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International students as a source of labour supply: Retention in their province of study



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International students as a source of labour supply: Retention in their province of study

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Abstract

The retention of international students in their province of study is increasingly being regarded as a potential source of skilled labour by regions seeking labour force growth. This article examines the retention of international students who completed their studies between 2010 and 2016 in their province of study after graduation. Overall, less than half of all international students remained in their province of study in the year after graduation (compared with 8 in 10 domestic students). Many of them may have left Canada. This rate decreased to 36% five years after graduation for international students, compared with about 75% for domestic students. Retention rates of international students one year after graduation varied considerably by province of study and were highest in Alberta and lowest in the Atlantic provinces. By level of study, 40% of international graduates with a bachelor's degree and 36% of those with a doctoral degree stayed in their province of study in the year after graduation, whereas this rate was much higher, at 58%, for those graduating with a college diploma. Among the 58% of international students who filed a tax return in Canada after graduation (i.e., evidence of having stayed), approximately 8 in 10 remained in their province of study one year after graduation; this rate fell to about 7 in 10 five years after graduation.

Keywords: international students, retention, mobility, post-secondary education

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Introduction

The retention of international students in their province of study upon graduation is often viewed as an important component of regionalization strategies designed to contribute to population and economic growth. With the majority of international students concentrated in large cities in Canada, the International Education Strategy (2019–2024) argues that “attracting students from a wider diversity of countries, as well as to a greater variety of regions and schools, would foster sustainable growth of Canada’s international education sector and distribute the benefits more equitably across the country” (Government of Canada 2019, 4). The retention of international students after their studies provides an opportunity to help address regional labour market and population needs. This may be particularly true for regions outside the large cities of Toronto, Vancouver and Montréal that have traditionally attracted smaller shares of immigrants.

This article documents the provincial retention rates of international students after graduation from postsecondary programs in Canada. The retention rate is defined as the proportion of postsecondary graduates who stay in their province of study after graduation. As study permit holders, international students are, by definition, in Canada temporarily to study. Many intend to leave the country upon graduation. However, even international students who stay in Canada may be less likely than domestic students (those with Canadian citizenship or permanent resident status) to remain in their province of study after graduation because they did not live in the province before their postsecondary studies and therefore have fewer pre-existing social connections. The impact of pre-existing social connections on the retention of postsecondary graduates is evident in a study by Galarneau, Hinchley and Ntwari (2017). Using a dataset unique to the Maritime provinces (Prince Edward Island, Nova Scotia and New Brunswick), the authors found that students who came from other Canadian provinces or territories to the Maritimes for postsecondary education had particularly low retention rates in the year after graduation (about 15%) compared with students who lived in those provinces at the time of admission (about 80%). While domestic graduates are used as a point of reference, the focus of this article is variations in the retention rates among international students by the sociodemographic and educational characteristics of age, sex, level of study, field of study and province of study.

Integrated data from the Postsecondary Student Information System (PSIS) and T1 Family File (T1FF) are used in this study to examine trends in the retention rates of international and domestic students who graduated between 2010 and 2016. PSIS data provide comprehensive information from 2010 onwards on graduates from Canadian public postsecondary institutions, including immigration status at graduation and province of study. T1FF data provide information on province of residence for graduates who completed a valid tax return. Together, this information is used to identify whether the province of residence of graduates was the same as their province of study, focusing on different points in time after graduation. For comparisons between international students (those in Canada with a study permit) and domestic students (those who are Canadian citizens or permanent residents), this article uses the immigration status of students at the time of graduation according to the PSIS data. The status of students at the time of entry or enrolment may differ from that at graduation.¹ However, it is not possible to identify immigration status at enrolment for the graduation cohorts of the early 2010s because their detailed school admission information is not covered in the available data.²

1. For instance, among the 2016 graduation cohort, about 5% of students who were international students at enrolment had become permanent residents by the time they graduated. However, the overall retention rate in the province of study one year after graduation was similar whether immigration status at graduation or enrolment was used. For the 2012 to 2016 graduation cohorts, the overall retention rate one year after graduation would increase from 49% to 50% if the earliest observed immigration status were used.
2. Comprehensive enrolment data are available from the 2009/2010 school year in the PSIS. Thus, data are not available for identifying the immigration status at initial postsecondary enrolment for individuals who graduated in the early 2010s. For the same reason, information on province of residence at time of admission is not available for those who graduated in the early 2010s.

