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Duration of Access of Canadian Immigrants to the First Job in Intended Occupation^{*}

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Abstract

Using detailed information on employment trajectory provided by the Longitudinal Survey of Immigrants to Canada (LSIC), this study examines labour market outcomes of recent immigrants in terms of duration of access to the first job in their intended occupation, as determined by a question in the first wave interview on labour market intentions. The matching between actual and intended occupations is obtained from the first two digits of National Occupational Classification codes, which consider successively occupation type and skill level. Using a Cox proportional hazards model, the study investigates the roles of factors related to human and social capital in speeding up the matching process of actual and intended occupations. It is found that the initial year in Canada is critical for an immigrant to land a job in intended field; after that period, the hazards of finding employment in intended occupation flatten down. In general, those with intention to work in non-professional jobs, such as sales and services, trades, transport and equipment operators, primary industry, and processing and manufacturing occupations, enter the first job in intended occupation more quickly. The results also show that education, English language ability, Canadian work experience and friend networks facilitate access to intended occupation..

Key words: *Immigrants, Occupation, Labour market, Canada*

JEL Classification: J24, J15.

Résumé

À partir de renseignements détaillés fournis par l'Enquête longitudinale auprès des immigrants du Canada (ELIC) sur les parcours professionnels, cette étude s'intéresse au temps qu'il faut aux nouveaux immigrants pour occuper un premier emploi dans la profession qu'ils envisagent d'exercer, celle-ci étant déterminée par une question posée dans le cadre de la première série d'entrevues. Le jumelage entre la profession réelle et celle envisagée est réalisé au moyen des deux premiers chiffres du code de la Classification nationale des professions, qui indiquent tour à tour le genre et le niveau de compétence. Avec un modèle de hasards proportionnels de Cox, l'étude permet de déterminer la mesure dans laquelle le capital social et le capital humain contribuent à accélérer le processus par lequel la profession envisagée devient la profession réelle. Il ressort que la première année au Canada est cruciale pour l'obtention d'un emploi dans le domaine envisagé; après cette période, les chances de trouver un emploi dans le domaine souhaité diminuent. En général, les personnes qui envisagent d'exercer une profession autre que libérale, par exemple dans le domaine des ventes et services, des métiers, de la conduite de matériel de transport, dans le secteur primaire ainsi que dans le domaine de la transformation et de la fabrication, obtiennent plus rapidement un emploi dans la profession envisagée. Les résultats de l'étude montrent par ailleurs que la scolarité, la connaissance de l'anglais, le fait de posséder une expérience de travail au Canada et d'y compter un réseau d'amis sont autant de facteurs qui aident à trouver un emploi dans le domaine souhaité.

Mots-clés : *Immigrants, profession, marché du travail, Canada.*

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1. Introduction

Occupational outcomes are considered an important indicator of labour market performance and employment quality. For immigrants, the matching between skills and labour market demand in terms of occupational distribution is particularly crucial for a successful integration into the receiving country's labour market. Research indicates that Canadian immigrants, especially those who landed recently, face a tough labour market and experience deteriorating economic outcomes compared to their native born counterparts and immigrants in earlier cohorts (e.g. Bloom, Grenier, and Gunderson, 1995; Aydemir and Skuterud, 2005; Picot, Hou and Coulombe, 2007). Stories about underemployment in low-skilled occupations, such as an immigrant with a Ph.D. driving a cab, are not uncommon in real life. Policies to facilitate the entry of immigrants into occupations that reflect their skills and aspirations focus on such factors as improving official language fluency, recognition of foreign credentials, and accumulation of experience in the receiving country. Other factors related to the matching process between skill supply and skill requirements of labour demand are not yet well understood. Among the empirical studies on immigrants' labour market outcomes, most make reference to employment and earnings, while relatively few look at occupational outcomes.

This paper addresses the gap in immigrants' occupational outcomes research by examining, through a Cox proportional hazards model, the relationship between various socio-economic factors and the time taken by recent immigrants to Canada to enter into the first job in the occupation that they intend to be engaged in. The analysis uses detailed information from the Longitudinal Survey of Immigrants to Canada (LSIC) on the intended occupations stated by immigrants after they arrive and their actual employment history. The matching between the intended and actual occupations is obtained by comparing the first two digits of the *National Occupational Classification* (NOC) codes. Those two digits indicate occupation type and skill level respectively.

One important finding is that the initial year is critical for a new immigrant to find employment in intended occupation; after this period the hazards of accessing employment in the intended field flatten. Human capital including education, language skills and pre-

migration Canadian experience are important factors determining the occupational outcomes of recent immigrants, while foreign work experience does not have a significant effect on intended occupation access. Also, those with intention to work in non-professional jobs enter the first job in intended occupation more quickly.

The paper is structured as follows. Section 2 reviews the relevant literature on occupational attainment of immigrants. It is followed by an introduction of the data in Section 3 and a brief descriptive analysis of occupational outcomes for the LSIC immigrants in Section 4. Section 5 presents the theoretical framework for the survival analysis. The empirical results from the Cox proportional hazards models are discussed in Section 6. Conclusions are made in the last part – Section 7.

2. Literature Review

While most of the previous research has used earnings to make inferences about the economic assimilation of immigrants, it has been recognized that occupational outcomes are an inherent part of their adjustment and integration. Unlike earning which is a continuous variable, occupational outcomes are represented by a large number of discrete categories. To contravene that difficulty, one approach consists in using indices of occupational status or prestige as dependent variables in regression models that look at the effects of various socio-economic characteristics (e.g. age, gender, education, language skills, country of origin, and etc.) on occupational attainment. The specific indices vary across studies. Another approach consists in employing discrete choice models to analyze how workers with different characteristics are distributed among broad occupation groups and how that distribution changes.

Based on an early contribution by Chiswick (1977), Chiswick, Lee and Miller (2003, 2005) proposed a model of occupational mobility of immigrants according to which immigrants tend to experience an occupational trajectory that follows a U-shaped pattern, in terms of occupational status, from the pre-migration jobs in the country of origin to the first and subsequent post-migration jobs in the destination country. This is because immigrants' skills

are not directly transferable between countries. As time goes on, however, immigrants are able to enter in occupations that are closer to those that they had earlier. The authors hypothesized that the steeper the initial decline of occupational status, the steeper the subsequent increase will be for a highly-skilled immigrant from a country of origin that is unlike the host country. The model was tested with data from the Longitudinal Survey of Immigrants to Australia, using the ANU3 index of occupational prestige developed for Australia. This indicator measures relative differences in labour market power, occupational prestige and requirements and earnings, including both a prestige scale and a socioeconomic status measure. The empirical analysis supports the authors' hypothesis. The analysis also reveals that living in an immigrant or ethnically concentrated area tends to improve the occupational status of immigrants, although the effect is of marginal significance. While geographic ethnic concentration is often employed as a proxy for social networks or social capital, this result lends obvious evidence on social capital effects on occupational outcomes.

This U-shaped pattern was further tested with U.S. data, with different indicators of occupational status. Akresh (2006) used the New Immigrant Survey Pilot, a longitudinal survey that followed a cohort of legal immigrants who arrived in 1996. She built her own occupational prestige index, based on average educational requirements of different occupations. Comparing pre- and post migration occupations, she found that half of immigrants experienced a downgrading of their occupation. The index is analyzed with OLS and multinomial logit regressions (for upgrading or downgrading). English knowledge and education are two important factors explaining occupational attainment. In another paper, Akresh (2008) used a more recent survey, the New Immigrant Survey, which followed the 2003 cohort. For that study the occupational prestige indicator is the International Socio-Economic Index, an indicator that was developed to compare occupational status across countries. Although the approaches differ a bit, results are similar to those of the author's other study.

Toussaint-Comeau (2004) investigated the factors that determine occupational assimilation of Hispanics in the U.S., using the Panel Study of Income Dynamics (PSID) data from 1990 to 1993. The index used in that study is the Socioeconomic Occupational Status Score developed by Nam and Powers (1983). This is an ordinal scale derived from the education

requirements and wages of the job. The results suggest that the level of individuals' human capital affects the rate of occupational mobility and determines whether convergence occurs in occupational status.

A difficulty of the above studies is that they all defined occupational status in a different way.¹ Other studies worked directly on occupation categories with discrete choice models. To keep the analysis manageable, the number of categories was usually kept small. Green (1999) estimated a multinomial logit model for the occupational distribution of various immigrant and native born workers with the 1981, 1986 and 1991 Canadian censuses and special tabulations from immigrant landing records. The groups considered by Green are professional occupations, other white collar occupations, blue collar occupations, and not working. The results indicate that immigrants experience a rapid adjustment in the first three years in Canada, moving out of non-employment and less skilled jobs and towards the more skilled occupations matching their original intentions. The patterns after this initial assimilation process are not obvious, suggesting that entry into intended occupation is most likely to happen in the initial years of integration.

