomes? Answers to this question are theoretically ambiguous, because the immigrant inflows can increase both the labour supply and labour demand, so the previous literature has turned to detailed empirical analysis. In this work, there have been debates on the appropriate methodology of research with the major difference between approaches being the way of subdividing the labour market of the host country. In my paper, I combine the two major streams of methods, namely the geographic area approach and the skill type approach. I specify a series of categorizations of the Canadian labour market by skill type at city, provincial and national levels. In addition to first difference regressions, I apply a two-stage regression method by relating the changes in native wages to changes in the immigrant intensity in a corresponding skill-area group. Results using the 1991-2001 Censuses suggest that natives' wage growth is not negatively affected by immigrant inflows.

In the second essay, I turn my research angle back to immigrants themselves with a focus on their labour force activities. It has been well documented that immigrants' clustering of residence in large cities has been associated with the creation of a number of ethnic enclaves. The intensive exposure to own-ethnic population could affect immigrant labour market

involvement positively or negatively. However, no extant Canadian research has provided empirical evidence on the sign of these enclave effects. In light of this, I use the 1981-2001 Censuses to estimate the impact of enclave residence on male immigrants' labour force participation rate and employment probability. My findings suggest that recent immigrants who migrated within ten years are more sensitive to the intensity of the city population with the same ethnicity: living in an enclave adversely impacts on their labour force participation, but increases their employment probability.

A third area that has been comparatively little studied is the performance of second generation immigrants, probably owing to a lack of Canadian data. However, the 2001 Census, for the first time since 1971, contains information on generation status. In the third essay, I exploit this fact to compare the labour market outcomes among the first, second and third generations. My results show that cross-generation differences in the returns to education vary at different levels of education. I propose explanation of this phenomenon based on ethnicity, mother tongue and area of residence.

The rest of the thesis is structured as follows. Chapter 2 studies the impact of immigration on native-born Canadian's wage growth; In Chapter 3, I estimate the impact of enclave residence on immigrants' labour force activities; An analysis of wages and returns to education of first, second and third generation immigrants is conducted in Chapter 4. The last chapter concludes.

Chapter 2 The Impact of Immigration on the Labour Market Outcomes of Native-born Canadians

2.1 Introduction

Since the introduction of the points system to Canadian immigration policy, a large number of highly educated working-age immigrants arrived in Canada and substantially changed the size and demographic composition of the labour force. It is therefore natural to investigate how native-born Canadians' labour market outcomes are affected by immigration. However, there is no easy answer to this question: on the one hand, the increased labour supply tends to put downward pressure on wage rates; on the other hand, immigrant consumption also helps to raise the aggregate demand, and hence encourages demand for labour inputs. Since immigration is likely to cause both labour supply and demand curves to shift out, its net effect on the equilibrium wage is theoretically ambiguous in sign and is thus an empirical question.

Although there has been substantial research attempting to address this issue using data from the U.S. (Altonji and Card 1991, Borjas 1991, 2003, Card 1990, LaLonde and Topel 1991, and Ottaviano and Peri 2006), Australia (Addison and Worswick 2002, and Maré and Stillman 2007) and Europe (Bonin 2005, D'Amuri et al. 2009, and Zorlu and Hartog 2005), no consensus has been reached on the net effect of immigration. In Canada, despite its large foreign-born population, there is a paucity of research on this question. As a complement to the existing literature, I will investigate in this paper the effect of immigration on native-born Canadians' wages during the 1990s. Using both a first difference regression and a two-stage regression approach, I link the changes in native wages to changes in the intensity of immigrants in a sub-labour market categorized by skill type and geographic area. The estimates of the effect of immigration are statistically insignificant or significantly positive, depending on the specification of sub-labour markets. My findings indicate that there is no negative effect of immigration on the growth rate of native wages.

The remainder of the paper is organized as follows. Section 2.2 reviews literature on the effect of immigration on natives. Models of first difference and two-stage regressions are developed in the Section 2.3. Section 2.4 discusses the data and tests native geographic mobility. I present my estimation results in Section 2.5. In Section 2.6, I discuss the potential bias caused by the endogeneity of the measure of immigrant intensity and use instrumental variable regression to solve this problem. Section 2.7 concludes.

2.2 Literature Review

A number of studies addressing the impact of immigration on natives use American data. In his influential paper, Card (1990) compares the Miami labour market to other areas in the U.S. after the 1980 Mariel boatlift. His difference-in-

differences analysis shows that the employment opportunities and wages of Miami natives are not adversely affected by the Mariel boatlift. Butcher and Card (1991) extend the study to 24 major American cities and also find little negative wage effect from immigration during the 1970s and 1980s. They explain that the large immigrant inflows raised the cost of living of the immigrant-intensive cities and increase the earnings of high-wage workers. Lalonde and Topel (1991) use the 1970 and 1980 U.S. Censuses and analyze immigrants' quality and assimilation by arrival cohorts. They find little negative effect on native wages, including those of young minority workers.

One criticism of the above spatial approach is the bias toward zero due to native migration. Borjas, Freeman and Katz (1996 and 1997) argue that since the spatial approach fails to consider native migration across cities in response to immigrant inflows, it will underestimate the impact of immigration on the host country.[1] They suggest analyzing the labour market at national level, in the assumption that immigrants affect the destination country as a whole. Their time-series analysis of the U.S. 1980-88 Current Population Survey show that immigration increased the American less-skilled workforce and is partially responsible for the declining wages and job opportunities of native high school dropouts. Borjas (2003) groups natives by measure of skill types, such as education and work experience, instead of geographic area, and finds that immigration has substantially worsened native earnings.

In response to Borjas's criticism on native migration, Card and Dinardo (2000) explore the correlation between changes in immigrant shares and changes in native skill distribution across cities during 1970-90. They find that native population of a skill group in a city actually slightly increases when the number of immigrants rises. Their results are consistent with those of Butcher and Card (1991) in that natives' intercity migration is positively correlated with inflows of recent immigrants. Therefore, they conclude that the estimates of immigration impact with spatial approach are not contaminated by out migration of natives. Card confirms the results in his 2001 and 2005 papers.

There are also studies using data from Australia and European countries. Chang (2004) calibrates a dynamic inter-temporal model on the 1990 Australian Census data, and finds that immigration does not significantly shift the aggregate average wage or unskilled workers' wages. Addison and Worswick (2002) analyze the 1981-1996 Income Distribution Survey of Australia using the spatial approach, and they find modestly positive and insignificant effect of immigration on native wages. Gross (2002) applies a general equilibrium method on the French labour market, and his findings suggest that immigrants have increased the aggregate demand and have created more jobs opportunities than they occupy.

In spite of the large immigrant population in Canada, there are a limited number of studies on this topic. Grant (1998) defines the sub-labour markets by occupation and applies the skill approach on the 1986-1992 Canadian Survey of

[1] In fact, Card (1990) also noticed that after the 1980 Mariel boatlift, Miami experienced slower population growth, and that fewer natives moved to Miami than to other cities.

Consumer Finances. Her findings suggest that immigration has little impact on native wages. Recently, Aydemir and Borjas (2006) extend Borjas's (2003) method to the 1971-2001 Canadian Censuses and show that immigration adversely impact on natives' wages and labour supply. However, given the substantial changes in immigration policies and skill composition of immigrants during the three decades (Green and Green 1999), it may be too strong an assumption that the effect of immigration is constant over such a long time span. An alternative is to consider a relatively short period of time to avoid large demographic changes in immigrant population.

2.3 Methodology

A straightforward method of estimating the impact of immigration on natives is to include in the native wage function the ratio of immigrants to the native-born in a sub-labour market that is combinedly categorized by skill type and geographic area:

$$(1) \quad \ln W_{it} = X_{it}\beta_t + SKILL_{jt}\beta_t^j + AREA_{kt}\beta_t^k + \beta_t^p Y_{pt} + \gamma_t (M/N)_{jkt} + u_{jk} + e_{it}$$

where subscript t stands for the year of observation. W is the weekly wages of a native-born Canadian i. X is a vector of natives' labour market characteristics, such as age, sex, marital status and visible minority. $SKILL$ is a vector of dummies identifying skill type j and $AREA$ indicates geographic area k. Y controls for variations in the labour demand, for example, the unemployment rate in an area p, where p might or might not be the same as k. M is the number of immigrants and N the number of natives with skill j living in area k, so the variable (M/N) measures the intensity of immigrants in a skill-area group. u is a group-specific fixed effect which represents unobserved wage determinants, while e is a random normal error term for individuals.

Assuming the β's and γ are time-invariant, first-differencing will cancel out the fixed effect and yield the following equation:

$$(2) \quad \Delta \ln W_{it} = \Delta X_{it}\beta_t + \Delta SKILL_{jt}\beta_t^j + \Delta AREA_{kt}\beta_t^k + \beta_t^p \Delta Y_{pt} + \gamma_t \Delta (M/N)_{jkt} + \varepsilon_{it}$$

where "Δ" represents the change in the value of a variable during a period τ, for example, $\Delta \ln W_{it} = \ln W_{it} - \ln W_{i(t-\tau)}$, and the error term $\varepsilon_{it} = e_{it} - e_{i(t-\tau)}$. The coefficient γ then measures the net effect of a change in the immigrant-to-native ratio on the change in native wages. However, this method requires panel data that trace a person over time, and it cannot be applied on cross-sectional data at the individual level. Given that my dataset is cross-sectional, I aggregate the observations into skill-area groups and use the means of the dependent and independent variables to construct pseudo-panel data. Then the wage function with aggregated data becomes:

$$(3) \quad \overline{\ln W_{jkt}} = \overline{X_{jkt}}\beta_t + SKILL_{jt}\beta_t^j + AREA_{kt}\beta_t^k + \beta_t^p Y_{pt} + \gamma_t (M/N)_{jkt} + u_{jk} + e_{it}$$

where $\overline{\ln W_{jkt}}$ is the mean log weekly wage of skill group j in area k in year t; $\overline{X_{jkt}}$ is the vector of mean values of X variables in the relative group. By definition, Y, M/N and u are already average values. The first difference equation of aggregated data under the assumption of time-invariant β, β^p_t and γ, but time-variant β^j_t and β^k_t, will be as follows:

$$(4) \quad \Delta\overline{\ln W_{jkt}} = \Delta\overline{X_{jkt}}\beta_t + SKILL_{jt}\beta^j_t + AREA_{kt}\beta^k_t + \beta^p_t \Delta Y_{pt} + \gamma_t \Delta(M/N)_{jkt} + e_{it}$$

If I relax the restriction on time invariance of coefficients β and γ, the first difference equation should then include interactions between time indicators and all the right-hand-side variables of equation (3). Empirically, it requires a large enough sample size, or number of sub-markets jk, to estimate all the coefficients. However, the limited number of labour force groups defined by skill types and areas will either make the fully interacted equation inestimable, or yield oversized standard errors.

This problem with limited sample size can be solved by a two-stage regression method developed by Borjas et al. (1996), Grant (1998) and Addison and Worswick (2002). In the first stage, means of the logarithm of native weekly wages are calculated for each year separately after controlling for effects of X variables. The difference in the adjusted means between the two surveys is then regressed on the change in the immigrant to native ratio in the second stage. The process can be illustrated as follows:

Stage 1: Run the following regression at the individual level on each cross-sectional dataset:

$$(5) \quad \ln W_{it} = X_{it}\beta_t + \theta_{jkt}\,(SKILL_{jt}*AREA_{kt}) + v_{it}$$

where the interaction ($SKILL*AREA$) indicates a native worker's skill group j and resident area k, and v_{it} is the residual. Then the average logarithm of weekly wages of skill-area group jk observed in year t is:

$$(6) \quad \overline{\ln W_{jkt}} = \overline{X_{jkt}}\beta_t + \theta_{jkt} + v_{jkt}$$

where the coefficient estimates θ_{jkt} can be treated as average wages of each skill-area group adjusted for effects from the X variables. Substituting (6) into (3), I obtain the following relationship:

$$(7) \quad \hat{\theta}_{jkt} = SKILL_{jt}\beta^j_t + AREA_{kt}\beta^k_t + \beta^p_t Y_{pt} + \gamma_t\,(M/N)_{jkt} + u_{jk} + e_{it}$$

Stage 2: The change in the adjusted average wage, $\Delta\hat{\theta}_{jkt} = \hat{\theta}_{jkt} - \hat{\theta}_{jk(t-\tau)}$, is calculated and used as the dependent variable in a first difference regression, assuming γ and β^p_t are time invariant while β^j_t and β^k_t are time-variant:

$$(8) \quad \Delta\hat{\theta}_{jkt} = SKILL_{jt}\beta^j_t + AREA_{kt}\beta^k_t + \beta^p_t\Delta Y_{pt} + \gamma_t \Delta(M/N)_{jkt} + v_{jkt}$$

where $v_{jkt} = v_{jkt} - v_{jk(t-\tau)}$. The skill and area dummy variables are included to allow for changes in their specific effects over time.

2.4 Data

An important policy change happened in the late-1980s when arranged employment was no longer a prerequisite for applicants under the skilled worker class immigration. The subsequent rapid flux of Asian immigrants has greatly altered the demographic composition of the Canadian labour market. It is then reasonable to expect that, after the policy change, immigration would have impacted the native born differently than before. In this paper, I focus my study on the period after the policy change, and use the 1991, 1996 and 2001 Canadian Census Public Use Microdata File (PUMF). Another important reason for me to choose these three most recently available censuses is that the definitions of some key variables, such as city and occupation, are consistent in these data files, whereas those in the previous censuses might be different. I restrict my sample to full time (30 hours or more per week) and full-year (worked for 50 weeks or more per year) paid workers, aged 16 to 64.

In Table 2.1, I compare wages and demographic characteristics of native-born Canadians and immigrants. All wages are deflated by Consumer Price Index (CPI) based on the 1992 Canadian dollar. Native weekly wages have slightly increased over the three censuses, whereas immigrants experience a fall in their wages. On average, immigrants are three years older than natives and are more likely to be married. There is a large disparity in the visible minority status: merely 2 percent of natives are non-whites, whereas the share of immigrants who are members of visible minority rises from 37 percent in 1991 to 51 percent in 2001. This is not surprising as the major source of recent immigrants has been Asia.

Given the strong tie between education and productivity, educational attainment is used as a measure of skill type. Individuals are categorized into four education groups: less than high school education, high school diploma, postsecondary certificate and university degrees. Both native and immigrant educational distributions have significantly changed over the decade. For natives, the shares of lower educational levels have declined while the proportion of university degree holders increases by 5 percentage points.[2] On the other hand, immigrants initially have larger proportions than natives at both ends of the educational distribution. But the share of immigrants with less than high school education has fallen by 6 percentage points while that with university education have substantially increased by 7 percentage points.

Immigrants' preference for large census metropolitan areas (CMA) is clearly shown in the table: more than 60 percent of immigrants choose to live in Montreal, Toronto and Vancouver, while the total proportion of natives in these

[2] Checking the educational composition by age cohorts, I find that almost half of natives aged between 60 and 64 in 1991 Census have less than high school education, while the average share of the rest of the natives is only 21 percent. This oldest native group is over 65 five years later and leaves the 1996 Census sample. As a result, the share of natives who have less than high school education declines by 4 percentage points, indicating an improvement in native educational attainment.

three areas is less than 30 percent. About one third of native-born Canadians live in non-CMAs, whereas only 10 percent of immigrants do so. Therefore, urban natives are more likely to be affected by immigrant inflows. Interestingly, the geographic distributions of natives and immigrants have not significantly changed over the three census years. There seems to be no direct evidence for native mobility as a result of immigrant inflow.

The occupational distributions of natives and immigrants are not consistent with immigrants' lead in educational attainment. Over 22 percent of immigrants work in low-paid jobs, such as manual workers, sales and service personnel, whereas this proportion of natives is only 18 percent. Since wage is usually compatible with occupation, occupation is used as an alternative measure of skill type in my empirical analysis.

2.5 Regression Results

Before I move on to the discussion of my regression results, it is important to tackle the issue of native mobility. If natives, in response to labour market competition from immigrants, move to less immigrant-intensive areas, the increase in local labour force from immigration will be offset by such native mobility, and hence the impact of immigration on wages will be underestimated. I use Card and DiNardo's (2000) method to check for native migration, and the results indicate that natives do not move out of immigration-intensive sub-markets. (The mathematical derivation and empirical results are presented in the Appendix.) Therefore, the bias due to native mobility does not seem to be a crucial problem with Canadian data.

In this section, I first categorize skill type by individuals' educational attainment and define geographic area by CMA of residence. Regression results of the first difference equation and the two-stage approach are presented respectively, and the robustness of the results is checked by other specifications of skill-area groups.

2.5.1 First Difference Regressions with Unadjusted Mean Wages

The first difference regression is specified by equation (4), in which the dependent variable is the change in (unadjusted) mean logarithm of native weekly wages with educational level j in city k, and the independent variables are the change in immigrant-native ratio, change in unemployment rates and changes in average X_{jk} variables. Since there are four education types in 19 CMAs, the number of skill-area groups is 76 with this specification. The three censuses provide three types of intercensal differences: two five-year intervals 1991-1996 and 1996-2001, and one ten-year interval 1991-2001. I plot the changes in average native wages $\Delta \ln W$ against the changes in immigrant to native ratios $\Delta(M/N)$ for these intervals in Figure 2.1 and 2.2, and highlight skill groups in the two largest host cities of immigrants, Toronto and Vancouver.

In Figure 2.1, most of the plots gather around the origin, and regression

lines of periods 1991-1996 and 1996-2001 both have flat slopes. Although Toronto and Vancouver are outliers, exclusion of these two most immigrant-intensive cities does not significantly change the slopes. Figure 2.2 graphs the decadal differences between 1991 and 2001. The regression line is still nearly horizontal, indicating a low correlation between immigrant inflows and changes in native wages.

Table 2.2 reports the coefficient estimates of $\Delta(M/N)$ from regressions with the three types of differences. The first column is the baseline model in which the skill- and area-specific effects are both assumed to be time invariant and are therefore cancelled out in the first difference equation. For example, the 0.044 coefficient in the third row indicates a 0.44 percent increase in native's wage growth rate, given a 10 percentage-point rise in the change of immigrant-to-native ratio in an education-area group during 1991-2001.[3] However, as illustrated by the diagrams, the estimates are insignificant and close to zero.

In order to separate out area- and skill-specific effects, I consequently include educational attainment, CMA, and both[4] in the regressions. The inclusion of education dummies alone does not affect the coefficients, as estimates in the second column are similar to those in the first column. However, when I only control for CMA-specific effects, the coefficients of $\Delta(M/N)$ in the third column become smaller in magnitude or even turn negative, but their significance is not increased. One explanation for the lower estimates is that economic growth in these cities optimally affects all education groups, and increases native wages. The inclusion of CMA dummies takes away the positive area effects on wages and lowers the estimates of immigrant effect. The last column reports regression results when both CMA and education effects are controlled. They are mostly closer to zero than the other columns, indicating a negligible effect on native wage growth.

2.5.2 *Two-Stage Regressions with Adjusted Mean Wages*

In the previous model, I assumed that returns to native human capital characteristics were unchanged between any two censuses. In order to allow for time-varying coefficients on these control variables, I use the two-stage approach specified by equation (8). While the first stage includes a set of X variables, only changes in (M/N) and dummies indicating skill and area groups are used in the second stage.

Before reporting the regression results, I again plot the dependent variable $\Delta\hat{\theta}$, changes in the adjusted mean of the logarithm of native weekly wages, against

[3] I also pool together the two five-year differences and run the same OLS regression including a time dummy variable to identify the intercensal difference in the intercept. The result is again insignificantly positive, but larger in magnitude. (A Chow test of the consistency of coefficients reveals no structural difference between the two periods.)

[4] Joint tests show that the area dummies are insignificant for the two five-year intervals, but significant for the ten-year period. The education variables are all insignificant over the four different specifications.

changes in the immigrant-to-native ratio for the two five-year differences in Figure 2.3. The regression line is slightly positive during 1991-1996, but nearly horizontal during 1996-2001. Unlike Figure 2.1, these two regression lines have substantially different intercepts, indicating that natives experienced faster wage growth (controlling for observable characteristics) during 1996-2001 than in the preceding five years. Additionally, Figure 2.4 plots the 1991-2001 decadal differences in which the regression line is moderately negative.

Table 2.3 reports the coefficient estimates of $\Delta(M/N)$ from OLS regressions of equation (8). The coefficients are all insignificant and similar to those in Table 2.2. Results with the ten-year interval are similar to the sum of the first two panels and are around zero. For example, a 10 percentage point increase in the immigrant to native ratio during 1991-2001 reduces native wage growth rate by roughly 2 percentage points after controlling for both area and education. The last row reports the regression results by pooling the two five-year differences, and the estimates are even smaller in magnitude. However, Chow test results show that native wage growth is subject to structural changes between the two five-year periods, which weakens the reliability of the estimates in the last row.

2.6 Endogeneity of Immigrant Intensity and IV Regressions

Technically, it would be ideal to have exogenous inflows of immigrants into the sub-labour markets. However, such a condition cannot be easily satisfied and, on the contrary, most countries adopt immigration policies that are counter-cyclical.

Altonji and Card (1991) argue that immigrants might be attracted to cities with a booming economy and with relatively high average wages, causing a positive relationship between immigrant density and natives' earnings. Thus, the ordinary least square (OLS) method would result in positively biased estimates of the impact. They suggest using the stock of existing immigrants as an instrumental variable (IV), as new immigrants tend to reside in cities with a large population of earlier cohorts with the same ethnic background. The stock of immigrants has been widely used in a series of empirical works, such as Borjas (1996) and Addison and Worswick (2002).

In Canada, new entrants also tend to live in immigrant-intensive cities. This is proved by the similarity in recently arrived immigrants and old cohorts' geographic distribution. I then use the immigrant-native ratio in the base year as the IV for changes in the immigrant-to-native ratio of each sub-labour market.[5]

2.6.1 IV Regression Results

IV estimates from first difference regressions are reported in Table 2.4.[6]

[5] Grant (1998) suggests alternative IVs that are derived from immigrants' intended occupation at entry. However, this piece of information is not available in Canadian Censuses.

[6] Although the existing share of immigrants in a city may be a good predicator for changes in immigrant intensity of the corresponding city, such relationship is not strong across skill-area groups.

The coefficient estimates are bigger in absolute value than OLS results. For example, the 0.730 estimate of baseline model with 1991-2001 decadal difference implies a 7.3 percent increase in native wage growth rate when there is a 10 percentage point increase in the ratio of immigrants to natives. However, most estimates are still insignificant. The positive relationship between changes in natives' wages and changes in immigrant intensity is again primarily driven by area-specific effects, as all the estimates become insignificant when CMA dummies are added. I run Durbin–Wu–Hausman tests for endogeneity of $\Delta(M/N)$ to justify the use of IV. The results show no evidence for endogeneity in the two five-year intervals, but in regressions with the ten-year difference and pooled data (the last two rows) the null hypothesis of no endogeneity is rejected in the baseline model and the model controlling for education-specific effect (column 1 and 2). Since the IV estimates are all positive in these cells, it is safe to conclude that IV regressions do not indicate negative impact of immigration either.

I then use IV in the second stage of the two-stage regression method. The coefficient estimates of $\Delta(M/N)$ are presented in Table 2.5. The baseline models show a significantly positive effect of immigration in all regressions. During 1991-1996, for example, the native wage growth rate rises by as high as 8 percentage points when the immigrant ratio increases by 10 percentage points. Inclusion of education attainment does not affect the results, as the coefficient estimates in the second row are similar to those in the first row. However, when only CMA indicators are included in the regression, they control for area-specific effects and make the estimates less positive. The effect of immigration is smallest in magnitude after controlling for education and area effects. Although the existing immigrant-to-native ratio is not a perfect instrument, the IV estimates imply that the seemingly positive relation between native wage growth and changes in immigrant ratios is largely due to area effects. When the area effects are controlled, the estimates become insignificant, indicating that immigration has almost no impact on native wage growth.

