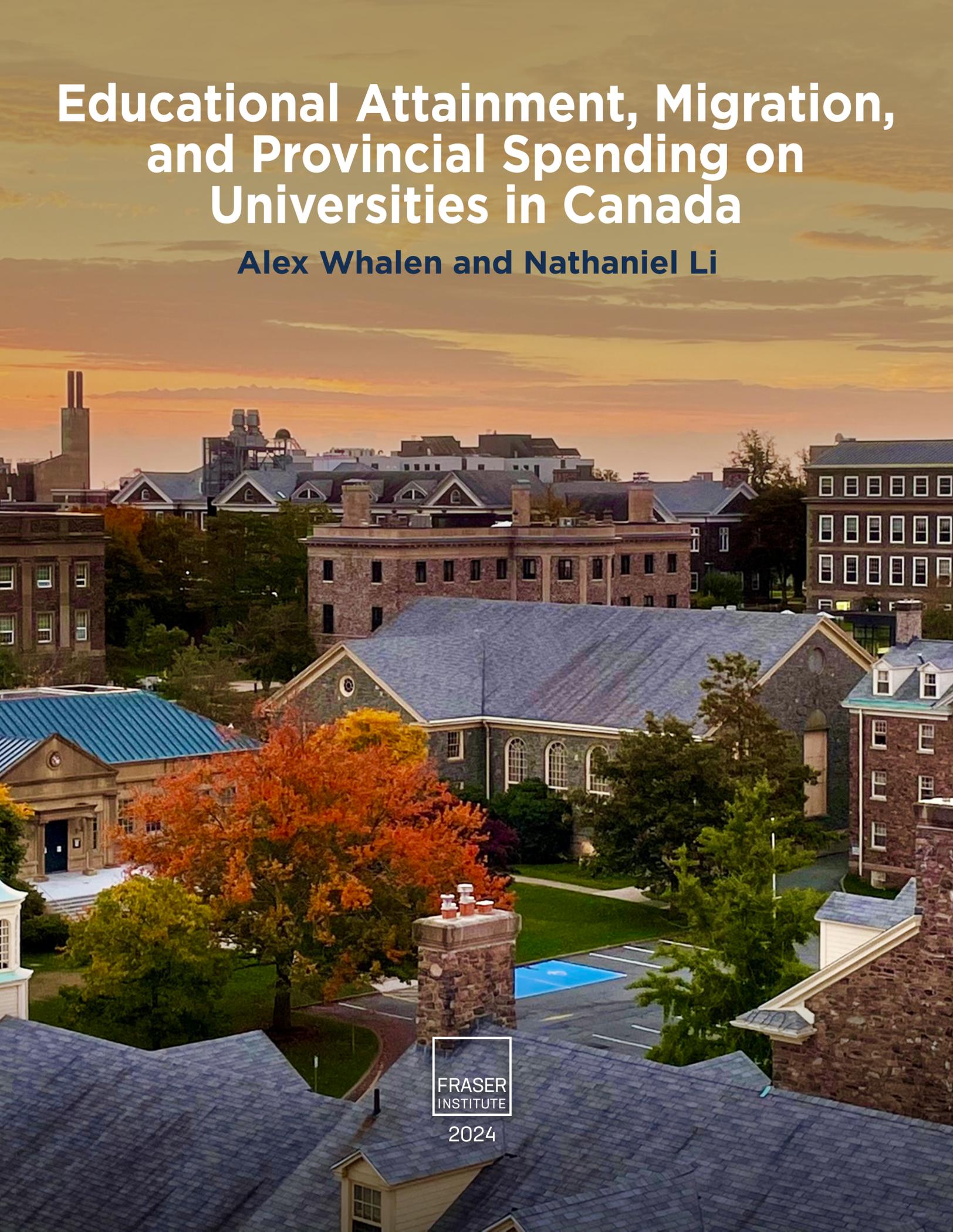


# Educational Attainment, Migration, and Provincial Spending on Universities in Canada

**Alex Whalen and Nathaniel Li**



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by Alex Whalen and Nathaniel Li



# Contents

Executive Summary / i

Introduction / 1

1 Methodology / 2

2 Spending / 3

3 Educational Attainment and Migration / 7

4 Summary Rankings and Correlation / 12

Conclusion / 15

References / 16

About the Authors / 21

Acknowledgments / 22

Publishing Information / 23

Purpose, Funding, & Independence / 24

Supporting the Fraser Institute / 24

About the Fraser Institute / 25

Peer review—validating the accuracy of our research / 25

Editorial Advisory Board / 26



## Executive Summary

Across the country, private and public universities educate over 1,000,000 full time and 250,000 part time students annually (Council of the Ministers of Education, 2022), at a cost of more than \$46-billion (from both government and private sources) in the latest year of available data (2020/21). While this funding comes from a variety of sources, the single largest source is provincial governments. Which provinces spend more or less on public universities over time (as measured by provincial subsidies). Do the provinces, in fact, benefit from more educated populations? Are there other factors at play, such as migration, that may affect the extent to which university graduates have a positive economic impact on the provinces where they studied?

Using a measure of real spending per domestic student, relative to their peers the high spending provinces are, in order from highest, Newfoundland & Labrador, Saskatchewan, Alberta, New Brunswick, and Prince Edward Island. The lower spending group includes, in order from lowest, Ontario, Nova Scotia, British Columbia, Quebec, and Manitoba.

