

Vancouver Centre of Excellence



Research on Immigration and Integration in the Metropolis

Working Paper Series

#00-04

Immigrant Occupational Skill Outcomes
and the Role of Region-Specific Human Capital

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May 2000

RIIM

Research on Immigration and Integration in the Metropolis

The Vancouver Centre is funded by grants from the Social Sciences and Humanities Research Council of Canada, Citizenship & Immigration Canada, Simon Fraser University, the University of British Columbia and the University of Victoria. We also wish to acknowledge the financial support of the Metropolis partner agencies:

- Health Canada
- Human Resources Development Canada
- Department of Canadian Heritage
- Department of the Solicitor General of Canada
- Status of Women Canada
- Canada Mortgage and Housing Corporation
- Correctional Service of Canada
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**IMMIGRANT OCCUPATIONAL SKILL OUTCOMES
AND THE ROLE OF REGION-SPECIFIC HUMAN CAPITAL**

by

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I would like to thank Don DeVoretz for his technical help and for opening up the opportunity for me to work with RIIM and Human Resources Development Canada (HRDC), and Louis Grignon at HRDC for enabling me to work within the government arena on this project. The technical and theoretical support received from him and others at the Applied Research Branch has been invaluable. I would also like to thank Krishna Pendakur for his technical help and support. Copy editing services were provided by Sydney Preston of RIIM.

ABSTRACT: There is growing evidence to suggest that there is a substantial underutilization of immigrant skills – the commonly referred to “taxi driver” phenomenon of recent immigrants to Canada. Are immigrants who were highly skilled doctors and engineers in their source country having to resort to low-skilled occupations upon arrival in Canada? This paper combines data from the 1991 and 1996 Canadian Censuses to evaluate the importance of this phenomenon by comparing occupational skill distributions found among immigrants from different regions of origin (including native-born residents as a reference group). A logistic regression model that asks the question: “What is the probability of an immigrant (with certain characteristics) finding employment in a highly skilled occupation?” helps to isolate human capital endowments that contribute to certain occupational skill distributions found among immigrants. Level of education, major field of study, and knowledge of official languages are key determinants of finding high-skilled employment. The isolated effects of region of origin on level of education are found to have a strong influence on an immigrant’s likelihood of being employed in high-skilled work. Immigrant-specific state variables contributing to occupational skill outcome include region of origin in isolation and period of immigration. This study highlights the importance of region-of-origin effects in the development of policy efforts to more accurately utilize the skill sets of immigrants in the Canadian labour market.

Key Words: Canada, immigrant skills, labour market, occupational skills.

Introduction

Growing evidence suggests there is a substantial underutilization of immigrant skills – the “taxi driver” phenomenon of recent immigrants to Canada.¹ Immigrants who were skilled doctors and engineers in their country of origin are suspected of having to resort to low-skilled occupations upon arrival in Canada. This paper aims to identify this phenomenon in the data as well as decipher factors contributing to this underutilization of human capital. Occupational skill distributions found among immigrants from different regions of origin are compared to one another and with native-born residents to evaluate the extent to which the skills of immigrants may be underutilized. The underutilization of immigrant skills is measured by differences in occupational skill level attainment with native-born residents, controlling for influential factors. The heterogeneity of immigrants to Canada makes this a difficult task, as the education and experience of some immigrants may be assessed differently and lead to different probabilities of getting into a high-skilled occupation. Immigrants may face barriers to successful labour market integration such as lack of foreign credential recognition or Canadian work experience. As national wealth increasingly relies on the skills of a country’s workforce, there is need to evaluate whether Canada is using the human capital of immigrants efficiently. Equity issues also arise if immigrants are unable to find skilled employment. The degree to which immigrants obtain high-skilled jobs will increasingly determine Canada’s role in the competitive global economy.

The extent to which immigrants find employment appropriate to their education and experience is most often explained within the context of two different theories. First, foreign education may be of lower quality than education obtained in Canada. In this case, the title of a degree of an educational program would be the same, but the worth may be less for foreign earned degrees. Second, because Canadian employers are risk averse and have imperfect knowledge of foreign credentials, full compensation is not given to foreign credentials, which results in the underutilization of human capital. The empirical work developed here cannot

¹ For example, Goldberg 2000.

distinguish between these explanations for unequal occupational skill outcomes of native-born residents and immigrants. Instead, this study identifies where occupational skill differentials are most acute and makes suggestions on how the outcomes of immigrants can be improved.

This paper highlights the extent to which immigrants integrate into the Canadian skilled workforce as measured by the results of a logistic regression model that enable the identification of factors that contribute to finding high skilled occupations. The economic experience of immigrants to Canada is viewed through occupational skill outcome differences among immigrants and native-born residents. The importance of immigration to the Canadian economy is stressed in Part I. Previous work concerning immigrant progress in Canada's labour environment is also reviewed in this section. In Part II, a logistic regression model is outlined that delivers the probability of both immigrants and native-born residents finding high skill level employment in the Canadian labour market. The variables and the data source are explained in this section. In Part III, the 1991 and 1996 Census data allow a descriptive analysis that reveals immigrants and native-born residents find themselves differently distributed among occupational skill levels. Part IV evaluates findings of the model. Part V summarizes key results as well as indicates importance of the findings and avenues for further research. The goal of this study is to identify forces that determine occupational skill outcomes of immigrants. Canadian immigration policy is currently under review and studies such as the present can contribute to the formation of policy that facilitates the integration of immigrants into the labour market.

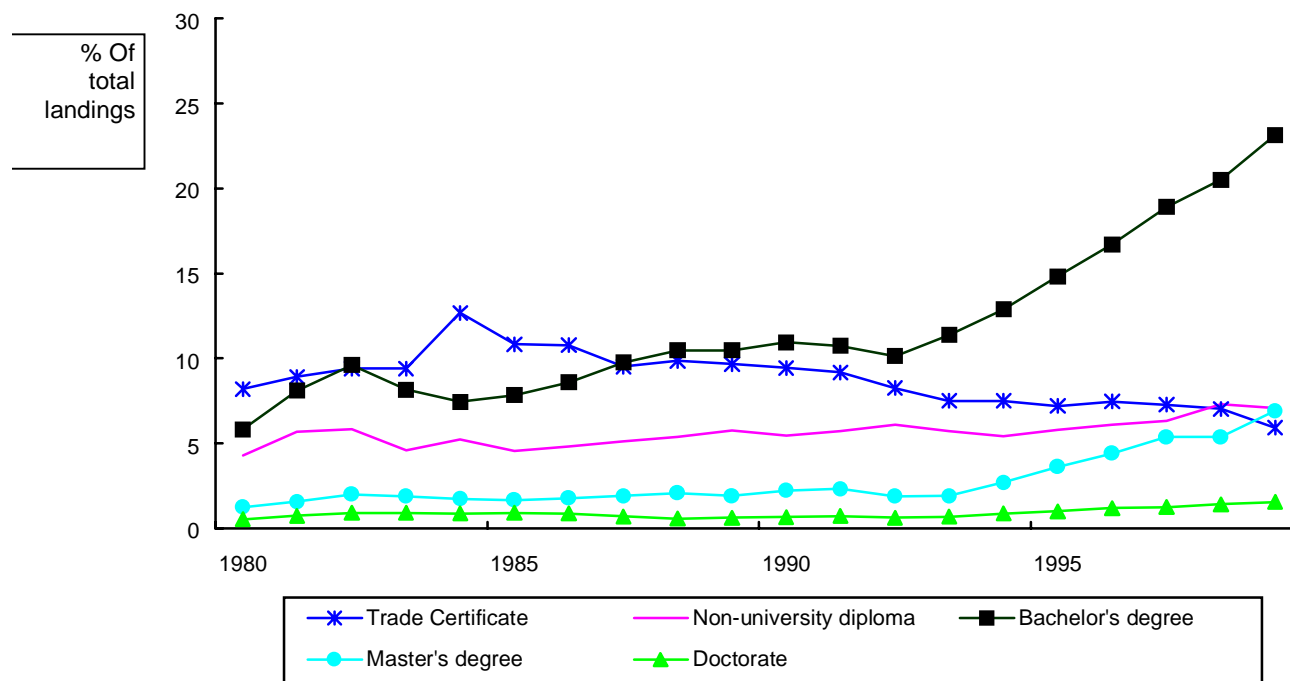
An Overview of Immigration in Canada

Immigrants who came to Canada in the early 1990s have not performed as well as previous arrivals in terms of earnings and rates of employment. Immigrants landing in the early 1990s experience significantly lower initial earnings than that of previous cohorts of immigrants.² Recent immigrants also have lower rates of employment than those of comparable native-born residents and these rates have declined markedly between 1986 and 1996. For example, Badets and Howatson-Leo (1999) find that the employment rate of recent immigrant men (having landed within the past five years) aged 25 to 44 years was 81 percent in 1986 and 71 percent in 1996, a decline of 10 percentage points over the decade. During this period, the employment rate of native-born men declined only 3 percentage points, from 87 percent in 1986 to 84 percent in 1996. The study also finds that recent immigrant women had an employment rate of 58 percent in 1986 and 51 percent in 1996, a decline of 7 percentage points, while for native-born women, the employment rate actually rose 8 percentage points, from 65 percent in 1986 to 73 percent in 1996. While employment rates declined for both male and female recent immigrants, native-born men experienced a much smaller decline while native-born women experienced an increase in their employment rate. Employment and earnings information – such as that contained in the Longitudinal Data Base (IMDB) and the 1996 Census – indicate that immigrants landing in the early 1990s have experienced greater difficulties integrating into the Canadian labour market than have earlier arrivals.

These outcomes occurred in spite of the fact that recent immigrants are more highly educated than were previous cohorts of immigrants. The overall rising trend overtime in immigrant education levels is evident in Figure 1 below.

² For example, according to tax file data (IMDB), two years after landing, immigrants arriving in 1980 earned an average annual amount of \$21,300 (in 1995 dollars) compared to the annual \$16,500 (in 1995 dollars) earned after two years by immigrants landing in 1990.