2.6.2 Sensitivity Tests

I further check the robustness of the two-stage regression model by using different categorizations of sub-labour markets, namely occupation-CMA, education-province and education-occupation.

It has been documented that immigrants' foreign education is often poorly recognized in the host country, and that they are in a disadvantageous position in finding jobs matching their level of education (Sweetman 2003). If a large proportion of immigrants working on positions that mismatch their educational attainment, defining skill type by education might not correctly reflect the labour market competition between immigrants and natives. Therefore, I alternatively categorize skill types by occupations. This alteration is made possible by a

Regressing $\Delta(M/N)$ over the existing (M/N) yields positive coefficient, but the R squared is no more than 0.30. This weak correlation may be the reason for spurious IV estimates under different model specifications.

common occupation variable defined on the 1991 classification basis in the three censuses. As shown in Table 2.6, both OLS and IV results are insignificantly negative for all years. Durbin–Wu–Hausman tests indicate that there is endogeneity of $\Delta(M/N)$ in baseline models and models controlling for occupation dummies (column 1 and 2) of the 1996-2001 and 1991-2001 periods, where IV estimates are positive and large in absolute value.

Since Borjas (1996) argues that enlarging geographic boundaries may reduce the probability of native cross-area migration and lessen the upward bias on the estimates, I then use provinces, instead of city, to define areas and run the two-stage regressions by dividing individuals into education-province groups. As reported in Table 2.7, the OLS results are still insignificant or positive. However, the IV results vary in sign. For example, during 1991-1996, a 10 percentage point rise in the immigrant-native ratio reduces native wage growth rate by about 13 percent when provincial fixed effects are controlled, but the negative effect is greatly reduced when both education and province indicators are included. Regression results based on the ten-year difference also indicate strong area effects, as the inclusion of province dummies turns the estimates negative and on the margin of significance.

Finally, I extend the two-stage regression approach to the national level and substitute education and occupation for *SKILL* and *AREA* terms in equation (8). Now that the bias due to native geographic mobility is eliminated, the estimated effect of immigration is expected to be more negative. However, most OLS results in Table 2.8 are still close to zero and statistically insignificant, and the IV estimates are even more positive for the two five-year intervals. Only the IV estimates in the last two columns of the 1991-2001 difference are significantly negative. For example, the coefficient –0.324 means that a 10-percentage point increase in the immigrant-native ratio is associated with a 3-percentage point drop in the native wage growth rate. Still, the overall effects of immigration on native wages, even estimated at the national level, are insignificant or moderately negative.

2.7 Conclusion

There have been debates on the effect of immigration on the labour markets in the host country. Immigrant inflows increase the labour supply, while their consumption of goods and services raises the demand for labour input. Thus, the net impact of immigration on the equilibrium wage is theoretically ambiguous. A number of empirical studies using different approaches and data sources have obtained conflicting estimates of the effect. In Canada, this question is particularly important when policy makers need to evaluate the benefits and costs of immigration and the relevant impact on the local economy. However, little literature analyzes this question using Canadian data despite its large foreign born population.

This paper provides a comprehensive analysis of the impact of immigration on native-born Canadians' wages for the period of 1991-2001 using a

first difference regression and a two-stage regression. Cross sectional microdata are aggregated by skill-area groups, and changes in the unadjusted and adjusted mean log weekly wage of natives are regressed on the change in immigrant-to-native ratio of the corresponding group. When sub-labour markets are categorized by education-CMA groups, all the OLS regressions yield small and insignificant coefficient estimates of changes in immigrant intensity. Additionally, I use the immigrant to native ratio in the base year as an instrument for its change, in order to address the bias due to endogenous immigrant residential location. I obtain even more positive estimates. The IV regression results with education-CMA groups indicate that the increasing immigrant inflows are even correlated with a small rise in native wage growth rates.

I apply the two-stage regression approach to a variety of specifications of sub-labour markets, including occupation-CMA, education-province and education-occupation groups, to check robustness of my findings. There is no clear evidence of a negative impact of immigration in either the OLS or IV results with these specifications. Although some estimates from regressions where education-occupation groups are used to divide labour market indicate significantly negative estimates during 1991-2001, the effects are small in magnitude. In summary, both first difference and two-stage regressions on 1991-2001 census data indicate that the substantial immigrant inflows after the policy change in late 1980s did not adversely affect native wage growth rates in the following decade.

References

Addison, Thomas and Christopher Worswick (2002) "The Impact of Immigration on the Earnings of Natives: Evidence from Australian Micro Data," *The Economic Record*, 78(1), 68-78.

Altonji, Joseph G. and David Card (1991) "The Effects of Immigration on the Labor Market Outcomes of Less-Skilled Natives," In *Immigration, Trade, and the Labor Market*, edited by J. M. Abowd and R. B. Freeman. University of Chicago Press.

Aydemir, Abdurrahman and George J. Borjas (2006) "A Comparative Analysis of the Labor Market Impact of International Migration: Canada, Mexico, and the United States," Working Paper 12327, National Bureau of Economic Research, Inc.

Bonin, Holger (2005) "Is the Demand Curve Really Downward Sloping?" Discussion Paper, IZA.

Borjas, George J. (1991) "Immigrants in the U.S. Labor Market, 1940–80," *American Economic Review*, 81 (2), 287-91.

__ (2003) "The Labor Demand Curve *Is* Downward Sloping: Reexamining the Impact of Immigration on the Labor Market," *Quarterly Journal of Economics*, 118, 1335–1374.

Borjas, George J., Richard B. Freeman and Lawrence F. Katz (1996) "Searching for the Effect of Immigration on the Labor Market," *American Economic Review*, 86(2), 246-251.

Borjas, George J., Richard B. Freeman and Lawrence F. Katz (1997) "On the Labor Market Impacts of Immigration and Trade," in *Immigration and the Work Force: Economic Consequences for the United States and Source Areas*, ed. by G. G. Borjas, and R. B. Freeman, 213–244. Chicago University Press, Chicago.

Butcher, Kristin F. and David Card (1991) "Immigration and Wages: Evidence from the 1980s," *American Economic Review*, 81 (2), 292–296.

Card, David (1990) "The Impact of the Mariel Boatlift on the Miami Labor Market," *Industrial and Labor Relations Review*, 43 (1), 245–257.

__ (2001) "Immigrant Inflows, Native Outflows, and the Local Labor Market Impacts of Higher Immigration," *Journal of Labor Economics*, 19, 22-64.

__ (2005) "Is the New Immigration Really So Bad?" *The Economic Journal*, 115(507), 300–323.

Card, David and John DiNardo (2000) "Do Immigrant Inflows Lead to Native Outflows?" *American Economic Review*, 90(2), 360-367.

Chang, Hsiao-Chuan (2004) "The Impact of Immigration on the Wage Differential in Australia," *The Economic Record*, 80(1), 49-57.

D'Amuri, Francesco, Gianmarco I. P. Ottaviano and Giovanni Peri (2009) "The Labor Market Impact of Immigration in Western Germany in the 1990's," Discussion Paper Series 0910, Centre for Research and Analysis of Migration (CReAM), Department of Economics, University College London.

Grant, Mary Lela (1998) "Do Immigrants Affect the Wage of Native Workers? Evidence from Canada," unpublished paper, Institute for Policy Analysis, University of Toronto, http://hdl.handle.net/1807/13124.

Green, Alan G. & David A. Green (1999) "The Economic Goals of Canada's Immigration Policy, Past and Present," *Canadian Public Policy*, 25(4), 425-451.

Gross, Dominique M. (2002) "Three Million Foreigners, Three Million Unemployed? Immigration Flows and the Labor Market in France," *Applied Economics*, 34(16), 1969-1983.

LaLonde, Robert J. and Topel, Robert H. (1991) "Immigrants in the American Labor Market: Quality, Assimilation, and Distributional Effects," *American Economic Review*, 81(2), 297-302.

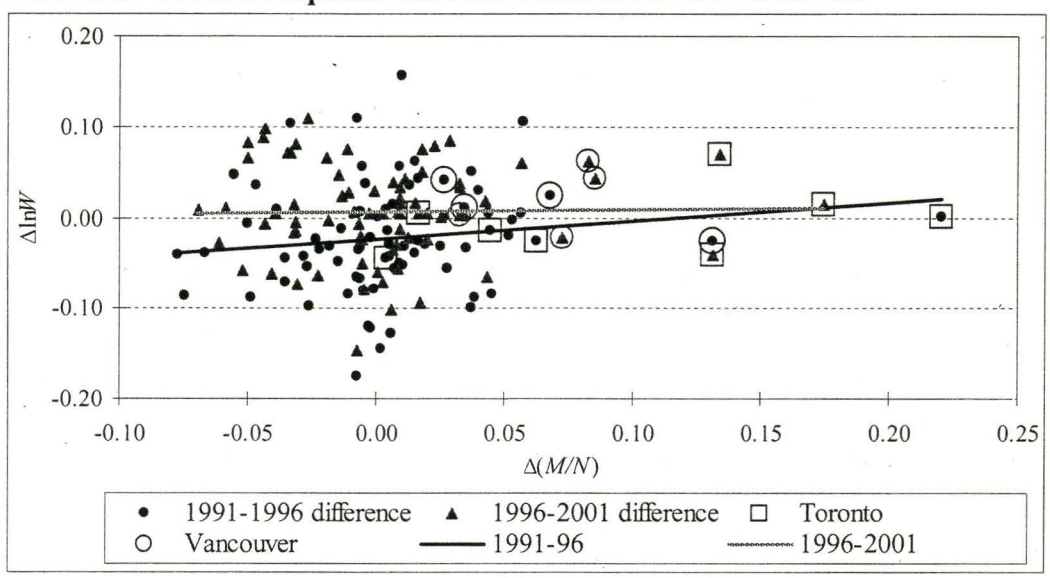
Maré, David C. and Steven Stillman (2007) "The Impact of Immigration on the Geographic Mobility of New Zealanders," Discussion Paper Series 0714, Centre for Research and Analysis of Migration (CReAM), Department of Economics, University College London.

Ottaviano, Gianmarco I.P. and Giovanni Peri (2006) "Rethinking the Effects of Immigration on Wages," Working Paper 12497, National Bureau of Economic Research, Inc.

Sweetman, Arthur (2003) "Immigrant Source Country School Quality and Canadian Labour Market Outcomes," Queen's University, School of Policy Studies.

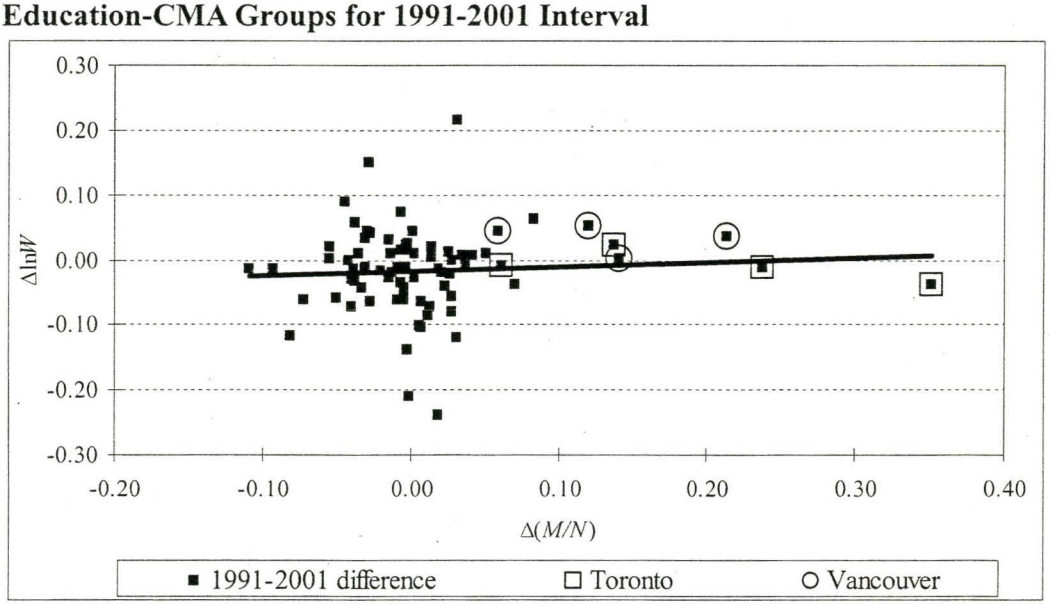
Zorlu, Aslan and Joop Hartog (2005) "The Effect of Immigration on Wages in Three European Countries," *Journal of Population Economics*, 18(1),113-151.

Figure 2.1
Natives: Δln*W* (Unadjusted Mean of Log Weekly Wages) against Δ(*M/N*) by Education-CMA Groups for 1991-1996 and 1996-2001 Intervals



NOTE: Samples include men and women aged 16-64, who have worked at full-time positions for a full year.

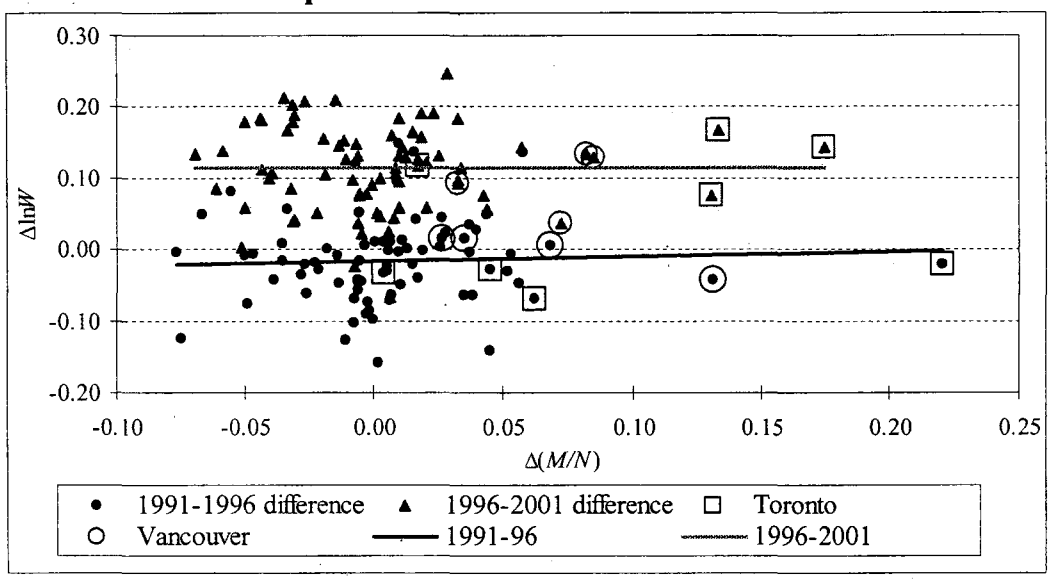
Figure 2.2
Natives: ΔlnW (Unadjusted Mean of Log Weekly Wages) against Δ(M/N) by Education-CMA Groups for 1991-2001 Interval



NOTE: Same as Figure 2.1.

Figure 2.3

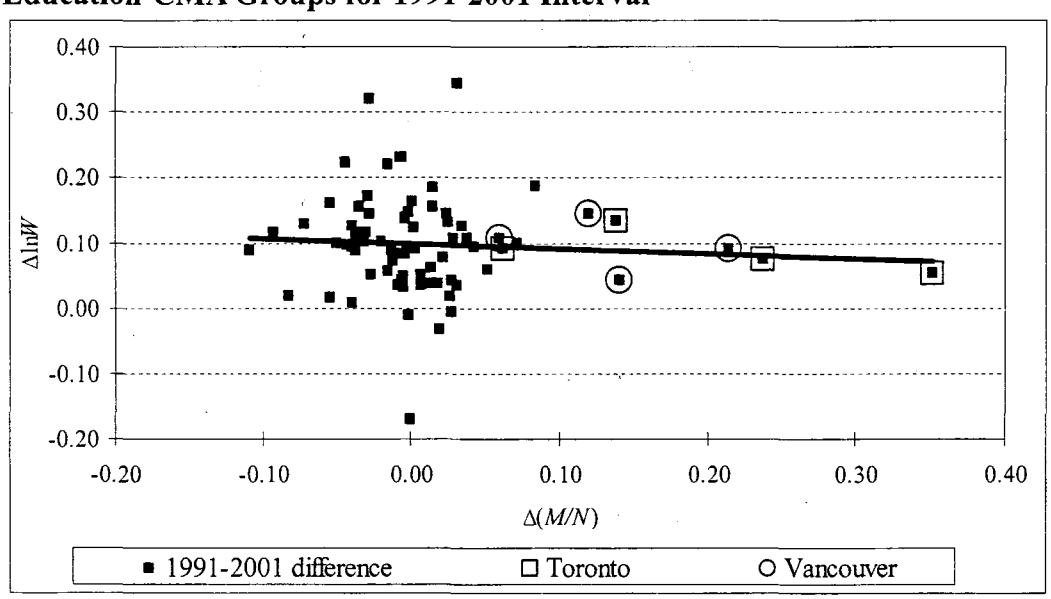
Natives: $\Delta\hat{\theta}$ (Adjusted Mean of Log Weekly Wages) against $\Delta(M/N)$ by Education-CMA Groups for 1991-1996 and 1996-2001 Intervals



NOTE: Samples include men and women aged 16-64, who have worked at full-time positions for a full year. The $\hat{\theta}$s are coefficient estimates of skill-area dummies from the first stage regression.

Figure 2.4

Natives: $\Delta\hat{\theta}$ (Adjusted Mean of Log Weekly Wages) against $\Delta(M/N)$ by Education-CMA Groups for 1991-2001 Interval



NOTE: Same as Figure 2.3.

Table 2.1
Sample Means of Natives and Immigrants: Census 1991, 1996 and 2001

	1991		1996		2001	
	Natives	Immigrants	Natives	Immigrants	Natives	Immigrants
Weekly wages ($)	573.5	573.9	573.0	547.2	579.4	552.4
Age	37.8	42.2	39.2	42.7	39.8	43.2
Male	0.588	0.594	0.578	0.583	0.568	0.563
Visible minority	0.013	0.372	0.012	0.434	0.018	0.513
Married	0.708	0.774	0.713	0.764	0.686	0.752
Educational Attainment:						
Less than high school	0.242	0.266	0.196	0.221	0.178	0.197
High school diploma	0.327	0.268	0.308	0.251	0.301	0.250
Certificate	0.266	0.257	0.301	0.280	0.318	0.276
University	0.164	0.209	0.196	0.248	0.203	0.277
Occupation:						
Senior managers	0.012	0.012	0.012	0.012	0.017	0.015
Middle managers	0.113	0.108	0.104	0.092	0.116	0.108
Professionals	0.155	0.163	0.172	0.182	0.176	0.192
Semi-professionals and technicians	0.063	0.058	0.061	0.056	0.077	0.072
Supervisors	0.020	0.018	0.020	0.017	0.018	0.016
Supervisors of crafts and trades	0.028	0.025	0.027	0.025	0.027	0.021
Administrative and senior clerical personnel	0.078	0.059	0.070	0.054	0.065	0.052
Skilled sales and service personnel	0.049	0.053	0.050	0.052	0.043	0.044
Skilled crafts and trades workers	0.082	0.086	0.078	0.075	0.088	0.083
Clerical personnel	0.126	0.109	0.129	0.114	0.109	0.100
Intermediate sales & service personnel	0.091	0.076	0.092	0.083	0.085	0.075
Semi-skilled manual workers	0.104	0.126	0.105	0.134	0.104	0.131
Other sales and service personnel	0.052	0.067	0.053	0.073	0.048	0.058
Other manual workers	0.027	0.039	0.025	0.031	0.026	0.033
CMA:						
Montreal	0.125	0.102	0.121	0.101	0.122	0.101
Toronto	0.120	0.401	0.115	0.396	0.114	0.424
Vancouver	0.052	0.101	0.053	0.114	0.051	0.119
Other CMAs	0.322	0.263	0.322	0.261	0.328	0.253
Non-CMA	0.381	0.132	0.388	0.127	0.384	0.102

NOTE: Samples include men and women aged 16-64, who have worked at full-time positions for a full year.

Table 2.2
OLS Estimates of $\Delta(M/N)$, First Difference Regressions with Education-CMA Sub-Markets

	(1)	(2)	(3)	(4)
Census 1991-1996	0.170	0.206	-0.042	0.036
	(0.178)	*(0.190)*	*(0.230)*	*(0.275)*
Census 1996-2001	-0.024	-0.074	-0.001	-0.061
	(0.203)	*(0.212)*	*(0.280)*	*(0.301)*
Census 1991-2001	0.044	-0.003	-0.065	-0.035
	(0.149)	*(0.148)*	*(0.208)*	*(0.185)*
Census 1991-1996 and 1996-2002 pooled	0.119	0.123	-0.030	-0.042
	(0.118)	*(0.120)*	*(0.146)*	*(0.153)*
Control for skill or area	Neither	Education only	CMA only	Both

NOTES: Robust standard errors are in parentheses. Significance levels are indicated by * for 10%, ** for 5%, and *** for 1 %. Each observation is a sub-labour market categorized by skill and area. The dependent variable is the unadjusted mean of the logarithm of native weekly wage. Regressions control for changes in the proportion of males, age groups, marital status, visible minority and occupations, and changes in unemployment rate. The sample is restricted to male and female natives, aged 15–64, who have worked at full-time positions for a full year.

Table 2.3
OLS Estimates of $\Delta(M/N)$, Two-Stage Regressions with Education-CMA Sub-Markets

	(1)	(2)	(3)	(4)
Census 1991-1996	0.207	0.293	0.007	0.129
	(0.160)	*(0.166)*	*(0.191)*	*(0.204)*
Census 1996-2001	-0.075	-0.119	-0.182	-0.327
	(0.143)	*(0.150)*	*(0.197)*	*(0.218)*
Census 1991-2001	0.098	0.099	-0.158	-0.199
	(0.124)	*(0.125)*	*(0.183)*	*(0.187)*
Census 1991-1996 and 1996-2002 pooled	0.071	0.071	-0.046	-0.053
	(0.106)	*(0.107)*	*(0.137)*	*(0.139)*
Control for skill or area	Neither	Education only	CMA only	Both

NOTES: Robust standard errors are in parentheses. Significance levels are indicated by * for 10%, ** for 5%, and *** for 1 %. Each observation is a sub-labour market categorized by skill and area. The dependent variable is the adjusted mean of the logarithm of native weekly wage. Regressions in the second stage control for changes in unemployment rate. The sample is restricted to male and female natives, aged 15–64, who have worked at full-time positions for a full year.

Table 2.4
IV Estimates of Δ(*M/N*), First Difference Regressions with Education-CMA Sub-Markets

	(1)	(2)	(3)	(4)
Census 1991-1996	0.522	0.463	0.622	0.569
	(0.380)	*(0.374)*	*(0.810)*	*(0.926)*
Census 1996-2001	0.162	0.158	-0.537	-0.816
	(0.481)	*(0.447)*	*(1.322)*	*(1.429)*
Census 1991-2001	0.730#	0.780#	0.737	1.256
	(0.372)	*(0.411)*	*(1.031)*	*(1.522)*
Census 1991-1996 and	0.832*#	0.826*#	0.510	0.762
1996-2002 pooled	*(0.298)*	*(0.303)*	*(1.486)*	*(4.173)*
Control for skill or area	Neither	Education only	CMA only	Both

NOTES: Same as Table 2.2.
Durbin-Wu-Hausman statistic is significant at .05 level, indicating the variable Δ(*M/N*) may be endogenous and justifying the use of IV estimates

Table 2.5
IV Estimates of Δ(*M/N*), Two-Stage Regressions with Education-CMA Sub-Markets

	(1)	(2)	(3)	(4)
Census 1991-1996	0.804*#	0.798*	0.304	0.100
	(0.343)	*(0.335)*	*(0.679)*	*(0.700)*
Census 1996-2001	0.541*#	0.543#	0.190	0.264
	(0.339)	*(0.348)*	*(1.479)*	*(0.943)*
Census 1991-2001	0.707*#	0.700*#	0.555	0.061
	(0.232)	*(0.233)*	*(0.993)*	*(1.759)*
Census 1991-1996 and	0.660*	0.667*	0.144	1.830
1996-2002 pooled	*(0.236)*	*(0.241)*	*(2.275)*	*(11.967)*
Control for skill or area	Neither	Education only	CMA only	Both

NOTES: Same as Table 2.2.
Durbin-Wu-Hausman statistic is significant at .05 level.