In general, high-spending provinces do not consistently have the highest levels of educational attainment. Consider that Newfoundland & Labrador, Saskatchewan, and Alberta ranked first, second, and third in spending per domestic student in the 20 years from 2000/01 to 2020/21, while these same three provinces' rankings are markedly different in the area of educational attainment. Conversely, the three lowest-spending provinces over this time period, Ontario, Nova Scotia, and New Brunswick, experienced the largest, fourth-largest, and ninth-largest increases in educational attainment. In other words, there appears to be no consistent relationship between more per-student spending and higher educational attainment, or lower per-student spending and lower educational attainment, over the long term.

A final consideration in our analysis is interprovincial migration. For any given province, substantial (net) migration to another province could represent a financial loss for the province as a sizable share of young, recent university graduates leave after completing their studies. Using a cohort of those aged 20 to 29, in the full time period studied, only two provinces recorded cumulative net inflows of people, two provinces showed very little change, and the remaining six had net migration to other provinces. The provinces with the highest incoming interprovincial migration as a share of their populations were Alberta, British Columbia, and Ontario, while those with the lowest were New Brunswick, Prince Edward Island, and Newfoundland & Labrador. This data shows that some provinces are spending above-average amounts on provincial university subsidies but not seeing increases in the level of education in the population, while also experiencing net migration out of province in the age group most likely to have completed an undergraduate degree.

In general, this study finds that higher spending per domestic student does not necessarily enable relatively high spending provinces to reap the rewards of a more educated workforce. Rather, interprovincial migration seems to be a more important factor, allowing university students educated and paid for in one province to move to another province after graduation, effectively transferring the provincial investment in human capital with them.

# Introduction

This study is focused on universities in Canada and, specifically, levels of provincial spending, the pattern of educational attainment, and interprovincial migration. The goal is to inform Canadians on provincial spending patterns and the results of that spending over time.

Across the country, 223 private and public universities educate over 1,000,000 full-time and 250,000 part-time students annually (Council of the Ministers of Education, 2022), at a cost of more than \$46 billion (from both government and private sources) in the latest year of available data (2020/21). While this funding comes from a variety of sources—including tuition, donations, endowments, grants, and funds provided by the federal government—the single largest source is provincial governments (Statistics Canada, 2022d).

The provinces fund education in a variety of ways, but the main one is direct operating grants to universities. By providing funding to institutions, provincial governments in effect subsidize university education for domestic students. In describing this funding, provincial governments commonly reference the benefits of higher education, especially the economic benefits. This study will focus on the common argument used by Canadian policy makers and academic leaders: that by subsidizing attendance at universities, provincial governments benefit from more educated populations, resulting in higher incomes for students over their lifetimes, from which governments then recapture much of their fiscal outlay for universities through the higher lifetime taxes paid by graduates.

This study will focus on the following questions. First, which provinces spend more or less on public [1] universities over time (as measured by provincial subsidies)? Second, do the provinces, in fact, benefit from more educated populations? Third, are there other factors at play, such as migration, that may affect the extent to which university graduates have a positive economic impact on the provinces where they studied? These questions are important and of interest to the public because, if higher-spending provinces are not seeing higher levels of education in their populations, this calls into question the soundness of the policy of heavily subsidizing university education.

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[1] While Canada does have a handful of private universities, given the focus of this study, we only discuss public universities.

# 1 Methodology

This study will primarily use data from Statistics Canada that cover provincial government spending on universities, university enrolments, educational attainment, and migration. Statistics Canada's Financial Information of Universities (FIUC) survey provides data on spending, while data on enrolments and educational attainment are available from the agency's Postsecondary Student Information System (PSIS). Migration data is drawn from the agency's Annual Demographic Estimates. Spending data is converted from nominal to real values using the Consumer Price Index annual average, not seasonally adjusted, and is further converted to a per-domestic-student basis using enrolment data from PSIS.

Drawing from these data sources, the study will proceed as follows. First, we will measure spending on a real, per-domestic-student basis to get a sense of the varying spending levels in the provinces and over time. A measure of spending per domestic student [2] allows us to compare across provinces with different student enrolments, while using real values allows us to compare the data over time, adjusted for inflation. Domestic enrolments include students residing in the given province as well as those normally resident elsewhere in Canada. Second, we will measure educational attainment to assess which provinces have more or less educated populations as measured by the share of the population with a bachelor's degree or higher. Third, we will compare the data on spending and educational attainment to assess whether provinces with higher levels of spending over time see higher levels of educational attainment in their populations. Lastly, we will address the issue of interprovincial migration, specifically whether it has a greater role than spending in determining education levels in the provincial populations.

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[2] International students are a large and growing component of university attendance in Canada. However, this study focuses only on domestic students since it is principally concerned with provincial subsidies. Provinces generally do not subsidize international student attendance in the same as domestic student attendance. While there are many interesting avenues of research in the changes in Canada's international student population, they are beyond our scope here.

## 2 Spending

This study uses the measure of real provincial spending [3] per domestic (Canadian) student [4] received by the universities. Using real values allows us to compare spending across time, stripping out the effects of inflation. Measurement on a per-domestic-student basis is the most appropriate choice given that provincial subsidies support domestic student enrolment. International students are generally not subsidized in the same way, and typically pay their full tuition costs. A per-student calculation allows for comparisons to be made across provinces.