**Figure 1: Post-secondary education by immigrant landing year:
1980-1999**

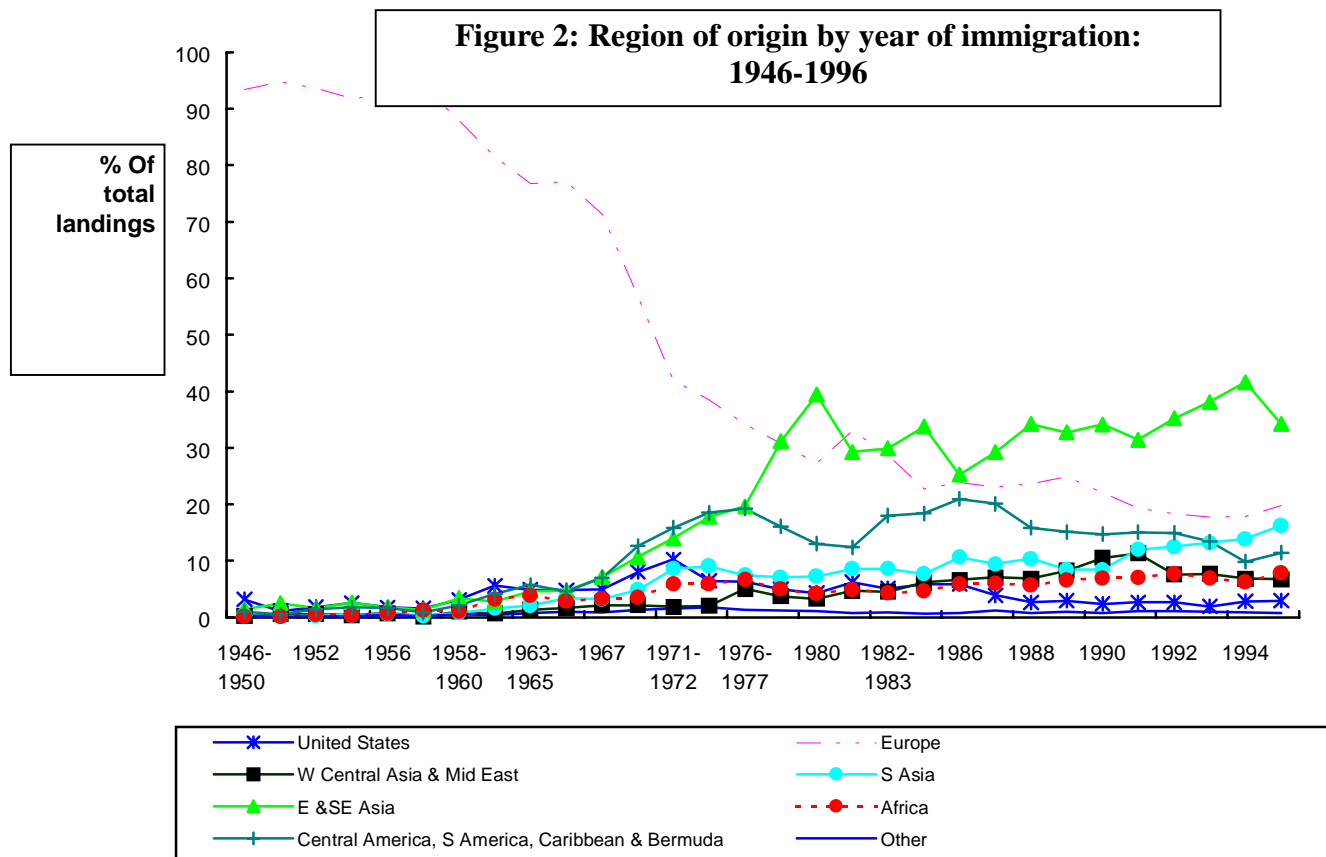


Source: Citizenship and Immigration Canada, *Facts and Figures 2000*

A substantial increase in the proportion of immigrants landing with university-level education is evident during the 1990s. As Figure 1 above shows, 45 percent of immigrants landing in 1999 had post-secondary education, compared with 20 percent in 1980 and 29 percent in 1990. In 1999, 23 percent of immigrants landing had a completed a Bachelor's degree, 7 percent a Master's degree, and 2 percent an earned doctorate. The trend of increasingly higher educated immigrants landing in Canada is significant in light of their recent performance in the labour market.

A drastic change in composition of Canadian immigrant origins has occurred over time. In the immediate postwar decade, Canada's immigration policy had a specific preference for immigrants from Northern European countries (Baker and Benjamin 1994). Over the 1950s and 1960s, equal entry conditions were gradually extended to immigrants from all

regions. During the 1970s and 1980s, large increases in the proportion of immigrants from Eastern Europe, Asia, Latin America, and Africa occurred. As more immigrants come from non-traditional areas, they may possess education and skills less readily recognized in – or transferable to – the Canadian labour market. Transferable skill sets are defined in this paper as those that are applicable and valuable to the Canadian labour market and recognized by Canadian employers.



Source: 1996 Census

The profile of recent immigrant cohorts has changed dramatically over the past few decades and is seen in Figure 2 above. Europeans comprised over 90 percent of all immigrants to Canada prior to 1960. European-born immigrants represented only one in five immigrants landing in 1996 compared to 57 percent in 1970. Moreover, the proportion coming from Western Europe has declined to 10 percent in 1996 from 51 percent in 1970. In contrast, the proportion of landed immigrants from Asia and the Middle East was 57 percent as compared

to 18 percent in 1970. The percent of total immigration from Central America, South America, the Caribbean, and Bermuda rises after 1960, as does immigration Africa. Distinct change in the composition of immigrant origins occurs after 1960 due largely to changes in Canadian immigration policy and changing conditions in source countries.³

Under Canada's most recent *Immigration Act* (enacted in 1978), immigration policy has been conducted to correspond with a point system that attempts to match skills of immigrants with perceived needs of the Canadian labour market (Baker and Benjamin 1994.) One major barrier faced by many immigrants is a lack of recognition of foreign credentials, made worse because of a difficulty for immigrants to obtain information and have qualifications assessed before coming to Canada (Citizenship and Immigration Canada 1998a). The accreditation of immigrant professionals is of growing concern to Canada, as evidenced at a recent conference in October 1999 in Toronto. This conference featured keynote addresses by provincial and federal politicians, including both the Minister of Citizenship and Immigration and the Minister of Human Resources Development Canada, and drew participants from many interested communities. The conference was organized in order to address the belief that the skills of recent immigrants selected under the current points system are dramatically underutilized, which is a great loss to Canada's economy and productivity, and that the current qualification recognition system is in need of serious changes.⁴ Experts voice that it is currently filled with discriminatory practices, including lack of recognition of language barriers, higher costs for foreign-trained individuals to prove their accreditation, and a higher level of intervention by regulatory bodies for immigrants than for native-born professionals.

An example of immigrant skill underutilization resulting from lack of foreign credential recognition is a recent case in British Columbia. The provincial Human Rights Commission ruled in late 1999 that British Columbia's College of Physicians and Surgeons discriminated against five foreign-trained physicians by denying them the right to work as doctors. The commission ordered the college to negotiate a resolution with the doctors, one of whom had

³ Change in policy allows for immigrants from all countries to apply, but change in composition depends on a combination of push and pull factors in source countries and Canada.

⁴ Human Resources Development Canada, Citizenship and Immigration Canada, 1999.

been trying to practice in British Columbia since 1983. The five doctors came from Italy, Romania, Russia, India and the Philippines. All five passed an equivalence examination before entering Canada, allowing them to apply for the mandatory internship program that places graduating students in hospitals. The doctors, all Canadian citizens or landed immigrants, also passed the Medical Council of Canada evaluating examination, a requirement of all foreign graduates from medical schools not recognized by the British Columbia college. The commission found that foreign-trained doctors from New Zealand, South Africa, Australia, the United Kingdom and the United States, were allowed to bypass the internship requirement and practice medicine immediately after passing the evaluating exam. Other doctors, such as the five in the case, were not granted internships, although some applied year after year, and were effectively barred from practicing medicine (Centre for Immigration Studies 1999).

Although largely undocumented, an example of immigrant skill underutilization resulting from lack of foreign credential recognition results from a recent case in British Columbia. The provincial Human Rights Commission of British Columbia ruled in late 1999 that British Columbia's College of Physicians and Surgeons discriminated against five foreign-trained physicians by denying them the right to work as doctors. The commission ordered the college to negotiate a resolution with the doctors, one of whom had been trying to practice in British Columbia since 1983. The five doctors came to British Columbia from Italy, Romania, Russia, India and the Philippines. All five passed an equivalence examination before entering Canada, allowing them to apply for the mandatory internship program that places graduating students in hospitals. The doctors, all Canadian citizens or landed immigrants, also passed the Medical Council of Canada evaluating examination, a requirement of all foreign graduates from medical schools not recognized by the British Columbia college. The commission found that foreign trained doctors from New Zealand, South Africa, Australia, England, and the United States, were allowed to bypass the internship requirement and practice medicine immediately after taking the evaluating exam. Other doctors, such as the five in the case, were not granted internships, although some applied year after year, and were effectively barred from practicing medicine.

The direction of new immigration policy is a selection model for immigrants based on generic attributes for success in a continuously changing labour market rather than specific

occupations. Proposed policy alterations stem from a perceived need for immigrants with flexible skill sets, and a realization of the importance of temporary economic movement (Citizenship and Immigration Canada 1998a). A focus on transferable skill sets creates a necessity to examine differences between the labour market experiences of this newer immigrant group with those of the previously dominant European group of immigrants. Previous studies treat immigrants to Canada as a largely homogeneous group, leaving a gap in knowledge of differences among occupational skill outcomes – outcomes that contain increasingly relevant information regarding the ability of immigrants to integrate into the labour market. With the current policy direction towards the selection of immigrants based on flexible skill sets, it is necessary to ensure abilities are adequately realized in the Canadian labour market.⁵

Literature Review

Previous studies on immigrants to Canada focus on wages and earnings, education, and employment. Baker and Benjamin (1994) study the performance of immigrants in the Canadian labour market to find that economic integration is becoming an increasingly elusive goal for most immigrant cohorts. The study finds that foreign educated immigrants earn less than do native-born residents with the same level of education. Further, a decrease in the entry earnings of recent immigrants is indicative of *permanent* differences across arrival cohorts, whose identification is “an important topic for future research.” The authors also find that the earlier immigrants have earnings that equal or exceed those of native-born residents. This evidence suggests that the labour market experience of recent immigrants has changed markedly from that of previous arrivals.

McDonald and Worswick (1998) use cross-sectional surveys spanning the period 1981 to 1992 for earnings comparison of immigrant and native-born men in Canada. The study finds that recent immigrant cohorts have suffered no decline in earnings. Job tenure is found to be a strongly significant determinant of earnings, and previous estimates of immigrant earnings

⁵ Any discussion on selection is limited to dependent immigrants, as immigration policy is made along the lines of economic, family, and refugee class. Family and refugees are not selected, whereas economic (independent) immigrants are selected.

differentials that have not incorporated job tenure information may partly reflect differences in tenure between immigrants and native-born residents. The authors contend that the decline in the rate of immigrant assimilation is not due to a decrease in the quality of immigrants. Instead, it is argued that economy wide conditions, specifically during year of arrival, affect the long-term performance of immigrant groups.

Studies that focus on the wages and earnings of immigrants generally treat immigrants as a homogeneous group. An exception to this is Pendakur and Pendakur (1998) who examine earnings differentials between whites and visible minorities, and earnings differentials within the white and visible minority groupings. Immigrant white men and immigrant visible minority men face earnings gaps of 2 percent and 16 percent. Earnings penalties range from 1 percent for Chinese immigrants to 22 percent for Black immigrants. A large and statistically significant earnings difference exists between immigrants who completed their education in Canada and immigrants who completed their education abroad, although the authors find that immigrant earnings gaps remain even after place of education is taken into account.

Other studies look at educational differences among immigrants and native-born residents. Badets and Howatson-Leo (1999) find that most recent immigrants speak English or French and are highly educated. The proportion of men with university degrees is twice as high among recent immigrants (36 percent) as among native-born men (18 percent) while for recent immigrant women the numbers are 31 percent versus 20 percent. However, despite these language abilities and high qualifications, recent immigrants are less likely to be employed. At the university level, 92 percent of native-born residents have jobs compared to 73 percent of recent immigrants and one quarter of recent immigrants with a university degree hold a job in sales and service occupations. As new entrants to the labour market, immigrants who came to Canada during the 1990s experienced difficulties finding employment.

Roy (1996) assesses immigrant usage of Canadian transfer programs, particularly that of Unemployment Insurance (UI). No difference exists between the annual weeks worked by immigrants and those worked by native-born residents, although the percent of the labour force to report being unemployed is higher among immigrants. The percent of unemployed among immigrant cohorts is greater for recent immigrants than for those arriving in Canada

prior to 1981. There are noticeable changes over time in immigrant usage of unemployment insurance.

Pendakur and Mata (1999) look at change over time in industry propensities of immigrant and native-born workers who live in the three largest Census Metropolitan Areas (CMAs) in Canada. The authors find labour force integration changes substantially both in response to shifts in the labour market and to the social integration of immigrants. Native-born workers slowly move away from areas considered dying sectors over the twenty-year period studied, as the economy shifts toward one based on services rather than manufacturing. Immigrants with low levels of schooling replace the native-born residents in these jobs. Substantial moves toward self-employment takes place on the part of immigrants working in high education industries, providing evidence in support of theories pointing to blocked occupational mobility.

Green (1995) examines occupational distributions of immigrants, particularly in comparison with their stated intended occupations at time of landing. The study estimates a multinomial logistic regression model of occupational selection for male immigrants using data from Census years 1981 and 1986. The model results indicate a statistically significant relationship between intended occupation at time of entry and actual occupation. However, once other occupation-related personal characteristics, such as education, are included, the significance of the intended occupation variables is eliminated. The author argues that this finding implies that characteristics such as education and location are more important determinants of occupation than statements of intent at time of landing.