This article is part of a series that provides a broad overview of international students as a source of labour supply in Canada. It documents sociodemographic differences between international and domestic students at graduation and examines these factors in relation to post-graduation retention rates in the province of study.

International students and domestic students had similar geographic distributions across provinces

This article focuses on postsecondary graduates who completed a college certificate or diploma or a university bachelor's, master's or doctoral degree between 2010 and 2016.³ Combined, graduates from these five levels of study accounted for 77% of all international student graduates in 2016, compared with 75% for Canadian citizens and 70% for permanent residents.⁴ The sample includes 2.2 million domestic graduates and 0.2 million international graduates (Table 1).

Relative to domestic students, international students had a similar geographic distribution across provinces but had some differences with respect to other sociodemographic and educational characteristics. The share of female international students (46%) was lower than that of domestic students (59%). It is perhaps not surprising that, with a higher share aged 25 to 34 at the time of graduation, international students were twice as likely as their domestic counterparts to have graduated with a master's or doctoral degree. The field of business, management and public administration was the top field of study for both domestic and international student graduates, with international student graduates (34%) more highly concentrated in this field than domestic graduates (20%). While roughly similar shares of domestic and international students graduated from programs in the field of social and behavioural sciences and law (17% and 15%, respectively), a much higher share (20%) of international students graduated from programs in the field of architecture, engineering, and related technologies than the share of domestic graduates (13%); the opposite was true for those graduating from programs in health and related fields (4% for international students and 17% for domestic students).

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3. Some postsecondary graduates enrol in new postsecondary education programs after graduation. Among the study sample of 2010 to 2015 postsecondary graduation cohorts, 25% of domestic students and 11% of international students enrolled in a new postsecondary education program one year after graduation. However, the rate of retention in the province of study was similar between graduates who did and did not enrol in new postsecondary programs. For instance, the overall retention rate one year after graduation was 81% for domestic graduates and 47% for international graduates among the 2010 and 2015 graduating cohorts. If those who enrolled in a new postsecondary education program were excluded, the respective rates would be 80% and 46%, respectively.
 4. In addition to these five programs, others at the postsecondary level include short program credentials or associated degrees; basic education and skills programs; apprenticeship programs; post-career, technical or professional training programs; health-related residency programs; and qualifying programs. Furthermore, bachelor's degree programs offered in colleges and certificate or diploma programs offered in universities are excluded in this analysis. Graduates from postsecondary programs in the territories and from programs in the field of personal improvement and leisure are excluded in this analysis because of insufficient numbers for analysis.

Table 1
Characteristics at time of graduation among postsecondary students who graduated between 2010 and 2016

	Domestic students percentage	International students percentage
Gender		
Male	41	55
Female	59	46
Age at time of graduation		
18 to 24	57	50
25 to 34	30	45
35 to 44	8	4
45 or older	5	1
Level of study at time of graduation		
College, certificate	12	5
College, diploma	23	21
University, bachelor's degree	51	42
University, master's degree	12	28
University, doctoral degree	2	4
Field of study at time of graduation		
Education	6	1
Visual and performing arts, and communications technologies	4	3
Humanities	6	5
Social and behavioural sciences and law	17	15
Business, management and public administration	20	34
Physical and life sciences and technologies	6	6
Mathematics, computer and information sciences	3	7
Architecture, engineering, and related technologies	13	20
Agriculture, natural resources and conservation	2	2
Health and related fields	17	4
Personal, protective and transportation services	4	2
Other	1	1
Province of study		
Newfoundland and Labrador	2	1
Prince Edward Island	1	0
Nova Scotia	4	5
New Brunswick	2	2
Quebec	20	19
Ontario	45	45
Manitoba	3	3
Saskatchewan	3	2
Alberta	11	8
British Columbia	12	15
Number of observations	2,216,100	200,300

Notes: Fields of study are categorized by the 2016 Classification of Instructional Programs primary groupings. Domestic students comprise both Canadian citizens and permanent residents at time of graduation and international students comprise those holding a study permit at time of graduation.