Provincial revenue refers to revenue received by universities in each province from the government of that province. Therefore, federal revenue, tuition, research grants, and so on are all excluded from the figures reported here. Examining provincial revenue received by the universities allows a comparison of the differences in the level of subsidy from province to province at the institutional level. We set aside the issue of provincial transfers to students and focus exclusively on transfers to institutions here, given data availability. To avoid confusion, the study refers to this “revenue” as “spending” in the remainder of the study. While the funds represent revenue to universities, they represent spending by the provinces. Tables 1 and 2, discussed below, present data on these spending levels in the most recent year available, and also over time.

Table 1 presents data on provincial spending per domestic student by province in the most recent year of available data, which is 2020/21. It also presents a simple average of the same measure for all provinces. Table 1 reveals that one province spent substantially more than the others per domestic student, and one province spent substantially

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[3] The spending data come from Statistics Canada (2022d), which tracks revenues received at universities by source. For our purposes, this revenue (at the institutional level) is referred to as spending, because we are assessing expenditures on universities by the provinces. The funds in question are spending from the provincial perspective and revenue from the institutional perspective.

[4] Spending equals the provincial subsidy granted to institutions divided by the number of domestic students in the province. These include both students who are normally resident in that province as well as students from the rest of Canada who are being educated in that province. In general, the rate of students attending universities out of their home province is low (less than 10%); however, it is higher in smaller provinces. For a more detailed discussion of out-of-province student attendance, interested readers can consult Usher (2022). For our purposes here, it is sufficient to note that the per-student spending numbers provided for each province include all university students in the province and, in some cases, this out-of-province student attendance may be compensated for through bi-lateral agreements. For example, the Atlantic Veterinary College in Charlottetown is funded not only by Prince Edward Island but also by the other Atlantic Provinces. These agreements are made on an *ad-hoc* basis and are hard to account for in a comprehensive way. Both the rates of out-of-province student attendance and these bilateral agreements are a limitation on the data presented here but they do not appear to be prevalent enough to change the main findings from the data.

Table 1: Provincial spending per domestic student, 2020/21

	Spending		Spending		Spending
Newfoundland & Labrador	\$25,398	Quebec	\$16,002	Nova Scotia	\$13,241
Saskatchewan	\$18,523	Alberta	\$15,076	Ontario	\$8,782
New Brunswick	\$16,977	Manitoba	\$14,378	Average	\$15,904
Prince Edward Island	\$16,544	British Columbia	\$14,119		

Sources: Statistics Canada, 2022d, 2022e, 2023; authors' calculations.

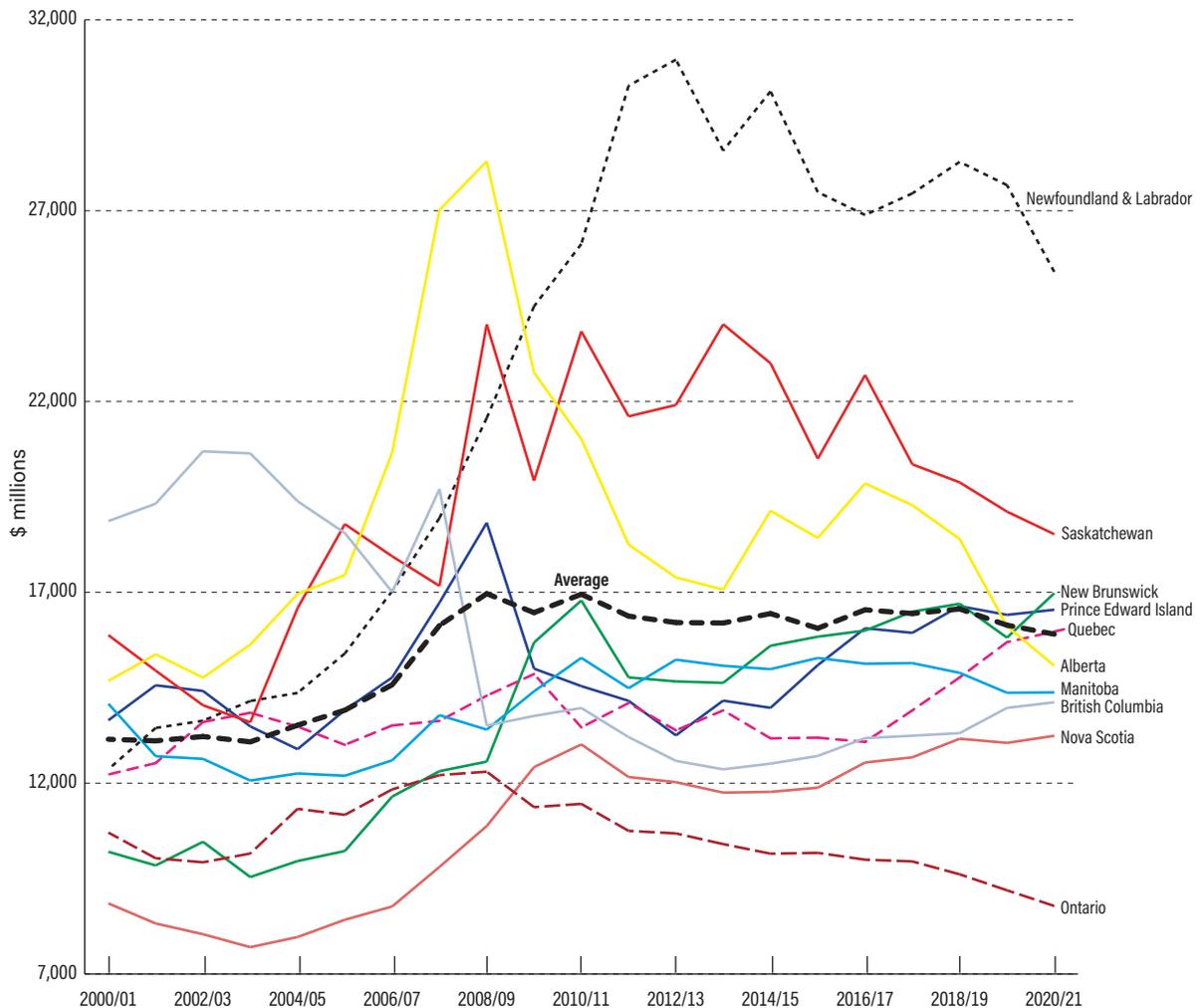
less, with most other provinces clustered close to the all-province average. Specifically, Newfoundland & Labrador was the highest-spending province, at \$25,398 in provincial spending received at universities on a per-domestic-student basis. This is \$9,494 above the national average. Saskatchewan also stands out as a relatively high spender on this metric, at \$18,523 (\$2,619 above the national average). On the opposite end of the spectrum is Ontario, the lowest-spending province in 2020/21 at \$8,782 per domestic student (\$7,122 below average). Nova Scotia is the second-lowest spender, at \$13,241 (\$2,663 below average).

