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by Yao Lu and Feng Hou

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Abstract

This study compares the differences in the mismatch between the education and occupations of immigrants in Canada and the United States, operationalized by over-education. It further explores how the cross-country differences may be related to the supply of and demand for university-educated immigrants and the way they are selected. Using comparable data and three measures of over-education, this study found that university-educated recent immigrants in Canada were much more likely to be overeducated than their U.S. peers. The over-education rate gap between recent immigrants and the native-born was much more pronounced in Canada than in the United States. In addition, while labour market demand was associated with a lower level of over-education in both countries, a greater supply of university-educated recent immigrants was positively associated with a likelihood of over-education among recent immigrants in Canada, but not in the United States. Furthermore, in Canada, the over-education rate was significantly lower among immigrants who were admitted through some form of employer selection (e.g., immigrants who worked in skilled jobs in Canada before immigration) than those who were admitted directly from abroad. Overall, this study provides insight into how the immigration system interacts with broader aspects of the labour market to shape the labour market outcomes of immigrants.

Executive summary

Canada and the United States are two major immigrant destinations with distinct immigration policies. The two countries also differ in immigration level and economy size, but their government structures, economic systems and social environment have many similarities. These similarities and differences provide a useful setting for comparative immigration research.

This study assesses the degree of over-education among university-educated immigrants in the United States and Canada. This study draws on comparable data from the 2014, 2015 and 2016 American Community Survey and the 2016 Canadian Census to calculate the over-education rate for immigrants and the native-born in each country. Over-education is defined as a worker's education exceeding the level of education required to adequately perform a particular job. Three alternative approaches are used to measure over-education.

This study further investigates possible underlying factors of the differing over-education rates among immigrants to the United States and Canada. The analysis is based on the assumption that immigration policies interact with broader aspects of the destination labour market, which affects the economic performance of skilled immigrants. This study also explores immigrant selection mechanisms that can promote immigrant education–occupation match. This is accomplished by comparing the over-education rates of university-educated immigrants admitted under different admission categories in Canada (e.g., purely points-based versus a combination of employer selection and a points system).

The results show that university-educated recent immigrants to Canada had a much higher likelihood of over-education than their U.S. peers. The cross-country difference was less pronounced for long-term immigrants, and native-born Americans were even slightly more likely to be overeducated than native-born Canadians. While recent immigrants are more likely than the native-born to experience an education–occupation mismatch in both countries, the gap was much more pronounced in Canada than in the United States.

While labor market demand is associated with a lower level of over-education among recent immigrants in both countries, a greater supply of university-educated recent immigrants was positively associated with over-education in Canada, but this was not the case for the United States. These results likely suggest that a larger supply of university-educated immigrants in a smaller economy reduces a country's ability to absorb immigrants. A smaller supply and a larger demand, combined with an employment-based immigration selection system for skilled immigrants in the United States likely balance immigrant supply with domestic labour market demand more effectively.

Within Canada, the over-education rate was significantly lower for immigrants selected through the Canadian Experience Class (CEC) than for those selected under the Federal Skilled Worker Program (FSWP). Provincial Nominee Program (PNP) immigrants had a higher over-education rate than FSWP immigrants. Although both the CEC and PNP resemble employer selection mechanisms, the CEC selects skilled workers while the PNP admits many lower-skilled workers.

1 Introduction

Canada and the United States are two major immigration destinations with distinct immigration policies. Canada's immigration system heavily rewards human capital, whereas family reunification is the central pillar of the U.S. system. Because of this main difference, academics and policy makers have increasingly compared the two countries. The Canada–United States comparison is facilitated by similarities between the two countries, including their government structures, economic systems and geographic proximity. However, there are substantial institutional differences in their immigration policies (Bloemraad 2011). The similarities and differences provide a useful setting for immigration research.

Canada's points-based system has allowed a higher percentage of immigrants to arrive to Canada with high levels of education and professional credentials than the system in the United States (Kaushal and Lu 2015). The more favourable human capital characteristics of immigrants to Canada, coupled with the country's more robust integration context, would suggest greater labour market success. Nevertheless, the literature suggests the opposite: immigrants to Canada lag behind those to the United States in labour market performance (Bonikowska, Hou, and Picot 2011). This pattern holds even when comparing university-educated immigrants from the same source country and after individual unobserved heterogeneity is accounted for (Kaushal et al. 2016; Wu et al. 2018). One common explanation for the Canada–United States difference in immigrant labour market outcomes is the greater tendency of immigrants with high innate abilities to self-select into the United States (e.g., Clarke, Ferrer, and Skuterud 2019). However, empirical research lends mixed support for this explanation (Kaushal et al. 2016). Furthermore, selective outmigration may exist among the Canadian-born, which may reduce the gap in labour market outcomes between immigrants and the Canadian-born.

This paper explores two other possible explanations. One focuses on the fundamental structural economic factors, namely labour market supply and demand. On the supply side, Canada has outpaced the United States in the percentage of university-educated immigrants in the labour force. However, on the demand side Canada's economy is one-tenth the size of the U.S. economy and Canada's industrial structure is less knowledge-intensive (Baldwin and Willox 2016). These features combine to create a larger supply of university-educated immigrants relative to labour market demand for skilled workers in Canada than in the United States. These broad aspects of the receiving-country labour market may interact with immigration policies to affect the economic performance of skilled immigrants. Another possible explanation is the differences in immigrant selection mechanisms, particularly the role of employer selection in improving the match between immigrant skills and labour market demand.

