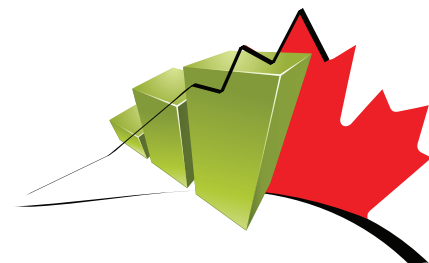


Economic and Social Reports

Early earnings trajectories of international students after graduation from postsecondary programs



by Youjin Choi, Feng Hou and Ping Ching Winnie Chan

Release date: February 24, 2021

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Early earnings trajectories of international students after graduation from postsecondary programs

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DOI: <https://doi.org/10.25318/36280001202100200004-eng>

Abstract

This study compares the earnings of international students with those of domestic students during their first five years after graduation from Canadian postsecondary institutions, and investigates the role of various pre-graduation characteristics in accounting for their earnings differences. This study also examines how the trajectories of earnings gaps vary between international and domestic graduates, across levels of education and major fields of study. Using the analysis of the linkage between the Postsecondary Student Information System and administrative tax data, this study found that international students earned less than domestic students, when they worked in Canada after graduation. An earnings gap also existed by level of education and field of study. A substantially larger earnings gap existed among graduates with a master's or doctoral degree than among graduates with a lower level of education. A much smaller gap existed between international and domestic graduates in the field of mathematics, computer and information sciences than in other fields. Fewer years of pre-graduation work experience and lower levels of pre-graduation earnings among international students accounted for most of their observed disadvantage in post-graduation earnings.

Acknowledgements

This study is conducted in collaboration with Immigration, Refugees and Citizenship Canada. The authors would like to thank Michael Farrell, Eric Fecteau, Rebeka Lee, Marina Prokopenko and Mikal Skuterud for their advice and comments on an earlier version of this paper.

Authors

Youjin Choi, Feng Hou and Ping Ching Winnie Chan are with the Social Analysis and Modelling Division, Analytical Studies Branch at Statistics Canada.

Introduction

There is considerable global competition for international students, who are often seen as strong candidates for economic immigration to countries that are facing current and future skills and labour shortages. International students bring extensive economic and social benefits to the host country. In particular, international students can significantly improve the financial situation of educational institutions, as well as cross-subsidize enrolment in higher education for domestic students (Shih 2017). Large enrolment of international students also enriches social and cultural diversity in the learning environment of receiving institutions and local communities (Citizenship and Immigration Canada 2010). Since the mid-2000s, the Canadian government has implemented various new measures to help international students seek work opportunities and acquire skilled work experience, both during their studies and after graduation, and to facilitate their transition to becoming permanent residents (Citizenship and Immigration Canada 2010, 2015). The granting of permanent residency to international student visa holders has increased in major destination countries, such as Australia, Canada and the United States (Clarke, Ferrer and Skuterud 2019).

International students have several advantages for economic immigration compared with immigrants who are selected directly from abroad. International students are on average younger and have more years to contribute to the labour market after immigration. Also, because their education is obtained in the destination country, there is no uncertainty about the quality of education and no barrier related to credential recognition. Since they have studied in the host country's official language and have had time to familiarize themselves with the local culture, they are likely to face fewer significant language and cultural barriers than other immigrants. Lastly, they may have a better social network for a job opportunity when they enter the labour market in the host country.

However, Canadian study experience does not guarantee successful outcomes for international students in the Canadian labour market (Sweetman and Warman 2014; Hou and Lu 2017; Chen and Skuterud 2018). Sweetman and Warman (2014) found either no or only a small advantage for former international students in terms of earnings compared with people who did not have pre-immigration Canadian study or work experience. Based on longitudinal administrative data, Hou and Lu (2017) found a large gap in observed earnings between former international students and their Canadian-born counterparts, both in the initial years after immigration and in the long run. They documented that, for the 1991 immigration cohort, this gap narrowed in the first 10 years after immigration, but there was no further catching up in the next 10 years. Similarly, pooling four cycles (2002, 2005, 2007, 2013) of the National Graduates Survey, Chen and Skuterud (2018) found that former international students with postsecondary education undertaken in Canada lagged behind their Canadian-born counterparts in a range of labour-market outcomes, including employment rates, hourly earnings and education–occupation match. The results of these previous studies raise a question: Why do international students struggle in the labour market, despite their expected advantages in economic integration?

Many factors are associated with international students' labour-market outcomes. Source region, proficiency in English or French, age at arrival, level of education, and field of study are known as important determinants (Chen and Skuterud 2018; Frenette, Lu and Chan 2019; Lu and Hou 2019).¹ A few previous studies suggest that pre-immigration Canadian work experience was likely the key factor differentiating international students from the Canadian-born population and from foreign-educated immigrants in terms of their labour market outcomes. Hou and Bonikowska (2018) found that immigrants with only Canadian study experience, but no Canadian skilled work experience, had only a small earnings advantage at the time of immigration over immigrants without prior Canadian experience. They also showed that former international students with prior Canadian work experience had earnings similar to

1. Discrimination is also likely to be an important determinant (Oreopoulos 2011). However, as it is difficult to identify with administrative data, this factor is not considered in this study.

Canadian-born graduates. They argued that Canadian work experience matters more than Canadian study experience, per se, in affecting labour market outcomes of immigrants. Hou and Lu (2017) found that, when group differences in Canadian work history were taken into account, the earnings gap between former international students and Canadian-born university graduates mostly disappeared. Despite the importance of Canadian work experience for better labour market outcomes, international students are less likely than domestic students to combine study and work in Canada (Frenette, Lu and Chan 2019).

The aim of this study is to compare the earnings trajectories for international and domestic students during the first five years after graduation from Canadian postsecondary programs, and to highlight pre-graduation Canadian work experience as a contributing factor to differences in their earnings trajectories. The analysis focuses on annual earnings in the first and fifth years after graduation for the cohort of 2010, 2011 and 2012 postsecondary graduates, using the linkage of two administrative datasets: the Postsecondary Student Information System (PSIS) and the T1 Family File (T1FF).

First, this study examines whether differences in earnings between international and domestic students change over time after graduation and provides two sets of estimates: observed differences and adjusted differences that are contingent on pre-graduation characteristics, such as level of education and field of study, and pre-graduation Canadian work experience characteristics. It also presents a decomposition analysis of the role of the various pre-graduation characteristics in explaining their earnings differences. The study then examines whether the relative earnings trajectories of international students vary by level of education and field of study. It also briefly discusses whether the role of the contributing factors varies by subgroup.

Two related studies by Frenette, Lu and Chan (2019) and Jung (2020) examined the earnings gap between international and domestic students who graduated from Canadian postsecondary institutions in 2010 and remained in Canada to work afterward. Jung (2020) documented findings that international students earned about 20% less than Canadian graduates in the first year after graduation. The gap narrowed to about 9% five years after graduation. Frenette, Lu and Chan (2019) found that, all other things being equal, such as level of education and field of study, international students still had lower post-graduation earnings, six years after graduation, than domestic students. The earnings gaps between international and Canadian students were generally smaller in STEM fields (science, technology, engineering and math) than in BHASE fields (business, health, humanities, arts, social science and education) (Jung 2020).