Figure 1 provides data on changes in real provincial spending per domestic student on universities over time (in constant 2020 dollars). A few provinces are worth highlighting. Newfoundland & Labrador [5] has been the highest-spending province on a per-student basis every year since 2009/10, and has maintained a considerable gap relative to the second-highest spender, Saskatchewan.

Alberta's spending (on a per student basis) has put it among the top three provinces for most of the period examined, but it has dropped to the middle of the pack in recent years. Ontario, the lowest-spending province for subsidies to universities adjusted for domestic enrolment, has been the lowest-spending province every year since 2009/10 and has ranked in the bottom three in all years examined. Nova Scotia and British Columbia have consistently ranked in the bottom three (with Ontario) on spending per domestic student each year over the last decade. British Columbia is also noteworthy in that it was Canada's highest-spending province for domestic student enrolment in the first five years of the dataset (2000/01–2004/05) but then moved quickly down in the spending ranking in the following years.

[5] Newfoundland & Labrador shows some unique features in the funding of its sole provincial university, Memorial University (MUN). First, the province heavily subsidizes a medical school at MUN, which is included in the provincial transfers described in this study. Secondly, the province has historically maintained a policy of lower tuition rates in exchange for higher provincial transfers to MUN. A thorough examination of these items is beyond the scope of this paper but readers should take note of these important aspects of Newfoundland & Labrador's position.

Figure 1: Real provincial spending per domestic student, 2000/01–2020/21  
(in constant 2020 dollars)



Sources: Statistics Canada 2022d, 2022e, 2023, authors' calculations.

Table 2 helps to categorize which provinces are above and below average in spending across different time periods. Specifically, the table presents data on each province's spending level and the variance from the all-provincial average for the five-, 10-, and 20-year time periods, as well as the ranking among provinces (highest spending to lowest spending) for the given time period.

The data in table 2 reveal that the rankings among provinces have remained relatively consistent over time. In fact, eight of 10 provinces had the same rank in per-student spending regardless of the time period examined. Only two provinces experienced a change in rank across the different time periods: New Brunswick, which ranks eighth in spending over the 20-year time period but is fourth over the 10- and five-year time periods; and British Columbia, which ranks fourth in spending over the 20-year time period and eighth over the 10- and five-year time periods.

Table 2: Differences from average spending (with ranks), selected time periods (in constant 2020 dollars)

	20-year			10-year			5-year		
	Average	Variance	Rank	Average	Variance	Rank	Average	Variance	Rank
Newfoundland & Labrador	\$23,113.23	\$7,572.80	1	\$28,310.26	\$12,022.58	1	\$27,137.03	\$10,818.28	1
Prince Edward Island	\$15,067.96	\$(472.46)	5	\$15,222.78	\$(1,064.90)	5	\$16,317.88	\$(0.87)	5
Nova Scotia	\$10,980.57	\$(4,559.86)	9	\$12,427.21	\$(3,860.47)	9	\$12,935.80	\$(3,382.95)	9
New Brunswick	\$13,825.42	\$(1,715.01)	8	\$15,748.41	\$(539.27)	4	\$16,396.58	\$77.82	4
Quebec	\$13,871.03	\$(1,669.40)	7	\$14,120.86	\$(2,166.83)	7	\$14,690.61	\$(1,628.14)	7
Ontario	\$10,574.25	\$(4,966.18)	10	\$9,969.41	\$(6,318.27)	10	\$9,506.16	\$(6,812.59)	10
Manitoba	\$14,015.22	\$(1,525.21)	6	\$14,897.56	\$(1,390.12)	6	\$14,782.17	\$(1,536.58)	6
Saskatchewan	\$19,623.11	\$4,082.68	2	\$21,161.12	\$4,873.44	2	\$20,112.86	\$3,794.11	2
Alberta	\$18,945.94	\$3,405.51	3	\$17,899.13	\$1,611.45	3	\$17,743.71	\$1,424.96	3
British Columbia	\$15,387.56	\$(152.87)	4	\$13,120.08	\$(3,167.60)	8	\$13,564.70	\$(2,754.05)	8
Average	\$15,540.43			\$16,287.68			\$16,318.75		

Sources: Statistics Canada 2022d, 2022e, 2023; authors' calculations.

