

# **Post-Secondary Graduates' Province of Study, Post-Graduation Residence in New Brunswick, and Labour Market Outcomes (2011-2016)**



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## **Project Title**

Post-secondary graduates' province of study, post-graduation residence in New Brunswick, and labour market outcomes (2011-2016)

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## Table of Contents

Definitions.....	vi
Executive Summary .....	1
Highlight of Findings.....	1
Key Takeaways .....	2
Introduction .....	3
Background .....	3
Study Objective .....	3
Data and Methodology.....	4
Data.....	4
Methodology.....	5
Results .....	7
Where Are NB Residents Going for Their Post-Secondary Studies? .....	7
What Factors Are Associated with the Decision to Leave NB for Post-Secondary Studies or After Graduation from Post-Secondary Studies? .....	9
What Determines Graduation from a University Outside NB? .....	11
Retention of Graduates from NB Universities in the Province .....	14
What Proportion of NB Residents Who Graduate from Out-of-Province Institutions Return to and Remain in NB After Graduation? .....	18
Overall Sample .....	18
By Gender .....	21
By Study Region .....	21
By Field of Study .....	22
Are There Income Differences Between NB Residents Who Live in NB After Graduation and Those Who Do Not? (University Only) .....	27
Overall.....	28
What Factors Influence Earnings Differences Between NB Residents Who Live in NB After Graduation and Those Who Do Not? (University Only).....	30
Discussion of Findings .....	36
References.....	39
Appendices .....	41
Incomes by Location of Study and Province of Residence by Years Since Graduation and Graduate Cohort.....	42

## List of Figures

Figure 1: NB Residents by Field of Study and Study Province, 2011-2018.....	10
Figure 2: Average Return Rates by Gender .....	21
Figure 3: Median Earnings Disparities Between Stayer-Stayer and Mover-Stayer Graduates, 2011 Cohort (University Only) .....	28
Figure 4: Median Earnings Disparities Between Stayer-Mover and Mover-Mover Graduates, 2011 Cohort Only .....	29

## List of Tables

Table 1: NB Residents by Province/Region of Study at Graduation .....	8
Table 2: Percentage of NB Residents Who Graduate from Out-of-Province Post-Secondary Institutions by Level of Study .....	9
Table 3: Likelihood of Graduating from a University Outside NB.....	12
Table 4: Likelihood of Leaving NB within 3 Years after Graduating from a University in NB.....	16
Table 5: Return Rates of NB Residents Who Graduate from Out-of-Province Post-Secondary Institutions by Year of Graduation .....	19
Table 6: Return Rates of Undergraduate-Level NB Residents Who Graduate from Out-of-Province Universities .....	19
Table 7: Retention Rates of NB Residents Who Graduate from NB Post-Secondary Institutions .....	20
Table 8: Retention Rates of Non-NB Residents Who Graduate from NB Post-Secondary Institutions.....	20
Table 9: Return Rates by Study Region.....	22
Table 10: Return Rates by Field of Study, Graduates of Non-NB Institutions .....	23
Table 11: Retention Rates of NB-Educated Graduates in Health and Related Fields.....	23
Table 12: Likelihood of a Graduate Returning to NB within 3 Years After Graduating from a Non-NB University .....	25
Table 13: Mobility Categories and their Definitions .....	27
Table 14: Income Determinants for Stayer-Stayer and Mover-Stayer Graduates 3 Years After Graduation .....	31
Table 15: Income Determinants for Stayer-Mover and Mover-Mover Graduates (University Only) .....	33
Table 16: NB Residents by Institution and/or Province/Region of Study at Graduation .....	41
Table 17: Median Income of Stayer-Stayer Graduates for Overall Sample, 2011-2016.....	42
Table 18: Median Income of Mover-Stayer Graduates for Overall Sample, 2011-2016.....	42
Table 19: Median Income of Stayer-Mover Graduates for Overall Sample, 2011-2016.....	42
Table 20: Median Income of Mover-Mover Graduates for Overall Sample, 2011-2016 .....	42
Table 21: Median Income of Stayer-Stayer Graduates of Health and Related Fields, 2011-2016 .....	43

Table 22: Median Income of Mover-Stayer Graduates of Health and Related Fields, 2011-2016 .....	43
Table 23: Median Income of Stayer-Mover Graduates of Health and Related Fields, 2011-2016 .....	43
Table 24: Median Income of Mover-Mover Graduates of Health and Related Fields, 2011-2016 .....	43
Table 25: Median Income of Stayer-Stayer Graduates of Math, Technology, Engineering, and Architecture, 2011-2016 .....	44
Table 26: Median Income of Mover-Stayer Graduates of Math, Technology, Engineering, and Architecture, 2011-2016 .....	44
Table 27: Median Income of Stayer-Mover Graduates of Math, Technology, Engineering, and Architecture, 2011-2016 .....	44
Table 28: Median Income of Mover-Mover Graduates of Math, Technology, Engineering, and Architecture, 2011-2016 .....	44
Table 29: Median Income of Stayer-Stayer Graduates of Law, Humanities, and Social Sciences, 2011-2016.....	45
Table 30: Median Income of Mover-Stayer Graduates of Law, Humanities, and Social Sciences, 2011-2016.....	45
Table 31: Median Income of Stayer-Mover Graduates of Law, Humanities, and Social Sciences, 2011-2016.....	45
Table 32: Median Income of Mover-Mover Graduates of Law, Humanities, and Social Sciences, 2011-2016.....	45
Table 33: Median Income of Out-of-Province Graduates Living in NB, 2011-2016.....	46
Table 34: Median Income of Out-of-Province Graduates Living outside NB, 2011-2016 .....	46