A review of recent studies on immigrants in the Canadian labour market reveals a gap in the knowledge of occupational skill level attainment. Literature confirms the existence of difficulties faced by recent immigrant cohorts, but which may be caused by differing factors. Despite a changing immigrant profile, previous studies generally treat immigrants to Canada as a single group, a practice that ignores differences in returns to skills for immigrants from different countries. With regard to the labour market, such information can help the formation of policy that better suits the integration process of some immigrant groups. If immigrants with certain backgrounds are not doing as well as other similarly qualified individuals, there

are effective policy measures that can be implemented. Policy initiatives would involve the strengthening of credential recognition agreements with particular countries (country specific) and the provision of educational frameworks for immigrants in which their skills are made compatible with the Canadian labour market (this might include an accelerated process by which Canadian equivalency diplomas are earned). Canadian immigration policy regulates entry based human capital criteria, and these human capital endowments must be weighed appropriately within the selection system to be used in providing an effective integration framework after landing.

Conceptual Framework

There is concern among labour market skill experts that many highly trained professionals and technically skilled immigrants, who have been welcomed to Canada, find provincially legislated licensing bodies slow or reluctant to recognize their credentials (Advisory Council on Science and Technology 2000). Experts believe this reluctance – which varies among professions and provinces – often can not be justified on the basis of protecting standards, and amounts to a restriction of the supply of skills and a waste of human potential (Ibid.). Structures within the Canadian economy may be preventing the utilization of human capital developed outside Canada. The objective of this study is to identify which immigrants with what human capital endowments are most likely to find high-skilled employment in the Canadian job market, and which groups are more likely to be experiencing an underutilization of human capital.

Does knowing an immigrants region of origin provide useful information for predicting his or her occupational skill outcome in Canada, and if so, what is the relationship between these two factors? Although many factors could affect an immigrant's occupational outcome, what is most useful for modeling purposes is relevant and readily available information, such as region of origin. Any additional information showing that immigrants are not a homogeneous group allows, if necessary, the design of policy tools that target specific groups. From the information contained within region-of-origin effects, policy makers can ensure immigrants have as efficient an integration process as possible, using options such as training, credential recognition measures and settlement programs. This paper aims to alert policy and

program planners to potentially important changes in immigrant composition, particularly the role of region specific human capital, in influencing immigrant occupational skill outcomes. The capability of policymakers to project immigrant occupational skill outcomes will be enhanced to the extent the relevant specific factors can be identified that influence immigrant occupational skill outcomes.

Data

Data is drawn from the 1991 and 1996 Canadian census Public Use Micro data, individual file, a 3 percent sample of the Canadian population. The dependent variable used in this paper is “high-skill occupation” as per the Standard Occupational Classification (SOC) (1991). The Census is the most used database in regard to research on immigrants. These data sets contain a large sample size and the coding is similar across these years. A broad breakdown in countries of immigrant origin is available. A data set was created for the empirical work comprised of all males and females aged 25 through 59 living in provinces outside the Atlantic region.⁶ The immigrant sample is further restricted to those landing after age 24, making it possible to assume education was obtained outside of Canada. By truncating the sample, the distribution of people is affected.⁷ Immigrants landing before age 24 must not be counted because they most often acquire human capital within Canada before entering the labour force. This population has been censored because the population parameters of this group are fundamentally different and non-random from those people immigrating after age 24 and it is necessary in this study that these two groups not be mixed. In taking this sample selection, 9.2 percent of the observations are thrown out.⁸ Observations with missing data are excluded from the sample.

⁶ Residents of Nova Scotia, New Brunswick, Prince Edward Island and Newfoundland are excluded from the analysis because detailed immigrant variables are masked.

⁷ For example, a result of the sample being restricted to immigrants arriving after age 24, is that for the cohort arriving in 1985, the 1996 Census will not have foreign-born people who are 35 years or less.

⁸ The method of using only immigrant observations for those arriving in Canada after age 24 gives a total sample size of 693,159. If all immigrants are included in the sample, the number of observations is 763,311, giving a difference of 70,152 observations, or 9.2 percent of 763,311.

Assimilation and Cohort Effects

Two separate sources give rise to changes in immigrant labour market behavior, *assimilation effects* and *cohort effects*. Assimilation effects occur over time according to length of residence and can be characterized as the immigrant's eventual convergence (or continual divergence) of employment and unemployment experience to the labour market behavior of native-born residents. Cohort effects arise from differences in the labour market attributes of immigrants arriving in different years. It is not possible to distinguish between a poor labour market environment and the attributes of the immigrant cohort – the demand and supply effects can not be isolated. Some immigrant attributes are observed (i.e. language and education) while others are unobserved (i.e. motivation and transfer of human capital). This can be affected by changes in the job skill standards applied to immigrants in any given year, resulting in an inflow of immigrants with differing abilities and potential economic success. It is significant that recent immigrant cohorts could differ from their predecessors in the levels of observable skills they bring to Canada.

Controlling for assimilation and cohort effects requires examining the same immigrant cohort at different times, using data for both immigrants and native-born residents. To put multiple censuses together, the 1991 and 1996 cross-sections are merged to generate a single file containing all the data. A variable is created that gives the year of census (i.e. 1991 or 1996) and the age of an individual. These age and period effects are assumed to be the same for both native-born residents and immigrants. The estimated regression includes *years since migration* and *period of immigration* variables that allows both assimilation and cohort affects for immigrant groups to be identified. Dummy variables indicating the period in which immigration occurred give coefficient estimates that represent the cohort-specific “fixed effects” and measures the extent of differences in participation in high-skill employment as of the time of entry across successive immigrant arrival groups. Years spent in Canada give assimilation effects for immigrants. While the same individuals cannot be identified across the two Census years, different individuals with the same number of years since immigration can be identified as coming from different period of immigration cohorts (the years since migration variable is not a linear combination of the period of immigration cohort dummies). This method, which follows Bloom, Grenier, and Gunderson (1994), allows estimation of

assimilation effects (within cohort occupational skill level growth) as well as period of immigration cohort effects (cross-cohort occupational skill level growth).

Model

Analysis builds upon a logistic regression model that estimates occupational skill level by asking the question: *What is the probability of an immigrant (with certain characteristics) finding employment in a highly skilled occupation?* Four different levels, (I, II, III, and IV), with skill level IV referring to the highest skilled occupations are used based on SOC (1991) classification. In order to capture the probability of outcomes, two logistic models are estimated. A first logistic estimates the probability of an immigrant to be employed in the highest skilled work, level IV. A second logistic model pools skill levels III and IV together and identifies the probability of finding skilled employment.⁹

Human capital variables are the focus of this study – particularly the significance of education interacted with country of origin. With βx representing the right hand side variables, the functional form of model is:

$$L = \frac{e^{\beta x}}{1 + e^{\beta x}}$$

Where the dependent variable L equals 1 if the individual is employed in skill level IV work, and 0 other wise. The model can be transformed to the following equation:

$$Y = \beta X + u$$

Where $Y = \ln\left(\frac{P}{1-P}\right)$ is the logistic, $P = \Pr\{L = 1|X\}$, X is a vector of independent variables, and β is the vector of associated coefficients.¹⁰ The following variables comprise the right hand side variables.

- Sex

⁹ A weakness of logistic regression models is a tendency to be good at predicting the dominant state. If the dominant form is that immigrants do not work in skill level IV jobs, the logistic may be poor at prediction. As a response to this, the second logistic is run with grouped skill level III and IV as the dependent variable, as together these two skill levels account for over 50 percent of outcomes in most region-of-origin categories, producing estimates that are good for prediction.

¹⁰ In the second logistic regression, the dependent variable is pooled skill level III and IV.

- Year of Census (1991 or 1996)
- Age¹¹, Age squared
- Years since migration, Years since migration squared
- Period of immigration
- Census Metropolitan Area (CMA)
- Legal marital status
- Member of visible minority
- Immigrant place of birth (region of origin)
- Highest level of education
- Highest level of education/Immigrant place of birth (region of origin)
- Major field of study
- Knowledge of official languages

Within the model, the significance of human capital variables indicates the extent by which skills are rewarded. Education variables are interacted with region of origin to see how this endowment affects the probability of finding a job in a high-skilled occupation. Classification according to place of birth is by geographical region and is as follows: (See Appendix: Region of origin geographical classification.)

1. Native-born residents
2. North America
3. Northern Europe
4. Western Europe
5. Southern Europe
6. Eastern Europe
7. Other Europe
8. West Central Asia & the Middle East
9. Southern Asia
10. East and South-East Asia
11. Africa
12. Central/ South America/ Caribbean & Bermuda
13. Other

An advantage of the logistic approach is that skill level is looked at as the dependent variable in a regression equation. Characteristics of an immigrant are used to estimate the probability that he or she will obtain a high-skill level occupation. Human capital endowments that positively influence the probability of an immigrant obtaining employment in a high-skilled occupation are identifiable. The literature argues that some immigrant groups tend to

¹¹ Human capital regressions usually include years of potential work experience and years of potential work experience squared as explanatory factors. For the present analysis, age is used as a proxy for work experience.)

experience labour market difficulties for a variety of reasons, including discrimination, non-recognition of foreign credentials, and low adaptability to Canadian technology (De Silva 1997). If this is true, it should be reflected in the coefficients of some of the region-of-origin variables included in the regression (Ibid.). Many advantages of logistic models make it an ideal way to compare occupational skill outcomes of immigrants and native-born residents.

Descriptive Analysis

To establish that disparities exist among occupational skill level distributions held by immigrant groups and native-born residents, the analysis examines evidence of these differences provided by the data. Native-born residents are included in the analysis as a reference group. The following tables are averages of the 1991 and 1996 Census data sets.¹²

¹² Using arithmetic means of two stocks of data without providing measures of variance or standard deviations can be misleading. A cross-check indicates that this is not the case. Individual data sets are available upon request.

Table 1: Sample Statistics: Native-born Residents & Immigrants (1991 & 1996 Census Years)

Immigrant place of birth	Total individuals	Sample (%)	Male (%)	Female (%)	Average Age*	Average years in school**
Native-born	140,277	85.3	49.60	50.40	39.64	13.76
North America	1,104	0.7	44.11	55.89	42.91	16.72
Northern Europe	2,405	1.5	51.31	48.69	47.06	15.71
Western Europe	1,236	0.8	51.21	48.79	45.94	12.40
Southern Europe	2,231	1.4	53.92	46.08	46.04	11.79
Eastern Europe	2,965	1.8	50.93	49.07	44.30	15.09
Other Europe	1,802	1.1	53.11	46.89	42.27	14.70
W Central Asia & Middle East	1,144	0.7	49.48	50.52	39.38	15.20
Southern Asia	2,170	1.3	45.67	54.33	41.77	14.50
E & SE Asia	6,824	4.2	47.60	52.40	41.20	14.20
Africa	695	0.4	54.82	45.18	41.22	14.36
CA SA Caribbean & Bermuda	1,453	0.9	47.49	52.51	42.88	12.61
Other	118	0.1	55.93	44.07	43.19	12.74
Total	164,424	100	--	--	--	--

* Calculated mean average age in the range 25 to 59 years.

**This is an average based on the grouping of years of schooling used in the Census.

In Table 1 above, the data set created from the 1991 and 1996 Censuses is divided into the designated regions of origin included in the model, providing both the individual count and percent of individuals born in each area.¹³ The total number of individual observations is 164,424, with native-born residents comprising 85.3 percent of the sample. The table reveals the largest group of immigrants to Canada (landing at 25 years of age or over) come from East and South-East Asia and comprise 4.2 percent of the total sample, followed by those originating from Eastern Europe at 1.8 percent.

The mean average age among native-born residents and within immigrant populations is contained within Table 1 and is an important factor when interpreting cross-tables that do not control for influential factors. With an average age of 39 years, the youngest immigrant group is from West Central Asia and the Middle East. The immigrant group eldest on average is from Northern Europe and has a mean age of 47 years. Immigrant groups from Southern and Western Europe are also relatively older. The mean age within an immigrant group is indicative of employment tenure, as well as time and experience in the Canadian labour market.

¹³ This analysis is based on a 25 percent random sample of the created data set.