Therefore, table 2 is helpful in classifying provinces as higher spending and lower spending, relative to their peers. In the high-spending group are (in order from highest) Newfoundland & Labrador, Saskatchewan, Alberta, New Brunswick, and Prince Edward Island. The lower-spending group includes (in order from lowest) Ontario, Nova Scotia, British Columbia, Quebec, and Manitoba. For the purposes of these groups, New Brunswick is considered to be high spending because it is in the top half for two of the three time periods examined, while British Columbia is considered to be in the lower half for the same reason. There is a partial geographic theme in the rankings, in that three of the four Atlantic Provinces (Newfoundland & Labrador, New Brunswick, and Prince Edward Island) are in the higher-spending group for the entire period.

A discussion of differences in spending among provinces naturally gives rise to the question of what results these provinces are receiving for their different spending choices. What are the implications of a long-term decision by a province to spend more or less than the Canadian average? While this could be measured in a variety of ways, the second part of this study will tackle the question by looking at two variables: educational attainment in the population and migration.

## 3 Educational Attainment and Migration

### Educational attainment

Having measured provincial spending on universities (on a real, per-domestic-student basis) and examined differences among the provinces as well as changes over time, the next step in the analysis is to evaluate the results of this government spending. This section will do so by measuring educational attainment levels to see whether provinces that spend more tend to have more educated populations. The study measures educational attainment as the percentage share of the provincial population with a bachelor's degree or higher. This is an appropriate variable because the spending section of this study has focused solely on public universities, which grant the majority of bachelor's degrees or higher credentials in Canada. Exceptions to this include colleges that grant bachelor's degrees and private universities, but the share of Canadian degrees granted by these institutions is low. [6] While degree-granting colleges and private universities do not show up in our spending data, given that most degrees are granted by publicly funded universities, the education level of the population is deemed to be a reasonable measure of whether governments are accomplishing their goals of fostering a better-educated population.

Table 3 is a snapshot of educational attainment levels as measured by the share of the provincial population with a bachelor's degree or higher in 2021 (the latest year of available data), as well as provincial rankings. Ontario (29.9%), British Columbia (28.6%), and Alberta (25.6%) are the three provinces with the highest levels of educational

Table 3: Education level in the population: percentage with Bachelor's degree or above, 2021

	Percentage	Rank		Percentage	Rank		Percentage	Rank
Newfoundland & Labrador	16.6	10	Quebec	23.5	5	Alberta	25.6	3
Prince Edward Island	22.0	7	Ontario	29.9	1	British Columbia	28.6	2
Nova Scotia	24.3	4	Manitoba	22.9	6	Average	23.3	
New Brunswick	19.0	9	Saskatchewan	20.5	8			

Sources: Statistics Canada, 2022g; authors' calculations.

[6] The actual number of degrees granted by private universities in Canada does not appear to be available but other data confirm the number is low in proportion to the total number of degrees granted. For example, two estimates suggest the number of privately educated post-secondary students in Canada is between 120,000 and 150,000 per year (Usher, 2016; Li and Jones, 2015). However, the majority of these students are pursuing credentials both than a bachelor's degree. Even if half of the students in private universities were pursuing degrees, this would be less than 5% of the total university enrolment in Canada in any given year (Statistics Canada, 2022c).

attainment. Newfoundland & Labrador has the lowest level by a substantial margin, at 16.6%. The province with the second-lowest level of educational attainment is New Brunswick (19.0%), followed by Saskatchewan (20.5%).

Table 4 expands the time frame by also looking at education levels in the population in 2006, 2011, and 2016 (these years are available because the data comes from Canada's census). Table 4 reveals a number of insights. First, every province has recorded increases in the level of education across each time period measured. The simple average among provinces for the share of the population with a bachelor's degree or higher increased from 15.7% in 2006, to 18.3% in 2011, 20.4% in 2016, and 23.3% in 2021. Second, when compared to the provincial rankings for 2021 displayed in table 3, table 4 shows little variation among the provinces over the longer term (between 2006 and 2021). Six of ten provinces maintained the same ranking over this 15-year period, while the remaining four provinces' rankings changed by only one position.

Third, while provincial rankings for educational attainment have held roughly constant, the gap between the highest- and lowest-ranking provinces has widened over time. In 2006, the gap between the highest- and lowest-ranking provinces—Ontario and Newfoundland & Labrador—was 9.2 percentage points, while the gap between second-highest and second-lowest—British Columbia and Saskatchewan—was 6.4 percentage points. By contrast, in 2021, the same two provinces ranked first and last, but the gap grew to 13.3 percentage points, while the gap between the second-highest and second-lowest—British Columbia and New Brunswick—grew to 9.6 percentage points.

Given the measurement of spending in part one of this study, table 4 reveals a key finding: in general, high-spending provinces do not consistently have the highest levels of educational attainment. Consider that Newfoundland & Labrador, Saskatchewan, and Alberta ranked first, second, and third for spending per domestic student over the 20-year time period from 2000/01 to 2000/21. While the educational attainment data covers a slightly shorter period, 2006 to 2021, [7] these same three provinces' rankings are markedly different in the area of educational attainment. Newfoundland & Labrador ranked tenth across all four time periods (2006, 2011, 2016, 2021), Saskatchewan ranked ninth, ninth, eighth, and eighth, while Alberta ranked third, fourth, third, and third in the four census years.

