Hou and Lu *IZA Journal of Development and Migration* (2017) 7:5
DOI 10.1186/s40176-017-0091-5

IZA Journal of Development and Migration

ORIGINAL ARTICLE Open Access

International students, immigration and earnings growth: the effect of a pre-immigration host-country university education

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Abstract

While destination-country education provides many potential advantages for immigrants, empirical studies in Australia, Canada and the USA have produced mixed results on the labour outcomes of immigrants who are former international students. This study uses large national longitudinal datasets to examine cross-cohort trends and within-cohort changes in earnings among three groups of young university graduates: immigrants who are former international students in Canada (Canadian-educated immigrants), foreign-educated immigrants who had a university degree before immigrating to Canada and the Canadian-born population. The results show that Canadian-educated immigrants on average had much lower earnings than the Canadian-born population but higher earnings than foreign-educated immigrants both in the short run and in the long run. However, Canadian-educated immigrants are a highly heterogeneous group, and the key factor differentiating their post-immigration earnings from the earnings of the Canadian-born population and foreign-educated immigrants is whether they held a well-paid job in Canada before becoming permanent residents. Furthermore, an extra year of Canadian work experience or an extra year of Canadian education experience before immigration added only a small or no earnings gain after immigration for Canadian-educated immigrants.

JEL Classification: J15, J24, J61

Keywords: International students, Immigration, Canadian education, Earnings

1 Introduction

The number of international students pursuing education in countries with advanced economies has been rising rapidly over recent decades. According to statistics for four English-speaking developed countries compiled by the United Nations Educational, Scientific and Cultural Organization (UNESCO), international students participating in tertiary education increased from 451,900 in 1999 to 784,000 in 2013 in the USA, from 232,500 to 416,700 in the UK, from 117,500 to 249,900 in Australia and from 32,500 to 135,200 (2012 statistics) in Canada.[1] Major receiving countries are becoming increasingly proactive in recruiting international students as a way to improve the financial health of educational institutions, attract talent and increase campus diversity

(Choudaha and Chang 2012). These countries also increasingly regard international students as an important group of young and well-educated individuals from which to select permanent residents. In Canada, for example, about one quarter of international students who arrived in the 1990s and 2000s transitioned into permanent residency within 10 years of obtaining their first study permit (Lu and Hou 2015).

There are many possible mechanisms through which Canadian education would benefit international students once they become permanent residents. One mechanism is the quality of education. Canadian education, particularly university education, is generally of higher quality and greater relevance to advanced economies than education received in the developing countries from which most contemporary immigrants to Canada originate (Bratsberg and Terrell 2002; Coulombe et al. 2014; Li and Sweetman 2014). A second mechanism is related to proficiency in English or French. Acquiring education in the receiving country would immerse international students in an environment that facilitates learning the official language of that country (Bleakley and Chin 2004; Bratsberg and Ragan 2002; Chiswick and Miller 1992). A third mechanism is acculturation (Tong 2010; Zeng and Xie 2004). Because they arrive younger and spend more years in Canada than foreign-educated immigrants, international students would gain better knowledge about the labour market and have more opportunities to establish social networks that could help their job search. Another possible mechanism is credentialism (Butcher 1994; Oreopoulos 2011; Painter 2013). Canadian employers are more familiar with Canadian educational qualifications than foreign ones and thus may prefer Canadian-educated immigrants over foreign-educated immigrants.

The above possible mechanisms have often been invoked to explain empirical findings that immigrants who received destination-country education outperform foreign-educated immigrants and even perform similarly to native-born workers in the labour market (e.g., Bratsberg and Terrell 2002; Zeng and Xie 2004). Some recent evidence, however, has raised doubts about the extent to which these mechanisms actually work for international students who become permanent residents. A few studies from Australia, Canada and the USA show that the earnings advantage of former international students over other economic immigrants is either small or non-existent (Birrell et al. 2006; Hou and Bonikowska 2016; Lowell and Avato 2014).

These findings have supported recent changes in immigrant selection policies in Australia and Canada. In the late 1990s, international students were regarded in Australia as ideal immigrant workers and were immediately eligible to immigrate. Policies were changed in the late 2000s, however, to restrict the study-to-immigration pathway to people with strong English proficiency, advanced degrees, employer sponsorship and work experience (Hawthorne and To 2014). In Canada, the Canadian Experience Class was initially introduced in 2008 to provide a direct pathway to permanent residency for international students who graduated from Canadian postsecondary educational institutions and for skilled temporary foreign workers. This program was modified in 2013 to target people who have at least 1 year of skilled work experience in Canada, regardless of whether they pursued Canadian postsecondary education. In the newly implemented Express Entry system for selecting economic immigrants, Canadian work experience is a key qualifying criterion, but Canadian study experience does not receive additional consideration (Bonikowska et al. 2015).[2] A conviction underlying these selection policies is that destination-country study experience

in and of itself is not necessarily an advantage. Instead, destination-country work experience—and, even more specifically, the earnings level—is a proven record that can be used to identify international students who will likely be successful in the labour market as permanent residents.

Given the large and rising number of international students in Western countries and the significant social and policy implications, a more comprehensive understanding of the study–immigration issue is needed (Hawthorne and To 2014; King and Raghuram 2013). This study uses three unique national longitudinal datasets to compare the earnings trajectories of immigrants who are former international students in Canada (Canadian-educated—CE immigrants), foreign-educated (FE) immigrants and the Canadian-born population. The study follows two cohorts of CE immigrants from the year when they became permanent residents. These immigrants had a university degree and were aged 25 to 34 when they became permanent residents. They are matched with the university-educated Canadian-born population and FE immigrants in the same age range. The focus on young university graduates allows for a clear comparison by immigration status and is also most relevant for policy issues related to the study-to-immigration transition.

This study asks two questions. First, do university-educated CE immigrants earn as much as Canadian-born university graduates both in the initial years after immigration and in the long term, and, if there is a large earnings gap between the two groups, what are the possible determinants? Second, do CE immigrants have a large earnings advantage over FE immigrants in the short and long run, and if they do, what are the possible determinants? The results suggest that the key factor differentiating the post-immigration earnings of CE immigrants from the earnings of the Canadian-born population and FE immigrants is whether international students held a well-paid job in Canada before becoming permanent residents. Years of Canadian work and study experience before becoming permanent residents have minimal effects on post-migration earnings among CE immigrants.

The remainder of this paper is organized in three sections. Section 2 consists of a discussion of the data sources, measures and analytical approaches. Section 3 presents descriptive statistics and multivariate analysis results. Section 4 concludes the paper.

2 Data and methods

2.1 Data

Three data sources are used to construct the study samples of CE immigrants, FE immigrants and the Canadian-born population.

The sample of CE immigrants is drawn from the linkage of three files: the Temporary Residents File (TRF), the Immigrant Landing File (ILF), and the T1 personal tax file. The TRF was created by Immigration, Refugees and Citizenship Canada (IRCC) and contains sociodemographic and administrative information on all temporary residents in Canada. Foreign students are identified among temporary residents as anyone who ever held a study permit issued by IRCC. The ILF contains the sociodemographic characteristics of permanent immigrants at the time of landing, including the highest level of completed education, age at immigration, class of immigration, official language and source country. The TRF–ILF linkage allows for the identification of former international students who made the transition into permanent residency. The T1 personal tax file includes annual information on income, taxes and some basic demographic characteristics,

but it does not contain information on immigration status and education. The tax file covers the period from 1982 to 2013, which is the most recent year available at the time of this study.

The sample of FE immigrants is derived from the Longitudinal Immigration Database (IMDB). The IMDB combines immigrant landing records and annual tax records for all immigrants who have arrived in Canada since 1980 and who have filed at least one tax return since 1982. Those who filed a tax return before landing (i.e., who lived in Canada before becoming permanent residents) and those who arrived before the age of 25 are excluded from the analysis as a way to exclude immigrants who might have acquired education in Canada before becoming permanent residents. Some CE immigrants and FE immigrants may pursue further education in Canada after immigration, and the regression models in this study control for this (see Section 2.2).

The sample of Canadian-born workers is created from the linkage between the 20% sample file of the 1991 Census and the Longitudinal Worker File, which is a 10% random sample of the taxfiling population, and the linkage between the 20% sample file of the 2006 Census (a subsample that could be linked to the 2011 National Household Survey) and the T1 personal tax file.[3] The census and NHS files allow the Canadian-born population and their educational attainment to be identified.

Common to all three data sources are the longitudinal earnings data from the tax file. The rate of taxfiling in Canada is very high, and the T1 personal tax file covers up to 95% of the Canadian working age population (Finnie 2007). Most working age individuals file tax returns every year, so attrition over time is quite low relative to longitudinal survey data. Therefore, the T1 personal tax file is representative both cross-sectionally and longitudinally.