Frenette *et al.* (2003) used the same methodology as Green to investigate occupational distributions using survey data from Australia, the US and Canada. They also analyzed occupational mobility with a Markov transition model. They found that immigrants are less likely than the native born to be in managerial and professional occupations, but that the difference decreases with the number of years in the receiving country.

Education-job match is another way to measure occupational outcomes of immigrants. Taking advantage of the Canadian National Occupational Classification, which categorizes occupations on the basis of both skill types and educational requirements, Galarneau and Morissette (2004) explored the Canadian Census data and found that highly educated recent immigrants to Canada had a high education-job mismatch rate compared to their Canadian-born counterparts. Among the recent immigrants with a university degree who were

¹ In more recent studies, Chiswick and Miller (2007, 2008) also define occupational status as the mean earnings within an occupation.

employed between 1991 and 2001, at least one in four had a job requiring no more than high school education. Galarneau and Morissette (2009) extended the analysis to the 2006 census and to immigrants established for a longer period. They found that the proportion of those immigrants with a university degree who worked in low skilled occupations increased between 1991 and 2006.

Green, Kler and Leeves (2007) employed a similar measure to investigate the over-education of immigrants to Australia, using the Longitudinal Survey of Immigrants to Australia. They compared an immigrant's education qualifications with the minimum required qualifications of the actual jobs. The results of their study showed that immigrants with Non-English Speaking Background (NESB) had higher rates of education to occupation mismatch than English Speaking Background (ESB) immigrants and lower returns to required and surplus education. There were also large variations in the incidence of over-education by visa category.

While skill or education levels or status of occupations are largely used as indicators of the occupational outcomes of immigrants, employment in the occupation in which the immigrants intend to be engaged in may be a more accurate indicator in terms of measuring the matching results between the employment aspiration and actual outcomes. The concept of intended occupation was used by Green (1999) as an indicator of pre-migration occupation in order to compare it to the actual occupations of immigrants. Grondin (2007) used the LSIC data to examine the relationship between official language skills and employment outcomes of new immigrants. Among the five employment outcome indicators that she constructed, four are related to occupational outcomes, one of which being intended occupation. The matching between the intended and the actual occupations was done only at the first classification level, corresponding to the major occupational types. As Grondin mentioned, this measure does not take into account the skill level of jobs. Thus, an immigrant working in a clerical job with an intention to be a professional in the same sector was deemed as working in the intended occupation, which may not be an appropriate measure of occupational outcomes for immigrants. Her findings indicate that proficiency in

official languages, especially English, has a significant effect on the probability of having an appropriate job. However, due to the methodology limitation,² it is difficult to differentiate the effects of the ability to speak English from those of other phenomena which might be strongly related to the English speaking ability on employment outcomes.

In spite of different approaches, most studies tend to agree that immigrants have difficulty working in occupation that reflects their skills when they arrive, but that their occupational status improves afterwards. This paper addresses the same questions using a new approach based on the concept of intended occupation. A duration analysis statistical model is used to investigate duration of access to the first job in intended occupation.³

3. Data

This study uses the Longitudinal Survey of Immigrants to Canada (LSIC), which was designed to investigate how new immigrants adjust to living in Canada during their first four years of settlement. The target population was immigrants who arrived in Canada between October 2000 and September 2001, were 15 years of age or over at the time of landing and landed from abroad. There was only one participant per family unit. The same respondents were interviewed at six months, two years and four years after arrival in Canada.⁴ An important feature of the survey is that it provides a job calendar that outlines the complete employment trajectory during the first four years after immigration, including start date, end date, occupation, earnings and hours worked per week for each job.

² Grondin (2007) uses cross-sectional models for her study. Thus, they cannot capture the timing of the major activities or the unobserved individual heterogeneity which could be addressed in panel data models.

³ Thapa and Gorgens (2006) also used duration analysis to investigate labour market outcome of immigrants in Australia, but with the time taken to find the first job, not a job in the intended occupation.

⁴ See “Statistics Canada (2007), Longitudinal Survey of Immigrants to Canada, Wave 3 – Microdata User Guide” for sample selection and survey design. The first wave interview took place between April 2001 and May 2002, the second between December 2002 and December 2003, and the third between December 2004 and December 2005. Twelve thousand immigrants were interviewed in Wave 1, while 9,300 and 7,700 of them participated in Waves 2 and 3 respectively. The final survey sample represents 157,600 immigrants of the target population who still resided in Canada at the time of the Wave 3 interview.

A sub-sample of the LSIC respondents was extracted for this study. There were questions in the LSIC asking about intention to work in Canada and actual participation in the labour force. In all three waves, as immigrants were interviewed on their labour force activities, those who did not participate in the labour force during the four years after landing were excluded from the analysis. In addition, immigrants were asked, six months after landing, if they planned to work in Canada when they decided to migrate. If the answer was yes, they were asked further if they had an idea of the kind of job they wanted. For those respondents who planned to work in Canada and had an idea of the kind of job they wanted, a specific description of the job was asked. Based on questions about labour market intention, the immigrants who did not plan to work in Canada or did not have an intended occupation in mind, or whose reported intended occupation could not be coded, were further excluded.⁵ After excluding the respondents residing in the three territories and those with possible collection errors in employment dates and other control variables, the sample size for the duration analysis of this study is 3921 immigrants, of which 2246 are males and 1675 are females.⁶

The LSIC contains two variables that are related to intended occupation: first, among the detailed information imported from the administrative database of all landed immigrants to Canada – the Field Operations Support System (FOSS), trade or occupation that they practiced or intended to practice when applying for immigration to Canada was recorded into one variable; second, at the time of the first wave interview, all respondents were asked about their labour market intention when they decided to come to Canada. The first information from applications mixed up intended occupations and pre-migration occupations, which does not necessarily capture labour market intention. Furthermore, the information was not reported for most immigrants not in the skilled workers category, and

⁵ While 814 respondents did not participate in the labour force during the first four years in Canada, among those who actually participated in the Canadian labour force, 2876 (1373 male and 1503 female) immigrants reported either no intention to work in Canada (14%) when arriving, or having no idea about intended occupation (58%), or non-coded intended occupations (23%), or no response.

⁶ The current study does not make any age limitation as the alternative estimations based on the core working age immigrants (aged 25 to 54) produced very similar estimates to the analysis for all ages.

those who landed as skilled workers may have been tempted to report an intended occupation that was not only listed on a General Occupations List (GOL), but which was also consistent with their past work experience, awarding them more points under Canada's immigrant selection system.⁷ Thus, this information is likely to be distorted to some extent, not capturing the real labour market intention of the LSIC immigrants. Therefore, the current study uses intended occupation information collected at the Wave 1 interview, which not only points to intended occupation exclusively, but also tends to reflect their true labour market intention.

The LSIC also captures actual occupation for each job held during the period of the survey. Both intended and actual occupations are coded in the LSIC micro dataset using the *2001 National Occupational Classification* (NOC), which is denoted by four-digit codes.⁸

The first digit of the NOC code designates the job's skill type (see the first panel of Appendix A), ranging from management occupations (code 0), business, finance and administration (code 1) to occupations unique to processing, manufacturing and utilities (code 9). Skill type is based on the type of work performed, but it also reflects the field of training or experience that is normally required for entry into the occupation. This includes the educational area of study required, as well as the industry of employment in cases where experience within an internal job ladder is required for entry.

⁷ This selection criterion was regulated by 1976 Immigration Act, which was replaced by Immigration and Refugee Protection Act (IRPA) in 2002. Under the new IRPA, intended occupation is neither a selection criterion nor a required field to fill out. All the LSIC immigrants were selected or admitted under the 1976 Immigration Act.

⁸ Actually, intended and actual occupations were first coded using the *Standard Occupational Classification 1991* (SOC), and then transformed into the 2001 NOC, with the help of a concordance table. For more information on NOC codes, please consult "National Occupational Classification Training Tutorial" provided by Human Resources and Social Development Canada (HRSDC) at <http://www5.hrsdc.gc.ca/NOC/English/NOC/2006/Tutorial.aspx>. There is a well-discussed issue that survey data on occupation and industry affiliation are subject to measurement error in coding, especially when identifying switches. Specifically in panel data, although there may be considerable variation in occupations across individuals, there is typically much less variation in changes across time in occupations for a given individual. Changes in measured occupations may partly represent measurement error. Kambourov and Manovskii (2004, 2009) discuss that problem in detail. In the current study, the matching between intended and actual occupations is realized at a high aggregation level by comparing only the first two digits of the occupational codes; hence the extent of measurement error is expected to be minimal.

The second digit, ranging from 1 to 6, represents four skill levels identified A through D and corresponds to the type and/or amount of training or education typically required to work in an occupation (see the second panel of Appendix A). This designation also reflects the experience required for entry and the complexity of the responsibilities involved in the work, compared with other occupations. Specifically, skill level A occupations, coded as 1, require university education; skill level B usually requires college education or apprenticeship, with the second digit being either 2 or 3; skill level C, coded 4 or 5, usually requires secondary school and/or occupation-specific training; skill level D, where the second digit is 6, corresponds to occupations where on the job training is usually provided.