Conversely, the three lowest-spending provinces over the time period covered, Ontario, Nova Scotia, and New Brunswick, had the largest, fourth-largest, and ninth-largest increases in educational attainment. In other words, there appears to be no consistent relationship between more per-student spending and higher educational attainment or lower per-student spending and lower educational attainment over the long-term (using the measures adopted for this study).

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[7] The two time periods are not fully aligned because educational attainment data comes from the quinquennial census, while spending is reported annually. 2001 census data is not included because this would capture students whose education was subsidized in the late 1990s, before our period of analysis begins. It should also be noted that we would expect a lag between spending and educational attainment, given that the spending occurs during the years a student is in university, while educational attainment only occurs upon graduation. While this is a limitation in the analysis, it does not change the findings given the relatively long time periods examined and the generality of the findings.

Table 4: Education level in the population: percentage with Bachelor's degree or above, 2006, 2011, 2021

	2006		2011		2016		2021	
	Percentage	Rank	Percentage	Rank	Percentage	Rank	Percentage	Rank
Newfoundland & Labrador	11.3	10	13.3	10	14.8	10	16.6	10
Prince Edward Island	14.1	7	17.0	7	19.1	7	22.0	7
Nova Scotia	16.4	5	18.9	4	20.8	4	24.3	4
New Brunswick	13.0	8	15.4	8	16.7	9	19.0	9
Quebec	16.5	4	18.6	5	20.5	5	23.5	5
Ontario	20.5	1	23.4	1	26.0	1	29.9	1
Manitoba	15.1	6	17.8	6	20.1	6	22.9	6
Saskatchewan	12.9	9	15.3	9	18.0	8	20.5	8
Alberta	17.6	3	20.9	4	23.4	3	25.6	3
British Columbia	19.3	2	22.1	2	24.6	2	28.6	2
Average	15.7		18.27		20.4		23.3	

Sources: Statistics Canada, 2022g; authors' calculations.

## Migration

Another consideration in our analysis is interprovincial migration. For any given province, substantial (net) migration to another province could represent a financial loss for the province as a sizable share of young, recent university graduates leave after completing their studies. In these cases, the province has spent money on subsidizing those students' education but does not receive the benefits of having them productively engaged in the provincial workforce. This applies not only to high-spending provinces: even a province with average spending levels could experience a financial loss if it also records high levels of (net) out-migration. To evaluate this question, this section presents data on net migration as a share of the provincial population in the 20-to-29 age group for each province, between the years 2000/01 and 2019/20 (the latest year of available data).

Table 5 presents data on net domestic migration as a share of the provincial population for the 20-to-29 age group for each year in each province, as well as average values and rankings among the provinces. Given that we are principally concerned with migration of bachelor's-level (or higher) graduates, it is necessary to select an age group before reviewing migration. In Canada in 2020, of the 327,000 university students who completed bachelor degrees that year, 92.2% were between the ages of 20 and 39 (Statistics Canada, 2022f). This age range captures the majority of new (and recent) graduates but would also likely capture many migrants who are closer to mid-career

Table 5: Migration as a percentage of population, ages 20 to 29, 2000/01–2019/20

	NL	PE	NS	NB	QC	ON	MB	SK	AB	BC
2000	-3.3%	-1.6%	-1.1%	-1.0%	-0.2%	0.4%	-0.7%	-2.1%	1.8%	-0.6%
2001	-2.8%	-0.8%	-0.9%	-1.1%	0.0%	0.1%	-0.8%	-2.5%	2.2%	-0.5%
2002	-2.2%	-0.4%	-0.5%	-0.9%	0.0%	0.0%	-0.5%	-1.5%	1.1%	-0.1%
2003	-2.2%	-0.2%	-0.9%	-0.8%	0.0%	-0.1%	-0.5%	-1.3%	1.1%	0.3%
2004	-3.4%	-1.2%	-1.4%	-1.3%	-0.1%	-0.2%	-1.3%	-2.6%	2.6%	0.4%
2005	-3.8%	-2.4%	-1.7%	-1.8%	-0.2%	-0.3%	-1.5%	-2.3%	3.4%	0.3%
2006	-4.3%	-4.2%	-2.3%	-1.8%	-0.4%	-0.3%	-1.2%	-0.7%	2.9%	0.7%
2007	-2.1%	-3.3%	-1.5%	-1.0%	-0.4%	-0.3%	-0.8%	0.0%	1.7%	0.8%
2008	-0.7%	-3.3%	-1.1%	-0.7%	-0.2%	-0.3%	-0.6%	0.3%	1.3%	0.5%
2009	-0.5%	-1.9%	-0.5%	-0.3%	-0.1%	-0.1%	-0.4%	0.2%	0.2%	0.5%
2010	-1.2%	-2.2%	-0.6%	-0.5%	-0.1%	-0.1%	-0.6%	0.0%	0.8%	0.1%
2011	-1.1%	-2.9%	-1.3%	-1.6%	-0.1%	-0.2%	-0.5%	0.4%	2.1%	-0.4%
2012	-0.9%	-3.7%	-1.5%	-2.1%	-0.2%	-0.3%	-0.7%	0.2%	2.7%	-0.4%
2013	-1.1%	-3.7%	-1.2%	-2.3%	-0.3%	-0.3%	-0.9%	-0.2%	2.7%	0.0%
2014	-1.0%	-3.1%	-1.3%	-2.0%	-0.4%	-0.2%	-0.9%	-0.7%	2.0%	0.5%
2015	-0.7%	-1.4%	-0.2%	-1.4%	-0.3%	0.1%	-0.5%	-0.7%	-0.2%	0.9%
2016	-1.4%	0.6%	0.2%	-0.4%	-0.1%	0.1%	-0.7%	-1.0%	-0.4%	0.8%
2017	-2.3%	-0.1%	0.2%	-0.6%	-0.1%	0.1%	-1.0%	-1.5%	0.2%	0.6%
2018	-2.0%	1.8%	0.3%	-0.1%	-0.1%	0.0%	-1.1%	-1.7%	0.2%	0.6%
2019	-1.5%	0.1%	0.3%	-0.3%	0.0%	-0.1%	-1.3%	-2.0%	0.4%	0.7%
Average	-1.9%	-1.7%	-0.8%	-1.1%	-0.2%	-0.1%	-0.8%	-1.0%	1.4%	0.3%
Rank	10	9	6	8	4	3	6	7	1	2