This study uses over-education as an indicator of immigrant skill utilization and assesses the over-education rate among university-educated immigrants in the United States and Canada. There has been research on over-education among immigrants to Canada (Banerjee, Verma, and Zhang 2018; Boyd 2013; Frank 2013; Girard and Smith 2013; McDonald, Warman, and Worswick 2015; Wald and Fang 2008) and the United States (Beckhusen et al. 2013; Chiswick and Miller 2009; Mattoo, Meagu, and Ozden 2008). However, no research has systematically compared the scope of the issue between the two countries to understand the extent to which over-education is a common challenge for immigrants in both countries or looked into the structural factors that contribute to immigrant over-education.[1]

The analysis draws on comparable data from the 2014, 2015 and 2016 American Community Survey (ACS) and the 2016 Canadian Census to calculate the over-education rate for the native-born and immigrants in each country. Over-education is defined as a worker's education exceeding the level of education required to adequately perform a particular job.

1. The terms "education–occupation mismatch" and "overeducation" are used interchangeably in this paper.

2 Immigration selection, labour market structures, and over-education

A key institutional difference between the United States and Canada is their immigration policies. Since the mid-1960s, immigration policies in the two countries have diverged in significant ways (Green and Green 1999). The United States maintains a family-reunification-oriented policy, following the adoption of the *Immigration and Naturalization Act* of 1965 (Pub. L. 89-236), which eliminated nationality-specific quotas. The policy makes it possible for various family members to immigrate: it is broader than in many other immigration destinations.

By contrast, Canada adopted a points system in 1967 that rewards characteristics that facilitate the economic integration of immigrants. Since 1993, Canada has made changes to its points system by favouring a human capital approach that places greater priority on education level and official languages proficiency (Hou and Picot 2016). In 2002, the Canadian government passed the *Immigration and Refugee Protection Act* (S.C. 2001, c. 27), which further enhanced the human capital approach while eliminating points assigned for specific in-demand occupations (partly because of the difficulties of forecasting labour market demand). In 2015, Canada introduced the Express Entry system to increase the efficiency of economic immigrant selection. The new Comprehensive Ranking System, which is used to screen applicants, puts more emphasis on Canadian work experience while maintaining the importance of language ability and education (Hou and Lu 2017).

In addition to immigration policies, a country's labour market structure also affects immigrants' labour market outcomes. Canada's immigration system creates a skilled immigrant population that is large relative to the size of the Canadian population. In 2016, annual permanent migration to Canada (0.82% of the population) was more than double the annual permanent migration to the United States (0.37% of the population).[2]

The U.S. economy is more than 10 times the size of the Canadian economy. In 2016, U.S. gross domestic product was about 12 times that of Canada (World Bank 2017). In the 1990s, economic growth was driven primarily by an increase in the employment of university-educated workers in the United States, but of non-university-educated workers in Canada (Ho, Rao, and Tang 2004). These macroeconomic conditions mean that the Canadian labour market is more limited in its ability to take in foreign-born workers, especially for skilled jobs commensurate with an immigrant's education. In Canada, the largest vacancies are in the service industry for jobs such as retail sales associates and caregivers, positions that do not necessarily require a university education (Haider 2015).

For these reasons, it is expected that skilled immigrants to Canada are more likely to be overeducated than their U.S. counterparts. This can be attributed to the supply of skilled immigrants outstripping demand in Canada, particularly among recent immigrants who are most likely to be overeducated (Chiswick and Miller 2009).

Because of greater supply in Canada, immigrant over-education may be particularly sensitive to supply factors, with a higher likelihood of over-education associated with a larger supply of university-educated immigrants in the local labour market. The large supply may intensify competition among university-educated immigrants and between these immigrants and the native-born (Aydemir and Borjas 2007; Hou and Picot 2014). In comparison, a smaller supply is better aligned with the demand for university-educated immigrants in the United States.

2. Authors' calculation based on U.S. and Canadian immigration statistics and population estimates from the following sources: U.S. Department of Homeland Security n.d.; United States Census Bureau n.d.; Statistics Canada n.d.*b*; and IRCC n.d.).

The better alignment of skilled immigrant supply and the labour market demand for skills in the United States is also facilitated by a two-step employer-sponsored selection of skilled immigrants. Under this system, selection is largely done by employers. Employers sponsor immigrants for H-1B visas and subsequent permanent residency applications. As a result, skilled immigrants have secure, prearranged jobs and avoid having to job search upon arrival while they are getting settled. In this context, supply conditions largely mirror the labour market's demand and capacity for skilled immigrants; therefore, a weaker positive relationship between supply and over-education would be expected in the United States.

By contrast, the screening of new immigrants under the Canadian points system is government regulated for the most part. Many immigrants to Canada arrive without pre-established jobs and have to navigate the labour market upon arrival. This may increase the likelihood of over-education, especially since the 1990s and 2000s when immigration increased steadily regardless of changes in the demand for skilled workers. Fluctuations in the high-tech sector in the late 1990s and early 2000s exemplify the vulnerability of university-educated immigrants to the changing economy (Hou 2013).