Management occupations are not assigned to a skill level in the NOC, on the basis of the fact that factors other than education and training, such as previous experience, ownership of real property and capital, inherent decision-making skills and organizational capabilities, are usually the most significant determinants for employment in management occupations. In the paper, the occupation or skill type 0 – management occupations – is considered equivalent to skill level A occupations which normally require university training.

Then the matching between intended and actual occupations is obtained by comparing the first two digits of the NOC codes, which take into consideration both the occupation type and the skill level.

4. Descriptive analysis of pre-immigration, intended and post-immigration occupations

Before introducing the duration model in the next section, a preliminary descriptive analysis of the survey results is presented.⁹ When they decided to move to Canada, most immigrants (71%) planned to continue their career in the occupation in which they had been working before landing (Table 1). Immigrants who intended to work in business, finance and administrative occupations (74%), natural and applied sciences and related occupations

⁹ All numbers in the descriptive analysis are weighted estimates.

(90%) and health occupations (91%) were the most likely to have worked in their specific intended field before coming to Canada.

	Total	Pre-migration employment	
		Worked in this intended occupation before landing	Worked in other occupations before landing
All immigrants who had an intended occupation ¹	<u>89306</u>	57126 ²	23755 ²
Intended occupation		71%	29%
Management Occupations	<u>3612</u>	26%	74%
Business, Finance and Administrative Occupations	<u>14961</u>	74%	26%
Natural and Applied Sciences and Related Occupations	<u>33004</u>	90%	10%
Health Occupations	<u>7979</u>	91%	9%
Occupations in Social Science, Education, Government Services and Religion	<u>9222</u>	62%	38%
Occupations in Art, Culture, Recreation and Sport	<u>3063</u>	66%	34%
Sales and Service Occupations	<u>8707</u>	57%	43%
Trades, Transport and Equipment Operators and Related Occupations	<u>5112</u>	67%	33%
Occupations Unique to Primary Industry	<u>933</u>	54%	46%
Occupations Unique to Processing, Manufacturing and Utilities	<u>2712</u>	41%	59%

¹ Exclude those for whom the intended occupation cannot be coded.

² Exclude those who did not work before landing and those for whom the pre-migration occupation could not be coded.

Source: Longitudinal Survey of Immigrants to Canada, 2005.

Table 2 shows the occupational distribution of the pre-migration job, the intended job and the post-migration jobs at 6 months, 2 years and for 4 years after landing for the LSIC immigrants. Before landing, out of an estimated 121,200 immigrants who had worked, 27% were in natural and applied sciences and related occupations, 16% worked in business, finance and administrative categories and 13% worked in the occupations in social science, education, government service and religion. These occupations are characterized as professional and high-skilled jobs.

When deciding to move to Canada, about 89,300 immigrants planned to work in Canada and had an idea about their intended occupation. The distribution of intended occupations replicates that of pre-migration jobs to a large extent, with some variations in managerial occupations and natural and applied sciences and related occupations. Again, intended occupations are concentrated in professional and high-skilled jobs.

Six months after landing, the occupational distribution shifted to become more concentrated in sales and services occupations (29%) and occupations unique to processing, manufacturing and utilities (22%), which are classified as lower skilled and require lower

levels of education. It appeared that in the initial settlement process, new immigrants had to accept lower-skilled occupations to start with.

With the time elapsed in Canada, more immigrants found jobs in management occupations, business, finance and administrative occupations, natural and applied sciences and related occupations and health occupations, all of which are high-skilled. The proportions of immigrants working in professional jobs approached pre-migration levels. For instance, four years after landing, 16% of the employed immigrants worked in business, finance and administrative occupations, the same percentage as before landing, while six months after landing it was only 12%.

Table 2					
Occupational distribution of pre-migration jobs, intended occupation and post-migration jobs *, by skill type					
	Before landing	Intended occupation	6 months after landing	2 years after landing	4 years after landing
All immigrants employed at the time of the interview or had an intended occupation¹	121200	89306	71214	82269	107000
Occupation group					
Management Occupations	11%	4%	3%	6%	7%
Business, Finance and Administrative Occupations	16%	17%	12%	14%	16%
Natural and Applied Sciences and Related Occupations	27%	37%	14%	16%	17%
Health Occupations	6%	9%	3%	4%	5%
Occupations in Social Science, Education, Government					
Service and Religion	13%	10%	6%	6%	6%
Occupations in Art, Culture, Recreation and Sport	3%	3%	1%	1%	2%
Sales and Service Occupations	11%	10%	29%	26%	23%
Trades, Transport and Equipment Operators and Related Occupations	6%	6%	7%	8%	9%
Occupations Unique to Primary Industry	2%	1%	2%	2%	1%
Occupations Unique to Processing, Manufacturing and Utilities	4%	3%	22%	16%	14%

* Post-migration jobs refer to the current main jobs at the time of the interviews only.

¹ Immigrants who were employed exclude those for whom the occupation was not reported or could not be coded.

Source: Longitudinal Survey of Immigrants to Canada, 2005.

However, there still exists an occupational gap when comparing post-migration jobs with pre-migration and intended occupations. Specifically, the proportions of immigrants working in natural and applied sciences and related occupations, in social sciences, education, government and service and religion, were lower than the pre-migration and intended levels. In contrast, much higher proportions of immigrants were employed in lower-skilled occupations, such as sales and service, and occupations unique to processing, manufacturing and utilities, compared to their jobs before landing and their intended occupations.

The distribution of skill levels of pre-migration jobs, intended occupations and post-

migration jobs further pointed to both progress towards higher-skilled occupations and gaps between post-migration jobs and pre-migration and intended occupations (Table 3). Before landing, most immigrants (81%) worked in skilled occupations which usually required university, college education or apprenticeship training (skill level 0, A, B). A similar proportion (80%) of immigrants desired to work in those skilled occupations. Six months after landing, only four in 10 employed immigrants worked in skilled jobs. The proportion increased to 50% two years after landing, and to 54% four years after landing. Although there was still a distance between the pre-migration level and the proportion four years after landing, the upward trend over time indicated progress with respect to high-skilled employment.

Table 3					
Skill level of pre-migration jobs, intended occupations and post-migration jobs *					
	Before landing	Intended occupation	6 months after landing	2 years after landing	4 years after landing
All immigrants employed at the time of the interview ¹	121200	89306	71214	80859	107000
Skill level ²					
0 (Management occupations, no skill level assigned)	11%	4%	3%	6%	7%
A (University education)	48%	57%	19%	22%	23%
B (College or apprenticeship)	22%	19%	18%	22%	24%
C (Secondary school or specific training)	16%	18%	35%	32%	32%
D (On-the-job training only)	2%	2%	25%	17%	14%
Skilled jobs (0, A, B)	81%	80%	40%	50%	54%

* Post-migration jobs refer to the current main jobs at the time of the interviews only.

¹ Immigrants who were employed exclude those for whom the occupation or skill level was not reported or could not be coded.

² Skill level was decided according to the National Occupational Classification (NOC) 2001.

Source: Longitudinal Survey of Immigrants to Canada, 2005.

The biggest gap between pre-and-post migration jobs is in skill level A, which generally requires university education. Compared to 48% of all immigrants employed in occupations with skill level A before landing, and to 57% who planned to work in these occupations when deciding to come to Canada, only 23% were employed in such occupations four years after landing.

5. Duration Analysis

A duration analysis is conducted to examine the occurrence of access to the first job in intended occupations over time. A basic proportional hazards (PH) model is specified as

follows:

$$(1) h(t_j) = h_0(t)g(x_j)$$

where $h(t_j)$ is the hazard function for a randomly selected individual of the population, i.e. the instantaneous conditional probability of exiting from the state of not being employed in intended occupation, when he or she has been at the risk of experiencing the event for at least a period of length t_j .

The hazard function is defined as:

$$(2) h(t_j) = f(t_j) / S(t_j), \text{ where } S(t) = 1 - F(t).$$

where $F(t)$ is the cumulative distribution function of t and $f(t) = F'(t)$, is the probability density of the duration. $S(t)$ is the survival function representing the probability that the duration of not finding a job in intended occupation lasts at least a period of length t .

The baseline hazard function $h_0(t)$ in (1) is assumed identical for all individuals; it may take a specific parametric form, or be left unspecified, resulting in a Cox (1972) proportional hazards model. The latter model is used for this study because of its flexibility. The target event is the occurrence of finding the first job in intended occupation. The initial point of time (t_0) under study is the time of landing. As the LSIC records the exact dates of the job history for each worker, duration is measured as the number of days between the landing date and the date at which an immigrant started the first job in intended occupation.