Sources: Statistics Canada 2022b, 2022c; authors' calculations.

and moving well after graduation. Thus, it is necessary to narrow the age group further. Statistics Canada (2022f) estimates that 67% of new university graduates in Canada are below the age of 25. A further review of the data over five years suggests the share of university graduates with a degree between the ages of 20 and 29 is 81%-to-82% on an annual basis (Statistics Canada, 2022f). Therefore, this study assumes that ages 20 to 29 is an appropriate age group for our analysis, as it will capture most “recent” graduates without being overly broad.

Over the full time period studied (2000/01–2019/20), only two provinces recorded cumulative net inflows of people in this age group, two provinces were essentially flat, and there was net migration out of the other provinces. The provinces with the highest interprovincial immigration as a share of their populations were Alberta, at an average of 1.4% per year, followed by British Columbia, at 0.3% per year. Ontario, at –0.1% was essentially flat, followed by Quebec, at –0.2%. Nova Scotia and Manitoba, each at –0.8%, and Saskatchewan, at –1.0%, were in the middle of the pack. The lowest-ranking provinces by this measure were New Brunswick, at –1.1%, Prince Edward Island, at –1.7%, and Newfoundland & Labrador, at –1.9%.

Combined with the data discussed above, table 5 shows that some provinces are spending above-average amounts on provincial university subsidies but not seeing increases in the level of education in the population and also experiencing net emigration in the age group most likely to have completed an undergraduate degree.

## 4 Summary Rankings and Correlation

This section presents summary rankings for each province across the three variables discussed above: spending per domestic student, educational attainment, and migration. Tables 6a and 6b below show the ranks in each category, separated by the high-spending and low-spending provinces as determined in part one of the paper.

Table 6A contains information for the four provinces that spend above average, record below-average levels of educational attainment, and have above-average rates of net migration out of the province. These provinces are Newfoundland & Labrador, Saskatchewan, New Brunswick, and Prince Edward Island. The remaining higher spending province, Alberta, has relatively strong results on both education attainment and migration.

Table 6B contains data for the two provinces, Ontario and British Columbia, that spend among the lowest amounts per domestic student, yet still enjoy a high rank in educational attainment and migration. Nova Scotia ranks among the lowest spenders and is roughly in the middle of the pack on education attainment and migration, while Quebec and Manitoba rank in the middle of the group of 10 provinces in all three categories.

These results suggest that educational attainment levels and migration are more closely connected with each other than per-student spending is with either. Most provinces that spend above the Canadian average over the longer term do not have better educated populations. However, most of the provinces that rank among the best on migration also have a more educated population, relative to other provinces.

Table 6: Summary ranking in spending, education level, and migration

	6A: Higher-spending provinces			6A: Lower-spending provinces			
	Spending	Education	Migration	Spending	Education	Migration	
Newfoundland & Labrador	1	10	10	Manitoba	6	6	6
Saskatchewan	2	8	7	Quebec	7	5	4
Alberta	3	3	1	British Columbia	8	2	2
New Brunswick	4	9	8	Nova Scotia	9	4	6
Prince Edward Island	5	7	9	Ontario	10	1	3

Note: Ranking in educational spending is based on the latest 5-year average (2016/17–2020/21); ranking in education level is based on 2021; and ranking in migration rate is based on 20-year average (2000/01–2019/20).

Sources: Statistics Canada, 2022b, 2022c, 2022d, 2022e, 2022g; authors' calculations.