This study compares the earnings trajectories of university-educated individuals, by immigration status, in two "entry" cohorts: the 1991 cohort and the 2006 cohort.[4] The 1991 cohort includes the Canadian-born population aged 25 to 34 in 1991 (the census year), FE immigrants who arrived in Canada and were aged 25 to 34 in 1991, and CE immigrants who became landed immigrants from 1990 to 1992 and were aged 25 to 34 in the year of landing. Three landing years are used for CE immigrants rather than one to increase the sample size. To ensure that CE immigrants who landed in different years are comparable with each other and with the Canadian-born population and FE immigrants, the study is restricted to a maximum of 20 years of follow-up, and regional economic conditions in each year when earnings were observed are controlled for, as are individual-level sociodemographic characteristics. Similarly, the 2006 cohort includes the Canadian-born population aged 25 to 34 in 2006, FE immigrants who arrived in Canada and were aged 25 to 34 in 2006, and CE immigrants who became landed immigrants from 2005 to 2007 and were aged 25 to 34 in the year of landing. This cohort is restricted to a maximum of six years of follow-up. All annual earnings are adjusted to 2013 constant dollars. In any given year, only people with at least $1000 in annual earnings are included in regression model estimations.

2.2 Measures

The outcome variable is annual employment earnings, which include total wages or salaries and positive net self-employment income. The tax file does not contain information

on working time (weeks or hours worked), so it is not possible to derive wage rates. Real annual earnings are top-coded at $300,000. The natural logarithm of real annual earnings is used in multivariate models. Since most immigrants cannot have a full year of employment in the calendar year when they first arrive, the earnings trajectories of all immigrants begin from the first full calendar year after immigration (e.g., for those who landed in 1991, 1992 was their first full year).

Three sets of explanatory variables are considered in accounting for group differences in earnings. One set is common to all three groups. The second set is specific to the Canadian-born population and CE immigrants, and the third is specific to CE and FE immigrants.

The first set includes age in the base year and its squared term, years since the base year and their squared term, months of full-time school attendance in each tax year and educational level (bachelor's degree and graduate degree). It also includes official language (English, French and others), visible minority status (visible minority and non-visible minority)[5] and geographic region of residence in each tax year (Atlantic region, Quebec, Ontario, Manitoba and Saskatchewan, Alberta and British Columbia). And it includes macroeconomic conditions as measured by regional unemployment rates among the population of prime working age in the year when earnings are observed.

The variables that are applicable only to the Canadian-born population and CE immigrants include years with positive earnings in Canada prior to the base year and the earnings level in Canada prior to the base year. The former is a conventional indicator of labour market work experience, while the latter represents the realized market value of individuals' job skills. The years with prior positive earnings are top-coded at 10, since information before 1982 is not available in the tax file. The level of prior earnings is measured as the maximum annual earnings prior to the base year in 2013 constant dollars, and it is coded into four categories: no prior earnings, low annual earnings ($20,000 or less), medium earnings ($20,000 to $50,000) and high earnings (over $50,000).

The variables that are applicable to both CE immigrants and FE immigrants include immigration class and source-country fixed effects. Immigration class is coded as skilled worker class, other economic class, family class, refugees and others. Previous Canadian studies have shown that labour market outcomes vary considerably by immigration class even after commonly measured human capital variables are controlled for (Hou and Picot 2014; Abbott and Beach 2011). Source-country fixed effects include 143 source countries for the 1991 cohort and 176 countries for the 2006 cohort.

Finally, the TRF contains a variable that is specific to CE immigrants—years of Canadian study—which is measured as the number of years in which a valid study permit was held in the 10 years prior to landing. This variable is used to capture the general acculturation effect. CE immigrants in this study all had a Canadian university education. When the educational level is controlled for (i.e., bachelor's degree versus graduate degree), more years of studying in Canada are likely associated with a high degree of acculturation in terms of mastering one or both of the official languages, establishing social networks, and gaining knowledge about the Canadian labour market and society.

2.3 Methods

Descriptive statistics are first produced to show the overall differences among the Canadian-born population, CE immigrants and FE immigrants in earnings trajectories and sociodemographic characteristics. Multivariate regression models are estimated to examine the extent to which the observed group differences in earnings can be accounted for by group differences in sociodemographic characteristics. To simplify the presentation, separate models are estimated to compare CE immigrants with the Canadian-born population and to compare CE immigrants with FE immigrants, since some key explanatory variables are not available for all three groups.

Three sequential models are constructed to compare CE immigrants with Canadian-born workers:

$$\text{Log earnings} = \beta_{ce}*\text{CE} + \beta_{ys}*YS + \beta_{ys2}*YS^2 + \beta_{cys}*\text{CE}*YS + \beta_{cys2}*\text{CE}*YS^2 + e \tag{1}$$

$$\text{Log earnings} = \beta_{ce}*\text{CE} + \beta_{ys}*YS + \beta_{ysb2}*YS^2 + \beta_{cys}*\text{CE}*YS + \beta_{cys2}*\text{CE}*YS^2 + \beta_x*X + e \tag{2}$$

$$\text{Log earnings} = \beta_{ce}*\text{CE} + \beta_{ys}*YS + \beta_{ys2}*YS^2 + \beta_{cys}*\text{CE}*YS + \beta_{cys2}*\text{CE}*YS^2 + \beta_x*X + \beta_p*P + e \tag{3}$$

Model 1 replicates the observed differences in log earnings trajectories between CE immigrants and the Canadian-born population, with the assumption that the earnings growth takes a quadratic function of years since the base year (*YS*) and the quadratic function is different between the two groups. CE is a dummy variable (CE immigrants = 1, and the Canadian-born population = 0). Model 2 adds in sociodemographic and macro-economic conditions (*X*) as discussed above in Section 2.2. Model 3 adds in years of work experience and the earnings level (*P*) in Canada prior to the base year.

Similarly, three models are estimated to compare CE and FE immigrants, with two differences. Model 2 also includes immigration class and source-country fixed effects, which are specific to immigrants. In model 3, years of work experience, the earnings level in Canada prior to the base year and years of Canadian study are added. These variables are not available for FE immigrants and thus should be interpreted as conditional interaction terms.

Although individuals are followed longitudinally starting from the base year in the study data, these data are not a balanced panel consisting of individuals who were employed in all years. The advantage of using this unbalanced panel is that the analysis can capture all individuals who ever worked in any given year, thus providing a fuller picture of the economic performance of immigrants. This is particularly important for CE immigrants, who are more likely to pursue further studies after the base year than FE immigrants and the Canadian-born population (as shown below in Tables 1 and 2). Additional analyses are conducted for a sample that excludes individuals who took at least 1 month of full-time study in a year. The results are compared with those from the full sample. Furthermore, comparing the number of persons and person-years in Table 1 and 2 suggests that immigrants (both Canadian-educated and foreign-educated)

Table 1 Means of variables, by immigration status, men with a university degree aged 25 to 34 in the base year, 1991 and 2006 cohorts

	1991 cohort			2006 cohort		
	Canadian-born men	Canadian-educated immigrants	Foreign-educated immigrants	Canadian-born men	Canadian-educated immigrants	Foreign-educated immigrants
	Mean					
First-year earnings (2013 constant dollars)	60,303	31,025	24,294	63,099	36,730	31,343
Log first-year earnings	10.77	9.98	9.74	10.80	10.14	10.05
Years since the base year	10.36	9.46	10.12	3.50	3.43	3.52
Age in the base year	29.66	29.10	29.51	29.41	28.42	30.23
Graduate degrees	0.25	0.49	0.21	0.24	0.45	0.33
Months of study in a year	0.08	0.29	0.12	0.58	1.62	0.60
French	0.33	0.06	0.05	0.25	0.04	0.04
Other languages	…	0.03	0.23	…	0.01	0.08
Visible minorities	0.04	0.91	0.76	0.10	0.85	0.79
Atlantic region	0.07	0.03	0.01	0.06	0.03	0.01
Quebec	0.28	0.19	0.16	0.23	0.25	0.23
Manitoba and Saskatchewan	0.06	0.04	0.02	0.06	0.04	0.04
Alberta	0.11	0.10	0.08	0.11	0.15	0.13
British Columbia	0.09	0.17	0.18	0.11	0.13	0.13
Skilled worker class	…	0.62	0.29	…	0.77	0.69
Other economic class	…	0.03	0.06	…	0.05	0.10
Family class	…	0.25	0.43	…	0.14	0.19
Refugees	…	0.10	0.21	…	0.04	0.02
Regional unemployment rate (percentage)	7.29	7.06	6.82	5.96	5.98	5.99
No prior earnings in Canada	0.01	0.09	…	0.00	0.12	…
Low prior earnings	0.08	0.40	…	0.11	0.40	…
Medium prior earnings	0.29	0.37	…	0.32	0.35	…
High prior earnings	0.62	0.14	…	0.57	0.14	…
Years of prior Canadian work experience	7.04	2.97	…	7.34	3.16	…
Years of Canadian study	…	3.96	…	…	3.84	…
Sample size (unique persons)	4523	3176	4191	7714	7730	9615
Person-years	79,574	37,872	56,836	43,788	37,660	48,265