Source: Postsecondary Student Information System and T1 Family File.

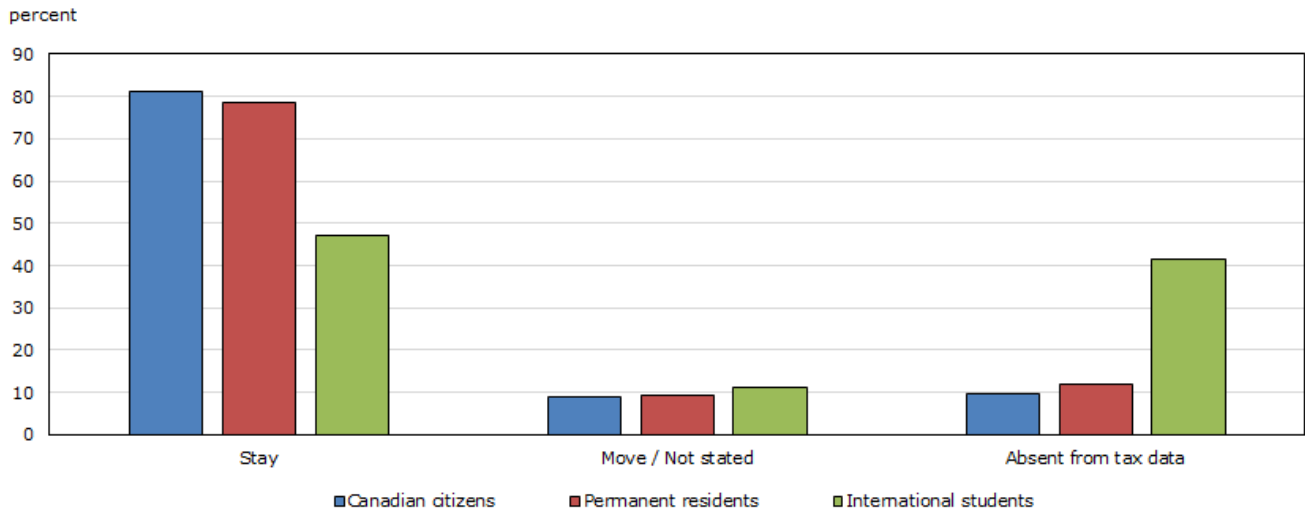
One in two international student graduates remained in their province of study one year after graduation

The population of graduates is grouped into three categories based on retention status to compute the retention rates of postsecondary graduates. These categories are (1) province of residence same as province of study in tax return (“Stay”), (2) province of residence different from province of study or not stated in tax return (“Move / Not stated”) and (3) no record available in the T1FF data (“Absent from tax data”). In this current article, two types of retention rates are computed on the basis of retention status. The first is the overall rate, or “unconditional retention rate,” defined as the proportion of postsecondary students staying in their province of study after graduation regardless of whether they are present in tax data. When an individual is absent from the tax data, it means they did not file a tax return, while living in Canada or abroad. Absence from the tax data is more likely to indicate having left Canada after graduation for international students than for domestic students. To measure the retention status of postsecondary graduates present in the tax data, a second measure, “conditional retention rate,” is used. It is defined as the proportion of graduates who are present in the tax data and who stay in their province of study.

Chart 1 and Chart 2 respectively show the shares of postsecondary graduates by retention and immigration status at one and five years after graduation. In the first tax year after graduation, 42% of international students were not present in the T1FF data, compared with 10% of domestic students. As would be expected, the share of graduates staying in their province of study was higher for domestic students (81% and 79% for Canadian citizens and permanent residents, respectively) than for international students (47%). This difference can likely be accounted for by the departure of many international students from Canada after graduation.