The current study makes several contributions to the literature. First, this study shows how the earnings gaps between international and domestic students evolve over time among those who graduated with similar levels of education and fields of study, and with similar pre-graduation Canadian work experience. Rather than providing a snapshot of one particular time period, this study examines how the relative earnings gaps change during the first five years after graduation. The current study also investigates the relative earnings trajectories for international and domestic graduates with similar levels and fields of study and with similar pre-graduation Canadian work experience, during the first five years after graduation, an approach different from Jung's (2020).

Furthermore, this study examines how the trajectories of earnings gaps between international and domestic students vary across levels of education and major fields of study. Compared with domestic students, international student graduates are more likely to have university degrees and more likely to have studied business, management and public administration; mathematics, computer and information sciences; and architecture, engineering and related technologies. Different levels of education and fields of study involve different degrees of skill specialization and labour-market demand and, thus, can potentially influence labour-market outcomes of international students relative to those of domestic students.

Last but not least, this study explores the role of pre-graduation work experience in explaining earnings gaps, in more depth, by considering both years of work experience and the highest amount of annual earnings that a student had ever earned in the 10 years before graduation. The relative importance of pre-graduation work experience in each field and with each level of study is also examined.

Findings from this study demonstrate that international students earned considerably less than domestic students after graduation, and pre-graduation Canadian work experience is crucial for understanding the differences in their post-graduation earnings. Compared with domestic students, international students were disadvantaged with respect to their level of pre-graduation Canadian work experience. Different barriers for international students looking for a job while studying (language proficiency, cultural differences and employment restrictions) should be noted as contributing to the significant employment gap between international students and domestic students. Therefore, the pre-graduation work experience measure captures both unobserved differences (for example, ability and language proficiency) between domestic students and international students, and institutional constraints (in terms of work-permit restrictions).

The remainder of the article is organized as follows. The next section describes the data and empirical strategies. The following two sections present results of descriptive and multivariate analyses. The final section concludes with a discussion of the significance and implications of the main findings for a better post-graduation labour market outcome for international students in the host country.

Data and methods

This study uses two data sources to prepare the analysis: the PSIS and the T1FF.

The PSIS contains detailed information on all students enrolled in provincially funded postsecondary institutions in Canada. Comprehensive graduation data are available from 2010 onwards. At the time of this study, graduation data were available for the years up to 2017. This study uses the following information on students at the time of graduation: graduation year, program and credential, field of study (the 2016 Classification of Instructional Programs), province of study, immigration status, age, and gender. Graduates from privately funded institutions or non-provincially funded public institutions are out of the scope of this study, because the PSIS universe is limited to provincially funded postsecondary institutions.²

The PSIS is linked to the T1FF to obtain information on labour-market income of postsecondary students. The T1FF contains detailed income information for all Canadian taxfilers. At the time of this study, the T1FF data from 1992 to 2017 were linked to the PSIS. Of particular interest for this study is the information on wages and salaries from paid jobs.³ This amount is the employment income (from the T4) reported by the taxfiler. It is important to note that not all individuals who receive a T4 slip from an employer need to report the amount on their income tax return, if the amount is below \$500.

The sample population of this study is restricted to individuals who graduated in the years 2010 to 2012. This cohort of graduates was chosen to study their earnings trajectories during the five years after graduation, considering the availability of comprehensive information on postsecondary graduates in the PSIS and of information on earnings in the T1FF.

2. According to Martin and MacLaine (2016), there were 1,300 private career colleges across Canada, focusing on career-oriented vocational training, with over 170,000 students enrolled annually. However, information on the number of international students graduating from these institutions is unavailable.

3. Self-employment income is excluded from this study. A tiny share of students had non-zero self-employment income right after graduation. Because most of these students also had employment income from paid jobs, inclusion of self-employment income did not significantly affect the propensity for an international student to be employed in Canada.

Four levels of education are considered in this analysis: below a bachelor's degree, a bachelor's degree, a university degree at the master's level and a university degree at the doctoral level. Graduates from these four levels of education accounted for 88% of all international students who graduated between 2010 and 2012, compared with 83% for Canadian citizen students and 82% for permanent resident students, according to the PSIS.⁴ The sample is limited to those who graduated from these four levels of education.

This study uses the immigration status of graduates at the time of their graduation to make comparisons between international students and domestic students (Canadian citizens and permanent residents). Students may have a different immigration status at the time of entry or enrolment however, the immigration status at enrolment could not be used because of data limitations.⁵

The labour-market outcome of interest in this study is annual earnings from paid jobs. The tax files do not contain information on working hours. Annual earnings were adjusted to 2017 constant dollars, using the annual Consumer Price Index. The natural logarithm of real annual earnings is used for analysis.

The change in earnings for the sample population is assessed for the five years after graduation, which is the longest duration in the labour market for the 2012 graduate cohort that currently available T1FF data allow. This study analyzes annual earnings in the full first year and in all five years after graduation. The analytical sample for earnings t years after graduation is limited to those for whom a non-zero amount of earnings in the T1FF was reported in the year. The sample is unbalanced.^{6,7}

This study examines the relative post-graduation earnings trajectories of international students compared with domestic students, especially Canadian citizen students. This comparison group serves to control for macro effects from the estimates (Green and Worswick 2012). The first part of the analysis compares post-graduation earnings of international students and domestic students in an ordinary least squares (OLS) regression model. Two sets of estimates are reported: (1) observed differences and (2) adjusted differences. For the second set of estimates, a linear regression model adjusts for differences between international and domestic students for the following factors: gender, age, level of education, field of study, province of study, and pre-graduation work experience and earnings. An OLS regression is applied separately for one and five years after graduation. A decomposition analysis is then carried out to investigate the relative importance of various characteristics considered in the model. The second part of the analysis repeats the same approach separately for each level of education and field of study for one and five years after graduation.

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4. This study excludes graduates from other short-program credentials or associate degrees. It further excludes graduates from the following programs: basic education and skills programs; apprenticeship programs; post-career, technical or training programs; pre-university CEGEP programs; and qualifying programs. These programs "are either related to the in-class components of apprenticeship training, are non-postsecondary in nature, do not result in an educational qualification, or they specifically prepare students to enter another postsecondary program rather than the labour market" (Statistics Canada 2019). Other exclusions include graduates from postsecondary programs in the territories because of limited data availability for the 2010 and 2011 graduate cohorts and graduates who studied in the field of personal improvement and leisure and from a health-related residency program, because very few international students were in this field or program.
 5. Comprehensive enrolment data are available from the 2009/2010 school years in the PSIS. This does not allow the immigration status at initial postsecondary enrolment to be identified for those graduated in the early 2010s.
 6. The unbalanced sample was used because it provides a fuller picture of graduates, since those who did not work in all five years are also captured in the analysis. When the balanced sample of graduates who had positive earnings in each of the first five years after graduation was used, observed differences were smaller. However, the qualitative findings from regression analyses with the unbalanced sample remained similar.
 7. The sample does not exclude those who returned to Canadian postsecondary education after graduating in the years 2010 to 2012. The majority of those who returned to postsecondary programs had non-zero earnings, although they had lower earnings, on average, than those who did not return to programs. When returning graduates were excluded from the sample, average post-graduation earnings increased for all three immigration groups. However, the qualitative findings from regression analyses remained similar.