Table 2.6
OLS and IV Estimates of $\Delta(M/N)$, Two-Stage Regressions with Occupation-CMA Sub-Markets

	(1)	(2)	(3)	(4)
OLS Regressions				
Census 1991-1996	-0.016	-0.016	-0.066	-0.074
	(0.072)	*(0.077)*	*(0.073)*	*(0.078)*
Census 1996-2001	-0.132	-0.166	-0.134	-0.175
	(0.085)	*(0.085)*	*(0.091)*	*(0.091)*
Census 1991-2001	0.025	0.014	-0.021	-0.046
	(0.069)	*(0.072)*	*(0.078)*	*(0.082)*
IV Regressions				
Census 1991-1996	-1.428	-2.619	0.464	0.211
	(4.337)	*(5.879)*	*(0.314)*	*(0.245)*
Census 1996-2001	3.449#	1.996#	-0.354	-0.576
	(4.214)	*(1.488)*	*(0.308)*	*(0.365)*
Census 1991-2001	1.872#	1.726*	0.224	-0.051
	(1.217)	*(0.855)*	*(0.292)*	*(0.310)*
Control for skill or area	Neither	Occupation only	CMA only	Both

NOTES: Robust standard errors are in parentheses. Significance levels are indicated by * for 10%, ** for 5%, and *** for 1 %. # Durbin-Wu-Hausman statistic is significant at .05 level. The dependent variable is the adjusted mean of the logarithm of native weekly wage. Regressions in the second stage control for changes in unemployment rate. The sample is restricted to male and female natives, aged 15–64, who have worked at full-time positions for a full year.

Table 2.7
OLS and IV Estimates of $\Delta(M/N)$, Two-Stage Regressions with Education-Province Sub-Markets

	(1)	(2)	(3)	(4)
OLS Regressions				
Census 1991-1996	-0.068	0.196	-0.417	-0.159
	(0.301)	*(0.317)*	*(0.235)*	*(0.243)*
Census 1996-2001	0.220	0.186	-0.031	-0.162
	(0.294)	*(0.333)*	*(0.249)*	*(0.284)*
Census 1991-2001	0.489	0.633*	-0.492	-0.368
	(0.269)	*(0.252)*	*(0.267)*	*(0.215)*
IV Regressions				
Census 1991-1996	24.778#	6.146#	-1.332*#	-0.710
	(84.611)	*(5.801)*	*(0.558)*	*(0.648)*
Census 1996-2001	0.954	0.773	-17.497	-0.361
	(1.063)	*(1.259)*	*(132.229)*	*(0.768)*
Census 1991-2001	3.683*#	2.662*	-3.712	-1.319
	(1.773)	*(1.091)*	*(1.937)*	*(0.645)*
Control for skill or area	Neither	Education only	Province only	Both

NOTES: Same as Table 2.6.

Table 2.8
OLS and IV Estimates of $\Delta(M/N)$, Two-Stage Regressions with Education-Occupation Sub-Markets

	(1)	(2)	(3)	(4)
OLS Regressions				
Census 1991-1996	0.016	0.009	0.165	0.159
	(0.247)	*(0.254)*	*(0.258)*	*(0.267)*
Census 1996-2001	0.094	0.015	0.133	0.036
	(0.072)	*(0.079)*	*(0.075)*	*(0.085)*
Census 1991-2001	0.005	-0.150	0.025	-0.176*
	(0.083)	*(0.085)*	*(0.081)*	*(0.077)*
IV Regressions				
Census 1991-1996	30.603#	15.624#	10.444#	7.969#
	(185.522)	*(30.270)*	*(32.829)*	*(8.784)*
Census 1996-2001	0.221*	0.087	0.267*	0.117
	(0.107)	*(0.135)*	*(0.104)*	*(0.134)*
Census 1991-2001	-0.024	-0.413*#	0.125	-0.324*
	(0.112)	*(0.142)*	*(0.108)*	*(0.125)*
Control for skill	Neither	Education only	Occupation only	Both

NOTES: Same as Table 2.6.

Appendix 2.1
Test for Native Mobility

Although the descriptive statistics in Section 2.4 show that there is almost no change in native geographic distribution over the decade, shifts in natives' skill distribution across cities is not clear. Theoretically, when native geographic migration is not affected by immigration, immigrant inflow into a particular skill group in a city will increase the labour supply of this group; otherwise, if native out-migration offsets the immigrant inflow, there will be little change in labour supply. In order to test for the presence of native migration across skill-area groups, I employ the method developed by Card and DiNardo (2000).

First, I define P to be total population of a sub-labour market, and it is the sum of immigrants and natives, or $P = M + N$. The following equation then holds:

A(1) $P_{jk} / P_k = (M_{jk} + N_{jk}) / (M_k + N_k)$

Take the logarithm of both sides:

A(2) $\ln (P_{jk} / P_k) = \ln (M_{jk} + N_{jk}) - \ln (M_k + N_k)$

The percentage change in the share of total population in a skill-area group is then approximately:

A(3) $\Delta\ln (P_{jk} / P_k) = (\Delta M_{jk} + \Delta N_{jk}) / (M_{jk} + N_{jk}) - (\Delta M_k + \Delta N_k) / (M_k + N_k)$

$\Delta\ln (P_{jk} / P_k) = (\Delta M_{jk} + \Delta N_{jk}) / P_{jk} - (\Delta M_k + \Delta N_k) / P_k$

$\Delta\ln (P_{jk} / P_k) = (\Delta M_{jk} / P_{jk} + \Delta N_{jk} / P_{jk}) - (\Delta M_k / P_k + \Delta N_k / P_k)$

Re-write the above equation into the sum of relative growth rate of immigrants and of natives:

A(4) $\Delta\ln (P_{jk} / P_k) = (\Delta M_{jk} / P_{jk} - \Delta M_k / P_k) - (\Delta N_{jk} / P_{jk} - \Delta N_k / P_k)$

Next, I assume that natives' reaction linearly depends on the immigrant inflow:

A(5) $(\Delta N_{jk} / P_{jk} - \Delta N_k / P_k) = a + b\,(\Delta M_{jk} / P_{jk} - \Delta M_k / P_k) + \xi_{jk}$

Substitute it into equation A(4):

A(6) $\Delta\ln (P_{jk} / P_k) = a + (1 + b)(\Delta M_{jk} / P_{jk} - \Delta M_k / P_k) + \xi_{jk}$

Thus, the coefficient $(1 + b)$ shows the relation between immigrant inflow and relative labour supply of skill group j across areas. When this coefficient is close to zero, that is b close to -1, it means that native mobility offsets the immigration-induced impact on labour supply. However, when the coefficient estimate is around 1, or b close to 0, native mobility across areas is then not correlated with immigrant inflow and immigration will increase the relative supply of labour.

In accordance with my skill-area approaches, I run the regression of equation A(6) on the four specifications of sub-markets: education-CMA, occupation-CMA, education- province and education-occupation. The estimates of $(1 + b)$ are reported in the following table, where each cell stands for a separate

of $(1 + b)$ are reported in the following table, where each cell stands for a separate regression of an intercensal interval. All the estimates of $(1 + b)$ are significantly greater than zero, which implies that natives have not moved away from immigrant intensive skill-area groups to offset the impact of immigration on labour supply. I also test the hypothesis that $(1 + b) = 1$, and most estimates are significantly greater than 1. The results indicate that natives do not move out of a skill-area group in response to immigrant inflow. In fact, native migration is even positively correlated with an increase in immigrant intensity during 1991-1996.

Appendix 2.2
Estimates of $(1 + b)$ in Equation A(6) with Various Specifications of Skill-Area Groups

	(1)	(2)	(3)	(4)
Census Intervals	1991-1996	1996-2001	1991-2001	Pooled 1991-1996 and 1996-2001
Education-CMA	3.506#	1.532	2.763#	2.778#
	(0.343)	*(0.301)*	*(0.283)*	*(0.175)*
Occupation-CMA	1.517#	2.066#	2.216#	1.953#
	(0.142)	*(0.161)*	*(0.181)*	*(0.094)*
Education-Province	2.759#	1.119	2.674#	2.445#
	(0.880)	*(0.416)*	*(0.591)*	*(0.371)*
Education-Occupation	2.588#	0.741	1.445#	1.504#
	(0.214)	*(0.106)*	*(0.159)*	*(0.102)*

NOTES: Standard errors in parentheses, all coefficients are significantly different from zero.
Estimates are significantly greater than 1 (or $b>0$) at 5% significance level; otherwise, not different from 1 (or $b = 0$).

Chapter 3 The Effect of Enclave Residence on the Labour Force Activities of Male Immigrants in Canada

3.1 Introduction

Since immigrants' labour market performance has an important effect on the Canadian economy, there has been an abundance of research on the convergence of immigrant earnings with those of native-born Canadians, a process known as assimilation. Baker and Benjamin (1994) and Bloom et al. (1995) find that immigrants who arrived in the 1970s have low entry earnings and low assimilation rates, and that they cannot catch up in earnings with natives. Hum and Simpson (2000), Frénette and Morisette (2003) and Gray et al. (2003) update the literature using more recently available data. They also do not observe evidence of assimilation during the 1990s, in spite of new immigrants' rising educational attainment.

In addition to earnings, it is equally important to study immigrant labour force activities, because the prerequisite of wage assimilation is to participate in the labour force and be employed. However, according to the Canadian censuses, young and recent immigrants have lower labour market involvement than old and earlier cohorts (as shown in Section 3.3). Additionally, after the 1987 policy change that no longer required a pre-arranged job position for immigration application under the skilled worker class, the average number of landing immigrants drastically increased to over 200,000 per year with a large proportion from Asian countries such as China, India and Pakistan. Owing to the increasing diversity in ethnic and cultural background of immigrants, it is reasonable to expect their labour force attachment to change.

An enclave is a minority foreign-born ethnic or cultural group living as an entity within the territory of the host country. It is well documented by economists, for example Balakrishnan and Hou (1999), Hou and Picot (2003) and Warman (2007), that immigrants in Canada, like those in other major host countries, tend to cluster in areas that have a large stock of immigrants with the same ethnicity, and build up their enclaves: examples would be China Town or the Jewish community in Toronto. There are many reasons for immigrants to live in enclaves. Bartel (1989) suggests that new immigrants usually favour a city that serves as the port of entry, hosts a great intensity of co-ethnic immigrants, and provides more job opportunities. Historically, the port city factor is crucial in the establishment of enclaves, while co-ethnicity and job opportunities become more important during its development.

An enclave provides immigrants with social networks and ethnic goods at low cost. By speaking a common language, immigrants in enclaves can quickly build up networks, and share knowledge about living and working in the host country. Moreover, immigrants from non-traditional source countries have brought

a wide variety of food, clothes and even holidays that are different from the Canadian tradition. Chiswick and Miller (2002) term the goods and services that are only consumed by some specific ethnic groups and not by natives as "ethnic goods". Due to economies of scale, the average cost of providing ethnic goods may decrease when the size of the ethnic group in an area grows. As a result, the price of ethnic goods could be more competitive in a large ethnic enclave than in a small one.

Given the particularity of immigrants' enclave residence, many researchers try to explore the effect of living in an ethnic enclave on immigrant earnings using data from Canada (Warman 2007), the U.S. (Borjas 2000, Chiswick and Miller 2002, and Chowdhury and Pedace 2007) and Europe (Clark and Drinkwater 2002 and Edin et al. 2003). However, there is little research on the relationship between immigrant residential segregation and their labour force attachment. Hou and Picot (2003) briefly touch upon this question in a study on ethnic enclaves using the 1981-1996 Canadian Censuses. They conclude that the correlation between the intensity of own-ethnicity neighbours and an immigrant's probability of employment is negative but statistically insignificant in most cases. Since they sample the three largest visible minority groups, namely Chinese, South Asian and Black, in Toronto, Montreal and Vancouver, their findings represent only part of the complete picture. Extensive research on more ethnic groups across the whole country is required to obtain a broader view. To this end, I use a sample of all major ethnic groups in Canada to analyze the impact of enclave residence on immigrant labour force participation rate and employment likelihood.

This paper is structured as follows. Section 3.2 provides a literature review. In Section 3.3, I describe the data and conduct a cross tabulation analysis. The basic econometric model of immigrant labour force activities is outlined in Section 3.4 and the regression results are presented. Section 3.5 explains the complications of the econometric model, and provides a solution to the problem. The conclusions are discussed in the final section.

3.2 Literature on Ethnic Enclaves

Economic research often uses residential segregation and ethnic network to explain the development of immigrant earnings and employment. However, the direction of the effect of enclave residence is undetermined.

On the one hand, the demand for ethnic goods in large enclaves provides business opportunities and hence directly increases the demand for immigrant workers with ethnic-specific skills. One important incentive for immigrants to work in these ethnic companies is that in most cases, they are not required to possess ability specific to success in Canadian labour market, such as proficiency in official languages. In this way, enclave residence may increase the odds for their initial survival in the labour market. As evidence, Borjas (1986) finds that immigrants have higher self-employment rates than natives due to their clustering of residence. In addition, an indirect positive effect comes from the social network that is readily available to new residents in ethnic enclaves. Immigrants, no matter

how proficient in official languages, can benefit from the job information obtained through the ethnic network. Goel and Lang (2009) study the effect of social ties on immigrant job search using data from the Longitudinal Survey of Immigrants to Canada (LSIC). They find that the job arrival rate is faster for immigrants who are closely tied to their network.

On the other hand, enclave residence could also have a negative effect on immigrant labour market performance. When the size of an enclave grows, more unassimilated immigrants enter the enclave and compete with existing immigrants for jobs in ethnic companies. An ethnic company may then possess monopsonistic power against those who lack the host-country specific skills. To maximize its profit, the company is likely to hire fewer workers and pay less than in a competitive labour market. Moreover, enclaves may segregate immigrants from the mainstream and reduce their incentive to acquire Canadian-specific skills. Lazear (1999) discovers a negative correlation between living in minority language enclaves and improvement of proficiency in official languages for immigrants in the U.S., and Chiswick and Miller (2002) find similar results using Canadian data. When immigrants living in ethnic enclaves do not accumulate as many language skills as those living outside, their work experience and other human capital may not be easily transferable into productivity in the host country. In this way, enclave residents' job opportunities are largely restricted within the confines of ethnic firms, and their employment likelihood outside enclaves then becomes very low.

Given the pros and cons of enclave residence, its net effect on immigrant labour market involvement is theoretically ambiguous. Therefore, a number of researchers attempt to address this question by empirical approaches. Studies using U.S. data have shown a negative relationship between enclaves and immigrant wage assimilation. Borjas (2000) measures enclave by ethnic segregation and finds that male immigrants' wage growth is harmed by their residence in enclaves. Chiswick and Miller (2002) use the concentration of home languages to measure enclave intensity and find negative effect on earnings as well. Warman (2007) applies Borjas's (2000) method to the 1981–2001 Canadian Census data and obtains a similar result.

Unlike earnings, research on other aspects of immigrant labour market outcomes does not yield pessimistic results. For example, Balakrishnan and Hou (1999) find a weakening correlation between residential and occupational segregation by ethnicity during the 1980s. Although immigrants still tend to live in enclaves, they become more likely to work in higher social status occupations. According to Hou and Picot's (2003) research, the effects of enclave residence at the census tract level on immigrant employment and occupational segregation vary across ethnic groups. For example, living in an own-ethnicity intensive neighbourhood lowers a black immigrant's likelihood of being employed and increases his probability of working in an ethnically segregated occupation, whereas the effect is not statistically significant either way for a Chinese immigrant. These studies provide an alternative angle of analyzing immigrant

enclave residence and labour market assimilation.

3.3 Data and Statistical Summary

The datasets that I use in this paper are drawn from the 1981, 1986, 1991, 1996 and 2001 Canadian Census Public Use Microdata File (PUMF). I restrict my sample to male immigrants aged 25-54 who are *not* born in an English or French speaking developed country. Thus, those born in the U.S., the U.K., Ireland, Australia, New Zealand and France are excluded due to their similarity to native-born Canadians in terms of languages and culture. I study males only because female labour supply is usually complicated by their roles in non-market work at home. The age restriction is set to the primary working ages in order to exclude individuals who are pursuing postsecondary education and those who are eligible for early retirement during the survey year. I also drop observations of Atlantic Provinces and the Territories because of the small representation of immigrants in these areas. All wages and earnings are deflated by Consumer Price Index (CPI) based on the 1992 Canadian dollar.

Descriptive statistics show that younger immigrants perform worse than older ones. I plot the age profile of immigrant participation rate and employment rate relative to same-aged natives by birth-year group in Figures 3.1 and 3.2. Immigrants born before 1951 have higher participation and employment rates than natives (that is, their relative rates are positive in the figures), while those born after 1951 are worse off than natives. Figure 3.3 and 3.4 present the immigrant- native differences in labour force activities by immigrant arrival cohort. Immigrants who arrived more recently, say after 1980, have lower relative participation and employment rates than those who migrated before 1980. However, as recent cohorts' time in Canada increases, their relative labour force activities tend to converge with the earlier cohorts. The fact that older and earlier immigrants perform better than younger and more recent cohorts implies assimilation through the improvement of labour market attachment.

3.3.1 How to Measure Ethnic Enclave?

I measure the ethnic enclaves by an *exposure index* that is commonly used in this type of literature. (Borjas 2000 and Warman 2007) Let M be the number of immigrants and P the total population. The exposure index of enclave is then the share of population in a census metropolitan area (CMA) c that belongs to an ethnicity j:

$$ENCLAVE = M_{cj}/P_c$$

I include both men and women of all work statuses and all ages to calculate the index, because each person's human capital and activity, regardless of his or her own labour market activity, can help construct the ethnic economy and network in an enclave and, in turn, affect a resident's labour force activities.

The geographic area is defined by CMA because the social network

between immigrants and their ethnic groups largely depends on their mobility. According to Warman (2007), on the one hand, bus and subway services provide immigrants with a means of low-cost transportation within a city. On the other hand, the distance between CMAs is large enough to make intercity commuting relatively inconvenient. Moreover, new immigrants often build up their network through the use of public services or immigrant-assistance programs, such as libraries or language training programs. Since most of these programs are provided and manipulated at the city level, it is reasonable to assume that immigrants usually interact with ethnic friends within a CMA. Although census tract is sometimes more accurate in measuring the neighbourhood characteristics (Hou and Picot 2003), it is too strong an assumption that immigrants interact more with their neighbours than with friends living in a distant community of the same city.

Table 3.1 lists enclaves with the highest exposure index in the 2001 Census by ethnicity and CMA. Toronto is the largest host city of ethnic enclaves, followed by Montreal and Vancouver. The economic environment in these cities may be one reason for immigrants to reside there. Besides, Vancouver magnetizes immigrants from Asia by its mild weather and vicinity of the Pacific Ocean. As discussed before, the large stock of existing immigrants in these cities then attract more immigrants from the same country of origin. Except for a few traditional source countries like Germany and Italy, immigrants from the new source countries, such as China, India and the Philippines have established most of the large ethnic enclaves. Due to the cultural and economic differences between these developing countries and Canada, immigrants from there are likely to cluster together and form a shelter against cultural shock. Limited by data availability, it is not possible to track all ethnicities from 1981 to 2001. However, an intercensal comparison of ethnic groups shows that Arab, Chinese, Filipino, Italian, and Portuguese enclaves continuously rank high in the list of exposure indices.

3.3.2 Who Are More Likely to Live in Ethnic Enclaves?

As discussed in the previous sections, there are a variety of reasons for immigrants to live in ethnic enclaves. Although a detailed analysis is beyond the range of this paper, I use a statistical summary to illustrate immigrant residential distribution.

Table 3.2 reports the distribution of enclave residence by immigrant socio-economic characteristics. I order the exposure index for immigrants from non-English or French speaking countries and divide them into three equal-sized groups. The lowest one third are called small enclave, and the highest one third are called large enclave. I then calculate the share of immigrants living in each enclave group by their socio-economic characteristics. For example, the first number in the row "High School Graduates" is equal to the number of immigrants with a high school diploma living in a small enclave divided by the total number of immigrant high school graduates. Therefore, the sum of each row in a census panel is 1. I omit age, marital status and naturalized citizenship, because they do

not seem to vary across enclave groups.

Immigrants whose years-since-migration (YSM) is more than 20 may have a high level of assimilation and their share of large enclave residents is lower than 30 percent in most censuses. By contrast, the most recent cohort who arrived in Canada within 10 years is more likely to live in large enclaves, and the likelihood turns as high as 40 percent in 2001. However, it does not necessarily mean that these immigrants have moved out of enclaves, because the exposure index can be lowered when the population in a CMA grows faster than the enclave size.

Traditionally, it is the less-educated immigrants who are more likely to live in ethnic enclaves. In 1986, about 40 percent immigrants with less than high school education choose large enclaves, whereas over 40 percent postgraduate immigrants live in small enclaves. However, the large inflow of skilled-worker immigrants from Asia during the 1990s has substantially changed the pattern; their high educational attainment and preference over large enclaves have raised the proportion of university degree holders living in large enclaves to 40 percent and that of postgraduates to 34 percent in 2001.

Knowledge of one of the official languages does not seem to be correlated with immigrant residential decision. However, those who cannot speak either one of the official languages tend to live in large enclaves.

3.3.3 How Do Enclave Residents Perform?

Table 3.3 compares the labour market performance of immigrants by the distribution of enclave residence. Means of natives and immigrants from English or French speaking developed countries are listed for reference. For example, the first number in the "Employed" row is the proportion of immigrants living in small enclaves who are employed. The sum of employed, unemployed and not in labour force is equal to 1 in each column.

In most census years, the share of employed is not very different between small and large enclaves. However, those living in large enclaves have lower participation rates and are less likely to be unemployed than those in small enclaves. Overall, enclave residence does not seem to improve immigrants' labour force involvement relative to natives.

Immigrants in large enclaves earn less than those in small enclaves. However, the disparity in annual wages and earnings shrinks over time, partially due to the increasing share of high-skilled immigrants living in large enclaves.

Interestingly, the proportion of large enclave residents working in the same Census Sub-Division (CSD) is even lower than those in a small enclave. This has two implications: (a) living in a large enclave may provide an immigrant with information about job opportunities beyond its geographic confinement; (b) considering immigrants' high dwelling-owning ratios, it may not be easy for them to move close to the place of work. If residents in large enclaves are less mobile than those in small enclaves, the effect of job opportunities on residence decision, that could cause endogeneity problem in the multivariate regression analysis, is

moderate. Since CSD is a smaller geographic area than CMA and the majority of people stay in the same CSD as five years ago, it is safe to say that most immigrants choose to live in the same enclave over a long period of time.

In summary, recently arrived immigrants are more likely to live in large ethnic enclaves on arriving in Canada, but they do not seem to fare better than those outside enclaves in terms of labour market involvement and earnings. However, the cross-tabular analysis is based on simple descriptive statistics without controlling for observable socio-economic characteristics. In order to accurately estimate the effect of enclave residence, I need to use multivariate regression methods.

