When is a degree not a degree?

Wage differences associated with foreign credential recognition for Canadian immigrants

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Abstract

Do Canadian immigrants who require foreign credential recognition face significant wage penalties compared to similar immigrants who obtain their credentials in Canada? The following analysis employs a multiple regression model of immigrants' wages to answer this question, within the broader context of economic and ethnic discrimination against immigrants. Using individual level microdata from the 2016 Canadian census, the results show that foreign credential recognition requirements do have significant negative impacts on wages for Canadian immigrants, particularly for those belonging to visible minority groups. The results are stratified by six fields of study (architecture and urban planning, education, engineering and geoscience, law, social work, and health care) and there are significant differences in wages between immigrants who studied in Canada and immigrants who studied abroad across all fields. The findings also indicate that women face larger wage penalties than men.

These results show that immigrants' foreign education is not valued as highly as Canadian education, suggesting that immigrants who are educated outside of Canada face discrimination or underemployment in Canada's labour market. 'Upskilling' by obtaining additional education in Canada can, in most cases, remove the wage penalty for immigrants in the selected fields of study. However, the qualitative research on this subject indicates that few immigrants to Canada have the resources to pursue the additional education necessary to close this wage gap. The policy implications of this research suggest that services such as childcare, stipends, and language training can greatly benefit immigrants, particularly women, who are in the process of recertifying their foreign credentials in Canada.

I. Introduction

Certain occupations are regulated with reserved titles or exclusive rights to practice, such as physicians, nurses, engineers, and architects, among many others (The Canadian Information Centre for International Credentials n.d.). These regulations prevent those without the necessary skills and training from practicing in these fields. Without these regulations in place, those without the relevant knowledge and skills could perform services such as urban planning, health care, and engineering projects, which engenders risks to health and safety. In other words, credentialed occupations protect the public good. Immigrants to Canada who want to work in these fields must have their foreign degrees, licenses, or certifications evaluated and accepted for work in Canada (Employment and Social Development Canada 2015). This process is known as foreign credential recognition.

Foreign credential recognition is carried out differently in each province or territory, as well as by the various professional organizations and bodies that regulate their respective professions. Five provincial assessment agencies (those in British Columbia, Alberta, Manitoba, Ontario, and Québec) form the Alliance of Credential Evaluation Services of Canada, which makes foreign credential recognition information available to immigrants and small licensing bodies (Guo 2009, 41). Large professional organizations, such as Geoscientists Canada, the Canadian Architectural Licensing Authorities, and provincial colleges for physicians and surgeons, typically perform their own assessments of immigrants' professional degrees (Guo 2009, 41; Employment and Social Development Canada 2015; "Geoscientists | Géoscientifiques Canada - Home" n.d.; "Canadian Architectural Licensing Authorities" n.d.; "Provincial Medical Regulatory (Licensing) Authorities" n.d.). Furthermore, universities and colleges must undertake their own assessments of academic credentials if immigrants want to pursue additional academic study (Guo 2009, 41).

While in theory, any immigrant to Canada with the necessary education and work experience can work in a regulated field, the reality is often very different. As Jeffrey Reitz explains, "research on the earnings of the new immigrants has shown, for example, that immigrants experience significant labour market disadvantage in Canada, and that the performance of new immigrants falls significantly below expectation based on an assumed equivalence of measurable human capital such as education and experience" (2001, 350). Immigrants, often carefully selected through Canada's Comprehensive Ranking System ('points' system) precisely because of their high education and skill levels, routinely struggle to find work that is commensurate with their human capital (Basran and Zong 1998; Bauder 2003; George and Chaze 2012; Grant and Nadin 2007; Krahn et al. 2000; Ngo and Este 2006; Picot 2004; Salaff and Greve 2003). This underutilization of immigrants' skills is sometimes referred to as "brain waste," offsetting the "brain gain" that Canada receives by admitting such highly-skilled immigrants in the first place (Reitz 2001, 349).

This paper will investigate if there are wage differences between immigrant adults who obtained professional degrees abroad compared to immigrant adults who obtained professional degrees in Canada. The hypothesis for this analysis is that immigrants who require foreign credential recognition, i.e., immigrants educated outside of Canada, face an earnings penalty compared to those that do not, which is supported by relevant literature based on quantitative and qualitative studies conducted in Canada and other major immigrant-receiving countries. Section II provides a literature review of the subject of foreign credential recognition in Canada and two comparable jurisdictions, the United States and Sweden. Section III describes the methods used for this analysis, Section IV presents the findings, and Section V provides a discussion of the results. Section VI presents concluding comments.

II. Literature Review

While there is a substantial body of literature on Canadian immigrants' wages generally, there are fewer studies that examine whether immigrants to Canada with foreign degrees have different earnings than immigrants to Canada who obtain Canadian degrees. Karen J. Buhr, in her study on female immigrant nurses in Canada, found that foreign-born nurses with nursing degrees from outside of Canada earn lower relative wages than foreign-born nurses with Canadian nursing degrees (2010). Richard A. Wanner similarly found that immigrants educated abroad receive lower returns on their education than those that are educated in Canada, both in terms of occupational status and earnings (1998). Janet Salaff and Arent Greve used multiple ordinal logistic regression to predict whether Chinese immigrants in Toronto would be working in the technical profession in which they trained – they typically did not, with women faring worse than men (2003). There is also considerable qualitative research on the challenges that immigrants with foreign degrees face in finding work in their field in Canada (Basran and Zong 1998; Bauder 2003; Fulton et al. 2016; P. R. Grant and Nadin 2007; Krahn et al. 2000; Mojab 1999; Phillion 2003; Salaff and Greve 2003). Further, recent immigrants to Canada are more likely than the native-born population to be employed in precarious work, i.e., work that is temporary, part-time, or otherwise insecure (Goldring and Joly 2014; Man 2004, 140).

Most quantitative studies to date have found that immigrants face a substantial earnings gap, and have faced one since the 1980s (Fortin, Lemieux, and Torres 2016, 104–5; Picot and Sweetman 2011, 13–15). Researchers offer various explanations as to why this is. A prevalent hypothesis is that immigrants face racial or ethnic discrimination in the labour market. Until 1967, Canada's immigration system favoured immigrants from the United Kingdom, the United States, and Western Europe (Basran and Zong 1998, 7). Between 1968 and 1992 – following the

introduction of the points system for potential immigrants to Canada in 1967, which does not consider applicants based on race or nationality – nearly half of the immigrants admitted to Canada arrived from Asia, Africa, and the Caribbean, drastically changing the ethnic makeup of immigrants to Canada compared to previous decades (Guo 2009, 39; Wanner 1998, 27). Krishna and Ravi Pendakur detailed the extensive earning differentials between Canadian-born and immigrant whites and visible minorities in a 1998 study. They demonstrated that visible minority immigrants earn less than white immigrants, suggesting that racial discrimination is a factor in wage gaps for visible minority immigrants (1998). In a similar study, Derek Hum and Wayne Simpson failed to find significant wage differences between whites and visible minorities among the Canadian-born but noted that visible minority immigrants can still be expected to earn less than white immigrants (1999). Philip Oreopolos also attributed barriers in the labour market for immigrants to ethnic discrimination. The author conducted an audit study with 13,000 randomly generated résumés with comparable experience and education, but varied them with English, Chinese, Indian, Pakistani, or Greek names; English names received the most calls for interviews, while Chinese, Indian, and Pakistani names received the fewest (Oreopoulos 2011). Nicole Fortin et al. determined in their study on foreign human capital that "direct information on location of study helps explain up to 70% of the immigrant/native-born wage gap" and that degrees from Africa, Asia, Latin America, and Eastern Europe were valued significantly less than degrees from Canada (2016, 106). Immigrants may further face an 'accent penalty,' which is associated with lower socioeconomic outcomes; speaking the dominant language of an area with an accent – in Canada, English or French – fails a cultural "litmus test" that can be perceived as failure to integrate (Portes and Rumbaut 2006, 207) and represents a significant employment barrier to immigrants at all levels of education (Preston and Man 1999, 117).

Another possibility is that immigrants with foreign credentials encounter obstacles in the credential recognition process, forcing them into less-skilled work that results in underemployment and, consequently, lower wages. This explanation for professional immigrants' lower wages is well-documented in the literature. Arthur Sweetman, in a publication for Statistics Canada, suggested that this could partly be attributable to an actual or perceived low quality of education in other countries; he writes that "every year of schooling is worth more in the labour market for those from the higher quality system than for those from a lower quality system," which he uses to explain the relative labour market success of white immigrants compared to that of visible minority immigrants (2004, 22). While a nation's school 'quality' as a whole may be varied and subjective, it is likely that the lack of knowledge Canadian employers hold about foreign education systems, as well as foreign work experience, could contribute to their hesitancy about hiring immigrants with foreign degrees (Banerjee and Lee 2015; Sweetman 2004). Immigrants may also lack information about the licensing and credential recognition requirements prior to their arrival in Canada, delaying further what can already be a long and arduous process (George and Chaze 2012).

There is some disagreement about the relative 'worth' of a degree from another country in the Canadian labour market. Naomi Alboim et al., for example, found that an immigrant's economic return on a degree from outside of Canada, when compared to a Canadian degree, is not statistically different from zero through a regression analysis of the 1991 Survey of Literacy Skills Used in Daily Activities (2005, 6). However, this study used a relatively small sample (n = 9455) that only included roughly 85 visible minority immigrants, whose earnings would likely be starkly different from the rest of the sample. Ana Ferrer and W. Craig Riddell also found that immigrants' completion of educational programs ("sheepskin" effects) resulted in higher economic returns than

those of the Canadian-born, contrary to previous research (2008; see, e.g., Reitz 2001; Thompson 2000). Yet the authors also acknowledged that immigrants arriving as adults – the population of interest for this analysis – experience much lower returns to their human capital than the Canadian-born or immigrants who arrive in Canada as children. These studies, therefore, do not demonstrably show that foreign education is valued similarly to Canadian education.

There is a smaller body of literature that examines the impacts of foreign credential recognition and wage penalties for immigrant women. Several authors have found that female immigrants to Canada face additional wage penalties compared to male immigrants or native-born women, which is often due to unemployment or underemployment (Elrick and Lightman 2016; Salaff and Greve 2003; Walsh, Brigham, and Wang 2011). Women typically arrive in Canada as dependent family members rather than principal applicants, indicating that their economic and labour market success is not valued as highly as their male spouses', even when their levels of human capital are comparable (Elrick and Lightman 2016; Man 2004; Preston and Man 1999, 117; Salaff and Greve 2003, 444–45; Wittebrood and Robertson 1991, 172). This aspect of Canadian immigration supports the family investment hypothesis, where "secondary workers," such as the dependent spouse of a principal applicant, take low-paying, unskilled work immediately upon arrival in a host country to provide for their families and to support the principal applicant's human capital investment, at the expense of their own human capital (Banerjee and Lee 2015, 215; Cobb-Clark and Crossley 2004, 374; Redstone Akresh 2006, 857).

In addition, if women arrive with their children, they are often responsible not just for supporting their partners and families, but also for unpaid work in the private sphere, such as childcare and housework (Breen and Cooke 2005). In several interview-based analyses, immigrant women in Canada cited unaffordable childcare facilities as one of the main reasons for their

unemployment or underemployment; they were forced to take low-paying work with flexible hours, or to remain unemployed, to accommodate the responsibilities of childcare (Khan and Watson 2005; Ng 1999; Phillion 2003; Preston and Man 1999; Wittebrood and Robertson 1991). The significant time that many immigrant women spend on domestic labour also makes it more difficult for them to recertify their credentials, upgrade their skills, or improve their English or French as necessary (Banerjee and Lee 2015, 61; Walsh, Brigham, and Wang 2011, 661). The professions under consideration in this analysis typically require at least two years of practical experience – in the form of residencies, apprenticeships, or field practice – that can be difficult or impossible for women to undertake while supporting their families (Man 2004, 141; Salaff and Greve 2003, 450). In this way, "the accreditation process deters immigrant women from practicing their professions" (Man 2004, 142). Rupa Banerjee and Anil Virma found that immigrant women living in households with children are significantly less likely to pursue post-secondary education than immigrant women without children; they found no such effect for immigrant men (2012, 73). Guida Man's research found that it is more common for Chinese immigrant women without children to obtain professional employment in Canada similar to what they held in China, supporting the hypothesis that immigrant women's time is disproportionately spent on childcare (2004, 139).

In addition to evidence of lost wages, another segment of research focuses on the emotional and psychological toll faced by immigrants who fail to find work in their field. Peter Grant and Shevaun Nadin, for example, found that exclusion from the labour market led to negative feelings from immigrant professionals towards Canadian life and culture, such as anger, perceptions of discrimination, and loss of self-respect (2007, 145, 155–56). Buhr also found that immigrants who are unable to have their credentials recognized feel that they are being discriminated against (2010,

212). Amy E. Fulton et al., in their study of immigrant social workers, reported that the social workers they interviewed felt that they were not able to secure work "due to issues of stereotyping, prejudice, and discrimination" (2016, 77). Shahrzad Mojab interviewed 86 immigrant women in Toronto, most of whom were highly-educated in their home countries, who said that "their intellectual capacity had been undermined in Canada" (1999). Gurcharn S. Basran and Li Zong found that more than half of the immigrants with professional degrees they interviewed in the Vancouver area felt that the provincial government, professional organizations, and educational institutions did not fairly recognize their credentials (1998, 14, Table 3). Research by Hieu Van Ngo and David Este found that, in addition to social isolation experienced by new immigrants to Canada, failing to find work in one's profession resulted in financial strain, feeling undervalued and discriminated against, and cultural challenges (2006, 36, 38, 40–41). Immigrants also report that they feel deceived by Canada's points system, as they are admitted based on their high score, but then cannot find meaningful employment in spite of their skills (Banerjee and Lee 2015, 207; Khan and Watson 2005). This suggests that in addition to the economic 'brain waste' that comes from immigrants' underemployment, there are also detrimental psychological effects on immigrants to Canada.

Studies from outside of Canada also indicate that foreign credential recognition represents a major barrier for immigrants. In the literature from the United States, researchers find that immigrants with foreign degrees both earn less and experience more professional 'downgrading' than those with domestic degrees, similar to the Canadian literature (Redstone Akresh 2006; Borjas 1988; Bratsberg and Ragan 2002). The United States, also like Canada, is a country whose native-born population has primarily Western European heritage and is home to a relatively large number of immigrants (Trevelyan et al. 2016, 3, 36). Bernt Bratsberg and James F. Ragan's research found

that immigrants who pursue their education in the United States receive higher returns to their education than those who do not, which are not the result of higher abilities or advanced English language skills (2002). George J. Borjas reached similar conclusions; he found that immigrants of non-European heritage earn less than the native-born population, despite arriving in the United States with more education on average (1988). Ilana Redstone Akresh also found that immigrants who acquire supplementary American education, in addition to education from their source country, can improve their employment opportunities and, consequently, their earnings (2006).

