Immigrant Economic Progress and Occupational Attainment in Canada

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Abstract

Using data collected from the 2001 Census of Canada Public Use Microdata File for individuals, this paper focuses on immigrants' economic performance and occupational attainment in Canada in comparison to that of the native-born. First, the occupational distribution at both the national and the provincial level is discussed. Then, human capital earnings models are estimated with and without dummy variables for fourteen occupational categories, for both the native-born and immigrants, by sex. Finally, the determinants of occupational attainment are examined by estimating a model of occupational status. The results indicate that both the native-born and immigrants have similar occupational distributions, and that many determinants of earnings have both a direct effect and an indirect effect through their influence on occupational choice. Education, marital status and language proficiency are the three main determinants of immigrants' access to higher paying occupations.

I. Introduction

According to Dolin and Young (2004), Canada has the highest per capita immigration rate in the world. In past decades, the Canadian economy suffered from labour shortages and a low birth rate, to which the government responded by actively recruiting immigrants. In the government's opinion, immigrants benefit the Canadian economy by making it strong and prosperous. Similarly, Bloom, Grenier and Gunderson (1995) mention that "immigrants are expected to satisfy the growing health care and pension needs of an otherwise aging population" (p. 998), while Pischke and Velling (1997) argue that a boom in immigration will help to reduce unemployment rates and boost employment and economic output. In fact, the unemployment rate reached 6.1% in 2006, just 0.6% higher than the United States, which is the lowest rate since 1976 in Canada. But contrary to government expectations, problems have gradually appeared over time. The most obvious problem is competition for jobs between immigrants and the native-born, leading to higher unemployment and lower wages for native-born Canadians. Borjas and Abdurrahman (2007) estimate that there is an almost four percent decline in the wages of all Canadians on average for every ten percent increase in the population of immigrants.

Since occupations serve as a link between individuals' attributes and their income, it plays a crucial role in determining employment income for both the native-born and the immigrants. Occupations, coupled with language proficiency, educational attainment, and other human capital variables, are important factors that can strongly influence on individual's earnings. The immigrant occupational distribution and how it changes over time is directly related to the potential contributions of immigrants to a host country. It is thus worthwhile to investigate this topic, which has not received much attention in Canada.

In this paper, I will compare the occupational distributions of immigrants and the native-born, as does Green (1999), and estimate human capital models of earnings in Canada similar to those of Chiswick and Miller (2008). Then, in order to distinguish my model from Bloom, Grenier and Gunderson's (1995) conventional framework, I add fourteen occupational categories to the model, so that I can analyze the role of changes in the occupational structure in explaining the difference in earnings between immigrants and native-born Canadians, and illustrate the factors causing inter-occupation and intra-occupation variations in individual earnings, as do Chiswick and Miller (2007) in their comparisons of the native-born and immigrants in the United States and Australia. Finally, I estimate a status attainment model in order to examine how workers' characteristics help them gain access to better jobs.

This paper is organized as follows. Part II reviews the previous literature comparing the labour market performance of the native-born and immigrants, and discusses some theoretical ideas regarding the impact on immigration of occupational variables. Part III describes the data used in this analysis, which are from the 2001 Census of Canada Public Use Microdata File for individuals. The human capital and occupational attainment models are also described in this section. Part IV outlines the empirical analysis and reports the findings. Part V summarizes the results and presents the conclusions.

II. Background and Previous Literature

Immigration has always been an important economic issue in many developed countries. Prior to my paper, many researchers have made great efforts to explore discrimination between the native-born and immigrants in different labour markets, and the

assimilation of immigrants into the local market with traditional analytical tools of economic theory. Initially, researchers paid more attention to the standard human capital variables, such as education and experience, and did not include occupations.

Borjas (1985) uses the 1970 and 1980 US Censuses to estimate pooled cross-section regressions. He identifies six cohorts of immigrants in his basic empirical model and restricts the estimation to men only. On one side, he states the general theoretical conclusions that recently arrived immigrants' earnings are much less than those of immigrants who have lived in the US for a longer time. He also finds that the growth rate of earnings for immigrants is quicker than for the native-born; immigrants needed to spend almost ten to fifteen years to assimilate into the American labour market. In addition, he finds that recent immigrants need more years to catch up with the native-born's earnings than did earlier cohorts. In his opinion, the explanation is a sharp decline in the quality of immigrants admitted to the country. Borjas (1992) demonstrates that the initial losses in earnings for immigrants are determined by the distance of their move and the rate of assimilation into the destination labour market. He also notes that there is an increasing tendency towards racial discrimination towards groups of immigrants over the 1970-1980 periods. Moreover, he provides evidence that the actual rate of growth in relative immigrant earnings is in reality overestimated by cross-section regression analysis.

Bloom, Grenier and Gunderson (1995) pooled data from the 1971, 1981 and 1986 Censuses of Canada. They confirm that the cohort effect is important in the analysis of immigrants' assimilation, and show that recent immigrants have more difficulty catching up to native-born Canadians, even though they have more rapidly increasing earnings than do the native-born (the same result found in Borjas (1985)). Furthermore, they conclude that the

earnings of immigrants at the time of first entry fall short of the earnings of native-born Canadians, and immigrants have become less competitive with local workers. They also explore female immigrants' performance in the Canadian labour market and compare it to that of female immigrants to the United States. They provide evidence that recent immigration cohorts have more difficulty assimilating into the Canada labour market, and the assimilation coefficients of female immigrants are smaller than that of male immigrants. They argue that this is the result of changes in the criteria for admitting immigrants to Canada. The most dramatic result arose from a comparison between immigrant women in Canada and the United States; the evidence suggests that there is a positive earnings gap at entry for female immigrants in the United States, which means they do not suffer any economic disadvantage.

After a large literature on immigrants' earnings had developed over time, some researchers noticed that occupations serve as a link between individuals' attributes and their earnings, and thus contribute directly to individual's earnings. A series of studies started to investigate how occupations affect earnings, first for the native-born and then gradually turning to immigrants.

Doeringer and Piore (1971) are two of the earliest theoretical researchers to study the differentiation in earnings among diverse occupations. They focus on the distinction between "bad" jobs in the periphery and "good" jobs in the core of the economy.[1] They demonstrate that individuals with good jobs typically earned higher wages, and also enjoyed better job security, upward age-earnings trajectories, and social fringe benefits such as health insurance

[1] "bad" jobs means "entry job classifications tend to lie at the bottom of lines and vacancies in other jobs"; "good" jobs include blue-collar employment in manufacturing or managerial employment in seniority districts at "Internal Labour Markets and Manpower Analysis" (Borjas 1980, pp. 2-3).

and pensions. Conversely, bad jobs have lower wages and are associated with little or no wage growth, provide little job security, and do not include fringe benefits. Crucially, there is also little mobility between the two employment sectors, so that disadvantaged workers, typically ethnic minorities and workers with low levels of education, tend to remain in low-paying peripheral employment with little opportunity for advancement. One limitation of this book is that the authors did not distinguish between the native-born and immigrants in examining the impact of specific occupations on earnings.

Brown, Moon and Zoloth (1980) developed an empirical model that includes eight occupational groups to predict the probability that an individual will choose a particular occupational category in the United States. They use multinomial logit and multiple discrimanant analyses and focus on discrimination between men and women. They conclude that personal characteristics and tastes account for only a small part of the difference in the distribution of occupations, and that a substantial portion of the segregation in occupations can be attributed to discrimination. Next, they demonstrate that the two main sources of discrimination in the labour market are wage differentials within occupations and differences in the occupational distribution. Then, they suggest that appropriate antidiscrimination policies could be fruitful in equalizing occupational opportunities between men and women. Last, through their empirical analyses, they find that "the simulated occupational distribution of women resembles the actual distribution of men much more closely than it does the women's actual distribution" (p. 511). In particular, a much larger proportion of women work as managers and clerical workers than their model predicts.

In the same paper, the authors also attempt to account for the variation in earnings across occupations, but they do not look at differences between immigrants and the native-

born. However, they acknowledge that the occupational distribution is important for immigrant-receiving countries. Thus, understanding changes in immigrants' occupational distribution will help us to understand how immigrants affect the economic growth of their host countries.

This issue is addressed by Green (1999), who compares the occupational distribution of immigrants and native-born Canadians. He uses data from the 1981, 1986 and 1991 Canadian Censuses and landing records at Citizenship and Immigration Canada to estimate a multinomial logit model. The model is estimated separately for immigrants and native-born Canadians in Canada. He focuses on three questions. Firstly, he provides evidence that immigrants are overrepresented in professional occupations, particularly in engineering or health and more skilled manufacturing occupations. Conversely, they are underrepresented in farming and other transportation occupations. Green notes that the point system for immigration assessment contributes to this bias in the occupational distribution of immigrants, because it attracts more skilled and highly educated individuals to work in Canada. However, he also observed that over the 1980s, the proportion of both immigrants and native-born workers in professional occupations went down, while the proportion in clerical and semi-professional jobs rose, with the biggest changes being among immigrants. He also finds that immigrants experience important changes in their labour force status several years after arrival. On average, immigrants move out of their initial unemployment or less-skilled job in the first three years, moving towards more skilled and educated occupations the longer they live in Canada.

Secondly, Green finds that immigrants are more mobile between occupations than the native-born, which implies that immigrants perhaps contribute to a more flexible labour force.

Furthermore, more recent cohorts show more rapid movement between occupations. The positive side of this phenomenon is that immigrants can fill occupational gaps in response to shocks, but the negative side is that most changes in occupations may not be the result of deliberate choices, but rather vulnerability. Finally, he shows that the occupational distribution of immigrants is closely related to the immigration selection system. He therefore concludes that "there is potential for immigration regulations to have a significant effect on the realized benefits that immigrants can bring to an economy" (p. 76).

Thus far, Green (1999) is the only study reviewed here that highlights the potentially large effect of the immigrant selection system on immigrants' occupational distribution. However, Bloom, Grenier and Gunderson (1995) also mention its important influence on earnings, and Borjas (1985) notes that it is one of the reasons that the quality of immigrants has declined. In contrast to the US immigration regime that emphasizes on family reunification, Canada's system emphases skilled-based immigration selection, as does that of Australia. In recent years, there have been some adjustments in Canada's immigration selection system. If immigrants work in different occupations than the native-born, they will fill occupational gaps and make economy more stable. Currently, under Canada's system, there exist three main entry classes for immigrants: family class, under which citizens and permanent residences can sponsor family members to immigrate to Canada; refugees and those in need of protection who are admitted for humanitarian reasons; and independent immigrants, including skill-based applicants and business investor immigrants, who are assessed on personal skill-related characteristics or wealth. The new Canadian Experience

Class belongs to the last group.[2] Admittedly, family reunification immigrants and refugees are not assessed or screened, while independent immigrants are assessed by the point system immigration assessment for immigrant applicants. Green concludes that "offsetting this effect has been the continual decline in the proportion of immigrants who entered in the independent class, from 70% in 1973 to 20% in 1992. One would predict that assessed immigrants will have an occupational distribution reflecting the criteria built into the point system and may have quite a different distribution relative to the native-born" (p. 52).

As research on this topic has progressed, some researchers have discovered that some aspects of human capital affect individuals' occupational options. In other words, they are directly related to occupations. These aspects of human capital include language proficiency, educational attainment, local work experience, etc. They can be viewed as having direct and indirect impacts on earnings, with the indirect impacts operating via occupational attainment. Their effects on earnings are actually combined with those of occupations.