The function $g(x_j)$ is a non-negative function of covariates that affect the target event. It is further specified so that the model becomes:

$$(3) h_i(t) = h_0(t) * \exp(\beta_1 x_{i1} + \dots + \beta_k x_{ik})$$

The main independent variables used in the regression models are variables that affect both the demand and supply sides of the labour market and the matching process of employers

and employees, based on a simple matching model with the presence of transaction costs.¹⁰ These explanatory variables are related to occupation or skill demand, wage rate that an employer may offer, or are factors affecting skill set, reservation wage, search efforts, attitudes towards varied occupational choices of an immigrant worker. Appendix B presents the complete definitions of the independent variables, which are divided into the following categories.

1) Human capital includes knowledge and skills coming from education, training and pre-migration work experience. The theory suggests that human capital – education and work experience – is the main indicator of a person’s labour market outcomes.¹¹ For immigrants, proficiency in official languages plays a crucial role in finding adequate employment (e.g. Grondin, 2007). In line with most research on immigrants’ economic outcomes which includes these variables as explanatory variables, the current study includes years of education at the time of landing, English and French ability, and incidence of pre-migration work experience.

2) Research also indicates that immigrants with some attachments to the receiving country outperform other immigrants in economic integration into the receiving country society. Canadian experiences – education or work experience – are fully transferable compared to foreign qualifications. Previous Canadian experience and personal ties also pre-familiarize newcomers with the new labour market and remove or alleviate some market frictions, so as to prepare them to better integrate into the Canadian labour market. Attachment to Canada prior to immigration such as having visited, studied or worked in Canada is included in the estimations.

3) Immigration category is a key factor affecting labour market outcomes. A point system that rewards human capital attributes and labour market needs is used to screen skilled worker principal applicants into Canada based on their adaptability to the Canadian labour

¹⁰ Cahuc and Zylberberg (2004), Chapter 9, Section 3.

¹¹ Ehrenberg and Smith (2003), Chapter 9.

market. However, refugees and family class immigrants make their migration decision based on different considerations than economic immigrants (Chiswick, Lee and Miller 2003). As a result, immigrants who land in categories other than economic class are expected to have less favourable labour market outcomes than their economic class counterparts.

4) Socio-demographic characteristics influence immigrants' occupational status. Age at migration is an important factor in an immigrant's employment and occupational outcomes. Older immigrants may have difficulty updating new skills and adapting to a new labour market and occupational requirements. Province and Census Metropolitan Area (CMA) of residence are expected to have impacts on occupational outcomes as well, as these variables may capture regional differences in economic conditions and the demand in local labour markets. Ethnic background may also impact on the labour market adjustment of immigrants, in terms of qualitative differences in education or official language proficiency, or traditional attitudes towards labour force participation and occupational choices. Some studies have found evidence that there are intergenerational transfers of "ethnic capital" (e.g. Borjas 1992). Therefore, ethnic groups are included in the estimation models.

5) The integration process of immigrants is context-dependent. Forces of supply and demand in specific occupations and skills affect immigrants' employment outcomes in their intended occupation. The transferability of skills also affects the ultimate occupational outcomes of immigrants: some occupations such as clerical jobs can be easily transferred while others are harder to transfer, requiring for example special licenses (e.g. lawyers and health professionals) or depending heavily on official language skills (e.g. teachers). Thus occupation type and skill level of intended occupation are included in the estimation to address the occupational disparities.

6) Both theoretical and empirical evidence shows that social capital, embedded in social networks or ethnic enclaves, affects skill match processes, thus influencing occupational outcomes (Xue 2008; Calvó-Armengol and Jackson 2003; Lin, Vaughn and Ensel, 1981; Chiswick, Lee and Miller 2003; Mullan 1989). Social capital indicators are included in the current study to test the hypothesis that they impact on employment entry into the intended occupation. Time varying variables describing changes of immigrant characteristics over

time are included in the estimations. This includes demographic variables such as age and marital status, region of residence (provinces and CMAs), participation in education or training after landing, proficiency of official languages and indicators of social networks developed in Canada. As the information on changes was collected only at the time of the interviews for these time varying variables, the exact timings of the transitions are unknown. Alternatively, the interview dates are employed to approximate the transition timings of time varying variables in order to create a person-period data file.¹²

6. Empirical Results

Table 4 highlights some characteristics of the estimation sample of the LSIC immigrants used for the duration analysis, by gender. The immigration categories vary vastly between genders. Male immigrants were overwhelmingly in the skilled worker principal applicants category (about two thirds) while female newcomers were more likely to have come to Canada in the skilled worker spouses and dependants category (46%). There is not much difference between female and male immigrants in the average age and marriage status and choice of location of residence. Education attainment was slightly higher for male immigrants than for female immigrants (16 years versus 15 years of schooling). Nearly two in 10 immigrants were enrolled in school at the time of interviews for both male and female immigrants (17% and 19% respectively).

The vast majority of immigrants could communicate in English (92% and 88% for male and female immigrants respectively). The distribution of ethnic groups reflected the trend of source countries.

Before coming to Canada, most immigrants had work experience (94% and 86% for male and female newcomers, respectively). Some 16% of the LSIC immigrants visited Canada

¹² A detailed description of how to include time varying variables in the time-occurrence data and create a person-period data file can be found in Xue (2008), Appendix F.

before landing. The intended occupations for male immigrants were concentrated in Natural and Applied Sciences (51%) while their female counterparts had more diverse choices in desired occupations. Business and Finance occupations, Natural and Applied Sciences occupations, Health and Social Sciences occupations were the main intended fields for female immigrants. Skill level wise, most immigrants intended to work in high-skilled occupations which require university education, college education or apprenticeship training (skill level A or B) (89% and 76% for male and female immigrants, respectively) while about two in 10 female immigrants intended to work in occupations requiring secondary school and/or occupation-specific training (skill level C).

Table 4. Sample means of variables in Cox proportional hazard estimations		
	Males	Females
Dependent variable		
Analysis time _t (in days)	697.988	729.301
Independent variables		
Immigration category		
Family Class (Reference category)	0.118	0.211
Skilled Workers (PA)	0.665	0.246
Skilled Workers (S&D)	0.118	0.458
Refugees	0.046	0.043
Others	0.053	0.042
Demographic variables		
Age	36.798	34.607
Married	0.806	0.847
Province and CMA of residence		
Atlantic Provinces	0.007	0.007
Quebec	0.192	0.178
Ontario (Reference category)	0.560	0.588
Manitoba and Saskatchewan	0.029	0.023
Alberta	0.085	0.087
BC	0.127	0.117
Toronto	0.451	0.456
Montreal	0.114	0.105
Vancouver	0.171	0.152
Ottawa-Hull	0.049	0.047
Calgary	0.029	0.039
Areas out of the main 5 CMAs (Reference category)	0.187	0.201
Ethnic group		
White (Reference category)	0.210	0.237
Chinese	0.224	0.239
South Asian	0.232	0.208
Black	0.050	0.048
Filipino	0.072	0.078
Latin	0.025	0.040
West Asian and Arab	0.122	0.088
Other Asian	0.055	0.048
Other Visible Minority	0.009	0.014
Education		
Years of schooling	16.002	15.202
Currently in school	0.172	0.193
Language ability		
English	0.921	0.878
French	0.197	0.183

Table 4 Sample means of variables in Cox proportional hazard estimations (cont'd)

Pre-migration attachment		
Visited Canada before landing	0.164	0.160
Studied in Canada before landing	0.041	0.037
Worked in Canada before landing	0.032	0.019
Had work experience before landing	0.944	0.863
Skill level of intended occupations		
Skill level A ¹ (Reference category)	0.665	0.575
Skill level B	0.223	0.182
Skill level C	0.092	0.223
Skill level D	0.019	0.019
Occupation group of intended occupations		
Management (Reference category)	0.052	0.027
Business and Finance	0.103	0.253
Natural and Applied Sciences	0.513	0.218
Health	0.043	0.148
Social Science	0.060	0.149
Art, Culture and Recreation	0.026	0.048
Sales and Services	0.078	0.111
Trades, Transport and Equipment Operators	0.085	0.017
Primary Industry	0.012	0.005
Processing Manufacturing and Utilities	0.028	0.025
Relatives		
Having relatives upon landing	0.447	0.518
Number of relatives in Canada	0.655	0.745
Frequency of contact with sponsors	0.139	0.239
Friends		
Having friends upon landing	0.691	0.614
Having made new friends	-	0.916
Number of sources meeting friends	2.907	2.855
Ethnic diversity of friends	0.497	0.494
Frequency of contact with friends	0.778	0.773
Group and organizational network		
Participation in organization	0.298	0.278
Volunteered time for organizations	0.163	0.144
Number of observations	5332	4219
Number of individuals	2246	1675

¹ Management occupations are considered as of skill level A which usually requires university education.
Data source: Longitudinal survey of immigrants to Canada (2005).