Sweden, another large immigrant-accepting country, also has a major body of literature on immigrants' foreign credential recognition. Sweden, in contrast to Canada, has a relatively large population of "humanitarian" immigrants and a relatively small population of "economic" immigrants from outside the European Union (Picot and Sweetman 2011, 7). Additionally, the unemployment rate of Sweden's foreign-born population is approximately 3.4 times higher than that of its native-born population and approximately 2.3 times higher than that of Canada's foreign-born population (OECD 2017a, 2017b). Sweden has looked to Canada's immigration policies in the past to improve the economic integration of its own immigrant population (Hojem and Ådahl 2011; Ugland 2014), however, immigrants in Sweden and Canada face similar challenges related to foreign credential recognition. Martin Nordin found that immigrants with non-Swedish education face lower returns on wages than immigrants with Swedish education (2011). Per Andersson and Shibao Guo also found that a foreign-born citizen in Sweden is less likely to be fully employed than a native-born citizen, even if they have Swedish education (2009). Pieter Bevelander and Helena Skyt Nielsen's research also indicated that "education from the country of origin is not a perfect substitute for Swedish education" in Sweden's labour market (2001, 465).

Overall, the literature from Sweden and the United States shows that the difficulties immigrants face with respect to foreign credential recognition are not limited to Canada.

III. Methods

The following analysis will answer the question "Do immigrants to Canada who require foreign credential recognition face wage penalties compared to similar immigrants who are educated in Canada?" Multiple regression analysis was conducted using Stata with data from the 2016 Canadian census.

Data

This analysis uses data from the 2016 Canadian census' individual level microdata files. The 2016 census was administered to all Canadian households, with 25% of households receiving the long-form census, which provides detailed information about geographic, demographic, social, and economic characteristics, forming a "comprehensive portrait of the Canadian population and Canadian households" (Statistics Canada 2016a, 2017). The long-form census provides rich and detailed information about selected segments of the Canadian population, including immigrants, and provides information about their year of immigration, place of education, and employment (Statistics Canada 2016a).

While the issue of barriers related to foreign credential recognition has been studied previously, especially with respect to labour market and wage penalties, there is a gap in recent data. Many key studies in this area use data from older Canadian censuses, which may not be reflective of the current status of immigrants. More recent work on immigrant wages (see, e.g.,

Adserà and Ferrer 2016; Fortin, Lemieux, and Torres 2016; Lightman and Good Gingrich 2018) used data from the 2006 census (or other Canadian datasets on immigration, such as the Survey of Labour and Income Dynamics and the Longitudinal Immigration Database), rather than the more recent 2011 National Household Survey, a voluntary survey that temporarily replaced the Canadian long-form census in that year. This analysis will use the most recently available data from the latest Canadian census, adding to and updating the previous research on this subject.

Sample

The sample used in this analysis is limited to immigrants to Canada with post-secondary degrees at the bachelor level or higher in selected fields that require credential recognition by a provincial regulatory body. This degree can be obtained in Canada or in another country, must be the highest degree that an immigrant has obtained, and must be in one of the following fields of study: architecture and urban planning, education, engineering and geoscience, law, social work, or health care. Immigrants working at the management level in any of these occupations are excluded from the analysis, to account for the wage differences associated with career advancement. Immigrants include naturalized Canadian citizens as well as permanent residents (Statistics Canada 2018, 143). Refugees are excluded from the sample, since their migration prior to settlement in a host country complicates their entry into the labour force and results in much weaker earnings when compared to other immigration categories (Elrick and Lightman 2016, 358; Mata and Pendakur 2017, 838; Picot and Sweetman 2011, 10–11; Redstone Akresh 2006, 858–59). Those with temporary work or study permits are also excluded, as their wage earnings in Canada are expected to be irregular when compared to a naturalized citizen or permanent resident, although some evidence suggests that immigrants who were previously students or temporary foreign workers in Canada may have

stronger labour market performance than other immigrants (Elrick and Lightman 2016, 355; Picot and Sweetman 2011, 3; Sweetman and Warman 2014).

The goal of selecting this sample is to isolate the effect of foreign credential recognition on immigrants' wages. To do so, immigrants who must go through the process of foreign credential recognition to work in their field of study have to be compared to those who do not. Comparing the wages of immigrants to the wages of the native-born (see, e.g., Adserà and Ferrer 2016; Banerjee and Verma 2012; Ferrer, Green, and Riddell 2006; Ferrer and Riddell 2008; Li 2008; Wanner 1998) would not demonstrate this effect. A t-test is performed on the wage coefficients for visible minority groups to determine if there is a statistically significant difference between the wages for each group based on location of study. When considering all fields of study together, there is a large enough sample size to yield significant results for most variables. The fields of architecture and urban planning, law, and social work have much smaller sample sizes, yielding fewer significant results, particularly when spread across the visible minority groups. The fields of education, engineering and geoscience, and health care generally have more significant results, including for most of the visible minority groups.

Due to a small number of immigrants residing in the territories, the sample is limited to immigrants residing in a Canadian province. The province of residence has a noticeable impact on wages – those residing in Québec and the Atlantic provinces typically earn less, while those residing in Alberta and Saskatchewan typically earn more. The latter observation is likely attributable to the economic boom associated with the extractive industries sector, which had spillover effects in other sectors (Fortin and Lemieux 2015, 683). Province of residence is expected to have significant results for health workers' and educators' wages in particular, as wages or

salaries for these professions are generally set provincially (Fierlbeck 2011, 17–20; Statistics Canada 2016b).

The sample is further limited by age in two ways – the sample is restricted to immigrants who at the time of the 2016 census were between the ages of 20 and 64 and who had arrived in Canada between the ages of 20 and 34. The age restrictions ensure that the sample is limited to the working-age population, not including youths (Statistics Canada 2016c). The age at arrival restriction is also necessary to limit the sample to immigrants who could plausibly have completed their post-secondary education either in Canada or in their country of origin. Immigrants who arrive as children or teenagers likely complete their schooling in Canada and are less likely to be affected by an accent penalty. Immigrants who arrive as older adults likely complete their schooling in their country of origin and may be unwilling to 'start over' at later stages in their careers (Walsh, Brigham, and Wang 2011, 662). Young adults, however, may pursue post-secondary education abroad or in Canada.

Additionally, an immigrant must have worked for wages for at least one hour in the reference week – Sunday, May 1 to Saturday, May 7, 2016 – to be included in the sample. Addressing the effects of foreign credential recognition on unemployment is beyond the scope of this analysis. Limiting the sample to immigrants with bachelor's degrees or higher is also necessary for the fields of study selected, as they require specialized education and training. Figure 1 shows the breakdown of immigrants in the fields of study specified above, by location of study, using Statistics Canada's weight for census and economic families. The actual sample size is approximately 25% of the weighted figures.

Figure 1: Weighted number of immigrants in selected fields of study that require credential recognition, by location of study

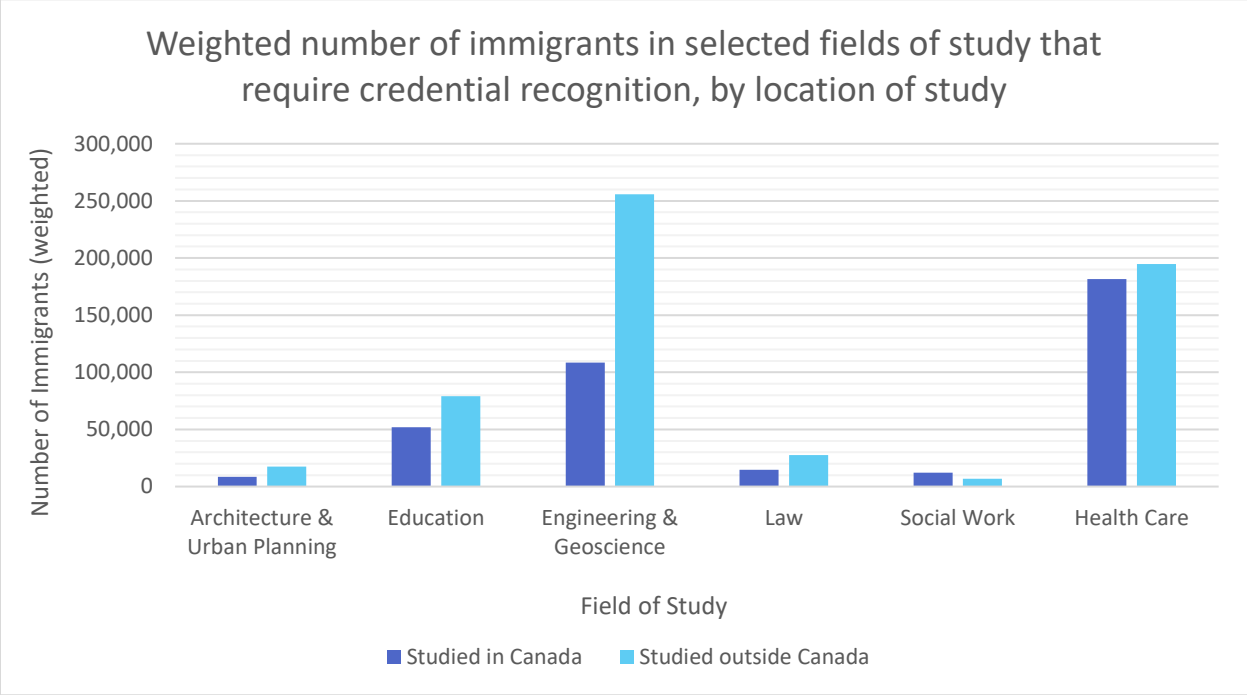


Figure 1 indicates that the proportion of immigrants who studied abroad versus studied in Canada is roughly even, with the exception of those that studied either engineering or geoscience, who primarily studied abroad. These immigrants were likely granted express entry under the Federal Skilled Workers program or an equivalent provincial program in industries with relevant in-demand occupations, such as the oil and gas extraction industry or the mining industry (CBC News 2015; CIC News 2013; Immigration, Refugees and Citizenship Canada 2007; Ministry of Immigration and Career Training n.d.).

Not all common credentialed professions in Canada are included in this analysis. For example, some public accountants in Canada may voluntarily regulate themselves, but there is no legal requirement that they do so. Only chartered professional accountants – as well as public accountants in British Columbia and Nova Scotia – have compulsory credential recognition

requirements in Canada (Employment and Social Development Canada 2019).[1] For simplicity, accountants were excluded entirely from the sample of credentialed professions. Pilots also require credential recognition, but this process is undertaken nationally by the federal government, not by a professional body or organization (Transport Canada 2010). Since the regulation of pilots is organized differently from most other credentialed professions and they account for a relatively small portion of the immigrant population in Canada, they are also not considered in this analysis.

Methodology

This analysis uses multiple regression to determine whether the relative wages of immigrants who obtained their highest degree outside of Canada are statistically different from those of immigrants who obtained their highest degree in Canada. The multiple regression equation used in this analysis can be written as:

$$\ln(wages) = a + b_1x_1 + b_2x_2 + \cdots + b_7x_7 + \varepsilon$$

Where the *wages* term represents an immigrant's reported wages for the 2015 calendar year, a is a constant term, b_1 represents the coefficient on the first variable (age), b_2 represents the coefficient on the second variable, etc.; ε represents an error term. The variables are described in the section below.

[1] The Department of Employment and Social Development's (ESDC) Job Bank website for accountants in Canada also lists public accountants in Ontario as a regulated profession; however, the ESDC's page for accountants in Ontario indicates that public accountants are voluntarily regulated. The pages for British Columbia and Nova Scotia, meanwhile, indicate that regulation for public accountants is compulsory.

Variables

Wages are the dependent variable for this analysis, measured in relation to seven independent variables. To reduce the right-skewness of the *wages* term, it is expressed by taking the natural logarithm of the original values. Wages are a useful income variable because they cannot contain negative values (unlike total income or investment income) and do not include government transfers such as child benefits or employment insurance benefits (Statistics Canada 2018, 219–20, 352). Differences in wages could also highlight discrimination in the labour market, as an employee is necessarily working for another person who controls their wages.

The first, second, and third independent variables are continuous variables of immigrants' ages, the square values of immigrants' ages, and ages at immigration, respectively. The age variable has a minimum value of 20 and a maximum value of 64. The age squared variable has a minimum value of 400 and a maximum value of 4096. The quadratic term accounts for the non-linear effect of age on wages – i.e., as age increases, wages generally increase, until individuals approach retirement age, at which point they begin to flatten out or decrease (Mincer, as cited in Preisendörfer and Voss 1990, 111–12). The age at immigration variable has a minimum value of 20 and a maximum value of 34.

The fourth independent variable is a set of nominal (dummy) variables of the highest degree an immigrant has obtained, with five possible categories: bachelor's degree (the base level, or comparison, group), university certificate or diploma above a bachelor's degree, master's degree, Ph.D., or degree in medicine, dentistry, or veterinary medicine.[2] This variable is coded as

[2] The only field of study that had results for the degree in medicine, dentistry, or veterinary medicine category was health care.

a dummy variable, which takes on a value of 0 or 1; the value is equal to 1 if a particular category is 'true' – i.e., it applies to the observation in question – and 0 if it is 'not true.'

The fifth variable is another categorical variable of province of residence at the time of the census, which results in ten possible categories, dummied out. Ontario is the comparison group (see Fortin and Lemieux 2015, 683), followed by the remaining provinces listed from east to west. As credential recognition for these fields of study is undertaken by provinces, controlling for province of residence is expected to affect wages. There are two instances where data were unavailable for provinces – Newfoundland and Labrador had no results for male immigrants who had studied architecture or urban planning and Prince Edward Island had no results for male immigrants who had studied law. These fields of study have the smallest sample sizes and the provinces in question have small immigrant populations (El-Assal 2019, fig. 4), so this is not unexpected.

The sixth variable is also a categorical variable of official language knowledge. There are four possible categories: knowledge of English only (the comparison group), knowledge of French only, knowledge of both English and French, or knowledge of neither official language. Ana Ferrer et al., in their study on literacy among Canadian immigrants, established that literacy in host-country language has a significant impact on earnings, accounting for up to two-thirds of the differences between university-educated immigrants' earnings and those of the native-born (2006, 383). Several other key studies of immigrant earnings in Canada also control for language knowledge of English or French (see, e.g., Buhr 2010; Fortin, Lemieux, and Torres 2016; Li 2008; Pendakur and Pendakur 1998).