Sources: Statistics Canada, 1991 Census and Longitudinal Worker File linkage; 2006 Census and T1 personal tax file linkage; Temporary Residents File, Immigrant Landing File and T1 personal taxfile linkage; and Longitudinal Immigration Database
… not applicable

Table 2 Means of variables, by immigration status, women with a university degree aged 25 to 34 in the base year, 1991 and 2006 cohorts

	1991 cohort			2006 cohort		
	Canadian-born women	Canadian-educated immigrants	Foreign-educated immigrants	Canadian-born women	Canadian-educated immigrants	Foreign-educated immigrants
	Mean					
First-year earnings (2013 constant dollars)	44,506	26,086	19,130	47,677	30,677	20,855
Log first-year earnings	10.45	9.78	9.50	10.52	9.97	9.58
Years since the base	10.45	9.81	10.55	3.50	3.41	3.54
Age in the base year	29.49	28.57	29.15	29.36	28.03	29.37
Graduate degrees	0.24	0.34	0.17	0.26	0.40	0.30
Months of study in a year	0.10	0.23	0.14	0.51	1.39	0.62
French	0.30	0.05	0.04	0.28	0.03	0.04
Other languages	0.00	0.04	0.24	0.00	0.01	0.11
Visible minorities	0.04	0.85	0.71	0.09	0.80	0.75
Atlantic region	0.08	0.02	0.01	0.08	0.02	0.01
Quebec	0.26	0.16	0.13	0.26	0.24	0.21
Manitoba and Saskatchewan	0.06	0.04	0.04	0.05	0.04	0.05
Alberta	0.10	0.07	0.07	0.10	0.11	0.13
British Columbia	0.09	0.19	0.18	0.11	0.18	0.15
Skilled worker class	…	0.43	0.15	…	0.58	0.35
Other economic class	…	0.16	0.20	…	0.10	0.33
Family class	…	0.33	0.48	…	0.28	0.31
Refugees	…	0.08	0.18	…	0.04	0.02
Regional unemployment rate (percentage)	7.25	6.94	6.66	6.07	5.99	5.95
No prior earnings in Canada	0.01	0.14	…	0.00	0.16	…
Low prior earnings	0.09	0.43	…	0.11	0.42	…
Medium prior earnings	0.41	0.35	…	0.41	0.33	…
High prior earnings	0.48	0.08	…	0.47	0.09	…
Years of prior Canadian work experience	6.97	2.59	…	7.48	3.09	…
Years of Canadian study	…	3.55	…	…	3.92	…
Sample size (unique persons)	4716	1661	3353	11,564	5912	9629
Person-years	80,635	20,005	44,300	64,446	27,304	42,614

Sources: Statistics Canada, 1991 Census and Longitudinal Worker File linkage; 2006 Census and T1 personal tax file linkage; Temporary Residents File, Immigrant Landing File and T1 personal tax file linkage; and Longitudinal Immigration Database
… not applicable

are more likely to be absent from the sample in some years than the Canada born. For example, for the 1991 cohort men, the Canadian born were observed on average in 18 years, while CE and FE immigrants were observed on average in 12 and 14 years, respectively.[6] To check whether the results are sensitive to different rates of absence from the sample by immigration status, the analyses are repeated for individuals who had non-trivial annual earnings (i.e., over $1000) in at least 18 years (out of a possible 20 total years of observation) for the 1991 cohort and in at least 5 years (out of a maximum of 6 years) for the 2006 cohort. The main conclusions on group differences in earnings trajectories and the role played by work history before the base year are essentially the same from these restricted samples as those from the unbalanced sample.

In regression models, cluster-robust standard errors are estimated to correct the independence among multiple observations of the same individual. Alternatively, random effects models are estimated and the results are broadly similar.[7] All models are estimated separately for men and women.

3 Empirical results

3.1 Group differences in explanatory factors and earnings

Table 1 presents descriptive statistics that show differences in explanatory variables between university-educated Canadian-born men, CE immigrant men and FE immigrant men for the 1991 and 2006 cohorts. Table 2 is for women.

CE immigrants tended to be slightly younger by half a year to one and a half years than the other two groups, depending on cohort and gender. A much higher share of them had a graduate degree, and they were more likely to undertake further education after the base year. CE immigrants were also more likely to belong to visible minority groups. For instance, in the 2006 cohort, 85% of CE immigrant men belonged to a visible minority, while the corresponding share was 10% for Canadian-born men and 79% for FE immigrants. These group differences were similar in the 1991 and 2006 cohorts.

The average months of study in the earnings year increased for all three groups from the 1991 cohort to the 2006 cohort. This increase was due to two factors. First, the latter cohort was followed for only 6 years, while the former was followed for 20 years. The likelihood of undertaking additional study was higher in the first few years in the follow-up.[8] Second, there was an increase in the average months of study for a given follow-up year between the 1991 and 2006 cohorts. For instance, in the first follow-up year, the average months of study increased from 0.15 to 0.92 for Canadian-born men, from 0.81 to 3.12 for CE immigrants and from 0.15 to 0.65 for FE immigrants.

Relative to the Canadian-born population, proportionally more CE immigrants did not work or had low earnings in Canada. For instance, in the 2006 cohort, about 14% of CE immigrant men had high earnings in Canada before the base year, compared with 62% of Canadian-born men. About 12% of CE immigrant men never worked in Canada before the base year, while almost all Canadian-born men had positive earnings in at least 1 year. CE immigrants also had about four fewer years of work experience in Canada than the Canadian-born population. These gaps in work history could result from a variety of factors: pursuing education beyond the bachelor's level at a higher rate, starting Canadian university education at a later age and having more difficulties in finding a job after graduation.

Relative to FE immigrants, CE immigrants were more likely to be admitted in the skilled worker class, particularly in the 1991 cohort. Essentially, all CE immigrants could speak an official language of Canada, but 8% of FE immigrant men and 11% of FE immigrant women could not in the 2006 cohort.

Figures 1, 2, 3 and 4 present earnings trajectories among individuals with only a bachelor's degree by immigration status, sex and cohort. Since a much higher share of CE immigrants have a graduate degree, comparing earnings at the same educational level could take into account group differences in educational level. Charts for individuals with a graduate degree showed similar patterns and are not reproduced here.

In Fig. 1, CE immigrant men with a bachelor's degree in the 1991 cohort had a very large earnings gap, at −0.84 log point, relative to Canadian-born men with the same level of education (i.e., CE immigrants earned 43% of the average earnings of Canadian-born men [exp(−0.84) = 43%]) in the first year after the base year. The gap narrowed to −0.48 log point 10 years after the base year (i.e., CE immigrants earned 62% of the average earnings of Canadian-born men); the gap stabilized afterwards. Relative to FE immigrants, CE immigrant men had higher initial earnings, by 0.19 log point (or about 21%), and the advantage barely changed over the 20-year follow-up period. Previous Canadian studies that examined the earnings differential between immigrants and the Canadian born relied on either longitudinal tax data or census data, and thus could not make closely matched comparisons as in the present study. Tax data do not contain education for the Canadian born so the comparison can only be made between immigrants and all Canadian-born workers. For example, Li (2003) showed that economic immigrants who arrived between 1990 and 1991 and aged 15 to 49 had an earnings gap of −1.05 with Canadian-born tax filers in the first year after immigration. While the census data allow the comparison between immigrants and the Canadian born with similar characteristics (notably education), it does not have yearly data. For instance, using census data, Bonikowska et al. (2011) found that university-educated immigrant men who arrived between 2000 and 2005 and aged 25 to 54 had an earnings gap of −0.67 log points with the Canadian born within the first 5 years after arrival. In our data, the first 5-year average gap for the 2006 cohort men was −0.55 for CE immigrants and −0.75 for FE immigrants aged 25 to 34 at the time of immigration.