3.4 Basic Model and Results

3.4.1 Model Specification

I use a probit model to estimate the effect of enclaves on immigrants' labour force activities. I include male immigrants who are in their primary working age in the labour force participation model, while only those employed and unemployed are sampled in the employment model. For each census year t, I run the following regression:

$$\text{Prob}(Y_{it}) = f(ENCLAVE_{cjt}, YSM_k, X_{it})$$

where Y is a binary variable indicating an immigrant's labour force activity, that is, Y equals one for a participant in the labour force participation model and for an employed man in the employment model, and zero otherwise. As defined in the previous section, $ENCLAVE_{cj}$ is the exposure index of immigrants with ethnicity j living in CMA c. In addition to regressions with the continuous enclave index, I use a dummy indicating a large enclave whose exposure index is greater than 0.02 which is roughly the 67 percentile (or two thirds). This enclave dummy allows me to estimate the threshold effect of enclave residence at the cut-off level[7]. *YSM* is a vector of dummies indicating the immigrant years-since-migration group that captures the assimilation effect because immigrants who arrive earlier may have higher labour market attachment than new arrivals. The three YSM groups are 21 years and more (the default), 11 to 20 years, and 10 years and less. In the regressions, I interact either continuous or discrete measure of enclave with *YSM* to test the effect at different stages of assimilation.

In the above equation, X is a series of socio-economic characteristic variables, including age, education, province, marital status, visible minority status and knowledge of official languages. In the labour force participation model, I add a dummy indicating the presence of at least one unmarried child because it can affect a person's participation decision in two ways: on the one hand, a child will increase the father's opportunity cost of time and the preference over leisure

[7] I have also used discrete enclave index by dividing the index into a series of equal-width bands and using a vector of dummies to indicate them. Regression results show that only enclaves with an index higher than 0.02 have significant coefficient estimates.

that, in turn, will reduce the participation rate. On the other hand, the presence of a child will also increase the budget constraint and motivate the father to participate in the labour market. Additionally, eligibility of child care tax benefits can increase a parent's after-tax income and also provide an incentive to participate. Likewise, in the employment model, I include the naturalized citizenship as a control variable, because Canadian citizenship will give a candidate some priority in obtaining government jobs.

3.4.2 Regression Results of the Labour Force Participation Model

To simplify the interpretation of the probit regression results of male immigrant labour force participation, I calculate and report the marginal effects of the independent variables in this section. In all regressions, the control variables[8] have expected signs, for example, the most recent immigrants whose YSM is 10 years and less have a significantly lower probability of participation than those who arrived 20 years ago. The age group variables show that the participation rate peaks at the age 30-39, and immigrants with higher education are more likely to participate. Compared to Ontario, only immigrants living in Quebec have a significantly lower participation rate. Those who cannot speak either official language and who belong to visible minority have a lower rate, but marriage and the presence of a child have positive effects on participation.

I highlight the estimated marginal effects of the enclave index and its interaction with YSM in Table 3.4. The enclave index is statistically insignificant in 1991 and before, but it turns significantly negative as of 1996. The marginal effect in 1996 means a 1 percentage point increase in the exposure index will lower the participation rate of immigrants living in the enclave by about 0.44 percent. Such an effect is moderate, because the average enclave index is about 1.5 percent whereas the participation rate ranges between 90 and 95 percent. In the lower panel of Table 3.4, I interact the enclave index with YSM groups; the marginal effects of enclave residence then vary over time for immigrants whose YSM is 11-20 years and less than 10 years. Before 1991, there are some positive effects of enclave residence on labour force participation, but the effect becomes mainly significantly negative in 1996 and 2001. For those who arrived in Canada 20 years before the observation year, the effect of enclave residence is always statistically insignificant.

Table 3.5 reports the regression results with models using a dummy to indicate residence in a large enclave. In the regressions without interaction, almost all the marginal effects of the enclave dummy are statistically insignificant, except for 1991 where they are significantly positive. When the enclave dummy is interacted with the YSM variables, the results are mostly insignificant, as shown in the lower panel of Table 3.5. In 1996 and 2001, the signs of the large enclaves are mainly negative and insignificant. In general, the small magnitude of the estimated effects and their lack of significance suggest that there is no evidence of

[8] The estimates of the control variables are omitted, but they are available upon request.

a threshold effect, and that immigrants who live in large enclaves do not have a substantially higher labour force participation rate than those who live outside. Even the significant estimate in 1991 implies merely a 1.6 percentage point difference in participation rate between large and small enclaves.

3.4.3 Regression Results of the Employment Model

I then restrict my sample to labour force participants and use the indicator of immigrant employment status as the dependent variable in the probit regressions. It should be noted that since only labour force participants are sampled in this model, the regression results can be treated as the inverse effect on immigrants' unemployment rate. The estimated marginal effects of enclave variables are presented in Table 3.6 and 3.7. Similar to the participation model, estimates of the control variables in this model all have expected signs.

In the upper panel of Table 3.6, the marginal effects of the exposure index are positive and significant in all years except for 1981. To illustrate the effects, I use enclaves of Indian immigrants as an example. From Part B of Table 3.1, the enclave index for Indians in Vancouver is 4.71 percent while that in Hamilton is 1.28 percent in 2001. Given the estimated marginal effect of 0.183 in Table 3.6, an Indian immigrant in Vancouver is more likely to be employed than his compatriot in Hamilton by about 0.6 percentage point [=(4.71% – 1.28%)*0.183]. I then interact the exposure index with YSM groups and the marginal effects of the interacted terms are shown in the lower panel of the table. There seems to be inverse relationship between the effect of enclave index and immigrants' time in the host country. Since 1986, the marginal effect is significantly positive for the two more recent cohorts whose YSM is below 20, and is strongest for those who arrived in Canada within 10 years. For the earliest cohort, the effect turns statistically insignificant and small in magnitude. Estimates of the interacted variables suggest that it is the new immigrants who substantially benefit from enclave residence in terms of employment probability.

In Table 3.7, results from regressions where a large enclave dummy is used instead of a continuous enclave index show a similar pattern. The marginal effects of living in a large enclave are all positive and significant when the YSM-specific effect is not controlled for. However, when interacted with YSM groups, they diminish to zero for immigrants with more than 20 years in Canada, but remain significantly positive for those whose YSM is 10 and less. Take the 1996 Census for example: the estimated effect for the recent immigrants is 0.028, which implies that those living in a large enclave have a higher employment probability than those in small enclaves by nearly 3 percentage points. The differential is substantial if viewed from the unemployment side. Since the enclave dummy provides a test for the threshold effect of living in large enclaves, it is not surprising to show stronger impact on immigrant employment probability than the continuous exposure index.

In summary, probit regression results have shown evidence of immigrant assimilation in labour market involvement because new immigrants have lower

participation and employment probabilities than earlier cohorts. There is an inverse relationship between the magnitude of the effect of enclave residence on immigrant labour force activity and their years-since-migration: the later the arrival cohort, the stronger the impact. For immigrants whose YSM is over 20 years, there is almost no significant correlation between enclave and their labour force activity. However, for new immigrants who arrive within 10 years, enclave residence significantly lowers their labour force participation rate, but it significantly increases the participants' probability of being employed.

The causal relationship may seem doubtful when I regress the labour force activities on the contemporary enclave index. Considering the long time that it takes for an enclave to be established and developed while an immigrant's labour force activity is a relatively short term status, it is reasonable to assume that the labour market outcome is affected by the ethnic enclaves rather than the inverse. However, it should be noted that in the long run, labour market performance of existing immigrants could influence the enclave size, or they could be both affected by some unobserved factors. These complications will be discussed in the following section.

3.5 Endogeneity of Enclave Variables and IV Regressions

Although the enclave size and intensity are not directly affected by the current labour market outcomes of immigrants, the probit regression results are not necessarily free from biases because immigrants may not choose residential location randomly. In addition to the easily accessible social network and low-cost ethnic goods, immigrants may also base their residential decisions on job opportunities and expected earnings in a city. The non-random geographic distribution of immigrants will have two complications on the probit regression analysis. First, it is possible that an immigrant who lacks the skills or ability specific to labour market success in the host-country tends to seek an enclave as an asylum, whereas an ambitious and self-motivated immigrant may be indifferent between living in an enclave and living outside. Since those unambitious and unmotivated enclave residents are less likely to participate or to be employed than those ambitious non-enclave residents, the estimated effect of enclave residence on immigrant labour force involvement may be negatively biased in a probit regression. Second, the size of an enclave may be endogenous to local labour market conditions. Suppose that immigrants are attracted to large cities, like Toronto and Vancouver, by the optimal economic conditions and substantial labour demand there. They will then build and develop ethnic enclaves in these cities. Although this process could take decades, the positive correlation between enclave size and job opportunities in an area would bias the probit estimates of enclave residence upwards.

There is no unanimously accepted solution to this endogeneity problem. For example, Borjas (2000) argues that his likely biased regression results provide a lower limit on the adverse impact of enclave residence on earning growth, and that the real effect could be even more negative. Edin et al. (2003) use the enclave

size in the base year as an instrument for the size of the current enclave in which a refugee immigrant resides. Although a standard solution is still an open question, I will propose an instrumental variable (IV) approach to address the bias due to the endogeneity of enclaves.

An IV should be correlated with the endogenous enclave variables but uncorrelated with the error term of the main regression equation. An auxiliary equation including the IVs is regressed to predict values of enclave variable, and the fitted values are then used in the main regression function.

I choose the lagged enclave exposure index and mother tongue as the IVs for ethnic enclaves, because these variables are hypothesized not to affect the current labour market outcome of immigrants, yet they may play important roles when immigrants make residential decisions. The lagged enclave exposure index is often used as a determinant of present enclave intensity because it is documented (Altonji and Card 1991) that a large concentration of existing immigrants attracts new immigrants with the same cultural background. One reason may be that an existing enclave provides them with ethnic goods at a relatively low price and easy access to information. (Zavodny 1997, Chowdhury and Pedace 2006 and Maré et al. 2008) Another reason could be the need of religious people for frequent communication and services at some religious institutions, as suggested by Breton (1964). It is economically wise for them to cluster around the place of worship that is built in an existing enclave. Because of the strong connection between ethnicity and religion groups, a church, mosque or temple will be the core of an ethnic community that attracts more immigrants with the same religion and hence increase the enclave size.[9] Mother tongue, the other instrument, can be one major reason for many immigrants, particularly those who are not fluent in the official languages, to live in an ethnic enclave. (Balakrishnan and Hou 1999) Since my sample is restricted to those from non-English or French speaking countries, heterogeneity in mother tongue is not likely correlated with immigrant labour market outcomes.

I report the IV regression results of participation and employment models using continuous and discrete enclave measures in Table 3.8 and 3.9 respectively. Because of the use of lagged variables, there is no regression for the 1981 Census.

In Table 3.8, the marginal effects of enclave index and large enclave dummy are insignificant on male immigrant labour force participation in Census 1986 and 1991. However, the effect turns significantly negative thereafter. For example, a 1 percentage point increase in enclave index lowers a male resident's participation rate by roughly 0.4 percentage point in 1996 and 2001. Meanwhile, estimates of enclave dummy in the lower panel indicate that the participation rate of an immigrant who lives in a large enclave is lower than someone outside by 3 percentage points. As expected, the negative effect of enclave is stronger than that estimated by a simple probit model.

Table 3.9 presents the IV regression results of male immigrant

[9] I try to include religious status as an instrument variable in the regression, but it seems to be so highly collinear with the lagged enclave index that its coefficient is almost zero.

employment models. The marginal effects of enclave variables are all positive and significant, and their magnitudes are similar to those from probit regressions. This provides strong evidence that immigrants benefit from enclave residence in terms of employment probability. As shown in the lower panel, the marginal effect of the large enclave dummy varies between 1.3 and 3.2 percentage points over time, which can be treated as a big impact on unemployment. Considering the large number of new immigrants who choose to cluster in ethnic enclaves, they are the group who benefit most from enclave residence.

IV regression results confirm my findings with probit models. Immigrants living in ethnic enclaves tend to have lower participation rate in recent years, but they have a better chance of being employed once in the labour force.

3.6 Conclusion

An ethnic enclave can provide an immigrant with social networks and job opportunities that suit the human capital obtained from the source country, but living in an enclave will also hinder the immigrant's acquisition of host-country specific skills. Therefore, the net effect of residing in an ethnic enclave on immigrant labour market performance is theoretically ambiguous. Many researchers attempt to disentangle the relationship between ethnic segregation and immigrant earnings, but no current study examines the effect of enclave residence on immigrant labour force activities using Canadian data. In this paper, I attempt to fill this gap in research through an empirical analysis on male immigrants using the 1981 - 2001 Canadian Censuses.

It is found that new immigrants who arrived in Canada after 1991 are more likely to cluster in large ethnic enclaves for a temporary or permanent source of social network, whereas old immigrant cohorts tend to live outside enclaves. With the inflow of skilled workers from Asian countries during the 1990s, the proportion of well-educated immigrants living in large enclaves has substantially increased.

Probit and IV regressions show that enclave variables that measure the intensity of ethnic clustering are negatively correlated with the labour force participation rate in the late 1990s, but the magnitude is moderate. By interacting immigrants' years-since-migration with enclave variables, I find that the impact on new immigrants' participation rate is significantly negative. This finding can be explained by immigrants' human capital investment and welfare participation. Aydemir's (2009) recent study shows that refugees living in enclaves are more likely to invest in language or professional training than those living outside. One possible reason may be the relatively low costs of providing ethnicity-specific training services in an enclave. When there are a large number of immigrants who do not speak the official languages fluently, but a limited number of positions are offered by ethnic companies, the need for language training is then increased for those who want to work. If the lower participation rate is due to immigrants' investment in human capital, it is then not necessary to worry about the negative effect of enclave residence. Additionally, through ethnic networks, immigrants

who are not proficient in English or French can easily get access to information about social welfare. Bertrand et al. (2000) find that access to a same-language network is positively related to welfare participation. Eligibility for social assistance can be treated as an increase in non-labour income and therefore as a disincentive of labour force participation.

In terms of the likelihood of being employed, immigrants, specifically the most recent arrival cohorts, actually benefit from living in ethnic enclaves. All the probit regression results suggest that immigrants in a large enclave have a higher employment probability than those living outside by 1 to 2 percentage points, which can be interpreted as a substantial impact on the unemployment rate. Considering the aforementioned human capital investment by enclave residents, the higher employment probability may be the reward to their newly acquired Canadian education or training. Moreover, the positive effect of enclave residence on employment may be explained by job opportunities in ethnic companies. Immigrants who want to work but lack Canadian-specific skills may choose to work in ethnic firms. When the within-ethnicity competition turns keen with the increasing size of enclave, the average wage is driven down, and those not employed may then undertake training or education and become non-participants. In addition, labour market information provided by the ethnic network may help new immigrants obtain jobs in non-ethnic firms too. Balakrishnan and Hou (1999) argue that immigrants become more mobile between place of work and residence because of growing urbanization. It is more and more likely for immigrants to live in enclaves to enjoy the low-cost ethnic goods and work outside ethnic segregation to earn higher wages.

In summary, enclave residence slightly reduces the immigrant labour force participation rate, but increases their probability of employment. Both impacts are stronger for new immigrants than old arrival cohorts. For the majority of immigrants, there is no clear evidence that their labour force involvement is hurt by enclave residence. This partially address the question raised by Borjas (2000) and Warman (2007) as to why immigrants still choose to live in ethnic enclaves in spite of its negative impact on wage growth: the benefit of low training costs or job opportunities offered by enclaves may outweigh the loss in wages. Based on this, policies on immigrant labour market assimilation should rather focus on raising wages than on improving employment opportunities.

References

Altonji, Joseph G. and David Card (1991) "The Effects of Immigration on the Labor Market Outcomes of Less-Skilled Natives." In *Immigration, Trade, and the Labor Market*, edited by J. M. Abowd and R. B. Freeman. University of Chicago Press.

Aydemir, Abdurrahman (2009) "Ethnic Enclaves and Human Capital Investments: Evidence from a Natural Experiment," Paper presented at the Economics of Immigration: Children of Immigrants & Temporary Migration, May 11-12, 2009, Vancouver BC.

Baker, Michael, and Dwayne Benjamin (1994) "The Performance of Immigrants in the Canadian Labor Market," *Journal of Labor Economics*, 12(3), 369–405.

Balakrishnan, T.R., and Feng Hou (1999) "Socioeconomic Integration and Spatial Residential Patterns of Immigrant Groups in Canada," *Population Research and Policy Review*, 18(3), 201-217.

Bartel, Ann (1989) "Where Do the New Immigrants Live?" *Journal of Labor Economics*, 7(4), 371-391

Bertrand, Marianne, Erzo F.P. Luttmer, and Sendhil Mullianathan (2000) "Network Effects and Welfare Cultures," *Quarterly Journal of Economics*, 115(3), 1019–1055.

Bloom, David E., Gilles Grenier, and Morely Gunderson (1995) "The Changing Labour Market Position of Canadian Immigrants," *Canadian Journal of Economics*, 28(4b), 987–1005.

Borjas, George J. (1986) "The Self-employment Experience of Immigrants," *Journal of Human Resources*, 21(4), 485–506.

__ (2000) "Ethnic Enclaves and Assimilation," *Swedish Economic Policy Review*, 7, 89–122.

Breton, Raymond (1964) "Institutional Completeness of Ethnic Communities and Personal Relations to Immigrants," *American Journal of Sociology*, 70(2), 193–205.

Chiswick, Barry R., and Paul W. Miller (2002) "Do Enclaves Matter in Immigrant Adjustment?" Discussion Paper No. 449, Institute for the Study of Labor (IZA).

Chowdhury, Mussaddeq and Roberto Pedace (2007) "Ethnic Enclaves and Labor Markets: An Analysis of Immigrant Outcomes in California," *Contemporary Economic Policy* 25(2), 238-249.

Clark, Kenneth, and Stephen Drinkwater (2002) "Enclaves, Neighbourhood Effects and Employment Outcomes: Ethnic Minorities in England and Wales," *Journal of Population Economics*, 15(1), 5–29.

Edin, Peter-Anders, Peter Fredriksson, and Olof Aslund (2003) "Ethnic Enclaves and the Economic Success of Immigrants – Evidence from A Natural Experiment," *Quarterly Journal of Economics*, 118(1), 329–357.

Frenette, Marc, and Rene Morisette (2003) "Will They Ever Converge? Earnings of Immigrant and Canadian-born Workers over the Last Two Decades," Analytical Studies Branch Research Paper Series, No. 215, Statistics Canada, Ottawa.

Goel, Deepti and Kevin Lang (2009) "The Role of Social Ties in the Job Search of Recent Immigrants," Working Papers No. 5, clsrn_admin-2009-12, CLSRN, the Department of Economics, University of British Columbia.

Gray, David, Jeffrey Mills and Sourushe Zandvakili (2003) "Immigration, Assimilation and Inequality of Income Distribution in Canada," University of Cincinnati, Department of Economics, Economics Working Papers Series, 2003-01.

Hou, Feng, and Garnett Picot (2003) "Visible-Minority Neighbourhood Enclaves Labour Market Outcomes of Immigrants," in *Canadian Immigration Policy for the 21st Century*, ed. Charles M. Beach, Alan G. Green, and Jeffrey G. Reitz (Kingston, ON: John Deutsch Institute).

Hum, Derek, and Wayne Simpson (2000) "Closing the Wage Gap: Economic Assimilation of Canadian Immigrants Reconsidered," *Journal of International Migration and Integration*, 1(4), 427-441.

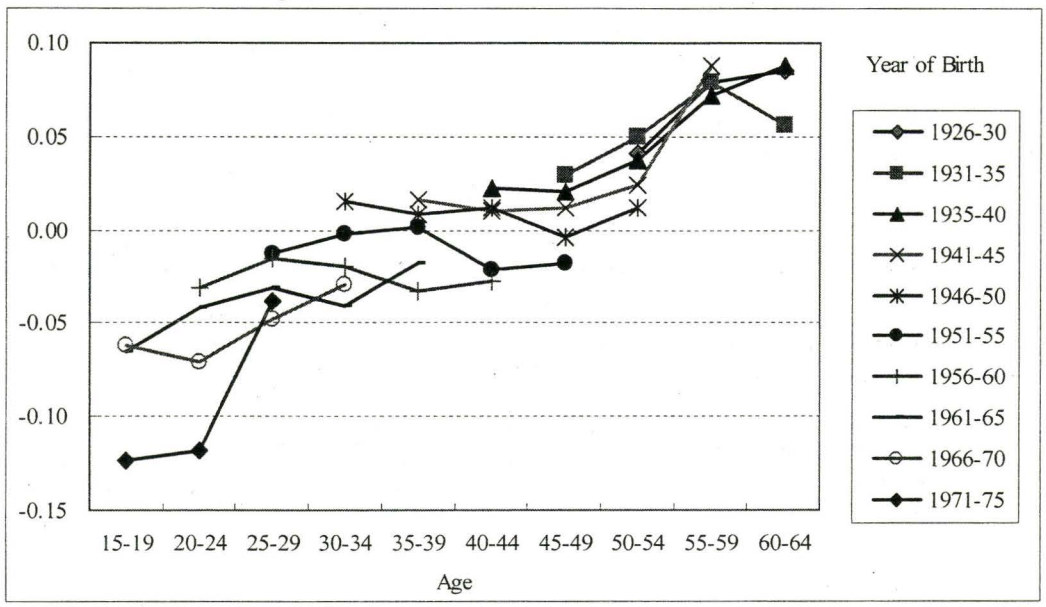
Lazear, Edward P. (1999) "Culture and Language," *Journal of Political Economy*, 107(6), 95–126.

Maré, Dave, Steven Stillman and Melanie Morten (2008) "Settlement Patterns and the Geographic Mobility of Recent Migrants to New Zealand," *Economic Impacts of Immigration Working Paper Series*, the Department of Labour, New Zealand, http://www.dol.govt.nz/PDFs/settlement-patterns.pdf.

Warman, Casey (2007) "Ethnic Enclaves and Immigrant Earnings Growth," *Canadian Journal of Economics*, 40(2), 401-422.

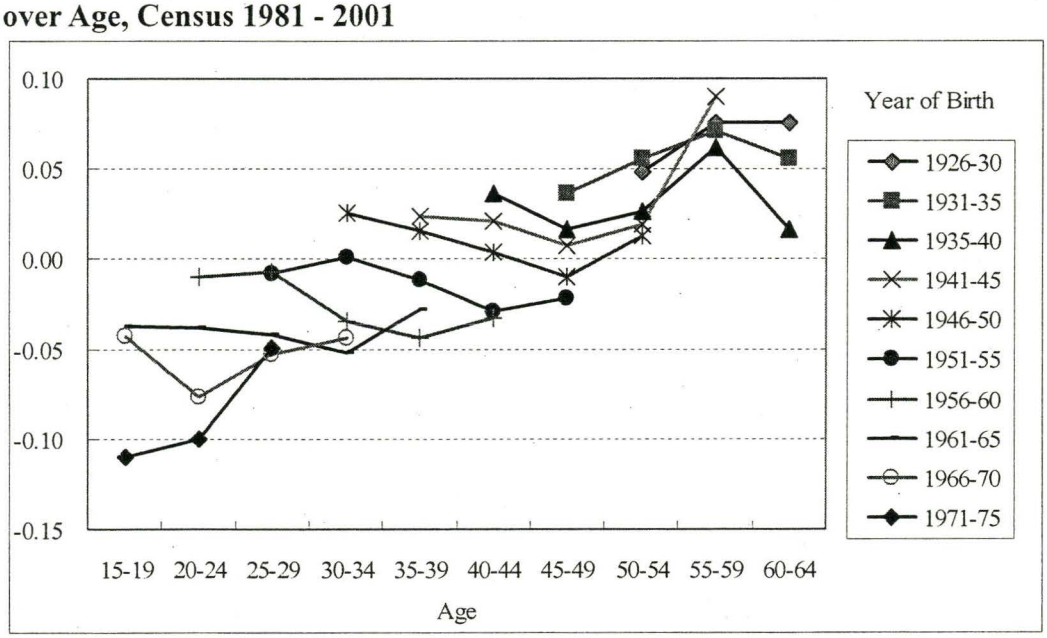
Zavodny, Madeline (1997) "Welfare and the Locational Choices of New Immigrants," *Economic Review*, Federal Reserve Bank of Dallas, issue Q II, 2–10.