The seventh and final independent variable included in the analysis is a two-way interaction term for two independent variables, an immigrant's location of study and their ethnic background.

Location of study is a nominal variable with two possible categories, inside Canada or outside of Canada. Ethnic background, also a nominal variable, has the following ten categories: not a visible minority (i.e., white), South Asian, East Asian, Black, Filipino, Latin American, Arab, Southeast Asian, West Asian, or "other," not included elsewhere.[3] The interaction term analyzes whether an immigrant's location of study has different effects on wages for immigrants of different visible minority statuses. Immigrants from more developed Northwestern European and English-speaking source countries, who tend not to belong to visible minority groups, generally fare better in Canadian and American labour markets (Banerjee and Verma 2012, 72–73; Bratsberg and Ragan 2002, 64; Picot 2004, 18). It is therefore hypothesized that immigrants who studied outside of Canada but who do not belong to a visible minority group will not face as severe of a wage penalty compared to immigrants who studied outside of Canada and do belong to a visible minority group. The comparison group for this variable is immigrants who studied in Canada and are not visible minorities.

The variables do not include work characteristics, such as the number of hours worked in a week, occupation, etc. Identifying work characteristics in the regression analysis would compare the wages of immigrants while controlling for similar positions and hours of work. However, the literature suggests that the main employment barrier associated with foreign credential recognition is the inability to obtain positions within a regulated profession, as immigrants are excluded from practicing by professional bodies. A control in the model for occupation or number of hours worked would not show evidence of these effects. It would only demonstrate the differences in the

[3] Immigrants who listed their ethnic background as "Aboriginal" were removed from the sample, as Aboriginal status has a specific meaning in the Canadian context – an Indigenous person of Canada – that does not apply to immigrants. The observations that were removed accounted for approximately 0.06% of the total sample.

wages of immigrants performing similar work, for a similar number of hours in a week. Work characteristics would be useful independent variables to include if the objective of the analysis were to examine whether there is wage discrimination between immigrants employed in similar positions. However, the objective for this analysis is to determine if there are significant differences between immigrants based on location of study only.

IV. Findings

As part of the initial exploratory data, mean wages are examined by visible minority status and location of study (shown in Table 1). This table uses the original visible minority statuses recorded by Statistics Canada, which is slightly modified for the regression analyses (see Appendix A).

Table 1: Mean wages, by visible minority status and location of study

Mean Wages (Immigrants and Native-Born) by Visible Minority Status and Location of Study			
Visible Minority Status	Mean Wages ($)		
	All	Studied in Canada	Studied outside of Canada
Not a visible minority	49375.35	58702.18	37097.84
South Asian	42412.69	56368.36	35952.36
Chinese	45511.84	59134.67	34050.51
Black	35618.61	42860.87	29128.81
Filipino	37504.24	45509.14	35337.27
Latin American	37723.84	43154.87	34992.94
Arab	38899.56	48704.1	32473.18
Southeast Asian	36716.65	46806.55	30511.57
West Asian	37689.31	50059.72	30683.99
Korean	36616.98	49931.47	28999.64
Japanese	48062.53	63854.14	35754.18
Visible minority, n.i.e.	39546.7	46549.85	33706.36
Multiple visible minorities	39912.37	51857.44	30575.32

Source: 2016 Census of Canada

Table 1 includes mean wages for both immigrants and the native-born to provide a broader sense of the wage penalties associated with visible minority status that are not specifically attributable to accent penalties, foreign credential recognition, or other types of potential discrimination against immigrants.

Table 2 below shows the regression output for all immigrants in the sample, sorted by sex. Due to well-documented differences in labour force characteristics and expected wages for men and women (see, e.g., Malkiel and Malkiel 1973; Oaxaca 1973; Blau and Kahn 2017), regressions are run separately for each sex. The F tests are significant for both regressions, indicating overall significance for the model. The regression for females has an adjusted R^2 value of 12.86% while the regression for males has an adjusted R^2 value of 12.64%. All sample sizes are weighted.[4]

[4] Statistics Canada does not permit the publication of observation counts from the census' confidential microdata. The counts for the sum of weights are used in the regressions as an approximation of the observation count of each sample. These weights differ from the frequency weights used for the figures, resulting in differences in the overall counts.

Table 2: Regression output for all immigrants in the sample, by sex

	Sum of weights = 641,825	Prob > F	0	Sum of weights = 671,000	Prob > F	0
		Adj R^2	0.1286		Adj R^2	0.1264
	Female			Male		
ln(Wages)	Coefficient (log units)	SE	Significance	Coefficient (log units)	SE	Significance
Age	0.158	0.002	***	0.181	0.002	***
Age^2	-0.002	0.000	***	-0.002	0.000	***
Age at Immigration	-0.015	0.000	***	-0.015	0.000	***
Highest Degree Obtained						
Bachelor's degree	*(Comparison)*			*(Comparison)*		
University certificate/diploma above bachelor's degree	0.033	0.010	***	0.026	0.010	**
Master's degree	0.140	0.007	***	0.155	0.006	***
Ph.D.	0.352	0.015	***	0.332	0.011	***
Degree in medicine, dentistry, or veterinary medicine	0.039	0.016	**	0.079	0.015	***
Province of Residence						
Ontario	*(Comparison)*			*(Comparison)*		
Newfoundland and Labrador	0.031	0.060		0.216	0.052	***
Prince Edward Island	-0.338	0.082	***	-0.107	0.085	
Nova Scotia	-0.276	0.030	***	-0.113	0.028	***
New Brunswick	-0.324	0.041	***	-0.213	0.040	***
Québec	-0.180	0.011	***	-0.215	0.011	***
Manitoba	-0.150	0.015	***	-0.149	0.016	***
Saskatchewan	-0.024	0.020		0.038	0.019	**
Alberta	0.096	0.008	***	0.215	0.008	***
British Columbia	-0.103	0.007	***	-0.079	0.007	***
Official Language Knowledge						
English only	*(Comparison)*			*(Comparison)*		
French only	-0.137	0.020	***	-0.237	0.020	***
English and French	0.036	0.009	***	0.002	0.009	
Neither English nor French	-0.562	0.045	***	-0.623	0.035	***
Study Location*Visible Minority Status						
Studied in Canada*Not a visible minority	*(Comparison)*			*(Comparison)*		
Studied in Canada*South Asian	0.062	0.013	***	0.057	0.012	***
Studied in Canada*East Asian	0.141	0.011	***	-0.012	0.011	
Studied in Canada*Black	0.035	0.015	**	-0.148	0.016	***
Studied in Canada*Filipino	0.172	0.023	***	-0.065	0.029	**
Studied in Canada*Latin American	-0.022	0.022		-0.074	0.024	***
Studied in Canada*Arab	0.002	0.022		-0.003	0.018	
Studied in Canada*Southeast Asian	0.059	0.026	**	-0.069	0.025	***
Studied in Canada*West Asian	-0.035	0.024		-0.127	0.022	***
Studied in Canada*Other	0.054	0.025	**	-0.048	0.027	*
Studied outside of Canada*Not a visible minority	-0.052	0.011	***	0.112	0.011	***
Studied outside of Canada*South Asian	-0.404	0.012	***	-0.254	0.011	***
Studied outside of Canada*East Asian	-0.249	0.013	***	-0.260	0.013	***
Studied outside of Canada*Black	-0.209	0.020	***	-0.278	0.017	***
Studied outside of Canada*Filipino	-0.116	0.012	***	-0.203	0.014	***
Studied outside of Canada*Latin American	-0.238	0.019	***	-0.059	0.019	***
Studied outside of Canada*Arab	-0.439	0.020	***	-0.291	0.017	***
Studied outside of Canada*Southeast Asian	-0.270	0.032	***	-0.310	0.035	***
Studied outside of Canada*West Asian	-0.498	0.023	***	-0.485	0.021	***
Studied outside of Canada*Other	-0.178	0.028	***	-0.261	0.028	***
Constant	7.157	0.041	***	7.043	0.041	***

$p < 0.01$ = ***; $p < 0.05$ = **; $p < 0.1$ = *

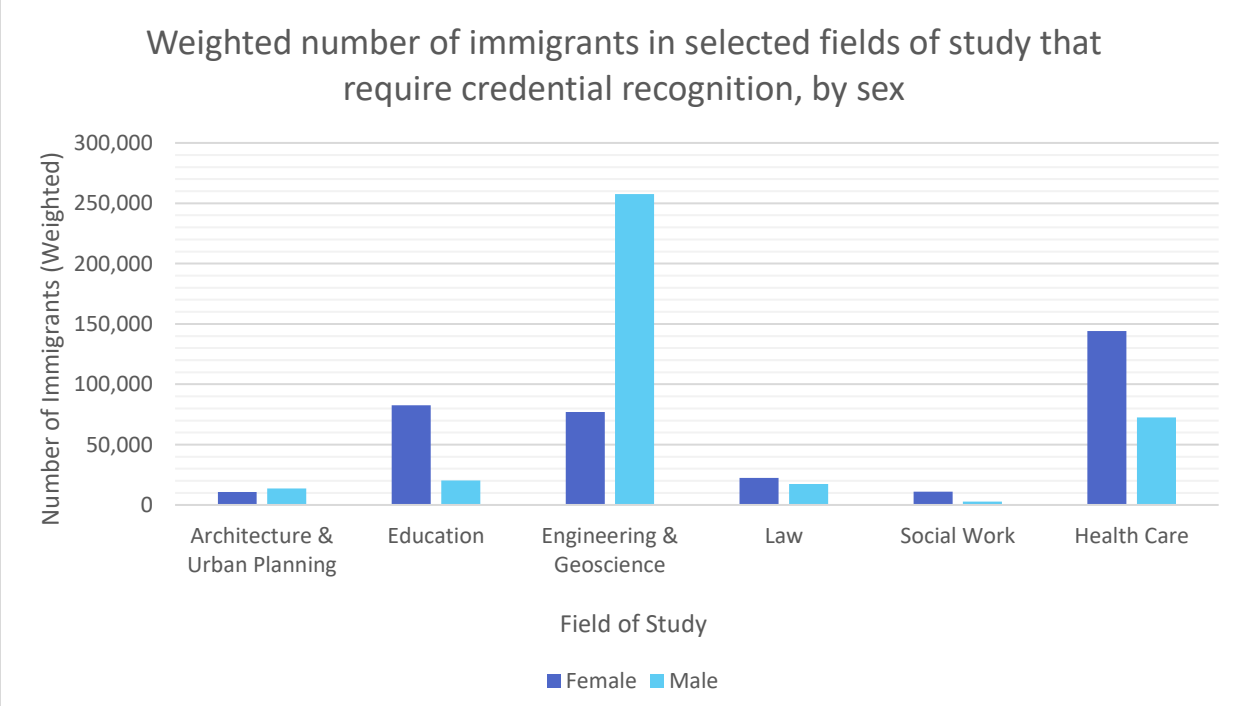
Source: 2016 Census of Canada

Sample: Immigrants, ages 20-64, with a bachelor's degree or higher, who immigrated to Canada at ages 20-34, and who worked for wages in the reference week

While the adjusted R^2 values for these regressions are relatively low, there are several highly significant results on coefficients, particularly for women. This suggests that there is a lot of variability in the data. This is expected for wages, which depend on a variety of factors that cannot be fully explored in the scope of this paper. However, even these high-variability data show a trend that leads to significant results. There are enough cases in the sample to demonstrate that there is a consistent relationship between location of study, interacted with visible minority status, and wages. The models would likely be poor predictors of wages, as work characteristics have not been included, but they do establish that there are significant wage gaps between immigrants that study in Canada and immigrants that study outside of Canada.

Wage differences will now be explored further by field of study, stratified again by sex. Figure 3 below shows the weighted sample sizes for each field of study.

Figure 2: Weighted number of immigrants in selected fields of study that require credential recognition, by sex



Results for the first six independent variables (age through to official language knowledge) are not appreciably different across the fields of study. Age and age at immigration are highly significant for all fields of study for both men and women. Increases in age result in increases in wages, while increases in the age squared and age at immigration terms result in decreases in wages. However, the increase in wages associated with age offsets the decrease in wages associated with age squared and age at immigration, resulting in net increases in wages as immigrants get older and as the time that they have spent in Canada increases. Immigrants also consistently earn less in Québec and more in Alberta, with ambiguous results for the remaining provinces. There is generally a small penalty for speaking only French and a large penalty for speaking neither English nor French, with no benefits for bilingualism (except for female educators and male health workers, who receive small wage increases).

The results for the interaction term, however, vary considerably across the fields of study. Tables 3-8 display the results for the interaction term by field of study and sex.[5] An additional column has been added to these tables with an indicator (†) for whether there is a statistically significant difference between the wages for each visible minority group based on location of study. Significance is calculated with the following t-test at the 5% level:

$$t = \frac{coefficient_1 - coefficient_2}{\sqrt{SE_1^2 + SE_2^2}}$$

Adjusted R^2 values are still relatively low among these regressions (ranging from 6.98% to 18.9%), but important conclusions can be drawn from larger groups with significant results, such as engineering and geoscience, education, and health care.

[5] The full regression outputs for each field of study are included in Appendix B.

Table 3: Regression outputs of the interaction term for immigrants who studied architecture or urban planning

Architecture/Urban Planning								
Sex	Visible Minority Status	Studied in Canada			Studied outside of Canada			†
		Coefficient (log units)	SE	Significance	Coefficient (log units)	SE	Significance	
Female	Not a visible minority	*(Comparison)*			-0.159	0.11		
	South Asian	-0.049	0.19		-0.173	0.15		
	East Asian	-0.085	0.12		-0.432	0.14	***	
	Black	0.138	0.25		0.136	0.27		
Sum of weights = 6075	Filipino	0.212	0.31		0.020	0.16		
Adj R^2 = 0.1014	Latin American	-0.069	0.21		-0.298	0.15	**	
Prob > F = 0	Arab	-0.256	0.22		-0.600	0.17	***	
	Southeast Asian	-0.323	0.30		-0.499	0.48		
	West Asian	0.005	0.18		-0.672	0.16	***	†
	Other	0.236	0.24		0.081	0.32		
Male	Not a visible minority	*(Comparison)*			0.077	0.08		
	South Asian	0.014	0.13		-0.152	0.12		
	East Asian	0.016	0.09		-0.352	0.10	***	†
	Black	-0.044	0.19		-0.270	0.16	*	
Sum of weights = 9120	Filipino	0.006	0.22		-0.142	0.10		
Adj R^2 = 0.1369	Latin American	-0.184	0.16		-0.042	0.11		
Prob > F = 0	Arab	-0.021	0.17		-0.011	0.11		
	Southeast Asian	-0.428	0.23	*	-0.189	0.28		
	West Asian	0.072	0.25		-0.405	0.13	***	
	Other	-0.292	0.23		0.083	0.20		
The † symbol denotes a significant difference between the wages for a visible minority group based on location of study.								
p < 0.01 = ***; p < 0.05 = **; p < 0.1 = *								
Source: 2016 Census of Canada								
Sample: Immigrants, ages 20-64, with a bachelor's degree or higher, who immigrated to Canada at ages 20-34, and who worked for wages in the reference week								

The fields of architecture and urban planning had one of the smallest sample sizes of the selected fields of study. Consequently, there are few significant results for this field, as shown in Table 3. Only two groups, West Asian women and East Asian men, had significant differences for wages based on location of study. Female East Asian, Latin American, Arab, and West Asian immigrants who studied outside of Canada are predicted to earn 43.2%, 29.8%, 60%, and 67.2%

less, respectively, than a Canadian-educated white immigrant. There are no significant results for female immigrants who studied architecture or urban planning in Canada.