The sample data indicates skill level differences in the occupations held by native-born residents and among various immigrant groups. Table 2 below allows comparison of native-born residents and immigrants according to place of birth and occupational skill level. (For a breakdown of skill level into occupation, see Appendix Table 1A.)

Table 2: Place of Birth by Occupational Skill Level (SOC (1991): Percent Total Sample by Region of Origin (1991 & 1996 Census)

Place of birth	Skill level				
	Not applicable*	I	II	III	IV
Native-born	13.87	8.30	28.52	26.91	22.40
North America	12.41	3.99	17.21	18.75	47.64
Northern Europe	9.65	5.45	22.79	28.81	33.31
Western Europe	15.45	18.77	25.08	26.05	14.64
Southern Europe	25.06	14.66	23.35	23.58	13.36
Eastern Europe	16.90	11.77	25.30	26.88	19.16
Other Europe	17.20	12.93	27.69	20.31	21.86
W Central Asia & Middle East	26.22	6.56	21.42	20.10	25.70
Southern Asia	19.68	12.81	31.89	17.24	18.39
E & SE Asia	19.01	12.15	31.11	18.49	19.24
Africa	27.91	8.06	24.60	13.53	25.90
CA SA Caribbean & Bermuda	22.02	14.93	32.28	19.06	11.70
Other	18.64	15.25	19.49	25.42	21.19

* It is necessary to include observations where occupation is not applicable in the sample, as this may result from lack of foreign credential recognition or skill underutilization. Excluding these observations would bias the model.

As shown in Table 2 above, 22.4 percent of native-born residents are employed in skill level IV occupations. Immigrants with the highest relative representation employed in this skill level are from North America, with 47.6 percent of those landing after age 24 finding such work. Northern European immigrants, at 33.3 percent, also have high relative representation in skill level IV occupations. With approximately 25 percent employed in skill level IV jobs, the immigrant groups from Africa and West Central Asia and the Middle East have greater representation than do native-born residents. At 11.7 percent, immigrants from Central America, South America, Caribbean and Bermuda have low relative participation in skill level IV work, followed closely by Southern European (13.4 percent) and Western European (14.6 percent) immigrants. South Asian immigrants have over 18 percent of individuals working in high-skilled jobs. At over 19 percent, East and South-East Asian and Eastern European immigrants have similar involvement in high-skill occupations. Immigrants from North

America, Northern Europe, Africa, and West Central Asia and the Middle East are employed in high-skill work to a greater extent than are native-born residents.

As both categories comprise skilled work, occupations in skill level III and IV are next pooled together. Native-born residents in skill level III and IV represent 49.3 percent of total native-born workers in the sample. North American immigrants remain strongly represented in high-skill occupations at 66.4 percent, followed by Northern European immigrants with 62.1 percent participation. When the two skill levels are pooled, immigrant representation from West Central Asia and the Middle East drops to below that of native-born residents (45.8 percent), as does that of those from Africa (39.4). Remaining immigrant categories display lower levels of representation than native-born residents in the two skilled occupation levels, particularly those from Central America, South America, Caribbean and Bermuda, with 30.8 percent involved. Both South Asian and East and South-East Asian immigrant groups show low representation in skilled jobs, with approximately 37 percent employed in the two occupational levels. Other European immigrants show approximately 42.2 percent participation in skilled jobs. Eastern European and Other immigrants, at 46 percent, display a similar distribution as native-born residents when the two skill levels are pooled. According to Census data, some immigrant groups arriving in Canada as adults find work in skilled occupations to a lesser extent than do native-born residents and immigrants from other regions.

An exploration of Canadian Census data highlights important differences among immigrants and native-born residents with regards to occupational skill level. This alone is not to be taken as evidence that there is skill underutilization amongst immigrant groups. There is a need to explore the data with a formal model that estimates the relative likelihood of an immigrant attaining high-skilled employment while controlling for influential factors.

Regression Estimates

Using the 1991 and 1996 Census data, coefficients are estimated that allow the computation of the probability of being in high-skill employment for each logistic regression, holding all

other factors at their average value.¹⁴ This technique isolates each variable in the model and reveals its direct relationship with the probability of employment in high-skill work. To assess statistical significance of the estimates, a 95 percent degree of confidence is used. In the context of the logistic regression, statistical significance means that a coefficient in the regression is statistically different from the coefficient of the omitted variable.¹⁵

The regression results presented in Appendix Table 2A and Table 3A provide calculations of the likelihood of being employed in a high-skill occupation derived from the logistic regression analysis. The levels of the rates are calculated holding other characteristics constant at the value of the mean for each factor. For example, employment in skill IV work for men is interpreted as the population of men working in high-skill employment, who: would be of average age in the population, have an average level of education, have arrived during an average period of immigration, be from an average region of origin (a hybrid person who would be 85.3 percent native-born, 0.7 percent North American, 1.5 percent Northern European, 0.8 percent Western European, 1.4 percent Southern European, 1.8 percent Eastern European, 1.1 percent Other European, 0.7 percent West Central Asian and Middle Eastern, 1.3 percent South Asian, 4.2 percent East and South-East Asian, 0.4 percent African, 0.9 percent Central and South American, Caribbean and Bermudan, and 0.1 percent Other), and so forth. This method used to interpret logistic models allows comparison of relative levels within the decomposition of each factor, knowing that all other factors are held constant. For example, native-born resident's and immigrant's participation in high-skill employment can be compared knowing that they are compared having the same age, education, field of study, etc. The logistic regression technique allows for separate returns to post-secondary education by region of origin.

Conclusions from the analysis reflected in Appendix Table 2A, probability of finding work in skill level IV occupations, are the following:

- Where region of origin is found to have a significant influence on the likelihood of being employed in skill level IV occupations, the effect is negative relative to native-born

¹⁴ The results presented in this section are based on a 25 percent random sample of the created data set.

residents, all things held similar. The relative likelihood that an immigrant from Other Europe will find skill level IV employment is .45 compared with a similar native-born resident, while for those from Central America, South America, Caribbean and Bermuda, the relative likelihood is .47. Immigrant groups from Southern Europe (.43) and Western Europe (.36) also have lower likelihood of finding skill level IV jobs relative to similar native-born residents. Eastern Europeans, all things held similar, have a likelihood of .65 relative to native-born residents, while those from East and South-East Asia have a relative likelihood of .79. The other region or origin variables are not found to differ significantly with being native-born. With all other factors held similar, the estimated logistic regression suggests that some immigrant groups have a disadvantage, compared with similar native-born residents, in terms of finding skill level IV work.

This evidence is supportive of the fact that integration into the Canadian labour market and work force needs may differ according to an individual's cultural and linguistic background. Differences in immigrant skill transferability arise from differences in skills learned by persons growing up and working in different source regions, and in the integration and settlement framework that is offered by Canada. Further, immigrants have different reasons for coming to Canada and these reasons can influence labour market integration as well.¹⁶ Influences of push and pull factors may play a role in the occupational skill outcomes of immigrants..

- By level of education, the logistic regression analysis shows significant increases in the relative likelihood of finding skill level IV employment for degree holders. All things held similar, an individual is employed in skill level IV employment with a relative likelihood of approximately 7.97 for a Bachelor's degree, 12.22 for a Master's degree, and 14.71 for a doctorate degree, in comparison with having a secondary school certificate or less (with a

¹⁵ When an estimate does not test as significant, it can mean either that the variance of the estimate is large and the possibility cannot be excluded that the estimate is not different from the base category, or that the estimate is actually very similar to the base category.

¹⁶ For example, immigrants coming from some economically developing countries may be desperate to move out of their country. Therefore, they are willing to accept an inferior job match in Canada and to come anyway, which is not the case for other immigrants from, for example, the United States, who will not leave their country if the occupational match they can have in Canada is not good. Developing country immigrants may therefore self-select themselves in low skill jobs to a much greater extent than those coming from the United States.

value of 1). These results support the new direction of immigration policy emphasizing education.

- Interacting level of education with region of origin produced results in support of the hypothesis that the education of some immigrant groups is not recognized as equivalent to that of native-born residents. Further, there are large differences in the effect region and origin interacted with level of education has among immigrant groups. It is possible to compare native-born residents with different immigrant groups, taking into account level of education, region of origin and the interaction effects that occur between level of education and region of origin. This distinction allows us to see how immigrants from particular regions of origin with particular levels of education find themselves in occupational skill level IV jobs, all other characteristics held similar, relative to native-born residents with the same level of education. This aids determining whether the skills of different immigrant groups are being underutilized, as the inclusion of the both the pure effect of education level (an “average” effect of that level of education) is estimated, which can then be modified by the influence of region of origin. It is then possible to estimate the influence of education level on native-born residents, and compare this with the effect on different immigrant groups.

Immigrants from Western Europe with a Bachelor’s degree have a probability of being in skill level IV employment of 33.46 percent, while the probability for a native-born resident with a Bachelor’s degree, all other characteristics held similar, is 41.91 percent. The interpretation in terms of likelihood relative to native-born residents with a Bachelor’s degree, all characteristics held similar, is then 0.80 for Western European immigrants. Southern European immigrants with a Bachelor’s degree have a likelihood of 0.37 relative to similarly educated native-born residents, and for a Master’s degree have a relative likelihood of 0.44, all things held similar. Eastern Europeans with Bachelor’s degrees have a likelihood of finding skill level IV employment relative to a similar native-born residents of 0.46, while for those with a Master’s degree it is 0.38. West Central Asian and Middle Eastern immigrants with Bachelor’s degrees have a likelihood of 0.62 relative to similarly educated native-born residents, while the relative likelihood is 0.60 for Master’s degree holders. South Asian immigrants with a Bachelor’s degree have a likelihood of 0.29 for

getting skill level IV employment compared with similar native-born residents, while for those with a Master's degree the likelihood is 0.46. For immigrants from East and South-East Asia these numbers are 0.50 and 0.67 respectively. For immigrants from Africa, the likelihood of being employed in skill level IV employment relative to similarly educated native-born residents is 0.68 for a Bachelor's degree, 0.73 for a Master's degree, and 0.55 for an earned doctorate degree. The regression indicates large gaps exist among immigrant groups and native-born residents in terms of occupational skill outcomes when the effect of region of origin on education level is considered.

- According to the logistic regression results, major field of study is a significant factor contributing to the likelihood of finding skill level IV employment. Implications of where skills of immigrants may be non-transferable to the Canadian labour market or are underutilized emerge in comparing the likelihood of holding a skill level IV job according to field of study with the distribution of immigrant groups across field of study. For example, the logistic regression indicates that studying nursing results in a likelihood of finding skill level IV employment of 2.45, relative to studying education (with a value of 1). High relative representation within this field of study is held by immigrants from Central America, South America, Caribbean and Bermuda, East and South-East Asia, and North America. The expected result is that immigrant groups studying within fields of study found to lead to a higher probability of finding high-skill work, would be employed in skill level IV work to a greater extent than other groups. However, this is not the case, as some fields of study found to have a higher likelihood of leading to high-skill work, relative to studying education, are not necessarily compatible with the distribution of immigrant groups within that field of study.
- As a proxy for potential work experience, age is found to have a positive effect on the probability of finding skill level IV employment.
- The logistic regression indicates that living in the two Census Metropolitan Areas (CMAs) of Toronto and Vancouver leads to a higher likelihood of skill level IV employment relative to living in other regions of Canada, including smaller CMAs.

- By knowledge of official languages, the logistic regression analysis indicates that individuals speaking only English have a higher likelihood (1.18) of finding skill level IV employment relative to those speaking only French, all other factors being held similar, while speaking both official languages has a relative likelihood of 1.50. Having no knowledge of either official language has a likelihood of .74 relative to speaking only French.
- By period of immigration, the logistic regression finds all periods negatively related to being a native-born resident (no period of immigration). However, the estimated signs on the coefficients are not significant until after 1986. Immigrants landing during the period 1987 to 1989 have a likelihood of .80 relative to native-born Canadians, while the likelihood is .77 for those landing during the years 1990 to 1992. The cohort of immigrants landing during the period 1993 to 1996 have a likelihood of finding skill level IV employment of .66 relative to similar native-born residents.
- Having identical other characteristics – limited to the ones considered here – men tend to have a significantly higher likelihood (1.62) of being employed in skill level IV occupations relative to women. This means that, with similar other characteristics as women, men tend to be employed in high-skill occupations more than women do. Further, being a member of a visible minority results in a likelihood of finding skill level IV employment of .81 relative to similar non-visible minorities.