Figure 3.1
Male Immigrant-Native Differences in Labour Force Participation Rate by Birth Cohort over Age, Census 1981 - 2001



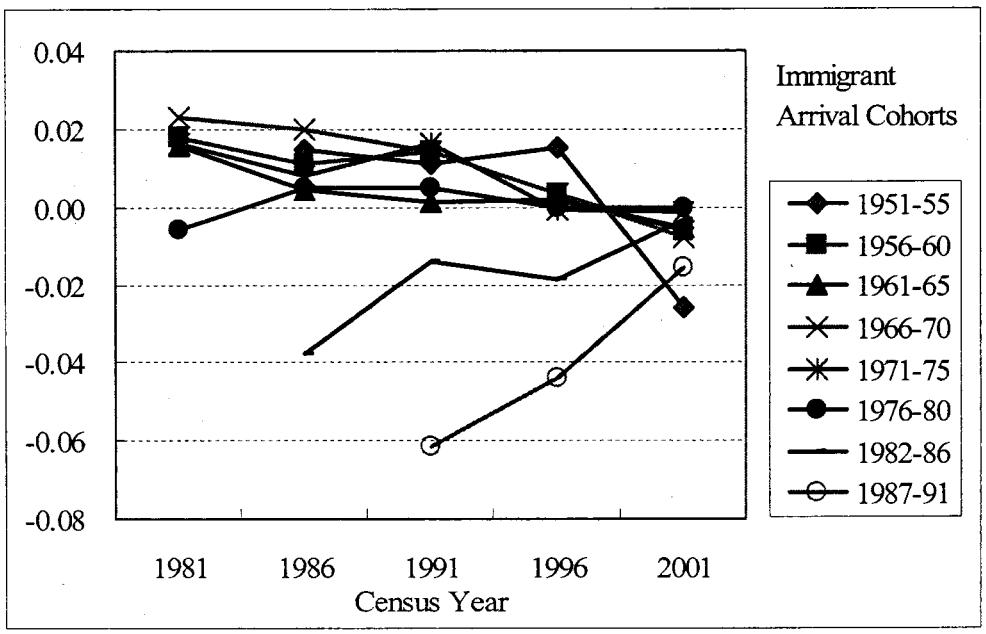
NOTES: The sample is restricted to male natives and immigrants aged 25–54.

Figure 3.2
Male Immigrant-Native Differences in Employment Rate by Birth Cohort over Age, Census 1981 - 2001



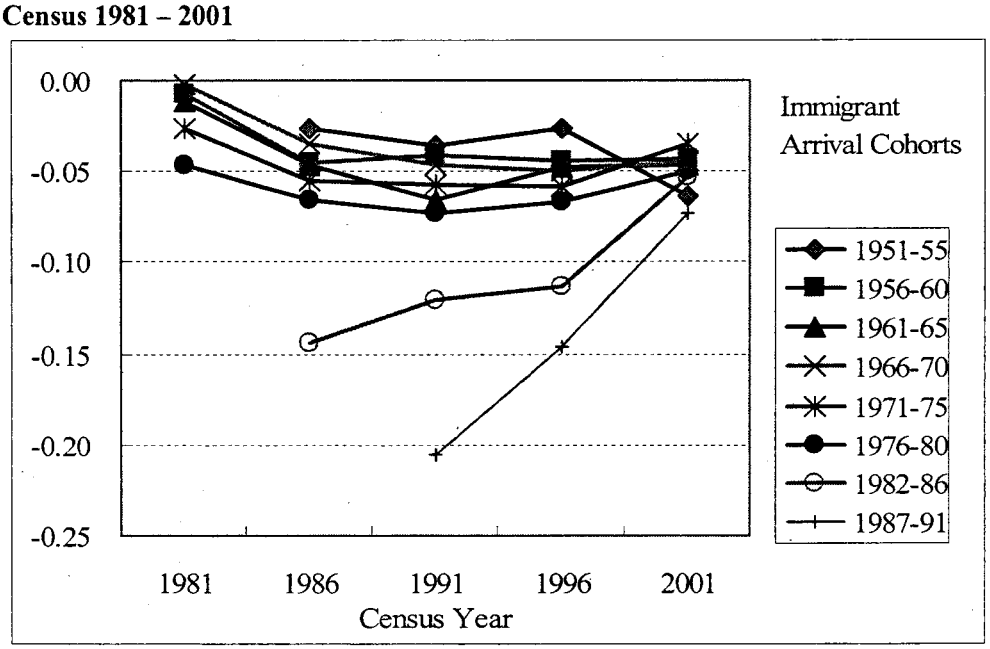
NOTES: Same as Figure 3.1.

Figure 3.3
Male Immigrant-Native Differences in Labour Force Participation Rate by Immigrant Arrival Cohort, Census 1981 – 2001



NOTES: Same as Figure 3.1.

Figure 3.4
Male Immigrant-Native Differences in Employment Rate by Immigrant Arrival Cohort, Census 1981 – 2001



NOTES: Same as Figure 3.1.

Table 3.1
Enclaves with the Highest Exposure Indices by Ethnicity and CMA, Census 2001

Part A	German	Polish	Portuguese	Italian	Chinese
Montreal	-	-	-	2.09%	1.15%
Ottawa - Hull	-	-	-	-	1.94%
Toronto	-	1.24%	1.88%	3.07%	6.58%
Hamilton	-	1.33%	-	2.48%	-
St. Catharines and Niagara Falls	-	-	-	3.10%	-
Kitchener	1.69%	-	1.91%	-	-
London	-	1.27%	1.24%	-	-
Windsor	-	-	-	3.06%	-
Winnipeg	1.30%	-	-	-	-
Calgary	-	-	-	-	3.43%
Edmonton	-	-	-	-	2.67%
Vancouver	-	-	-	-	12.98%
Victoria	-	-	-	-	1.84%

Part B	Indian	Filipino	Arab	Korean	Jamaican
Montreal	1.05%	-	1.95%	-	-
Ottawa - Hull	1.24%	-	1.70%	-	-
Toronto	6.81%	1.97%	-	-	1.51%
Hamilton	1.28%	-	-	-	-
St. Catharines and Niagara Falls	-	-	-	-	-
Kitchener	1.78%	-	-	-	-
London	-	-	-	-	-
Windsor	-	-	2.53%	-	-
Winnipeg	1.10%	2.74%	-	-	-
Calgary	2.48%	1.08%	-	-	-
Edmonton	2.00%	-	-	-	-
Vancouver	4.71%	1.97%	-	1.06%	-
Victoria	-	-	-	-	-

NOTES: Enclave exposure index = number of immigrants with an ethnicity in a city / total population of the city

Table 3.2
Distribution of Enclave Residence for Male Immigrants by Socio-Economic Characteristics, Census 1981 – 2001

Part A	1981 (n=14,118)			1986 (n=14,734)		
	Small	Medium	Large	Small	Medium	Large
YSM >20	0.	0.37	0.26	0.37	0.34	0.28
YSM 11-20	0.28	0.40	0.32	0.30	0.34	0.35
YSM ≤ 10	0.22	0.42	0.36	0.32	0.38	0.30
Less than High School	0.29	0.37	0.34	0.31	0.29	0.40
High School Graduates	0.32	0.41	0.28	0.35	0.37	0.28
Some Postsecondary	0.31	0.41	0.28	0.34	0.41	0.25
Bachelor's Degree	0.24	0.42	0.34	0.33	0.39	0.29
Postgraduate	0.30	0.44	0.25	0.41	0.39	0.21
Mother Tongue is English or French	0.29	0.45	0.25	0.31	0.34	0.35
Knowledge of English or French but Other Mother Tongue	0.31	0.38	0.31	0.35	0.36	0.30
No Official Language	0.19	0.41	0.40	0.19	0.27	0.54

Part B	1991 (n=24,936)			1996 (n=28,351)		
	Small	Medium	Large	Small	Medium	Large
YSM >20	0.34	0.34	0.33	0.37	0.34	0.30
YSM 11-20	0.32	0.34	0.35	0.34	0.34	0.31
YSM ≤ 10	0.33	0.34	0.33	0.27	0.37	0.37
Less than High School	0.33	0.31	0.36	0.34	0.32	0.34
High School Graduates	0.34	0.35	0.32	0.33	0.36	0.31
Some Postsecondary	0.34	0.35	0.31	0.33	0.35	0.32
Bachelor's Degree	0.29	0.33	0.38	0.26	0.37	0.37
Postgraduate	0.34	0.38	0.28	0.32	0.37	0.30
Mother Tongue is English or French	0.31	0.28	0.41	0.29	0.28	0.42
Knowledge of English or French but Other Mother Tongue	0.34	0.35	0.31	0.33	0.37	0.30
No Official Language	0.25	0.36	0.40	0.22	0.31	0.47

Table 3.2 (Continued)
Distribution of Enclave Residence for Male Immigrants by Socio-Economic Characteristics, Census 1981 - 2001

Part C	2001 (n=30,309)		
	Small	Medium	Large
YSM >20	0.39	0.33	0.29
YSM 11-20	0.36	0.34	0.30
YSM ≤ 10	0.27	0.34	0.39
Less than High School	0.37	0.30	0.33
High School Graduates	0.34	0.34	0.32
Some Postsecondary	0.36	0.35	0.29
Bachelor's Degree	0.27	0.33	0.40
Postgraduate	0.30	0.35	0.34
Mother Tongue is English or French	0.30	0.43	0.27
Knowledge of English or French but Other Mother Tongue	0.34	0.32	0.34
No Official Language	0.22	0.22	0.55

NOTES: "Small" means enclaves with an exposure index at the lowest 1/3, while "Large" enclaves refer to those at the top 1/3. Value of each cell = immigrants of a socio-economic group that live in an enclave percentile range / total immigrants of the group. The sample is restricted to males aged 25–54 with positive wages living in Ontario, Quebec, Manitoba, Saskatchewan, Alberta, British Columbia.

Table 3.3
Sample Means by Enclave Residence and Immigration Status for Males

Census 1981	Immigrants in Small Enclaves	Immigrants in Medium Enclaves	Immigrants in Large Enclaves	English / French Immigrants	Natives
Employed	0.92	0.92	0.93	0.94	0.90
Unemployed	0.03	0.03	0.03	0.03	0.04
Not in Labour Force	0.05	0.05	0.04	0.03	0.06
Work in the same CSD (among Employed)	0.54	0.49	0.41	0.46	0.51
Annual Wages ($)	32,041	31,570	30,680	38,891	33,244
Annual Earnings ($)	36,213	35,490	33,026	42,001	36,690
Age	39.95	39.13	38.61	39.32	37.15
Married	0.82	0.83	0.85	0.81	0.77
Visible Minority	0.00	0.00	0.00	0.00	0.00
Dwelling Owned	0.74	0.70	0.73	0.67	0.69
Same CSD in 5 years	0.73	0.70	0.74	0.64	0.73
Observation	4,214	5,574	4,330	5,877	68,063

Census 1986	Immigrants in Small Enclaves	Immigrants in Medium Enclaves	Immigrants in Large Enclaves	English / French Immigrants	Natives
Employed	0.87	0.87	0.90	0.91	0.87
Unemployed	0.07	0.07	0.05	0.05	0.07
Not in Labour Force	0.05	0.06	0.06	0.04	0.06
Work in the same CSD (among Employed)	N/A	N/A	N/A	N/A	N/A
Annual Wages ($)	29,529	29,201	28,740	38,163	30,889
Annual Earnings ($)	32,821	32,251	31,233	41,227	33,661
Age	40.29	39.89	39.32	40.02	36.90
Married	0.82	0.81	0.83	0.79	0.74
Visible Minority	0.33	0.33	0.50	0.09	0.01
Dwelling Owned	0.70	0.65	0.77	0.69	0.67
Same CSD in 5 years	0.75	0.74	0.80	0.72	0.77
Observation	4,932	5,190	4,612	5,385	76,691

Table 3.3 (continued)
Sample Means by Enclave Residence and Immigration Status for Males

Census 1991	Immigrants in Small Enclaves	Immigrants in Medium Enclaves	Immigrants in Large Enclaves	English / French Immigrants	Natives
Employed	0.84	0.83	0.86	0.90	0.86
Unemployed	0.09	0.10	0.08	0.06	0.08
Not in Labour Force	0.07	0.07	0.06	0.04	0.06
Work in the same CSD (among Employed)	0.56	0.48	0.40	0.45	0.50
Annual Wages ($)	27,450	28,201	29,270	38,201	31,945
Annual Earnings ($)	30,586	31,215	31,638	41,540	34,817
Age	39.72	40.01	39.35	40.40	37.45
Married	0.78	0.79	0.81	0.78	0.72
Visible Minority	0.44	0.40	0.67	0.17	0.01
Dwelling Owned	0.61	0.64	0.76	0.69	0.69
Same CSD in 5 years	0.64	0.66	0.65	0.67	0.73
Observation	8,227	8,433	8,276	8,911	129,191

Census 1996	Immigrants in Small Enclaves	Immigrants in Medium Enclaves	Immigrants in Large Enclaves	English / French Immigrants	Natives
Employed	0.81	0.79	0.79	0.89	0.85
Unemployed	0.09	0.10	0.07	0.05	0.07
Not in Labour Force	0.10	0.12	0.13	0.06	0.08
Work in the same CSD (among Employed)	0.47	0.41	0.36	0.43	0.44
Annual Wages ($)	24,392	23,017	23,186	35,722	29,776
Annual Earnings ($)	26,942	25,205	25,245	38,950	32,272
Age	40.48	39.78	39.61	41.48	38.59
Married	0.76	0.76	0.77	0.75	0.69
Visible Minority	0.43	0.51	0.83	0.09	0.01
Dwelling Owned	0.60	0.56	0.71	0.70	0.69
Same CSD in 5 years	0.72	0.72	0.67	0.72	0.77
Observation	9,081	9,950	9,320	6,822	126,972

Table 3.3 (concluded)
Sample Means by Enclave Residence and Immigration Status for Males

Census 2001	Immigrants in Small Enclaves	Immigrants in Medium Enclaves	Immigrants in Large Enclaves	English / French Immigrants	Natives
Employed	0.83	0.83	0.83	0.88	0.87
Unemployed	0.07	0.06	0.05	0.04	0.05
Not in Labour Force	0.11	0.10	0.12	0.08	0.08
Work in the same CSD (among Employed)	0.51	0.50	0.49	0.49	0.47
Annual Wages ($)	26,310	27,014	26,481	37,054	33,086
Annual Earnings ($)	29,238	29,448	28,738	40,648	35,769
Age	41.01	40.35	40.44	41.76	39.56
Married	0.75	0.75	0.81	0.73	0.68
Visible Minority	0.51	0.59	0.85	0.14	0.02
Dwelling Owned	0.60	0.57	0.71	0.70	0.71
Same CSD in 5 years	0.73	0.71	0.69	0.74	0.79
Observation	10,105	10,130	10,074	6,082	126,726

NOTES: Each cell presents the weighted average of an enclave group. The sample is restricted to males aged 25–54 with positive wages living in Ontario, Quebec, Manitoba, Saskatchewan, Alberta, British Columbia.

Table 3.4
Probit Regressions of Male Immigrant Labour Force Participation: Marginal Effects of Enclave Exposure Index

	(1)	(2)	(3)	(4)	(5)
Census	1981	1986	1991	1996	2001
Regressions with No Interaction					
Enclave Index	0.081	0.092	0.149	-0.436***	-0.346***
	(0.068)	(0.114)	(0.155)	(0.090)	(0.128)
Pseudo R^2	0.05	0.05	0.06	0.06	0.05
Regressions with Enclave Index Interacted with YSM Group					
Enclave Index * YSM>20	-0.048	-0.051	0.237	-0.000	0.015
	(0.131)	(0.202)	(0.185)	(0.270)	(0.120)
Enclave Index * YSM 11-20	0.156	-0.123	0.496***	-0.085	-0.166**
	(0.103)	(0.114)	(0.134)	(0.124)	(0.081)
Enclave Index * YSM<10	0.122	0.632***	-0.069	-0.653***	-0.528**
	(0.107)	(0.175)	(0.275)	(0.158)	(0.211)
Pseudo R^2	0.05	0.05	0.06	0.06	0.05
Observations	14,893	15,348	27,496	29,709	30,997

NOTES: Robust standard errors are in parentheses. Significance levels are indicated by * for 10%, ** for 5%, and *** for 1 %. The dependent variable is the dummy indicating whether an individual participates in the labour force (employed or unemployed). Regressions control for years-since-migration, age group, educational attainment, knowledge of official languages, marital status, visible minority status and province of residence. The sample is restricted to males aged 25–54 living in Ontario, Quebec, Manitoba, Saskatchewan, Alberta, British Columbia.

Table 3.5
Probit Regressions of Male Immigrant Labour Force Participation: Marginal Effects of Large Enclave Dummy

	(1)	(2)	(3)	(4)	(5)
Census	1981	1986	1991	1996	2001
Regressions with No Interaction					
Large Enclave Dummy	0.003	0.004	0.011**	-0.011	-0.008
	(0.004)	(0.004)	(0.005)	(0.008)	(0.008)
Pseudo R^2	0.05	0.05	0.06	0.05	0.05
Regressions with Large Enclave Dummy Interacted with YSM Group					
Large Enclave * YSM>20	-0.000	-0.002	0.007	-0.018*	0.003
	(0.006)	(0.007)	(0.005)	(0.010)	(0.007)
Large Enclave * YSM 11-20	0.008*	-0.000	0.016***	-0.010	-0.010
	(0.005)	(0.005)	(0.005)	(0.009)	(0.007)
Large Enclave * YSM<10	0.002	0.017***	0.011	-0.007	-0.015
	(0.008)	(0.005)	(0.009)	(0.017)	(0.019)
Pseudo R^2	0.05	0.05	0.06	0.05	0.05
Observations	14,893	15,348	27,496	29,709	30,997

NOTES: Same as Table 3.4

Table 3.6
Probit Regressions of Male Immigrant Employment: Marginal Effects of Enclave Exposure Index

	(1)	(2)	(3)	(4)	(5)
Census	1981	1986	1991	1996	2001
Regressions with No Interaction					
Enclave Index	0.090	0.451***	0.596***	0.375***	0.183***
	(0.055)	(0.151)	(0.168)	(0.104)	(0.056)
Pseudo R^2	0.05	0.06	0.05	0.06	0.05
Regressions with Enclave Index Interacted with YSM Group					
Enclave Index * YSM>20	-0.012	0.298	0.204	0.136	0.063
	(0.132)	(0.247)	(0.246)	(0.151)	(0.078)
Enclave Index * YSM 11-20	0.111	0.428**	0.419*	0.409***	0.178***
	(0.133)	(0.187)	(0.236)	(0.115)	(0.064)
Enclave Index * YSM<10	0.135	0.659***	0.976***	0.443**	0.226***
	(0.095)	(0.250)	(0.191)	(0.174)	(0.078)
Pseudo R^2	0.05	0.06	0.05	0.06	0.05
Observations	14,220	14,500	25,613	26,199	27,536

NOTES: Robust standard errors are in parentheses. Significance levels are indicated by * for 10%, ** for 5%, and *** for 1 %. The dependent variable is the dummy indicating whether an individual is employed. Regressions control for years-since-migration, age group, educational attainment, knowledge of official languages, marital status, visible minority status and province of residence. The sample is restricted to male labour force participants (employed or unemployed) aged 25–54 living in Ontario, Quebec, Manitoba, Saskatchewan, Alberta, British Columbia.

Table 3.7
Probit Regressions of Male Immigrant Employment: Marginal Effects of Large Enclave Dummy

	(1)	(2)	(3)	(4)	(5)
Census	1981	1986	1991	1996	2001
Regressions with No Interaction					
Large Enclave Dummy	0.006**	0.020***	0.017***	0.018***	0.011**
	(0.003)	(0.004)	(0.006)	(0.006)	(0.004)
Pseudo R^2	0.05	0.06	0.05	0.06	0.05
Regressions with Large Enclave Dummy Interacted with YSM Group					
Large Enclave * YSM>20	-0.003	0.011	0.006	0.003	0.000
	(0.006)	(0.007)	(0.007)	(0.006)	(0.006)
Large Enclave * YSM 11-20	0.004	0.019***	0.009	0.011	0.013**
	(0.006)	(0.006)	(0.008)	(0.010)	(0.005)
Large Enclave * YSM<10	0.012***	0.026***	0.029***	0.028***	0.015**
	(0.004)	(0.006)	(0.008)	(0.007)	(0.006)
Pseudo R^2	0.05	0.06	0.05	0.06	0.05
Observations	14,220	14,500	25,613	26,199	27,536

NOTES: Same as Table 3.6.

Table 3.8
IV Probit Regressions of Male Immigrant Labour Force Participation: Marginal Effects of Enclave Variables

	(1)	(2)	(3)	(4)
Census	1986	1991	1996	2001
Enclave Exposure Index	-0.037	0.139	-0.444***	-0.394***
	(0.124)	(0.198)	(0.094)	(0.123)
Rho[10]	0.004	-0.006	0.006	0.006
Large Enclave Dummy	0.001	0.009	-0.028***	-0.031**
	(0.008)	(0.008)	(0.010)	(0.014)
Rho	-0.024	0.017	0.055***	0.081***
Observations	10,826	21,895	27,411	29,991

NOTES: Results from the second stage regressions are presented. Robust standard errors are in parentheses. Significance levels are indicated by * for 10%, ** for 5%, and *** for 1 %. The dependent variable is the dummy indicating whether an individual participates in the labour force (employed or unemployed). Regressions control for years-since-migration, age group, educational attainment, knowledge of official languages, marital status, visible minority status and province of residence. The sample is restricted to males aged 25–54 living in Ontario, Quebec, Manitoba, Saskatchewan, Alberta, British Columbia.

[10] Rho measures the correlation between the errors in the probit equation and the reduced-form equation for the endogenous regressor. A rho that is significantly different from zero means one should reject the null hypothesis that there is no endogeneity issue and verifies the use of IV.

Table 3.9
IV Probit Regressions of Male Immigrant Employment: Marginal Effects of Enclave Variables

	(1)	(2)	(3)	(4)
Census	1986	1991	1996	2001
Enclave Exposure Index	0.395**	0.592***	0.373***	0.153**
	(0.193)	(0.189)	(0.107)	(0.060)
Rho	-0.010	-0.016	-0.041***	0.018*
Large Enclave Dummy	0.032***	0.023**	0.019***	0.013**
	(0.009)	(0.010)	(0.007)	(0.006)
Rho	-0.077**	-0.048**	-0.022	-0.014
Observations	10,265	20,441	24,187	26,652

NOTES: Results from the second stage regressions are presented. Robust standard errors are in parentheses. Significance levels are indicated by * for 10%, ** for 5%, and *** for 1 %. The dependent variable is the dummy indicating whether an individual is employed. Regressions control for years-since-migration, age group, educational attainment, knowledge of official languages, marital status, visible minority status and province of residence. The sample is restricted to male labour force participants (employed or unemployed) aged 25–54 living in Ontario, Quebec, Manitoba, Saskatchewan, Alberta, British Columbia.

Chapter 4 Explaining the Labour Market Outcomes of First, Second and Third Generation Immigrants in Canada

4.1 Introduction

In the assessment of the labour market performance of immigrants in Canada, the portrait of the second generation is often vague. Owing to an absence of suitable data that include a generation identifier, economic research on the second generation is limited. Most studies focus on the first generation's income assimilation only; leading examples are Baker and Benjamin (1994) and Aydemir and Skuterud (2005). They have mainly found that immigrants cannot catch up in earnings with the native born. However, if assimilation is treated as a multi-generational process, the labour market outcome of the second generation is a key measure of the success of an immigrant family. Therefore, it is important to distinguish the second generation and analyze how they fare in the Canadian labour market.