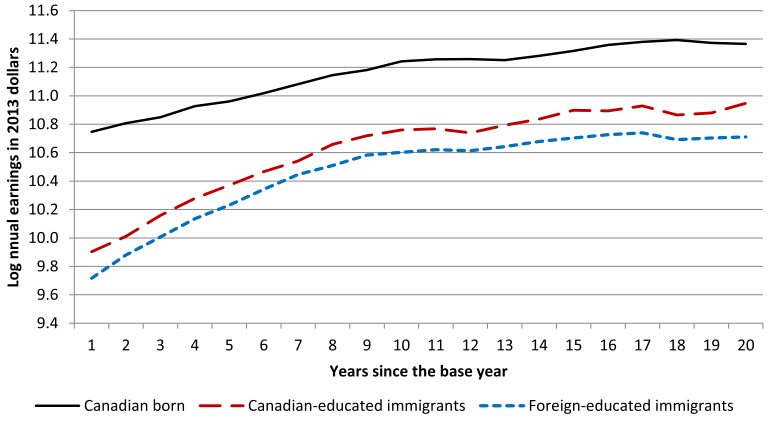

Fig. 1 Log annual earnings of male workers with a bachelor's degree, by immigration status, 1991 cohort

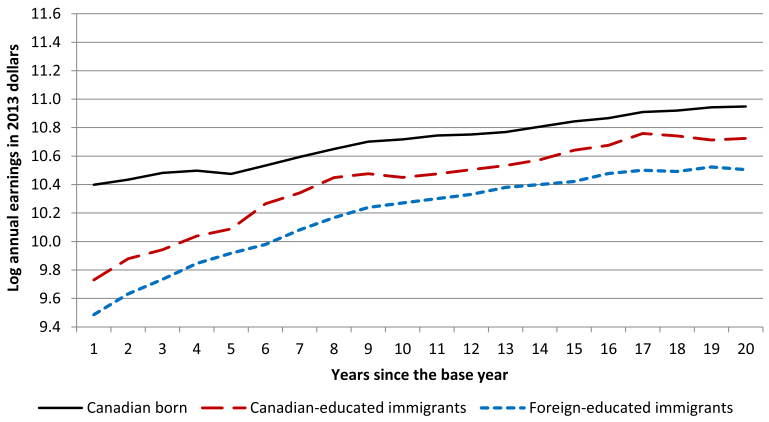

Fig. 2 Log annual earnings of female workers with a bachelor's degree, by immigration status, 1991 cohort

The group differences in earnings for women in Fig. 2 were similar to those observed for men. Relative to their male counterparts, CE immigrant women had a smaller gap in earnings with the Canadian-born population, while their advantage over FE immigrants in earnings was somewhat larger. CE immigrant women had a large earnings gap, at −0.67 log point, relative to Canadian-born women with the same education level (or 49% lower than the average for Canadian-born women) in the first year. This gap narrowed to −0.24 log point (or 20% lower than the average for Canadian-born women) by the 10th year and remained stable afterwards.

The patterns of group differences in earnings trajectories for the 2006 cohort (Figs. 3 and 4) are broadly similar to those for the 1991 cohort. One discernible change is that the advantage of CE immigrant women relative to FE immigrant women was larger in the 2006 cohort than in the 1991 cohort. This is because CE immigrants experienced a much larger increase in earnings between the 1991 and 2006 cohorts than FE immigrant women.

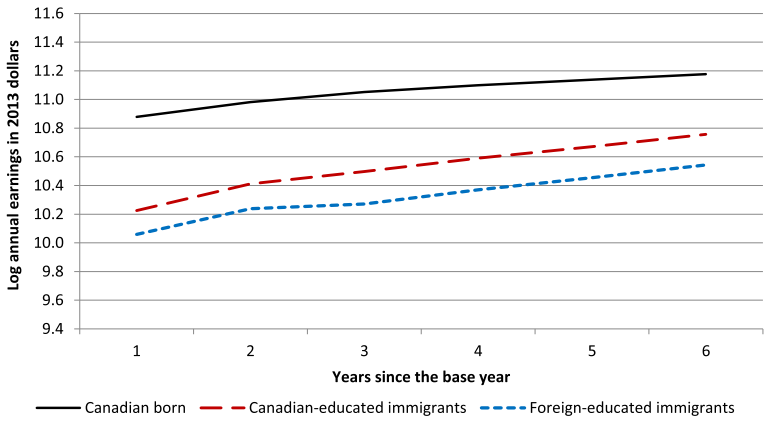

Fig. 3 Log annual earnings of male workers with a bachelor's degree, by immigration status, 2006 cohort

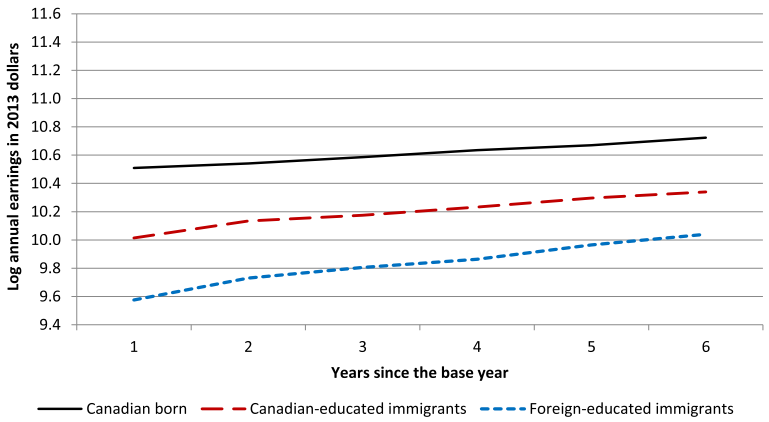

Fig. 4 Log annual earnings of female workers with a bachelor's degree, by immigration status, 2006 cohort

3.2 Comparing Canadian-educated immigrants with the Canadian-born population

Table 3 presents the results of multivariate regression models that compare the earnings of university-educated CE immigrant men and Canadian-born men and factors associated with their earnings gaps for the 1991 and 2006 cohorts. Table 4 presents the same models for women.

The first three models in Table 3 were estimated for the 1991 cohort. Model 1 shows that there was a very large initial earnings gap between CE immigrant men and Canadian-born men (−0.760 log point, or CE immigrants earned about 46% of what Canadian-born men earned). The earnings of CE immigrant men grew more rapidly, as indicated by the positive interaction term between CE immigrants and years since the base year. However, they could not catch up with those of the Canadian-born population because their growth rate started to level off after about 10 years, as indicated by the negative interaction term between CE immigrants and squared years since the base year. When the sociodemographic control variables were added for model 2, the initial earnings gap of CE immigrants decreased from −0.760 to −0.549 log point. Figure 5 plots the estimated earnings trajectories for Canada-born men with a bachelor's degree (solid line without square markers) and CE immigrant men with a bachelor's degree (dash line without square markers). It shows that the earnings gap reduced to about −0.22 log point by 20th year after the base year. The decreases in the estimated initial and long-term earnings gaps were mostly attributable to the high share of visible minorities among CE immigrants; visible minorities had a large earnings gap (−0.193 log point) with the white group.

When variables representing work history before the base year were added for model 3, the initial earnings gap of CE immigrants was further reduced to −0.245 log point. The estimated earnings trajectories for Canadian-born men (solid line with square markers) and for CE immigrant men (dash line with square markers) in Fig. 5 show that CE immigrant men would surpass Canadian-born men in earnings 6 years after the base year if both groups had the same work history before the base year. Having high earnings before the base year was associated with a very large earnings advantage (0.800 log point); while having medium earnings before the base year was associated with a moderate earnings advantage (0.241 log point). In contrast, having low earnings before the base year was not associated with any significant earnings advantage after

Table 3 Regression models comparing earnings between Canadian-educated immigrant men and Canadian-born men with a university degree, 1991 and 2006 cohorts

	1991 cohort			2006 cohort		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
	coefficient					
Canadian-educated immigrants	−0.760 ***	−0.549 ***	−0.245 ***	−0.660 ***	−0.324 ***	0.003
Years since the base year	0.074 ***	0.066 ***	0.068 ***	0.101 ***	0.089 ***	0.098 ***
Squared years since base year	−0.002 ***	−0.002 ***	−0.002 ***	−0.007 ***	−0.006 ***	−0.007 ***
Canadian-educated immigrants interacted with years since base year	0.071 ***	0.056 ***	0.062 ***	0.105 ***	0.032 ***	0.055 ***
Canadian-educated immigrants interacted with squared years since base year	−0.003 ***	−0.002 ***	−0.002 ***	−0.007 **	−0.002	−0.004 *
Age in the base year	…	0.183 **	−0.070	…	0.103	−0.105
Age squared	…	−0.003 **	0.001	…	−0.001	0.002
Graduate degrees	…	0.227 ***	0.218 ***	…	0.144 ***	0.149 ***
Months of study in a year	…	−0.180 ***	−0.157 ***	…	−0.101 ***	−0.084 ***
French	…	0.006	0.007	…	0.099 **	0.059 *
Other languages	…	−0.273 **	−0.211 **	…	−0.379 ***	−0.207 *
Visible minorities	…	−0.193 ***	−0.036	…	−0.125 **	−0.057
Atlantic region	…	−0.193 ***	−0.122 ***	…	−0.107 **	−0.051 *
Quebec	…	−0.219 ***	−0.129 ***	…	−0.287 **	−0.143 ***
Manitoba and Saskatchewan	…	−0.247 ***	−0.186 ***	…	−0.040	0.004
Alberta	…	−0.017	0.005	…	0.216 ***	0.194 ***
British Columbia	…	−0.207 ***	−0.157 ***	…	−0.116 ***	−0.081 ***
Regional unemployment rate	…	−0.010 **	−0.009 *	…	−0.007	−0.014 ***
Low prior earnings	…	…	0.039	…	…	0.181 ***
Medium prior earnings	…	…	0.241 ***	…	…	0.559 ***
High prior earnings	…	…	0.800 ***	…	…	1.130 ***
Years of prior Canadian work experience	…	…	0.030 ***	…	…	0.010
Intercept	10.758 ***	8.099 ***	11.438 ***	10.807 ***	9.114 ***	11.631 ***