At the time of landing, around 50% of immigrants had relatives already living in Canada (45% of men and 52% of women) while over 60% had friends in Canada (69% and 61% for male and female respectively). Consistent with the immigration category distributions by gender, female immigrants had more relatives in Canada than males, whereas male newcomers made more friends in Canada than females upon landing.

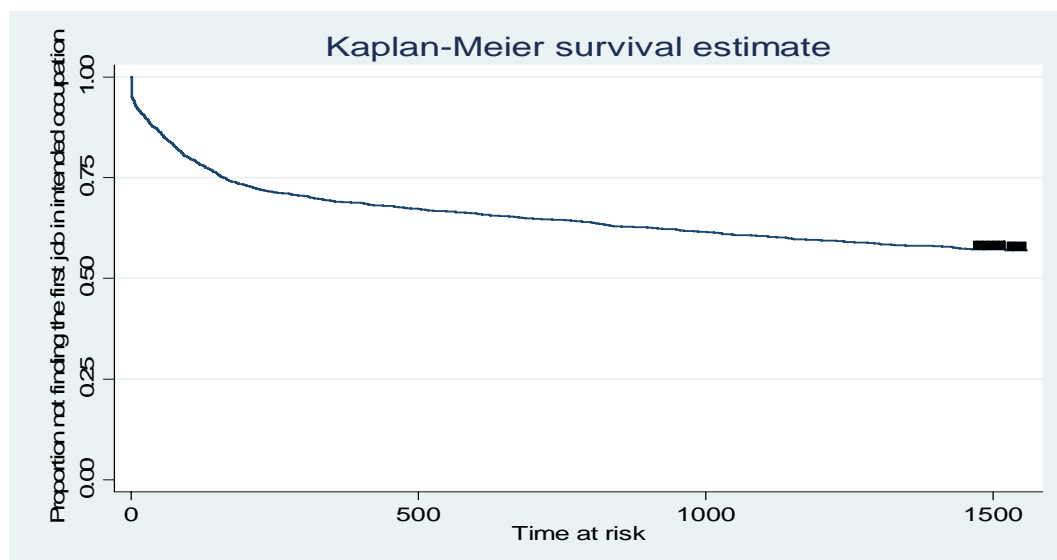
While the LSIC does not provide information on the absolute number of people in all networks, there are some good substitutes for network size. For example, information is collected on the types of relatives in Canada (spouse, children, parents, grandparents, brothers and sisters, uncles and aunts, cousins, etc.). By counting the types of relatives, the

study gets an approximation of network size for families. In a similar way, the size of friendship network is obtained by counting the sources from where an immigrant met new friends. However, these relative measurements for network size tend to underestimate the true size; thus the effects of network size should be interpreted with caution when compared with those from other studies using absolute numbers.

As the ethnic diversity indexes are scaled from 0 to 1, these immigrants had relatively diverse networks (about 0.5 for friendship diversity) for both genders. Participation in organizations was relatively low: nearly three in 10 immigrants took part in groups or organizations (30% and 28% for males and females, respectively). Accordingly, the proportion of immigrants who volunteered time for groups or organizations was also low: 16% and 14% for male and female newcomers, respectively).

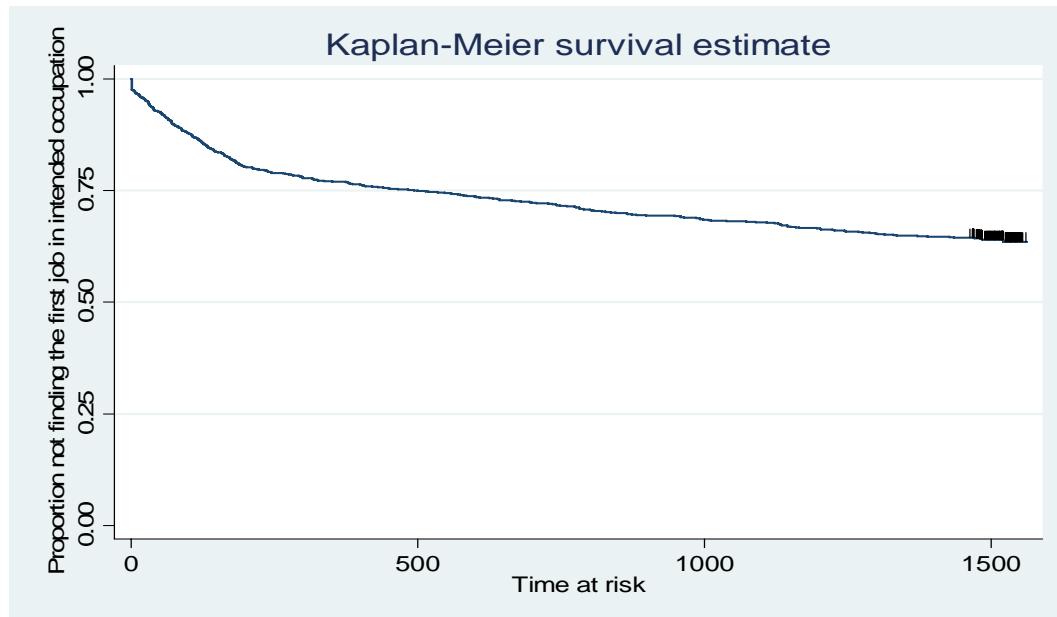
A complete perspective on the time taken to find the first job in intended occupation is obtained by plotting the proportion of immigrants who had not found their first job in their intended field at each day since landing in Canada (until the end of the survey, i.e. approximately the fourth year in Canada). The Kaplan-Meier survivor function curves in Figures 1 and 2 show the speeds of the first job access in intended occupation of male and female immigrants respectively.

Figure 1 Kaplan-Meier survival estimate for male immigrants



n=2246
Data Source: Longitudinal Survey of Immigrants to Canada, 2005.

Figure 2 Kaplan-Meier survival estimate for female immigrants



n=1675
Source: Longitudinal Survey of Immigrants to Canada, 2005.

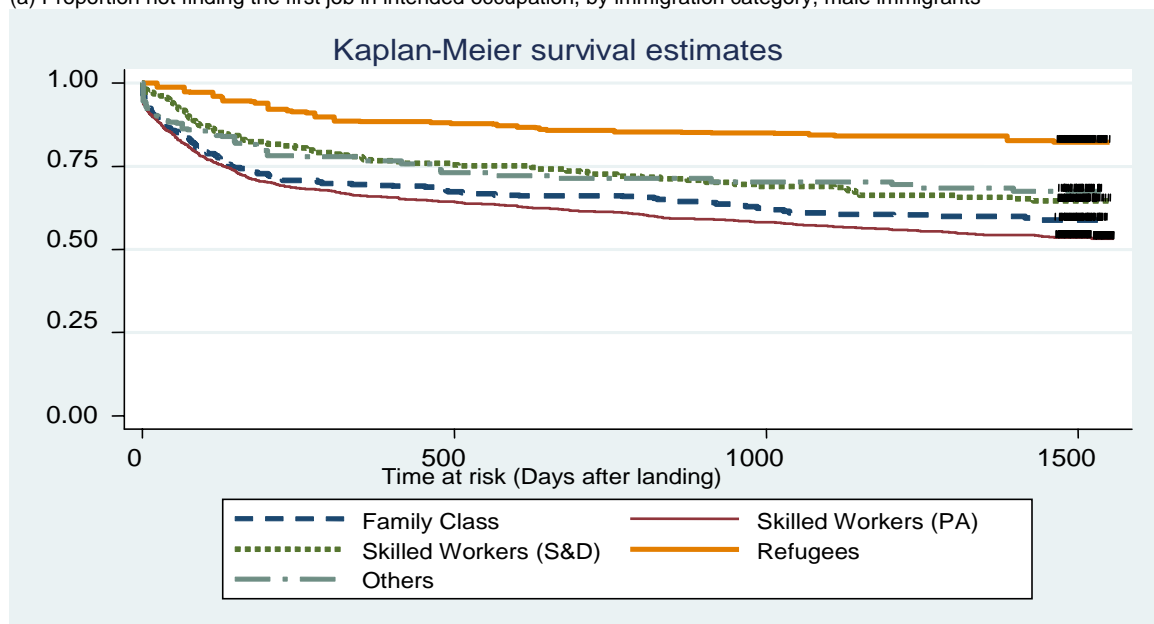
Both curves exhibit a very quick transition into the employment in intended occupation during the first six months in Canada. Between the first six months (day 183) and the first 12 months (day 365), the curves flatten a bit but do not stabilize until the last months of the first four years. The plots show that the initial year was critical for both male and female newcomers to find jobs in their intended fields.

Male immigrants were able to find their intended occupations more quickly than their female counterparts, reflected by a steeper survival curve. Four years after landing, about 43% of male immigrants who planned to work in Canada found employment in their intended occupations, while only 36% of female immigrants who participated in the labour force managed to work in their intended occupation.