On the one hand, the second generation are different from the first generation immigrants in that they are born in Canada. Unlike their foreign born parents, the second generation obtain the majority or even all of their education and work experience in Canada. Therefore, they are expected to perform better in the labour market than the first generation whose foreign education and experience are often poorly recognized in the host country (Schaafsma and Sweetman, 2001 and Aydemir and Skuterud, 2005). On the other hand, the second generation are different from the third generation in that at least one of their parents is born abroad. The intergenerational earnings mobility discovered by Aydemir, Chen and Corak (2005) may reflect the foreign born parents' influence on the labour market outcomes of the second generation.

In a recent study, Aydemir and Sweetman (2006) use the 2001 Canadian Census to find that the second generation in Canada have better socio-economic characteristics than the third generation. However, when their advantages in these characteristics are accounted for, the second generation actually earn less than the third generation on average. They attribute the second generation's earnings deficit to the lower returns to their observable characteristics, particularly years of schooling. However, they do not examine whether the cross-generation differences in returns vary with educational levels, because the linearity of years of schooling variable in their regressions restricts the returns to education to be the same at every level of education. Moreover, they do not explain the reason for the differential in the returns to education, despite the strong possibility that the second generation obtain the same education as the third generation. Picot and Hou (2009) update the literature using the 2006 Census, and they find similar results. The second generation's earnings advantages relative to the third generation is explained by their higher educational attainments and residence in large urban areas. The variation in the second generation's labour market

outcomes is found to be substantial across ethnicity, but its linkage to the returns to education is not well explored.

This paper adds to the literature in two ways. First, I examine how the second generation's disadvantage compared with the third generation in the returns to education varies at different levels of educational attainment. This is important as it helps policy makers identify targeted populations. Second, I explain the cross-generation differences in the returns to education by ethnicity, language and place of residence. This is because the return to education largely depends on the transferability of knowledge acquired from the school into productivity, which may be affected by the cultural and linguistic distance between immigrants and Canadian mainstream. If the relatively low return to the second generation's education is due to a low proficiency in one of the official languages, assimilation policy should aim at increasing the language skills of this group. However, if it is their ethnic and cultural diversity that causes the cross-generation differences, policy should then emphasize on accelerating the social acceptance of immigrants from countries that are culturally distant from Canada and, at the same time, promoting these immigrants' understanding of the Canadian social norms.

An additional question is the heterogeneity within the second generation due to their parents' place of birth. An immigrant's marriage to a native may be a signal of acculturation and assimilation. Meng and Gregory (2005) use Australian censuses to show that immigrants married to the native born earn more than those who marry other immigrants. If the former pass their property of self-motivation and ability of adaptation on to their offspring through generic and family channels, the second generation with only one foreign born parent may fare better than those with both parents born abroad. However, no existing literature directly compares the two different second generation groups. In order to fill the knowledge gap, I also test for the heterogeneity within the second generation in terms of wages.

Another relevant, yet less-studied, group of immigrants are the first generation who migrate as non-adults. Being brought to Canada at a young age, they are likely to acquire their highest education and work experience in the host country. Additionally, the priority in linguistic and cultural adjustment also accelerates young immigrants' integration into the mainstream. Schaafsma and Sweetman (2001) show that immigrant relative earnings are negatively associated with their age at immigration. Young immigrants' relative earnings premium is attributed to their fast acculturation rate and the low return to adult immigrants' foreign education and experience. These reasons are also used by Chiswick and DebBurman (2004) to explain the labour market outcomes of young immigrants in the U.S. In light of these findings, I will also test the hypothesis that immigrants who migrate before school age perform as well as the second generation, owing to their similarity in family composition and Canadian background.

In this paper, I use the 2001 Canadian Census for my empirical analysis

because it contains, for the first time since 1971, information about an individual's generation status as well as his or her parents' places of birth. Multivariate regression results show that young immigrants who migrate before age 20 earn as much as the second generation at each educational level, and that the wage differential is statistically insignificant between the second generation with one foreign born parent and those with both parents born abroad. Among males with postsecondary education and higher, the third generation outperform the first and second generation. Their wage premium over other generations can be explained by ethnicity, mother tongue and area of residence.

The rest of this paper proceeds as follows. Section 4.2 surveys the literature on cross-generation comparison of and intergenerational mobility in immigrant labour market performance. In section 4.3, I compare different generation groups using descriptive statistics from the 2001 Canadian Census. Section 4.4 introduces the multivariate regression method and discusses the estimation results. In section 4.5, I use more detailed regressions on sub-samples to analyze the wage differentials across ethnicity, mother tongue and geographic area groups. Finally, section 4.6 concludes.

4.2 Literature on Cross-Generation Analysis of Immigrants

There are a number of economic studies on the labour market performance of the first, second and third generations using data from various countries. For example, Aydemir and Sweetman (2006) and Picot and Hou (2009) compare the three generations in the U.S. to those in Canada, given the differences in immigration policy and immigrant place of origin in the two countries. The second generation and young first generation in the U.S., unlike Canadian immigrants, have earnings that are not significantly different from the third generation, no matter whether education, ethnicity and location are controlled for. In a study for Australia, Chiswick and Miller (1985) find that the second generation earn more than the average, but the earnings premium disappears when observable characteristics are accounted for. However, in both studies, the reasons for the similarity or difference in the earnings between the second and the third generations are not fully explored.

One school of research uses intergenerational earnings mobility models to explain the second generation's labour market performance. The method was developed by Borjas (1992, 1993) and Solon (1992) in an attempt to link the second generation's earnings to their potential parents' by pooling two datasets collected twenty or thirty years apart. Since there is no "family identifier" linking an immigrant who is observed in an earlier dataset to his child who is observed in another dataset a few decades later, the first generation sample then have to be aggregated by ethnicity and geographic area, and the means of their education and earnings enter the regression function of the second generation's earnings. Using data from the U.S. censuses, Borjas (1993) finds that the correlation in earnings between the first and second generations is strong during 1940-1990. He suggests that one explanation may be the "ethnic capital" that is passed from fathers to

sons. Solon's (1992) finding using survey data is similar to that of Borjas in that the intergenerational earnings mobility is very low from 1968 to 1985.

Card, DiNardo and Estes (2000) apply a similar method on the 1940 and 1970 censuses and the 1994-1996 Current Population Surveys, but they find stronger evidence for intergenerational earnings mobility through the channel of education. Children of immigrants with higher education tend to be better educated and hence have higher earnings. Caponi (2009) adds to the argument on the linkage between the first and second generations by studying Mexican immigrants in the U.S. He finds that the altruistic first generation immigrants are positively self-selected. Mexicans with more human capital are more likely to migrate, and they are able to transfer their manual and intellectual abilities to their children. Therefore, the second generation are expected to acquire more education and to perform better in the U.S. labour market than their parents.

Similar research has been conducted using European data. In the Netherlands, van Ours and Veenman (2003) find that low educational attainment persists from the first generation to the second generation. Rooth and Ekberg (2003) suggest that poor labour market outcomes by the second generation in Sweden are associated with their ethnic parents. Additionally, they notice the heterogeneity within the second generation: those with one foreign-born parent perform better than those having both parents born abroad. Nicoletti and Ermisch (2008) find that the intergenerational earnings mobility in the U.K. is constant over those born in the 1950s and 1960s.

In Canada, Aydemir, Chen and Corak (2005) combine the 1981 and 2001 Canadian Censuses to estimate the degree of intergenerational earnings mobility. Although they find that paternal earnings are strongly associated with the second generation's years of schooling, the low return to the latter's education reduces the degree of persistence in earnings between fathers and children. The generational mobility in earnings is therefore higher among immigrants in Canada than those in the U.S.

However, these studies on intergenerational mobility are mostly subject to a selection bias due to the lack of an accurate match of parents and children. If, say, the least successful immigrants return to their home country and the remaining second generation are from relatively better off families, the estimated intergenerational earnings persistence may then be downward biased relative to the true value.

4.3 Data and Descriptive Statistics

The dataset that I use in this study is the 2001 Canadian Census, because it provides information on an individual's generation status and his parents' place of birth. The first generation refers to persons who were born outside Canada; the second generation refers to those who were born in Canada and had at least one parent born abroad; and the third generation and over refers to the Canadian born whose parents were also born in Canada.

In addition, with the availability of information on age at immigration, I

am able to identify young immigrants who arrive at different stages of schooling (preschool, elementary and high school). This is important since receiving early education in the host country may play a key role in a person's future labour market performance.

Combining variables of generation status and immigrants' age at immigration, I am able to divide the sample into the following eight groups.[11]

Canadian born:

Third generation and over
Second generation, father is foreign born
Second generation, mother is foreign born
Second generation, both parents are foreign born

Foreign born:

First generation, age at immigration 0-4
First generation, age at immigration 5-12
First generation, age at immigration 13-19
First generation, age at immigration >20

The cross-sectional census data satisfy the econometric requirements of this study, because my purpose is to identify and explain wage differentials among the young first generation, the second and third generations at a point of time, whereas earnings assimilation of adult first generation immigrants is not the focus of this paper.

My sample is restricted to non-aboriginal males in primary working ages, 25-54 years old.[12] I use annual income from wages and salaries to measure a person's labour market performance because it captures variations in both the unit income (say, hourly or weekly wage) and labour supply (hours or weeks worked in a year). Because female labour supply may be complicated by their roles in non-market works at home, I study males' wages only in this paper. For a meaningful calculation of the logarithm of wages, I subsequently drop observations with zero wages. Income from self-employment is not included, because it may be negative in case of a business loss.

As to the level of education, according to Ferrer and Riddell (2008), it is the completion of an educational program, rather than the time spent in school, that rewards an individual with an earnings premium. Thus, educational attainment is a more appropriate measure than years of schooling, and it is therefore used in my analysis.

I report the statistical summary for Canadian born and foreign born men in Table 4.1. Compared to the third generation, the second generation with one foreign born parent, either father or mother, are well educated. Their share of high school dropouts is 6 percentage points lower than the third generation, whereas the share of above university degree is 6 percentage points higher. The second generation whose parents are both foreign born are younger than any other group

[11] The categorization is similar to Aydemir, Chen and Corak (2005) and Aydemir and Sweetman (2006), except for that I include more age-at-immigration groups.

[12] Aboriginal people are not included in the sample because their generations cannot be identified.

on average. However, their share of university degree holders is even higher than the second generation with one foreign born parent.

Among the foreign born males who migrate before age twenty, the educational attainment seems to be negatively correlated with the age at immigration. For example, teenage immigrants have the highest high school dropout ratio, whereas their proportion of postgraduate is the lowest. The education distribution of immigrants who migrate before age four is similar to that of the second generation. Adult immigrants who migrate after twenty years old are likely the principal applicants or their spouses, and they have by far the highest share of postgraduate degree holders.

One distinction between the second generation with one foreign born parent and those with two foreign born parents is mother tongue. About 64 percent of the latter speak English or French as their mother tongue, whereas the share for the former is as high as 93 percent (even higher than the third generation). For the foreign born, the share of mother tongue that is an official language declines with the person's age of migration.

Another evidence of heterogeneity among the second generation is the proportion who are members of a visible minority. The vast majority of second generation with one foreign born parent are white. Given the closeness of white immigrants to traditional Canadians in terms of cultural background and language spoken, it is reasonable to believe that their offspring are very similar to native-born Canadians. By contrast, the share of visible minority is more than 10 percent for the second generation whose parents are both foreign born. Among immigrants, the proportion of visible minority increases with age of migration. This suggests that, at least 25 years before the census year (that is, 1976 and earlier), white immigrants were more likely to migrate with young children or even give birth to children in Canada than visible minority immigrants.

The first and second generations' geographic distribution is very different from the third generation. More than 30 percent of immigrants and second generation with two foreign born parents choose to live in Toronto, while the proportion is roughly 15 and 7 percent for the second generation with one foreign born parent and the third generation, respectively. By contrast, the proportion of residents outside Census-Metropolitan-Areas (CMA) increases from first to third generations.

All wages are deflated by Consumer Price Index (CPI) based on the 1992 Canadian dollar. On average, the second generation groups earn more wages than the third generation by over $3,000 per year. For the foreign born, the average annual wages decline when their age at migration rises. An extreme example is that the wage differential between an immigrant who migrates before school age and an adult immigrant is as much as $9,000 on average. Considering adult immigrants' lead in educational attainment, their low income reflects the fact that education obtained abroad is not fully recognized by the Canadian labour market.

The statistical summary indicates that the second generation and young immigrants are much better educated and earn higher wages than the third

generation. For first generation immigrants, age at migration is negatively correlated with their wages. Those who migrate after age twenty fare the worst, despite their highest educational attainment.

4.4 Model Specification and Results

A man's wage function can be expressed as:

(1) $\ln W = f(X, EDU, GEN, EDU*GEN)$

where $\ln W$ is the logarithm of the person's annual wage.[13] X is a vector of socio-economic variables including age, mother tongue, marital status, visible minority status and CMA of residence. *EDU* is a vector of five educational attainments, including less than high school (the default), high school diploma, some postsecondary, bachelor's degree, and postgraduate degree. *GEN* is a vector of the eight abovementioned generation groups. The interaction between *EDU* and *GEN* can be used to test for the differential in returns to education across generation groups.

In most research on immigrant earnings, years-since-migration and implicit experience are included to control for the assimilation; examples are Baker and Benjamin (1994) and Aydemir and Sweetman (2006). However, in this study, I am more interested in the wage differentials between the three groups who are mainly brought up in the host country, namely the first generation who migrate at a young age, the second and the third generations. Assimilation through time in Canada may not be a meaningful question of interest for the young first generation, as their Canadian experience is almost the same as the native-born. For adult first generation immigrants, their generation indicator itself captures both cohort and assimilation effects, because years-since-migration can be obtained as age minus age at immigration. Additionally, since implicit experience is usually calculated by subtracting years of schooling and six from an individual's age, it is therefore omitted when I have already controlled for both age and education.

The ordinary least square regression results using male samples aged 25-54 with positive wages are presented in Table 4.2. All the education variables have expected signs and magnitude, and are statistically significant.

In the first column, I do not interact education with generation, but control for age. Relative to the (default) second generation with both parents born abroad, the third and first generations earn significantly lower annual wages. First generation immigrants who migrate before school age perform as well as the second generation, as implied by their insignificant coefficient estimate.

In the second column, I interact education with generation to examine the variation in the return to education across generation groups. The coefficient estimates of the generation dummies reflect the wage differential within the

[13] It is noteworthy to mention that the minimum of positive annual wages is greater than 1 dollar and hence its logarithm is always positive.

default education group, that is, high school dropouts. Unsurprisingly, they show a similar pattern to those in the first column except that wages of the first generation who migrate at age 5-12 are no longer significantly different from that of the second generation. However, among those with high school diploma and some postsecondary education, the third generation show a small wage premium over the default second generation. Among those with some postsecondary education, the first generation who migrate at age 5-12 are significantly worse off than the default group, while other first generation immigrants do not earn significantly less. As for university degree holders, the third generation have a wage premium of about 15.6 percent over the default group, while adult first generation immigrants earn less than the second generation by about 12.7 percent. The third generation also lead in wages among those with postgraduate education, and the other generation groups are not significantly different from the default.

The third column controls for all socio-economic characteristics[14] that are mentioned in equation (1). The coefficient estimates of the third generation all become lower in value and less significant. In particular, this estimate turns statistically insignificant among those with a high school diploma.

In summary, the cross-generation differences in the returns to education vary over educational level. The third generation earn less than the second generation if they have less than high school education. However, the third generation outperform the other generations once they obtain at least some postsecondary education. Additionally, regression results indicate that the second generation are not significantly different from immigrants who migrate before age twenty for most educational levels. Adult immigrants with less than high school education or with a bachelor's degree suffer from a wage deficit compared to the second generation.

My findings add to the understanding of the cross-generation difference in the returns to education. It is among well educated males that the second generation earn less than the first generation. If, according to Caponi (2009), human capital can be divided into manual and intellectual abilities that are respectively associated with low and high educational attainments, the results can be interpreted as a relatively high return to the second generation's manual ability and a relatively low return to their intellectual ability. Since labour-intensive jobs are usually less demanding in communication skills or cultural knowledge, immigrants and their children can handle them as well as the third generation and achieve earnings parity. However, if the second generation also inherit their parents' cultural and linguistic distance, their intellectual ability may not be fully recognized by the Canadian labour market, which can result in the wage deficit against the third generation counterparts. In this case, assimilation policy should put more emphasis on first and second generations with university education to help them better transfer the intellectual ability into productivity.

[14] Most of the coefficient estimates of the control variables have expected signs and magnitudes. For example, a married man earns more than a single one by 28 percent. Compared to Toronto, males living in other cities or areas earn significantly less, except for Oshawa and Windsor.

4.5 Explaining the Cross-Generation Differences in Return to Education

Since the well educated second and first generations are highly likely to suffer from lower returns to education than the third generation, it is important to explain why their intellectual ability is poorly transferred into earnings. Given that the transferability depends on communication skills and local labour demand, I analyze cross-generation differences in returns to education by taking into account ethnicity, mother tongue and area of residence.

4.5.1 Ethnicity

I divide the dataset into five sub-samples according to an individual's educational attainment and estimate the model separately for each education sub-sample. On the right hand side, I include a vector of dummies, *ETH*, indicating nine ethnicity groups, namely Canadian and those from English or French speaking developed countries (the default group, including British, the U.S., French and Oceanic); European; Jewish; Asian (excluding Mideast); Mideast; Caribbean, Central and South American; African; Aboriginal; and other ethnicities. The wage function for education group J is specified as follows:

$$(2) \qquad \ln W^J = f(X^J, ETH^J, GEN^J, ETH^J * GEN^J)$$

where the interaction between ethnicity and generation measures the cross-generation wage differential among a particular ethnic group. My assumption that ethnicity affects wages through its influence on the return to education is not the same as Picot and Hou (2009) who treat ethnicity as a direct determinant of earnings. If ethnicity is a determinant of the cross-generation differences in the returns to education, including it in these regressions will lower the significance level of generation dummies. Technically, my method is similar to running one regression by interacting education attainments with all the right-hand-side variables in equation (1) and the constant. However, a table reporting all the three-dimensional interactions may be messy and inconvenient to interpret. Therefore, I choose regressions with sub-samples and present the results in Table 4.3 and Table 4.4 respectively for models with and without the interaction between ethnicity and generation indicators.

In Table 4.3, ethnicity is not interacted with immigrant generation, and each column stands for a separate regression using the sub-sample at a specific educational level. The coefficients of ethnicity dummies are consistent with prior expectations: at all educational levels, individuals with Asian, Middle Eastern, Central and South American, African and other ethnic backgrounds earn less than Canadians or those from developed English or French speaking countries. Individuals with European ethnicity experience a wage deficit at university degree level and higher, but the magnitude of this effect is moderate. Unlike other ethnicities, Jewish men do not seem to earn lower wages than Canadians except for those with some postsecondary education. The third generation and adult

immigrants have lower average wages than the second generation and non-adult immigrants.

I then include interactions of ethnicity and generation and present the estimation results in Table 4.4. Most of the ethnicity indicators now turn statistically insignificant. This is probably due to the lack of visible minority observations within the default generation group (the second generation with both parents born abroad). The magnitude of the coefficients are not small but their significance level are reduced by the large standard errors.

The first column of Table 4.4 reports regression results for individuals with less than high school education. Among the default group, those from developed English/French speaking countries, the second generation outperform the third generation and adult first generation. However, for other ethnic groups, the cross-generation wage differentials are mainly insignificant. In particular, there is no clear evidence that adult immigrants with less than high school education perform worse than their second generation counterparts within these ethnic groups. This is consistent with the assumption that manual ability can be more easily adapted to the host country.

Estimation results for the high school graduate sample are presented in the second column. The third generation does not seem to earn differently from the second generation. Adult immigrants from Asia, Mideast, and Central and South America earn significantly less than the second generation, whereas people with European and African background do not show wage differentials across generations.

The third column of Table 4.4 reports regression results from the sample of males with some postsecondary education. For all ethnicities, the third generation at this educational level do not earn higher wages than the second generation. Adult first generation immigrants generally earn less than the second generation, except for those from English or French speaking developed countries or with Jewish ethnicity.

Estimates for holders of bachelor's degrees are presented in the fourth column, where the third generation wages are not higher than those of the second generation for all ethnic groups. In particular, the third generation with European background even earn significantly less than their own-ethnic second generation by around 16 percent. Except for the default ethnic group, adult first generation immigrants of all other ethnicity suffer from a wage deficit, ranging from 37 to 76 percent, compared with the second generation. As to the non-adult first generation immigrants, only those from Central and South America earn significantly less than the second generation, whereas no evidence of wage differentials is found for other ethnic groups.

As shown in the last column of Table 4.4, among those with postgraduate degrees, only the European third generation show a wages deficit against the second generation. There is almost no significant wage differential between the young first generation, the second and the third generations, or within the second generation. The only group that consistently earn lower wages than the default

second generation is the adult first generation of all ethnic groups.

It should be noticed that the low significance of some of the estimates in Table 4.4 could be the result of a limited number of observations in that particular education-ethnicity-generation cell. For example, the count of Jewish males is barely 100 at each educational level, and there is a lack of African first and second generations. The corresponding coefficient estimates should thus be interpreted with caution. The estimates of the third generation are either negative or statistically insignificant for all ethnic groups.

To address the problem with the small sample size, I aggregate Jewish, Asian, Mideast, African and Central and South American males into one large "non-European" ethnic group and run similar regressions by education.[15] The estimates of the third generation of this aggregate group are still statistically insignificant in all the regressions, indicating that they do not outperform their own-ethnic second generation. Therefore, the cross-generation differences in the returns to education can be partially explained by ethnicity.

4.5.2 Mother Tongue

Another possible cause for variation in wage differentials by level of education could be the linguistic differences. Good oral and written communication skills in one or two official languages could be part of the productivity specific to positions that require higher education. It is then reasonable to assume that the wage premium by the third generation who obtain university degree and higher education (in Table 4.2) is partially due to their superior mastery of official languages compared with the other generations.

To test for this hypothesis, I use the interaction between educational attainment J and a dummy variable that indicates whether a male's mother tongue is an official language M. On this basis, I divide my data into ten sub-samples. Regressions including generation dummies and other socio-economic characteristics are specified as follows for each sub-sample:

$$(3) \qquad \ln W^{J,M} = f(X^{J,M}, GEN^{J,M})$$

Again, this specification is equivalent to a regression of the full sample by interacting education attainments and mother tongue with all other right-hand-side variables. For the simplicity of reporting results, I use separate regressions and present the coefficient estimates of generation variables in Table 4.5.

Among males whose mother tongue is English or French (Panel A), there is almost no wage differential between the young first generation, the second and third generation. The third generation with less than high school education earn slightly less than the similarly educated second generation. However, the adult first generation's wage deficit is significant and substantial at every educational level.

Interestingly, the third generation whose mother tongue is not one of the

[15] The coefficient estimates are omitted, but they are available upon request.

official languages earn substantially less than their second generation counterparts at all educational levels. As shown in Panel B, the third generation's wage deficits range from 13 to 34 percent.

In both panels, the wage differential within the second generation and that between the second generation and young first generation immigrants are mostly insignificant.

The results in Table 4.5 imply that mother tongue plays an important role in determining the differences in the returns to education. Although the causal relationship between language and educational attainment requires further study, it is safe to conclude that the third generation's wage premium at university and higher educational levels is partially explained by their excellence in language skills. As shown in Table 4.1, a large proportion of the second generation (with both parents born aboard) and first generation immigrants speak non-official languages as their mother tongue. Although they also possess knowledge in English or French, their language proficiency might not be as high as native speakers, and hence hinders the transfer of their intellectual ability and educational achievement into productivity.