For male immigrants, there are even fewer significant results. East Asian and West Asian immigrant men who study outside of Canada face considerable wage penalties compared to white immigrants who study in Canada (35.2% and 40.5% less, respectively). Male Southeast Asian immigrants who have Canadian education can be expected to earn 42.8% less than white immigrants with Canadian education, but the result for this term is only weakly significant.

Figure 3 shows the wage differences between male and female visible minority immigrants and comparable white immigrants who studied architecture or urban planning in Canada. As white immigrants educated in Canada are the comparison group, significant differences for this group by location of study cannot be established and they are excluded from the figure. Shaded bars represent significance at the 5% level for wage differences by location of study.

Figure 3: Wage differences for immigrants compared to white immigrants who studied architecture or urban planning in Canada, by sex, visible minority status, and location of study

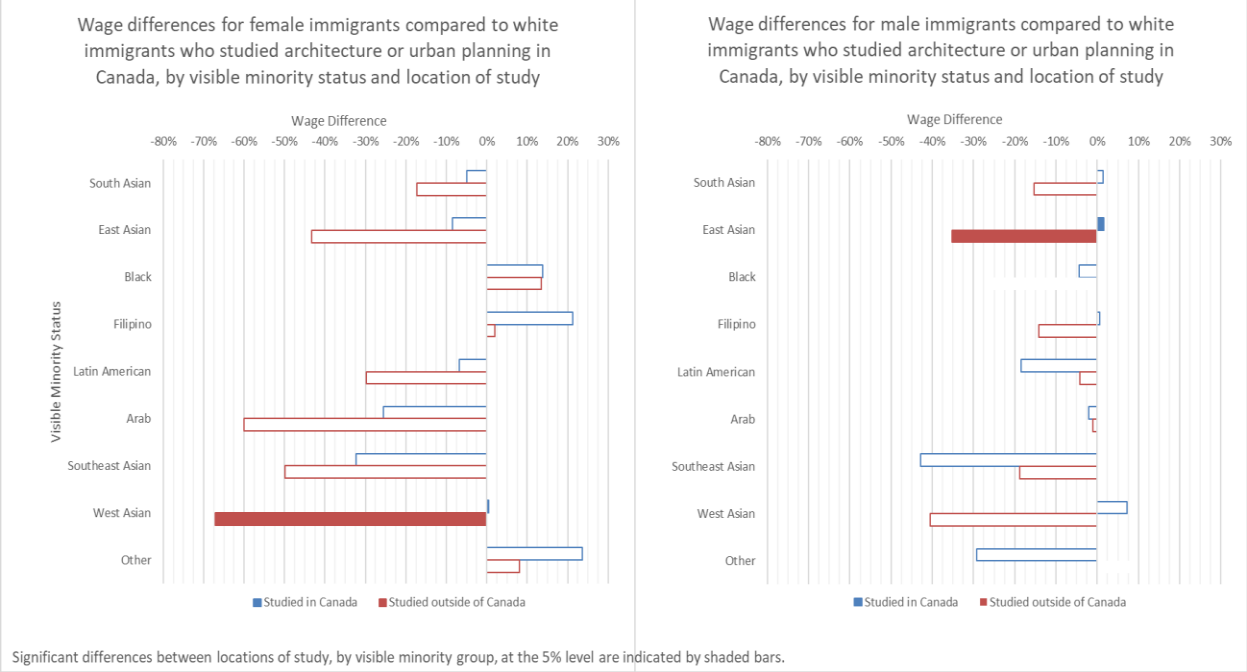


Table 4: Regression outputs of the interaction term for immigrants who studied education

Education								
Sex	Visible Minority Status	Studied in Canada			Studied outside of Canada			†
		Coefficient (log units)	SE	Significance	Coefficient (log units)	SE	Significance	
Female	Not a visible minority	*(Comparison)*			-0.200	0.03	***	
	South Asian	0.002	0.04		-0.502	0.04	***	†
	East Asian	0.066	0.04	*	-0.528	0.04	***	†
	Black	0.044	0.04		-0.207	0.06	***	†
Sum of weights = 52,965	Filipino	-0.033	0.09		-0.227	0.04	***	†
Adj R^2 = 0.1697	Latin American	-0.066	0.07		-0.484	0.06	***	†
Prob > F = 0	Arab	-0.189	0.06	***	-0.443	0.07	***	†
	Southeast Asian	-0.053	0.11		-0.378	0.10	***	†
	West Asian	-0.027	0.09		-0.644	0.09	***	†
	Other	0.055	0.08		-0.065	0.10		
Male	Not a visible minority	*(Comparison)*			-0.075	0.05		
	South Asian	-0.078	0.08		-0.523	0.07	***	†
	East Asian	-0.166	0.07	**	-0.515	0.09	***	†
	Black	-0.014	0.06		-0.196	0.08	**	
Sum of weights = 14,690	Filipino	0.067	0.13		-0.333	0.07	***	†
Adj R^2 = 0.1714	Latin American	-0.127	0.12		-0.540	0.11	***	†
Prob > F = 0	Arab	0.011	0.10		-0.365	0.11	***	†
	Southeast Asian	-0.126	0.15		-0.525	0.17	***	
	West Asian	-0.109	0.19		-0.628	0.15	***	†
	Other	0.038	0.11		-0.300	0.16	*	
The † symbol denotes a significant difference between the wages for a visible minority group based on location of study.								
p < 0.01 = ***; p < 0.05 = **; p < 0.1 = *								
Source: 2016 Census of Canada								
Sample: Immigrants, ages 20-64, with a bachelor's degree or higher, who immigrated to Canada at ages 20-34, and who worked for wages in the reference week								

Education is a female-dominated profession, resulting in more observations for women than for men, with more significant results for women. Female immigrants who have degrees in education earn lower wages if they studied outside of Canada for nearly all visible minority groups, including white immigrants, ranging from 20% to 64.4% less than a white immigrant who studied in Canada. If their highest degree was obtained in Canada, only Arab female immigrants face wage penalties, earning 18.9% less than a comparable white immigrant, while East Asian female

immigrants are expected to earn slightly more – 6.6%. There are significant differences in wages by location of study for all visible minority female immigrants, except for those who identify their visible minority status as "other".

There are fewer significant results for men. All male immigrant educators who studied outside of Canada earn relatively less than a white immigrant who studied in Canada, except for white immigrants. Their wage penalties range from 19.6% to 62.8% less than a white immigrant who studied in Canada. East Asian men are the only visible minority group expected to earn less than a comparable white immigrant if they have Canadian education, with wage penalties of 16.6%. There are no statistically significant penalties for foreign credential recognition for Black, Southeast Asian, and "other" visible minority men, but all other visible minority groups face significant wage differences for their foreign education. Figure 4 below shows the significant differences between the visible minority groups based on location of study.

Figure 4: Wage differences for immigrants compared to white immigrants who studied education in Canada, by sex, visible minority status, and location of study

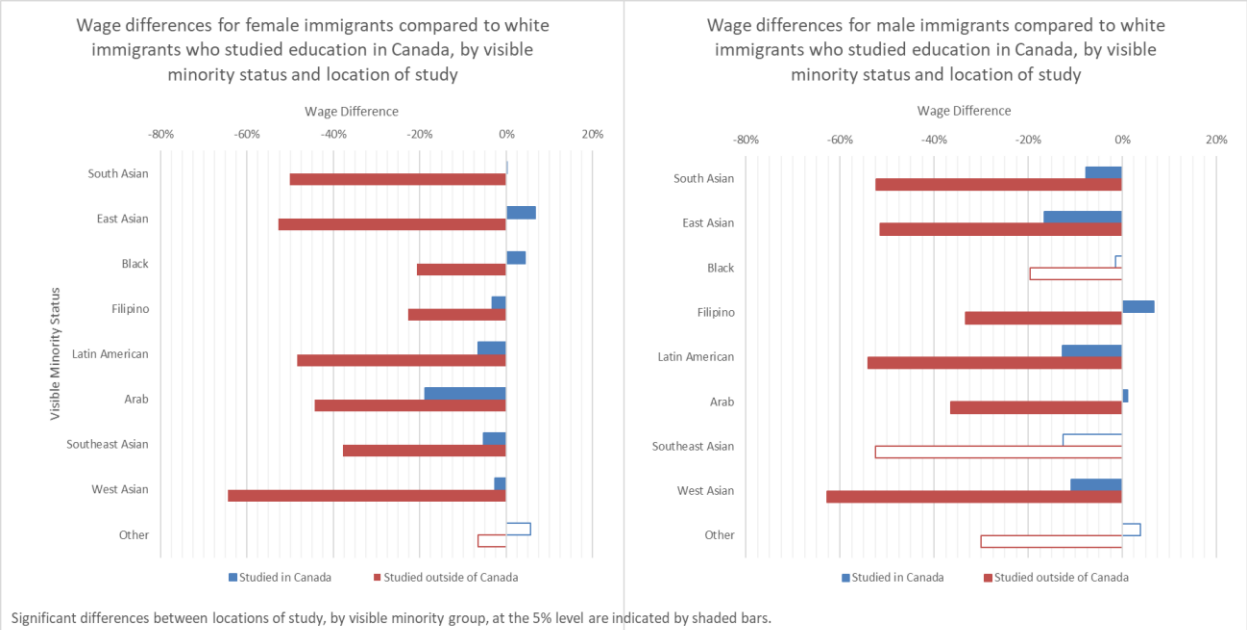


Table 5: Regression outputs of the interaction term for immigrants who studied engineering or geoscience

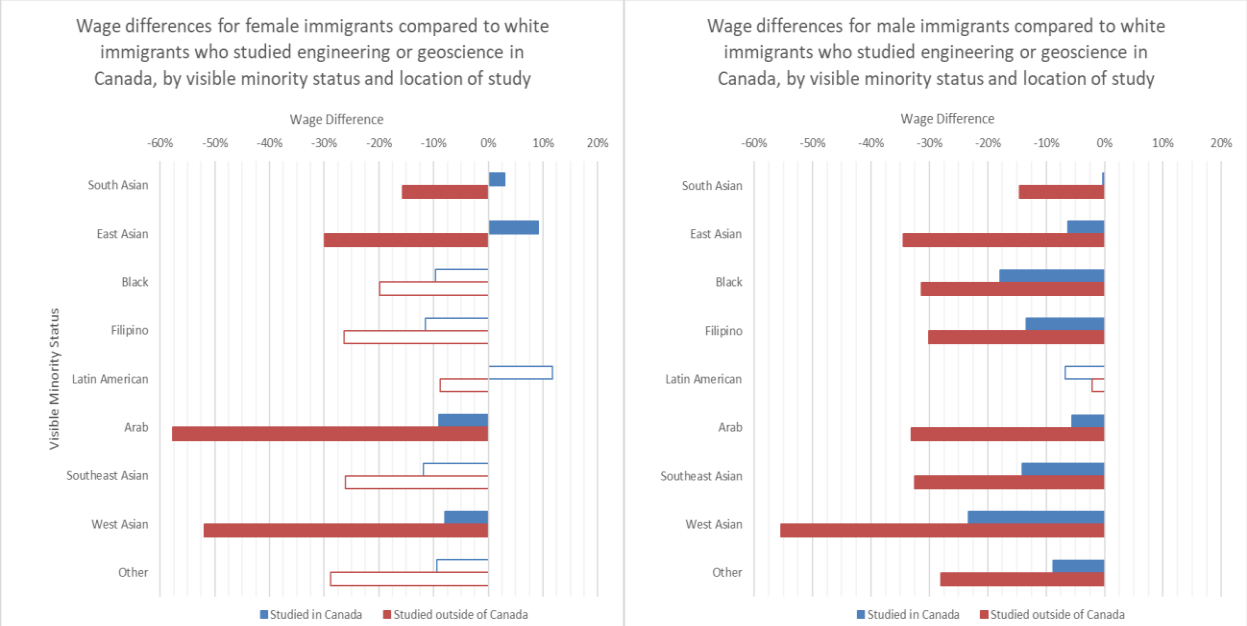
Engineering/Geoscience								
Sex	Visible Minority Status	Studied in Canada			Studied outside of Canada			†
		Coefficient (log units)	SE	Significance	Coefficient (log units)	SE	Significance	
Female	Not a visible minority	*(Comparison)*			-0.131	0.05	***	
	South Asian	0.030	0.06		-0.157	0.06	***	†
	East Asian	0.092	0.05	*	-0.299	0.05	***	†
	Black	-0.096	0.09		-0.199	0.11	*	
Sum of weights = 47,320	Filipino	-0.115	0.13		-0.264	0.06	***	
Adj R^2 = 0.1355	Latin American	0.117	0.09		-0.088	0.06		
Prob > F = 0	Arab	-0.090	0.08		-0.577	0.07	***	†
	Southeast Asian	-0.118	0.11		-0.262	0.15	*	
	West Asian	-0.079	0.07		-0.520	0.07	***	†
	Other	-0.094	0.15		-0.288	0.11	***	
Male	Not a visible minority	*(Comparison)*			0.010	0.02		
	South Asian	-0.002	0.02		-0.145	0.02	***	†
	East Asian	-0.062	0.02	***	-0.345	0.02	***	†
	Black	-0.179	0.04	***	-0.314	0.04	***	†
Sum of weights = 184,345	Filipino	-0.134	0.07	**	-0.301	0.03	***	†
Adj R^2 = 0.1290	Latin American	-0.067	0.05		-0.021	0.03		
Prob > F = 0	Arab	-0.056	0.03	*	-0.330	0.03	***	†
	Southeast Asian	-0.141	0.05	***	-0.325	0.07	***	†
	West Asian	-0.234	0.04	***	-0.554	0.03	***	†
	Other	-0.089	0.06		-0.280	0.05	***	†
The † symbol denotes a significant difference between the wages for a visible minority group based on location of study.								
p < 0.01 = ***; p < 0.05 = **; p < 0.1 = *								
Source: 2016 Census of Canada								
Sample: Immigrants, ages 20-64, with a bachelor's degree or higher, who immigrated to Canada at ages 20-34, and who worked for wages in the reference week								

Out of the selected fields of study, engineering and geoscience had the largest sample size. It is a highly male-dominated profession, although Canada has also accepted a large number of female immigrants in this field. Female visible minority immigrants who studied engineering and geoscience in Canada universally do not face wage penalties compared to white immigrants who studied in Canada. East Asian female immigrants earn 9.2% more than a white immigrant. The results for women who study engineering and geoscience outside of Canada are not as positive. All groups (except for Latin American women, for whom there are no significant results) earn less

than the comparison group. Arab and West Asian female immigrants who studied outside of Canada are expected to earn 57.7% and 52% less, respectively, than white female immigrants who studied in Canada, while the remaining groups earn between 13.1% and 29.9% less. The only statistically significant results for differences between the groups based on location of study are for South Asian, East Asian, Arab, and West Asian female immigrants; there are significant wage penalties for these groups if they study outside of Canada.