For example, Chiswick and Miller (2003) find that job offers are strongly related to language proficiency and country of origin. Individuals who are not fluent in the official languages are more likely to end up in low-skilled occupations and are less occupationally mobile; thus immigrants with these characteristics will continue to earn low incomes in the future. According to Green's (1999), the level of language proficiency is much more important than differences in country of origin.

Galarneau and Morissette (2004), who also study the occupational distribution of immigrants, use pooled data from the 1991, 1996 and 2001 Censuses to examine trends over a ten-year period. Firstly, they examine the reasons why a majority of highly educated

[2] Canadian Experience Class refers to individuals who have recent Canadian work experience or those who recently graduated and worked in Canada. Individuals who apply under this class must be assessed by Citizenship and Immigration Canada.

immigrants work in low-skilled occupations in Canada. Possible explanations include professional and institutional barriers facing some occupations such as physicians, problems getting foreign credentials and experience recognized, a lack of ways to get local information on occupations, and the personal characteristics of immigrants, such as their quality or motivations. Furthermore, domestic job opportunities are believed to be one of the most important factors affecting an immigrant's occupation. Next, they consider the country of origin, the major field of study, visible-minority status, and the level of official language proficiency to be the key factors in determining immigrants' occupations and earnings. For example, immigrants from South Asia who majored in humanities, social science and education, and who speak neither English nor French have a high probability of working in low-skilled jobs, even though they have a bachelor's degree or higher educational attainment.

Lastly, they analyze the situation of female immigrants. The situation is worse for female immigrants than for comparable male immigrants and native-born females. They are also affected by their application status, because the majority of them applied as spouses or under family reunification. Galarneau and Morissette note that the earnings gap remains at 20% ten years after immigrants arrived in Canada. They argue that this phenomenon is attributable to immigrants' concentration in low-paying occupations.

Hall and Farkas (2008) note that even in low-paying occupations in the United States, for instance in construction or in the fast food industry, immigrants have more difficulty than the native-born reaching senior positions. However, the rate of increase of immigrants' payoff is three times higher than that of their native counterparts, particularly when the economy is weak. Most importantly, they find that undocumented immigrants face

occupational discrimination and are more likely to be exploited by employers, a problem not mentioned by other studies.

In another recent paper, Cohen-Goldner and Eckstein (2008) formulate a dynamic occupational choice model for Israel, and estimate it using simulated maximum likelihood, with quarterly panel data for the period 1990 to 1992. They state that it is worthwhile for immigrants to invest in occupation-related vocational training, because it heightens the opportunities that the specific occupation offers, and enhances the possibility of earnings growth. Like Hall and Farkas (2008), they insist on the importance of knowledge of official languages in getting a job in the immigration-receiving country. The estimated coefficients of their model imply that the estimated rate of return to training is 73% higher on earnings for white-collar immigrants. Blue-collar immigrants' training yields returns that are lower, but still significant at 32% higher. Surprisingly, their empirical analysis shows that pre-immigration education and work experience do not contribute to immigrants' earnings conditional on locally accumulated human capital. In other words, only local experience yields a relatively high return.

With respect to immigrants' economic performance and occupational attainment, Chiswick and Miller have systematically explored occupational attainment in countries such as the United States and Australia. In Chiswick and Miller (2007), they use the one percent Public Use Microdata Sample from the 2000 United States Census of population, focusing on adult men aged 25-64 years. They argue that labour market experience is not associated with upward occupational mobility for the native-born in the United States. Through their empirical analyses and the estimation of an occupational attainment model, they demonstrate that it is more likely for immigrants with foreign work experience to work in lower-paying

occupations during the first few years after entry. They also find that the relatively high-paying occupational categories are the same for the native-born and immigrants, which implies that occupational fixed effects are not the main contributor to the different pattern of results across immigrants and non-immigrants. Last, they conclude that "the negative impact of foreign labour market experience on occupational status was relatively more intense in the upper half of the occupational status distribution" (p. 23).

In a subsequent study, Chiswick and Miller (2008) draw on data from the 2001 Australian Census of Population and Housing one percent sample, restricting their sample to men aged 20 to 64 who were employed on a full-time basis. They first augment a conventional human capital earnings model by adding dummy variables for either 44 occupational categories or nine major occupational groups. Then they estimate an occupational attainment model. From these empirical analyses, they conclude that there is less-than-perfect international transferability of the immigrant's skills, as immigrants are at an economic disadvantage during the first years in the destination country. They also find that the occupational fixed effect is very similar for the native-born, English-born immigrants and non-English born immigrants, as they did for the United State (2007). In addition, there exists a negative effect of pre-immigration labour market experience on occupational status in Australia for immigrants from non-English speaking countries. After comparing their Australian and US results, they conclude that different immigrant selection regimes (primarily family reunification in the US and skill-based immigration in Australia) do not influence the negative association between current occupational status and pre-immigration labour market experience.

In contrast to the large number of studies of male immigrants' earnings in the labour market, there are just few articles that focus only on women. Grossman (1984) is one of them. She uses a multinomial logit model to examine the differences between the native-born, foreign-born and second generation immigrants in Sweden. Generally, women's performance in the labour market is a little worse than that of men. However, the participation rates of foreign women are almost the same as those of native-born women, except for Southern Europeans and Finns. Even more, the average proportion of working females for foreigners is greater than for the native-born, nearly11.1% versus 8.9%. When the sample is restricted to those who worked full-time all year, average earnings of foreign women were just a little smaller than those of native women. As for the occupational distribution, foreign-born women more highly concentrated in manufacturing and services, with almost three times the share of native-born women. Native-born women are more likely than immigrants to be in professional and clerical occupations.

With respect to second generation immigrants, Grossman makes an interesting discovery. She finds that women whose father had a high status job are less likely to be in manufacturing or service occupations. In addition, the more educated the mother, the more likely one is to be in professional or clerical occupations.

As has been noted, Brown, Moon, and Zoloth (1980) and Green (1999) demonstrate the important of occupational distribution for the economic growth of a country. Bloom, Grenier and Gunderson (1995) estimate the human capital earnings models to examine the assimilation of immigrants in Canada, while Chiswick and Miller (2007) added occupational dummies to the conventional human capital framework for the United States and Australia. Unfortunately, there does not seem to be any articles that examine how occupations affect the

earnings of the native-born and immigrants in Canada. My investigation of this topic builds on the methods of those previous authors.

III. Data and Earnings Equation

1. Raw Data and Sample Selection

The data analysed in the paper are taken from the 2001 Census of Canada Public Use Microdata File for individuals. Because the 2001 Census of Canada provides details on earnings and work, together with socio-economic information on individuals' personal characteristics, it is ideally suited for researching the determinants of earnings, employment and occupational structure. The dataset includes a wide array of relevant characteristics including age, province or territory, educational attainment, marital status, the number of weeks the individual worked, knowledge of official languages, place of birth, duration of residence for immigrants, and an immigrant status indicator, among other variables.

The analysis of this paper is restricted to individuals aged 20 to 64 who worked full-time for at least 48 weeks in 2000, and for whom wage income is positive. The self-employed and any individual missing required information are excluded from the initial sample, a twenty percent sample of the microdata file containing 160,211 observations. After these exclusions there are 41,621 observations left in the database. Those who reside in the three territories (Yukon Territory, Northwest Territories and Nunavut) located in the North of Canada or in the Atlantic Provinces (Newfoundland and Labrador, Prince Edward Island, Nova Scotia and New Brunswick), are excluded as well. The Atlantic provinces are excluded because so few immigrants move there, so that it does not seem reasonable to compare the performance of immigrants to that of residents of this region.

In the estimating equations for immigrants, I add the place of birth as an additional explanatory variable. Surprisingly, I find that there are small number of individuals who are immigrants were born in Canada. There are three possible explanations for such cases: first, they may be children born in Canada to foreign diplomatic or military personal who subsequently immigrated to Canada. Second, they may be persons who have lost their Canadian citizenship, for example by being born in Canada but raised in another country whose citizenship they later adopted upon reaching the age of majority, who subsequently re-immigrated to Canada. Third, some individuals may have lied when they filled in their census form. I exclude those individuals who are classified as immigrants, but born in Canada, because these immigrants have a high probability of having a similar background or education to those of native-born Canadians. Thus comparisons between them and native-born Canadians would not be convincing. Admittedly, there also exist some individuals who are Canadian citizens by birth, but were born in other countries. Those individuals are excluded as well. After these exclusions, there remain 17,168 native-born males, 13,236 native-born females, 4,679 immigrant males, and 3,652 immigrant females in the sample. The names of all the variables retrieved from the 2001 Census of Canada are listed in Appendix A.

2. Models and Specification

The human capital earnings function in the literature has the following general form:

$$\mathrm{Ln}\, W_i = \mathrm{C} + \beta_1 EDU_i + \beta_2 EXP_i + \beta_3 EXP_i^2 + X_i^{'} \delta + \varepsilon_i \,,$$

where W_i is annual wages and salaries before deductions for such items as income tax, pensions and employment insurance (excluding self-employment income); EDU represents

educational attainment as measured by total years of schooling; EXP represents potential labour market experience, measured using the standard Mincer formula, age- total years of schooling – 6; X_i' is a vector of individual i's characteristics that affect income, and ε_i is a random error term.

The parameters $\beta_1, \beta_2, \beta_3, \delta$ and C are coefficients to be estimated. ε_i is assumed to be normally distributed, with a mean of zero and a constant variance for all i. The variables included in X_i' represent knowledge of official languages, the natural logarithm of weeks worked,[3] years since migration for immigrants, and dichotomous variables for marital status, visible minority, province of residence, etc. Appendix B contains a complete definitions of all the variables used in estimation.

Because I would like to evaluate the relative importance of individual human capital endowments, the labour market rewards to these endowments, and occupation-related earnings effects, I estimate the human capital model both with and without occupational controls. First, I estimate the earnings function without controlling for occupation. In this conventional model, the estimated coefficients of the explanatory variables will be presented as a benchmark, providing the fundamental relationship between the productivity of individuals' characteristics and earnings. Next, I estimate the earnings model with fourteen occupational categories. In this earnings function, the estimated coefficients of the occupational dummies provide information on each specific occupation's effect on earnings, which reflects the direct effect of the specific occupation on earnings. With occupation held constant, the estimated coefficients of other explanatory variables reflect effects on earnings within occupations that lead to intra-occupation differentials. Meanwhile, separate earnings

[3] The same variable used in the estimates of the human capital models as Chiswick and Miller (2007) in the study of the US.

equations are estimated for native-born Canadians and immigrants to facilitate comparisons between them and reveal the differences between them.

Throughout this paper, I use years of schooling to measure educational attainment. This variable was constructed from the Census data by assigning specific values to the cases where the value represents a range of years rather than an actual number of years: the value 2.5 is assigned to less than Grade 5 or no schooling; 6.5 is assigned to 5 to 8 years of schooling; 15.5 is assigned to 14 to 17 years of schooling; and the value 20 is used for 18 or more years of schooling. For individuals with 9 to 13 years of schooling, the actual number of years is available.

Province of residence is another independent variable in this typical human capital model. From the estimated coefficients of the provincial dummies, I can infer the difference in earnings between various provinces. Because important differences in provincial economic structure have developed in recent years, in order to measure the provinces' performance better, I decided to define separate dummy variables for Alberta, Manitoba and Saskatchewan instead of just one for the Prairie Provinces. In particular, more and more immigrants are moving to Alberta, contributing to its rapid economic development in recent years. I use AB to represent the dummy variable that is equal to 1 if individuals reside in Alberta. Similarly, MA, SA, QC, ON and BC are dichotomous variables that represent the other five provinces that remain in the sample: Manitoba, Saskatchewan, Quebec, Ontario, and British Columbia. Ontario is the reference category in the equations.