Two key control variables in these analyses are pre-graduation Canadian work experience and pre-graduation earnings. In this study, pre-graduation Canadian work experience covers the 10-year period before graduation and counts the number of years with non-zero earnings in the labour market. Pre-graduation earnings are measured by the highest annual earnings ever earned before graduation, and these earnings reflect the quality or skill level of pre-graduation work experience.

Descriptive results

This section compares early labour-market outcomes and sociodemographic characteristics of international students and domestic students who graduated from postsecondary institutions between 2010 and 2012.

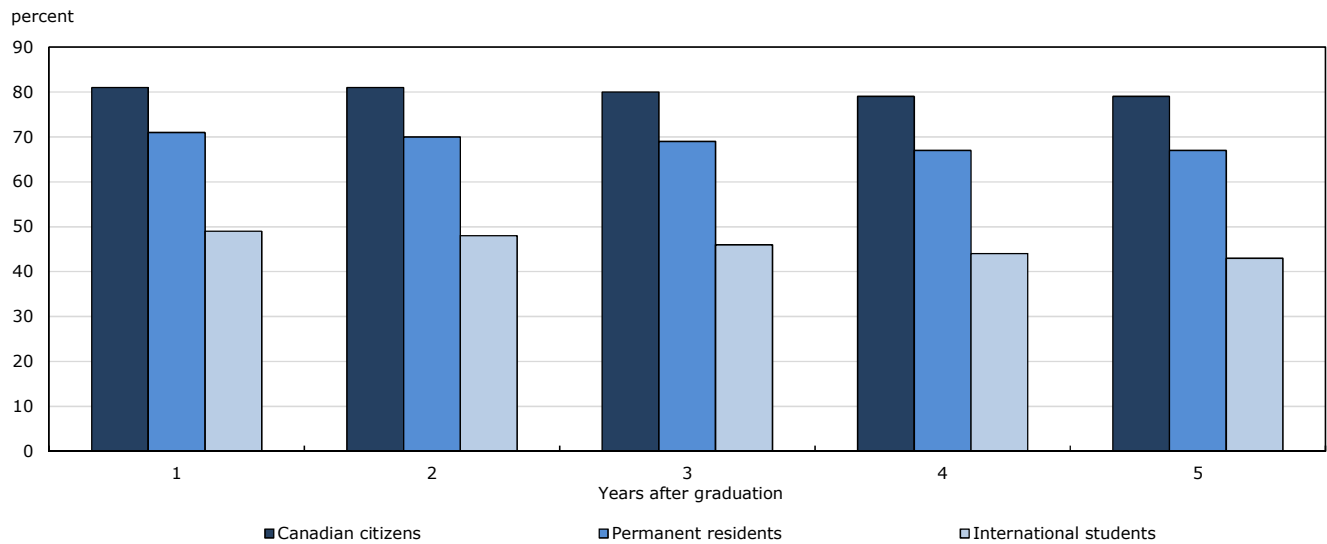
International students comprised 6% of the sample (about 66,800 students in total), whereas Canadian citizen and permanent resident students accounted for 87% and 7% of the student population, respectively (about 927,700 and 71,900 students in total).⁸

Charts 1 and 2 display labour-market outcomes of graduate cohorts from 2010 to 2012, by immigration status, from the first to fifth year after graduation. Chart 1 presents the share of graduates with positive earnings in Canada from one to five years after graduation, by immigration status. When compared with Canadian citizen graduates, international graduates were considerably less likely to have positive earnings in Canada during the first five years after graduation. One year after graduation, the share of international graduates with positive earnings was approximately 33 percentage points lower than that of Canadian citizen graduates. Over the five years, the difference in the shares between the two groups remained similar. The vast majority of the difference reflects the fact that many international students leave Canada after their studies.

Chart 2 displays the average logged earnings of the graduates. These statistics were calculated for graduates with positive earnings, and exclude those with zero earnings. International graduates had lower average logged earnings than domestic graduates for all five years after graduation. The earnings gap between international graduates and Canadian citizen graduates stood at 0.113 log points one year after graduation and 0.124 log points five years after graduation.

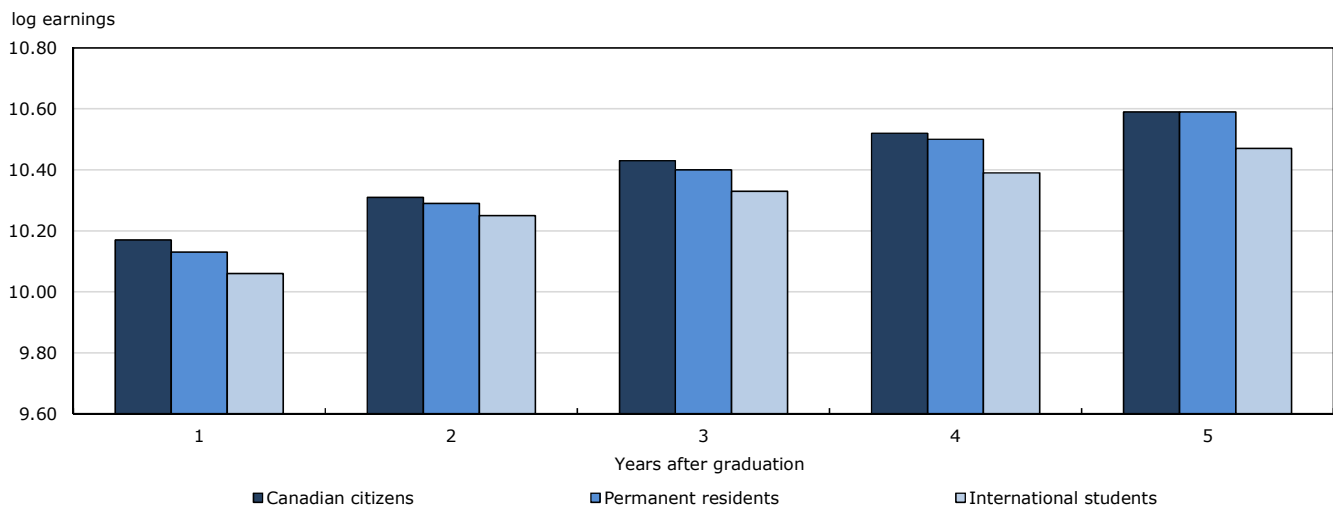
8. The number of observations is rounded to the nearest 100.

Chart 1
Percentage of 2010-to-2012 graduate cohort with positive T4 earnings by year after graduation and immigration status



Source: Statistics Canada, Postsecondary Student Information System and T1 Family File linkage.

Chart 2
Mean logged T4 earnings of 2010-to-2012 graduate cohort with positive T4 earnings by time after graduation and immigration status



Source: Statistics Canada, Postsecondary Student Information System and T1 Family File linkage.