Conclusions from the analysis reflected in Appendix Table 3A, probability of finding work in skill level III or IV occupations, are the following:

- Differences in the likelihood of finding high-skill level work among immigrant groups and native-born residents, all things held similar remain present in this regression estimate. Immigrants from North Europe (.82), West Central Asia and the Middle East (.74) and Africa (.60) now also have a lower likelihood of finding skilled employment relative to native-born residents, all things similar. The likelihood that an immigrant from Other Europe finds work in skilled employment, all things held similar, relative to a native born resident is .46, while the likelihood is .51 for immigrants from Western Europe and .57 for those from Southern Europe. With a likelihood of approximately .63, immigrants from

Eastern Europe and from East and South-East Asia and have a lesser chance than native-born residents of being employed in high-skill work. The relative likelihood that an immigrant from Central and South America, Caribbean and Bermuda or from Southern Europe will find skill level III or IV employment is .59 relative to similar native-born residents. South Asian immigrants are found to have a likelihood of .67 relative to similar native-born Canadians. With all other factors held similar, the estimated logistic regression suggests that some immigrant groups have a disadvantage compared with similar native-born residents in terms of finding skill level III and IV employment.

- Interacting level of education with region of origin produced results in support of the hypothesis that the education of some immigrant groups is not recognized as equivalent to that of native-born residents. For immigrants from Southern Europe, Eastern Europe, and Other Europe, education at the university Bachelor's degrees and Master's degrees are seen to have a lower probability of similarly educated native-born residents. The same holds true for university educated immigrants from West Central Asia and the Middle East, South Asia, East and South-East Asia, Africa, and Central America, South America, Caribbean and Bermuda. Logistic regression results provide indication that the education levels of members of the Canadian labour force are not all equally regarded.
- When skill level III or IV is the dependent variable in the logistic regression, major field of study is found to play a role in determining occupational skill outcome. Many of the areas of study are found to be significantly different from studying education (base category) in influencing the relative likelihood of being employed in skill level III or IV occupations. The results also suggest that to be employed in skill level III or IV work, it is important that there be some post secondary education, with the field of study chosen playing a lesser role. This is in accordance with policy aimed to eliminate field of study from selection criteria.
- In this logistic regression, period of immigration effects indicate an overall lack of difference in the likelihood of an immigrant being employed in a high-skill job relative to native-born residents up until the 1993 to 1996 period, where the relative likelihood is .83.

- In terms of sex, visible minority status, level of education, and knowledge of official languages, the results from the logistic regression with skill level III and IV as the dependent variable are in accordance with those found in the skill level IV logistic regression.

The most critical finding in the estimated logistic regressions is that differences exist in the relative likelihood of being employed in skilled work according to some important human capital variables. Particularly, education level interacted with region of origin is found significant for many immigrant groups.¹⁷ This is represented by a divergence from the estimated value of a particular education level in terms of finding skilled work -- a deviation that is found significant for many region of origin and education level interaction variables. One or more of the three components needed for transferable skill sets – which are applicable and valuable in the Canadian labour market and recognized by Canadian employers – are not being met. These results indicate there are large differences in the transferability of education obtained outside of Canada, and is a likely contributing factor to underutilization of immigrant skills.

Conclusion

Estimated logistic regressions indicate that while some immigrants possess “on paper” similar endowments, the likelihood that they get work in a high skill occupation is lower than other similarly qualified individuals. The results highlight the importance of level of schooling as determining the incidence of employment in skill level IV work. Education interacted with region of origin gives evidence of influencing occupational skill outcomes in the Canadian labour market, interpreted as a divergence in the value placed on the educational “paper” attainment. An unwillingness or inability on the part of Canadian employers to recognize the education of some immigrants as equivalent to that earned by native-born residents may contribute to the cause of this non-transferability of skill sets.

¹⁷ The general lack of significance found in region of origin interacted with university doctorate degrees, is likely a reflection of sample selection. The sample was limited to immigrants arriving in Canada after age 24, leaving a possibility that doctorate degrees were obtained from Canadian universities and therefore do not produce likelihood of occupational skill outcome different from that of native-born residents.

This paper measures the gap in occupational skill outcomes between similarly endowed native-born residents and immigrants, which is interpretable in two different though not mutually exclusive ways. First, foreign education may be worse in terms of the productivity of its graduates compared with education obtained in Canada. In this case, the title of an educational degree is the same, but the worth is lower for foreign earned credentials. Second, domestic employers may be poorly informed about foreign certificates, and may economize on risk by hiring domestically educated workers preferentially.

Factors may play a role in occupational skill outcomes that are beyond the individual control of an immigrant and this has important implications for policy. Qualified individuals coming to Canada need the opportunity to use their skills to their maximum potential. If these skills are not consistent with Canadian code (not applicable), immigrants must be given the opportunity to bridge these abilities with the labour market. This suggests a role for policy in developing and encouraging programs such as bridging classes and immigrant internships that would facilitate the qualification process (recognition by Canadian employers) for both immigrants and employers. The logistic regressions in this paper suggest that these programs are necessary to complete the transferability of skill sets to the Canadian labour market.

One commentary on the study is that when increasing from skill level III to level IV, the qualifications of getting in may be more narrow and restrictive (i.e. to be a medical doctor or lawyer). Thus, likelihood differences between skill level III and IV may not necessarily be a by-product of skill level but may be caused by more stringent qualifications. The transition matrices into the skill level IV group may be large, as the mean skill level and paper requirements and legal requirements may be more stringent. This suggests that Canadian professional associations have a large role to play in allowing the labour market to reach its full potential.

This study opens up avenues for further research on the topic, including data development. In particular, data is needed that asks the important question “Where did you obtain your education?” A new survey, the Longitudinal Survey of Immigrants to Canada (LSIC), is currently being developed by Statistics Canada that starts in the year 2000 with data collected until 2004 for the first cohort. It includes important information on education obtained before coming to Canada and since arrival. The survey will also have information on

employment held before coming to Canada and since arrival, and recognition of credentials or professional qualifications from outside Canada. The influence of push and pull factors on the occupational skill outcomes of immigrants is an area for further research. Further studies could also examine the upward mobility of immigrants among the four skill levels of occupations over time.

To be a leader in the global knowledge-based economy, it is necessary for Canada to utilize the skill pool of its labour force to its maximum ability. This study lends support to the hypothesis that the skill sets of some immigrants are being underutilized in the Canadian labour market, as it is clear they are not valued as equivalent. Whether the lower likelihood of some immigrant groups relative to similarly educated native-born Canadians of being in high-skill employment is based on a proper assessment of skills must be explored. Where the skills of these groups are found to be non-transferable to the Canadian labour market, policy can provide bridging programs for obtaining proper recognition. Additional information that shows immigrants as a heterogeneous group allows the design of targeted policies that meet specific or broad needs. Region-of-origin effects on immigrant occupational skill outcome is an important piece of information in the efforts to more accurately model the skill transferability of immigrants to the Canadian labour market.

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Appendices

Appendix: Region of origin geographical classification

North America: United States

Northern Europe: United Kingdom

Western Europe: Germany, Netherlands

Southern Europe: Italy, Portugal, former Yugoslavia (Bosnia and Herzegovina, Croatia, Former Yugoslav Republic of Macedonia, (FYROM), Slovenia, Yugoslavia)

Eastern Europe: Poland, USSR, former (European component) (Estonia, Latvia, Lithuania, Belarus, Republic of Moldova, Russian Federation, Ukraine, USSR, n.i.e.)

Other Europe: Austria, Belgium, Czech Republic, Slovakia, Czechoslovakia, n.i.e., France, Greece, Hungary, Romania, Denmark, Finland, Iceland, Norway, Sweden, Liechtenstein, Luxembourg, Monaco, Switzerland, Bulgaria, Republic of Ireland (Eire), Albania, Andorra, Gibraltar, Malta, San Marino, Spain, Vatican City State

West Central Asia and the Middle East: Iran, Lebanon, Armenia, Azerbaijan, Georgia, Kazakhstan, Tajikistan, Turkmenistan, Uzbekistan, Afghanistan, Bahrain, Cyprus, Iraq, Israel, Jordan, Kuwait, Oman, Qatar, Saudi Arabia, Syria, Turkey, United Arab Emirates, Yemen, Palestine / West Bank / Gaza Strip

Southern Asia: India, Sri Lanka, Bangladesh, Bhutan, Maldives, Nepal, Pakistan,

East and South East Asia: China, People's Republic of, Hong Kong, Philippines, Vietnam, South Korea, Taiwan, Brunei Darussalam, Cambodia, Indonesia, Japan, Laos, Macau, Malaysia, Mongolia, Myanmar, North Korea, Singapore, Thailand

Africa: Burundi, Comoros, Djibouti, Eritrea, Ethiopia, Kenya, Madagascar, Malawi, Mauritius, Mayotte, Mozambique, Reunion, Rwanda, Seychelles, Somalia, United Republic of Tanzania, Uganda, Zambia, Zimbabwe, Algeria, Egypt, Libya, Morocco, Sudan, Tunisia, Western Sahara, Botswana, Lesotho, Namibia, Republic of South Africa, Swaziland, Angola, Benin, Burkina Faso, Cameroon, Cape Verde, Central African Republic, Chad, Congo, Cote d'Ivoire, Equatorial Guinea, Gabon, Gambia, Ghana, Guinea-Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Sao Tome and Principe, Saint Helena, Senegal, Sierra Leone, Togo, Zaire.

Central America, South America, Caribbean and Bermuda: El Salvador, Belize, Costa Rica, Guatemala, Honduras, Mexico, Nicaragua, Panama, Guyana, Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Falkland Islands (Malvinas), French Guiana, Paraguay, Peru, Suriname, Uruguay, Venezuela, Jamaica, Trinidad and Tobago, Anguilla, Antigua and Barbuda, Aruba, Bahamas, Barbados, Bermuda, Cayman Islands, Cuba, Dominica, Dominican Republic, Grenada, Guadeloupe, Haiti, Martinique, Montserrat, Netherlands Antilles, Puerto Rico, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Turks and Caicos Islands, British Virgin Islands, U.S. Virgin Islands.

Other: Other countries and regions not elsewhere identified.

Appendix Table 1A

Table 1A: Place of birth by occupation & skill level: % total sample by region of origin (1991 & 1996 Census)*

Immigrant place of birth	Occupation								
	SKILL LEVEL IV			SKILL LEVEL III					
	Snr. Manag.	Mid. & other Manag.	Prof.	Semi-Prof. & technicians	Super-visors	Super-visors: crafts & trades	Admin. & senior clerical personnel	Skilled sales & service Personnel	Skill crafts & trade work
Native-born	0.94	8.11	13.35	5.18	1.26	3.74	5.96	3.89	6.88
North America	1.72	10.87	35.05	5.80	1.00	2.90	4.44	2.45	2.17
Northern Europe	1.87	12.52	18.92	6.24	1.83	2.33	6.99	3.53	7.90
Western Europe	0.97	7.04	6.63	2.99	1.38	5.02	2.59	3.32	10.76
Southern Europe	0.67	6.36	6.32	3.05	0.58	3.32	1.79	3.94	10.89
Eastern Europe	0.74	7.52	10.89	5.40	0.94	3.34	2.90	4.42	9.88
Other Europe	0.78	6.55	14.54	4.27	0.83	2.05	2.83	4.22	6.10
W Central Asia & Middle East	1.05	11.71	12.94	4.90	0.70	0.96	4.28	5.94	3.32
Southern Asia	0.69	5.94	11.75	3.27	0.65	0.78	2.58	5.48	4.47
E & SE Asia	0.85	7.47	10.92	3.78	1.14	1.04	3.24	4.37	4.92
Africa	1.01	7.19	17.70	3.60	1.01	0.86	3.17	1.73	3.17
CA SA Carib & Bermuda	0.55	2.82	8.33	4.06	1.38	1.31	3.23	2.48	6.61
Other	2.54	6.78	11.86	5.93	0.00	4.24	3.39	5.08	6.78

Immigrant place of birth	Occupation				
	SKILL LEVEL II			SKILL LEVEL I	
	Clerical personnel	Intermed. Sales & service personnel	Semi-Skilled manual workers	Other sales & service personnel	Other manual workers
Native-born	9.87	8.97	9.68	5.44	2.86
North America	4.35	7.52	5.34	2.72	1.27
Northern Europe	8.86	8.86	5.07	4.28	1.16
Western Europe	5.10	7.93	12.06	10.76	8.01
Southern Europe	3.63	5.29	14.43	8.38	6.28
Eastern Europe	4.89	8.47	11.94	7.96	3.81
Other Europe	7.60	6.55	13.54	8.38	4.55
W Central Asia & Middle East	8.30	7.43	5.68	4.98	1.57
Southern Asia	8.29	10.55	13.04	9.45	3.36
E & SE Asia	8.88	9.61	12.62	8.41	3.74
Africa	7.63	9.06	7.91	5.90	2.16
CA SA Carib & Bermuda	8.67	8.40	15.21	10.74	4.20
Other	4.24	4.24	11.02	11.02	4.24

* Note: The difference between the sum of the individual immigrant categories and 100% is the percent falling within the "Not Applicable" category (See Table 2 for numbers).