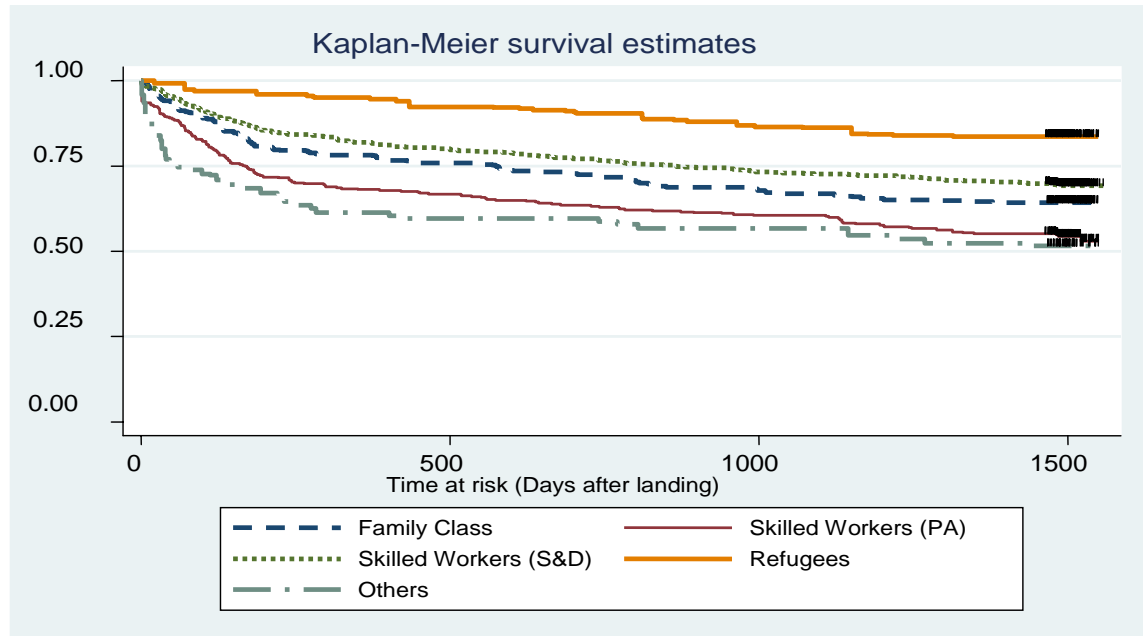
Exploring the immigration categories, the survival curves exhibit some obvious differentials across classes (Figure 3). It is not surprising to see that male skilled worker principal applicants were the most likely to find employment in their intended occupations throughout the first four years among all immigration categories (Figure 3(a)). However, for female immigrants (Figure 3(b)), those who landed in other categories which were mostly of other economic class had been able to find jobs in their intended occupations most quickly, followed by skilled worker principal applicants.

Figure 3 Kaplan-Meier survival estimates, by immigration category, male and female immigrants

(a) Proportion not finding the first job in intended occupation, by immigration category, male immigrants



(b) Proportion not finding the first job in intended occupation, by immigration category, female immigrants



Source: Longitudinal Survey of Immigrants to Canada, 2005.

The results from the Cox regression models including the full set of social capital indicators, which are estimated separately for the samples of men and women immigrants, are presented in Table 5 and Table 6. The estimates are presented in the form of hazard ratios, which are easier to interpret when most of the independent variables are categorical, as is the current study. A ratio greater than one indicates that a variable positively affects the access to intended occupation, while a ratio smaller than one indicates the opposite.¹³

Columns (1) in Tables 5 and 6 present a specification without social capital effects on employment entry in intended occupation for male and female immigrants respectively, while Columns (2) add social capital indicators. The effects of social capital on intended occupation access are not prevalent, as reflected by the generally insignificant hazard ratios

¹³ The standard errors reported in Tables 5 and 6 are for the hazard ratios. Please note that an ACI (Asymptotic confidence interval) for a hazard ratio is not computed using its own asymptotic standard error. For instance, adding and subtracting 1.96 times a hazard ratio's asymptotic standard error from the hazard ratio does **not** yield a 95% ACI. To construct the appropriate interval, one must antilog the symmetric limits for the coefficient itself. However, the Z statistics and p-values based on tests of the original hazard coefficients being significantly different from zero provide the same statistical inference as testing whether the hazard ratios reported in these tables are significantly different from one.

associated with most social capital indicators (Column (2) for males in Table 5 and Column (2) for females in Table 6). The final specifications with only significant social capital indicators are reported in Columns (3) for male and female immigrants, respectively. The addition of social capital indicators in the estimations generally improves the goodness of fit indicated by AIC and BIC, compared with the basic models without any social capital indicators (Columns (1) in both tables).

Table 5 Cox proportional hazard estimations of access to the first job in intended occupation, male immigrants

	(1)		(2)		(3)	
	Hazard Ratio	Robust Standard Error	Hazard Ratio	Robust Standard Error	Hazard Ratio	Robust Standard Error
Immigration category (Family Class)						
Skilled Workers (PA)	1.197	0.153	1.541**	0.317	1.603**	0.326
Skilled Workers (S&D)	0.882	0.144	1.12	0.246	1.166	0.253
Refugees	0.474***	0.124	0.564*	0.173	0.594*	0.178
Others	0.78	0.168	0.982	0.248	1.008	0.255
Education						
Years of schooling	1.061***	0.017	1.056***	0.017	1.058***	0.017
Currently in school	0.422***	0.053	0.414***	0.052	0.419***	0.052
Language ability						
English	1.249	0.201	1.165	0.188	1.185	0.192
French	0.739**	0.107	0.733**	0.105	0.73**	0.105
Pre-migration attachment to Canada and experience						
Visited Canada before landing	1.534***	0.150	1.516***	0.150	1.49***	0.146
Studied in Canada before landing	1.602***	0.269	1.624***	0.268	1.596***	0.266
Worked in Canada before landing	2.752***	0.483	2.606***	0.453	2.713***	0.472
Had work experience before landing	1.172	0.229	1.194	0.236	1.205	0.235
Skill level of intended occupation (Skill level A)						
Skill level B	0.932	0.126	0.903	0.122	0.908	0.122
Skill level C	1.22	0.212	1.194	0.208	1.2	0.208
Skill level D	1.034	0.393	1.002	0.387	1.007	0.385
Occupation group of intended occupation (Management)						
Business and Finance	1.451	0.358	1.583*	0.402	1.56*	0.394
Natural and Applied Sciences	1.427*	0.301	1.561**	0.343	1.523*	0.330
Health	1.386	0.368	1.542	0.421	1.49	0.404
Social Science, Education, Government Service and Religion	1.566*	0.385	1.7**	0.430	1.663**	0.420
Art, Culture and Recreation	0.815	0.326	0.883	0.348	0.866	0.341
Sales and Services	1.885**	0.530	2.09**	0.600	2.055**	0.586
Trades, Transport and Equipment Operators	2.069***	0.563	2.313***	0.648	2.226***	0.616
Primary Industry	2.211**	0.816	2.431**	0.909	2.338**	0.878
Processing Manufacturing and Utilities	2.178**	0.745	2.419**	0.849	2.312**	0.807
Relatives						
Having relatives upon landing			0.901	0.108		
Number of relatives in Canada			0.98	0.066		
Frequency of contact with sponsors			1.453**	0.267	1.413*	0.258
Friends						
Having friends upon landing			0.919	0.084		
Number of sources meeting friends			1.029	0.026		
Ethnic diversity of friends			1.498***	0.209	1.572***	0.209
Frequency of contact with friends			1.174	0.211		
Group and organizational network						
Participation in organization			1.091	0.109		
Volunteered time for organizations			1.029	0.130		
Number of observations	5332		5332		5332	
Number of individuals	2246		2246		2246	
Log pseudo likelihood	-6974.734		-6961.93		-6966.160	
AIC	14037.47		14029.87		14024.32	
BIC	14327.05		14378.68		14327.07	

* p<0.1; ** p<0.05; *** p<0.01. Standard Errors are adjusted for 2246 clusters in individuals. See footnote 13.

Reference categories are indicated in parentheses.

The regressions in the Table are also controlled for age, marital status, province and CMA of residence and ethnic groups. Please find the complete results in Xue (2008), Table D.3 in Appendix D.

Data source: Longitudinal survey of immigrants to Canada (2005).