Note: The model *R*-squared is 0.150, 0.208 and 0.312 in models 1, 2 and 3, respectively, for the 1991 cohort, it is 0.108, 0.257 and 0.393 in models 1, 2 and 3, respectively, for the 2006 cohort. Sources: Statistics Canada, 1991 Census and Longitudinal Worker File linkage; 2006 Census and T1 personal tax file linkage; Temporary Residents File, Immigrant Landing File and T1 personal tax file linkage, and Longitudinal Immigration Database

… not applicable

*Significantly different from reference category ($p < 0.05$), **$p < 0.01$, ***$p < 0.001$

the base year. One year of Canadian work experience before the base year was associated with higher earnings of 0.030 log point in the years after the base year. The effect of the earnings level in Canada before immigration was about three times as large as the effect of years of prior work experience, in terms of the contribution to the decrease in the earnings gap of CE immigrants from model 2 to model 3.[9] In addition, the large and significant coefficient of visible minority status in model 2 became non-significant in model 3. This change suggests that a lower share of people who belong to a visible minority had high earnings in the early stage of their careers.

The three models in the right panel were estimated for CE immigrant men and Canadian-born men in the 2006 cohort. As with the 1991 cohort, the earnings gap of CE immigrants became smaller from model 1 to model 2 and was further reduced from

Table 4 Regression models comparing earnings between Canadian-educated immigrant women and Canadian-born women with a university degree, 1991 and 2006 cohorts

	1991 cohort			2006 cohort		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
	Coefficient					
Canadian-educated immigrants	−0.617 ***	−0.624 ***	−0.343 ***	−0.540 ***	−0.374 ***	−0.021
Years since the base year	0.040 ***	0.038 ***	0.037 ***	0.060 ***	0.046 ***	0.052 ***
Squared years since base year	0.000 ***	0.000 **	0.000 *	−0.002	−0.001	−0.001
Canadian-educated immigrants interacted with years since base year	0.071 ***	0.067 ***	0.070***	0.061 **	0.032 *	0.047 ***
Canadian-educated immigrants interacted with squared years since base year	−0.003 ***	−0.003 ***	−0.003 ***	−0.005	−0.004	−0.005 *
Age in the base year	…	−0.054	−0.270 ***	…	−0.164 **	−0.290 ***
Age squared	…	0.001	0.004 ***	…	0.003 **	0.005 ***
Graduate degrees	…	0.276 ***	0.235 ***	…	0.201 ***	0.170 ***
Months of study in a year	…	−0.109 ***	−0.091 ***	…	−0.087 ***	−0.074 ***
French	…	0.082 **	0.093 ***	…	0.103 ***	0.071 **
Other languages	…	−0.178	−0.107	…	−0.163	0.005
Visible minorities	…	0.046	0.144 ***	…	−0.020	0.020
Atlantic region	…	−0.148 ***	−0.086 *	…	−0.060 *	0.015
Quebec	…	−0.151 ***	−0.065 *	…	−0.253 ***	−0.125 ***
Manitoba and Saskatchewan	…	−0.211 ***	−0.168 ***	…	−0.057 *	−0.024
Alberta	…	−0.067 *	−0.088 **	…	0.066 *	0.047
British Columbia	…	−0.167 ***	−0.106 ***	…	−0.127 ***	−0.071 **
Regional unemployment rate	…	−0.003	−0.007	…	−0.007	−0.009 *
Low prior earnings	…	…	0.078	…	…	0.252 ***
Medium prior earnings	…	…	0.355 ***	…	…	0.573 ***
High prior earnings	…	…	0.822 ***	…	…	1.078 ***
Years of prior Canadian work experience	…	…	0.015 *	…	…	0.017 **
Intercept	10.448 ***	11.086 ***	13.935 ***	10.522 ***	12.881 ***	14.172 ***

Note: the model *R*-squared is 0.077, 0.115, and 0.201 in models 1, 2 and 3, respectively, for the 1991 cohort, it is 0.066, 0.146, and 0.250 in models 1, 2 and 3, respectively, for the 2006 cohort. Sources: Statistics Canada, 1991 Census and Longitudinal Worker File linkage; 2006 Census and T1 personal tax file linkage; Temporary Residents File, Immigrant Landing File and T1 personal tax file linkage; and Longitudinal Immigration Database

… not applicable

*Significantly different from reference category ($p < 0.05$), **$p < 0.01$, ***$p < 0.001$

model 2 to model 3, becoming not statistically significant. Figure 6 plots the estimated earnings trajectories for Canada-born men and CE immigrant men based on model 2 and model 3. The estimated results show that CE immigrant men would surpass Canadian-born men in earnings in the second year after the base year if both groups had the same work history before the base year. The reduction in the gap from model 1 to model 2 was mostly attributable to the inclusion of visible minority status and months of study, as most CE immigrants belonged to a visible minority, and they spent more months studying after the base year than the Canadian-born population. The decrease in the earnings gap from model 2 to model 3 was almost entirely attributable to the earnings level before immigration. Years of prior work experience were not a significant predictor of earnings for the 2006 cohort. Compared with the results for the

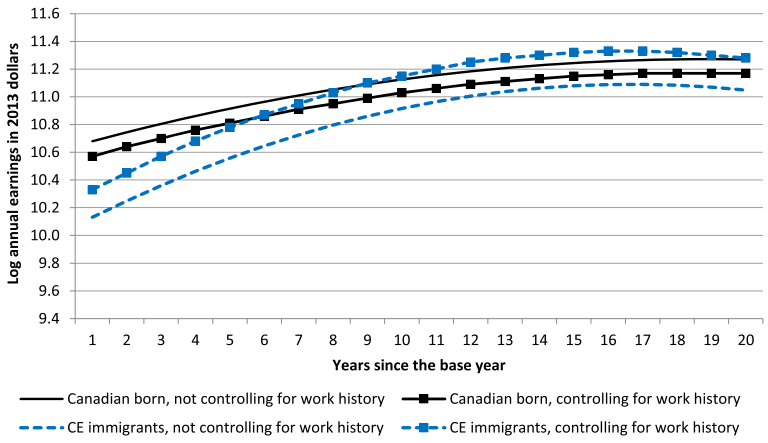

Fig. 5 Estimated log annual earnings of male workers with a bachelor's degree, by immigration status, 1991 cohort

1991 cohort, the effect of the earnings level before immigration became much stronger for the 2006 cohort. Even individuals with low earnings had a significant earnings advantage over those who did not work before the base year.