Almost all interaction term coefficients are significant for male immigrant professionals. Of the visible minority groups that studied in Canada, only South Asian, Latin American, Arab, and "other" visible minority status immigrants did not have significant results. All remaining visible minority groups earn relatively less than white immigrants who studied in Canada. All results, apart from white and Latin American immigrants, are significant for immigrants who studied outside of Canada and the differences between these groups and those who studied in Canada are statistically significant. Figure 5 shows the significant differences in wages for male and female visible minority immigrants by location of study.

Figure 5: Wage differences for immigrants compared to white immigrants who studied engineering or geoscience in Canada, by sex, visible minority status, and location of study



Significant differences between locations of study, by visible minority group, at the 5% level are indicated by shaded bars.

Table 6: Regression outputs of the interaction term for immigrants who studied law

Law								
Sex	Visible Minority Status	Studied in Canada			Studied outside of Canada			†
		Coefficient (log units)	SE	Significance	Coefficient (log units)	SE	Significance	
Female	Not a visible minority	*(Comparison)*			-0.238	0.07	***	
	South Asian	-0.124	0.11		-0.621	0.10	***	†
	East Asian	-0.011	0.10		-0.470	0.10	***	†
	Black	-0.329	0.10	***	-0.621	0.11	***	†
Sum of weights = 11,705	Filipino	-0.054	0.28		-0.196	0.21		
Adj R^2 = 0.1890	Latin American	-0.304	0.17	*	-0.741	0.11	***	†
Prob > F = 0	Arab	-0.296	0.16	*	-0.822	0.12	***	†
	Southeast Asian	0.055	0.26		-0.200	0.22		
	West Asian	-0.002	0.16		-0.942	0.20	***	†
	Other	0.165	0.20		-0.870	0.23	***	†
Male	Not a visible minority	*(Comparison)*			-0.154	0.09	*	
	South Asian	-0.144	0.11		-0.799	0.10	***	†
	East Asian	-0.150	0.13		-0.487	0.12	***	
	Black	-0.444	0.13	***	-0.575	0.13	***	
Sum of weights = 9830	Filipino	-0.545	0.43		-0.555	0.17	***	
Adj R^2 = 0.1864	Latin American	-0.062	0.23		-0.301	0.13	**	
Prob > F = 0	Arab	0.132	0.19		-0.675	0.12	***	†
	Southeast Asian	-0.436	0.36		-1.059	0.31	***	
	West Asian	-0.669	0.20	***	-0.593	0.20	***	
	Other	-0.074	0.30		-0.653	0.26	**	
The † symbol denotes a significant difference between the wages for a visible minority group based on location of study.								
p < 0.01 = ***; p < 0.05 = **; p < 0.1 = *								
Source: 2016 Census of Canada								
Sample: Immigrants, ages 20-64, with a bachelor's degree or higher, who immigrated to Canada at ages 20-34, and who worked for wages in the reference week								

All male immigrants and almost all female immigrants who studied law outside of Canada face wage penalties compared to immigrants who studied law in Canada. All of the results for this field and study location are significant, despite a much smaller sample size relative to some of the other fields of study. This is not an unexpected result, considering lawyers working in Canada are expected to be knowledgeable about Canadian laws, which would be unlikely to be the case for someone who obtained a law degree outside of Canada.

Female lawyers who studied in Canada had few significant results; only Black female immigrants who studied law in Canada faced a highly significant wage penalty, at 32.9%. Latin American and Arab female immigrants who studied in Canada have weakly significant results, earning 30.4% and 29.6% less, respectively. Female immigrants who studied law outside of Canada had several significant results, however. Except for Filipinos and Southeast Asians, for whom there are no significant findings, all female immigrants who studied law outside of Canada faced substantial wage penalties – a range of 23.8% and 94.2% less than a comparable white immigrant who studied in Canada, with most earning at least 60% less – as well as significant penalties when compared to female immigrants who studied law in Canada.

There are significant wage penalties for Black and West Asian male immigrants who study law in Canada and all groups who study outside of Canada also have significant penalties. Unusually, West Asian men who study law outside of Canada earn relatively more than West Asian men who study law in Canada (7.6% more) when compared to white immigrants who study law in Canada. However, they still earn 59.3% less than a comparable white immigrant. The only significant results based on differences in location of study for male immigrants who study law are for the South Asian and Arab visible minority groups. Figure 6 shows the significant differences between the visible minority groups based on location of study.

Figure 6: Wage differences for immigrants compared to white immigrants who studied law in Canada, by sex, visible minority status, and location of study

Table 7: Regression outputs of the interaction term for immigrants who studied social work

Social Work								
Sex	Visible Minority Status	Studied in Canada			Studied outside of Canada			†
		Coefficient (log units)	SE	Significance	Coefficient (log units)	SE	Significance	
Female	Not a visible minority	*(Comparison)*			-0.174	0.09	**	
	South Asian	0.098	0.10		-0.539	0.10	***	†
	East Asian	0.037	0.10		-0.474	0.13	***	†
	Black	-0.010	0.07		-0.329	0.16	**	
Sum of weights = 7395	Filipino	0.059	0.21		-0.066	0.12		
Adj R^2 = 0.1630	Latin American	0.007	0.11		-0.099	0.16		
Prob > F = 0	Arab	-0.073	0.19		-0.357	0.26		
	Southeast Asian	0.143	0.19		-0.113	0.52		
	West Asian	0.196	0.18		0.014	0.33		
	Other	0.165	0.15		-0.222	0.36		
Male	Not a visible minority	*(Comparison)*			0.306	0.21		
	South Asian	0.316	0.25		0.100	0.20		
	East Asian	0.511	0.24	**	0.316	0.26		
	Black	0.159	0.17		0.265	0.26		
Sum of weights = 2085	Filipino	0.086	0.48		0.524	0.35		
Adj R^2 = 0.0698	Latin American	0.241	0.34		-0.740	0.61		
Prob > F = 0.0005	Arab	0.712	0.41	*	-0.169	0.34		
	Southeast Asian	-0.211	0.46		0.497	0.63		
	West Asian	0.543	0.46		0.472	0.95		
	Other	0.544	0.56		0.370	0.60		
The † symbol denotes a significant difference between the wages for a visible minority group based on location of study.								
p < 0.01 = ***; p < 0.05 = **; p < 0.1 = *								
Source: 2016 Census of Canada								
Sample: Immigrants, ages 20-64, with a bachelor's degree or higher, who immigrated to Canada at ages 20-34, and who worked for wages in the reference week								

The field of social work has the second-smallest total sample size of the selected fields of study. The group of male immigrants who studied social work is the smallest sample across all of the considered fields – approximately one-third the size of the next-smallest sample – and so these regressions have few significant results. The adjusted R^2 value for males, at 6.98%, is also the lowest among all the regressions. For female immigrants, none of the visible minority groups that studied in Canada have coefficients that are statistically different from zero. There are four

significant results for female immigrants who studied social work outside of Canada – the results indicate that there are wage penalties for white, South Asian, East Asian, and Black immigrants (17.4%, 47.2%, 48.4%, and 29.7% less, respectively, than a white immigrant who studied in Canada). Of these four groups, only South and East Asian female immigrants face significant penalties for studying outside of Canada, compared to South and East Asian immigrants who study in Canada.

The only significant results for male immigrants are for those who study in Canada; there are no significant results for male immigrants who study social work outside of Canada. Male East Asian immigrants who study in Canada are expected to earn 51.1% more than the comparison group, while male Arab immigrants who study in Canada are expected to earn 71.2% more, although the result is only weakly significant. Figure 7 shows the significant differences in wages for male and female visible minority immigrants by location of study.

Figure 7: Wage differences for immigrants compared to white immigrants who studied social work in Canada, by sex, visible minority status, and location of study

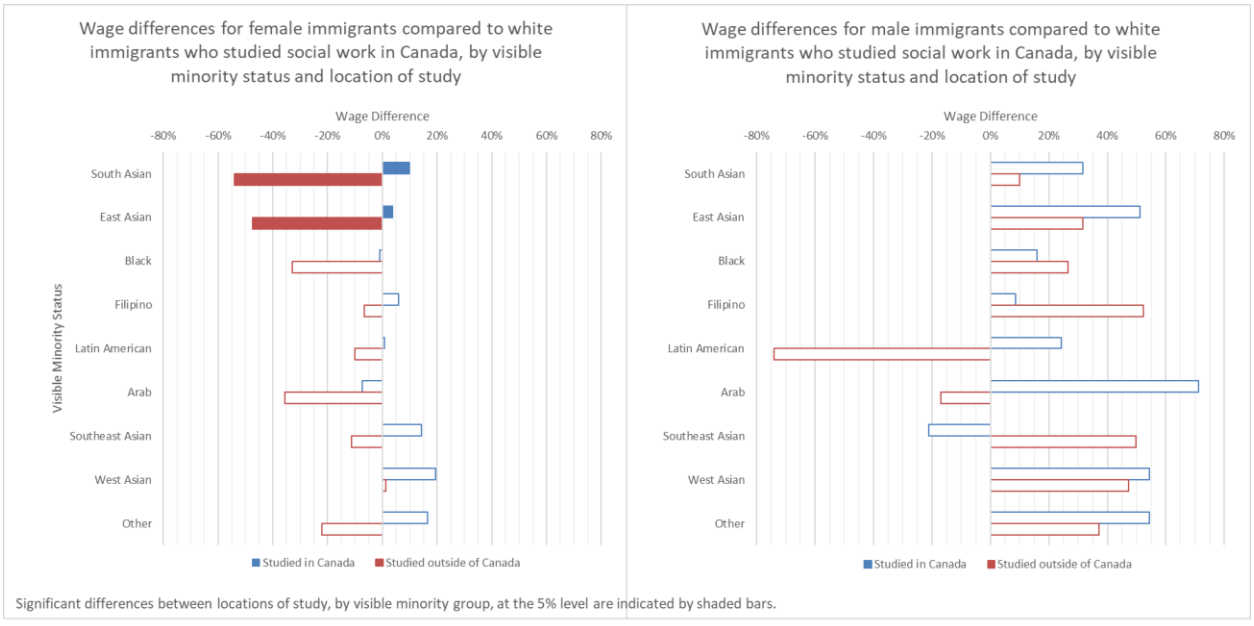


Table 8: Regression outputs of the interaction term for immigrants who studied health care

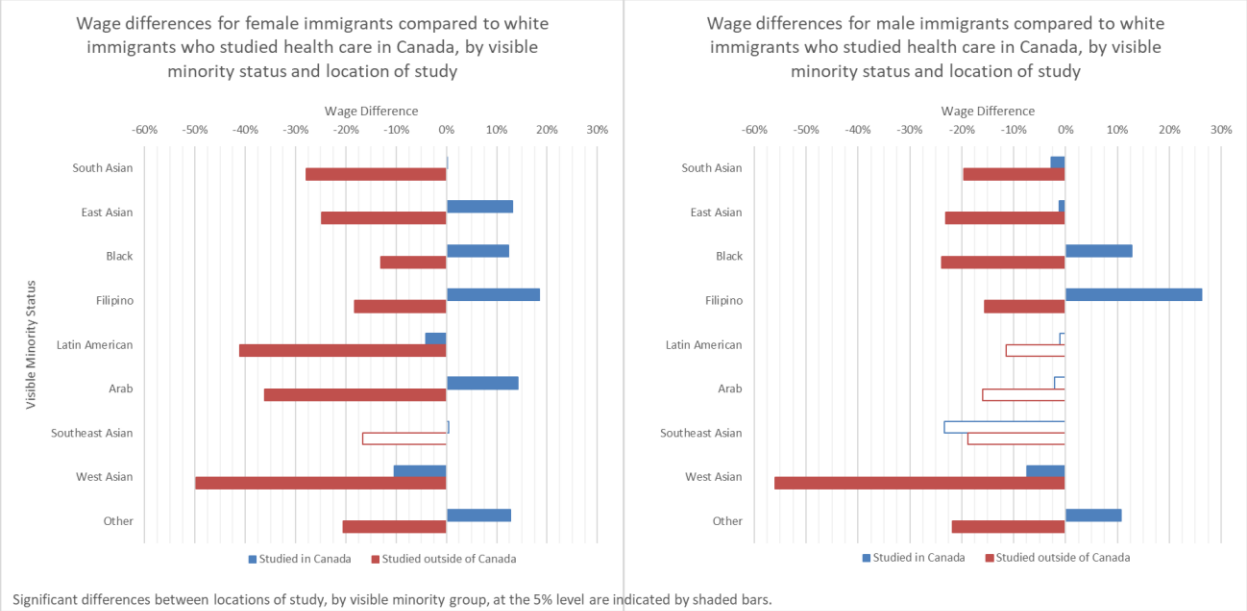
Health Care								
Sex	Visible Minority Status	Studied in Canada			Studied outside of Canada			†
		Coefficient (log units)	SE	Significance	Coefficient (log units)	SE	Significance	
Female	Not a visible minority	*(Comparison)*			-0.070	0.03	**	
	South Asian	0.002	0.04		-0.278	0.03	***	†
	East Asian	0.132	0.03	***	-0.247	0.04	***	†
	Black	0.123	0.04	***	-0.131	0.06	**	†
Sum of weights = 89,125	Filipino	0.184	0.04	***	-0.183	0.03	***	†
Adj R^2 = 0.1266	Latin American	-0.041	0.07		-0.411	0.06	***	†
Prob > F = 0	Arab	0.143	0.07	**	-0.362	0.05	***	†
	Southeast Asian	0.005	0.06		-0.167	0.09	*	
	West Asian	-0.104	0.07		-0.498	0.06	***	†
	Other	0.127	0.07	*	-0.205	0.07	***	†
Male	Not a visible minority	*(Comparison)*			0.087	0.05	*	
	South Asian	-0.027	0.06		-0.196	0.05	***	†
	East Asian	-0.012	0.05		-0.231	0.06	***	†
	Black	0.128	0.08		-0.238	0.07	***	†
Sum of weights = 46,060	Filipino	0.263	0.09	***	-0.156	0.05	***	†
Adj R^2 = 0.1366	Latin American	-0.010	0.13		-0.114	0.09		
Prob > F = 0	Arab	-0.021	0.08		-0.160	0.06	***	
	Southeast Asian	-0.233	0.11	**	-0.188	0.14		
	West Asian	-0.074	0.09		-0.560	0.08	***	†
	Other	0.107	0.12		-0.218	0.11	**	†
The † symbol denotes a significant difference between the wages for a visible minority group based on location of study.								
p < 0.01 = ***; p < 0.05 = **; p < 0.1 = *								
Source: 2016 Census of Canada								
Sample: Immigrants, ages 20-64, with a bachelor's degree or higher, who immigrated to Canada at ages 20-34, and who worked for wages in the reference week								

For female immigrants who study health care, all of the significant results for the interaction term show wage increases for visible minority groups who studied in Canada, relative to white immigrants who studied in Canada. There are no wage penalties observed for any female visible minority groups who studied health care in Canada. Conversely, all female immigrant health workers who studied outside of Canada face wage penalties, for both visible minorities and non-visible minorities. However, these penalties are not as severe as they are in other fields of

study; the largest wage penalty is 49.8% for West Asian women. There are statistically significant differences in wages for all groups who study outside of Canada compared to those that study in Canada, with the exception of Southeast Asian female immigrants.