To determine the role of employer selection in alleviating education–occupation mismatch, this study compares the over-education rates in Canada of university-educated immigrants admitted through various mechanisms. Although skilled immigrants to Canada are admitted through the points system, Canada has one admission mechanism that is similar to the employer sponsorship mechanism in the United States: the Canadian Experience Class (CEC). These immigrants are first selected by Canadian employers as temporary foreign workers, and their performance is later evaluated by their employers to determine whether they get to keep their job. Therefore, they are considered to be employer-selected immigrants. The relative over-education rate of educated immigrants who are admitted either through the points system or through employer selection provides useful insights into the effectiveness of employer selection in matching immigrants based on labour market demand. To the extent that employer selection is more effective in meeting the needs of the economy, over-education would be more prevalent among immigrants who are admitted through the points system alone. A similar comparison cannot be done in the United States because data on class of entry are not available.

The discussion above leads to three hypotheses:

1. University-educated immigrants in Canada are more likely to be overeducated than those in the United States. This is particularly true for recent immigrants.

2. Because of a greater supply and smaller demand in Canada, labour market supply factors are more positively associated with over-education among immigrants to Canada than immigrants to the United States.

3. Immigrants to Canada admitted purely through the points system are more likely to be overeducated than those who also went through employer selection.

3 Data, measures and methods

3.1 Data

The data are from Statistics Canada's 2016 Census of Population 25% sample microdata file and the 2014, 2015 and 2016 ACS downloaded from the Integrated Public Use Microdata Series (Ruggles et al. 2017). Three years of ACS data are pooled to obtain a sample size comparable with that of the Canadian census. The analyses focus on individuals aged 25 to 64 with an occupation. The study sample was restricted to individuals with at least a bachelor's degree. The study also excluded new immigrants who arrived in the census or survey year because of different collection procedures in the ACS and Canadian census.[3] After these restrictions, the study sample consisted of 370,045 immigrants in Canada and 223,608 immigrants in the United States.

3.2 Measures

3.2.1 Over-education

The key outcome variable is over-education. It is defined as individuals with a university education (i.e., at least a bachelor's degree) working in occupations that require only a high school diploma or less. The study also defined marginal over-education, which is when individuals with a university education work in occupations that require some postsecondary education below a bachelor's degree. Therefore, the outcome variable has three categories: over-education, marginal over-education and education–occupation match. Distinguishing between over-education and marginal over-education is important since overeducated workers have lower earnings and subjective well-being than marginally overeducated workers (Frank and Hou 2018). Furthermore, postsecondary education below a bachelor's degree is more common in Canada than in the United States.

There are three general ways to determine the education required for an occupation (Hartog 2000). The first is through job analysis, which is an occupation evaluation done by professional job analysts in the field. The second is through realized matches, which looks at the actual educational attainment of current workers in each occupation; required education is determined based on the level of education that workers in the respondent's occupation have attained (e.g., the mode or mean level of education among workers in an occupation) (Cohn and Khan 1995). The third way is through workers' subjective self-assessment on the minimum education required for their job. Of the three approaches, the job analysis method dominates the literature and is deemed to be conceptually superior (Hartog 2000). Therefore, this study focuses on results from measures derived from this approach.

This study uses three alternative measures to define the educational requirement of a given occupation. Using multiple measures allows the robustness of the results to be evaluated. As shown below, the three measures produced substantively similar results. First, two job analysis measures were developed to match the data to the U.S. system and Canadian system, respectively.

The U.S. system provides information on the educational requirement by occupation assigned by the Bureau of Labor Statistics (BLS). BLS economists assigned the typical level of education that most workers need for a job to each of the six-digit Standard Occupational Classification (SOC) categories. Occupations were assigned one of the following eight education levels: doctoral or

3. The 2016 Canadian Census was collected on May 10, so new immigrants who arrived after the census date would not be captured. In comparison, the ACS data were collected each month; therefore, the ACS is able to capture immigrants who arrived throughout the survey year. This excluded 4,843 immigrants in Canada and 3,074 immigrants in the United States.

professional degree; master's degree; bachelor's degree; associate's degree; postsecondary non-degree award; some college, no degree; high school diploma or equivalent; *or* no formal educational credential. The 2014 version of the SOC was used in this study.

The Canadian system is based on the education levels assigned by Employment and Social Development Canada for some 500 occupational groups in the four-digit National Occupational Classification (NOC). In the NOC, skill level is defined primarily by the amount and type of education and training required to enter and perform the duties of an occupation. The NOC identifies four skill levels: level A**,** university degree (bachelor's, master's or doctorate); level B, some postsecondary education; level C, high school graduation or some job-specific training; and level D, some elementary or secondary education and on-the-job training. The NOC does not assign specific education levels to management occupations. For the purpose of this study, senior management occupations and specialized middle management occupations were treated as skill level A. Skill level B was applied to middle management occupations in retail and wholesale trade and customer services, and to middle management occupations in trades, transportation, production and utilities. The 2016 version of the NOC (Government of Canada n.d.) was used in this study.

The third measure was derived from the required educational level as reported by current workers in an occupation from the Occupational Information Network (O*NET) (20.1 Database) (O*NET n.d.*a*). For each of the over 800 listed occupations, O*NET lists the percentage distribution of 12 categories of required educational levels, ranging from less than a high school diploma to doctoral degree and post-doctoral training. The O*NET educational data are based on a small number of observations per occupation (between 15 and 90, with an average of 29).