Table 6 Cox proportional hazard estimations of access to the first job in intended occupation, female immigrants

	(1)		(2)		(3)	
	Hazard Ratio	Robust Standard Error	Hazard Ratio	Robust Standard Error	Hazard Ratio	Robust Standard Error
Immigration category (Family Class)						
Skilled Workers (PA)	1.289*	0.180	1.686**	0.387	1.281*	0.179
Skilled Workers (S&D)	0.877	0.111	1.131	0.236	0.864	0.110
Refugees	0.583**	0.157	0.716	0.215	0.581**	0.156
Others	1.559*	0.364	1.987**	0.555	1.532*	0.360
Education						
Years of schooling	1.03	0.022	1.028	0.021	1.029	0.021
Currently in school	0.432***	0.060	0.42***	0.059	0.427***	0.060
Language ability						
English	1.629***	0.282	1.585***	0.278	1.593***	0.277
French	1.027	0.180	1.033	0.180	1.028	0.180
Pre-migration attachment to Canada and experience						
Visited Canada before landing	1.36**	0.169	1.311**	0.165	1.351**	0.168
Studied in Canada before landing	1.339	0.314	1.325	0.313	1.352	0.318
Worked in Canada before landing	3.23***	0.726	3.138***	0.709	3.254***	0.730
Had work experience before landing	1.348*	0.222	1.333*	0.220	1.34*	0.222
Skill level of intended occupations (Skill level A)						
Skill level B	1.068	0.158	1.051	0.158	1.061	0.158
Skill level C	1.847***	0.288	1.857***	0.291	1.826***	0.286
Skill level D	1.573	0.619	1.587	0.626	1.524	0.605
Occupation group of intended occupations (Management)						
Business and Finance	1.324	0.436	1.296	0.432	1.333	0.439
Natural and Applied Sciences	1.349	0.438	1.324	0.435	1.35	0.438
Health	1.346	0.446	1.307	0.439	1.348	0.446
Social Science, Education, Government Service and Religion	1.549	0.507	1.501	0.496	1.541	0.504
Art, Culture and Recreation	1.41	0.522	1.378	0.517	1.431	0.528
Sales and Services	1.304	0.461	1.259	0.449	1.328	0.469
Trades, Transport and Equipment Operators	0.152	0.186	0.135	0.168	0.156	0.189
Primary Industry	3.189**	1.672	3.215**	1.713	3.189**	1.663
Processing Manufacturing and Utilities	2.591**	1.129	2.576**	1.135	2.603**	1.134
Relatives						
Having relatives upon landing			1.234	0.189		
Number of relatives in Canada			0.91	0.077		
Frequency of contact with sponsors			1.331	0.254		
Friends						
Having friends upon landing			0.984	0.104		
Made new friends after landing					1.453**	0.263
Number of sources meeting friends			1.004	0.033		
Ethnic diversity of friends			1.211	0.206		
Frequency of contact with friends			1.226	0.277		
Group and organizational network						
Participation in organization			1.134	0.147		
Volunteered time for organizations			0.959	0.153		
Number of observations	4219		4219		4219	
Number of individuals	1675		1675		1675	
Log pseudo likelihood	-4232.050		-4227.467		-4229.661	
AIC	8552.1		8560.933		8549.321	
BIC	8831.384		8897.343		8834.952	

* p<0.1; ** p<0.05; *** p<0.01. Standard Errors are adjusted for 1675 clusters in individuals. See footnote 13.

Reference categories are indicated in parentheses.

The regressions in the Table are also controlled for age, marital status, province and CMA of residence and ethnic groups. Please find the complete results in Xue (2008), Table D.3 in Appendix D.

Data source: Longitudinal survey of immigrants to Canada (2005).

In line with the literature, human capital – education and language skills – affects the occupational outcomes of immigrants significantly. Both years of schooling and English speaking ability have positive effects on the speed of finding the first job in intended occupations for both male and female newcomers. However, the effect of education is significant for men and the English language effect is significant for women. Specifically, for male immigrants, controlling for other variables, the hazard or risk of getting a first job in intended occupation increases by about 6% with each year of full-time education at arrival. Controlling for other variables, hazard or speed of access to the first job in intended occupation is 59.3% greater for those female immigrants who could converse in English compared with those with no English speaking ability.

It is worth noting that the attachment to Canada before migration plays a significant role in facilitating the finding of employment in intended occupation, especially Canadian work experience before landing. While foreign work experience also hastens the access to the first job in desired fields as indicated by higher-than-one hazard ratios for both genders, the effects are insignificant for males or only marginally significant for females.

Consistent with the Kaplan-Meier descriptive survival curves, for male and female immigrants, skilled worker principal applicants have a significantly quicker access to employment in intended occupation compared to the reference category – family class immigrants (60.3% and 20.1% higher for males and females respectively). While skilled worker spouses and dependants also have a faster speed of landing the first employment in intended occupation shown by the hazard ratios higher than one, the effects are not significant.

Desired occupational group significantly affects the speed of the employment access to intended fields for both male and female immigrants. For male newcomers, the occupational groups with the “advantage” in terms of an easier and quicker access are located in the two extremes. On the one hand, male immigrants intending to work in some professional occupations such as business and finance, natural and applied sciences and social sciences occupations have significantly higher hazard ratios for access to the first intended occupations. On the other hand, those with

intention to work in non-professional jobs, such as sales and services, trades, transport and equipment operators, primary industry, and processing and manufacturing occupations, enter the first job in intended occupation even more quickly (5.5%, 22.6%, 33.8% and 31.2% faster than those intending to work in managerial occupations, respectively).

The easier access to the non-professional occupations is more prominent for female immigrants: those desiring to work in primary industry and processing, manufacturing and utilities occupations are much more likely to find employment in these fields. The hazard ratios for skill levels of intended occupations confirm the findings from occupational groups somewhat. Immigrants who planned to work in occupations requiring lower education and/or skills (skill levels C and D) had a faster access to their intended occupations, compared to those desiring to work in a higher-skilled field (skill level A or managerial occupations).

The other factors most influencing the speed of the access to the first job in intended occupation include age, current school participation, and ethnic groups. Factors playing roles for different genders are quite similar, with a little variation in magnitude and significance.

Among the social capital variables, for male immigrants, “frequency of contact with family sponsors” and “ethnic diversity of friendship network” are the two main factors significantly hastening entry into employment in intended fields. Compared with those who have no contact with their family sponsors, those who talk to their family sponsors every day or live with sponsors have a 41.3% faster access to the first job in intended occupation. An ethnically diverse friend network helps male immigrants find employment in intended occupation in terms of a 57.2% faster speed, compared to an ethnically concentrated friend network.

While most of the other social network indicators play positive roles in facilitating the access to the desired occupations, as shown by the higher-than-one hazard ratios, the effects are not all statistically significant.

For female immigrants, none of the social capital indicators has a significant effect on speed of access to employment in desired occupations (Column (2) in Table 6). However, as the hazard

ratios for the three indicators about friendship network developed in Canada after landing (number of sources for meeting friends, ethnic diversity of friend networks and frequency of contact with friends) are all greater than one, although insignificant, an alternative indicator is developed to identify the incidence of making new friends after landing, attempting to capture the general effect of friend networks. When this indicator enters the estimation for female immigrants (Column (3) in Table 6), a significant positive effect is found on the intended job access. For female immigrants who made new friends after landing, controlling for other characteristics and factors, the hazard of getting a first job in intended occupation is 45.3% higher than the one for those without new friends in Canada.

This result suggests that while it is hard to identify which elements within the friendship networks are playing roles in speeding up the process of finding the first job in intended occupation, making new friends or developing new social networks in Canada helps the occupational matching process for those female immigrants.

7. Conclusions

Using information contained in the LSIC on detailed job trajectory and occupational intentions of immigrants at the time of landing, this paper has analyzed occupational outcomes in terms of the duration of access to the first job in intended occupation during the first four years in Canada. Based on semi-parametric Cox proportional hazards models, the study has investigated factors that determine the speed of access to employment in intended occupation for male and female immigrants respectively. Survival curves from the Kaplan-Meier estimates for both genders show that while more immigrants found employment in their intended occupation the longer they were in Canada, the critical period for an immigrant to find employment in his or her desired field is the initial one year in the Canadian labour market. The hazards of finding a job in intended occupation, both for males and females, dropped significantly during the first year in Canada and flattened afterwards.

The results are consistent with the literature that human capital such as education and language skills are essential factors determining the occupational outcomes of immigrants. It is also found that foreign work experience does not have any significant effects on occupational destination, compared to the significant positive effect of Canadian work experience prior to landing on the employment access to intended occupation. This result provides rationale for the implementation of the Canadian Experience Class 2008 for permanent immigration for certain skilled temporary workers and international students with Canadian degrees and Canadian work experience. In general, those with intention to work in non-professional jobs, such as sales and services, trades, transport and equipment operators, primary industry, and processing and manufacturing occupations, enter the first job in intended occupation more quickly. The results also show that education, English language ability, Canadian work experience and friend networks facilitate access to intended occupation.

While intended occupations of immigrants are very likely to change over time, especially during the initial adaptation and adjustment to the Canadian labour market, intended occupations are identified in this study by the desire at the time of landing or before living in Canada. Should more information capturing changes in occupational intentions become available after immigrants arrive, the research on the employment access in intended fields would enable better understandings of the job-skill matching process for immigrants.