There are only two significant results for visible minority immigrant men who studied health care in Canada – Filipino men can be expected to earn 26.3% more than a white male immigrant who studied health care in Canada and Southeast Asian men can be expected to earn 23.3% less. No other group has statistically significant results if they studied in Canada. Latin American and Southeast Asian immigrants who study outside of Canada do not have statistically significant results compared to white immigrants who study in Canada, but all other visible minority groups face wage penalties, ranging from a 15.6% penalty for Filipino immigrants to a 56% penalty for West Asian immigrants. There is a weakly significant wage increase for white immigrants who study health care outside of Canada. Latin American, Arab, and Southeast Asian male immigrants do not have statistically significant differences in wages for studying outside of Canada compared to those who study in Canada; all remaining visible minority groups do have significantly different wages when foreign credential recognition is required. Figure 8 shows the significant differences between the visible minority groups based on location of study.

Figure 8: Wage differences for immigrants compared to white immigrants who studied health care in Canada, by sex, visible minority status, and location of study



V. Discussion

These findings do not intend to justify or explain a causal relationship between foreign credential recognition requirements and wage penalties, but rather to provide possible explanations for some of the characteristics of the data and results. The limits on the sample for this analysis eliminate some explanations for lower wages among immigrants with foreign education; for example, it only includes immigrants that were working at the time of the census, so the lower wages are not due to zero values. Management-level employees were excluded from the occupation data, so failure to advance within one's profession is also likely not a plausible explanation for these lower earnings. This leaves two plausible explanations: either foreign-educated immigrants are being paid less for their work than Canadian-educated immigrants, or they are failing to obtain work in their field and are consequently employed in positions that do not pay as well. The evidence therefore suggests that skilled and educated professional immigrants with degrees from outside of

Canada are either facing discrimination or underemployment in Canada's labour market, providing support to the theory of 'brain waste' in Canada.

This analysis, unfortunately, cannot speak to the effect that foreign credential recognition may have on pushing immigrants out of the labour market entirely, as unemployed individuals were not included in the sample. It also does not consider any differences between regions where immigrants obtain their schooling. For example, is a West Asian immigrant equally worse off obtaining their degree in West Asia versus Western Europe? Further, it is not able to distinguish between immigrants who 'upskill' in a certain element of their field of study and those who have to re-train entirely to obtain foreign credential recognition. The former is a relatively minor barrier to obtaining full employment in Canada, while the latter can be a time-consuming and expensive burden.

When all fields of study are considered together, as they are in Table 2, the results show that visible minority immigrants who study abroad in the selected fields of study almost always earn less than visible minority immigrants who study in Canada. White immigrants generally experience smaller wage penalties than visible minority immigrants. These results lend support to the possibility of ethnic discrimination towards immigrants in the Canadian labour market. Ethnic discrimination could contribute to either of the potential causes of wage differences discussed above, i.e., immigrants could be receiving lower wages because of their ethnicity, or their ethnicity could prevent them from obtaining a high-level position commensurate with their skill set, resulting in underemployment. The qualitative research on the subject of foreign credential recognition suggests that underemployment is primarily due to immigrants' difficulties in obtaining foreign credential recognition from a professional body and their province of residence – it is unknown whether ethnic discrimination plays a role in this aspect.

There are also significant wage differences between immigrants of the same ethnicity educated in Canada and those educated outside of Canada, holding all other considered variables constant, particularly in the fields of education, engineering and geoscience, law, and health care. There is less clear evidence of wage penalties for immigrants who studied abroad in the fields of architecture and urban planning and social work; however, this is likely due to a small number of cases relative to the other fields of study. Additionally, women earn substantially less than men across most visible minority status groups.

Immigrants who upgrade their skills or obtain additional education after their arrival in Canada fare better than immigrants who do not. This additional Canadian education likely signals an immigrant's future productivity to employers (Banerjee and Lee 2015, 207); e.g., that an immigrant is knowledgeable and educated, familiar with the relevant Canadian system for their field of study, and proficient in at least one of the official languages. However, upgrading skills or pursuing additional degrees or certifications are impossible options for some immigrants, especially women with children, who are typically burdened with childcare and other unpaid domestic responsibilities. The federal and provincial governments may then want to consider policies geared towards female professionals. Women not only face lower wages than men generally but also earn relatively less when the effects of foreign credential recognition are considered. Policies that make specialized services such as childcare, stipends, and language training available to immigrant women who pursue additional education to upgrade existing skills or are in the process of recertifying their foreign credentials in Canada could improve wages for women overall.

Based on the results of this analysis, immigrants with degrees in the field of health care have the most to gain by 'upskilling' in Canada. Several visible minority groups of female

immigrants who studied health care in Canada earn relatively more than comparable white immigrants, results that are rarely seen in other fields of study. Male visible minority immigrants who study health care in Canada face almost no statistically significant differences in wages than comparable white immigrants, with only one group (Southeast Asian immigrants) earning less than the comparison group. As health care has one of the largest sample sizes in the analysis, the lack of significance on these results would not stem from insufficient evidence from the data, unlike the results from architecture and urban planning or social work. This indicates that there is limited ethnic discrimination among immigrant health care workers educated in Canada. Conversely, all visible minority groups who study health care outside of Canada face significant wage penalties, with the exception of male white immigrants, who earn slightly more. If programs facilitating re-training or 'upskilling' for immigrants were to be targeted towards a specific field, health care would be a logical option to maximize wage gains for immigrant professionals.

Additional research may also be warranted to examine the wage penalties that West Asian and Arab immigrants face in Canada's labour market. West Asian immigrants who studied outside of Canada have among the largest wage penalties of any visible minority group. These immigrants also tend to face wage penalties even if they had completed education in Canada, while other groups typically have equivalent or only slightly lower wages compared to white immigrants if they re-train in Canada. The penalties for these two groups also appear to disproportionately affect women. Further qualitative research about labour market opportunities for Arab and West Asian immigrants could be beneficial in addressing their wage gaps.

VI. Conclusion

These results are consistent with the broader literature on immigrant wages and credential recognition in Canada, namely that immigrants with degrees that require foreign credential recognition face a wage penalty compared to immigrants with Canadian degrees, similar to Banerjee and Lee (2015), Basran and Zong (1998), Buhr (2010), Hum and Simpson (1999), Reitz (2001), and Wanner (1998), who all established that immigrants' earnings are negatively associated with foreign education and work experience. The results also strongly support the literature related to female immigrants' wages and expected professional opportunities in Canada, similar to Banerjee and Verma (2012), Basran and Zong (1998), Salaff and Greve (2003), and Walsh, Brigham, and Wang (2011), who found that female immigrants face larger wage penalties than male immigrants.

Much of the literature on the subject of foreign credential recognition in Canada dates back to the 1990s and early 2000s. The results from this analysis find similar results to much of the earlier literature, indicating that little has changed for immigrant professionals in the Canadian labour market over the past two decades. While the degree of the wage penalty associated with foreign credential recognition is difficult to ascertain, as no other study included in the literature review used this dataset or sample, it seems clear that – with few exceptions – immigrants who require foreign credential recognition in Canada continue to earn lower wages than immigrants who obtain post-secondary education from Canadian institutions.

It is not clear whether this devaluation of immigrants' skills is occurring at the employer, provincial, or professional organization level, or a combination of all three. Nonetheless, the findings support the theory of 'brain waste' and have negative implications for immigrants who settle in Canada, in addition to the Canadian economy as a whole. The qualitative literature on this

subject suggests that highly-skilled immigrants who try and fail to find work in their field experience emotional, mental, and financial distress associated with discrimination and underemployment. At the same time, the premise of Canada's points system is to bring highly-skilled individuals into the country to fill labour market gaps; if these individuals are not employed in positions that are commensurate with their skill set, then the effectiveness of this system is undermined.

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Appendix A

The regressions were performed in Stata; the code below is the syntax from the Stata do-file.

```
use "P:\18-PRGSSH-COOL-5383-S001\Clara\data\working file.dta"
```

The following lines limit the data to the desired sample – immigrants (ImmDer == 2), aged 20-64, who immigrated between the ages of 20 and 35.

```
keep if ImmDer == 2 & ///
age > 19 & age < 65 & ///
Age_Imm > 19 & Age_Imm < 35
```

The "RECODES" section modifies certain variables from the census to run the regressions more easily.

```
*** RECODES

* Recode of LOC_STUDY
** Studied in/outside of Canada
recode LOC_STUDY (11010/11062 = 0 "Studied in Canada") ///
                 (11304/51882 = 1 "Studied outside of Canada") ///
                 , gen(study_location)


* Recode of DVisMin
** Visible minority status
** Dropping "Aboriginal" status
recode DVisMin (13 = 0 "Not a visible minority") ///
                (1 = 1 "South Asian") ///
                (2 9 10 = 2 "East Asian") ///
                (3 = 3 "Black") ///
                (4 = 4 "Filipino") ///
                (5 = 5 "Latin American") ///
                (6 = 6 "Arab") ///
                (7 = 7 "Southeast Asian") ///
                (8 = 8 "West Asian") ///
                (11 12 = 9 "Other") ///
                (14 = .) ///
                , gen(vismin)

* Recode of PTs
** Dropping territories
mvdecode pr, mv(60 / 62 = .)

* Recode of Hours_No_Zeros
** 0 hrs of work or > 0 hrs of work
recode Hours_No_Zeros (0 = 0 "No hours of work") ///
                      (1 / 168 = 1 "> 0 hours") ///
```

```
                        , gen(hrs_worked)


* Generation of credential variable, by field
** Health care includes residencies (1482 / 1636)
** Management-level occupations excluded
recode CIP2011 (90 91 94 97 = 1 "Architecture & urban planning") ///
                        (246 / 251 271 / 341 = 2 "Education") ///
                        (346 348 / 398 829 830 833 835 = 3 "Engineering & geoscience") ///
                        (581 583 / 596 = 4 "Law") ///
                        (925 927 = 5 "Social work") ///
                        (1127 1129 / 1151 1188 / 1199 1201 / 1222 1233 / 1237 1241 1243 ///
                        1245 / 1261 1264 / 1272 1274 1275 1281 1284 1289 / 1302 1324 ///
                        1339 / 1363 1366 1482 / 1636 = 6 “Health care”) ///
                        (nonm = 0 "Does not require credential recognition") ///
                        , gen(credential_fos)

** New variables
gen lnwages = ln(Wages)
gen freqwgt = round(CompW2)
gen age_sq = age ^ 2

*** WAGE REGRESSIONS
** All fields
```

The regressions include the dependent variable (lnwages), followed by the codes for the independent variables, as well as additional restrictions on the sample (these follow the ‘if’ term - bachelor’s degree or higher and worked at least one hour in the reference week). ‘bysort Sex’ runs the regressions separately for males and females. The weight term is included in square brackets, aw = CompW2.

```
bysort Sex: regress lnwages i.HCDD_14V age age_sq Age_Imm ib(35).pr ///
                        i.oln i.study_location#i.vismin [aw = CompW2] ///
                        if HCDD_14V > 5 & hrs_worked > 0

** [1] Architecture and urban planning
bysort Sex: regress lnwages i.HCDD_14V age age_sq Age_Imm ib(35).pr ///
                        i.oln i.study_location#i.vismin [aw = CompW2] ///
                        if HCDD_14V > 5 & credential_fos == 1 & hrs_worked > 0

** [2] Education
bysort Sex: regress lnwages i.HCDD_14V age age_sq Age_Imm ib(35).pr ///
                        i.oln i.study_location#i.vismin [aw = CompW2] ///
                        if HCDD_14V > 5 & credential_fos == 2 & hrs_worked > 0

** [3] Engineering
bysort Sex: regress lnwages i.HCDD_14V age age_sq Age_Imm ib(35).pr ///
```

```
                    i.oln i.study_location#i.vismin [aw = CompW2] ///
                    if HCDD_14V > 5 & credential_fos == 3 & hrs_worked > 0

** [4] Law
bysort Sex: regress lnwages i.HCDD_14V age age_sq Age_Imm ib(35).pr ///
                    i.oln i.study_location#i.vismin [aw = CompW2] ///
                    if HCDD_14V > 5 & credential_fos == 4 & hrs_worked > 0

** [5] Social work
bysort Sex: regress lnwages i.HCDD_14V age age_sq Age_Imm ib(35).pr ///
                    i.oln i.study_location#i.vismin [aw = CompW2] ///
                    if HCDD_14V > 5 & credential_fos == 5 & hrs_worked > 0

** [6] Health care
bysort Sex: regress lnwages i.HCDD_14V age age_sq Age_Imm ib(35).pr ///
                    i.oln i.study_location#i.vismin [aw = CompW2] ///
                    if HCDD_14V > 5 & credential_fos == 6 & hrs_worked > 0

*** WEIGHTED TABS
** All
```