To keep the analysis consistent, the educational requirement of occupations is grouped into three categories for all three measures: university education (bachelor's, master's or doctorate), some postsecondary education and high school or less. For both the BLS- and NOC-based measures, each occupation has a required education level. For O*NET, the mode education level (i.e., the most prevalent level among the three aggregated education categories) was chosen as the required education level.

The educational requirement determined from these three measures is linked to occupations in the ACS and Canadian census. The ACS uses the same SOC system as the BLS. However, some SOC codes in the ACS are missing the last two to four digits. For these incomplete SOC codes, the linkage was done at a higher available digit level after aggregating the BLS educational requirement to the corresponding higher SOC digit level. The mode education level among the more detailed digits was chosen for the higher digit level. The linkage between O*NET occupation codes and the SOC was done using a crosswalk provided by O*NET (O*NET n.d.*b*). The BLS and O*NET measures were applied to the Canadian census based on a concordance between the six-digit SOC codes and the four-digit 2011 NOC codes (which have the same structure as the 2016 NOC codes). This concordance was based on the similarity of SOC and NOC occupational descriptions (see Frenette and Frank [2017] for details). The same concordance was used to apply NOC educational requirements to the ACS.

3.2.2 Labour market supply and demand factors

Two supply factors and one demand factor were created at the regional level to predict the over-education rate of university-educated immigrants in the United States and Canada. The U.S. regions are based on the 449 Super Public Use Microdata Areas (PUMASUPRs) in IPUMS (IPUMS USA n.d.). In Canada, the regions are based on the 76 economic regions (the three small economic regions for the three territories were combined) (Statistics Canada 2016).

Supply factors include the share of university-educated recent immigrants (who have been in the country for 10 years or less) in the total adult population and the share of university-educated

established immigrants (who have been in the country for more than 10 years) in the total adult population. The demand factor is measured by the share of native-born workers in knowledge-based industries. Knowledge-based industries are defined by the industry's research and development activities and the educational attainment of its workforce. They include 22 four-digit NAICS (North American Industry Classification System) industries, covering engineering and science-based manufacturers, telecommunications, data processing, computer systems design, and consulting services (E.W. Clendenning & Associates 2000). Native-born workers are used to calculate the demand measure because their conditions are less sensitive to the supply of immigrant workers and to cyclical fluctuations, therefore better capturing economic needs.[4]

It is important to note that these supply and demand measures by no means will fully capture supply and demand for university-educated workers. Furthermore, to the extent that less successful immigrants may be more likely to stay in or move to regions with a larger concentration of immigrants, and more motivated immigrants are more likely to move to regions with a strong demand, the derived measures are potentially endogenous. This study assumes these tendencies are the same in Canada and the United States, and compares whether these measures have similar associations with over-education of immigrants in the two countries.

3.2.3 Control variables

Several individual demographic characteristics were included as control variables: age, gender (male = 0, female = 1), graduate degree (bachelor's degree = 0, graduate degree = 1), marital status (married; divorced, separated or widowed; never married), language skills, foreign degree, years since immigration and source region. The language skill is measured by the primary language spoken at home. This variable is coded as speaking English versus other languages in the United States; and in Canada, speaking English outside of Quebec or speaking French in Quebec versus other languages. Foreign degree was derived from age at immigration and years of schooling in the U.S. data (foreign-educated if years of schooling plus 6 are less than age at immigration). In the Canadian data, the information is directly available. For both Canada and the United States, source regions were classified into 14 categories: North America, Central America, Caribbean, South America, Northern Europe, Western Europe, Southern Europe, Eastern Europe, Africa, South Asia, Southeast Asia, East Asia, West Asia and other.

3.3 Methods

Descriptive statistics were first produced to show the distribution of over-education, marginal over-education and education–occupation match for recent immigrants, established immigrants and the native-born workers in each country. Including the native-born in the descriptive statistics allows a baseline of labour market conditions to be established in the two countries. To test the first hypothesis, multinomial regression models were run to examine cross-country differences in the over-education rate after controlling for a range of demographic and socioeconomic factors. These analyses pool Canadian and U.S. data separately for recent immigrants, established immigrants and the native-born.[5]

4. The two supply factors were strongly and positively correlated with the share of workers in knowledge-based industries among native-born workers (r = 0.72 and 0.78 in Canada, and 0.59 and 0.65 in the United States).
5. In addition to the basic demographic and socioeconomic variables, the regression model for the native-born also controlled for race or visible minority groups. Visible minority groups in Canada were based on responses to the Canadian census question on visible minority membership: "Is this person: 1: White, 2: South Asian (e.g., East Indian, Pakistani, Sri Lankan, etc.), 3: Chinese, 4: Black, 5: Filipino, 6: Latin American, 7: Arab, 8: Southeast Asian (e.g., Vietnamese, Cambodian, Laotian, Thai, etc.), 9: West Asian (e.g., Iranian, Afghan, etc.), 10: Korean, 11: Japanese, 12: Other – specify:" (Statistics Canada n.d.*a*, Question 19), "White" refers to those who self-identified as White only and excludes individuals who self-identified as both White and one or more minority groups. For both countries, the variable was divided into five categories: White, Black, Latino, Asian and other.

To test the second hypothesis, this study pooled the immigrant samples in the United States and Canada (separately for new immigrants and established immigrants), and estimated multilevel multinomial logit models predicting over-education among immigrants based on supply and demand factors (controlling for individual characteristics). Robust variance estimation was used to account for correlated errors among observations within a local labour market and unequal variances across local labor markets.