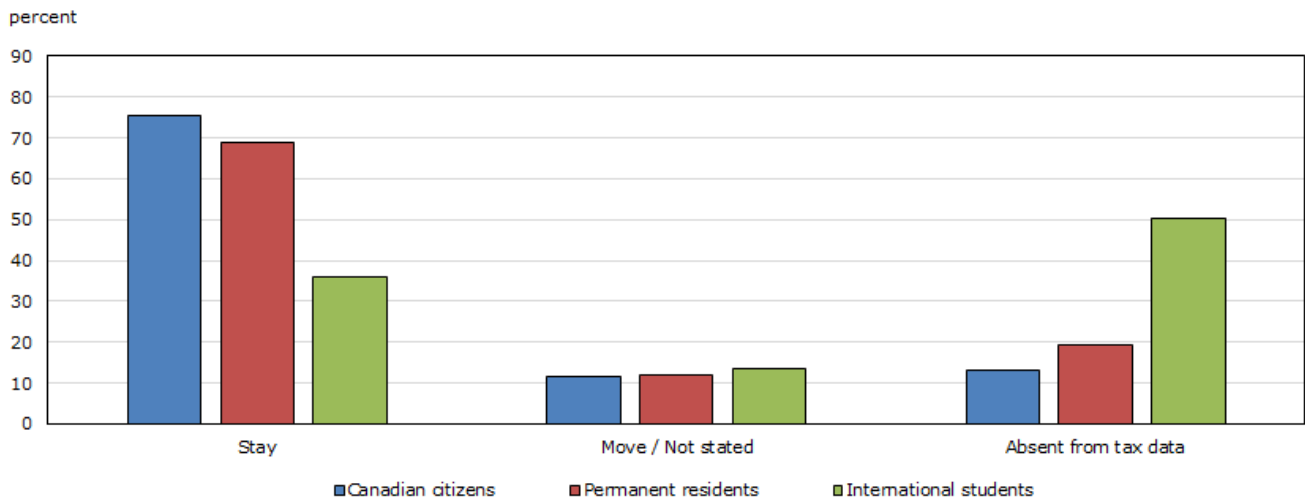
While the same retention pattern was evident at five years after graduation, there were small increases in the share not appearing in the tax data and in the share moving to a different province for all three immigration status groups. In the fifth year after graduation, 13% of graduates who were Canadian citizens did not appear in the tax data and 76% stayed in their province of study; these shares were 19% and 69% for permanent residents, respectively. For international students, 50% were absent from the tax data five years after graduation, while 36% had stayed in their province of study, compared with 75% of domestic students (combining Canadian citizen and permanent resident students).

Chart 1
Share of postsecondary graduates by retention and immigration status one year after graduation



Note: Because of data availability, data on 2010 to 2016 graduates were used to calculate first-year retention rates, and data on 2010 to 2012 graduates were used to calculate fifth-year retention rates.
Source: Postsecondary Student Information System and T1 Family File.

Chart 2
Share of postsecondary graduates by retention and immigration status five year after graduation



Note: Because of data availability, data on 2010 to 2016 graduates were used to calculate first-year retention rates, and data on 2010 to 2012 graduates were used to calculate fifth-year retention rates.
Source: Postsecondary Student Information System and T1 Family File.

Retention of international students varied considerably by student characteristics

There was considerably more variation in first-year retention rates of international students by sociodemographic and educational characteristics compared with domestic students (Table 2). Among all international students, 40% of graduates with a bachelor's degree and 36% of graduates with a doctoral degree stayed in their province of study in the year after graduation, whereas this rate was much higher, at 58%, for those graduating with a college diploma. In terms of field of study, international graduates of personal, protective and transportation services programs were the most likely to stay in their province of study, followed by those graduating from programs in architecture, engineering, and related technologies; mathematics, computer and information sciences; and health and related fields. In contrast, those least likely to stay were those graduating from programs in the fields of humanities; social and behavioural sciences and law; and physical and life sciences and technologies. International students graduating from programs in the top field of study—business, management and public administration—were roughly in the middle of the distribution for retention rates in the province of study in the year after graduation.

Among students with a tax record one year after graduation, (conditional) retention varied by level of study (Table 2, last two columns). The first-year conditional retention rates were lowest among international students for those graduating from doctoral programs relative to other postsecondary programs; their domestic counterparts were also less likely to stay in their province of study. With employment opportunities specific to those who hold a doctoral degree being relatively narrower, it is possible these graduates are more likely than others to move to another province to secure a job commensurate with their education. Notably, international and domestic graduates had the largest difference in conditional retention rates at the college level relative to other levels of study; that is, international students graduating from a college program were much more likely to move to a different province after graduation compared with their domestic counterparts. College programs are relatively shorter than programs at higher levels of postsecondary education and, therefore, provide a less time-consuming pathway to becoming eligible for a post-graduation work permit and for permanent residency. International students who entered college programs may be those who had a stronger willingness to permanently immigrate to Canada; a relatively higher proportion of this group of international students filed taxes in Canada.