Appendix Table 2A

Table 2A: Results from logistic estimation of skill level IV occupations

Variables	Estimated coefficient β	Mean (share in the population)	β^* Mean	Logistic	Likelihood in %	Standard error	Significance (T statistic)	Relative likelihood
Intercept	-4.953	1	-4.9530	-2.1689	10.2583	0.161	-30.764	X
Is a man	0.541	0.496	0.2683	-1.8962	13.0541	0.015	36.067	1.6240
Is a woman	0	0.5047	0.0000	-2.4372	8.0381	0	X	1
Member of visible minority	-0.232	0.5551	-0.1288	-2.2721	9.3463	0.057	-4.070	0.8123
Not member of visible minority	0	0.4449	0.0000	-2.0401	11.5060	0	X	1
Census 1991	0	0.51	0.0000	-1.8837	13.1968	0	x	1
Census 1996	-0.582	0.49	-0.2852	-2.4657	7.8300	0.058	-10.034	0.5933
Years since immigration	0.007	1.64	0.0115	-2.1765	10.1885	0.009	0.778	1
Years since migration squared	0.0001	32.2556	0.0032	-2.1835	10.1246	0.0001	1.000	0.9937
Immigrant	0	0.853	0.0000	-2.1088	10.8242	0	0.000	1
region of origin								
North America	0.036	0.007	0.0003	-2.0728	11.1766	0.263	0.137	1.0326
North Europe	-0.039	0.015	-0.0006	-2.1478	10.4534	0.144	-0.271	0.9657
West Europe	-1.097	0.008	-0.0088	-3.2058	3.8947	0.221	-4.964	0.3598
South Europe	-0.912	0.014	-0.0128	-3.0208	4.6494	0.148	-6.162	0.4295
East Europe	-0.474	0.018	-0.0085	-2.5828	7.0252	0.145	-3.269	0.6490
Other Europe	-0.871	0.011	-0.0096	-2.9798	4.8346	0.212	-4.108	0.4466
W Central Asia & Middle East	0.343	0.007	0.0024	-1.7658	14.6062	0.191	1.796	1.3494
South Asia	-0.188	0.013	-0.0024	-2.2968	9.1386	0.166	-1.133	0.8443
E & SE Asia	-0.267	0.042	-0.0112	-2.3758	8.5035	0.107	-2.495	0.7856
Africa	0.299	0.004	0.0012	-1.8098	14.0659	0.283	1.057	1.2995
C & S America, Carib & Berm	-0.816	0.009	-0.0073	-2.9248	5.0940	0.245	-3.331	0.4706
Other	-2.629	0.001	-0.0026	-4.7378	0.8682	1.917	-1.371	0.0802
Highest level schooling								
SS or less	0	0.4238	0.0000	-2.9470	4.9880	0	0.000	1
Trades	0.244	0.045	0.0110	-2.7030	6.2798	0.049	4.980	1.2590
Post secondary	0.875	0.3691	0.3230	-2.0720	11.1851	0.026	33.654	2.2424
University BA	2.531	0.1297	0.3283	-0.4160	39.7480	0.035	72.314	7.9688
University MA	3.392	0.0281	0.0953	0.4450	60.9455	0.057	59.509	12.2185
University PHD	3.961	0.0052	0.0206	1.0140	73.3807	0.162	24.451	14.7116
Native-born highest level schooling								
SS or less	0	0.3468	0.0000	-2.8573	5.4306	0	0.000	1
Trades	0	0.0377	0.0000	-2.6133	6.8289	0	0.000	1
Post secondary	0	0.3035	0.0000	-1.9823	12.1076	0	0.000	1
University BA	0	0.1027	0.0000	-0.3263	41.9146	0	0.000	1
University MA	0	0.0198	0.0000	0.5347	63.0583	0	0.000	1
University PHD	0	0.0012	0.0000	1.1037	75.0956	0	0.000	1
North America highest level schooling								
SS or less	0	0.0012	0.0000	-2.8213	5.6185	0	0.000	1.0346
Trades	-0.909	0.00008	-0.0001	-3.4951	2.9453	1.086	-0.837	0.4313
Post secondary	0.061	0.0021	0.0001	-1.8941	13.0783	0.289	0.211	1.0802
University BA	-0.172	0.002	-0.0003	-0.4711	38.4366	0.285	-0.604	0.9170
University MA	0.048	0.0012	0.0001	0.6099	64.7928	0.34	0.141	1.0275
University Phd	0.085	0.0004	0.0000	1.2159	77.1349	0.526	0.162	1.0272
North Europe highest level schooling								
SS or less	0	0.0042	0.0000	-2.9051	5.1904	0	0.000	0.9558
Trades	0.019	0.0009	0.0000	-2.6421	6.6480	0.263	0.072	0.9735
Post secondary	0.122	0.0066	0.0008	-1.9081	12.9199	0.145	0.841	1.0671
University BA	0.024	0.0019	0.0000	-0.3501	41.3369	0.185	0.130	0.9862
University MA	-0.154	0.0007	-0.0001	0.3329	58.2475	0.296	-0.520	0.9237
University Phd	-0.796	0.0003	-0.0002	0.2687	56.6778	0.438	-1.817	0.7547
West Europe highest level schooling								
SS or less	0	0.0039	0.0000	-3.9543	1.8812	0	0.000	0.3464
Trades	0.51	0.0004	0.0002	-3.2003	3.9155	0.456	1.118	0.5734
Post secondary	0.667	0.0027	0.0018	-2.4123	8.2241	0.247	2.700	0.6793
University BA	0.736	0.0003	0.0002	-0.6873	33.4638	0.366	2.011	0.7984
University MA	0.134	0.0001	0.0000	-0.4283	39.4537	0.571	0.235	0.6257
UniversityPhD	1.242	0.0001	0.0001	1.2487	77.7078	1.092	1.137	1.0348

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Appendix Table 2A: (Cont'd.)

Variables		Estimated coefficient β	Mean (share in population)	β^* Mean	Logistic	Likelihood in %	Standard error	Significance (T statistic)	Relative likelihood
South	SS or less	0	0.0081	0.0000	-37693	2.2548	0	0.000	0.4152
Europe	Trades	0.587	0.0005	0.0003	-2.9383	5.0293	0.367	1.599	0.7365
highest level schooling	Post secondary	0.596	0.0027	0.0016	-2.2983	9.1265	0.182	3.275	0.7538
	University BA	-0.468	0.0014	-0.0007	-1.7063	15.3647	0.199	-2.352	0.3666
	University MA	-0.578	0.0005	-0.0003	-0.9553	27.7824	0.272	-2.125	0.4406
	University PhD	0.064	0.0001	0.0000	0.2557	56.3584	0.696	0.092	0.7505
East	SS or less	0	0.0057	0.0000	-3.3313	3.4514	0	0.000	0.6355
Europe	Trades	-0.579	0.0012	-0.0007	-3.6663	2.4934	0.341	-1.698	0.3651
highest level schooling	Post secondary	-0.086	0.0074	-0.0006	-2.5423	7.2947	0.152	-0.566	0.6025
	University BA	-0.637	0.0017	-0.0011	-1.4373	19.1967	0.183	-3.481	0.4580
	University MA	-1.21	0.0014	-0.0017	-1.1493	24.0620	0.196	-6.173	0.3816
	University PhD	-0.32	0.0003	-0.0001	0.3097	57.6817	0.426	-0.751	0.7681
Other	SS or less	0	0.0034	0.0000	-3.7283	2.3470	0	0.000	0.4322
Europe	Trades	0.064	0.0004	0.0000	-3.4203	3.1668	0.515	0.124	0.4637
highest level schooling	Post secondary	0.182	0.0036	0.0007	-2.6713	6.4689	0.234	0.778	0.5343
	University BA	-0.412	0.0021	-0.0009	-1.6093	16.6688	0.233	-1.768	0.3977
	University MA	-0.083	0.0009	-0.0001	-0.4193	39.6689	0.28	-0.296	0.6291
W. Central Asia & Middle East	SS or less	0	0.0024	0.0000	-2.5143	7.4863	0	0.000	1.3785
	Trades	-0.573	0.0002	-0.0001	-2.8433	5.5030	0.659	-0.869	0.8058
highest level schooling	Post secondary	-0.726	0.0022	-0.0016	-2.3653	8.5859	0.232	-3.129	0.7091
	University BA	-1.055	0.0017	-0.0018	-1.0383	26.1482	0.219	-4.817	0.6238
	University MA	-1.379	0.0005	-0.0007	-0.5013	37.7240	0.307	-4.492	0.5982
	University PhD	-0.839	0.0001	-0.0001	0.6077	64.7420	0.807	-1.040	0.8621
South Asia	SS or less	0	0.0049	0.0000	-3.0453	4.5422	0	0.000	0.8364
highest level schooling	Trades	-0.242	0.0002	0.0000	-3.0433	4.5508	0.564	-0.429	0.6664
	Post secondary	-0.28	0.0039	-0.0011	-2.4503	7.9418	0.189	-1.481	0.6559
	University MA	-1.229	0.0007	-0.0009	-0.8823	29.2705	0.25	-4.916	0.4642
	University PhD	-0.522	0.0002	-0.0001	0.3937	59.7178	0.554	-0.942	0.7952
East & South East Asia	SS or less	0	0.016	0.0000	-3.1243	4.2117	0	0.000	0.7755
	Trades	0.165	0.0011	0.0002	-2.7153	6.2078	0.251	0.657	0.9090
highest level schooling	Post secondary	-0.173	0.0141	-0.0024	-2.4223	8.1489	0.102	-1.696	0.6730
	University BA	-0.743	0.0069	-0.0051	-1.3363	20.8122	0.107	-6.944	0.4965
	University MA	-0.585	0.0018	-0.0011	-0.3173	42.1339	0.162	-3.611	0.6682
	University PhD	-0.429	0.0005	-0.0002	0.4077	60.0541	0.342	-1.254	0.7997
Arica	SS or less	0	0.0221	0.0000	-2.5583	7.1872	0	0.000	1.3235
highest level schooling	Trades	-1.211	0.0001	-0.0001	-3.5253	2.8601	1.071	-1.131	0.4188
	Post secondary	-0.637	0.0016	-0.0010	-2.3203	8.9457	0.328	-1.942	0.7389
	University BA	-0.885	0.001	-0.0009	-0.9123	28.6533	0.319	-2.774	0.6836
	University MA	-0.99	0.0003	-0.0003	-0.1563	46.1009	0.424	-2.335	0.7311
	University PhD	-1.735	0.0001	-0.0002	-0.3323	41.7686	0.576	-3.012	0.5562
C & S America	SS or less	0	0.0041	0.0000	-3.6733	2.4764	0	0.000	0.4560
	Trades	0.216	0.0004	0.0001	-3.2133	3.8669	0.575	0.376	0.5663
Caribbean & Bermuda	Post secondary	0.143	0.0037	0.0005	-2.6553	6.5664	0.268	0.534	0.5423
highest level schooling	University BA	-0.145	0.0008	-0.0001	-1.2873	21.6313	0.301	-0.482	0.5161
	University MA	-0.727	0.0002	-0.0001	-1.0083	26.7316	0.454	-1.601	0.4239
	University PhD	3.712	0.00004	0.0001	3.9997	98.2009	5.08	0.731	1.3077
Other	SS or less	0	0.001	0.0000	-5.4863	0.4126	0	0.000	0.0760
highest level schooling	Trades	3.783	0.00002	0.0001	-1.4593	18.8577	2.262	1.672	2.7615
	Post secondary	2.727	0.0003	0.0008	-1.8843	13.1898	1.952	1.397	1.0894
	University BA	2.625	0.00008	0.0002	-0.3303	41.8172	2.008	1.307	0.9977
	University MA	6.366	0.00003	0.0002	4.2717	98.6234	5.953	1.069	1.5640
	University PhD	5.996	0.000006	0.0000	4.4707	98.8690	13.635	0.440	1.3166

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Appendix Table 2A (Cont'd.)