To test the third hypothesis, immigrants to Canada were disaggregated by different selection programs, and their corresponding over-education levels were compared using multinomial logit models. Linking the Canadian census with the Immigrant Landing File enables Canadian immigrant admission categories to be identified. However, there is no measure of selection programs in the U.S. data that allows for a direct evaluation of the role of employer selection in the United States.

4 Results

4.1 Cross-country differences in over-education among immigrant and native-born workers

Table 1 presents the over-education rate among university-educated workers. The results are divided by immigration status (native-born, recent immigrants and established immigrants) and country (United States and Canada). The left panel displays the unadjusted distribution. The right panel displays the adjusted distribution based on multinomial logit models pooling Canadian and U.S. data for each subsample (native-born, new immigrants and established immigrants), controlling for the cross-country differences in demographic variables listed in Table 2. Results are presented for three alternative definitions of over-education based on standards derived from the BLS, NOC and O*NET. Within each definition, the over-education variable has three categories: over-education, marginal over-education and education–occupation match. The three categories sum up to 100%.

The results show some clear patterns. In general, the over-education rate was greater among immigrants than among the native-born. Moreover, the gap between immigrants and the native-born was much wider in Canada than in the United States. The adjusted and unadjusted results were generally similar, although the cross-country differences in over-education diminished slightly after the adjustment. As seen in the right panel (BLS definition), the predicted probability of over-education was 42.0% among recent immigrants to Canada and 22.9% among the native-born, a difference of 19.1 percentage points. In comparison, the immigrant to native-born difference was relatively small in the United States: 29.3% for recent immigrants and 25.6% for the native-born, a gap of 3.7 percentage points. In other words, 42% of recent immigrants in Canada with a bachelor's degree were working in jobs that required a high school education at most. This was true for only 29.3% of those in the United States. The marginal over-education gap between immigrants and the native-born was also wider in Canada, albeit to a lesser degree.

The over-education rate among long-term immigrants was slightly higher in Canada than in the United States and the difference was much smaller in magnitude than the cross-country difference for recent immigrants. This could be explained by recent immigrants to Canada transitioning out of over-education faster than their U.S. counterparts.[6]

6. Cohort differences could not account for the difference between recent and established immigrants in Canada. For instance, the overeducation rates based on the NOC for recent immigrants were 32% in 2001 and 36% in 2006, both within 3 percentage points of the rate of 34.6% in 2016.

Native-born Canadians had a lower over-education rate than native-born Americans, although the difference was quite small. The major cross-country difference in the over-education rate among recent immigrants was separate from the cross-country difference among the native-born. All adjusted Canada–United States differences based on multinomial models (right panel) are significant at the 0.001 level.

The three alternative methods yielded somewhat different over-education distributions. For both countries, the BLS definition produced the highest over-education rates and lowest marginal over-education rates. The NOC definition produced the largest marginal over-education rates and lowest education–occupation match rates. The O*NET definition produced the highest education-occupation match rates. Despite these differences, the gap in over-education rates between recent immigrants and native-born workers in both countries and between recent immigrants in the two countries remained consistent across the three alternative methods.

Table 1
Over-education among workers with at least a bachelor's degree, aged 25 to 64, United States (2014 to 2016) and Canada (2016)

	Observed (unadjusted)			Adjusted		
	Native-born	Recent immigrants	Established immigrants	Native-born	Recent immigrants	Established immigrants
	percent					
United States						
U.S. Bureau of Labor Statistics						
Over-education	25.8	28.9	27.4	25.6	29.3	27.4
Marginal over-education	4.4	4.7	5.3	4.5	5.0	5.5
Education–occupation match	69.9	66.4	67.4	69.9	65.8	67.2
Canadian National Occupational Classification						
Over-education	14.8	20.9	17.5	14.7	21.5	17.7
Marginal over-education	23.8	19.1	22.0	23.9	19.1	22.2
Education–occupation match	61.4	60.0	60.5	61.4	59.5	60.1
Occupational Information Network						
Over-education	17.6	24.0	20.6	17.3	24.3	20.7
Marginal over-education	10.1	8.0	9.9	10.3	8.3	10.1
Education–occupation match	72.4	68.0	69.5	72.4	67.3	69.2
Canada						
U.S. Bureau of Labor Statistics						
Over-education	22.8	42.3	29.4	22.9	42.0	29.4
Marginal over-education	4.6	9.4	7.4	4.5	9.0	7.2
Education–occupation match	72.7	48.3	63.2	72.7	49.0	63.4
Canadian National Occupational Classification						
Over-education	13.1	34.6	21.3	13.2	34.0	21.1
Marginal over-education	24.9	27.7	27.2	24.8	27.7	27.1
Education–occupation match	62.0	37.7	51.5	62.0	38.2	51.8
Occupational Information Network						
Over-education	12.9	34.7	20.8	13.0	34.4	20.6
Marginal over-education	10.4	14.0	12.7	10.3	13.6	12.5
Education–occupation match	76.7	51.3	66.6	76.7	52.0	66.8

Notes: The adjusted numbers for native-born individuals are based on a multinomial model pooling the native-born in the United States and Canada and controlling for racial group, marital status, age, sex and graduate degree. The adjusted numbers for immigrants are based on multinomial models pooling immigrants (recent or established) in the United States and Canada and controlling for marital status, age, sex, graduate degree, source region and years since immigration. All adjusted Canada–United States differences are significant at the 0.001 level. The observed (unadjusted) or adjusted percentages may not add up to 100.0% because of rounding.
Sources: Statistics Canada, 2016 Census; and United States Census Bureau, 2014, 2015 and 2016 American Community Survey.