In terms of field of study, international students had lower conditional retention rates than domestic students across all fields. Among international students who filed taxes, the field with the lowest retention rate was the humanities, followed by health and related fields, as well as agriculture, natural resources and conservation. Among domestic students, the field with the lowest conditional retention rate was agriculture, natural resources and conservation, followed by physical and life sciences and technologies. The fields of study with the highest first-year conditional retention rates for international graduates were also those in which the gap with domestic students was the smallest, such as visual and performing arts, and communications technologies; education; and social and behavioural sciences and law. In contrast, the gap in the conditional retention rate of international and domestic graduates was notably larger in the humanities (18 percentage points); health and related fields (13 percentage points); and architecture, engineering, and related technologies (11 percentage points). The conditional retention rate in the field of study attracting the largest share of international students—business, management and public administration—was slightly above the average compared with other fields and was 9 percentage points lower than the rate of their domestic counterparts.

It is worth pointing out that international students graduating from programs in architecture, engineering, and related technologies—the second most popular field of study among international students—had a relatively high unconditional retention rate (53%). This field of study also had one of the lowest shares of international graduates absent from the tax data (32%). The conditional retention rate, however, fell in the middle of the distribution when it came to retention rates in the province of study in the year after graduation by field of study. Taken together, these findings suggest that, while international graduates in the field of architecture, engineering, and related technologies were more likely than graduates in other fields to stay in Canada, they were not more likely to stay in their province of study after graduation.

Table 2
Retention rates in the year following graduation of postsecondary students who graduated between 2010 and 2016, by immigration status and selected characteristics

	Unconditional retention rates		Share absent from tax data		Conditional retention rates	
	Domestic students	International students	Domestic students	International students	Domestic students	International students
			percentage			
Overall	81	47	10	42	90	81
Gender						
Male	80	46	11	41	89	78
Female	82	48	9	43	90	84
Age at time of graduation						
18 to 24	83	44	9	45	91	81
25 to 34	79	51	11	37	88	81
35 to 44	81	44	8	45	89	80
45 or older	81	35	9	58	89	82
Level of study at time of graduation						
College, certificate	86	52	8	35	93	81
College, diploma	87	58	8	26	95	78
University, bachelor's degree	80	40	11	52	89	83
University, master's degree	74	50	11	38	83	81
University, doctoral degree	66	36	14	50	77	72
Field of study at time of graduation						
Education	84	48	8	45	91	87
Visual and performing arts, and communications technologies	79	45	13	49	91	88
Humanities	78	36	13	49	89	71
Social and behavioural sciences and law	79	41	11	52	89	85
Business, management and public administration	82	47	10	42	91	82
Physical and life sciences and technologies	78	42	11	46	87	78
Mathematics, computer and information sciences	80	52	12	35	90	81
Architecture, engineering, and related technologies	81	53	10	32	90	79
Agriculture, natural resources and conservation	75	46	10	40	83	77
Health and related fields	84	51	7	34	90	77
Personal, protective and transportation services	82	60	9	28	90	84
Other	77	34	13	56	88	78
Province of study						
Newfoundland and Labrador	76	28	6	43	81	49
Prince Edward Island	60	24	6	56	64	55
Nova Scotia	63	25	6	51	68	52
New Brunswick	72	28	4	41	75	47
Quebec	83	40	12	53	94	85
Ontario	82	50	11	38	93	82
Manitoba	84	59	6	29	89	84
Saskatchewan	82	55	6	28	87	76
Alberta	81	60	8	31	88	87
British Columbia	81	49	9	43	89	86

Notes: Conditional retention rates are based on graduates observed in tax data. Fields of study are categorized by the 2016 Classification of Instructional Programs primary groupings. Domestic students comprise both Canadian citizens and permanent residents at time of graduation and international students comprise those holding a study permit at time of graduation.