Variables		Estimated coefficient β	Mean (share in population)	β^* Mean	Logistic	Likelihood in %	Standard error	Significance (T statistic)	Relative likelihood
Major field of study	Educ, Rec & Counselling	0	0.0507	0.0000	-1.2822	21.7177	0	0.000	1
	Fine & applied arts	-1.173	0.0263	-0.0308	-2.4552	7.9060	0.05	-23.460	0.3640
	Humanities & related fields	-0.829	0.0289	-0.0240	-2.1112	10.8014	0.042	-19.738	0.4974
	Soc. science & related fields	-0.836	0.0461	-0.0385	-2.1182	10.7341	0.037	-22.595	0.4943
	Bus & commerce	-0.445	0.0451	-0.0201	-1.7272	15.0947	0.038	-11.711	0.6950
	Fin management	-0.865	0.0321	-0.0278	-2.1472	10.4594	0.045	-19.222	0.4816
	Ind & institution mgmnt & admin.	-0.928	0.0179	-0.0166	-2.2102	9.8839	0.052	-17.846	0.4551
	Mkt, merch, retailing & sales	-0.38	0.0134	-0.0051	-1.6622	15.9468	0.057	-6.667	0.7343
	Secretarial science	-1.368	0.0713	-0.0975	-2.6502	6.5977	0.041	-33.366	0.3038
	Agri & bio-sciences/tech	0.043	0.0279	0.0012	-1.2392	22.4576	0.042	1.024	1.0341
	Engineering & Applied Sciences	-0.334	0.0205	-0.0068	-1.6162	16.5730	0.048	-6.958	0.7631
	Bldg. Tech.	-1.033	0.0193	-0.0199	-2.3152	8.9872	0.052	-19.865	0.4138
	Data proc. & computer sci/tech.	0.045	0.0061	0.0003	-1.2372	22.4925	0.075	0.600	1.0357
	Electronic & electrical tech.	-1.157	0.2875	-0.3326	-2.4392	8.0232	0.038	-30.447	0.3694
	Other engineering & applied science tech & trades	-1.366	0.0287	-0.0392	-2.6482	6.6100	0.055	-24.836	0.3044
	Nursing	1.409	0.0114	0.0161	0.1268	53.1659	0.059	23.881	2.4480
	Other health prof. sciences & tech.	-0.326	0.0159	-0.0052	-1.6082	16.6839	0.054	-6.037	0.7682
	Math & physical sciences	-0.233	0.0079	-0.0018	-1.5152	18.0170	0.07	-3.329	0.8296
	All other	-0.452	0.0005	-0.0002	-1.7342	15.0052	0.272	-1.662	0.6909
	No post-sec. (NA)	-0.981	0.2425	-0.2379	-2.2632	9.4217	0.04	-24.525	0.4338
All other CMAs & regions	0	0.66	0.0000	-2.2255	9.7481	0	0.000	1	
Montreal	0.046	0.1329	0.0061	-2.1795	10.1604	0.024	1.917	1.0423	
Toronto	0.289	0.1461	0.0422	-1.9365	12.6029	0.021	13.762	1.2929	
Vancouver	0.127	0.0657	0.0083	-2.0985	10.9240	0.029	4.379	1.1206	
Knowledge of official languages	French only	0	0.1498	0.0000	-2.3681	8.5638	0	0.000	1
	English only	0.179	0.6362	0.1139	-2.1891	10.0733	0.025	7.160	1.1763
	Neither	-0.315	0.0106	-0.0033	-2.6831	6.3978	0.126	-2.500	0.7471
	English & French	0.451	0.1967	0.0887	-1.9171	12.8185	0.026	17.346	1.4968
Age	Age	0.152	40	6.0800	-2.1689	10.2583	0.007	21.714	1
	Age ²	-0.002	1701.148	-3.4023	-2.1689	10.2583	0.0001	-20.000	1
Period of Immigration	No year (native)	0	0.853	0.0000	-2.1521	10.4136	0	0.000	1.0000
	Prior to 1977	0.05	0.0534	0.0027	-2.1021	10.8894	0.121	0.413	1.0457
	1978-1980	-0.086	0.0094	-0.0008	-2.2381	9.6382	0.122	-0.705	0.9255
	1981-1983	-0.074	0.0098	-0.0007	-2.2261	9.7432	0.114	-0.649	0.9356
	1984-1986	-0.197	0.0103	-0.0020	-2.3491	8.7138	0.108	-1.824	0.8368
	1987-1989	-0.244	0.0185	-0.0045	-2.3961	8.3471	0.09	-2.711	0.8016
	1990-1992	-0.283	0.018	-0.0051	-2.4351	8.0536	0.09	-3.144	0.7734
	1993-1996	-0.457	0.0137	-0.0063	-2.6091	6.8556	0.099	-4.616	0.6583
Legal marital status	Single	0	0.2196	0.0000	-2.3565	8.6551	0	0.000	1.0000
	Divorced	0.121	0.0919	0.0111	-2.2355	9.6608	0.03	4.033	1.1162
	Married	0.277	0.6329	0.1753	-2.0795	11.1106	0.019	14.579	1.2837
	Separated	0.037	0.0373	0.0014	-2.3195	8.9521	0.042	0.881	1.0343
	Widowed	-0.011	0.0152	-0.0002	-2.3675	8.5685	0.071	-0.155	0.9900

* This logistic regression is modeling the probability that an individual is employed in skill level IV work and was estimated with 164,424 observations.

**Cox and Snell R Square: .230; Nagelkerke R Square: .352; Model Chi-Square: 42929.098 with 120 DF (p=0.000); percentage of correct predictions: 83.6%.

Appendix Table 3A

Table 3A: Results from logistic estimation of skill level III and IV occupations

Variables	Estimated coefficient β	Mean (share in the population)	β^* Mean	Logistic	Likelihood in %	Standard error	Significance (T statistic)	Relative likelihood
Intercept	-3.323	1	-3.3230	-0.5331	36.9801	0.124	-26.798	X
Is a man	0.766	0.496	0.3799	-0.1470	46.3314	0.012	63.833	1.6178
Is a woman	0	0.5047	0.0000	-0.9130	28.6385	0	X	1
Member of visible minority	-0.279	0.5551	-0.1549	-0.6572	34.1369	0.046	-6.065	0.8396
Not member of visible minority	0	0.4449	0.0000	-0.3782	40.6561	0	X	1
Census 1991	0	0.51	0.0000	-0.2719	43.2440	0	x	1
Census 1996	-0.533	0.49	-0.2612	-0.8049	30.8978	0.048	-11.104	0.7145
Years since migration	0.021	1.64	0.0344	-0.5496	36.5949	0.007	3.000	1
Years since migration squared	0.0001	32.2556	0.0032	-0.5706	36.1090	0.0001	1.000	0.9867
Immigrant region of origin	0	0.853	0.0000	-0.4337	39.3247	0	0.000	1
Native-born	-0.32	0.007	-0.0022	-0.7537	32.0019	0.17	-1.882	0.8138
North America	-0.311	0.015	-0.0047	-0.7447	32.1981	0.1	-3.110	0.8188
North Europe	-0.933	0.008	-0.0075	-1.3667	20.3156	0.113	-8.257	0.5166
West Europe	-0.799	0.014	-0.0112	-1.2327	22.5712	0.087	-9.184	0.5740
South Europe	-0.681	0.018	-0.0123	-1.1147	24.6999	0.093	-7.323	0.6281
East Europe	-1.071	0.011	-0.0118	-1.5047	18.1728	0.117	-9.154	0.4621
Other Europe	-0.466	0.007	-0.0033	-0.8997	28.9116	0.137	-3.401	0.7352
W Central Asia & Middle East	-0.585	0.013	-0.0076	-1.0187	26.5284	0.105	-5.571	0.6746
South Asia	-0.686	0.042	-0.0288	-1.1197	24.6070	0.074	-9.270	0.6257
E & SE Asia	-0.738	0.004	-0.0030	-1.1717	23.6551	0.216	-3.417	0.6015
Africa	-0.753	0.009	-0.0068	-1.1867	23.3853	0.125	-6.024	0.5947
C & S America, Carib & Berm	-0.387	0.001	-0.0004	-0.8207	30.5619	0.349	-1.109	0.7772
Other	0	0.4238	0.0000	-1.1021	24.9339	0	0.000	1
Highest level schooling	0.32	0.045	0.0144	-0.7821	31.3858	0.033	9.697	1.2588
SS or less	0.656	0.3691	0.2421	-0.4461	39.0278	0.019	34.526	1.5653
Trades	1.732	0.1297	0.2246	0.6299	65.2457	0.031	55.871	2.6168
Post secondary	2.622	0.0281	0.0737	1.5199	82.0518	0.068	38.559	3.2908
University BA	2.735	0.0052	0.0142	1.6329	83.6561	0.195	14.026	3.3551
University MA	0	0.3468	0.0000	-0.9689	27.5107	0	0.000	1
University PhD	0	0.0377	0.0000	-0.6489	34.3246	0	0.000	1
Native-born highest level schooling	0	0.3035	0.0000	-0.3129	42.2416	0	0.000	1
SS or less	0	0.1027	0.0000	0.7631	68.2035	0	0.000	1
Trades	0	0.0198	0.0000	1.6531	83.9315	0	0.000	1
Post secondary	0	0.0012	0.0000	1.7661	85.3977	0	0.000	1
University BA	0	0.0012	0.0000	-1.2889	21.6045	0	0.000	0.7853
University MA	-0.802	0.00008	-0.0001	-1.7783	14.4510	0.607	-1.321	0.4210
University PhD	-0.067	0.0021	-0.0001	-0.7073	33.0190	0.2	-0.335	0.7817
North America highest level schooling	-0.14	0.002	-0.0003	0.2957	57.3385	0.216	-0.648	0.8407
SS or less	0.782	0.0012	0.0009	2.1077	89.1647	0.425	1.840	1.0624
Trades	1.482	0.0004	0.0006	2.9207	94.8859	0.983	1.508	1.1111
Post secondary	0	0.0042	0.0000	-1.2873	21.6306	0	0.000	0.7863
University BA	-0.247	0.0009	-0.0002	-1.2143	22.8936	0.192	-1.286	0.6670
University MA	0.131	0.0066	0.0009	-0.5003	37.7464	0.108	1.213	0.8936
University PhD	-0.103	0.0019	-0.0002	0.3417	58.4597	0.18	-0.572	0.8571
SS or less	0.447	0.0007	0.0003	1.7817	85.5903	0.473	0.945	1.0198
Trades	-0.249	0.0003	-0.0001	1.2061	76.9615	0.675	0.592	0.9012
Post secondary	0	0.0039	0.0000	-1.9019	12.9898	0	0.000	0.4722
University BA	0.703	0.0004	0.0003	-0.8789	29.3414	0.281	2.502	0.8548
University MA	0.118	0.0027	0.0003	-1.1279	24.4556	0.144	0.819	0.5789
University PhD	-0.083	0.0003	0.0000	-0.2529	43.7119	0.332	-0.250	0.6409
SS or less	1.261	0.0001	0.0001	1.9811	87.8802	1.055	1.195	1.0470
Trades	0.414	0.0001	0.0000	1.2471	77.6804	1.087	0.381	0.9096
Post secondary	0	0.0081	0.0000	-1.7679	14.5808	0	0.000	0.5300
University BA	0.479	0.0005	0.0002	-0.9689	27.5107	0.244	1.963	0.8015
University MA	0.026	0.0027	0.0001	-1.0859	25.2398	0.123	0.211	0.5975
University PhD	-0.936	0.0014	-0.0013	-0.9719	27.4509	0.159	-5.887	0.4025
SS or less	-1.197	0.0005	-0.0006	-0.3429	41.5114	0.265	-4.517	0.4946
Trades	-0.801	0.0001	-0.0001	0.1661	54.1439	0.7	-1.144	0.6340

Continued.../

Appendix Table 3A: Cont'd.