4.5.3 City of Residence

Another distinction between the three generations is the first and the second generations' preference over large urban areas. As suggested by Table 4.1, more than 80 percent of first generation immigrants live in a CMA and the great majority of them choose Toronto, Vancouver and Montreal. About half of the second generation whose parents are both foreign born live in the three cities, whereas the share of those with one foreign born parent is less than one third. As for the third generation, less than one quarter reside in the three cities. This clustering of immigrants in Toronto, Vancouver and Montreal may intensify the labour market competition within ethnic groups and, in turn, may lower their equilibrium wages. Such a negative "enclave effect" on earnings has been documented by Warman (2007) using Canadian census data. If the well educated second and first generation's wage deficit is associated with city of residence, then controlling for area effects will shrink the wage differential between them and the third generation.

Accordingly, I repeat the regression model (3) by substituting CMA for mother tongue. In other words, the sub-samples are categorized by the interaction between educational attainments and indicators of Toronto, Vancouver, Montreal, other CMAs and non-CMA.

Estimates of generation variables are reported by geographic area in Table 4.6, where each column represents a separate regression. In general, the third generation do not earn significantly differently from the default second generation group. Among those with some postsecondary education, the third generation in Toronto (Panel A) and other CMAs (Panel D) even experience moderate wages deficits. The wage differential within the second generation and that between the second generation and young first generation immigrants are mostly insignificant.

These findings indicate that city of residence is also an important determinant of the cross-generation differences in the return to education.

4.6 Conclusion

Within the limited literature on the labour market outcomes of the first, second and third generation immigrants in Canada, Aydemir and Sweetman (2006) find that the second generation earn less than the third generation when their advantageous human capital characteristics are controlled for. They attribute the second generation's wage deficit to a relatively low return to their years of schooling. I explore this further to identify the cross-generation wage differentials of males at various levels of educational attainment, and attempt to explain the causes of these differences. The paper thus complements Aydemir and Sweetman (2006) and Picot and Hou (2009) and provides some specific policy orientation.

My model allows cross-generation differences in the returns to education to vary at different levels of education. As expected, estimation results indicate that the third generation's wage premium over other generations is not a constant along the spectrum of education. The third generation with postsecondary or higher education earn more than the similarly educated second generation. However, among males with high school or lower education, the wage differential is statistically insignificant between the third and the second generation. When the labour market assimilation is viewed as a multi-generational process, my findings imply that being born and raised in Canada does not guarantee full assimilation of the second generation.

The fact that better educated members of the second generation perform worse than the less educated, relative to the third generation, may reflect the difficulties immigrants and their children face in adapting their intellectual ability to the Canadian labour market. If so, policies that support immigrant assimilation should target those with higher education. This echoes Caponi's (2009) finding that assimilation policy has a larger positive effect on the first and second generation's earnings if it focuses on the college educated rather than the high school educated.

Once the targeted population is identified, it is necessary to explore the reasons for the wage differential between the second and third generations with higher education in order to design suitable policies to eliminate the gap. Compared to the third generation, the second generation is characterized by a high proportion of visible minorities, a large share of members whose mother tongue is not an official language and a strong preference for residence in the largest cities. If these characteristics are associated with poor labour market outcomes for well educated men, the second generation will then earn less than the third generation. To confirm this, I run additional regressions on sub-samples defined by the interaction between educational attainment and, consequently, ethnicity, mother tongue and CMA. In almost all sub-samples, the third generation's wage premium disappears, indicating that the cross-generation differences in the return to education are due to the second generation's ethnic and linguistic distance from

the third generation, and to a negative area effect from living in large CMAs.

The results are consistent with literature that finds strong persistence in immigrant earnings across generations. For example, Picot and Hou (2009) document considerable variation in the second generation's educational levels and relative earnings across ethnic groups. Borjas (1992, 1993) and Rooth and Ekberg (2003) argue that the second generation's earnings are substantially influenced by their parents' ethnicity. If immigrants' disadvantage in transferring their human capital into the host-country-specific productivity is passed over to their children through "ethnic capital", or the quality of the ethnic environment, the second generation would then be expected to earn less than the equally educated third generation.

To increase the recognition of the first and second generations' human capital by the Canadian labour market, policy makers can exert efforts in two ways. On the one hand, more intensive assimilation policies, such as advanced language training and co-op programmes could be designed to help immigrants with higher education. For example, Chiswick and DebBurman (2004) suggest that English trainings for immigrant parents can facilitate the assimilation of the second generation who are born in non-English speaking families. At the same time, general understanding among immigrants of the Canadian tradition and culture, either in daily life or in workplace, should be promoted to help people from different backgrounds integrate into the mainstream.

On the other hand, the relatively low recognition of the second generation's education could be partially due to employers' preference over some particular ethnic groups. As evidence, Oreopoulos (2009) uses a field experiment to show that the interview callback rate for Canadian-born applicants with English names is higher than those with Asian names by as much as 40 percentage points. Considering the increasing proportion of immigrants who are members of visible minorities, this may be an even more serious problem for their children's labour market outcome in the future. This might warrant reinforcement of policies on employment and pay equity in the Canadian labour market.

Moreover, given the first and second generations' residential preferences over large metropolitan cities, competition among themselves in the local labour markets may be another reason for the second generation to experience low returns to education. Given this, policies could be designed to encourage immigrants to settle in small cities or non-urban areas. For example, the Provincial Nominee Program may be a means for Atlantic and Prairie Provinces to attract immigrants and their offspring.

Additionally, I explore the difference in labour market outcomes within the second generation. However, men with one foreign born parent do not perform significantly better than those with both parents born abroad, despite the assumption that their difference in family composition may impact on their wages. This partly reflects the fact that the differences in socio-economic characteristics within these second generation groups are not as substantial as those between the second and the third generations.

Given the similarity between the second generation and the first generation who immigrate at young ages, their labour market performance is expected to be similar. My estimation results support this hypothesis. For the first generation immigrants who arrive in Canada before twenty years old, particularly those before school age, their wages are not significantly different from the second generation. This finding supports Schaafsma and Sweetman's (2001) conclusion that young immigrants can quickly assimilate in the host country and achieve wage parity with the Canadian born. By contrast, adult first generation immigrants are found to earn significantly less than the second generation, and their wage deficit does not disappear even with controls for ethnicity, mother tongue and CMA.

Although this paper answers the question as to whether there are cross-generation wage differentials at different levels of education and explains the possible causes, an over-time comparison of wages across various generation groups cannot be conducted using one cross-sectional dataset. A combination of two or more censuses or panel data from other surveys may be used for further research on the dynamics of the first, second and third generations' labour market outcomes. Such future work will lead to a more complete understanding of the multigenerational nature of immigrant assimilation.

References

Aydemir, Abdurrahman, Wen-Hao Chen and Miles Corak (2009) "Intergenerational Earnings Mobility among the Children of Canadian Immigrants," *The Review of Economics and Statistics*, 91(2), 377-397.

Aydemir, Abdurrahman and Mikal Skuterud (2005) "Explaining the Deteriorating Entry Earnings of Canada's Immigrant Cohorts," *Canadian Journal of Economics*, 38(2), 641-671.

Aydemir, Abdurrahman and Arthur Sweetman (2006) "First and Second Generation Immigrant Educational Attainment and Labor Market Outcomes: A Comparison of the United States and Canada," Discussion Paper No. 2298, Institute for the Study of Labor (IZA).

Baker, Michael, and Dwayne Benjamin (1994) "The Performance of Immigrants in the Canadian Labor Market," *Journal of Labor Economics*, 12(3), 369-405.

Borjas, George J. (1992) "Ethnic Capital and Intergenerational Mobility," *Quarterly Journal of Economics*, 107(1), 123–150.

Borjas, George J. (1993) "The Intergenerational Mobility of Immigrants," *Journal of Labor Economics*, 11(1), 113–135.

Caponi, Vincenzo (2009) "Intergenerational Transmission of Abilities and Self Selection of Mexican Immigrants," Working Paper No. 002, the Department of Economics, Ryerson University.

Card, David, John DiNardo and Eugena Estes. 2000. "The More Things Change, Immigrants and the Children of Immigrants in the 1940s, the 1970s, and the 1990s." In G. Borjas (editor), *Issues in the Economics of Immigration*, Chicago: NBER and University of Chicago Press, 227-270.

Chiswick, Barry R. and Noyna DebBurman (2004) "Educational attainment: analysis by immigrant generation," *Economics of Education Review*, Elsevier, 23(4), 361-379.

Chiswick, Barry R. and Paul W. Miller (1985) "Immigrant Generation and Income in Australia," *The Economic Record*, 61(2), 540-53.

Ferrer, Ana and Craig W. Riddell (2008) "Education, credentials, and immigrant earnings," *Canadian Journal of Economics*, 41(1), 186-216.

Meng, Xin & Robert G. Gregory (2005) "Intermarriage and the Economic Assimilation of Immigrants," *Journal of Labor Economics*, 23(1), 135-176.

Nicoletti, Cheti and John Ermisch (2008) "Intergenerational Earnings Mobility: Changes across Cohorts in Britain," *The B.E. Journal of Economic Analysis & Policy*, 7(2), *Contributions to Economic Analysis & Policy*, 1755-1755.

Oreopoulos, Philip (2009) "Why Do Skilled Immigrants Struggle in the Labor Market? A Field Experiment with Six Thousand Resumes," NBER Working Papers 15036, National Bureau of Economic Research, Inc.

Picot, Garnett and Feng Hou (2009) "Seeking Success in Canada and the United States: The Determinants of Labour Market Outcomes Among the Children of Immigrants" Working Papers No. 48, clsrn_admin-2009-12, CLSRN, the Department of Economics, University of British Columbia.

Rooth, Dan-Olof and Jan Ekberg (2003) "Unemployment and Earnings of Second Generation Immigrants in Sweden. Ethnic Background and Parent Composition," *Journal of Population Economics*, 16(4), 787–814.

Schaafsma, Joseph and Arthur Sweetman (2001) "Immigrant Earnings: Age at Immigration Matters," *Canadian Journal of Economics*, 34(4), 1066-1099.

Solon, Gary (1992) "Intergenerational Income Mobility in the United States," *The American Economic Review*, 82(3), 393-408.

Van Ours, Jan C. and Justus Veenman (2003) "The Educational Attainment of Second-Generation Immigrants in the Netherlands," *Journal of Population Economics*. 16(4), 739-753.

Warman, Casey (2007) "Ethnic Enclaves and Immigrant Earnings Growth," *Canadian Journal of Economics*, 40(2), 401-422.

Table 4.1
Statistical Summary of Canadian Born and Foreign Born Men, Census 2001

Generation	(A) Canadian born			
	3rd and over	2nd,father foreign born	2nd,mother foreign born	2nd, Both foreign born
Average Age	39.7	39.4	40.4	36.6
Less than High School	0.22	0.16	0.16	0.13
High School Graduates	0.31	0.29	0.30	0.27
Some Postsecondary	0.29	0.30	0.30	0.33
Bachelor's Degree	0.12	0.17	0.16	0.18
Postgraduate	0.06	0.07	0.08	0.09
Mother Tongue is Official Language	0.88	0.93	0.93	0.64
Married	0.72	0.69	0.70	0.63
Visible Minority	0.01	0.03	0.02	0.11
Toronto	0.07	0.15	0.16	0.31
Vancouver	0.04	0.09	0.09	0.10
Montreal	0.13	0.07	0.05	0.10
Other CMAs	0.31	0.36	0.36	0.31
Non-CMA	0.45	0.32	0.35	0.19
Paid Worker	0.85	0.85	0.85	0.85
Self-Employed	0.07	0.08	0.07	0.08
Annual Wage	38,125	41,650	41,500	41,264
Weeks Worked in a Year	46.7	47.4	47.3	47.6
Hours Worked in a Week	39.4	40.2	40.1	40.2
Observation	93,132	5,579	4,456	11,119

Table 4.1 (Continued)
Statistical Summary of Canadian Born and Foreign Born Men, Census 2001

	(B) Foreign born			
Age at Immigration	4 and less	5-12	13-19	20 and more
Average Age	39.0	39.2	38.6	41.7
Less than High School	0.12	0.18	0.24	0.19
High School Graduates	0.28	0.28	0.27	0.22
Some Postsecondary	0.31	0.29	0.27	0.24
Bachelor's Degree	0.19	0.18	0.15	0.18
Postgraduate	0.09	0.08	0.06	0.17
Mother Tongue is Official Language	0.52	0.43	0.30	0.23
Married	0.66	0.68	0.69	0.83
Visible Minority	0.19	0.32	0.56	0.66
Toronto	0.31	0.33	0.40	0.43
Vancouver	0.09	0.11	0.13	0.14
Montreal	0.08	0.11	0.11	0.12
Other CMAs	0.32	0.29	0.25	0.23
Non-CMA	0.20	0.16	0.10	0.08
Paid Worker	0.85	0.84	0.83	0.82
Self-Employed	0.08	0.08	0.09	0.08
Annual Wage	42,027	40,526	36,244	33,145
Weeks Worked in a Year	47.3	47.6	46.4	45.1
Hours Worked in a Week	39.7	39.7	38.8	37.9
Observation	2,609	4,020	4,195	18,649

NOTE: Sample includes non-aboriginal males aged 25-54 who have positive wages.

Table 4.2
Regression Results of Male Wage Function: Immigrant Generation and Educational Attainment

	(1)[a]	(2)[a]	(3)[b]
Generation (Default: 2nd Generation, Both Parents Foreign Born)			
3rd+ Generation	-0.077***	-0.148***	-0.135***
	(0.010)	(0.027)	(0.026)
2nd Generation, Father Foreign Born	-0.010	-0.065	-0.090**
	(0.016)	(0.041)	(0.041)
2nd Generation, Mother Foreign Born	-0.021	0.028	-0.012
	(0.017)	(0.044)	(0.043)
1st Generation, Age at Immigration 0-4	-0.030	-0.033	0.003
	(0.021)	(0.060)	(0.058)
1st Generation, Age at Immigration 5-12	-0.062***	-0.032	0.019
	(0.018)	(0.044)	(0.044)
1st Generation, Age at Immigration 13-19	-0.137***	-0.110***	0.003
	(0.018)	(0.040)	(0.040)
1st Generation, Age at Immigration >20	-0.418***	-0.389***	-0.246***
	(0.012)	(0.030)	(0.031)
Educational Attainment (Default: Less than High School)			
High School	0.222***	0.174***	0.164***
	(0.007)	(0.031)	(0.030)
Postsecondary	0.386***	0.351***	0.318***
	(0.007)	(0.030)	(0.030)
Bachelor's	0.598***	0.517***	0.511***
	(0.009)	(0.033)	(0.033)
Postgraduate	0.689***	0.611***	0.590***
	(0.011)	(0.040)	(0.040)

Table 4.2 (Continued)
Regression Results of Male Wage Function: Immigrant Generation and Educational Attainment

	(1)[a]	(2)[a]	(3)[b]
Interactions between High School and:			
3rd+ Generation		0.067**	0.052
		(0.032)	(0.032)
2nd Generation, Father Foreign Born		0.051	0.038
		(0.051)	(0.050)
2nd Generation, Mother Foreign Born		-0.034	-0.030
		(0.055)	(0.053)
1st Generation, Age at Immigration 0-4		0.044	0.032
		(0.072)	(0.070)
1st Generation, Age at Immigration 5-12		-0.043	-0.029
		(0.056)	(0.055)
1st Generation, Age at Immigration 13-19		-0.046	-0.038
		(0.052)	(0.051)
1st Generation, Age at Immigration >20		0.023	0.016
		(0.038)	(0.037)
Interactions between Postsecondary and:			
3rd+ Generation		0.059*	0.056*
		(0.032)	(0.031)
2nd Generation, Father Foreign Born		0.054	0.050
		(0.050)	(0.049)
2nd Generation, Mother Foreign Born		-0.081	-0.079
		(0.054)	(0.053)
1st Generation, Age at Immigration 0-4		-0.037	-0.029
		(0.071)	(0.069)
1st Generation, Age at Immigration 5-12		-0.113**	-0.071
		(0.055)	(0.054)
1st Generation, Age at Immigration 13-19		-0.071	-0.045
		(0.052)	(0.051)
1st Generation, Age at Immigration >20		-0.005	-0.022
		(0.037)	(0.037)

Table 4.2 (Concluded)
Regression Results of Male Wage Function: Immigrant Generation and Educational Attainment

	(1)[a]	(2)[a]	(3)[b]
Interactions between Bachelor's and:			
3rd+ Generation		0.156***	0.103***
		(0.035)	(0.035)
2nd Generation, Father Foreign Born		0.090	0.039
		(0.056)	(0.055)
2nd Generation, Mother Foreign Born		-0.085	-0.112*
		(0.061)	(0.060)
1st Generation, Age at Immigration 0-4		0.013	0.030
		(0.077)	(0.075)
1st Generation, Age at Immigration 5-12		0.086	0.132**
		(0.061)	(0.060)
1st Generation, Age at Immigration 13-19		-0.032	0.026
		(0.059)	(0.058)
1st Generation, Age at Immigration >20		-0.127***	-0.126***
		(0.041)	(0.040)
Interactions between Postgraduate and:			
3rd+ Generation		0.143***	0.097**
		(0.043)	(0.042)
2nd Generation, Father Foreign Born		0.084	0.043
		(0.071)	(0.070)
2nd Generation, Mother Foreign Born		-0.030	-0.072
		(0.074)	(0.073)
1st Generation, Age at Immigration 0-4		0.010	0.025
		(0.092)	(0.090)
1st Generation, Age at Immigration 5-12		-0.027	-0.002
		(0.077)	(0.075)
1st Generation, Age at Immigration 13-19		0.075	0.095
		(0.078)	(0.076)
1st Generation, Age at Immigration >20		-0.051	-0.067
		(0.047)	(0.046)
Observations	143,759	143,759	143,759
R-squared	0.08	0.08	0.12

NOTES: Standard errors are in parentheses. Significance levels are indicated by * for 10%, ** for 5%, and *** for 1 %. The dependent variable is the logarithm of annual wages. The sample is restricted to non-aboriginal males aged 25-54 who have positive wages.

[a] Regressions control for age only.

[b] Regressions control for age, mother tongue, marital status, visible minority status and CMA.

Table 4.3
Regression Results of Wage Function of Males by Educational Attainments: No Interaction between Immigrant Generation and Ethnicity

	Less than High School	High School Graduates	Some Postsecondary	Bachelor's Degree	Postgraduate
Generation (Default: 2nd Generation, Both Parents Foreign Born)					
3rd+ Generation	-0.130***	-0.071***	-0.091***	-0.062**	-0.121***
	(0.032)	(0.020)	(0.018)	(0.025)	(0.037)
2nd Generation, Father Foreign Born	-0.062	-0.010	-0.013	-0.033	-0.082
	(0.048)	(0.030)	(0.028)	(0.037)	(0.058)
2nd Generation, Mother Foreign Born	0.034	-0.001	-0.054*	-0.118***	-0.106*
	(0.051)	(0.033)	(0.030)	(0.041)	(0.060)
1st Generation, Age at Immigration 0-4	-0.025	0.024	-0.054	-0.012	-0.026
	(0.067)	(0.040)	(0.035)	(0.046)	(0.068)
1st Generation, Age at Immigration 5-12	0.005	-0.030	-0.108***	0.083**	-0.064
	(0.050)	(0.034)	(0.031)	(0.040)	(0.061)
1st Generation, Age at Immigration 13-19	-0.003	-0.063*	-0.102***	-0.049	0.030
	(0.047)	(0.034)	(0.032)	(0.042)	(0.065)
1st Generation, Age at Immigration >20	-0.206***	-0.216***	-0.283***	-0.441***	-0.391***
	(0.038)	(0.026)	(0.023)	(0.029)	(0.038)
Ethnicity (Default: Canadian, U.S., U.K. and Australia)					
European	0.022	0.036**	0.009	-0.046*	-0.097***
	(0.023)	(0.017)	(0.016)	(0.024)	(0.033)
Jewish	0.155	0.031	-0.232***	0.091	-0.009
	(0.165)	(0.094)	(0.075)	(0.062)	(0.064)
Asian	-0.271***	-0.219***	-0.149***	-0.223***	-0.265***
	(0.035)	(0.026)	(0.024)	(0.027)	(0.035)
Mideast	-0.435***	-0.361***	-0.391***	-0.270***	-0.337***
	(0.070)	(0.053)	(0.047)	(0.047)	(0.057)
Central and South American	-0.152***	-0.106***	-0.127***	-0.139***	-0.248***
	(0.058)	(0.040)	(0.036)	(0.053)	(0.081)
African	-0.229**	-0.501***	-0.482***	-0.538***	-0.581***
	(0.105)	(0.069)	(0.062)	(0.080)	(0.090)
Other Ethnicity	-0.212***	-0.172***	-0.176***	-0.131***	-0.145***
	(0.019)	(0.015)	(0.014)	(0.020)	(0.030)
Observations	28,951	41,889	41,644	20,419	10,856
R-squared	0.03	0.04	0.05	0.12	0.11

NOTES: Same as Table 4.2 ([a]) except that visible minority status is not included in the regressions.