At the same time, the dataset includes a Census Metropolitan Area (CMA) variable. According to Statistics Canada, a CMA "is formed by one or more adjacent municipalities centred on a large urban area. The census population count of the urban core is at least

100,000 to form a census metropolitan area".[4] There are nineteen CMAs identified in the census public use data, including Halifax, Montreal, Quebec, Hamilton, Kitchener, etc. The variable CMA will be equal to 1 if an individual resides in one of these nineteen cities.

Unfortunately, there is little information on the degree of fluency of those who can converse in Canada's official languages, English and French. The degree of language fluency will be represented by four separate variables derived from the self-reported definition in the census. LANG1 represents individuals who can conduct a conversation in English only, LANG2 represents individuals who can conduct a conversation in French only, and LANG3 comprises those who can conduct a conversation both languages. LANG4 represents those who cannot conduct a conversation in either English or French; it will be included only in the equations for immigrants. Because there are so few native-born Canadians who cannot converse in either English or French, they will be excluded in the estimation of equations for the native-born. Furthermore, for all equations, the English language will be used as a benchmark (i.e., LANG1 is excluded from the equations).

Concerning the place of birth of immigrants, I create nine dummy variables for the region of origin to reflect changes in immigration policies. FOR1 represents the US and traditional European Countries, which includes the United Kingdom, Germany, Italy, the Netherlands, Poland, Portugal, France and Greece. FOR2 represents other European countries, including the former USSR, the former Yugoslavia and other countries. FOR3 represents immigrants born in West Central Asia and the Middle East. FOR4 represents immigrants born in Southern Asian (India and other Southern Asia countries). FOR5 represents the P.R. of China and Hong Kong. FOR6 represents the Philippines and Vietnam.

[4] This definition can be found on p. 7 of Statistics Canada (2006), the 2001 Census Public Use Microdata File Individuals File, User Guide

It is noteworthy that the Philippines had the strongest performance in terms of occupational attainment in a previous study.[5] FOR7 represents immigrants born in other countries in Eastern and South-East Asia. Finally, FOR8 and FOR9 represent immigrants born in Africa and the Americas (Central America, South America, the Caribbean and Bermuda), respectively. FOR9 will be the reference category in the equations.

With respect to the duration of stay in Canada for immigrants, I will focus on the most recent twenty years, just as Chiswick and Miller (2007) did. The variable COH1 identifies immigrants who arrived in Canada from 1991 to 2001, while COH2 identifies immigrants who arrived in Canada from 1981 to 1990. These variables can account for the years of residence effect on earnings, or they may reflect changes in the different immigrant cohorts.

Regarding the occupational categories, they are based on the National Occupational Classification, coded by Statistics Canada and Human Resource Development Canada. This classification system is a three-tiered hierarchical arrangement of occupational groups. It consists of 14 occupational categories, 26 major groups, 140 minor groups and 520 unit groups. The fourteen categories are Senior Managers, Middle and Other Managers, Professionals, Semi-professionals and Technicians, Supervisors, Supervisors: crafts and trades, Administrative and senior clerical personnel, Skilled sales and service personnel, Skilled crafts and trades workers, Clerical personnel, Intermediate sales and service personnel, Semi-skilled manual workers, Other sales and service personnel, and Other manual workers. And "other manual workers" is the reference category in the equations. Admittedly, the variable NOCHRDP (primarily used by HRDC to classify occupational data) that I use provides fewer classifications than the variable NOCS01P (2001 National Occupational Classification for Statistics), which has 25 occupational categories. The reason

[5] See Jason Gilmore (2007), p. 6

that I chose these fourteen classifications rather than the latter finer classification is because there would not have been adequate observations in each specific occupation, especially in the immigrant subsample. Using larger groups, even though there is a smaller number of them, makes the estimation results more persuasive.

In addition to examining differences between immigrants and the native-born in the returns to occupations, I also examine occupational attainment using the model of Chiswick and Miller (2008). The occupational attainment model, which is based on that of Nickell (1982), is estimated using Ordinary Least Squares.[6] In the occupational status attainment model, mean occupational earnings are used to rank occupations. Then each individual is assigned an occupational rank, equal to the average earnings for their occupational group. The following equation is then estimated:

$$Occu_i = \chi_i' \alpha + u_i ,$$

where $Occu_i$ represents the mean natural logarithm of annual wages and salaries for the specific occupational category in which individual i works; χ_i is the vector that contains the personal characteristics and attributes that influence this occupation's mean earnings, which include educational attainment, work experience, language proficiency, marital status, visible minority status and so on. u_i is the error term, assumed to be normally distributed with a mean of zero and a constant variance. This model can be used to examine the role of a worker's characteristics in gaining access to better jobs.

IV. Empirical Analysis

In this section, I first describe some characteristics of the variables in the sample. Then,

[6] Nickell (1992) argues that a "successful" occupation is one with relatively high average hourly earnings.

I discuss the estimates in the equations of the human capital model of earnings for the native-born and immigrant. Finally, the estimates of the status attainment model are examined.

1. The Provincial and Occupational distribution of the Sample

Table 1 and Table 2 present the means and standard deviations of all the variables for the native-born and immigrants respectively. According to Table 1, Ontario has the largest proportion of native-born males – almost 40% of the sample. Quebec is the second largest province, but its share is almost 10 percentage points less than that of Ontario at 30.1% of observations. It is followed by Alberta and British Columbia, both of which account for 11.5% of native-born males. The two Prairie provinces of Manitoba and Saskatchewan are each home to less than 5% of the individuals in the sample. The distribution of native-born women across provinces is similar to that of native-born men.

Regarding male immigrants' distribution across provinces, 60% of male immigrants chose to reside in Ontario, almost four times the second largest share, which belongs to British Columbia. This is likely due to Ontario's multicultural background, which makes it convenient for immigrants to live there. British Columbia is also a popular destination for immigrants because of its nice living environment and comfortable weather. The disadvantage of British Columbia is its relatively higher cost of living. Quebec ranks third among immigrants, because it has favorable immigration policies to attract business or personal investment. It is fairly attractive for individuals who want to immigrate to Canada, but they may not have the language skills or academic background to pass the point-based immigration assessment. Among the three Prairie Provinces, Alberta clearly has a larger proportion of immigrants than Manitoba or Saskatchewan. It is also noteworthy that over

90% immigrant males reside in a CMA. This figure suggests that immigrants prefer to live in large cities or urban areas.

As for the occupational distribution of native-born males, "semi-skilled manual workers", "skilled sales and trades workers", "professionals" and "middle and other managers" are the top four occupational groups, with shares of 15.9%, 15.2%, 14.2% and 12.9% of workers in the sample respectively. "Senior Manager" and "Supervisors" are the occupations with the lowest proportions, only 1.4% and 1.9%, respectively. This is likely because these senior positions require high levels of education and professional work experience. Turning to male immigrants' occupational distribution, the top four occupations are the same as for native-born males, although the ordering of the four is slightly different: "professionals", "semi-skilled manual workers", "skilled crafts and trades workers" and "middle managers" account for 18.1%, 16.8%, 13.6% and 12.5% of the observations respectively. Furthermore, male immigrants are slightly more likely to be "professionals" or "semi-skilled manual workers" than the native-born. "Supervisors", "Administrative and senior clerical personnel" and "senior managers" are the three occupations that are least common among male immigrants, with shares of 1.4%, 1.6% and 1.9% respectively.

In comparison to that of men, the occupational distribution of women is quite different. "Professionals", "clerical personnel", "administrative and senior clerical personnel", and "intermediate sales and service personnel" are the top four occupations for native-born females, reaching as high as 21.4%, 18.3%, 12.7% and 10.8% respectively. "Skilled sales and trades workers" and "senior managers" are the least common occupations. This is probably because women tend to have better office skills and are more careful about details. In addition, they tend to spend more time taking care of family and children, so they may

deliberately avoid high-pressure jobs. For female immigrants, "professionals", "clerical personnel" and "intermediate sales and service personnel" are the three most common occupations. The most striking difference between the native-born and immigrant women is with respect to "semi-skilled manual worker", which is the fourth largest occupational group for female immigrants, but only the eighth largest group for native-born females. 10.4% of female immigrants, but only 3.8% of native-born women, fall into this occupational group.

In order to shed further light on the similarities and differences between immigrants and native-born Canadians, Table 3 and Table 4 present the occupational distribution in the six provinces included in the sample. As the tables show, the occupational distribution of immigrants is similar to that of native-born Canadians in each province, which is not consistent with my expectations; it is possible that this is because I have excluded all part-time workers, so that just full-time individuals are left. Full-time immigrants are more likely to have stable incomes and high-levels of skills like those of the native-born, whereas many immigrants with part-time jobs work in low-paying occupations. In this case, it is easy to see that there are larger proportions of immigrants among "semi-skilled manual worker", "other sales and service personnel", "other manual workers" and "professionals". Clearly, the first three of these occupations are among the lowest-skilled jobs, which provides a straightforward explanation for why the average earnings of immigrants are less than those of the native-born.

2. *Human Capital Earnings Model*

Due to the similar occupational distribution across provinces for the native-born and immigrants, Tables 3 and 4 do not clearly demonstrate that immigration has reduced

variations in labour market tightness in Canada, and also can not fully explain the earnings gap between the two groups. Therefore, I estimate a conventional earnings model with and without occupational dummy variables, in order to reveal the effect of occupation on earnings.

To facilitate comparisons and help identify the causes of the earnings gap between immigrants and the native-born, separate earnings equations are estimated for immigrants and native-born Canadians. Separate equations are also estimated for men and women within each of these groups. Before discussing the parameters estimates, I carry out a variety of diagnostic tests to check whether my regression models are applicable for this paper. These tests include normality tests, multicollinearity tests, heteroscedaticity tests and Ramsey's RESET tests. The results of these tests are presented in Table 5 and Table 6, for the native-born and immigrants respectively.

To test for normality of the errors, I used the Jarque-Bera Test and the Goodness of Fit Test. For native-born males without occupational controls, the observed value of the Jarque-Bera test statistic with two degrees of freedom is 871783.4. At the 5% level of significance, the critical value of Chi-square with two degrees of freedom is 5.99. Obviously, the observed value is greater than the critical value; therefore I have to reject the null hypothesis that the error term is normally distributed. Next, I examine the result of the Goodness of Fit test for normality of the residuals. At the 5% level of significance, the observed Chi-square equals 8194.16 with 43 degrees of freedom, while the p-value is 0.000. Again, the conclusion is that the error term is not normally distributed. Theoretically, in this case, we should use an asymptotic hypothesis test instead of the usual t or F test. Nevertheless, as discussed in sections 4.9 and 5.4 of Greene (2008), in most cases using critical values from the t and F

distributions will result in a more conservative test, so I can keep on using t and F tests unless some other problem prevents me from doing so.

Subsequently, I examine the estimates in the equation with the occupational variables. For both the Jarque-Bera test and the Goodness of Fit test, the observed Chi-square value is higher than the critical value at the 5% level of significance. Therefore I conclude that the random error is not normally distributed for this equation also. The same conclusion is reached for the native-born females' equations, and all equations for immigrants.