Variables		Estimated coefficient β	Mean (share in population)	β^* Mean	Logistic	Likelihood in %	Standard error	Significance (T statistic)	Relative likelihood
East Europe highest level schooling	SS or less	0	0.0057	0.0000	-1.6499	16.1128	0	0.000	0.5857
	Trades	-0.087	0.0012	-0.0001	-1.4169	19.5154	0.171	-0.509	0.5686
	Post secondary	-0.18	0.0074	-0.0013	-1.1739	23.6158	0.097	-1.856	0.5591
	University BA	-0.729	0.0017	-0.0012	-0.6469	34.3697	0.153	-4.765	0.5039
	University MA	-1.331	0.0014	-0.0019	-0.3589	41.1235	0.18	-7.394	0.4900
Other Europe highest level schooling	University PhD	0.021	0.0003	0.0000	1.1061	75.1408	0.566	0.037	0.8799
	SS or less	0	0.0034	0.0000	-2.0399	11.5081	0	0.000	0.4183
	Trades	0.135	0.0004	0.0001	-1.5849	17.0108	0.275	0.491	0.4956
	Post secondary	0.151	0.0036	0.0005	-1.2329	22.5681	0.137	1.102	0.5343
	University BA	-0.598	0.0021	-0.0013	-0.9059	28.7847	0.156	-3.833	0.4220
W Central Asia & Middle East highest level schooling	University MA	-0.61	0.0009	-0.0005	-0.0279	49.3035	0.235	-2.596	0.5874
	University PhD	0.449	0.0002	0.0001	1.1441	75.8439	0.766	0.586	0.8881
	SS or less	0	0.0024	0.0000	-1.4349	19.2342	0	0.000	0.6992
	Trades	0.128	0.0002	0.0000	-0.9869	27.1532	0.443	0.289	0.7911
	Post secondary	-0.101	0.0022	-0.0002	-0.8799	29.3206	0.167	-0.605	0.6941
South Asia highest level schooling	University BA	-0.824	0.0017	-0.0014	-0.5269	37.1249	0.181	-4.552	0.5443
	University MA	-0.9	0.0005	-0.0005	0.2871	57.1295	0.323	-2.786	0.6807
	University PhD	2.455	0.0001	0.0002	3.7551	97.7138	3.416	0.719	1.1442
	SS or less	0	0.0049	0.0000	-1.5539	17.4529	0	0.000	0.6344
	Trades	-0.081	0.0002	0.0000	-1.3149	21.1674	0.346	-0.234	0.6167
East & South East Asia highest level schooling	Post secondary	-0.591	0.0039	-0.0023	-1.4889	18.4093	0.125	-4.728	0.4358
	University BA	-1.299	0.0031	-0.0040	-1.1209	24.5851	0.131	-9.916	0.3605
	University MA	-1.405	0.0007	-0.0010	-0.3369	41.6572	0.231	-6.082	0.4963
	University PhD	-1.027	0.0002	-0.0002	0.1541	53.8458	0.554	-1.854	0.6305
	SS or less	0	0.016	0.0000	-1.6549	16.0453	0	0.000	0.5832
Africa highest level schooling	Trades	-0.218	0.0011	-0.0002	-1.5529	17.4673	0.171	-1.275	0.5089
	Post secondary	-0.227	0.0141	-0.0032	-1.2259	22.6906	0.067	-3.388	0.5372
	University BA	-0.676	0.0069	-0.0047	-0.5989	35.4604	0.084	-8.048	0.5199
	University MA	-0.895	0.0018	-0.0016	0.0721	51.8027	0.162	-5.525	0.6172
	University PhD	0.043	0.0005	0.0000	1.1231	75.4570	0.447	0.096	0.8836
C & S America Caribbean & Bermuda highest level schooling	SS or less	0	0.0221	0.0000	-1.7069	15.3571	0	0.000	0.5582
	Trades	-0.776	0.0001	-0.0001	-2.1629	10.3135	0.563	-1.378	0.3005
	Post secondary	-0.333	0.0016	-0.0005	-1.3839	20.0389	0.249	-1.337	0.4744
	University BA	-0.49	0.001	-0.0005	-0.4649	38.5833	0.268	-1.828	0.5657
	University MA	-0.87	0.0003	-0.0003	0.0451	51.1283	0.399	-2.180	0.6092
Major field of study	University PhD	-1.058	0.0001	-0.0001	-0.0299	49.2535	0.604	-1.752	0.5768
	SS or less	0	0.0041	0.0000	-1.7219	15.1631	0	0.000	0.5512
	Trades	-0.487	0.0004	-0.0002	-1.8889	13.1374	0.317	-1.536	0.3827
	Post secondary	-0.117	0.0037	-0.0004	-1.1829	23.4538	0.141	-0.830	0.5552
	University BA	-0.579	0.0008	-0.0005	-0.5689	36.1499	0.218	-2.656	0.5300
Other highest level schooling	University MA	-1.154	0.0002	-0.0002	-0.2539	43.6873	0.427	-2.703	0.5205
	University PhD	2.732	0.00004	0.0001	3.7451	97.6913	5.07	0.539	1.1440
	SS or less	0	0.001	0.0000	-1.3559	20.4914	0	0.000	0.7448
	Trades	5.299	0.00002	0.0001	4.2631	98.6117	6.628	0.799	2.8729
	Post secondary	-0.112	0.0003	0.0000	-0.8119	30.7494	0.464	-0.241	0.7279
	University BA	-0.502	0.00008	0.0000	-0.1259	46.8576	0.719	-0.698	0.6870
	University MA	3.11	0.00003	0.0001	4.3761	98.7582	5.816	0.535	1.1767
Major field of study	University PhD	2.713	0.000006	0.0000	4.0921	98.3571	13.505	0.201	1.1518
	Educ, Rec & Counselling	0	0.0507	0.0000	0.1300	46.7552	0	0.000	1
	Fine & applied arts	-0.278	0.0263	-0.0073	-0.4080	39.9398	0.043	-6.465	0.8542
	Humanities & related fields	-0.421	0.0289	-0.0122	-0.5510	36.5638	0.043	-9.791	0.7820
	Soc. science & related fields	-0.388	0.0461	-0.0179	-0.5180	37.3326	0.038	-10.211	0.7985
	Bus & commerce	-0.19	0.0451	-0.0086	-0.3200	42.0682	0.038	-5.000	0.8998
Fin management	-0.249	0.0321	-0.0080	-0.3790	40.6374	0.04	-6.225	0.8692	

Continued.../

Appendix Table 3A. Cont'd.

Variables	Estimated coefficient β	Mean (share in population)	β^* Mean	Logistic	Likelihood in %	Standard error	Significance (T statistic)	Relative likelihood
Mkt, merch, retailing & sales	0.052	0.0134	0.0007	-0.0780	48.0516	0.061	0.852	1.0277
Secretarial science	-0.107	0.0713	-0.0076	-0.2370	44.1032	0.036	-2.972	0.9433
Agric & bio sciences/tech	0.278	0.0279	0.0078	0.1480	53.6939	0.043	6.465	1.1484
Engineering & applied sciences	0.39	0.0205	0.0080	0.2600	56.4643	0.053	7.358	1.2077
Building technologies	-0.18	0.0193	-0.0035	-0.3100	42.3121	0.049	-3.673	0.9050
Data proc. & computer scitech	-0.183	0.0061	-0.0011	-0.3130	42.2389	0.072	-2.542	0.9034
Electronic & electrical tech.	-0.711	0.2875	-0.2044	-0.8410	30.1330	0.034	-20.912	0.6445
Other engineering & applied science tech & trades	0.027	0.0287	0.0008	-0.1030	47.4279	0.044	0.614	1.0144
Nursing	0.991	0.0114	0.0113	0.8610	70.2875	0.062	15.984	1.5033
Other health prof. sciences & tech.	0.14	0.0159	0.0022	0.0100	50.2506	0.052	2.692	1.0748
Math & physical sciences	0.17	0.0079	0.0013	0.0400	51.0005	0.077	2.208	1.0908
All other	-0.143	0.0005	-0.0001	-0.2730	43.2177	0.243	-0.588	0.9243
No post-sec (NA)	-0.665	0.2425	-0.1613	-0.7950	31.1101	0.035	-19.000	0.6654
All other CMAs & regions	0	0.66	0.0000	-0.5569	36.4267	0	0.000	1
Montreal	-0.019	0.1329	-0.0025	-0.5759	35.9879	0.019	-1.000	0.9880
Toronto	0.134	0.1461	0.0196	-0.4229	39.5825	0.017	7.882	1.0866
Vancouver	0.103	0.0657	0.0068	-0.4539	38.8436	0.023	4.478	1.0663
Knowledge of official language								
French only	0	0.1498	0.0000	-0.6936	33.3225	0	0.000	1
English only	0.162	0.6362	0.1031	-0.5316	37.0136	0.017	9.529	1.1108
Neither	-0.087	0.0106	-0.0009	-0.7806	31.4183	0.07	-1.243	0.9429
English & French	0.297	0.1967	0.0584	-0.3966	40.2121	0.019	15.632	1.2068
Age	0.143	40	5.7200	-0.5331	36.9801	0.006	23.833	1
Age ²	-0.002	1701.148	-3.4023	-0.5331	36.9801	0.0001	-20.000	1
Period of immigration								
No year (native)	0	0.853	0.0000	-0.5421	36.7702	0	0.000	1.0000
Prior to 1977	0.188	0.0534	0.0100	-0.3541	41.2391	0.097	1.938	1.1215
1978-1980	0.143	0.0094	0.0013	-0.3991	40.1531	0.096	1.490	1.0920
1981-1983	0.125	0.0098	0.0012	-0.4171	39.7213	0.091	1.374	1.0803
1984-1986	0.004	0.0103	0.0000	-0.5381	36.8632	0.084	0.048	1.0025
1987-1989	0.081	0.0185	0.0015	-0.4611	38.6727	0.071	1.141	1.0517
1990-1992	-0.078	0.018	-0.0014	-0.6201	34.9761	0.071	-1.099	0.9512
1993-1996	-0.272	0.0137	-0.0037	-0.8141	30.7020	0.078	-3.487	0.8350
Legal								
Single	0	0.2196	0.0000	-0.7702	31.6440	0	0.000	1.0000
Divorced	0.149	0.0919	0.0137	-0.6212	34.9513	0.023	6.478	1.1045
Married	0.35	0.6329	0.2215	-0.4202	39.6473	0.015	23.333	1.2529
Separated	0.031	0.0373	0.0012	-0.7392	32.3183	0.031	1.000	1.0213
Widowed	0.049	0.0152	0.0007	-0.7212	32.7133	0.05	0.980	1.0338

* This logistic regression is modeling the probability that an individual is employed in skill level III or IV work and was estimated with 164,424 observations.

** Cox and Snell R Square: .187; Nagelkerke R Square: .249; Model Chi-Square: 33893.816 with 120 DF (p=0.000); percentage of correct predictions: 68.4%.

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