Table 4.4
Regression Results of Wage Function of Males by Educational Attainments: Interaction between Immigrant Generation and Ethnicity

	Less than High School	High School Graduates	Some Postsecondary	Bachelor's Degree	Postgraduate
Generation (Default: 2nd Generation, Both Parents Foreign Born)					
3rd+ Generation	-0.115**	-0.014	0.015	0.067	0.033
	(0.053)	(0.033)	(0.030)	(0.043)	(0.061)
2nd Generation, Father Foreign Born	-0.081	0.006	0.063	0.076	0.016
	(0.067)	(0.043)	(0.039)	(0.053)	(0.080)
2nd Generation, Mother Foreign Born	-0.034	0.031	0.008	-0.029	-0.002
	(0.069)	(0.044)	(0.040)	(0.056)	(0.080)
1st Generation, Age at Immigration 0-4	0.038	-0.029	-0.020	0.035	0.025
	(0.119)	(0.066)	(0.060)	(0.081)	(0.122)
1st Generation, Age at Immigration 5-12	-0.050	-0.047	-0.035	0.110	-0.037
	(0.097)	(0.061)	(0.056)	(0.078)	(0.112)
1st Generation, Age at Immigration 13-19	-0.008	-0.088	-0.157**	-0.025	0.089
	(0.122)	(0.074)	(0.068)	(0.097)	(0.143)
1st Generation, Age at Immigration > 20	-0.255***	-0.150***	-0.050	-0.039	-0.011
	(0.084)	(0.053)	(0.043)	(0.064)	(0.075)
Ethnicity (Default: Canadian, U.S., U.K. and Australia)					
European	-0.020	0.049	0.111***	0.129**	0.178**
	(0.066)	(0.041)	(0.037)	(0.052)	(0.076)
Jewish	0.675	-0.026	-0.410**	0.169	0.211
	(0.540)	(0.288)	(0.192)	(0.153)	(0.188)
Asian	0.116	-0.066	0.003	-0.017	0.047
	(0.168)	(0.086)	(0.072)	(0.069)	(0.105)
Mideast	0.120	0.246	0.114	-0.054	-0.020
	(0.344)	(0.197)	(0.192)	(0.193)	(0.275)
Central and South American	-0.179	0.240**	0.163*	0.291**	-0.185
	(0.180)	(0.107)	(0.085)	(0.116)	(0.207)
African	0.697	-0.205	0.389	-0.199	0.292
	(0.762)	(0.255)	(0.515)	(0.296)	(0.538)
Other Ethnicity	-0.052	-0.087	0.030	0.030	0.053
	(0.105)	(0.063)	(0.054)	(0.068)	(0.109)

Table 4.4 (Continued: 1)
Regression Results of Wage Function of Males by Educational Attainments: Interaction between Immigrant Generation and Ethnicity

	Less than High School	High School Graduates	Some Postsecondary	Bachelor's Degree	Postgraduate
Interactions between European ethnicity and:					
3rd+ Generation	0.086	0.034	-0.059	-0.164**	-0.201**
	(0.074)	(0.048)	(0.045)	(0.066)	(0.102)
2nd Generation, Father Foreign Born	-0.034	0.040	-0.123*	-0.230**	-0.243
	(0.116)	(0.078)	(0.075)	(0.100)	(0.180)
2nd Generation, Mother Foreign Born	0.108	-0.066	-0.220**	-0.370**	-0.203
	(0.142)	(0.099)	(0.096)	(0.147)	(0.194)
1st Generation, Age at Immigration 0-4	0.019	0.084	0.009	-0.041	-0.107
	(0.150)	(0.089)	(0.081)	(0.116)	(0.171)
1st Generation, Age at Immigration 5-12	0.138	0.070	-0.028	-0.045	-0.048
	(0.120)	(0.082)	(0.076)	(0.110)	(0.157)
1st Generation, Age at Immigration 13-19	0.046	0.011	0.197**	0.126	-0.323
	(0.140)	(0.095)	(0.092)	(0.145)	(0.200)
1st Generation, Age at Immigration >20	0.146	-0.040	-0.235***	-0.372***	-0.489***
	(0.100)	(0.070)	(0.058)	(0.089)	(0.097)
Interactions between Jewish ethnicity and:					
3rd+ Generation	-0.295	0.213	0.363	-0.141	-0.266
	(0.612)	(0.330)	(0.232)	(0.177)	(0.213)
2nd Generation, Father Foreign Born	-	-0.414	0.096	0.072	0.260
	-	(0.369)	(0.354)	(0.308)	(0.309)
2nd Generation, Mother Foreign Born	-0.059	-0.176	-0.329	-0.115	-0.518
	(1.204)	(0.460)	(0.442)	(0.290)	(0.382)
1st Generation, Age at Immigration 0-4	-0.382	-1.320**	0.231	0.047	-0.920**
	(0.939)	(0.621)	(0.659)	(0.398)	(0.469)
1st Generation, Age at Immigration 5-12	-0.596	0.110	-0.041	-0.430	0.116
	(0.727)	(0.485)	(0.486)	(0.313)	(0.433)
1st Generation, Age at Immigration 13-19	-0.470	0.308	0.514	0.056	-0.261
	(0.704)	(0.465)	(0.445)	(0.376)	(0.473)
1st Generation, Age at Immigration >20	-0.614	0.345	0.000	-0.470**	-0.453**
	(0.626)	(0.354)	(0.229)	(0.212)	(0.222)

Table 4.4 (Continued: 2)
Regression Results of Wage Function of Males by Educational Attainments: Interaction between Immigrant Generation and Ethnicity

	Less than High School	High School Graduates	Some Postsecondary	Bachelor's Degree	Postgraduate
Interactions between Asian ethnicity and:					
3rd+ Generation	0.053	-0.155	0.175	0.010	0.018
	(0.247)	(0.157)	(0.131)	(0.140)	(0.243)
2nd Generation, Father Foreign Born	0.130	-0.478	0.134	0.436	-0.267
	(0.780)	(0.347)	(0.345)	(0.303)	(0.431)
2nd Generation, Mother Foreign Born	-0.201	0.099	0.291	0.296	-0.696
	(0.566)	(0.247)	(0.279)	(0.228)	(0.666)
1st Generation, Age at Immigration 0-4	-0.428	0.085	0.071	0.117	0.169
	(0.349)	(0.161)	(0.137)	(0.133)	(0.209)
1st Generation, Age at Immigration 5-12	-0.360	-0.035	-0.097	0.092	0.203
	(0.222)	(0.123)	(0.108)	(0.112)	(0.181)
1st Generation, Age at Immigration 13-19	-0.321	-0.101	0.030	-0.032	0.085
	(0.208)	(0.120)	(0.105)	(0.123)	(0.193)
1st Generation, Age at Immigration >20	-0.373**	-0.239**	-0.324***	-0.545***	-0.548***
	(0.181)	(0.098)	(0.081)	(0.087)	(0.118)
Interactions between Mideast ethnicity and:					
3rd+ Generation	-0.263	0.023	-0.448	0.019	-0.008
	(0.455)	(0.372)	(0.312)	(0.328)	(0.601)
2nd Generation, Father Foreign Born	0.163	-0.145	0.385	-	0.573
	(1.131)	(0.582)	(0.548)	-	(0.968)
2nd Generation, Mother Foreign Born	-	-0.749	0.068	0.469	0.021
	-	(0.970)	(0.910)	(0.654)	(0.973)
1st Generation, Age at Immigration 0-4	-0.345	0.006	-0.168	-0.025	0.571
	(0.718)	(0.584)	(0.344)	(0.358)	(0.548)
1st Generation, Age at Immigration 5-12	-0.632	-0.481	-0.389	-0.036	-0.102
	(0.480)	(0.332)	(0.292)	(0.271)	(0.438)
1st Generation, Age at Immigration 13-19	-0.469	-0.260	-0.068	0.125	0.128
	(0.409)	(0.244)	(0.239)	(0.244)	(0.374)
1st Generation, Age at Immigration >20	-0.460	-0.691***	-0.640***	-0.473**	-0.468*
	(0.358)	(0.209)	(0.201)	(0.204)	(0.283)

Table 4.4 (Continued: 3)
Regression Results of Wage Function of Males by Educational Attainments: Interaction between Immigrant Generation and Ethnicity

	Less than High School	High School Graduates	Some Postsecondary	Bachelor's Degree	Postgraduate
Interactions between Central and South American ethnicity and:					
3rd+ Generation	-0.067	-0.347	0.010	-0.126	0.607
	(0.291)	(0.229)	(0.226)	(0.332)	(0.687)
2nd Generation, Father Foreign Born	0.391	-0.355	-0.051	0.046	0.810
	(1.093)	(0.375)	(0.283)	(0.456)	(0.949)
2nd Generation, Mother Foreign Born	0.482	-0.599	-0.415	0.456	0.422
	(0.648)	(0.487)	(0.453)	(0.456)	(0.952)
1st Generation, Age at Immigration 0-4	-0.658	-0.064	-0.136	-0.405*	0.395
	(0.577)	(0.232)	(0.188)	(0.225)	(0.445)
1st Generation, Age at Immigration 5-12	0.076	-0.381**	-0.392***	-0.503**	-0.248
	(0.286)	(0.163)	(0.141)	(0.227)	(0.473)
1st Generation, Age at Immigration 13-19	-0.283	-0.336**	-0.171	-0.529**	0.219
	(0.253)	(0.165)	(0.137)	(0.237)	(0.523)
1st Generation, Age at Immigration >20	0.149	-0.472***	-0.504***	-0.757***	-0.237
	(0.202)	(0.124)	(0.102)	(0.141)	(0.229)
Interactions between African ethnicity and:					
3rd+ Generation	-0.418	-0.051	-0.392	0.124	-0.100
	(0.879)	(0.354)	(0.630)	(0.689)	(0.759)
2nd Generation, Father Foreign Born	-	-0.146	-	-	-
	-	(0.989)	-	-	-
2nd Generation, Mother Foreign Born	-	1.220	-	-	-
	-	(0.983)	-	-	-
1st Generation, Age at Immigration 0-4	-1.124	-0.333	-0.926	-0.946	-
	(1.084)	(0.608)	(0.652)	(0.593)	-
1st Generation, Age at Immigration 5-12	-0.579	0.199	-0.369	-0.134	-0.785
	(0.846)	(0.397)	(0.605)	(0.470)	(0.765)
1st Generation, Age at Immigration 13-19	-1.120	-0.086	-0.957*	0.055	-0.568
	(0.859)	(0.342)	(0.561)	(0.438)	(0.723)
1st Generation, Age at Immigration >20	-0.929	-0.412	-1.000*	-0.613**	-1.099**
	(0.773)	(0.270)	(0.519)	(0.312)	(0.548)

Table 4.4 (Concluded)
Regression Results of Wage Function of Males by Educational Attainments: Interaction between Immigrant Generation and Ethnicity

	Less than High School	High School Graduates	Some Postsecondary	Bachelor's Degree	Postgraduate
Interactions between other ethnicity and:					
3rd+ Generation	-0.037	0.015	-0.089	0.021	-0.073
	(0.109)	(0.066)	(0.057)	(0.073)	(0.116)
2nd Generation, Father Foreign Born	-0.028	0.012	-0.106	-0.068	0.009
	(0.160)	(0.098)	(0.086)	(0.112)	(0.182)
2nd Generation, Mother Foreign Born	0.171	-0.096	0.015	0.172	0.228
	(0.181)	(0.111)	(0.093)	(0.126)	(0.195)
1st Generation, Age at Immigration 0-4	-0.327	0.171	-0.096	-0.040	-0.059
	(0.266)	(0.138)	(0.121)	(0.148)	(0.212)
1st Generation, Age at Immigration 5-12	0.234	-0.031	-0.029	-0.064	-0.114
	(0.197)	(0.116)	(0.102)	(0.131)	(0.196)
1st Generation, Age at Immigration 13-19	0.039	0.023	-0.055	-0.121	-0.190
	(0.188)	(0.121)	(0.106)	(0.147)	(0.215)
1st Generation, Age at Immigration >20	-0.078	-0.077	-0.444***	-0.457***	-0.348***
	(0.135)	(0.088)	(0.073)	(0.095)	(0.127)
Observations	28,951	41,889	41,644	20,419	10,856
R-squared	0.06	0.08	0.09	0.16	0.14

NOTES: Every column stands for a separate regression. Standard errors are in parentheses. Significance levels are indicated by * for 10%, ** for 5%, and *** for 1 %. The dependent variable is the logarithm of annual wages. Regressions control for age, mother tongue, marital status and CMA. The sample is restricted to non-aboriginal males aged 25-54 who have positive wages.

Table 4.5
Regression Results of Wage Function of Males by Education and Mother Tongue: Immigrant Generation

	(A) Mother Tongue is Official Language(s)				
	Less than High School	High School Graduates	Some Postsecondary	Bachelor's Degree	Postgraduate
3rd+ Generation	-0.070*	-0.014	-0.025	0.016	-0.045
	(0.036)	(0.022)	(0.019)	(0.027)	(0.039)
2nd Generation, Father Foreign Born	-0.058	0.002	0.010	0.025	-0.028
	(0.050)	(0.032)	(0.029)	(0.037)	(0.058)
2nd Generation, Mother Foreign Born	0.015	0.025	-0.035	-0.060	-0.076
	(0.054)	(0.034)	(0.031)	(0.041)	(0.059)
1st Generation, Age at Immigration 0-4	0.126	0.014	-0.059	-0.006	-0.027
	(0.092)	(0.052)	(0.046)	(0.057)	(0.087)
1st Generation, Age at Immigration 5-12	0.033	-0.020	-0.050	0.109**	-0.103
	(0.077)	(0.047)	(0.042)	(0.055)	(0.080)
1st Generation, Age at Immigration 13-19	-0.042	0.020	-0.080*	-0.050	0.081
	(0.089)	(0.054)	(0.048)	(0.065)	(0.097)
1st Generation, Age at Immigration > 20	-0.248***	-0.155***	-0.135***	-0.177***	-0.175***
	(0.067)	(0.039)	(0.031)	(0.042)	(0.051)
Observations	21,055	32,649	32,288	14,513	6,990
R-squared	0.05	0.07	0.07	0.15	0.15

Table 4.5 (Continued)
Regression Results of Wage Function of Males by Education and Mother Tongue: Immigrant Generation

	(B) Mother Tongue is Other Language				
	Less than High School	High School Graduates	Some Postsecondary	Bachelor's Degree	Postgraduate
3rd+ Generation	-0.339***	-0.331***	-0.221***	-0.126**	-0.209**
	(0.065)	(0.048)	(0.044)	(0.061)	(0.087)
2nd Generation, Father Foreign Born	-0.193	-0.200*	-0.071	-0.175	-0.275
	(0.157)	(0.107)	(0.092)	(0.129)	(0.194)
2nd Generation, Mother Foreign Born	0.014	-0.343***	-0.134	-0.149	0.003
	(0.174)	(0.104)	(0.102)	(0.141)	(0.215)
1st Generation, Age at Immigration 0-4	-0.134	0.007	-0.050	0.012	0.010
	(0.100)	(0.062)	(0.056)	(0.074)	(0.109)
1st Generation, Age at Immigration 5-12	0.012	-0.055	-0.135***	0.036	-0.007
	(0.073)	(0.052)	(0.048)	(0.060)	(0.096)
1st Generation, Age at Immigration 13-19	0.028	-0.129***	-0.139***	-0.095	0.004
	(0.067)	(0.050)	(0.048)	(0.061)	(0.097)
1st Generation, Age at Immigration >20	-0.192***	-0.313***	-0.445***	-0.601***	-0.453***
	(0.062)	(0.042)	(0.037)	(0.046)	(0.063)
Observations	7,896	9,240	9,356	5,906	3,866
R-squared	0.06	0.08	0.08	0.12	0.08

NOTES: Standard errors are in parentheses. Significance levels are indicated by * for 10%, ** for 5%, and *** for 1 %. The dependent variable is the logarithm of annual wages. Regressions control for age, marital status, visible minority status and CMA. The sample is restricted to non-aboriginal males aged 25-54 who have positive wages.

Table 4.6
Regression Results of Wage Function of Males by Education and CMA: Immigrant Generation

	(A) Toronto				
	Less than High School	High School Graduates	Some Postsecondary	Bachelor's Degree	Postgraduate
3rd+ Generation	-0.030	-0.011	-0.066*	-0.019	-0.080
	(0.067)	(0.040)	(0.038)	(0.045)	(0.071)
2nd Generation, Father Foreign Born	0.013	-0.027	-0.136*	-0.049	-0.069
	(0.126)	(0.070)	(0.070)	(0.075)	(0.118)
2nd Generation, Mother Foreign Born	0.044	-0.032	-0.037	-0.151*	-0.027
	(0.134)	(0.079)	(0.074)	(0.083)	(0.123)
1st Generation, Age at Immigration 0-4	0.071	-0.006	-0.012	0.081	0.139
	(0.127)	(0.071)	(0.069)	(0.079)	(0.123)
1st Generation, Age at Immigration 5-12	0.104	0.062	-0.022	0.131*	0.053
	(0.092)	(0.061)	(0.059)	(0.068)	(0.114)
1st Generation, Age at Immigration 13-19	0.028	-0.102*	-0.078	0.015	0.103
	(0.083)	(0.058)	(0.058)	(0.070)	(0.114)
1st Generation, Age at Immigration >20	-0.097	-0.229***	-0.290***	-0.463***	-0.456***
	(0.077)	(0.050)	(0.045)	(0.052)	(0.074)
Observations	3,968	6,011	6,206	4,817	2,811
R-squared	0.07	0.10	0.09	0.17	0.16

Table 4.6 (Continued: 1)
Regression Results of Wage Function of Males by Education and CMA: Immigrant Generation

	(B) Vancouver				
	Less than High School	High School Graduates	Some Postsecondary	Bachelor's Degree	Postgraduate
3rd+ Generation	-0.121	-0.024	-0.035	-0.068	-0.041
	(0.104)	(0.066)	(0.060)	(0.079)	(0.119)
2nd Generation, Father Foreign Born	0.028	0.056	0.108	-0.046	-0.144
	(0.153)	(0.100)	(0.089)	(0.115)	(0.186)
2nd Generation, Mother Foreign Born	-0.177	-0.084	-0.131	-0.052	-0.312
	(0.162)	(0.107)	(0.104)	(0.123)	(0.208)
1st Generation, Age at Immigration 0-4	0.193	0.095	0.142	-0.010	0.037
	(0.268)	(0.127)	(0.118)	(0.130)	(0.276)
1st Generation, Age at Immigration 5-12	0.102	0.045	-0.115	0.340***	0.128
	(0.171)	(0.101)	(0.100)	(0.114)	(0.196)
1st Generation, Age at Immigration 13-19	0.147	0.007	0.045	-0.131	0.022
	(0.159)	(0.104)	(0.096)	(0.115)	(0.203)
1st Generation, Age at Immigration >20	-0.190	-0.237***	-0.243***	-0.469***	-0.329***
	(0.137)	(0.084)	(0.071)	(0.085)	(0.120)
Observations	1,598	2,511	2,850	1,802	976
R-squared	0.08	0.12	0.12	0.20	0.14

Table 4.6 (Continued: 2)
Regression Results of Wage Function of Males by Education and CMA: Immigrant Generation

	(C) Montreal				
	Less than High School	High School Graduates	Some Postsecondary	Bachelor's Degree	Postgraduate
3rd+ Generation	-0.126	0.068	0.088	-0.002	-0.180
	(0.134)	(0.074)	(0.061)	(0.072)	(0.114)
2nd Generation, Father Foreign Born	-0.590***	-0.094	0.063	-0.005	-0.128
	(0.212)	(0.124)	(0.098)	(0.121)	(0.180)
2nd Generation, Mother Foreign Born	-0.008	-0.036	0.142	0.055	-0.376*
	(0.253)	(0.148)	(0.130)	(0.151)	(0.212)
1st Generation, Age at Immigration 0-4	-0.003	0.248	0.128	-0.216	-0.280
	(0.285)	(0.154)	(0.115)	(0.146)	(0.232)
1st Generation, Age at Immigration 5-12	-0.280	-0.159	-0.118	0.174	-0.272
	(0.175)	(0.117)	(0.096)	(0.124)	(0.172)
1st Generation, Age at Immigration 13-19	-0.356**	-0.067	-0.156	0.138	-0.100
	(0.160)	(0.117)	(0.097)	(0.121)	(0.193)
1st Generation, Age at Immigration >20	-0.458***	-0.150*	-0.385***	-0.568***	-0.365***
	(0.139)	(0.086)	(0.072)	(0.083)	(0.115)
Observations	2,967	4,641	5,084	2,736	1,497
R-squared	0.07	0.092	0.12	0.17	0.12

Table 4.6 (Continued: 3)
Regression Results of Wage Function of Males by Education and CMA: Immigrant Generation

	(D) Other CMAs				
	Less than High School	High School Graduates	Some Postsecondary	Bachelor's Degree	Postgraduate
3rd+ Generation	-0.005	-0.063*	-0.083***	-0.055	-0.046
	(0.055)	(0.033)	(0.029)	(0.041)	(0.056)
2nd Generation, Father Foreign Born	-0.107	-0.058	-0.028	-0.063	-0.038
	(0.081)	(0.048)	(0.044)	(0.059)	(0.088)
2nd Generation, Mother Foreign Born	0.020	-0.070	-0.109**	-0.153**	-0.073
	(0.087)	(0.052)	(0.047)	(0.067)	(0.088)
1st Generation, Age at Immigration 0-4	-0.001	-0.052	-0.092	-0.041	-0.017
	(0.110)	(0.066)	(0.060)	(0.079)	(0.108)
1st Generation, Age at Immigration 5-12	0.127	-0.063	-0.036	-0.011	-0.023
	(0.090)	(0.060)	(0.054)	(0.071)	(0.100)
1st Generation, Age at Immigration 13-19	0.161*	-0.046	-0.025	-0.003	0.147
	(0.091)	(0.063)	(0.059)	(0.083)	(0.113)
1st Generation, Age at Immigration >20	-0.110	-0.293***	-0.284***	-0.401***	-0.256***
	(0.080)	(0.049)	(0.040)	(0.056)	(0.065)
Observations	7,449	12,356	12,982	6,796	3,580
R-squared	0.07	0.09	0.09	0.16	0.14

Table 4.6 (Concluded)
Regression Results of Wage Function of Males by Education and CMA: Immigrant Generation

	(E) Non-CMA				
	Less than High School	High School Graduates	Some Postsecondary	Bachelor's Degree	Postgraduate
3rd+ Generation	-0.048	0.008	-0.031	0.085	-0.065
	(0.056)	(0.041)	(0.036)	(0.061)	(0.087)
2nd Generation, Father Foreign Born	-0.025	-0.015	-0.029	0.082	-0.053
	(0.077)	(0.056)	(0.051)	(0.081)	(0.134)
2nd Generation, Mother Foreign Born	0.032	0.035	-0.051	-0.026	-0.056
	(0.080)	(0.058)	(0.053)	(0.085)	(0.131)
1st Generation, Age at Immigration 0-4	-0.068	0.060	-0.109	0.265**	-0.038
	(0.129)	(0.085)	(0.075)	(0.120)	(0.162)
1st Generation, Age at Immigration 5-12	-0.064	-0.040	-0.128*	0.137	-0.038
	(0.105)	(0.077)	(0.072)	(0.111)	(0.171)
1st Generation, Age at Immigration 13-19	0.135	0.134	-0.134	0.097	0.349
	(0.118)	(0.095)	(0.085)	(0.142)	(0.217)
1st Generation, Age at Immigration >20	-0.215**	-0.164**	-0.249***	-0.088	-0.127
	(0.095)	(0.071)	(0.057)	(0.084)	(0.105)
Observations	12,969	16,370	14,522	4,268	1,992
R-squared	0.06	0.06	0.06	0.12	0.09

NOTES: Standard errors are in parentheses. Significance levels are indicated by * for 10%, ** for 5%, and *** for 1 %. The dependent variable is the logarithm of annual wages. Regressions control for age, mother tongue, marital status, visible minority status and province. The sample is restricted to non-aboriginal males aged 25-54 who have positive wages.

Chapter 5 Conclusion

About one in five residents of Canada were born elsewhere, and this large immigrant population has assured the research interest in immigration. The three essays in this thesis focus on the labour market outcomes of the following three groups respectively: native-born Canadians, immigrants and their offspring.

In the first paper, I analyze the impact of immigration on natives' wage growth by combining two competing, but complementary, approaches. I divide the Canadian labour market by skill type and geographic area and construct a pseudo-panel data from the 1991, 1996 and 2001 Censuses. In the first step of a two-stage regression, I compute natives' (adjusted) average wages in each skill-area group controlling for the effects of standard human capital characteristics. In the second step, I regress the changes in the adjusted native average wages on the changes in immigrant-to-native shares in the corresponding skill-area groups. After accounting for biases due to native mobility, endogenous location of immigrants and labour demand shifts, the estimated effect of immigration is either statistically insignificant or significantly positive during different intercensal intervals. The results are robust over various specifications of sub-labour markets at city, provincial and national levels, indicating that there is no evidence for a negative impact on native wage growth from the large immigrant influx during the 1990s.

The second essay examines the impact of ethnic enclaves on immigrants' labour force participation and employment, using data from the 1981-2001 Censuses. Since immigrants could be attracted to areas with more job opportunities and hence enlarge the size of an enclave, I use instrumental variables (IV) to address this endogeneity problem. For recent immigrants who arrived in Canada within the preceding ten years, the intensity of enclave residence is negatively associated with their labour force participation rate since 1996, but positively related to their employment probability in all censuses. However, living in an enclave has no significant effect on the labour force activity of older immigrants who have lived in Canada for more than twenty years. These results are robust to probit and IV estimations.

To contribute to the limited literature on cross-generation analysis, I compare the labour market performance of first, second and third generation immigrants in the third paper. I apply multivariate regression methods on the 2001 Census to test for the existence and variation of cross-generation differences in the returns to education. Regression results show that among those with bachelor's degree and higher education, the third generation earn more than the second generation. Of the less educated population, the third generation do not have a wage premium over the second generation. I explain the cross-generation differences at various educational levels by the first and second generations' ethnic and linguistic distance from the Canadian mainstream, and by the city-specific effects on wages given immigrants' location decisions. Within the

second generation, there is no evidence for wage differentials. I also find that the first generation whose age at immigration is less than twenty earn as much as the second generation. However, adult first generation immigrants constantly perform worse than the second generation.

These three papers add to Canadian research on the economics of immigration. However, to unveil fully the relationship between immigration and the health of the Canadian labour market requires further research on topics such as return and onward migration and the performance of refugees and dependent immigrants. When the welfare of all stakeholders is considered, it may then be possible for policy makers to tailor the immigration policy to better meet the needs of the Canadian economy.