To detect multicollinearity, I use Auxiliary R^2s and simple correlation coefficients. If either of these are greater than 0.8, it implies there exists a strong linear relationship between the explanatory variables in the regression model. However, for native-born males in this paper, no matter which equation is considered, none of the auxiliary R^2 values except that for EXP and EXP2 suggest a really serious multicollinearity problem as Table 5 shows. Moreover, the regression results are good in the sense that only one of the estimated coefficients, the constant, is not significantly different from zero at the 5% significance level. I arrive at the same conclusion after checking the simple correlation coefficients. Therefore, after considering all the evidence, I think one can conclude that multicollinearity does not really pose a serious problem for these equations.

In stark contrast to the situation of native-born males, there are a few auxiliary R^2 values greater than 0.8 in the equations for native-born females and immigrants, especially for specific occupations. This is probably because I used the occupation "other manual worker", which is nonzero for only small number observations, as a benchmark. As shown in Table 7, if I retest using "clerical personal" as the benchmark, there are no longer any auxiliary R^2 s greater than 0.8 for the occupational dummy variables. In any case,

multicollinearity is a data problem and does not affect the properties of the OLS estimator, so I do not need to make any corrections for it.

Next, I use the Breusch-Pagan-Godfrey (BPG) test to determine whether the model suffers from heteroscedasticity. Because previous tests have shown that the random error is not normally distributed in the equations, I use the Koenker version of the BPG test. For native-born males with no occupational controls, the observed value is equal to 56.98. At the 5% significance level, the critical value of Chi-square with 14 degree of freedom is 23.7, which is less than the observed value. So I have to reject the null hypotheses that the errors are homoskedastic, which implies that heteroskedasticity exists in the Native-born male equation without occupational controls. Similarly, I find that heteroskedasticity is a problem in all other native-born and female immigrants' equations, whether or not occupational controls are included. However, for male immigrants, the tests lead to the conclusion that there is no heteroskedasiticity, even at the 10% level of significance.

Finally, I check for specification errors using Ramsey's RESET test, which is a simple test for omitted variables and errors in functional form. The third variant of the RESET, and the modified FRESETS and FRESETL tests will be used to detect it; this is because they generally perform best in all three versions.[7] For native-born men, the three observed p-values are less than 0.05, which implies that there are specification errors in the equation at the 5% significance level. When occupational dummy variables are included, even though just one of the three test statistics, RESET (4), has a p-value less than 0.05, this result also means that there is a specification error in the function at the 5% significance level.

After examining the specification tests for all other native-born females and immigrants equations, it is easy to see that for equations with no occupational controls, the hypothesis

[7] See DeBenedictis and Giles (1998) for a discussion of the FRESETS and FRESETL tests.

that there is no specification error in the model is always rejected, except for female immigrants at the 5% significance level. For the equations with the occupational variables, the null hypothesis is not rejected at the 5% significance level just in the case of native-born women. These results suggest that there are specification errors in most of these functions. Other possible determinants of earnings that are not included are variables such as the number of children in the family, which may have an impact on individuals' earnings.

The results of OLS estimation of the human capital earnings model are presented in Table 8 for native-born Canadians and in Table 9 for immigrants.[8] Because the diagnostic tests indicated that there is a heteroskedasticity problem, I use White's heteroskedasticity-consistent covariance matrix estimator to construct asymptotically valid t and F statistics for the human capital earnings model. As shown in the tables, for the native-born, both equations have reasonable explanatory power, particularly after the occupational variables are added to the equations. The adjusted R^2 increases from 0.1548 to 0.1893 when the occupational dummies are included. These values of adjusted R^2 are really a little small; although there is the possibility that many determinants of the log of earnings are not included, a low R^2 or adjusted R^2 is also a common phenomenon when using microdata. Furthermore, the improvement in the adjusted R^2 suggests that adding occupational categories improves the fit of the equation. Moreover, the F statistics are 225.60 and 149.50 for native-born males, which indicate that the regressions have explanatory power at the 5% significance level. The same conclusion is reached for all other equations.

Turning now to the parameter estimates themselves, the coefficients of earnings functions with no occupational controls can be viewed as a benchmark that provides the

[8] The OLS estimation of the human capital earnings was carried out using Shazam 10.0 Professional Edition.

fundamental relationship between the productivity of individuals' characteristics and earnings. In the model with fourteen occupational categories, the estimated coefficients of occupations provide information on the specific effect of each occupation on earnings. In this model, variations in earnings within each occupation are explained by the other variables of the model.

As Table 8 shows, the estimated coefficient of education for native-born males is statistically significant and has a positive effect. This implies that an additional year of education will increase annual earnings by 6.72% when there are no occupational controls, but only 4.61% when the occupational categories are added to the equation, holding all else constant. At the same time, this indirectly demonstrates that the payoff to education of native-born males is overestimated in the equation without occupational dummy variables. Similar conclusions can be drawn for native-born females and all immigrants. Significantly, the payoff to an extra year of schooling is always higher for the native-born than for immigrants, whether male or female, even when the occupational dummy variables are included.

The changes in the coefficients resulting from the addition of the occupational dummies are summarized in Table 10. Here one can see that the payoff to an extra year of schooling decreases by 31.4% and 39.08% respectively for native-born males and male immigrants, after occupational structure is taken into account. The decline in the estimated return to an extra year of education is smallest for native-born men, and is largest for male immigrants. For the latter group, the coefficient of years of education falls from 5.45 to 3.32 percent, a 39.08% reduction. These results suggest that for native-born males and male immigrants, over 30 percent and almost 40 percent, respectively, of the increase in earnings associated

with an extra year of schooling results from entrance into higher-paying occupations. In other words, it implies that, for male immigrants, almost 40 percent of the increase in earnings observed in the equation without controls is derived from inter-occupational earnings differences, while slightly over 60 percent is derived from increases in earnings within occupations, as a result of a higher level of education.

Regarding the labour market experience of native-born men, the estimated coefficients of EXP and EXP2 are statistically significant at the 5% significance level. As Table 10 shows, if potential experience increases by one year, native-born men will enjoy an increase in earnings of 2.92% in the case of ten years experience with no occupational controls, holding all else constant.[9] But the estimated return decreases to 2.69% when occupational dummy variables are added to the conventional earnings function. Furthermore, the payoff to additional years of labour market experience will decrease as experience increases. For individuals with twenty years experience, the increase in earnings will be just 1.65% with no occupational controls, and only 1.51% with occupational controls. For male immigrants when there are no occupational controls, the estimated return to an extra additional year of experience in earnings is very small, only 0.78% and 0.37% respectively for ten and twenty years experience, but only 0.87% and 0.44% respectively for ten and twenty years experience with occupational dummy variables included. These results show that the effect of an increase in male immigrants' experience on earnings is less than that of native-born men, whether or not occupational controls are included. Similar conclusions are reached for both native-born women and immigrant women.

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[9] The effect of experience is calculated using the equation $\frac{\partial \ln W}{\partial EXP} = \beta_2 + 2\beta_3 EXP$, where β_2 is the estimated coefficient of EXP, and β_3 is the estimated coefficient of EXP2. The derivative depends on the level of experience.

Table 10 shows that the payoff to experience is overestimated in the equations with no occupational controls for the native-born, but underestimated for those of immigrants. In addition, for the native-born, the payoff to an extra year experience falls by between 7.68% and 15.82% when occupational fixed effects are added, depending on sex and the initial level of experience. These results imply that most of the increase in earnings arising from increases in experience is due to earnings mobility within occupations rather than movement to higher-paying occupations. Conversely, for immigrants, adding occupational controls has a different effect on the payoff to work experience. For male immigrants with ten years of labour market experience, the return to experience increases by 11.86% when the occupational variables are included in the equation, while male immigrants with twenty years experience enjoy a 17.2% increase in the return to experience. This result indirectly demonstrates that the low return to experience of immigrants is partly due to immigrants being channelled into relatively low-paying occupations in Canada, and there exists a negative association between occupational status in Canada and labour market experience for immigrants. Adding occupational controls also increases the return to experience for female immigrants, although the increase is much smaller, only 1.79% and 0.41% for ten and twenty years of experience respectively. This indicates that most of the earnings growth of female immigrants results from intra-occupation earnings mobility associated with increased labour market experience.

Next, the estimated coefficients of the immigrants' duration variables are statistically significant. The results show that male immigrants who arrived in Canada during the most recent ten years earn on average 32.57% less than male immigrants who arrived before 1980, holding other variables constant, when there are no occupational controls. Male immigrants

who arrived between 1980 and 1990 earn 17.25% less than those who arrived before 1980. This result confirms the findings of Borjas (1985) and Bloom, Grenier and Gunderson (1995) that recent immigrants earn much less than immigrants who had arrived in the destination country much earlier.

When occupational controls are added to the earnings equations, the negative effect of recent arrival decreases for both men immigrants and women immigrants. For immigrants who arrived in Canada during the most recent ten years (1990-2001), there is an improvement of 8.75% for men and 12.17% for women. For immigrants who arrived in Canada between 1980 and 1990, the improvement in earnings is even larger, reaching 18.43% and 15.58% for men and women respectively. These results imply that there is a limited impact of residence in Canada on earnings due to movement between occupations. In other words, the earnings growth as a result residence in Canada comes about primarily through intra-occupation earnings mobility. The same conclusion is reached by Chiswick and Miller (2007) using data for the United States.

Regarding language proficiency, the results imply that native-born men who speak only French (LANG2) generally earn 7.58% less than men who speak only English when occupational controls are not included, but only 5.98% less than those who only speak English with occupational controls. These results imply that there is a 21% improvement in the earnings of French speakers when occupational variables are added to the equation; it also illustrates that for native-born men about 21% of the decrease in earnings associated with French-only language skills is due to French speakers being concentrated in low-wage occupations. However, there is no statistically significant differential in earnings between

those who are bilingual and those who can speak only English. Native-born women are in a similar situation.

Simultaneously, the results imply that language proficiency is indisputably an important determinant of immigrants' success in Canada. If they cannot speak either English or French, male immigrants earn over one-fourth on average less than other male immigrants who speak only English, holding all other variables constant. Furthermore, there is just a 2.08% improvement when occupational dummy variables are included, which implies that most of the decrease in earnings arises within occupations, rather than between occupations. For male immigrants who speak only French or who are bilingual, there are no differences in earnings relative to those who speak only English. However, female immigrants who are bilingual earn 15.30% more than female immigrants who speak only English; this is the only group that shows a positive effect of language proficiency on earnings.

Concerning the province of residence of native-born males, the estimated coefficients for Alberta and British Columbia are not statistically significant at the 5% significance level. In other words, there is no difference in earnings between those who reside in Alberta or British Columbia and those who reside in Ontario. This result suggests that these three provinces have similar wage levels for employees when other factors are held constant. However, the estimated coefficients for Quebec, Manitoba, Saskatchewan and CMA are statistically significant. They all indicate negative effects on individuals' earnings except in the case of CMA (census metropolitan area). For instance, an individual who resides in Quebec earns 10.55% less than an individual who resides in Ontario. However, individuals who live in a census metropolitan area earn on average 10.26% more than other individuals who do not live in a city, holding other variables constant.

For male immigrants, the estimated coefficients of SA, AB, BC and CMA are not statistically significant, whereas the coefficients of QC and MA imply that the earnings differential with Ontario is negative and statistically significant at the 5% level of significance. It is surprising that there is no differential between immigrants who reside in Saskatchewan and immigrants who reside in Ontario, since such a differential does exist for the native-born. This result may be caused by the small number of observations in the immigrants' sample for Saskatchewan. Among the four provinces with the highest proportions of immigrants, Ontario, British Columbia and Alberta don't have differences in earnings, holding all else constant; a similar conclusion is obtained for the native-born.