To further examine how the higher tendency of CE immigrants to take some months of full-time study in a year may affect the group differences in earnings trajectories, we re-ran all the models in Table 3 after excluding observations that took some months of full-time study in a year. The remaining sample was 95% of the original pooled sample of the Canadian-born and CE immigrant men in the 1991 cohort, about 88% of the original pooled sample in the 2006 cohort. The exclusion of the student sample reduced the estimated earnings gap from model 1 (no controls) by 0.14 percentage points (from −0.76 to −0.62) in the base year and 0.16 percentage points (from −0.49 to −0.33) 20 years after. However, the differences were small in the estimated results from the two samples after adjusting for sociodemographic characteristics, as in model 2 and model 3. For instance, in model 2 for the 1991 cohort, the estimated earnings gap was −0.51 in the base year and −0.21 after 20 years in the restricted sample, compared with −0.55 and −0.22 in the original sample. These comparisons suggest that the inclusion

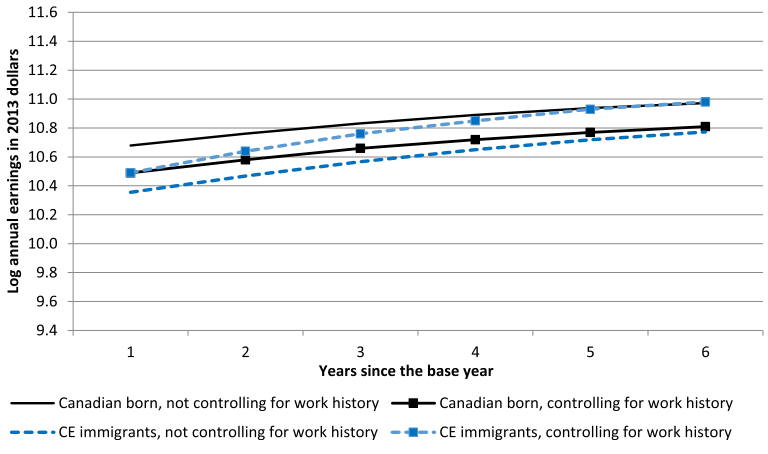

Fig. 6 Estimated log annual earnings of male workers with a bachelor's degree, by immigration status, 2006 cohort

of months of full-time study as a control variable in the models using the original sample produced results that were very similar to those from the sample excluding observations that took some months of full-time study.[10]

The results of the multivariate models comparing CE immigrant women and Canadian-born women in Table 4 are generally similar to those for men. Figure 7 plots the estimated earnings trajectories for Canada-born and CE immigrant women with a bachelor's degree based on model 2 and model 3 for the 1991 cohort. Figure 8 is for the 2006 cohort. Both charts suggest that work history before the base year was the key determinant of the earnings gap between Canadian-born and Canadian-educated immigrant women in both the initial and long-term earnings.

One noticeable difference between women and men is that visible minority status was not associated with an earnings disadvantage for either the 1991 cohort or the 2006 cohort. As a result, controlling for visible minority status made very little change in the earnings gap of CE immigrant women from model 1 to model 2 in the 1991 cohort. The relatively large decrease in the earnings gap of CE immigrants from model 1 to model 2 for the 2006 cohort was due mostly to the group difference in months of study. As with men, the disadvantages in the earnings level before the base year and in the years of work experience before the base year accounted for about one half for the 1991 cohort or essentially all for the 2006 cohort of the earnings gap of CE immigrant women. In terms of the contribution to the earnings gap, the effect of the earnings level was about five times that of years of Canadian work experience for both the 1991 cohort and the 2006 cohort.

3.3 Comparing Canadian-educated and foreign-educated immigrants

Table 5 presents the results of multivariate regression models that compare the earnings of university-educated CE and FE immigrant men and factors associated with their earnings gaps for the 1991 and 2006 cohorts.

The three models in the left panel in Table 5 are for the 1991 cohort. CE immigrant men had higher initial earnings (0.210 log point in model 1) and a higher growth rate (about 0.012 log point per year) than FE immigrants. After sociodemographic

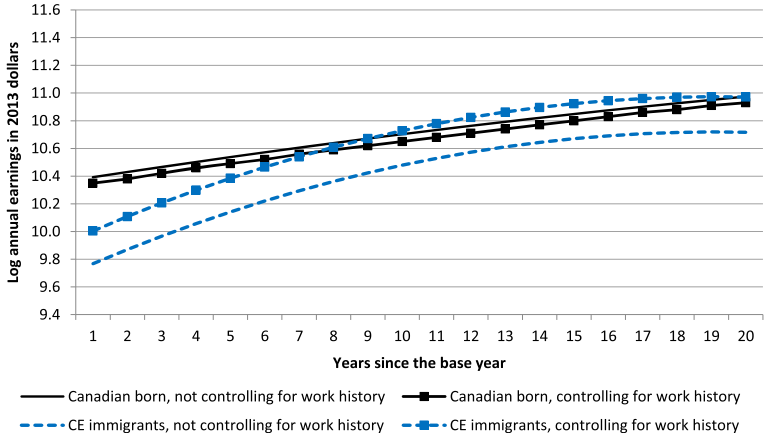

Fig. 7 Estimated log annual earnings of female workers with a bachelor's degree, by immigration status, 1991 cohort

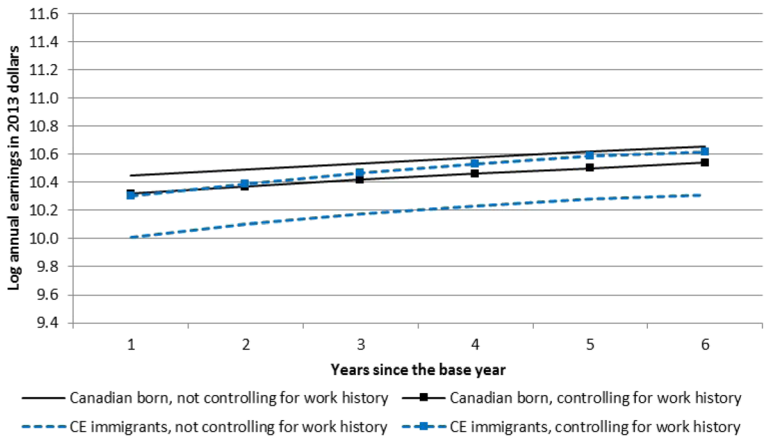

Fig. 8 Estimated log annual earnings of female workers with a bachelor's degree, by immigration status, 2006 cohort

characteristics and source-country fixed effects were controlled for in model 2, the initial earnings advantage of CE immigrants narrowed slightly to 0.171 log point, and they no longer had a higher growth rate relative to FE immigrants. These changes were attributable mostly to the larger share of CE immigrants with a graduate degree and the smaller share not speaking English or French. Source-country fixed effects did not contribute much to the earnings differences between CE and FE immigrants.

When the conditional interaction terms of work history and years of study in Canada among CE immigrants (variables that do not apply to FE immigrants, as mentioned in Section 2.3) were included in model 3 for the 1991 cohort (Table 5), the coefficient for CE immigrants became negative and significant at −0.259 log point. This negative coefficient implies that CE immigrants who did not have any Canadian work history before they became permanent residents earned significantly less than otherwise observably equivalent FE immigrants. This point is further illustrated in Table 7, which presents the estimated earnings gap between FE immigrants and CE immigrants with various combinations of Canadian work history and years of study in Canada, based on the regression coefficients in model 3. The choice of 4 years of study in Canada and 3 years of Canadian work experience before immigration for CE immigrants in the estimation was based on the observed averages for these two variables as reported in Tables 1 and 2.

Table 7 shows that CE immigrant men with 4 years of study in Canada but no Canadian work experience before immigration earned less than observably equivalent FE immigrants in both the initial years after landing and the long run. CE immigrant men with 4 years of study in Canada and 3 years of experience with low earnings performed similarly to FE immigrants in the initial years after immigration but slightly better in the long run. However, CE immigrants with medium or high earnings in Canada before immigration had much higher earnings than FE immigrants in both the short run and the long run. These estimates clearly suggest that having medium or high earnings in Canada before immigration was the key factor that put CE immigrants at an advantage over FE immigrants after immigration. As will be further discussed below, the earnings level before immigration likely reflects the observed and unobserved skills of CE immigrants and the match between skills and labour market demand. Meanwhile, years of Canadian work experience or years of Canadian education mattered much less.

Table 5 Regression models comparing earnings between Canadian-educated immigrant men and foreign-educated immigrant men with a university degree, 1991 and 2006 cohorts