Table 2 compares the demographic characteristics of university-educated recent and long-term immigrant workers in Canada and the United States. University-educated immigrants were more likely to have a graduate degree in the United States than in Canada. Relative to their counterparts in the United States, recent immigrants to Canada were older and more likely to be female or married. In terms of source region, Asia was the main source region of university-educated recent

immigrants to both countries. South Asia (e.g., India) was relatively overrepresented in the United States, while Southeast Asia and West Asia were overrepresented in Canada.

Table 2
Means or proportions of predictors among university-educated workers by immigration status, Canada (2016) and the United States (2014 to 2016)

	Recent immigrants		Established immigrants	
	Canada	United States	Canada	United States
	number			
Individual characteristics				
Age	39.081	36.368	46.027	45.065
	proportion			
Female	0.483	0.423	0.493	0.484
Graduate degree	0.425	0.463	0.374	0.422
Black	0.072	0.084	0.052	0.099
Latin American	0.052	0.170	0.029	0.198
Asian	0.640	0.499	0.572	0.414
Other	0.017	0.052	0.021	0.051
Married	0.811	0.683	0.756	0.697
Separated, divorced or widowed	0.053	0.067	0.087	0.127
Speak official language at home	0.501	0.445	0.621	0.530
Completed education abroad	0.813	0.776	0.474	0.366
North America	0.025	0.025	0.038	0.033
Central America	0.017	0.081	0.014	0.114
Caribbean	0.019	0.049	0.031	0.072
South America	0.048	0.068	0.033	0.072
Northern Europe	0.029	0.035	0.057	0.037
Western Europe	0.040	0.036	0.035	0.049
Southern Europe	0.011	0.021	0.041	0.019
Eastern Europe	0.066	0.060	0.106	0.077
Africa	0.118	0.073	0.086	0.061
South Asia	0.224	0.262	0.158	0.129
Southeast Asia	0.176	0.090	0.100	0.131
East Asia	0.138	0.141	0.214	0.152
West Asia	0.084	0.049	0.080	0.046
Oceania and other	0.006	0.011	0.006	0.009
Years since immigration	6.004	5.387	24.107	25.874
	number			
Sample size	146,503	54,063	223,542	169,545

Sources: Statistics Canada, 2016 Census; and United States Census Bureau, 2014, 2015 and 2016 American Community Survey.

4.2 Cross-country differences in the role of supply and demand factors

Table 3 presents the descriptive statistics of the supply and demand factors. The share of university-educated recent immigrants in the workforce was much higher in Canada than in the United States, suggesting a much greater supply of skilled immigrants in Canada. The share of university-educated long-term immigrants was also higher in Canada than in the United States, although to a lesser extent. The demand for skilled workers was greater in the United States. The share of native-born workers in knowledge-based industries was lower in Canada. When both supply and demand factors are taken into account, Canada had a greater supply of university-educated immigrants relative to demand than the United States.

Table 3
Descriptive statistics of supply and demand factors, United States (2014 to 2016) and Canada (2016)

	Recent immigrants		Established immigrants	
	Canada	United States	Canada	United States
	proportion			
Share of university-educated recent immigrants in the local adult population	0.067	0.037	0.067	0.033
Share of university-educated established immigrants in the local adult population	0.088	0.076	0.100	0.077
Share of native-born workers in knowledge-based industries	0.082	0.101	0.085	0.098

Note: The means of these supply and demand measures differ for recent and established immigrants because they distribute differently across regional labour markets, although the measure is the same for the two groups in the same regional labour market.

Sources: Statistics Canada, 2016 Census; and Unted States Census Bureau, 2014, 2015 and 2016 American Community Survey.

The left panel of Table 4 presents results from the multilevel multinomial logit models predicting the likelihood of over-education and marginal over-education for recent immigrants in Canada and the United States in a pooled sample. Education–occupation match is the base category. The table is based on the BLS definition. The same set of models was estimated using the NOC and O*NET definitions, and the results were largely consistent (tables available on request). The table displays coefficients (log odds) associated with a covariate controlling for other covariates in the model.

Table 4
Multinomial models predicting over-education among recent and established immigrants with a bachelor's degree, United States (2014 to 2016) and Canada (2016)