Some of these differences in earnings between international and domestic students are likely related to differences in their characteristics, such as levels and fields of study and work experience before graduation. Table 1 presents summary statistics of 2010-to-2012 graduates with positive earnings one year after graduation. This table shows considerable differences in characteristics between international and domestic students.

First, the distribution of graduates across education levels varied considerably by immigration status. A much smaller share of international students had a certificate or diploma below a bachelor’s degree, and a higher share had a master’s degree, than did domestic students.

Compared with Canadian citizen graduates, international students were considerably more likely to study business, management and public administration; architecture, engineering and related technologies; and mathematics, computer and information sciences. In all three groups, business, management and public administration was the most popular field of study. Among domestic students, the top three fields of study among the 2010-to-2012 graduates who had positive earnings one year after graduation were social and behavioural sciences and law; health and related fields; and architecture, engineering and related technologies. For international students, mathematics, computer and information sciences replaced health and related fields in the list.

In terms of Canadian work experience, international students and domestic students had very different profiles at the time of graduation. International students were much more likely to have no Canadian work experience before graduation. In the sample, 43.6% of international students had no Canadian work experience before graduation, compared with 2.2% of Canadian citizen students and 9.7% of permanent resident students. The average number of years of pre-graduation work experience was 6.2 for Canadian citizen students, 3.9 for permanent resident students, and 1.2 for international students. The differences in pre-graduation work experience may be related to the fact that international students had more employment restrictions during their studies, because they had to apply for a work permit to work off campus.

Among those with Canadian work experience within 10 years before graduation, most international students earned less than \$20,000 in the year when they earned the most. Canadian citizen students and permanent resident students were much more likely to have had higher annual earnings before graduation. Four in 10 domestic students earned more than \$20,000 in a year before graduation, whereas only 1 in 10 international students did so.

Table 1
Summary statistics of 2010-to-2012 graduates reporting positive T4 earnings one year after graduation by immigration status

	Canadian citizens	Permanent residents	International students
	percent		
Level of education			
Below bachelor's degree	41.9	39.1	32.1
Bachelor's degree	47.0	39.1	38.1
Master's degree	10.1	16.6	27.6
Doctoral degree	1.0	5.3	2.2
Field of study			
Education	7.1	4.3	1.2
Visual and performing arts, and communications technologies	4.4	2.2	2.6
Humanities	6.5	4.2	3.4
Social and behavioural sciences and law	16.6	12.6	12.7
Business, management and public administration	21.7	27.5	36.9
Physical and life sciences and technologies	4.8	5.9	5.2
Mathematics, computer and information sciences	2.2	5.5	7.9
Architecture, engineering and related technologies	12.4	18.3	20.8
Agriculture, natural resources and conservation	1.8	1.2	2.1
Health and related fields	17.8	16.2	4.7
Personal, protective and transportation services	4.1	1.6	1.9
Other	0.7	0.5	0.5
Gender			
Male	39.9	45.6	56.4
Female	60.1	54.4	43.6
Maximum annual T4 earnings within 10 years before graduation			
No Canadian experience	2.2	9.7	43.6
Below \$20,000	53.7	48.4	45.4
\$20,000 to \$49,999	30.9	30.9	9.8
\$50,000 or more	13.3	11.0	1.2
Province of study			
Newfoundland and Labrador	1.8	0.5	1.3
Prince Edward Island	0.6	0.1	0.3
Nova Scotia	4.1	1.2	3.9
New Brunswick	2.2	0.8	2.0
Quebec	20.1	23.3	15.6
Ontario	40.9	45.5	44.6
Manitoba	2.8	2.2	3.5
Saskatchewan	2.8	1.2	1.7
Alberta	11.1	12.4	12.3
British Columbia	13.6	12.9	14.9
	years		
Age at graduation	26.4	31.0	25.5
Pre-graduation Canadian work experience	6.2	3.9	1.2

Source: Statistics Canada, Postsecondary Student Information System and T1 Family File linkage.

Table 2 presents average earnings at years 1 and 5 after graduation, by immigration status and pre-graduation characteristics, which comprise gender, level of education, field of study and pre-graduation Canadian work experience. This table shows that the differences in trajectories of average earnings between immigration-status groups varied across pre-graduation characteristics.

Table 2
Mean logged T4 earnings of 2010-to-2012 graduates one year and five years after graduation by immigration status and pre-graduation characteristics

Characteristics	Canadian citizens		Permanent residents		International students	
	Year 1	Year 5	Year 1	Year 5	Year 1	Year 5
	log earnings					
Total	10.17	10.59	10.13	10.59	10.06	10.47
Gender						
Male	10.24	10.75	10.27	10.75	10.17	10.62
Female	10.12	10.49	10.02	10.45	9.91	10.27
Level of education						
Below bachelor's degree	10.09	10.44	10.04	10.42	10.00	10.30
Bachelor's degree	10.12	10.65	10.07	10.61	10.02	10.47
Master's degree	10.69	10.93	10.43	10.79	10.17	10.63
Doctoral degree	10.58	11.03	10.39	11.01	10.15	10.93
Field of study						
Education	10.46	10.66	10.26	10.67	9.84	10.32
Visual and performing arts, and communications technologies	9.60	10.11	9.46	10.15	9.64	10.03
Humanities	9.64	10.34	9.59	10.20	9.65	10.13
Social and behavioural sciences and law	9.94	10.49	9.79	10.34	9.80	10.21
Business, management and public administration	10.34	10.72	10.16	10.60	10.06	10.47
Physical and life sciences and technologies	9.62	10.46	9.59	10.36	9.75	10.19
Mathematics, computer and information sciences	10.28	10.75	10.29	10.80	10.22	10.71
Architecture, engineering and related technologies	10.44	10.85	10.42	10.84	10.35	10.74
Agriculture, natural resources and conservation	10.17	10.56	9.95	10.50	9.87	10.28
Health and related fields	10.40	10.61	10.40	10.67	10.25	10.51
Personal, protective and transportation services	9.99	10.45	9.96	10.34	10.02	10.21
Other	9.92	10.45	10.00	10.42	9.57	10.35
Pre-graduation Canadian work experience (within 10 years before graduation)						
0 years	9.49	10.14	9.66	10.30	9.87	10.33
1 to 4 years	9.84	10.42	10.01	10.52	10.18	10.57
5 or more years	10.31	10.67	10.41	10.76	10.43	10.74
Maximum annual T4 earnings within 10 years before graduation						
No Canadian experience	9.49	10.14	9.66	10.30	9.87	10.33
Below \$20,000	9.88	10.45	9.86	10.43	10.09	10.50
\$20,000 to \$49,999	10.37	10.67	10.38	10.72	10.60	10.88
\$50,000 or more	10.98	11.11	11.05	11.19	11.18	11.31

Source: Statistics Canada, Postsecondary Student Information System and T1 Family File linkage.

First, international students consistently earned less than domestic students at all four levels of education, but the earnings gaps varied by level of education. One year after graduation, differences in earnings between international graduates and Canadian citizens were larger for graduates with an advanced degree than for graduates with a lower level of education. Observed differences decreased by the fifth year for graduate-degree holders, whereas they slightly increased over time for graduates with a lower level of education.