	1991 cohort			2006 cohort		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
	Coefficient					
Canadian-educated immigrants	0.210 ***	0.171 ***	−0.259 ***	0.072 ***	0.259 ***	−0.140 ***
Years since the base year	0.133 ***	0.115 ***	0.115 ***	0.124 ***	0.177 ***	0.182 ***
Squared years since base year	−0.005 ***	−0.004 ***	−0.004 ***	−0.006 ***	−0.016 ***	−0.016 ***
Canadian-educated immigrants interacted with years since base year	0.012 *	0.000	0.003	0.081 ***	−0.022 *	−0.009
Canadian-educated immigrants interacted with squared years since base year	0.000	0.000	0.000	−0.008 ***	0.003	0.002
Age in the base year	…	0.082	0.072	…	0.062	0.060
Age squared	…	−0.002	−0.001	…	−0.001	−0.001
Graduate degrees	…	0.249 ***	0.206 ***	…	0.095 ***	0.086 ***
Months of study in a year	…	−0.149 ***	−0.141 ***	…	−0.092 ***	−0.086 ***
French	…	−0.213 **	−0.208 ***	…	−0.081 **	−0.086 **
Other languages	…	−0.246 ***	−0.251 ***	…	−0.215 ***	−0.222 ***
Atlantic region	…	0.127	0.143 *	…	0.145 ***	0.121 ***
Quebec	…	−0.187 ***	−0.166 ***	…	−0.225 ***	−0.176 ***
Manitoba and Saskatchewan	…	−0.114 **	−0.106 **	…	−0.035	−0.039
Alberta	…	−0.030	−0.040	…	0.234 ***	0.217 ***
British Columbia	…	−0.203 ***	−0.193 ***	…	−0.044 *	−0.047 **
Regional unemployment rate	…	−0.027 ***	−0.027 ***	…	−0.032 ***	−0.035 ***
Other economic class	…	−0.111 **	−0.072	…	−0.159 ***	−0.134 ***
Family class	…	−0.205 ***	−0.153 ***	…	−0.251 ***	−0.195 ***
Refugees	…	−0.124 ***	−0.109 **	…	−0.476 ***	−0.427 ***
Low prior earnings	…	…	0.098	…	…	0.205 ***
Medium prior earnings	…	…	0.276 ***	…	…	0.510 ***
High prior earnings	…	…	0.656 ***	…	…	0.925 ***
Years of prior Canadian work experience	…	…	0.028 **	…	…	0.012 *
Years of Canadian study	…	…	0.018 **	…	…	−0.012 *
Intercept	9.788 ***	9.269 ***	9.425 ***	10.075 ***	8.517 ***	9.759 ***
Source-country fixed effect	No	Yes	Yes	No	Yes	Yes

Note: the model *R*-squared is 0.132, 0.239 and 0.254 in models 1, 2 and 3, respectively, for the 1991 cohort; it is 0.054, 0.217 and 0.236 in models 1, 2 and 3, respectively, for the 2006 cohort. Sources: Statistics Canada, 1991 Census and Longitudinal Worker File linkage; 2006 Census and T1 personal tax file linkage; Temporary Residents File, Immigrant Landing File and T1 personal tax file linkage; and Longitudinal Immigration Database

… not applicable

*Significantly different from reference category ($p < 0.05$), **$p < 0.01$, ***$p < 0.001$

The pattern of earnings differences between CE and FE immigrant men in the 2006 cohort is generally similar to that observed in the 1991 cohort. Model 1—in the right panel of Table 5 for the 2006 cohort—shows that CE immigrants on average had higher initial earnings, by 0.072 log point, and more rapid earnings growth than FE immigrants. When sociodemographic factors and source-country fixed effects are controlled for, CE immigrants had an even larger advantage in initial earnings, by 0.259 log point, but a smaller growth rate than FE immigrants. These changes were due to CE

immigrants spending more months studying after immigration. Model 3 in Table 5 and the estimated earnings differences in Table 7 between FE immigrants and CE immigrants with various combinations of Canadian work history and years of Canadian study show that only CE immigrants with medium or high earnings in Canada before immigration had a large earnings advantage over FE immigrants after immigration. The effect on post-immigration earnings of having medium or high earnings before immigration was much stronger in the 2006 cohort than the 1991 cohort, while the effect of years of prior Canadian work experience was smaller. The effect of years of study in Canada was positive in the 1991 cohort but negative in the 2006 cohort.

Table 6 presents the multivariate regression for university-educated CE and FE immigrant women that corresponds to Table 5 for men. The overall patterns of earnings differences between CE and FE immigrant women were similar to those of men, with a few minor differences. The advantage of CE immigrant women in initial earnings was larger than that of men, so they did not have significantly lower earnings than FE immigrant women even without Canadian work history before immigration (see also Table 7 estimates for women). For the 2006 cohort in particular, CE immigrant women who had low earnings in Canada before immigration earned significantly more than FE immigrants (by 0.249 log point, Table 7). The effect of the earnings level before immigration on post-immigration earnings was much larger for CE immigrant women than for CE immigrant men. More years of Canadian work or study experience were not associated with an extra gain in post-immigration earnings for CE immigrant women when the earnings level before immigration was controlled for (Table 6).

4 Conclusions

This study compared the earnings trajectories of immigrants who are former international students in Canada (Canadian-educated (CE) immigrants), foreign-educated (FE) immigrants and the Canadian-born population. This is the first comprehensive study in Canada and, to the best of the authors' knowledge, in any major immigrant-receiving Western country that uses large national longitudinal datasets to examine cross-cohort trends and within-cohort changes in the earnings of former international students who became permanent residents relative to FE immigrants and native-born workers. The analysis followed the earnings trajectories of university graduates who were aged 25 to 34 in the 1991 and 2006 cohorts.

The results showed that CE immigrants who graduated from university had a large earnings gap with their Canadian-born counterparts both in the initial years after immigration and in the long run. In the first full year after becoming permanent residents, CE immigrant workers earned on average about 50% less (for women) to 60% less (for men) than Canadian-born workers in both the 1991 cohort and the 2006 cohort. For the 1991 cohort, this gap narrowed in the first 10 years after immigration to 20% among women and 40% among men, but there was no further catching up afterwards. The narrowing of the initial earnings gap was also observed during the 6-year follow-up period for the 2006 cohort. Part of the earnings gap was related to the fact that most CE immigrants belonged to a visible minority, and they tended to spend more time pursuing additional education. However, most of the gap could be accounted for by differences in Canadian work history. For both the 1991 cohort and the 2006 cohort, about 50% of CE immigrant men had medium or high earnings in Canada before the

Table 6 Regression models comparing earnings between Canadian-educated immigrant women and foreign-educated immigrant women with a university degree, 1991 and 2006 cohorts

	1991 cohort			2006 cohort		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
	Coefficient					
Canadian-educated immigrants	0.290 ***	0.161 ***	−0.098	0.384 ***	0.425 ***	0.060
Years since the base year	0.108 ***	0.100 ***	0.099 ***	0.114 ***	0.147 ***	0.152 ***
Squared years since base year	−0.003 ***	−0.003 ***	−0.003 ***	−0.005 ***	−0.011 ***	−0.012 ***
Canadian-educated immigrants interacted with years since base year	0.004	−0.003	0.000	0.007	−0.054 ***	−0.044 ***
Canadian-educated immigrants interacted with squared years since base year	0.000	0.000	0.000	−0.002	0.004	0.004
Age in the base year	…	0.019	0.011	…	−0.081	−0.068
Age squared	…	0.000	0.000	…	0.001	0.001
Graduate degrees	…	0.215 ***	0.178 ***	…	0.092 ***	0.080 ***
Months of study in a year	…	−0.090 ***	−0.084 ***	…	−0.077 ***	−0.072 ***
French	…	−0.091	−0.084	…	−0.126 ***	−0.143 ***
Other languages	…	−0.246 ***	−0.250 ***	…	−0.193 ***	−0.191 ***
Atlantic region	…	−0.180 **	−0.125	…	0.060	0.052
Quebec	…	−0.210 ***	−0.183 ***	…	−0.277 ***	−0.221 ***
Manitoba and Saskatchewan	…	−0.239 ***	−0.218 ***	…	−0.044	−0.054
Alberta	…	−0.093 *	−0.095 *	…	0.164 ***	0.132 ***
British Columbia	…	−0.141 ***	−0.129 ***	…	−0.071 ***	−0.069 ***
Regional unemployment rate	…	−0.019 ***	−0.019 ***	…	−0.015 **	−0.019 ***
Other economic class	…	−0.123 ***	−0.091 **	…	−0.265 ***	−0.231 ***
Family class	…	−0.210 ***	−0.179 ***	…	−0.339 ***	−0.278 ***
Refugees	…	−0.209 ***	−0.182 ***	…	−0.509 ***	−0.434 ***
Low prior earnings	…	…	0.041	…	…	0.229 ***
Medium prior earnings	…	…	0.269 ***	…	…	0.529 ***
High prior earnings	…	…	0.722 ***	…	…	0.956 ***
Years of prior Canadian work experience	…	…	0.001	…	…	0.000
Years of Canadian study	…	…	0.017	…	…	0.000
Intercept	9.541 ***	9.668***	9.766 ***	9.598 ***	11.683 ***	11.016 ***
Source-country fixed effect	No	Yes	Yes	No	Yes	Yes

Note: The model *R*-squared is 0.117, 0.200 and 0.213 in models 1, 2 and 3, respectively, for the 1991 cohort, it is 0.056, 0.179 and 0.204 in models 1, 2 and 3, respectively, for the 2006 cohort. Sources: Statistics Canada, 1991 Census and Longitudinal Worker File linkage; 2006 Census and T1 personal tax file linkage; Temporary Residents File, Immigrant Landing File and T1 personal tax file linkage; and Longitudinal Immigration Database

… not applicable

*Significantly different from reference category ($p < 0.05$), **$p < 0.01$, ***$p < 0.001$

base year (the year of immigration), compared with about 90% of Canadian-born men. When group differences in prior Canadian work history were taken into account, the earnings gap of CE immigrants became much smaller in the 1991 cohort and disappeared in the 2006 cohort.