Looking at marital status, being married always has a statistically significant positive effect on the earnings of men, whether native-born or immigrants. The results indicate that married men earn more than unmarried men. Because married men have more responsibility for taking care of their family and children, they need to work harder to get more financial support and make their family stable. In addition, the extent of the increase in earnings for married immigrants is less than that for the native-born male. However, for women, the effect of marriage is different for immigrants and the Canadian-born. Marriage appears to have no effect on female immigrants' earnings, but a positive effect on the earnings of native-born women.

Conclusions with respect to the effect of visible minority status and weeks worked are very different for the native-born and immigrants. The good phenomenon is that discrimination against visible minorities has improved for the native-born — discrimination has disappeared for the native-born at the 5% significance level in Canada. Regardless of whether individuals are black, South Asian, Chinese or some other visible minorities, there

will be no differential between their earnings and those of non-visible minorities. In stark contrast to the situation for the native-born, the problem of discrimination against visible minorities is still evident for immigrants. Male immigrants who are members of visible minorities would earn 17.89% less on average than individuals who are not members of visible minorities, holding all other variables constant. Female immigrants who belong to visible minorities usually earn 16% less than those who do not belong to visible minorities.

For the native-born, the natural logarithm of the number of weeks worked has a positive effect on earnings. However, it is unclear why the estimated coefficients show that it does not affect on earnings in the case of immigrants. In addition, it looks like the country of origin does not have an effect on earnings for male immigrants at the 5% significance level. For female immigrants, only those from China, Hong Kong and Africa earn about 15% more than female immigrants from other American countries. One possible explanation is that female immigrants from China and Hong Kong tend to be independent individuals and more likely to work because of their traditional culture; they are not likely to be housewives in their countries of origin.

In the remainder of this section, I will focus on the estimated coefficients of the occupational variables, which directly reflect the specific effect of each occupation on earnings. For native-born males, the results reveal that the estimated coefficients for "senior managers", "middle and other managers", "professionals", "semi-professionals and technicians", "supervisors in crafts and trades", "administrative and senior clerical personnel", "skilled sales and service personnel", "skilled crafts and trades workers" and "other sales and service personnel" are statistically significant. Individuals who work as "senior managers" on average earn 61.01% more than "other manual workers", while those

who work as "skilled crafts and trade workers" earn 15.91% more than "other manual workers". Just as Green (1999) explained in his paper, this is because the higher-paying occupations require more education, professional work experience and vocational training, etc. However, among these occupational categories, only the estimated coefficient of "other sales or service personnel" is negative. This coefficient estimate implies that individuals working in this field would earn 29.26% less than "other manual workers". Even though education has been controlled for, "other sales or service personnel" may earn lower wages because their skill requirements are less than those of "other manual workers", because having the same years of education does not guarantee that workers have the same qualifications. On the other hand, the estimated coefficients of "supervisors", "clerical personnel", "intermediate sales and service personnel" and "semi-skilled manual workers" are not statistically significant, which implies that those occupations perhaps have skill requirements similar to those of "other manual workers".

For male immigrants, the same occupational categories have statistically significant coefficients as for native-born men, and the results show that occupations that pay more on average do have higher estimated coefficients. Furthermore, the estimated coefficients for "middle managers", "professionals", "semi-professionals and technicians", "supervisors in crafts and trades", "administrative and senior clerical personnel", as well as "skilled crafts and trades workers" are higher for male immigrants than for native-born men. Nevertheless, male immigrants who are "senior managers" and "skilled sales and service personnel" earn less than native-born males. This is especially true for "skilled sales and service personnel", who earn 18.94% more than "other manual workers" if they are native-born males, but earn 20.29% less than "other manual workers" if they are male immigrants. Simultaneously, the

results show that the estimated coefficients for "supervisors", "clerical personnel", "intermediate sales and service personnel" and "semi-skilled manual workers" are not statistically significant, which means there are no differences in earnings between those occupational groups and "other manual workers".

Turning to women, the estimated coefficients show similar differences across occupations to those of men. For native-born females, only the coefficients of "senior manager", "middle managers", "professionals", "semi-professionals and technicians", "administrative and senior clerical personnel", "skilled sales and service personnel" and "clerical personnel" are statistically significant. Fewer occupations have statistically significant coefficients for female immigrants, just "senior manager", "middle managers", "professionals" and "administrative and senior clerical personnel". The most interesting finding is that most of the estimated coefficients of occupations for women are greater than the corresponding coefficients for men. It is also difficult for me to understand why this is so.

These comparisons of the estimated coefficients of the occupational dummy variables reveal that the high-paying occupations for one group are also the high-paying occupations for other groups. Furthermore, it demonstrates that differences between occupations are not the major determinant of the earnings differential between immigrants and the native-born. Chiswick and Miller (2007) arrived at the same conclusion using data for the United States.

3. *Occupational attainment*

This section of the paper presents estimates of a model of occupational attainment that assists in accounting for the pattern of effects reported in Table 9; similar models were estimated by Chiswick and Miller (2007). In this model, the dependent variable is mean

occupational earnings; thus this model will help to identify the determinants of inter-occupational earnings differentials. Table 11 presents the estimates of the model of occupational status with mean occupational earnings as the dependent variable.

First of all, I carry out a variety of diagnostic tests to check whether the econometric assumptions underlying the occupational attainment models are valid. As Table 11 shows, the results of the Jarque-Bera Test and the Goodness of Fit Test both show that the error term is not normally distributed. In addition, the BPG test implies that heteroskedasticity exists in all equations, so I use White's heteroskedasticity-consistent covariance matrix estimator to construct asymptotically valid t and F statistics for occupational attainment model.

For native-born males, the estimated coefficients of years of schooling show that education is one of the main determinants of occupational status. An extra year of schooling is associated with entry into occupations having 3.28% higher mean occupational earnings. In comparison to all other groups, the payoff to years of education in mean occupational earnings is generally lower for immigrants than for the native-born. Native-born women receive the highest returns to an extra year of schooling, around 4.04% higher mean occupational earnings. Male immigrants with an extra year of schooling earn 0.5 percentage points less than the native-born, reaching 2.76%; this is also the lowest payoff to additional year of education among the four groups. Female immigrants with an extra year of schooling gain entry into occupations having 3.09% higher returns. Therefore, these results are consistent with the smaller partial effects of education on individual earnings among immigrants in the estimated coefficients of the human capital model. Similar conclusions were reached by Chiswick and Miller (2007) in their study of the United States.

Regarding labour market experience, the estimated coefficients for the native-born indicate that labour market experience has a smaller effect than education on mean occupational earnings in Canada. For example, the results imply that the payoff to native-born men of an increase in experience is 0.33% higher mean occupational earnings in the case of ten years of experience, and 2.38% in the case of twenty years work experience.[10] Similarly Chiswick and Miller (2008) in their study of Australia found that "the effects on mean occupational earnings of labour market experience are very small and sensitive to the level of aggregation of the occupational categories" (p. 53). However, the results show that experience is not associated with the mean occupational earnings of immigrants, regardless of whether they are men or women. This implies that individuals' access to higher paying occupations is on the basis of pre-labour market characteristics, such as years of education or marital status. Admittedly, this result conflicts with the result in Table 10 that shows that the effect of work experience has a positive effect on immigrants' earnings, even though the payoff to additional years of work experience tends to decrease over years.

The estimated coefficients of language skills in the occupational status models show that language proficiency is another main determinant of occupational advancement. For example, for native-born males, those who speak only French earn 2.40% less mean occupational earnings than those who speak only English. In particular, individuals who are bilingual overall earn more than individuals who speak only English except for native-born women; male immigrants earn the most – on average 8.92% higher mean occupational earnings – but native-born women who are bilingual are the only one group that earns 2.64% less than those who speak only English. This implies that knowledge of French and English are useful tools through which immigrants get access to better paying occupations after they

[10] See Footnote 9 for the formula used to calculate the rate of return to experience.

arrive in Canada. A similar conclusion was reached by Chiswick and Miller (2007) in their study of the United States.

Another variable whose coefficient is statistically significant in Table 11 is marital status. In comparison with Chiswick and Miller's (2008) research on Australia, marital status appears to have larger percentage impact on mean occupational earnings in Canada. According to Table 11, married native-born men have the highest payoff in mean occupational earnings, reaching as high as 4.08%, while female immigrants have the lowest payoff to marriage, only 1.53%. Significantly, the results show that the effect of marital status on mean occupational earnings is larger for the native-born than that for immigrants, which is consistent with the former estimates of the effect of marital status on earning (as Tables 9 and Table10 show).

Likewise, length of residence in Canada has a modest effect on mean occupational earnings. The results demonstrate that male immigrants who arrived in Canada during the most recent ten years (1990-2001) earn on average 5.02% less than those who arrived before 1980, and the conclusions are consistent with the former for earnings. Lastly, belonging to a visible minority does not affect native-born individuals' mean occupational earnings, but has a negative effect on those of immigrants. The conclusions match those of the human capital models.

V. Conclusion

This paper investigates the role of occupations in determining the earnings of the native-born and immigrants. Occupations directly serve as a link between individuals' contributions and their earnings, so the conventional earnings model with occupational

variables can provide more information on inter-occupational and intra-occupational changes. The empirical analysis is based on the 2001 Census of Canada Public Use Microdata File for individuals, which contains information on fourteen occupational categories based on the National Occupational Classification. The empirical analysis is restricted to individuals aged 20 to 64 who worked full-time, had positive wage income, and who did not reside in the three territories or the Atlantic Provinces.

First of all, over three quarters of immigrants reside in Ontario and British Columbia, with 90% living in census metropolitan areas. There seems to be an overload of immigrants in these two provinces and in census metropolitan areas; if more immigrants were to locate in other cities or provinces, perhaps there would be more work opportunities for them. They have a similar occupational distribution to that of the native-born in Canada. Men are more likely to be "professionals", "skilled crafts and trades workers", "semi-skilled workers" and "middle and other managers", while women are more likely to be in "professionals", "clerical personal" and "intermediate sales and service personnel". The largest difference in occupational shares is for "semi-skilled manual worker", which ranks fourth for native-born women and eighth for immigrant women. However, a relatively larger proportion of immigrants are found in low-paying occupations across provinces. In other words, inter-occupation differences have made a limited contribution to the differences in earnings between the native-born and immigrants; instead, much of the differential arises from intra-occupational earnings mobility.

Secondly, the results of the empirical analyses of the human capital earnings model confirm the fundamental theoretical prediction that education and work experience both have a positive effect on earnings, but the payoff to an extra year of schooling is always higher for

the native-born than for immigrants. While the payoff to additional years of experience decreases as experience increases for both immigrants and native-born Canadians, recent immigrants earn much less than immigrants who arrived in Canada much earlier. However, there are also some results not consistent with my expectations. For example, the native-born who are bilingual have no differences in earnings with the native-born who speak only English; immigrants' weeks of work have no effect on their earnings; and immigrants' birthplace has only a limited effect on earnings for female immigrants who are from China, Hong Kong and Africa. The good phenomenon is that discrimination against visible minorities has decreased for the native-born, even though this problem is still evident for immigrants. Government should try to stabilise the existing policies and then use some other efficient channels to improve the situation of immigrants.