Source: Postsecondary Student Information System and T1 Family File.

Retention rates of international students were lowest for the Atlantic provinces

There was considerable variation in retention rates across provinces for both domestic and international students. Overall, provincial (unconditional) retention rates were lowest in the four Atlantic provinces (Newfoundland and Labrador, Prince Edward Island, New Brunswick, and Nova Scotia) for both international and domestic graduates (Table 2). In particular, first-year provincial retention rates were below 30% for international graduates who studied in the four Atlantic provinces. In other provinces, the retention rates for international graduates ranged from 40% in Quebec to 60% in Alberta.

Approximately 8 in 10 international students present in the tax data remained in their province of study one year after graduation; this conditional retention rate fell to about 7 in 10 five years after graduation; this compares with about 9 in 10 one year after graduation for domestic students (Table 3).

Among domestic graduates present in the tax data, first-year retention rates of those who studied in the Atlantic provinces were relatively low, ranging from 64% for Prince Edward Island to 81% for Newfoundland and Labrador. First-year conditional retention rates of domestic graduates were higher in Central and Western Canada, ranging from 87% in Saskatchewan to 94% in Quebec. Although the conditional retention rates dropped by the fifth year after graduation, a similar retention pattern by province persisted.

First-year conditional retention rates of international graduates were lowest in the Atlantic provinces (ranging from 47% for New Brunswick to 55% for Prince Edward Island) and higher in Central and Western Canada (ranging from 76% for Saskatchewan to 87% for Alberta). The largest gaps in retention rates between international and domestic students were found in Newfoundland and Labrador and New Brunswick.

By the fifth year after graduation, conditional retention rates in all provinces had fallen for both domestic and international students present in the tax data. However, decreases were larger for international students, especially among those who had studied in the Atlantic provinces, Saskatchewan or Manitoba. Notably, the conditional retention rates of international students who had studied in Alberta and British Columbia remained close to those of their domestic counterparts during the five years after graduation.

Table 3
Conditional retention rates of international and domestic students in the first and fifth year after graduation, by province of study

Province of study	Year 1		Year 5	
	Domestic students	International students	Domestic students	International students
		percent		
Canada	90	81	87	73
Newfoundland and Labrador	81	49	77	30
Prince Edward Island	64	55	57	19
Nova Scotia	68	52	62	29
New Brunswick	75	47	68	28
Quebec	94	85	93	78
Ontario	92	82	90	76
Manitoba	89	84	83	58
Saskatchewan	87	76	82	53
Alberta	88	87	84	80
British Columbia	89	86	86	79

Notes: Because of data availability, data on 2010 to 2016 graduates were used to calculate first-year retention rates, and data on 2010 to 2012 graduates were used to calculate fifth-year retention rates. Conditional retention rates are based on graduates observed in tax data. Domestic students comprise both Canadian citizens and permanent residents at time of graduation, and international students comprise those holding a study permit at time of graduation.

Source: Postsecondary Student Information System and T1 Family File.

Conclusion

The retention of international students in their province of study is increasingly of interest to regions seeking new sources of skilled labour to contribute to local economies. This study documented provincial retention rates of international and domestic postsecondary graduates who completed their studies between 2010 and 2016. The analysis showed that less than half of all international students remained in their province of study in the year after graduation, compared with 8 in 10 domestic students. This difference is the result of a higher share of international students without a tax record, likely suggestive of having left Canada. When only those with a tax record in Canada after graduation (i.e., evidence of having stayed) are considered, retention rates of international students remained below those of domestic students. A similar pattern, albeit with lower overall retention rates, continued to the fifth year after graduation.

Despite international students and domestic students having a similar geographic distribution, retention rates after graduation varied by province of study. At five years after graduation, the conditional retention rates of international students in the Atlantic provinces, Manitoba and Saskatchewan were considerably lower than those of domestic students and when compared with their counterparts in the largest immigrant-receiving provinces—Ontario, British Columbia, Alberta and Quebec. These results suggest that factors that attract the majority of immigrants to settle in these provinces (scope of labour market opportunities, city size, presence of family and social ties, etc.) also influence the mobility decisions of international students after graduation.

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