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Appendix A National Occupational Classification Codes

Skill Types (the first digit of an NOC code)

Skill Type	Occupation
0	Management Occupations
1	Business, Finance and Administration Occupations
2	Natural and Applied Sciences and Related Occupations
3	Health Occupations
4	Occupations in Social Sciences, Education, Government Service and Religion
5	Occupations in Art, Culture, Recreation and Sport
6	Sales and Service Occupations
7	Trades, Transport and Equipment Operators and Related Occupations
8	Occupations Unique to Primary Industry
9	Occupations Unique to Processing, Manufacturing and Utilities

Skill Levels (the second digit of an NOC code, both alphabetic characters and numerical values)

Skill Level (alpha)	Skill Level (digit)	Nature of Education/Training
A Occupations usually require university education.	1	<ul style="list-style-type: none"> ▪ University degree at the bachelor's, master's or doctorate level.
B Occupations usually require college education or apprenticeship training.	2 or 3	<ul style="list-style-type: none"> ▪ Two to three years of post-secondary education at a community college, institute of technology or CEGEP <i>or</i> ▪ Two to five years of apprenticeship training <i>or</i> ▪ Three to four years of secondary school and more than two years of on-the-job training, specialized training courses or specific work experience. ▪ Occupations with supervisory responsibilities and occupations with significant health and safety responsibilities, such as firefighters, police officers and registered nursing assistants are all assigned the skill level B.
C Occupations usually require secondary school and/or occupation-specific training.	4 or 5	<ul style="list-style-type: none"> ▪ One to four years of secondary school education <i>or</i> ▪ Up to two years of on-the-job training, specialized training courses or specific work experience.
D On-the-job training is usually provided for occupations.	6	<ul style="list-style-type: none"> ▪ Short work demonstration or on-the-job training <i>or</i> ▪ No formal educational requirements.

Appendix B Definition of the variables

<i>Dependent variable</i>	
Duration of access to the first intended occupation	Duration of access to the first intended occupation by the first 4 years since landing, in days
<i>Independent variables</i>	
Immigration category	
Family	1 if respondent is in Family class, 0 otherwise. (Reference category)
Skilled Workers (PA)	1 if respondent landed as a Skilled Worker principal applicant, 0 otherwise
Skilled Workers (S&D)	1 if respondent landed as a Skilled Worker spouse and dependant, 0 otherwise
Refugees	1 if respondent landed as a Refugee, 0 otherwise
Others	1 if respondent landed in an immigration category other than Family Class, Skilled Workers (principal applicants and spouses and dependants) and Refugees, which mostly consists of business immigrants in economic class.
Demographic variables	
Age	Age in years
Married	1 if respondent is married or living with a common-law partner, 0 if respondent is single, separated or divorced, or widowed
Province of residence	
Atlantic Provinces	1 if respondent is living in Atlantic provinces: New Brunswick, Nova Scotia, Prince Edward Island and Newfoundland and Labrador, 0 otherwise.
Quebec	1 if respondent is living in Quebec, 0 otherwise.
Ontario	1 if respondent is living in Ontario, 0 otherwise. (Reference category)
Manitoba and Saskatchewan	1 if respondent is living in Saskatchewan or Manitoba, 0 otherwise.
Alberta	1 if respondent is living in Alberta, 0 otherwise.
BC	1 if respondent is living in British Columbia, 0 otherwise.
Census metropolitan areas (CMAs)	
Toronto	1 if respondent is living in Toronto, 0 otherwise.
Montreal	1 if respondent is living in Montreal, 0 otherwise.
Vancouver	1 if respondent is living in Vancouver, 0 otherwise.
Ottawa-Hull	1 if respondent is living in Ottawa-Hull, 0 otherwise.
Calgary	1 if respondent is living in Calgary, 0 otherwise.
Not in the Big 5 CMAs	1 if respondent is living in an area other than the big 5 CMAs, 0 otherwise. (Reference category)
Population group	
White	1 if respondent is white, 0 otherwise. (Reference category)
Chinese	1 if respondent is Chinese, 0 otherwise.
South Asian	1 if respondent is South Asian, 0 otherwise.
Black	1 if respondent is Black, 0 otherwise.
Filipino	1 if respondent is Filipino, 0 otherwise.
Latin	1 if respondent is Latin, 0 otherwise.
West Asian and Arab	1 if respondent is West Asian and Arab, 0 otherwise.
Other Asian	1 if respondent is other Asian--South East Asian, Korean, Japanese, 0 otherwise.
Other Visible Minority	1 if respondent is other visible minority---Visible minority n.i.e., Multiple visible minorities, White and visible minority, 0 otherwise.
Languages	
English	1 if respondent has the knowledge of English (speaking fairly well or better), 0 otherwise (poorly or none).
French	1 if respondent has the knowledge of French (speaking fairly well or better), 0 otherwise (poorly or none).
Education	
Years of schooling	Years of full-time schooling, in years
Currently in school	1 if respondent is in school at the time of the interview, 0 otherwise
Experience	
Visited Canada before landing	1 if respondent visited relatives or friends in Canada or visited Canada as a tourist before

	landing, 0 otherwise
Studied in Canada before landing	1 if respondent studied in Canada before landing, 0 otherwise
Worked in Canada before landing	1 if respondent worked in Canada before landing, 0 otherwise
Had work experience before landing	1 if respondent had work experience before landing, 0 otherwise
Skill level of intended occupations	
Skill level A	1 if the second digit of the NOC code for the intended occupation is 1 or the first digit is 0 (i.e. management level is treated as skill level A), 0 otherwise. (Reference Category)
Skill level B	1 if the second digit of the NOC code for the intended occupation is 2 or 3, 0 otherwise.
Skill level C	1 if the second digit of the NOC code for the intended occupation is 4 or 5, 0 otherwise.
Skill level D	1 if the second digit of the NOC code for the intended occupation is 6, 0 otherwise.
Occupation group of intended occupations	
Management	1 if the current main job is in the Management Occupations, 0 otherwise. (Reference Category)
Business and Finance	1 if the current main job is in the Business, Finance and Administrative Occupations
Natural and Applied Sciences	1 if the current main job is in the Natural and Applied Sciences and Related Occupations, 0 otherwise
Health	1 if the current main job is in the Health Occupations, 0 otherwise
Social Science, Education, Government Service and Religion	1 if the current main job is in the Occupations in Social Science, Education, Government Service and Religion, 0 otherwise.
Art, Culture and Recreation	1 if the current main job is in the Occupations in Art, Culture, Recreation and Sport, 0 otherwise.
Sales and Services	1 if the current main job is in the Sales and Service Occupations, 0 otherwise
Trades, Transport and Equipment Operators	1 if the current main job is in the Trades, Transport and Equipment Operators and Related Occupations, 0 otherwise.
Primary Industry	1 if the current main job is in the Occupations Unique to Primary Industry, 0 otherwise.
Processing Manufacturing and Utilities	1 if the current main job is in the Occupations Unique to Processing Manufacturing and Utilities, 0 otherwise.
Social capital	
<i>_Relatives</i>	
Having relatives in Canada upon landing	1 if respondent had relatives living in Canada at the time of landing, 0 otherwise.
Number of relatives in Canada	Number of types of relatives (spouse, children, parents, grandparents, brothers or sisters, etc.) in Canada, ranging from 0 to 11.
Frequency of contact with family sponsors	Frequency of contact with family sponsor (0-1) : 0--- No sponsor or having not seen or talked to sponsors since arriving; Between 0 and 1 --- Seeing or talking to sponsors in varied frequencies; the higher the index is, the more frequently respondent contacts with sponsors. 1--- Seeing or talking to sponsors every day.
<i>_Friends</i>	
Having friends in Canada upon landing	1 if respondent had friends living in Canada at the time of landing, 0 otherwise.
Having made new friends in Canada	1 if respondent made new friends in Canada, 0 otherwise.
Number of sources meeting friends	Number of sources meeting new friends, ranging from 0 to 14.
Ethnic diversity of friends	Ethnic diversity of friend network (0-1): 0--- No friends or all friends belong to the same ethnic or cultural groups as respondent; Between 0 and 1 --- Some friends belong to the same ethnic or cultural groups as respondent; the higher the index is, the more ethnically diversified is the friend network. 1--- None of the friends belong to the same ethnic or cultural groups as respondent.
Frequency of contact with friends	Frequency of contact with friends (0-1) : 0--- No friends or having not seen or talked to friends since arriving; Between 0 and 1 --- Seeing or talking to friends in varied frequencies; the higher the index is, the more frequently respondent contacts with friends. 1--- Seeing or talking to friends every day.
<i>_Group and organizational network</i>	
Participation in organization	1 if respondent participated in any organization or group, 0 otherwise.
Volunteered time in organizations	1 if respondent volunteered time in organizations or groups, 0 otherwise.

Data source: Longitudinal Survey of Immigrants to Canada (2005).