The estimated coefficients also indicate that "senior managers", "middle and other managers" and "professionals" are the top three highest paying occupations when other variables are held constant, whether for men or women. The results indicate that the high-paying occupations for one group are also the high-paying occupations for other groups in Canada, which demonstrates that inter-occupational differences are not the major determinant of the differences in earnings between immigrants and the native-born. Another interesting finding is that most of the estimated coefficients of occupations for women are greater than the corresponding coefficients for men.

Thirdly, the model of occupational status is used to strengthen the empirical analysis from the human capital earnings model with and without occupational variables. The results demonstrate that explanatory variables such as educational attainment, marital status and language proficiency are the main determinants that affect mean occupation earnings and

allow immigrants to move to higher-paying occupations. Nevertheless, labour market experience has a smaller effect than education on mean occupational earnings in Canada. The results show that the effects of residence in Canada and visible minorities on mean occupational earnings are consistent with their effects on the human capital earnings model.

Finally, I would like to discuss immigration policies. Due to policy adjustments and the financial crisis, there are now proportionately fewer skilled-based immigrants in Canada than in recent years. However, the new immigration class, Canadian Experience Class, is a useful policy to attract more international students to live and work in Canada after graduation. These students usually have a relatively high local educational background; they also have some knowledge of local life and customs. However, it is difficult for these students to get work permits and to get local work experience in their field, because employers seem to be reluctant to hire international students even when they have a work permit.[11] As a result, they are often restricted to low-wage jobs, which is a waste of their human capital and makes this new immigration policy less effective. The government should therefore try to simplify the process of issuing work permits and investigate the causes of employers' reluctance to hire students with work permits.

[11] These observations are based on anecdotal experience.

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Appendix A. The variables retrieved from the 2001 Census of Canada

Mnemonic	Title
PROVP	Province or territory
CMA	Census metropolitan area
AGEP	Age
SEXP	Sex
MARSTLP	Legal Marital Status
POBPA	Place of Birth
CITIZENP	Citizenship
IMMPOPP	Immigrant Status Indicator
YRIMMIG	Year of Immigration
VISMINP	Visible Minority Indicator
OLNP	Knowledge of Official Languages
TOTSCHP	Total Years of Schooling
COWP	Class of Worker
FPTWKP	Full-time or Part-time Weeks Worked in 2000
NOCHRDP	Occupation-Based on the National Occupational Classification
NOCS01P	Occupation-Based on the 2001 National Occupational Classification for Statistics (Noc-S 2001)
WAGESP	Wages and Salaries
SELFIP	Self-Employment Income

Appendix B. Definitions of Variables used in the regression model

Variables	Definition
Income	Annual wages and salaries before deductions for income tax, pensions and employment insurance (excluding self-employment income)
Education	It measured by the total years of schooling
Experience	It measured by the standard Mincer formula, age-total years of schooling-6
QC	=1, if individuals reside in Quebec
ON	=1, if individuals reside in Ontario
MA	=1, if individuals reside in Manitoba
SA	=1, if individuals reside in Saskatchewan
AB	=1, if individuals reside in Alberta
BC	=1, if individuals reside in British Columbia
CMA	=1, if individuals reside in census metropolitan area
MAR	=1, if individuals married
INWW	the natural logarithm of weeks worked
VIS	=1, if individuals is visible minority
COH1	=1, if individuals arrived in Canada from 1991 to 2001
COH2	=1, if individuals arrived in Canada from 1981 to 1990
LANG1	=1, if individuals only speak English
LANG2	=1, if individuals only speak French
LANG3	=1, if individuals are Bilingual
LANG4	=1, if individuals cannot speak English or French
FOR1	=1, if immigrants born in the US and traditional European Countries
FOR2	=1, if immigrants born in other European countries
FOR3	=1, if immigrants born in West Central Asia and the Middle East
FOR4	=1, if immigrants born in Southern Asian
FOR5	=1, if immigrants born in P.R China and Hong Kong
FOR6	=1, if immigrants born in Philippines and Vietnam
FOR7	=1, if immigrants born in other countries in Eastern and South-East Asia
FOR8	=1, if immigrants born in Africa
FOR9	=1, if immigrants born in other Americas
OCCU1	=1, if individuals are senior managers
OCCU2	=1, if individuals are middle and other managers
OCCU3	=1, if individuals are professionals
OCCU4	=1, if individuals are semi-professionals and technicians
OCCU5	=1, if individuals are supervisors
OCCU6	=1, if individuals are supervisors in crafts and trades
OCCU7	=1, if individuals are administrative and senior clerical personnel
OCCU8	=1, if individuals are skilled sales and service personnel
OCCU9	=1, if individuals are skilled crafts and trades workers
OCCU10	=1, if individuals are clerical personnel
OCCU11	=1, if individuals are intermediate sales and service personnel
OCCU12	=1, if individuals are semi-skilled manual workers
OCCU13	=1, if individuals are other sales and service personnel
OCCU14	=1, if individuals are other manual workers

Table 1. Descriptive Statistics of Variables for the Native-Born in Canada, 2001

Variable	Native-born Males		Native-born Females	
	Mean	Standard Deviation	Mean	Standard Deviation
Log of annual earnings	10.57	0.81848	10.29	0.754
Years of Education	13.85	3.2534	14.24	3.021
Years of Experience	19.91	11.088	19.55	11.180
Quebec	0.301	0.459	0.297	0.457
Ontario	0.398	0.489	0.392	0.488
Manitoba	0.042	0.201	0.042	0.201
Saskachawen	0.030	0.170	0.036	0.188
Alberta	0.115	0.319	0.114	0.318
British Columbia	0.115	0.318	0.118	0.323
CMA	0.649	0.477	0.677	0.468
Marital Status	0.537	0.498	0.484	0.500
Log of weeks of works	3.941	0.023	3.941	0.023
Visible Minority	0.020	0.140	0.019	0.135
English	0.629	0.483	0.616	0.486
French	0.136	0.342	0.141	0.348
Bilingual	0.235	0.424	0.243	0.429
Senior Manager	0.019	0.139	0.010	0.098
Middle Managers	0.129	0.335	0.098	0.297
Professionals	0.142	0.349	0.214	0.410
Semi-prof. & tech.	0.074	0.262	0.084	0.278
Supervisors	0.014	0.119	0.022	0.146
Trades supervisor	0.041	0.199	0.009	0.094
Adm. & Senior clerical	0.019	0.136	0.127	0.333
Skilled service	0.047	0.211	0.037	0.188
Skilled trades workers	0.152	0.359	0.008	0.087
Clerical personal	0.056	0.229	0.183	0.387
Intermediate sales	0.065	0.246	0.108	0.311
Manual worker	0.159	0.365	0.038	0.192
Other service personal	0.043	0.203	0.050	0.218
Other Manual Worker	0.039	0.194	0.013	0.112

Source: Author's calculations based on data from the 2001 Census of Canada Public Use of Microdata File for Individuals.

Table 2. Descriptive Statistics of Variables by Immigrants in Canada, 2001

Variable	Male Immigrants		Female Immigrants	
	Mean	Standard Deviation	Mean	Standard Deviation
Log of annually earnings	10.52	0.869	10.22	0.832
Years of Education	14.26	3.968	14.15	3.723
Years of Experience	23.21	11.376	22.43	11.272
Quebec	0.115	0.319	0.108	0.311
Ontario	0.600	0.490	0.614	0.487
Manitoba	0.027	0.163	0.025	0.156
Saskachawen	0.006	0.077	0.006	0.076
Alberta	0.090	0.286	0.083	0.276
British Columbia	0.162	0.368	0.164	0.370
CMA	0.903	0.296	0.919	0.273
Marital Status	0.736	0.441	0.638	0.481
Log of weeks of works	3.938	0.025	3.938	0.027
Visable Minority	0.516	0.500	0.554	0.497
COH1	0.275	0.447	0.258	0.437
COH2	0.238	0.426	0.251	0.434
English	0.828	0.377	0.828	0.377
French	0.022	0.147	0.029	0.169
Bilingual	0.130	0.336	0.118	0.322
None	0.020	0.140	0.025	0.156
Senior Manager	0.019	0.136	0.006	0.077
Middle Managers	0.125	0.331	0.087	0.281
Professionals	0.181	0.385	0.185	0.388
Semi-prof. & tech.	0.070	0.255	0.077	0.266
Supervisors	0.014	0.116	0.018	0.134
Trades supervisorr	0.027	0.161	0.008	0.093
Adm. & Senior clerical	0.016	0.125	0.100	0.300
Skilled service	0.047	0.213	0.036	0.187
Skilled trades workers	0.136	0.343	0.012	0.110
Clerical personal	0.056	0.230	0.156	0.363
Intermediate sales	0.050	0.219	0.109	0.311
Manual worker	0.168	0.374	0.104	0.305
Other service personal	0.056	0.230	0.070	0.254
Other Manual Worker	0.034	0.182	0.033	0.178

Source: Author's calculations based on data from the 2001 Census of Canada Public Use of Microdata File for Individuals.

Table 3. Occupational Distribution of the Native-born and Immigrants, by Province

occupation	Quebec		Ontario		Manitoba		Saskatch.		Alberta		British Columbia	
	N	I	N	I	N	I	N	I	N	I	N	I
Total Population	9112	934	12062	5057	1289	218	994	49	3503	725	3551	1356
Senior Manager	1.35	0.86	1.71	1.30	1.40	0.92	1.81	4.08	1.62	1.38	1.35	1.62
Middle Managers	9.44	9.85	12.35	11.33	10.00	5.96	12.88	6.12	12.85	9.79	13.24	11.06
Professionals	17.90	17.88	18.23	18.67	16.52	11.93	14.79	26.53	15.13	20.41	16.50	16.74
Semi-prof & tech.	8.25	7.60	7.59	7.00	7.60	6.89	6.54	2.04	8.36	7.72	7.60	8.04
Supervisors	2.02	2.03	1.76	1.60	1.86	1.38	1.11	2.04	1.88	1.28	1.13	1.25
Trades supervisor	2.80	3.21	2.44	1.64	2.95	2.75	3.92	4.08	3.11	1.93	2.79	1.62
Adm. & clerical	7.06	3.75	6.62	5.70	5.51	2.29	6.94	8.16	6.34	4.14	7.44	5.61
Skilled service	4.48	4.93	4.09	3.58	3.80	3.21	5.03	10.20	3.94	6.21	4.37	5.16
trades workers	8.37	7.07	8.90	7.91	9.47	13.76	10.26	8.16	10.11	9.93	8.56	8.26
Clerical personal	11.51	7.82	10.34	10.52	12.88	9.17	11.27	6.12	11.53	10.07	11.41	9.81
Intermediate sales	7.57	7.39	7.86	6.84	10.32	8.72	10.87	10.20	9.11	7.03	10.03	10.62
manual worker	10.81	17.35	11.8	14.89	10.71	22.02	7.85	6.12	9.11	9.93	8.48	9.51
service personal	5.11	7.07	4.07	5.56	4.42	7.34	4.93	4.08	4.71	7.17	4.79	7.38
Other Worker	3.33	3.21	2.72	3.46	2.56	3.67	1.81	2.04	2.20	2.90	2.34	3.32

Notes: 'N' stands for the native-born; 'I' stands for immigrants
Source: Author's calculations based on data from the 2001 Census of Canada Public Use of Microdata File for Individuals.