Expanding on the rankings presented in tables 6a and 6b, table 7 provides additional results on the relationship among the variables discussed in this study. First, we examine the correlation between spending and educational attainment using two approaches. Since educational attainment data is only available at census years, we calculate the correlation between spending and educational attainment using the average provincial

Table 7: Correlations among educational attainment, spending, and migration

*Correlation between education attainment and average spending (5-year leading average preceding the census year)*

N	Correlation coefficient	P-value	Significance
40	-0.238	0.079	N

*Correlation between education attainment and average spending (5-year leading average preceding the census year, using only data up to 2016 census)*

N	Correlation coefficient	P-value	Significance
30	-0.172	0.362	N

*Correlation between education attainment and migration*

N	Correlation coefficient	P-value	Significance
30	0.541	0.002	Y

*Correlation between education attainment and migration (5-year leading average preceding the census year)*

N	Correlation coefficient	P-value	Significance
30	0.523	0.003	Y

Sources: Statistics Canada, 2022c, 2022b, 2022d, 2022e, 2022g, 2023; authors' calculations.

spending over the five years preceding the given census year. The results show a correlation coefficient of  $-0.238$ , but it is not statistically significant, as indicated by a p-value of 0.079. To ensure the accuracy of our findings, we also test the relationship between spending and educational attainment using only census data up to 2016, which aligns better with the time frame of the educational attainment and migration test below. With this approach, we find a correlation coefficient of  $-0.172$ , which is even less significant, with a p-value of 0.362. Both tests suggest there is no meaningful statistical relationship between per-student spending and provincial educational attainment.

Next, we investigate the relationship between migration and educational attainment, using migration data at census years and a five-year average migration preceding the given census year. Both tests reveal a significant positive correlation. The first test finds a correlation coefficient of 0.541, indicating strong statistical significance with a p-value of 0.002. The second test yields a correlation coefficient of 0.523 with a p-value of 0.003, confirming the presence of a moderate positive correlation between migration and educational attainment. Provinces with higher net interprovincial migration tend to have a larger proportion of their population with a bachelor's degree or higher.

It is worth noting there are limitations in this data and the scope of the study does not permit us to evaluate all possible explanatory factors. For example, the share

of educational attainment in the population will also be affected by the number of international immigrants settling and the extent to which they possess higher levels of educational attainment when they settle in various provinces.

In summary, the findings of these tests indicate that higher levels of spending as measured by direct provincial contributions to universities do not necessarily lead to higher levels of educational attainment in the population. Instead, the data shows that migration is more closely related to higher levels of attainment. Provinces experiencing stronger net interprovincial migration tend to have a more educated population, as measured by the percentage of individuals with a bachelor's degree or higher.

## Conclusion

This study has reviewed provincial data on university education subsidies to institutions, educational attainment in provincial populations, and interprovincial migration patterns. It examined how these variables have changed over time and also the differences among provinces. In general, the study finds that higher spending per domestic student does not necessarily enable relatively high spending provinces to reap the rewards of a more educated workforce. Rather, interprovincial migration seems to be a more important factor, allowing university students educated and paid for in one province to move to another province after graduation, effectively carrying the provincial investment in human capital along with them.

The results are strongest in four provinces that have the combination of above-average spending coupled with track records of long-term net migration out of the province. These provinces are Newfoundland & Labrador (1<sup>st</sup> in spending and 10<sup>th</sup> in net emigration), Saskatchewan (2<sup>nd</sup> in spending and 7<sup>th</sup> in net emigration), New Brunswick (4<sup>th</sup> in spending and 8<sup>th</sup> in net emigration), and Prince Edward Island (6<sup>th</sup> in spending and 9<sup>th</sup> in net emigration). In each of these cases, over the longer term provincial governments have spent above-average amounts per student while seeing many young, educated workers relocate to other provinces. Further, these four provinces rank 10<sup>th</sup>, 8<sup>th</sup>, 9<sup>th</sup>, and 7<sup>th</sup> for educational attainment, which provides further support for the argument that the impact of higher spending is not being felt in the provincial labour force because a significant share of educated workers are migrating elsewhere. Lastly, our calculations show no significant correlation between provincial spending and educational attainment, but a significant positive correlation between migration and educational attainment. These findings should be of interest to policy makers across the country, particularly those in higher-spending provinces who are attempting to develop more educated populations and are also sensitive to the effectiveness of policies that heavily subsidize university education.

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## About the Authors

### Alex Whalen

Alex Whalen is Associate Director, Atlantic Canada Prosperity with the Fraser Institute and coordinator of the activities of the Atlantic Canada division. Prior to joining the Institute, Mr Whalen was Vice-President of the Atlantic Institute for Market Studies (AIMS), which merged with the Fraser Institute in 2019. He is a graduate of the Schulich School of Law at Dalhousie University, and the School of Business at the University of Prince Edward Island. He brings prior experience as an entrepreneur and business manager to his work at the Institute. His writing has appeared widely in newspapers including the *Globe and Mail*, *National Post*, *Chronicle Herald*, *Telegraph Journal*, *Calgary Herald*, and others.



### Nathaniel Li

Nathaniel Li is a Senior Economist at the Fraser Institute. He holds a B.A. from the Fudan University in China and a Ph.D. in Food, Agricultural and Resource Economics from the University of Guelph. Prior to joining the Fraser Institute, he worked for the University of Toronto as a postdoctoral fellow and the University of Guelph as a research associate. His past research has been published in *Applied Economic Perspectives and Policy*, *Agricultural Economics*, *Preventive Medicine*, and *Canadian Public Policy*.



# Acknowledgments

The authors extend their thanks to the Lotte and John Hecht Memorial Foundation for supporting this project. Any errors and omissions are the sole responsibility of the authors. As the researchers worked independently, the views and conclusions expressed in this paper do not necessarily reflect those of the Board of Directors of the Fraser Institute, the staff, or supporters.

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## ISBN

978-0-88975-755-4

## Citation

Alex Whalen and Nathaniel Li (2024). *Educational Attainment, Migration, and Provincial Spending on Universities in Canada*. Fraser Institute. <<http://www.fraserinstitute.org>>.

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