The first line of code for each field of study shows the number of immigrants by location of study and visible minority status overall, while the second line of code shows the numbers separately for males and females. The frequency weight, fw = freqwgt, is included in square brackets.

```
tab vismin study_location if hrs_worked > 0 & HCDD_14V > 5 ///
[fw = freqwgt]

bysort Sex: tab vismin study_location if hrs_worked > 0 & HCDD_14V > 5 ///
[fw = freqwgt]

** [1] Architecture & urban planning
tab vismin study_location if hrs_worked > 0 & HCDD_14V > 5 & ///
credential_fos == 1 [fw = freqwgt]

bysort Sex: tab vismin study_location if hrs_worked > 0 & HCDD_14V > 5 & ///
credential_fos == 1 [fw = freqwgt]

** [2] Education
tab vismin study_location if hrs_worked > 0 & HCDD_14V > 5 & ///
credential_fos == 2 [fw = freqwgt]

bysort Sex: tab vismin study_location if hrs_worked > 0 & HCDD_14V > 5 & ///
credential_fos == 2 [fw = freqwgt]
```

```
** [3] Engineering & geoscience
tab vismin study_location if hrs_worked > 0 & HCDD_14V > 5 & ///
credential_fos == 3 [fw = freqwgt]

bysort Sex: tab vismin study_location if hrs_worked > 0 & HCDD_14V > 5 & ///
credential_fos == 3 [fw = freqwgt]

** [4] Law
tab vismin study_location if hrs_worked > 0 & HCDD_14V > 5 & ///
credential_fos == 4 [fw = freqwgt]

bysort Sex: tab vismin study_location if hrs_worked > 0 & HCDD_14V > 5 & ///
credential_fos == 4 [fw = freqwgt]

** [5] Social work
tab vismin study_location if hrs_worked > 0 & HCDD_14V > 5 & ///
credential_fos == 5 [fw = freqwgt]

bysort Sex: tab vismin study_location if hrs_worked > 0 & HCDD_14V > 5 & ///
credential_fos == 5 [fw = freqwgt]

** [6] Health care
tab vismin study_location if hrs_worked > 0 & HCDD_14V > 5 & ///
credential_fos == 6 [fw = freqwgt]

bysort Sex: tab vismin study_location if hrs_worked > 0 & HCDD_14V > 5 & ///
credential_fos == 6 [fw = freqwgt]
```

Appendix B

The following tables show the full regression outputs for each field of study.

Architecture/Urban Planning		Prob > F	0		Prob > F	0
	n = 6075	Adj R^2	0.1014	n = 9120	Adj R^2	0.1369
	Female			Male		
ln(Wages)	Coefficient (log units)	SE	t	Coefficient (log units)	SE	t
Age	0.163	0.024	6.77	0.210	0.017	12.30
Age^2	-0.002	0.000	-5.73	-0.002	0.000	-11.04
Age at Immigration	-0.014	0.004	-3.82	-0.018	0.002	-7.53
Highest Degree Obtained						
Bachelor's degree	*(Comparison)*			*(Comparison)*		
University certificate/diploma above bachelor's degree	0.139	0.114	1.21	-0.130	0.076	-1.72
Master's degree	0.000	0.066	0	0.056	0.049	1.14
Ph.D.	-0.118	0.202	-0.58	0.218	0.139	1.57
Degree in medicine, dentistry, or veterinary medicine	N/A	N/A	N/A	N/A	N/A	N/A
Province of Residence						
Ontario	*(Comparison)*			*(Comparison)*		
Newfoundland and Labrador	0.643	0.763	0.84	N/A	N/A	N/A
Prince Edward Island	-0.187	0.811	-0.23	-1.274	1.002	-1.27
Nova Scotia	-0.252	0.342	-0.74	-0.107	0.359	-0.30
New Brunswick	-0.133	1.179	-0.11	-0.930	0.379	-2.46
Québec	-0.123	0.123	-1.01	-0.173	0.089	-1.95
Manitoba	-0.789	0.242	-3.26	-0.102	0.126	-0.81
Saskatchewan	-0.067	0.345	-0.19	0.115	0.184	0.62
Alberta	0.154	0.112	1.38	0.245	0.071	3.46
British Columbia	-0.147	0.077	-1.9	0.058	0.056	1.04
Official Language Knowledge						
English only	*(Comparison)*			*(Comparison)*		
French only	-0.239	0.201	-1.19	-0.270	0.144	-1.88
English and French	-0.112	0.102	-1.1	-0.055	0.078	-0.70
Neither English nor French	-0.206	0.401	-0.51	-0.312	0.243	-1.28
Study Location*Visible Minority Status						
Studied in Canada*Not a visible minority	*(Comparison)*			*(Comparison)*		
Studied in Canada*South Asian	-0.049	0.190	-0.26	0.014	0.130	0.11
Studied in Canada*East Asian	-0.085	0.123	-0.69	0.016	0.091	0.18
Studied in Canada*Black	0.138	0.253	0.54	-0.044	0.186	-0.24
Studied in Canada*Filipino	0.212	0.313	0.68	0.006	0.218	0.03
Studied in Canada*Latin American	-0.069	0.208	-0.33	-0.184	0.159	-1.16
Studied in Canada*Arab	-0.256	0.219	-1.17	-0.021	0.172	-0.12
Studied in Canada*Southeast Asian	-0.323	0.301	-1.07	-0.428	0.225	-1.90
Studied in Canada*West Asian	0.005	0.179	0.03	0.072	0.252	0.28
Studied in Canada*Other	0.236	0.241	0.98	-0.292	0.227	-1.29
Studied outside of Canada*Not a visible minority	-0.159	0.111	-1.42	0.077	0.083	0.92
Studied outside of Canada*South Asian	-0.173	0.154	-1.12	-0.152	0.120	-1.27
Studied outside of Canada*East Asian	-0.432	0.138	-3.13	-0.352	0.104	-3.40
Studied outside of Canada*Black	0.136	0.270	0.50	-0.270	0.158	-1.71
Studied outside of Canada*Filipino	0.020	0.161	0.12	-0.142	0.099	-1.43
Studied outside of Canada*Latin American	-0.298	0.147	-2.03	-0.042	0.113	-0.37
Studied outside of Canada*Arab	-0.600	0.166	-3.60	-0.011	0.110	-0.10
Studied outside of Canada*Southeast Asian	-0.499	0.483	-1.03	-0.189	0.276	-0.68
Studied outside of Canada*West Asian	-0.672	0.157	-4.27	-0.405	0.129	-3.13
Studied outside of Canada*Other	0.081	0.322	0.25	0.083	0.203	0.41
Constant	7.163	0.490	14.61	6.263	0.368	17.00
$p < 0.01$ = ***; $p < 0.05$ = **; $p < 0.1$ = *						
Source: 2016 Census of Canada						
Sample: Immigrants, ages 20-64, with a bachelor's degree or higher, who immigrated to Canada at ages 20-34, and who worked for wages in the reference week						

Education		Prob > F	0		Prob > F	0
	n = 52,965	Adj R^2	0.1697	n = 14,690	Adj R^2	0.1714
	Female			Male		
ln(Wages)	Coefficient (log units)	SE	t	Coefficient (log units)	SE	t
Age	0.164	0.007	24.51	0.210	0.012	16.80
Age^2	-0.002	0.000	-21.02	-0.002	0.000	-15.72
Age at Immigration	-0.014	0.001	-16.21	-0.011	0.001	-7.92
Highest Degree Obtained						
Bachelor's degree	*(Comparison)*			*(Comparison)*		
University certificate/diploma above bachelor's degree	0.062	0.026	2.42	0.048	0.045	1.06
Master's degree	0.153	0.021	7.32	0.135	0.035	3.82
Ph.D.	0.462	0.062	7.42	0.295	0.078	3.78
Degree in medicine, dentistry, or veterinary medicine	N/A	N/A	N/A	N/A	N/A	N/A
Province of Residence						
Ontario	*(Comparison)*			*(Comparison)*		
Newfoundland and Labrador	0.148	0.158	0.94	-0.183	0.450	-0.41
Prince Edward Island	-0.328	0.190	-1.73	0.079	0.423	0.19
Nova Scotia	-0.338	0.083	-4.07	-0.072	0.133	-0.54
New Brunswick	-0.438	0.102	-4.31	-0.228	0.197	-1.16
Québec	-0.175	0.033	-5.24	-0.187	0.055	-3.39
Manitoba	-0.142	0.043	-3.28	-0.068	0.072	-0.94
Saskatchewan	-0.100	0.058	-1.73	0.187	0.092	2.03
Alberta	0.089	0.025	3.53	0.159	0.046	3.49
British Columbia	-0.119	0.024	-4.96	0.033	0.043	0.75
Official Language Knowledge						
English only	*(Comparison)*			*(Comparison)*		
French only	0.045	0.051	0.88	-0.097	0.079	-1.23
English and French	0.096	0.027	3.60	-0.007	0.045	-0.17
Neither English nor French	-0.736	0.159	-4.62	-0.342	0.181	-1.89
Study Location*Visible Minority Status						
Studied in Canada*Not a visible minority	*(Comparison)*			*(Comparison)*		
Studied in Canada*South Asian	0.002	0.042	0.05	-0.078	0.082	-0.95
Studied in Canada*East Asian	0.066	0.039	1.70	-0.166	0.074	-2.24
Studied in Canada*Black	0.044	0.043	1.02	-0.014	0.064	-0.21
Studied in Canada*Filipino	-0.033	0.086	-0.38	0.067	0.134	0.50
Studied in Canada*Latin American	-0.066	0.070	-0.94	-0.127	0.115	-1.10
Studied in Canada*Arab	-0.189	0.059	-3.23	0.011	0.103	0.11
Studied in Canada*Southeast Asian	-0.053	0.109	-0.49	-0.126	0.150	-0.84
Studied in Canada*West Asian	-0.027	0.092	-0.29	-0.109	0.186	-0.59
Studied in Canada*Other	0.055	0.080	0.70	0.038	0.113	0.34
Studied outside of Canada*Not a visible minority	-0.200	0.031	-6.51	-0.075	0.050	-1.48
Studied outside of Canada*South Asian	-0.502	0.038	-13.10	-0.523	0.074	-7.06
Studied outside of Canada*East Asian	-0.528	0.044	-11.87	-0.515	0.088	-5.85
Studied outside of Canada*Black	-0.207	0.063	-3.28	-0.196	0.080	-2.46
Studied outside of Canada*Filipino	-0.227	0.036	-6.31	-0.333	0.069	-4.83
Studied outside of Canada*Latin American	-0.484	0.058	-8.40	-0.540	0.109	-4.95
Studied outside of Canada*Arab	-0.443	0.067	-6.57	-0.365	0.107	-3.41
Studied outside of Canada*Southeast Asian	-0.378	0.100	-3.77	-0.525	0.166	-3.15
Studied outside of Canada*West Asian	-0.644	0.094	-6.86	-0.628	0.151	-4.15
Studied outside of Canada*Other	-0.065	0.095	-0.68	-0.300	0.163	-1.84
Constant	6.877	0.146	47.06	6.179	0.280	22.07

$p < 0.01$ = ***; $p < 0.05$ = **; $p < 0.1$ = *

Source: 2016 Census of Canada

Sample: Immigrants, ages 20-64, with a bachelor's degree or higher, who immigrated to Canada at ages 20-34, and who worked for wages in the reference week

Engineering/Geoscience		Prob > F	0		Prob > F	0
	n = 47,320	Adj R^2	0.1355	n = 184,345	Adj R^2	0.1290
	Female			Male		
ln(Wages)	Coefficient (log units)	SE	t	Coefficient (log units)	SE	t
Age	0.159	0.008	19.24	0.174	0.004	47.38
Age^2	-0.001	0.000	-15.23	-0.002	0.000	-41.91
Age at Immigration	-0.028	0.001	-18.89	-0.018	0.001	-28.91
Highest Degree Obtained						
Bachelor's degree	*(Comparison)*			*(Comparison)*		
University certificate/diploma above bachelor's degree	0.004	0.035	0.12	-0.037	0.017	-2.17
Master's degree	0.107	0.023	4.69	0.156	0.011	13.81
Ph.D.	0.153	0.047	3.24	0.279	0.020	14.05
Degree in medicine, dentistry, or veterinary medicine	N/A	N/A	N/A	N/A	N/A	N/A
Province of Residence						
Ontario	*(Comparison)*			*(Comparison)*		
Newfoundland and Labrador	-0.224	0.247	-0.91	0.249	0.087	2.84
Prince Edward Island	-0.988	0.413	-2.39	-0.112	0.193	-0.58
Nova Scotia	-0.323	0.133	-2.42	-0.045	0.060	-0.74
New Brunswick	-0.264	0.175	-1.51	-0.255	0.085	-2.99
Québec	-0.168	0.040	-4.18	-0.218	0.019	-11.46
Manitoba	-0.159	0.065	-2.45	-0.120	0.030	-4.02
Saskatchewan	-0.149	0.078	-1.9	0.117	0.036	3.24
Alberta	0.189	0.028	6.85	0.307	0.013	23.17
British Columbia	-0.116	0.028	-4.15	-0.027	0.014	-1.96
Official Language Knowledge						
English only	*(Comparison)*			*(Comparison)*		
French only	-0.259	0.072	-3.62	-0.191	0.038	-5.07
English and French	0.036	0.037	0.99	0.028	0.018	1.59
Neither English nor French	-0.859	0.129	-6.64	-0.538	0.059	-9.15
Study Location*Visible Minority Status						
Studied in Canada*Not a visible minority	*(Comparison)*			*(Comparison)*		
Studied in Canada*South Asian	0.030	0.061	0.48	-0.002	0.024	-0.10
Studied in Canada*East Asian	0.092	0.051	1.82	-0.062	0.023	-2.70
Studied in Canada*Black	-0.096	0.089	-1.08	-0.179	0.037	-4.83
Studied in Canada*Filipino	-0.115	0.134	-0.86	-0.134	0.066	-2.03
Studied in Canada*Latin American	0.117	0.087	1.34	-0.067	0.049	-1.38
Studied in Canada*Arab	-0.090	0.081	-1.12	-0.056	0.031	-1.78
Studied in Canada*Southeast Asian	-0.118	0.107	-1.1	-0.141	0.045	-3.13
Studied in Canada*West Asian	-0.079	0.072	-1.1	-0.234	0.036	-6.57
Studied in Canada*Other	-0.094	0.146	-0.65	-0.089	0.057	-1.55
Studied outside of Canada*Not a visible minority	-0.131	0.048	-2.74	0.010	0.022	0.45
Studied outside of Canada*South Asian	-0.157	0.056	-2.81	-0.145	0.024	-6.09
Studied outside of Canada*East Asian	-0.299	0.051	-5.9	-0.345	0.024	-14.37
Studied outside of Canada*Black	-0.199	0.110	-1.81	-0.314	0.038	-8.16
Studied outside of Canada*Filipino	-0.264	0.057	-4.65	-0.301	0.027	-11.33
Studied outside of Canada*Latin American	-0.088	0.064	-1.39	-0.021	0.033	-0.65
Studied outside of Canada*Arab	-0.577	0.071	-8.13	-0.330	0.031	-10.63
Studied outside of Canada*Southeast Asian	-0.262	0.148	-1.77	-0.325	0.066	-4.95
Studied outside of Canada*West Asian	-0.520	0.068	-7.65	-0.554	0.033	-16.82
Studied outside of Canada*Other	-0.288	0.109	-2.64	-0.280	0.052	-5.38
Constant	7.633	0.176	43.44	7.441	0.079	93.97