Table 4. Occupational Distribution of Men and Women, by Province

Occupation	Quebec		Ontario		Manitoba		Saskatch.		Alberta		British Columbia	
	N	I	N	I	N	I	N	I	N	I	N	I
Male												
No. of Obs.	5177	538	6855	2812	727	127	509	28	1984	422	1980	756
Senior Manager	0.02	0.01	0.02	0.02	0.01	0.00	0.03	0.07	0.02	0.02	0.02	0.02
Middle Managers	0.11	0.12	0.13	0.13	0.11	0.07	0.14	0.07	0.14	0.11	0.14	0.13
Professionals	0.14	0.19	0.14	0.18	0.14	0.12	0.13	0.29	0.14	0.21	0.14	0.16
Semi-prof & tech.	0.08	0.07	0.07	0.07	0.07	0.08	0.05	0.04	0.08	0.06	0.07	0.08
Supervisors	0.02	0.02	0.01	0.01	0.02	0.01	0.01	0.04	0.01	0.01	0.01	0.02
Trades supervisorr	0.04	0.04	0.04	0.02	0.04	0.05	0.06	0.07	0.05	0.03	0.05	0.03
Adm. & clerical	0.02	0.01	0.02	0.02	0.02	0.00	0.02	0.00	0.02	0.01	0.02	0.02
Skilled service	0.05	0.07	0.04	0.04	0.04	0.03	0.05	0.11	0.04	0.06	0.05	0.06
trades workers	0.14	0.11	0.15	0.13	0.16	0.20	0.19	0.14	0.17	0.16	0.15	0.14
Clerical personal	0.06	0.05	0.05	0.06	0.07	0.09	0.04	0.00	0.05	0.06	0.05	0.05
Intermediate sales	0.06	0.06	0.06	0.04	0.07	0.04	0.08	0.04	0.07	0.07	0.08	0.07
manual worker	0.16	0.15	0.17	0.19	0.17	0.20	0.12	0.11	0.14	0.15	0.14	0.13
service personal	0.05	0.07	0.04	0.06	0.04	0.06	0.04	0.00	0.04	0.05	0.04	0.06
Other Worker	0.04	0.04	0.04	0.03	0.04	0.05	0.03	0.04	0.03	0.04	0.03	0.04
Female												
No. of Obs.	3935	396	5207	2245	562	91	485	21	1519	303	1571	600
Senior Manager	0.01	0.00	0.01	0.01	0.01	0.02	0.01	0.00	0.01	0.00	0.01	0.01
Middle Managers	0.07	0.07	0.11	0.09	0.08	0.04	0.11	0.05	0.12	0.08	0.12	0.09
Professionals	0.22	0.17	0.23	0.19	0.21	0.11	0.17	0.24	0.17	0.20	0.20	0.18
Semi-prof & tech.	0.09	0.09	0.08	0.07	0.08	0.05	0.08	0.00	0.09	0.10	0.08	0.07
Supervisors	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.00	0.03	0.02	0.02	0.01
Trades supervisorr	0.01	0.02	0.01	0.01	0.02	0.00	0.02	0.00	0.01	0.00	0.01	0.01
Adm. & clerical	0.14	0.07	0.12	0.11	0.10	0.05	0.12	0.19	0.12	0.08	0.14	0.11
Skilled service	0.04	0.02	0.04	0.03	0.03	0.03	0.05	0.10	0.04	0.06	0.03	0.04
trades workers	0.01	0.02	0.01	0.01	0.01	0.05	0.01	0.00	0.01	0.02	0.01	0.01
Clerical personal	0.19	0.12	0.17	0.17	0.20	0.09	0.19	0.14	0.20	0.15	0.19	0.16
Intermediate sales	0.10	0.10	0.10	0.10	0.14	0.15	0.14	0.19	0.12	0.09	0.13	0.15
manual worker	0.04	0.20	0.05	0.10	0.03	0.25	0.03	0.00	0.03	0.06	0.02	0.05
service personal	0.05	0.08	0.05	0.06	0.05	0.09	0.06	0.10	0.06	0.11	0.05	0.09
Other Worker	0.02	0.02	0.01	0.04	0.01	0.02	0.01	0.00	0.01	0.02	0.01	0.02

Table 5. Diagnostic Tests for Equations Estimated using OLS for the Native-born

Test Statistic	Male		Female	
	Without Occup.	With Occupa.	Without Occup.	With Occup.
Jarque-Bera Test	871783.4 (0.000)	987643.4 (0.000)	526720.8 (0.000)	635544.2 (0.000)
Goodness of Fit test	8194.16 (0.000)	8969.46 (0.000)	6270.84 (0.000)	6765.42 (0.000)
BPG test	56.978 (0.000)	83.225 (0.000)	52.750 (0.000)	80.6000 (0.000)
Koenker (R2)				
Auxiliary R^2				
EDU	0.2376	0.4269	0.2349	0.4220
EXP	0.9232	0.9238	0.9219	0.9229
EXP2	0.9211	0.9216	0.9200	0.9206
QC	0.7447	0.7453	0.7108	0.7121
MA	0.0598	0.0606	0.0630	0.0653
SA	0.0473	0.0494	0.0616	0.0642
AB	0.1288	0.1303	0.1353	0.1380
BC	0.1365	0.1387	0.1466	0.1517
CMA	0.0648	0.0839	0.0563	0.0675
MAR	0.1766	0.1845	0.1053	0.1094
LNWW	0.0119	0.0157	0.0114	0.0170
VIS	0.0276	0.0293	0.0292	0.0300
LANG2	0.6859	0.6868	0.6635	0.6649
LANG3	0.6166	0.6181	0.5559	0.5576
Senior Manager	*	0.3581	*	0.4407
Middle Managers	*	0.7510	*	0.8760
Professionals	*	0.7809	*	0.9326
Semi-prof & tech.	*	0.6432	*	0.8597
Supervisors	*	0.2665	*	0.6273
Trades supervisor	*	0.4999	*	0.4074
Adm. & clerical	*	0.3335	*	0.8975
Skilled service	*	0.5333	*	0.7349
trades workers	*	0.7619	*	0.3731
Clerical personal	*	0.5721	*	0.9216
Intermediate sales	*	0.6077	*	0.8831
manual worker	*	0.7665	*	0.7417
service personal	*	0.5079	*	0.7856
CONSTANT	0.0000	0.0000	0.0000	0.0000
Ramsey's RESET test				
RESET (4)	4.4193 (0.004)	3.8792 (0.010)	18.803 (0.000)	2.4116 (0.065)
FRESETL (3)	3.7067 (0.001)	1.7391 (0.108)	13.406 (0.000)	1.4874 (0.178)
FRESETS (2)	2.8195 (0.010)	1.4678 (0.185)	10.873 (0.000)	0.8211 (0.553)

Table 6. Diagnostic Tests for Equations Estimated using OLS for Immigrants

Test Statistic	Male		Female	
	Without Occup.	With Occupa.	Without Occup.	With Occup.
Jarque-Bera Test	161773.4(0.000)	199622.5(0.000)	108186.9(0.000)	122457.9(0.000)
Goodness of Fit	2245.34 (0.000)	2546.57 (0.000)	2007.91 (0.000)	2161.34 (0.000)
BPG test	34.229 (0.103)	53.409 (0.497)	42.921 (0.014)	58.492 (0.018)
Auxiliary R^2				
EDU	0.2861	0.4199	0.3130	0.4684
EXP	0.9361	0.9367	0.9301	0.9305
EXP2	0.9350	0.9357	0.9301	0.9305
QC	0.4803	0.4836	0.4866	0.4940
MA	0.0377	0.0406	0.0435	0.0539
SA	0.0091	0.0128	0.0114	0.0146
AB	0.0557	0.0596	0.0524	0.0606
BC	0.1104	0.1171	0.1208	0.1327
CMA	0.0731	0.0776	0.0785	0.0837
MAR	0.1488	0.1540	0.0687	0.0740
LNWW	0.0181	0.0240	0.0240	0.0328
VIS	0.7893	0.7902	0.8177	0.8187
COH1	0.3703	0.3801	0.3783	0.3909
COH2	0.2629	0.2721	0.2668	0.2742
FOR1	0.7959	0.7965	0.8172	0.8175
FOR2	0.6072	0.6091	0.6414	0.6426
FOR3	0.2167	0.2182	0.1838	0.1855
FOR4	0.3940	0.3977	0.3211	0.3305
FOR5	0.3852	0.3982	0.3993	0.4053
FOR6	0.3493	0.3544	0.4062	0.4103
FOR7	0.1598	0.1631	0.2052	0.2109
FOR8	0.2445	0.2470	0.2112	0.2151
LANG2	0.2734	0.2751	0.3451	0.3471
LANG3	0.3995	0.4088	0.3662	0.3714
LANG4	0.1051	0.1099	0.1054	0.1199
Senior Manager	*	0.3764	*	0.1781
Middle Managers	*	0.7720	*	0.7243
Professionals	*	0.8288	*	0.8406
Semi-prof & tech.	*	0.6660	*	0.7026
Supervisors	*	0.2887	*	0.3662
Trades supervisorr	*	0.4331	*	0.2158
Adm. & clerical	*	0.3258	*	0.7453
Skilled service	*	0.5701	*	0.5219
trades workers	*	0.7726	*	0.2718
Clerical personal	*	0.6114	*	0.8087
Intermediate sales	*	0.5870	*	0.7543
manual worker	*	0.7993	*	0.7358
service personal	*	0.6033	*	0.6632
CONSTANT	0.0000	0.0000	0.0000	0.0000
Ramsey's RESET test				
RESET (4)	5.8776 (0.001)	3.0600 (0.027)	2.2654 (0.079)	4.6990 (0.003)
FRESETL (3)	3.7962 (0.001)	2.0139 (0.060)	1.2499 (0.277)	1.8296 (0.089)
FRESETS (2)	3.8896 (0.001)	1.7331 (0.109)	1.1603 (0.325)	1.0753 (0.375)

Table 7. The Auxiliary R^2 output when the equation estimated by the "Clerical personal" used as the benchmark

	The Native-born		Immigrants	
	Male	Female	Male	Female
Senior Manager	0.2653	0.0536	0.2562	0.0438
Middle Managers	0.6625	0.2917	0.6547	0.3049
Professionals	0.6972	0.4984	0.7276	0.4800
Semi-prof. & tech.	0.5432	0.2679	0.5276	0.2879
Supervisors	0.1961	0.0882	0.1903	0.0929
Trades supervisorr	0.4098	0.0419	0.3125	0.0551
Adm. & Senior clerical	0.2454	0.3275	0.2142	0.3273
Skilled service	0.4328	0.1404	0.4425	0.1759
Skilled trades workers	0.6885	0.0363	0.6699	0.0841
Intermediate sales	0.5087	0.3075	0.4492	0.3560
manual worker	0.6990	0.1638	0.7085	0.4130
Other service personal	0.4155	0.1933	0.4820	0.3001
Other manual worker	0.4019	0.0701	0.3781	0.2061

Table 8. Estimation of Earnings Functions of the Native-Born, Aged 20-64Years, 2001