Second, international students had, on average, lower earnings than domestic students in many fields of study, with a few exceptions where they had similar earnings (e.g., visual and performing arts, and communications technologies; humanities; and health and related fields). Interestingly, in the field of physical and life sciences and technologies, international students earned slightly more than domestic students in their first year of work after graduation. However, this advantage disappeared, and international students had lower earnings in the fifth year. Observed differences between international and Canadian citizen graduates were largest in the field of education. For the four most popular fields of study among international students, graduates from the two STEM fields (architecture, engineering and related technologies; and mathematics, computer and information sciences) had a smaller earnings gap in both years 1 and 5 after graduation than students who graduated from the two non-STEM fields (business, management and public administration; and social and behavioural sciences and law).

Results of regression analyses

So far, this study has identified three main findings. First, international students earned less than domestic students during the first five years after graduation. Second, domestic and international students also differed in levels of education, fields of study, and pre-graduation work experience. Third, the early earnings trajectories for international students relative to domestic students varied by education level and field of study.

Next, a multivariate OLS regression framework is used to compare earnings of international and domestic students with similar educational characteristics for their most recent degree, demographic characteristics and pre-graduation work experience.

Regression results

Table 3 presents results of regression models comparing logged earnings of international students with those of domestic students during the first five years after graduation. In Model 1, logged earnings are regressed on dummy variables indicating immigration status. The full model takes into account demographic characteristics (gender and age at graduation), educational characteristics of the most recent degree (level of education, field of study and province of study) and pre-graduation work experience (the number of years of work experience and the maximum annual earnings a student had received within 10 years before graduation). A multivariate regression is estimated separately for one and five years after graduation. The results show how the earnings differences after graduation changed over time.

The key coefficients of interest are those associated with the dummy variables that indicate immigration status at graduation, and they refer to differences in earnings between international students (or permanent residents) and Canadian citizens (the reference group). The unadjusted differences (reported in Model 1) show that international students earned 0.113 log points (or approximately 10.7%) less than Canadian students did one year after graduation. The gap increased slightly five years after graduation. Permanent residents earned slightly less than Canadian citizens in both the first and fifth years after graduation.

The full model reports the differences in the mean logged earnings after taking into account differences in the selected characteristics. After this adjustment, international students earned substantially more than Canadian citizens did one year after graduation. However, this advantage for international students relative to Canadian citizen students, in terms of mean logged earnings, disappeared five years after graduation. Meanwhile, after the adjustment, permanent residents earned slightly more than Canadian citizens in the first and fifth years after graduation.

Coefficients on levels of education show a clear positive association between earnings and levels of education one year after graduation. Compared with the reference group of those with a certificate or diploma below a bachelor's degree, the relative earnings of master's-degree program graduates remained the same over time, whereas the relative earnings of graduates with a bachelor's degree or a doctoral degree increased at a higher rate.

Before adjustment in the full model, graduates from the field of education had the highest average logged earnings one year after graduation (Table 2). With the adjustment, a few fields of study showed higher earnings than education one year after graduation. The relative return was highest in the field of architecture, engineering and related technologies (0.174 log points). Compared with the field of education, the relative return in the field of business, management and public administration and the field

of architecture, engineering and related technologies increased to 0.134 log points and 0.245 log points in the fifth year, respectively.

For the characteristics related to pre-graduation Canadian work experience, the coefficients representing the return to additional years of pre-graduation work experience and the return to having a job with higher pay decreased slightly between years 1 and 5 after graduation. These results suggest that the influence of pre-graduation work experience was not limited to the initial years after graduation.

Table 3
Regression results—Logged earnings at years 1 and 5 after graduation

Outcome: Logged earnings	Model 1		Full model	
	Year 1	Year 5	Year 1	Year 5
	coefficients			
Immigration status				
Canadian citizens (reference group)	...	...	...	...
Permanent residents	-0.038 **	-0.010 *	0.048 **	0.039 **
International students	-0.113 **	-0.124 **	0.234 **	0.006
Level of education				
Below bachelor's degree (reference group)	...	...	...	...
Bachelor's degree	...	...	0.186 **	0.297 **
Master's degree	...	...	0.346 **	0.353 **
Doctoral degree	...	...	0.403 **	0.597 **
Field of study				
Education (reference group)	...	...	...	...
Visual and performing arts, and communications technologies	...	...	-0.480 **	-0.329 **
Humanities	...	...	-0.559 **	-0.236 **
Social and behavioural sciences and law	...	...	-0.283 **	-0.080 **
Business, management and public administration	...	...	0.008 *	0.134 **
Physical and life sciences and technologies	...	...	-0.598 **	-0.185 **
Mathematics, computer and information sciences	...	...	-0.014 †	0.145 **
Architecture, engineering and related technologies	...	...	0.174 **	0.245 **
Agriculture, natural resources and conservation	...	...	-0.151 **	-0.040 **
Health and related fields	...	...	0.160 **	0.126 **
Personal, protective and transportation services	...	...	-0.072 **	0.040 **
Other	...	...	-0.350 **	-0.105 **
Gender				
Male (reference group)	...	...	...	...
Female	...	...	-0.065 **	-0.203 **
Age at graduation	...	...	-0.004 **	-0.005 **
Age at graduation squared	...	...	0.000 *	0.000 **
Pre-graduation Canadian work experience (in years)	...	...	0.062 **	0.040 **
Pre-graduation Canadian work experience squared	...	...	-0.002 **	-0.002 **
Maximum annual T4 earnings within 10 years before graduation				
No Canadian experience (reference group)	...	...	...	...
Below \$20,000	...	...	0.074 **	0.080 **
\$20,000 to \$49,999	...	...	0.403 **	0.250 **
\$50,000 or more	...	...	0.924 **	0.700 **
Province of study				
Newfoundland and Labrador	...	...	0.180 **	0.034 **
Prince Edward Island	...	...	0.042 **	-0.057 **
Nova Scotia	...	...	0.016 **	-0.056 **
New Brunswick	...	...	0.030 **	-0.074 **
Quebec	...	...	0.060 **	-0.059 **
Ontario (reference group)	...	...	...	...
Manitoba	...	...	0.100 **	-0.040 **
Saskatchewan	...	...	0.285 **	0.086 **
Alberta	...	...	0.271 **	0.089 **
British Columbia	...	...	0.045 **	-0.030 **
Constant	10.170 **	10.595 **	9.639 **	10.317 **
Number of observations	838,600	805,100	838,600	805,100
R-squared	0.000	0.001	0.210	0.118

... not applicable

* significantly different from reference category ($p < 0.05$)

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

† significantly different from reference category ($p < 0.10$)

Note: The number of observations is 838,600 for Year 1 and 805,100 for Year 5.

Source: Statistics Canada, Postsecondary Student Information System and T1 Family File linkage.

Decomposition analysis

The regression results for logged earnings show that the earnings difference, one year after graduation, between international students and Canadian citizens changed from a negative value in Model 1 to a large positive value in the full model. Among all characteristics considered in the full model, which characteristics contributed most to the changes in the key coefficients from Model 1 to the full model? Table 4 displays a general regression decomposition analysis to answer this question.