$p < 0.01$ = ***; $p < 0.05$ = **; $p < 0.1$ = *

Source: 2016 Census of Canada

Sample: Immigrants, ages 20-64, with a bachelor's degree or higher, who immigrated to Canada at ages 20-34, and who worked for wages in the reference week

Law		Prob > F	0		Prob > F	0
	n = 11,705	Adj R^2	0.1890	n = 9830	Adj R^2	0.1864
	Female			Male		
ln(Wages)	Coefficient (log units)	SE	t	Coefficient (log units)	SE	t
Age	0.185	0.016	11.35	0.217	0.019	11.72
Age^2	-0.002	0.000	-9.63	-0.002	0.000	-10.39
Age at Immigration	-0.022	0.002	-9.14	-0.019	0.003	-7.45
Highest Degree Obtained						
Bachelor's degree	*(Comparison)*			*(Comparison)*		
University certificate/diploma above bachelor's degree	-0.026	0.057	-0.45	0.096	0.065	1.47
Master's degree	0.130	0.053	2.47	0.165	0.060	2.75
Ph.D.	0.437	0.122	3.59	0.317	0.114	2.78
Degree in medicine, dentistry, or veterinary medicine	N/A	N/A	N/A	N/A	N/A	N/A
Province of Residence						
Ontario	*(Comparison)*			*(Comparison)*		
Newfoundland and Labrador	0.040	0.398	0.1	0.092	0.548	0.17
Prince Edward Island	-0.426	0.651	-0.65	N/A	N/A	N/A
Nova Scotia	0.011	0.251	0.04	-0.110	0.301	-0.37
New Brunswick	-0.333	0.350	-0.95	0.170	0.322	0.53
Québec	-0.199	0.074	-2.71	-0.427	0.086	-4.95
Manitoba	-0.184	0.171	-1.07	-0.137	0.183	-0.75
Saskatchewan	-0.231	0.182	-1.27	-0.056	0.207	-0.27
Alberta	0.143	0.072	2	0.266	0.079	3.36
British Columbia	-0.026	0.062	-0.42	-0.018	0.071	-0.26
Official Language Knowledge						
English only	*(Comparison)*			*(Comparison)*		
French only	-0.230	0.114	-2.03	-0.025	0.134	-0.19
English and French	0.089	0.061	1.44	0.096	0.075	1.28
Neither English nor French	-0.907	0.408	-2.22	-0.233	0.252	-0.92
Study Location*Visible Minority Status						
Studied in Canada*Not a visible minority	*(Comparison)*			*(Comparison)*		
Studied in Canada*South Asian	-0.124	0.106	-1.18	-0.144	0.114	-1.26
Studied in Canada*East Asian	-0.011	0.101	-0.11	-0.150	0.131	-1.15
Studied in Canada*Black	-0.329	0.101	-3.25	-0.444	0.127	-3.48
Studied in Canada*Filipino	-0.054	0.283	-0.19	-0.545	0.428	-1.27
Studied in Canada*Latin American	-0.304	0.174	-1.75	-0.062	0.235	-0.26
Studied in Canada*Arab	-0.296	0.159	-1.87	0.132	0.189	0.70
Studied in Canada*Southeast Asian	0.055	0.258	0.21	-0.436	0.358	-1.22
Studied in Canada*West Asian	-0.002	0.162	-0.01	-0.669	0.199	-3.37
Studied in Canada*Other	0.165	0.204	0.81	-0.074	0.301	-0.25
Studied outside of Canada*Not a visible minority	-0.238	0.075	-3.2	-0.154	0.088	-1.75
Studied outside of Canada*South Asian	-0.621	0.104	-5.96	-0.799	0.102	-7.82
Studied outside of Canada*East Asian	-0.470	0.102	-4.62	-0.487	0.124	-3.94
Studied outside of Canada*Black	-0.621	0.108	-5.73	-0.575	0.131	-4.37
Studied outside of Canada*Filipino	-0.196	0.205	-0.96	-0.555	0.174	-3.18
Studied outside of Canada*Latin American	-0.741	0.113	-6.55	-0.301	0.134	-2.25
Studied outside of Canada*Arab	-0.822	0.123	-6.68	-0.675	0.124	-5.43
Studied outside of Canada*Southeast Asian	-0.200	0.223	-0.9	-1.059	0.306	-3.46
Studied outside of Canada*West Asian	-0.942	0.201	-4.68	-0.593	0.203	-2.93
Studied outside of Canada*Other	-0.870	0.226	-3.84	-0.653	0.260	-2.51
Constant	6.966	0.333	20.93	6.332	0.394	16.07

$p < 0.01$ = ***; $p < 0.05$ = **; $p < 0.1$ = *

Source: 2016 Census of Canada

Sample: Immigrants, ages 20-64, with a bachelor's degree or higher, who immigrated to Canada at ages 20-34, and who worked for wages in the reference week

Social Work		Prob > F	0		Prob > F	0.0005
	n = 7395	Adj R^2	0.1630	n = 2085	Adj R^2	0.0698
	Female			Male		
ln(Wages)	Coefficient (log units)	SE	t	Coefficient (log units)	SE	t
Age	0.143	0.017	8.63	0.131	0.040	3.29
Age^2	-0.001	0.000	-7.04	-0.001	0.000	-2.74
Age at Immigration	-0.011	0.002	-4.7	-0.013	0.005	-2.59
Highest Degree Obtained						
Bachelor's degree	*(Comparison)*			*(Comparison)*		
University certificate/diploma above bachelor's degree	0.160	0.109	1.47	0.300	0.251	1.19
Master's degree	0.279	0.049	5.75	0.256	0.112	2.29
Ph.D.	0.433	0.192	2.25	0.152	0.367	0.42
Degree in medicine, dentistry, or veterinary medicine	N/A	N/A	N/A	N/A	N/A	N/A
Province of Residence						
Ontario	*(Comparison)*			*(Comparison)*		
Newfoundland and Labrador	0.142	0.525	0.27	0.250	0.707	0.35
Prince Edward Island	-2.627	0.645	-4.08	0.332	1.134	0.29
Nova Scotia	-0.061	0.230	-0.27	0.590	0.719	0.82
New Brunswick	-0.100	0.418	-0.24	0.137	0.782	0.18
Québec	-0.163	0.109	-1.5	-0.199	0.220	-0.90
Manitoba	-0.081	0.120	-0.68	-0.032	0.216	-0.15
Saskatchewan	-0.081	0.152	-0.53	-0.167	0.352	-0.47
Alberta	0.106	0.068	1.56	0.216	0.140	1.55
British Columbia	-0.042	0.069	-0.61	0.080	0.156	0.51
Official Language Knowledge						
English only	*(Comparison)*			*(Comparison)*		
French only	0.138	0.159	0.87	0.279	0.351	0.80
English and French	-0.020	0.088	-0.23	-0.073	0.187	-0.39
Neither English nor French	-0.179	0.449	-0.4	-3.257	1.446	-2.25
Study Location*Visible Minority Status						
Studied in Canada*Not a visible minority	*(Comparison)*			*(Comparison)*		
Studied in Canada*South Asian	0.098	0.096	1.02	0.316	0.252	1.25
Studied in Canada*East Asian	0.037	0.099	0.38	0.511	0.236	2.17
Studied in Canada*Black	-0.010	0.073	-0.14	0.159	0.170	0.93
Studied in Canada*Filipino	0.059	0.207	0.28	0.086	0.479	0.18
Studied in Canada*Latin American	0.007	0.114	0.06	0.241	0.343	0.70
Studied in Canada*Arab	-0.073	0.189	-0.39	0.712	0.409	1.74
Studied in Canada*Southeast Asian	0.143	0.188	0.76	-0.211	0.455	-0.46
Studied in Canada*West Asian	0.196	0.181	1.08	0.543	0.463	1.17
Studied in Canada*Other	0.165	0.154	1.07	0.544	0.558	0.97
Studied outside of Canada*Not a visible minority	-0.174	0.088	-1.97	0.306	0.206	1.49
Studied outside of Canada*South Asian	-0.539	0.103	-5.22	0.100	0.203	0.49
Studied outside of Canada*East Asian	-0.474	0.134	-3.55	0.316	0.261	1.21
Studied outside of Canada*Black	-0.329	0.164	-2.01	0.265	0.264	1.00
Studied outside of Canada*Filipino	-0.066	0.117	-0.57	0.524	0.354	1.48
Studied outside of Canada*Latin American	-0.099	0.159	-0.63	-0.740	0.607	-1.22
Studied outside of Canada*Arab	-0.357	0.261	-1.37	-0.169	0.341	-0.50
Studied outside of Canada*Southeast Asian	-0.113	0.519	-0.22	0.497	0.635	0.78
Studied outside of Canada*West Asian	0.014	0.325	0.04	0.472	0.945	0.50
Studied outside of Canada*Other	-0.222	0.364	-0.61	0.370	0.604	0.61
Constant	7.175	0.353	20.32	7.253	0.878	8.26

$p < 0.01$ = ***; $p < 0.05$ = **; $p < 0.1$ = *

Source: 2016 Census of Canada

Sample: Immigrants, ages 20-64, with a bachelor's degree or higher, who immigrated to Canada at ages 20-34, and who worked for wages in the reference week

Health Care		Prob > F	0		Prob > F	0
	n = 89,125	Adj R^2	0.1266	n = 46,060	Adj R^2	0.1366
	Female			Male		
ln(Wages)	Coefficient (log units)	SE	t	Coefficient (log units)	SE	t
Age	0.149	0.005	27.23	0.161	0.008	20.04
Age^2	-0.001	0.000	-21.49	-0.001	0.000	-16.09
Age at Immigration	-0.017	0.001	-19.3	-0.018	0.001	-14.92
Highest Degree Obtained						
Bachelor's degree	*(Comparison)*			*(Comparison)*		
University certificate/diploma above bachelor's degree	-0.077	0.030	-2.55	-0.050	0.055	-0.92
Master's degree	0.015	0.025	0.59	0.024	0.037	0.65
Ph.D.	0.019	0.044	0.43	0.215	0.048	4.48
Degree in medicine, dentistry, or veterinary medicine	-0.206	0.020	-10.510	-0.010	0.027	-0.380
Province of Residence						
Ontario	*(Comparison)*			*(Comparison)*		
Newfoundland and Labrador	0.577	0.133	4.34	0.790	0.127	6.24
Prince Edward Island	0.096	0.196	0.49	0.302	0.236	1.28
Nova Scotia	-0.023	0.078	-0.29	0.136	0.092	1.48
New Brunswick	0.030	0.105	0.29	0.680	0.141	4.84
Québec	-0.204	0.036	-5.7	-0.365	0.051	-7.15
Manitoba	-0.013	0.035	-0.36	0.058	0.050	1.15
Saskatchewan	0.238	0.045	5.28	0.271	0.060	4.52
Alberta	0.133	0.021	6.43	0.286	0.031	9.09
British Columbia	0.020	0.020	0.99	0.059	0.030	1.97
Official Language Knowledge						
English only	*(Comparison)*			*(Comparison)*		
French only	0.100	0.060	1.66	0.036	0.097	0.37
English and French	-0.024	0.030	-0.8	0.101	0.043	2.35
Neither English nor French	-0.611	0.175	-3.5	-0.678	0.209	-3.25
Study Location*Visible Minority Status						
Studied in Canada*Not a visible minority	*(Comparison)*			*(Comparison)*		
Studied in Canada*South Asian	0.002	0.037	0.04	-0.027	0.057	-0.48
Studied in Canada*East Asian	0.132	0.035	3.78	-0.012	0.053	-0.22
Studied in Canada*Black	0.123	0.038	3.22	0.128	0.079	1.62
Studied in Canada*Filipino	0.184	0.045	4.11	0.263	0.090	2.94
Studied in Canada*Latin American	-0.041	0.070	-0.58	-0.010	0.125	-0.08
Studied in Canada*Arab	0.143	0.068	2.11	-0.021	0.076	-0.27
Studied in Canada*Southeast Asian	0.005	0.065	0.07	-0.233	0.106	-2.20
Studied in Canada*West Asian	-0.104	0.068	-1.54	-0.074	0.095	-0.78
Studied in Canada*Other	0.127	0.070	1.81	0.107	0.124	0.86
Studied outside of Canada*Not a visible minority	-0.070	0.033	-2.13	0.087	0.050	1.73
Studied outside of Canada*South Asian	-0.278	0.035	-8.02	-0.196	0.050	-3.89
Studied outside of Canada*East Asian	-0.247	0.042	-5.93	-0.231	0.063	-3.66
Studied outside of Canada*Black	-0.131	0.055	-2.36	-0.238	0.071	-3.38
Studied outside of Canada*Filipino	-0.183	0.031	-5.93	-0.156	0.054	-2.88
Studied outside of Canada*Latin American	-0.411	0.060	-6.84	-0.114	0.092	-1.25
Studied outside of Canada*Arab	-0.362	0.051	-7.06	-0.160	0.058	-2.74
Studied outside of Canada*Southeast Asian	-0.167	0.086	-1.93	-0.188	0.144	-1.31
Studied outside of Canada*West Asian	-0.498	0.058	-8.55	-0.560	0.079	-7.11
Studied outside of Canada*Other	-0.205	0.070	-2.93	-0.218	0.110	-1.99
Constant	7.466	0.114	65.76	7.236	0.173	41.89

$p < 0.01$ = ***; $p < 0.05$ = **; $p < 0.1$ = *

Source: 2016 Census of Canada

Sample: Immigrants, ages 20-64, with a bachelor's degree or higher, who immigrated to Canada at ages 20-34, and who worked for wages in the reference week