	Recent immigrants		Established immigrants	
	Over-education	Marginal over-education	Over-education	Marginal over-education
	coefficients			
Covariates				
Canada	0.779 ***	0.823 ***	0.080	0.124
Age	-0.135 ***	-0.071 ***	-0.062 ***	-0.037 **
Age squared ÷ 100	0.183 ***	0.091 ***	0.084 ***	0.051 ***
Female	0.269 ***	0.715 ***	0.069	0.577 ***
Graduate degree	-0.870 ***	-0.654 ***	-1.053 ***	-0.937 ***
Married	-0.076 **	-0.022	-0.308 ***	-0.173 ***
Separated, divorced or widowed	0.278 ***	0.199 **	-0.010	0.017
Number of children living at home	0.013	0.059 ***	0.026 ***	0.046 ***
Years since immigration	-0.034 ***	0.020 ***	-0.008 ***	-0.012 ***
Speak official language at home	-0.195 ***	-0.182 ***	-0.153 ***	-0.220 ***
Completed education abroad	0.671 ***	0.599 ***	0.581 ***	0.564 ***
North America	-0.180 *	-0.089	0.079 *	0.023
Central America	1.251 ***	0.929 ***	0.877 ***	0.606 ***
Caribbean	1.525 ***	1.341 ***	0.526 ***	0.604 ***
South America	0.749 ***	0.663 ***	0.470 ***	0.398 ***
Western Europe	0.116	0.043	0.210 ***	0.123
Southern Europe	0.609 ***	0.480 **	0.153 *	0.289 ***
Eastern Europe	1.032 ***	1.135 ***	0.272 ***	0.597 ***
Africa	1.007 ***	0.954 ***	0.242 ***	0.332 ***
South Asia	0.566 ***	0.719 ***	0.421 ***	0.567 ***
Southeast Asia	1.427 ***	1.247 ***	0.443 ***	0.671 ***
East Asia	0.484 ***	0.509 ***	0.217 ***	0.253 ***
West Asia	0.553 ***	0.658 ***	0.289 ***	0.317 ***
Oceania and other	0.199	-0.008	0.124 *	0.274 **
Share of university-educated immigrants in the local adult population[1]	-2.386	-3.909 *	-0.614	-0.546
Share of workers in knowledge-based industries	-2.655 *	-2.382 *	-2.107 ***	-2.163 ***
Canada × share of university-educated immigrants in the local adult population[1]	9.979 ***	10.846 **	0.721	-0.062
Canada × share of workers in knowledge-based industries	-7.953 ***	-5.833	-0.240	2.536 *
Constant	1.080 ***	-2.319 ***	0.544	-1.872 ***

* significantly different from reference category (p < 0.05)

** significantly different from reference category (p < 0.01)

*** significantly different from reference category (p < 0.001)

1. This is the share of university-educated recent immigrants in the model for recent immigrants, and the share of established immigrants in the model for established immigrants.

Notes: Results are based on the Bureau of Labor Statistics definition of educational requirements for occupations. The sample size is 200,566 in the model for recent immigrants and 393,087 for established immigrants. The model pseudo R-squared is 0.107 for recent immigrants and 0.066 for established immigrants. The reference group for graduate degree is a bachelor's degree, for marital status it is never married and for source region it is Northern Europe.

Sources: Statistics Canada, 2016 Census; and United States Census Bureau, 2014, 2015 and 2016 American Community Survey.

There is a significantly higher risk of over-education for recent immigrants in Canada than in the United States. Older age, being female, and being separated, divorced, or widowed, were associated with a higher likelihood of over-education. Having a graduate degree protects recent immigrants from over-education, so does a longer duration of residence in the host country. Skilled immigrants with better language skills, as measured by whether speaking official language at home, are less likely to be overeducated. Recent immigrants who obtain their highest degree abroad, in contrast, experience heightened risk of over-education. Compared with immigrants from Northern Europe (the reference group), North America, Western Europe, and Oceania, immigrants from Central America, the Caribbean, South America, Southern Europe,

Eastern Europe, Africa, and Asia all had considerably higher rates of over-education. The results for marginal over-education is largely similar to the patterns just described.

Turning to structural factors in the labor market, the role of the demand-side factor was as expected and substantively similar across countries. A higher share of workers in knowledge-based industries was associated with lower levels of over-education and marginal over-education for recent immigrants in both the United States and Canada. The significant and negative interaction term for over-education indicates that the association was stronger in Canada. The role is similar in the two countries with respect to marginal over-education.

In contrast, the supply of university-educated recent immigrants was differently associated with over-education in the two countries. The share of university-educated recent immigrants was not significantly associated with over-education in the United States. It is even negatively related to marginal over-education, suggesting that a higher share of educated immigrants actually reduces the risk of marginal over-education for recent immigrants. However, the interaction term is significant and positive, pointing to a large positive association between supply of skilled recent immigrants and over-education in Canada. In other words, a large supply of highly-educated immigrants was significantly associated with a higher likelihood of over-education for recent immigrants in Canada.

The right panel of Table 4 shows the multilevel multinomial models for long-term immigrants in the United States and Canada. Similar to recent immigrants, the demand factor is negatively associated with over-education in both countries, though its role becomes negligible for marginal over-education among established immigrants. Unlike recent immigrants, the share of university-educated established immigrants was not significantly associated with over-education.

4.3 The role of immigrant selection mechanisms

One probable reason for the large cross-country difference in over-education among recent immigrants is the role played by employer selection. Skilled immigrants to the United States are much more likely to be selected by employers than their counterparts to Canada. The CEC and the Provincial Nominee Program (PNP) resemble employer selection mechanisms. Here, these two categories of immigrants are compared with those who were admitted under the Federal Skilled Worker Program (FSWP).[7] The majority of FSWP immigrants were admitted directly from abroad and had no prior contact with Canadian employers.