Variable Name	Native-Born Male		Native-Born Female	
	1	2	1	2
EDU	0.0672 (33.21)	0.0461 (20.18)	0.0855 (37.55)	0.0548 (21.57)
EXP	0.0419 (22.44)	0.0388 (21.12)	0.0406 (21.10)	0.0353 (18.74)
EXP2/100	-0.0636 (-15.32)	-0.0593 (-14.55)	-0.0639 (-14.20)	-0.0566 (-12.88)
QC	-0.1055 (-4.26)	-0.1028 (-4.23)	-0.1158 (-4.73)	-0.1034 (-4.34)
MA	-0.1733 (-5.88)	-0.1725 (-5.97)	-0.1673 (-5.43)	-0.1688 (-5.63)
SA	-0.0920 (-2.66)	-0.1153 (-3.39)	-0.1073 (-3.24)	-0.0974 (-3.03)
AB	0.0225 (1.17)	0.0120 (0.63)	-0.1020 (-5.02)	-0.0995 (-5.04)
BC	-0.0093 (-0.48)	-0.0149 (-0.79)	0.0341 (1.69)	0.0358 (1.82)
CMA	0.1026 (8.24)	0.0959 (7.79)	0.1700 (12.85)	0.1486 (11.49)
MAR	0.2157 (17.00)	0.1869 (14.97)	0.0400 (3.14)	0.0235 (1.90)
LNWW	1.1334 (4.48)	1.0301 (4.15)	1.5393 (5.88)	1.1923 (4.67)
VIS	-0.0251 (-0.60)	-0.0204 (-0.50)	-0.0716 (-1.59)	-0.0809 (-1.85)
LANG2	-0.0758 (-2.53)	-0.0598 (-2.04)	-0.0777 (-2.61)	-0.0753 (-2.60)
LANG3	0.0170 (0.78)	-0.0016 (-0.07)	0.0343 (1.63)	0.0154 (0.75)
Senior Manager	*	0.6101 (12.09)	*	0.7083 (8.88)
Middle Managers	*	0.3510 (10.44)	*	0.3761 (6.74)
Professionals	*	0.3116 (9.06)	*	0.4274 (7.80)
Semi-prof & tech.	*	0.1873 (5.21)	*	0.1852 (3.30)
Supervisors	*	-0.0138 (-0.25)	*	0.1142 (1.75)
Trades supervisorr	*	0.2266 (5.68)	*	0.1357 (1.68)
Adm. & Senior clerical	*	0.1840 (3.64)	*	0.1823 (3.33)
Skilled service	*	0.1894 (4.85)	*	0.1207 (2.00)
Skilled trades workers	*	0.1591 (4.95)	*	0.1101 (1.31)
Clerical personal	*	-0.0348 (-0.93)	*	0.1370 (2.55)
Intermediate sales	*	0.0527 (1.45)	*	-0.0826 (-1.50)
Manual worker	*	0.0121 (0.38)	*	0.0334 (0.56)
Other service personal	*	-0.2926 (-7.41)	*	-0.1975 (-3.40)
CONSTANT	4.5376 (4.57)	5.1485 (5.28)	2.4604 (2.39)	4.1623 (4.14)
No. of Observations	17168	17168	13236	13236
R^2	0.1555	0.1906	0.1603	0.2088
Adjusted R^2	0.1548	0.1893	0.1594	0.2072
F-test	225.60 (0.000)	149.50 (0.000)	180.33 (0.000)	129.07 (0.000)

Notes: Heteroscedasticity-consistent't' statistics in parentheses;
Source: 2001Census of Canada Public Use Microdata File for individuals.

Table 9. Estimation of Earnings Functions of Immigrants, Aged 20-64 Years, 2001

Variable Name	Male Immigrants		Female Immigrants	
	1	2	1	2
EDU	0.0545 (15.51)	0.0332 (8.76)	0.0557 (13.52)	0.0354 (7.70)
EXP	0.0118 (2.89)	0.0130 (3.25)	0.0242 (5.67)	0.0247 (5.87)
EXP2/100	-0.0202 (-2.48)	-0.0216 (-2.71)	-0.0485 (-5.37)	-0.0497 (-5.60)
QC	-0.3096 (-6.04)	-0.2576 (-5.15)	-0.2516 (-4.40)	-0.2134 (-3.78)
MA	-0.2093 (-2.83)	-0.1898 (-2.64)	-0.1861 (-2.23)	-0.1580 (-1.92)
SA	-0.2104 (-1.37)	-0.2522 (-1.69)	-0.1379 (-0.82)	-0.1153 (-0.70)
AB	-0.0015 (-0.04)	0.0065 (0.16)	-0.1424 (-3.01)	-0.1314 (-2.81)
BC	-0.0323 (-0.95)	-0.0120 (-0.36)	-0.0715 (-1.95)	-0.0534 (-1.48)
CMA	0.0286 (0.69)	0.0194 (-0.48)	0.1226 (2.52)	0.1316 (2.75)
MAR	0.1618 (5.59)	0.1393 (4.93)	0.0002 (0.02)	-0.0122 (-0.45)
LNWW	0.6411 (1.37)	0.4780 (1.05)	0.8423 (1.74)	0.4778 (0.99)
VIS	-0.1789 (-3.48)	-0.1362 (-2.72)	-0.1602 (-2.67)	-0.1290 (-2.19)
COH1	-0.3257 (-9.79)	-0.2972 (-9.11)	-0.3499 (-9.49)	-0.3073 (-8.40)
COH2	-0.1725 (-5.35)	-0.1407 (-4.46)	-0.1393 (-4.07)	-0.1176 (-3.48)
FOR1	0.0375 (0.68)	0.0229 (0.43)	0.0364 (0.57)	0.0288 (0.46)
FOR2	0.0183 (0.28)	0.0125 (0.20)	-0.0468 (-0.63)	-0.0318 (-0.43)
FOR3	-0.0912 (-1.35)	-0.1211 (-1.65)	-0.1223 (-1.48)	-0.1136 (-1.40)
FOR4	0.0157 (0.32)	-0.0061 (-0.13)	0.0440 (0.78)	0.0434 (0.78)
FOR5	0.0376 (0.72)	-0.0154 (-0.30)	0.1465 (2.78)	0.1114 (2.14)
FOR6	0.0027 (0.06)	0.0056 (0.12)	0.0583 (1.16)	0.0809 (1.64)
FOR7	-0.0121 (-0.16)	-0.0480 (-0.64)	0.1250 (1.74)	0.1126 (1.59)
FOR8	0.0156 (0.26)	-0.0260 (-0.44)	0.1674 (2.43)	0.1219 (1.79)
LANG2	-0.0305 (-0.33)	-0.0418 (-0.46)	-0.2699 (-2.90)	-0.2813 (-3.07)
LANG3	0.0862 (1.90)	-0.0255 (0.57)	0.1530 (3.09)	0.1158 (2.37)
LANG4	-0.2598 (-2.93)	-0.2544 (-2.94)	-0.0725 (-0.84)	-0.0584 (-0.68)
Senior Manager	*	0.5852 (5.48)	*	0.6381 (3.59)
Middle Managers	*	0.3781 (5.21)	*	0.3434 (4.06)
Professionals	*	0.4637 (6.45)	*	0.3932 (4.88)
Semi-prof. & tech.	*	0.2518 (3.23)	*	0.1165 (1.35)
Supervisors	*	-0.0600 (-0.51)	*	0.1447 (1.23)
Trades supervisorr	*	0.2646 (2.80)	*	0.1361 (0.90)
Adm. & Senior clerical	*	0.2393 (2.14)	*	0.1886 (2.28)
Skilled service	*	-0.2029 (-2.47)	*	-0.0164 (-0.17)
Skilled trades workers	*	0.1602 (2.29)	*	-0.1613 (-1.22)
Clerical personal	*	0.0271 (0.34)	*	0.0560 (0.71)
Intermediate sales	*	-0.0627 (-0.77)	*	-0.0569 (-0.70)
manual worker	*	0.0518 (0.75)	*	0.0027 (0.03)
Other service personal	*	-0.1806 (-2.29)	*	-0.1026 (-1.26)
CONSTANT	7.1844 (3.90)	7.9363 (4.41)	5.9783 (3.12)	7.5339 (3.99)
No. of Observations	4679	4679	3652	3652
R^2	0.1442	0.1931	0.1512	0.1859
Adjusted R^2	0.1396	0.1865	0.1453	0.1773
F-test	31.37 (0.000)	29.22 (0.000)	25.83 (0.000)	21.71 (0.000)

Notes: Heteroscedasticity-consistent't' statistics in parentheses;
Source: 2001Census of Canada Public Use Microdata File for individuals

Table 10. Payoffs to selected Characteristics form Analysis of Earnings in Canada, 2001

Variable	Male			Female		
	Standard	Controlling for 14 occupations	% change	Standard	Controlling for 14 occupations	% change
The Native-Born						
Education	6.72	4.61	-31.40	8.55	5.48	-35.91
Experience						
10 years	2.918	2.694	-7.68	2.782	2.398	-13.80
20 years	1.646	1.508	-8.38	1.504	1.266	-15.82
Language						
French	-7.58	- 5.98	21.00	-7.77	-7.53	3.00
Immigrants						
Education	5.45	3.32	-39.08	5.57	3.54	-36.44
Experience						
10 years	0.776	0.868	11.86	1.45	1.476	1.79
20 years	0.372	0.436	17.20	0.48	0.482	0.41
Migrated						
1990-2001	-32.57	-29.72	8.75	-34.99	-30.73	12.17
1980-1990	-17.25	-14.07	18.43	-13.93	-11.76	15.58
Language						
French	*	*	*	-26.99	-28.13	-4.22
Bilingual	*	*	*	15.30	11.58	-24.31
None	-25.98	-25.44	2.08	*	*	*

Note: The payoffs are expressed as percentages.
Source: Authors' calculations based on Table 8 and Table 9.

Table 11. Estimates of Model of Occupational Status, with the Mean Occupational Earnings as the Dependent Variable, Native-born and Immigrations in Canada

Variable Name	The Native-born		Immigrants	
	Male	Female	Male	Female
EDU	0.0328 (57.21)	0.0404 (58.54)	0.0276 (27.29)	0.0309 (29.23)
EXP	0.0043 (8.13)	0.0064 (10.55)	-0.0007 (-0.60)	-0.0006 (-0.56)
EXP2/100	-0.0048 (-3.95)	-0.0088 (-6.16)	0.0010 (0.10)	0.0020 (0.75)
MAR	0.0408 (11.11)	0.0203 (5.16)	0.0339 (4.00)	0.0153 (2.04)
VIS	-0.0028 (-0.23)	0.0084 (0.59)	-0.0488 (-6.28)	-0.0462 (-5.83)
COH1	*	*	-0.0502 (-5.10)	-0.0694 (-6.88)
COH2	*	*	-0.0475 (-4.99)	-0.0311 (-3.37)
LANG2	-0.0240 (-2.88)	-0.0005 (-0.05)	0.0050 (0.20)	0.0044 (0.18)
LANG3	0.0315 (5.07)	-0.0264 (4.00)	0.0892 (6.66)	0.0590 (4.34)
LANG4	*	*	0.0432 (1.92)	-0.0405 (-2.00)
CONSTANT	9.2558 (33.78)	8.1565 (25.26)	9.5528 (17.71)	7.92 (14.83)
Diagnostic Tests				
Jarque-Bera Test	498.1404 (0.000)	70.9826 (0.000)	20.0387 (0.000)	58.9945 (0.000)
Goodness of Fit test	1373.5182 (0.000)	1151.8256 (0.000)	374.3031(0.000)	268.7062 (0.000)
BPG test Koenker (R2)	156.298 (0.000)	31.788 (0.003)	44.824 (0.000)	38.655 (0.002)
No. Of Obs.	17168	13236	4679	3652
R^2	0.2161	0.2378	0.2103	0.2680
Adjusted R^2	0.2155	0.2386	0.2074	0.2646
F-test	337.75 (0.000)	295.90 (0.000)	73.01 (0.000)	78.264 (0.000)

Notes: Heteroscedaticity-consistent "t" statistics in parentheses; estimation specification has mean occupational earnings as the dependent variables.

Source: 2001 Census of Canada Public Use Microdata File for individuals