The decomposition analysis shows that controlling for level of education and field of study tends to increase rather than reduce the earnings gap between international students and Canadian citizens. In other words, if the distribution in level of education and field of study of international students and Canadian citizen students were the same, the disadvantage for international graduates in earnings would have been greater than the observed one in Model 1.

This decomposition analysis also suggests that the number of years of Canadian work experience before graduation and the level of maximum annual earnings before graduation account for all of the earnings gap between international students and Canadian citizens. That is, their unadjusted differences in earnings were largely explained by the fact that the majority of international students had no work experience before graduation, and those who had work experience had lower earnings.

The differences between permanent residents and Canadian citizens in their pre-graduation Canadian work experience account for all their differences in earnings. They had similar characteristics in terms of pre-graduation earnings, but permanent residents had a shorter work history in Canada than Canadian citizens (Table 1).

In summary, relative to domestic students, international students were at an advantage in terms of having higher levels of education and a higher concentration in fields of study associated with higher earnings, but they were disadvantaged in pre-graduation Canadian work experience. Their disadvantages far outweighed their advantages, and that resulted in a large gap in observed earnings.

Table 4
Decomposition of the changes in key estimates between two models

	Year 1		Year 5	
	Permanent residents vs. Canadian citizens	International students vs. Canadian citizens	Permanent residents vs. Canadian citizens	International students vs. Canadian citizens
Total adjustment	-0.086	-0.347	-0.048	-0.130
		log points		
		percent		
Explained total	100	100	100	100
Level of education	-29	-14	-41	-32
Field of study	-45	-9	-74	-39
Gender	-4	-3	-21	-27
Age at graduation	30	-2	85	-7
Pre-graduation Canadian work experience	116	68	104	97
Maximum annual T4 earnings within 10 years before graduation	29	58	48	110
Province of study	4	1	-1	-2

Note: Model 1 and the full model from Table 3 are used for this decomposition. Total adjustment is calculated by subtracting the key coefficient of the full model from that of Model 1.

Source: Statistics Canada, Postsecondary Student Information System and T1 Family File linkage.

Subgroup analysis

Compared with domestic students, international student graduates are more likely to have university degrees and more likely to have studied business, management and public administration; mathematics, computer and information sciences; and architecture, engineering and related technologies. Different levels of education and fields of study involve different degrees of skill specialization and labour-market demand and, thus, can potentially influence relative earnings of international students after graduation. This section examines whether the differences in earnings trajectories by immigration status, and the contribution of various factors to these differences, vary by level of education and field of study among postsecondary graduates.

Level of education

For the subgroup analysis by level of education, OLS regression models are applied separately for students with credentials below a bachelor's degree, bachelor's degrees, master's degrees and doctoral degrees. The key coefficients associated with the dummy variables that indicate immigration status are reported in Table 5.

While international graduates earned less than domestic graduates at all four levels of education, the observed earnings gaps varied by level of education. One year after graduation, differences in logged earnings between international graduates and Canadian citizen graduates were substantially larger among graduates with an advanced degree than among graduates with a lower level of education. The difference was approximately 10% for bachelor's degrees and approximately 40% for master's degrees, calculated as $(1 - e^{-0.522})$. The observed differences decreased in the fifth year for graduate studies, whereas the differences in earnings for lower levels of education increased over time.

If international students and Canadian citizen students had the same characteristics, including their field of study and pre-graduation work experience, the earnings of international graduates relative to the earnings of Canadian citizen graduates would show very different patterns for all four levels of education. After the adjustment, the most dramatic change in the results was found among graduates with a certificate or diploma below a bachelor's degree and those with a master's degree. Among college graduates, international graduates earned substantially more than their Canadian citizen counterparts one year after graduation. The coefficients get smaller five years after graduation, but international graduates still had higher earnings. For master's-degree graduates, the two groups earned a similar amount in the first year after graduation, unlike the large unadjusted difference. However, international graduates still earned slightly less than Canadian citizen graduates in the fifth year after graduation (approximately by 6.4%).

Among bachelor's degree graduates, international students earned more (0.235 log points, or 26%) than Canadian students one year after graduation, but they earned slightly less (approximately by 4.5%) five years after graduation. Among doctoral degree graduates, international students still earned slightly less one year after graduation, but this gap disappeared five years after graduation.

Table 5 also shows the results of decomposition analysis undertaken separately by level of education. For all four levels of education, the number of years of Canadian work experience and the maximum amount of annual earnings before graduation account for almost all of the total adjustment, but their relative importance varies across levels of education. For graduates with a certificate or diploma below a bachelor's degree, the two characteristics related to pre-graduation Canadian work experience account for a similar share of the total adjustment. For bachelor's-degree graduates, the contribution of their pre-graduation work experience was twice that of their maximum pre-graduation earnings. The return to an extra year of pre-graduation work experience was large for this group. In contrast, for master's-degree graduates, the contribution of maximum pre-graduation earnings was twice that of pre-graduation work

experience. About 7 in 10 international students who graduated from a master’s degree program and worked in Canada one year after graduation had Canadian work experience before graduation. Regression results suggest that the return to an additional year of work experience was low. Meanwhile, there were differences in pre-graduation earnings between international students and Canadian citizen students (see Table A1 in the appendix for group differences in pre-graduation work experience by levels of education). More than half of the international graduates working in Canada one year after graduation had a job paying less than \$20,000 a year prior to graduation, whereas more than half of the Canadian citizen graduates had a job paying more than \$20,000 a year.

For doctoral students, the contribution of maximum pre-graduation earnings is five times that of pre-graduation work experience. Since most doctoral graduates, and 90% of international doctoral graduates, had Canadian work experience before graduation, their maximum earnings before graduation play a greater role for the total adjustment in the full model. Regression results show that the relative return to having earned more than \$50,000 a year was higher for doctoral-level graduates compared with graduates from other levels of education. In addition, the share of doctoral-level graduates who earned more than \$50,000 was much higher for Canadian citizen graduates than for international graduates (36% vs. 5%). This difference in maximum earnings may be related to the difference between these two groups in their average years of Canadian work experience. The international doctoral-level graduates had, on average, 4 years of Canadian work experience within the 10 years before their graduation, whereas their Canadian counterparts had, on average, 8 years of work experience. While international students are most likely to gain work experience from teaching and research assistantship during their graduate studies, Canadian citizen students are more likely to have other work experience, gained outside universities.