Table 5 presents the over-education rates among university-educated recent immigrants to Canada by admission category. The left panel presents the observed results, while the results in the right panel are based on multinomial regressions with the three-category over-education variable as the outcome and three-category admission class as the key predictor. University-educated recent immigrants who were admitted through the CEC had a much lower over-education rate and a higher rate of education–occupation match than FSWP immigrants. The differences between these two classes became slightly smaller after controlling for differences in demographic characteristics (right panel). For example, based on the BLS definition, the predicted probability of over-education was 28.6% for recent CEC immigrants and 37.0% for FSWP immigrants. The estimates based on alternative definitions were qualitatively similar. All adjusted differences between the CEC and FSWP were significant at the 0.001 level.

7. Among recent immigrants in this study (i.e., those who have been in Canada for 10 years or less), CEC immigrants were 7 years younger than FSWP immigrants, followed by PNP immigrants (about 4 years younger). CEC immigrants had the shortest duration of residence in Canada (about 3 years), compared with PNP (4.5 years) and FSWP immigrants (6.9 years). This is partly because the CEC was introduced more recently than the other categories. There was a lower share of PNP immigrants with a graduate degree (35%) than FSWP (50%) and CEC (40%) immigrants. South Asia, Southeast Asia and East Asia were the main source regions for CEC (61%), PNP (70%) and FSWP (64%) immigrants. South Asia was the top source region for CEC (28%) and FSWP (34%) immigrants, and Southeast Asia (primarily the Philippines) was the top source region for PNP immigrants (34%).

The difference between the CEC and FSWP is consistent with the hypothesis that employer selection improves education–occupation match for recent immigrants.

Meanwhile, PNP immigrants had a higher over-education rate than FSWP immigrants. All adjusted differences between the PNP and FSWP were significant at the 0.001 level. This is likely because the occupations selected for PNPs are often low- and semi-skilled, whereas our sample consisted of immigrants with at least a bachelor's degree. The disadvantage of PNP immigrants was also partly attributed to their demographic characteristics, particularly a lower probability of having a graduate degree and a higher probability of coming from Southeast Asia. It is likely that some university-educated immigrants use the PNP as an easier route to immigration than the points system.

The large difference between the CEC and PNP suggests that employer selection does not necessarily lead to superior labour market outcomes among immigrants. Only when employer selection is linked to skilled jobs, as is the case with most H-1B visa immigrants to the United States and CEC immigrants to Canada, do the benefits become evident.

Table 5
Over-education among recent immigrants with at least a bachelor's degree, aged 25 to 64, by admission class, Canada, 2016

	Observed (unadjusted)			Adjusted		
	Canadian Experience Class	Provincial nominees	Federal skilled workers	Canadian Experience Class	Provincial nominees	Federal skilled workers
	percent					
U.S. Bureau of Labor Statistics						
Over-education	26.5	49.8	36.7	28.6	43.1	37.0
Marginal over-education	6.3	9.1	9.7	8.2	9.6	9.3
Education–occupation match	67.3	41.0	53.6	63.2	47.2	53.7
Canadian National Occupational Classification						
Over-education	18.2	41.2	30.1	19.7	34.8	29.6
Marginal over-education	27.9	27.0	27.2	29.8	28.1	27.4
Education–occupation match	53.9	31.8	42.8	50.5	37.2	43.1
Occupational Information Network						
Over-education	19.6	43.3	28.9	21.3	36.2	28.7
Marginal over-education	10.6	13.0	14.3	12.9	13.7	14.5
Education–occupation match	69.8	43.7	56.8	65.7	51.0	56.8

Notes: The adjusted numbers are based on a multinomial model controlling for age, sex, marital status, graduate degree, years since immigration, home language, foreign education, and source region. All adjusted differences between the Canadian Experience Class and the Federal Skilled Workers Program (FSWP), and between the Provincial Nominee Program and FSWP are significant at the 0.001 level. The observed (unadjusted) or adjusted percentages may not add up to 100.0% because of rounding.

Source: Statistics Canada, 2016 Census.

5 Conclusion

The present study examines the prevalence of over-education and structural factors associated with it among immigrants to Canada and the United States. The results show that university-educated recent immigrants to Canada were much more likely to be overeducated than their U.S. peers. The cross-country difference was small for long-term immigrants, and native-born Americans were even slightly more likely to be overeducated than native-born Canadians. Most striking is the difference between recent immigrants and the native-born. While recent immigrants are more likely than the native-born to experience an education–occupation mismatch in both countries, the gap was much more pronounced in Canada than in the United States.

This study also provides insights into how the interaction between the immigration system and broader aspects of the labour market affects immigrants' labour market outcomes. When demand for skilled labour was strong, immigrants were more likely to find jobs matched to their educational qualifications in both countries. A greater supply of university-educated immigrants was positively associated with over-education in Canada, but this was not the case for the United States. These results likely suggest that a greater supply of university-educated recent immigrants in a smaller economy like Canada's reduces the country's ability to absorb immigrants. A smaller supply and greater demand, combined with an employment-based immigration selection system for skilled immigrants to the United States likely more effectively balances the supply of immigrants with domestic labour market demand. However, the possible impact of cross-country differences in supply–demand balance and immigrant selection is likely limited to the initial years after immigration as the difference in the over-education level was small among established immigrants in the two countries.

Within Canada, the over-education rate was significantly lower for CEC immigrants than for FSWP immigrants, while PNP immigrants had a higher over-education rate than FSWP immigrants. These results imply that only when employer selection is linked to skilled jobs, as is the case with most H-1B visa immigrants to the United States and CEC immigrants to Canada, do the benefits become evident.

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