The disadvantage of CE immigrants in prior Canadian work history is certainly endogenous and could originate from a variety of sources: pursuing education beyond the

Table 7 Estimated earnings difference between Canadian-educated and foreign-educated immigrants, by cohort and years since immigration

	1991 cohort			2006 cohort	
	Years since immigration			Years since immigration	
	1	5	20	1	5
	Log point				
Men					
Four years of Canadian study, no Canadian work experience	−0.182	−0.168	−0.098	−0.194	−0.185
Four years of Canadian study, 3 years of Canadian work experience with low prior earnings	0.000	0.015	0.084	0.048	0.057
Four years of Canadian study, 3 years of Canadian work experience with medium prior earnings	0.179	0.193	0.262	0.353	0.362
Four years of Canadian study, 3 years of Canadian work experience with high prior earnings	0.559	0.574	0.643	0.768	0.777
Four years of Canadian study, 1 year of Canadian work experience with high prior earnings	0.502	0.517	0.586	0.743	0.752
Women					
Four years of Canadian study, no Canadian work experience	−0.031	−0.033	−0.054	0.019	−0.072
Four years of Canadian study, 3 years of Canadian work experience with low prior earnings	0.014	0.011	−0.010	0.249	0.158
Four years of Canadian study, 3 years of Canadian work experience with medium prior earnings	0.242	0.240	0.218	0.549	0.458
Four years of Canadian study, 3 years of Canadian work experience with high prior earnings	0.695	0.693	0.672	0.976	0.885
Four years of Canadian study, 1 year of Canadian work experience with high prior earnings	0.693	0.690	0.669	0.976	0.884

Note: estimated from model 3 in Tables 5 and 6. Sources: Statistics Canada, 1991 Census and Longitudinal Worker File linkage; 2006 Census and T1 personal tax file linkage; Temporary Residents File, Immigrant Landing File and T1 personal tax file linkage; and Longitudinal Immigration Database

bachelor's level at a higher rate, resulting in fewer years in the labour force; starting Canadian university education at a later age or taking longer to finish a given level of education; and having more difficulties in finding a good job after graduation because of deficiencies in their social network and language abilities. An investigation of these possible factors requires information that is not available in the administrative data used for this study. Nevertheless, these results suggest that many CE immigrants could not overcome this disadvantage in the initial stage of their career even 20 years after immigration.

On average, CE immigrants did have some moderate advantages in post-immigration earnings over FE immigrants. However, the earnings advantages of CE immigrants were concentrated among those who had medium or high earnings in Canada before immigration. CE immigrant men without a Canadian work history before immigration earned significantly less than FE immigrants. CE immigrant men who had worked but had had low earnings in Canada before immigration, who made up about 40% of all CE immigrant men, did not have a significant earnings advantage over FE immigrants. Only CE immigrants who had had medium or high earnings before immigration had much higher earnings than FE immigrants, and this advantage was larger in the 2006 cohort than in the 1991 cohort. The post-immigration earnings of CE immigrant women without prior Canadian work experience were similar to those of FE immigrant women. However, as long as CE immigrant women had prior Canadian work

experience, they surpassed FE immigrant women in post-immigration earnings by a wide margin, particularly in the 2006 cohort.

These results may suggest that the level of pre-landing Canadian earnings plays an increasing role in differentiating the post-immigration labour market outcomes of university-educated immigrants. Over the 1990s and 2000s, the share of immigrants with a university degree more than doubled among men and tripled among women; it reached over 50% among prime-age immigrants (Hou and Picot 2016). Meanwhile, the earnings returns to university education declined among immigrants both in absolute terms and relative to lower levels of education (Picot et al. 2016). While education might have become less indicative of the earning potential of immigrants, the level of pre-landing Canadian earnings, as a proven record of success in the Canadian labour market, might come to be more effective in capturing the unobserved skills of immigrants and the match between their skills and labour market demand.

This study found that an extra year of Canadian work experience or an extra year of Canadian education experience added only a small or no earnings gain after immigration for CE immigrants when earnings level in Canada before immigration was controlled for. This seems to suggest that general acculturation associated with extended exposure to the receiving society was not a strong predictor of post-immigration earnings when achieved educational attainment and earnings level before immigration are taken into consideration. What matters to CE immigrants were not years of Canadian work or study experience, but the realized market value of the Canadian work or education experience, as indicated by the earnings level in Canada before immigration.

Reasons why some international students could find good jobs and have high earnings before immigration while others could not are likely complicated and cannot be addressed by the data used in this study. Labour market demand and supply in particular fields of study, language ability, concentration in certain types of educational institutions and contact with the receiving society are among the possible factors (Hawthorne and To 2014). It is also possible that certain international students may face a labour market barrier that constrains their chance of finding a high-paying job after finishing their Canadian education. Further understanding of these underlying factors would help more international students become economically successful immigrants.

Endnotes

[1]Based on statistics downloaded from the UNESCO Institute for Statistics (http://data.uis.unesco.org/Index.aspx?queryid = 169) in January 2016.

[2]In November 2016, Canadian government modified the Comprehensive Ranking System that is used to screen applicants of skilled immigrants. Under the new system, applicants with a Canadian educational credential will get up to 30 additional points. This change is to make it easier for international students to become permanent residents and help Canadian educational institutions stay competitive in attracting international students. The added points for Canadian education, however, are not substantial relative to points allocated to Canadian work experience. For example, an applicant with Canadian work experience can get up to 180 points conditional on whether he/she also had postsecondary education and foreign experience.

[3]The initial purpose for the linkage among the 2006 census 20% sample micro data, the 2011 National Household Survey (NHS) and the T1 file was to verify the data quality of the NHS. This linkage file has been subsequently used for research. This study used only the 2006 census-T1 linkage, not the NHS component.

[4]Because only the microdata files for the 1991 Census and the 2006 Census were linked to the tax file at the time of the study, it is not possible to choose different cohorts for the Canadian-born population.

[5]For the Canadian-born population, this variable is based on a derived variable in the 1991 Census and self-identification in the 2006 Census. For CE and FE immigrants, it is based on source region. Immigrants who were born in Asia, Africa and Latin America are classified as belonging to a visible minority.

[6]CE and FE immigrants had higher rates of absence relative to the Canadian born primarily for two reasons. First, they were more likely to not file tax in some years. For instance, among the 1991 cohort university-educated men aged 25 to 34 who filed tax at least once, 81% of the Canadian born, 45% of CE immigrants and 62% of FE immigrants filed at least 18 years in the 20-year period of observation. Conversely, 7% of the Canadian born, 40% of CE immigrants and 23% of FE immigrants filed tax less than 10 years in the 20-year period. It is not possible to be certain whether individuals who did not file tax were not present in Canada. Second, CE and FE immigrants were less likely to be employed than the Canadian born. Among the 1991 cohort men, about 3% Canadian-born university graduates aged 25 to 34 had earnings under $1000 in the base year, and this share changed little over the 20-year period of observation. About 12% of FE immigrants had earnings under $1000 in the base year, and this share decreased to 9% by the 7^{th} year. About 21% of FE immigrants had earnings under $1000 in the base year, and this share decreased to 15% in the 10^{th} year and remained afterwards.

[7]The model coefficients for variables related to the comparison differ mostly in the second digit after the decimal point. However, the effects of some aggregate variables tend to be stronger in random effects models, particularly the negative effect of regional unemployment rates.

[8]For instance, the average months of study changed from 0.81 in the first year after the base year to 0.30 in the fifth year for CE immigrant men and from 0.15 to 0.08 for Canadian-born men in the 1991 cohort. For FE immigrants, the average increased from 0.15 in the first year after immigration to 0.19 in the second year and gradually decreased to 0.14 by the fifth year.

[9]This observation is derived from a decomposition analysis based on group differences in these characteristics and the regression coefficients associated with these characteristics (see Hou [2014] for details).

[10]This conclusion also applies to the models comparing Canadian-born and CE immigrant women, and to the models comparing CE and FE immigrants.

Acknowledgements
The authors would like to thank Garnett Picot, Grant Schellenberg, Mikal Skuterud, Arthur Sweetman, and analysts at Immigration, Refugees and Citizenship Canada for advice and comments on an earlier version of this paper. Any errors are the responsibility of the authors. The authors would also like to thank the anonymous referee and the editor for useful remarks.
Responsible editor: Denis Fougère

Competing interests
The IZA Journal of Development and Migration is committed to the IZA Guiding Principles of Research Integrity. The authors declare that they have observed these principles.

Publisher's Note

Received: 27 October 2016 Accepted: 15 December 2016
Published online: 13 June 2017

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