Table 5
Subgroup analysis by level of education (international students vs. Canadian citizens)

	Below bachelor's degree		Bachelor's degree		Master's degree		Doctoral degree	
	Years since graduation							
	Year 1	Year 5	Year 1	Year 5	Year 1	Year 5	Year 1	Year 5
	log points							
Observed differences [a]	-0.088 **	-0.143 **	-0.103 **	-0.173 **	-0.522 **	-0.308 **	-0.436 **	-0.103 **
Robust standard errors	0.009	0.010	0.009	0.010	0.013	0.013	0.063	0.038
Adjusted differences [b]	0.443 **	0.120 **	0.235 **	-0.049 **	0.030	-0.064 **	-0.130 †	-0.008
Robust standard errors	0.010	0.011	0.010	0.011	0.020	0.019	0.067	0.041
Total adjustment [a-b]	-0.531	-0.264	-0.339	-0.125	-0.551	-0.244	-0.306	-0.095
	percent							
Explained by	100	100	100	100	100	100	100	100
Field of study	6	-1	-17	-57	-6	-21	-14	-68
Gender	-2	-15	-1	-17	-4	-20	-5	-32
Age at graduation	-2	-7	-1	-5	-1	-12	-9	-61
Pre-graduation work experience	47	54	82	104	33	21	21	62
Maximum annual T4 earnings before graduation	46	67	36	68	78	133	112	199
Province of study	6	2	0	7	-1	0	-4	0

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

† significantly different from reference category (p < 0.10)

Note: Observed differences are key coefficients on the international student indicator from Model 1, and adjusted differences are those from the full model.

Source: Statistics Canada, Postsecondary Student Information System and T1 Family File linkage.

Field of study

OLS regression models were applied separately for the top four fields of study in terms of the fraction of international graduates (at any level of education) who worked in Canada one year after graduation. These fields are social and behavioural sciences and law (12.7%); business, management and public administration (36.9%); mathematics, computer and information sciences (7.9%); and architecture, engineering and related technologies (20.8%).

The unadjusted results show that international graduates earned less than Canadian citizen graduates in all four fields, but there are some variations in the size of the earnings gap by field of study (Table 6). International graduates earned substantially less in the first year after graduation than Canadian citizen graduates in the field of business, management and public administration, the most popular field of study among international students. The difference remained almost the same in the fifth year. Similar patterns are found in the field of architecture, engineering and related technologies and the field of mathematics, computer and information sciences, with a smaller earnings gap. The earnings gap was smallest in the field of mathematics, computer and information sciences. In the field of social and behavioural sciences and law, the disadvantage in earnings for international graduates increased over the first five years after graduation.

After differences in student characteristics, such as level of education and pre-graduation work experience, were taken into account, international students, on average, had higher earnings in the first year after graduation than Canadian citizen students, in the four fields. Meanwhile, there were notable differences in earnings trajectories during the first five years across all fields. In the field of mathematics, computer and information sciences, international students' advantage in earnings decreased but remained significantly large (approximately 13.1%) in the fifth year. In the field of business, management and public administration and the field of architecture, engineering and related technologies, the difference in earnings narrowed to about zero by the fifth year. Lastly, among graduates of social and behavioural sciences and law, the Year-1 advantage in earnings for international graduates was the largest among the four fields, but they earned less in the fifth year than Canadian citizen graduates.

Table 6
Subgroup analysis by field of study (international students vs. Canadian citizens)

	Social and behavioural sciences and law		Business, management and public administration		Mathematics, computer and information sciences		Architecture, engineering and related technologies	
	Years since graduation							
	Year 1	Year 5	Year 1	Year 5	Year 1	Year 5	Year 1	Year 5
	log points							
Observed differences [a]	-0.147 **	-0.277 **	-0.275 **	-0.252 **	-0.052 *	-0.043 †	-0.091 **	-0.108 **
Robust standard errors	0.015	0.019	0.009	0.010	0.021	0.022	0.013	0.013
Adjusted differences [b]	0.284 **	-0.045 *	0.217 **	-0.019	0.263 **	0.131 **	0.179 **	0.026 †
Robust standard errors	0.018	0.021	0.012	0.012	0.027	0.027	0.015	0.015
Total adjustment [a-b]	-0.430	-0.232	-0.492	-0.232	-0.315	-0.173	-0.270	-0.135
	percent							
Explained by	100	100	100	100	100	100	100	100
Level of education	-4	-11	-8	-16	-10	-28	-30	-76
Gender	-2	-8	-2	-12	-1	-5	2	6
Age at graduation	0	0	-3	-10	-10	-16	1	2
Pre-graduation work experience	65	74	51	51	44	52	59	76
Maximum annual T4 earnings before graduation	43	42	61	88	78	101	72	100
Province of study	-2	2	1	-1	-1	-3	-4	-8

* significantly different from reference category (p < 0.05)

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

† significantly different from reference category (p < 0.10)

Note: Observed differences are key coefficients on the international student indicator from Model 1, and adjusted differences are those from the full model. Robust standard errors are in parentheses.

Source: Statistics Canada, Postsecondary Student Information System and T1 Family File linkage.

The bottom panel of Table 6 shows the result of the decomposition analysis that was carried out separately for each field of study. The size of the total adjustment explained by pre-graduation characteristics, and the contribution of these characteristics to the total adjustment, varied by field of study. The size of the total adjustment for earnings differences in the first year was smallest in the field of architecture, engineering and related technologies and largest in the field of business, management and public administration.

In all four fields, the number of years of Canadian work experience and maximum amount of annual earnings before graduation account for the total adjustment, but their relative importance varied across fields of study. The contribution of the maximum annual pre-graduation earnings was higher in the two STEM fields, compared with the two non-STEM fields. In the STEM fields, more than 60% of the international graduates who worked in Canada in the first year after graduation had Canadian work experience before graduation. The fraction was lower in the non-STEM fields. Since most international graduates in the STEM fields already had some Canadian work experience, the maximum pre-graduation annual earnings were a stronger differentiating factor and made a greater contribution to the total adjustment.

The decomposition analysis also suggested that educational level played a significant role in the difference in earnings between international graduates and Canadian citizen graduates in the field of architecture, engineering and related technologies. The observed difference in earnings would have been much larger in this field if international graduates and Canadian citizen graduates were similarly distributed across all levels of education. Stark compositional differences existed in this field between international students and Canadian citizen students in levels of education, and the field has a large return to a higher level of education.

Unlike in the other fields, having Canadian work experience before graduation was relatively more important than the amount of annual earnings in the field of social and behavioural sciences and law. It was because the group difference in pre-graduation earnings was small (see Table A2 in the appendix for group differences in pre-graduation work experience by field of study). Although most Canadian citizen graduates had pre-graduation work experience in all four fields of study, a higher share of them had a low-paying job in this field than in the other three fields. The return to Canadian work experience was large in this field, compared with the other fields.

Discussion and conclusion

This study compares the early earnings trajectories of international students with those of domestic students after graduation. Among the classes of 2010, 2011 and 2012, international graduates earned less than Canadian citizen and permanent resident graduates in the first five years after graduation. Differences in their pre-graduation work experience, which considers the number of years they worked and the earnings they received within 10 years before graduation, accounted for most of the earnings disadvantages for international graduates. Their disadvantage in pre-graduation Canadian work experience far outweighed their advantages of having higher levels of education and concentration in the fields associated with higher earnings.

International graduates also earned less than Canadian citizen graduates with the same level of education and in the same field of study, although the size of the earnings gaps varied. By level of education, the observed earnings gaps were particularly large in the first year after graduation between international and Canadian citizen graduates with a master's or doctoral degree, although the gaps narrowed substantially by the fifth year after graduation. Among the major fields of study in which international students were mostly concentrated, the earnings gap was smallest in the field of mathematics, computer and information sciences, followed by the field of architecture, engineering and related technologies. In the most popular field of study for international students, business, management and public administration, international graduates earned substantially less than Canadian citizen graduates in both the first and fifth years after graduation. In general, the disadvantage for international students in pre-graduation work experience accounted for their earnings gap by level of education and field of studies. Furthermore, even after the disadvantage to international students in pre-graduation work experience was taken into account, the position of international students relative to Canadian citizen students in the labour market became weaker, over time, in most fields of study and at most levels of

education that were considered in this study (except for earnings among doctoral degree graduates). The weakening earnings of international students, over time, relative to those of Canadian citizen students, does not mean that their earnings were falling, but that they grew relatively more slowly.

This study demonstrated that pre-graduation Canadian work experience is crucial for understanding the differences in post-graduate earnings trajectories between international and domestic students. International students were at a disadvantage in pre-graduation work experience relative to domestic students. Almost all Canadian citizen students had work experience before graduation, whereas about 4 in 10 international students did not have any work experience in Canada before graduation. Even if international students had work experience in Canada, it was shorter, and a much higher share of them worked at low-paying jobs. The degree of disadvantage in pre-graduation work experience also varied by level of education and field of study. These findings suggest that the post-graduation disadvantage for international graduates in the labour market is closely related to their disadvantage in pre-graduation work experience in the host country. Another point worth noting is that, for both international and domestic graduates, those who had high earnings before graduation are also likely to have a high degree of unobserved abilities. It is conceivable that selectivity is likely stronger among international students because they tend to face additional barriers.

The question of why international students are disadvantaged in pre-graduation work experience remains to be addressed. To answer this question, the usual suspects echo the same possible factors to which the employment gap between immigrant and native-born populations are attributable in the literature. Language proficiency, cultural differences, concentration in fields of study, academic performance (as measured by course grades), employers' reluctance to recruit and train job applicants with temporary residency status, and employer discrimination are among the possible factors (Chen and Skuterud 2019; Hawthorne and To 2014; Oreopoulos 2011). International students may face these barriers when looking for a job while studying, before they formally enter the labour market, and after they graduate. The expected advantages for international graduates in terms of economic integration are based on the belief that the period of their studies in Canada would allow them to improve their language proficiency, familiarize themselves with Canadian (workplace) culture and build local networks. International students in the early years of their postsecondary studies, especially bachelor's degree programs, may not have spent enough time in Canada to fully gain these advantages.

Another possible answer is the difference in participation rates between domestic and international students in work-integrated learning (WIL). WIL provides participating students the benefits of workplace-related skill accumulation and connections to potential employers. International students may have lower participation rates in WIL than domestic students (Martin and Rouleau 2020).⁹ Several barriers impede the participation of international students in WIL, including their lack of knowledge about the local labour market, limited local networks, level of language competency and employers' attitudes (Gribble 2014). International students also face financial barriers, such as relocation costs and the additional tuition fees required for delayed graduation (Business/Higher Education Roundtable 2016). Because international students pay high tuition fees, these additional costs may lead to their reluctance to participate in WIL. Employers' concerns about the temporary-visa status of international students and their reluctance to invest their resources in hiring and training international students are other barriers (Gribble 2014).

Finally, government policies could be a possible reason for the gap in pre-graduation Canadian work experience. One example concerns the regulations that affect study-permit holders with respect to employment in Canada. Until 2014, international students had to apply for a work permit to work off

9. Martin and Rouleau (2020) explored work-integrated learning in Canada using data from the Longitudinal and International Study of Adults. They found that, compared with non-visible minorities, visible minorities were less likely to be employed during their postsecondary education, especially in a job related to their field of study.

campus.¹⁰ Having to go through the additional procedure for a work permit may discourage international students from seeking employment while studying. In addition, international students have limited access to government-sponsored student hiring programs. The Canadian government has run several programs to help Canadian youth gain paid work experience. Canada Summer Jobs is an initiative that provides wage subsidies to employers with 50 or fewer full-time employees to create summer work experiences for youth who are 15 to 30 years old.¹¹ However, international students are not eligible for this program because of the temporary nature of their time in Canada, which does not allow for establishing a long-term connection to the Canadian labour market (Employment and Social Development Canada 2020). International students may also have limited opportunities to gain quality work experience in public sector jobs through federal government student work programs, such as the Federal Student Work Experience Program. Even though international students are welcome to apply for these programs, they are less likely to benefit from them because priority is given to domestic students.

For both international and domestic students, pre-graduation work experience is a crucial factor for a successful transition into the labour market (Martin and Rouleau 2020). The disadvantage for international students in pre-graduation work experience hampers their ability to compete for a high-paying, high-quality job after graduation. The results of this study imply that policies to reduce the pre-graduation work-experience gap are crucial to reducing the post-graduation earnings gap between international and domestic students.

A future study could focus on determining whether Canada's recent policy changes aimed at facilitating access to the labour market for study-permit holders while studying will have meaningful effects in their pre-graduation work experience and post-graduation labour-market outcomes.

10. As of June 1, 2014, study-permit holders were automatically authorized to work off campus for up to 20 hours per week during the academic session and full time during scheduled breaks, without a separate work permit.

11. Details can be found at <https://www.canada.ca/en/employment-social-development/services/funding/canada-summer-jobs.html>.

Appendix

Table A.1
Pre-graduation work experience characteristics by immigration status and level of education

Characteristics	Below bachelor's degree		Bachelor's degree		Master's degree		Doctoral degree	
	Canadian citizens	International students	Canadian citizens	International students	Canadian citizens	International students	Canadian citizens	International students
	years							
Pre-graduation Canadian work experience	5.8	0.7	6.2	1.3	8.1	1.4	8.3	4.1
	percent							
Maximum annual T4 earnings before graduation								
No Canadian experience	3.3	58.1	1.6	41.8	0.6	32.2	0.5	6.8
Below \$20,000	51.2	36.0	61.8	45.0	28.3	55.6	28.5	63.2
\$20,000 to \$49,999	33.0	5.1	29.6	12.3	28.0	10.5	34.6	24.7
\$50,000 or more	12.6	0.9	7.0	0.9	43.1	1.7	36.4	5.3

Source: Statistics Canada, Postsecondary Student Information System and T1 Family File linkage.

Table A.2
Pre-graduation work experience characteristics by immigration status and field of study

Characteristics	Social and behavioural sciences and law		Business, management and public administration		Mathematics, computer and information sciences		Architecture, engineering and related technologies	
	Canadian citizens	International students	Canadian citizens	International students	Canadian citizens	International students	Canadian citizens	International students
	years							
Pre-graduation Canadian work experience	6.2	1.2	6.6	1.0	6.1	1.3	5.7	1.4
	percent							
Maximum annual T4 earnings before graduation								
No Canadian experience	1.7	45.2	1.6	50.7	2.7	37.4	3.3	33.7
Below \$20,000	61.3	48.0	45.2	40.6	45.7	47.4	45.3	49.1
\$20,000 to \$49,999	28.7	6.3	34.1	7.8	37.6	14.1	38.3	15.1
\$50,000 or more	8.3	0.5	19.1	0.9	14.1	1.1	13.2	2.2

Source: Statistics Canada, Postsecondary Student Information System and T1 Family File linkage.

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