## Definitions

This report uses the following terms to classify New Brunswick (NB) residents who graduated from a university according to province of study and post-graduate residence:

<b>Stayer-Stayer</b>	An NB resident who graduated from a university <b>in NB</b> and remained <b>in NB</b> after graduation
<b>Mover-Stayer</b>	An NB resident who graduated from a university <b>outside NB</b> but lived <b>in NB</b> after graduation
<b>Stayer-Mover</b>	An NB resident who graduated from a university <b>in NB</b> but lived <b>outside NB</b> after graduation
<b>Mover-Mover</b>	An NB resident who graduated from a university <b>outside NB</b> and lived <b>outside NB</b> after graduation

## Executive Summary

As New Brunswick (NB) continues to invest in the retention and attraction of university and college graduates, it is important to know what proportion of its residents who leave for post-secondary studies are returning to the province and contributing to the local economy. Based on an analysis of registrar data from Canadian post-secondary institutions linked with tax data from T1 tax returns, this report sets out the mobility and earnings patterns of NB residents who leave the province for their post-secondary studies, comparing them to residents who choose to stay and study in NB. Counts, return rates, and median incomes after graduation are presented by gender, field of study, level of study, and region of study for the 2011 to 2016 tax years.

### Highlight of Findings

**About 80 percent of university graduates who declare NB as their permanent province of residence at admission (i.e., NB residents) graduate from a university in NB.**

- Of the roughly 20 percent who graduate from university outside NB, a majority (12 percent) choose a university within the Atlantic region (i.e., Nova Scotia, Prince Edward Island, or Newfoundland and Labrador).
- 5 percent of NB graduates attend university in Ontario, and 3 percent attend university in Quebec. Only 2 percent of NB residents who graduate from university do so from a university in the Western Canadian provinces.
- New Brunswickers with the following characteristics have a higher likelihood of graduating from a university outside NB, rather than inside the province: being female, being 30 years and under, having a higher socioeconomic standing, or being unmarried.
- Graduate-level students are more likely than undergraduate students to graduate from universities outside NB. The availability of graduate programs in the province is one of the likely explanations for this, as only three institutions in NB are authorized to award graduate degrees.
- Other factors being equal, graduates of Physical and Life Sciences programs are the most likely to graduate from a university outside NB. These graduates are twice as likely as their Arts, Communication, and Humanities counterparts to have graduated from an out-of-province institution. On the other hand, Education graduates are the least likely to study outside the province, with graduates being 46 percent less likely than their Arts, Communication, and Humanities counterparts to have graduated from an out-of-province institution.

**Slightly over half of the New Brunswickers who graduate from universities outside NB return to NB within a year after graduation. Five years later, less than half of these graduates are still in NB.**

- Despite the proportion of out-of-province graduates who return, NB is still seeing a net loss of university graduates each year.
- Other factors being equal, characteristics such as being female, older than 30, married, and/or of a higher socioeconomic class are associated with a higher likelihood of returning to NB after graduation.
- Relative to undergraduates, graduate-level graduates of programs in Education, Math, Computer and Information Sciences, and Health and Related Fields are more likely to return to NB after graduating from a non-NB university.
- By study province, graduates from Ontario universities are the least likely to return to NB within 3 years of graduation.

**Among NB residents who graduate from university, post-graduation earnings are not determined by the province in which they attended university.**

- After accounting for graduates' demographic characteristics, program of study, and level of study, we find that a graduate's province of study is not a determinant of income. This means the NB labour market values the credential itself and does not differentiate across credentials.
- Similarly, the incomes of NB residents working in other provinces are the same among graduates of NB universities and graduates of non-NB universities.

## Key Takeaways

If the goal of the NB government is to increase the size of the province's population and workforce, NB residents should be encouraged to study at NB institutions rather than outside the province. While New Brunswickers who graduate from NB universities earn as much after graduation as those who graduate from universities in other provinces, they have a much higher probability of remaining in NB.

However, if the goal is to attract and/or retain graduates with needed credentials at a lower cost to the public treasury, more New Brunswickers should be encouraged to leave the province for their studies. NB taxpayers do not (directly) fund universities in other provinces, and half of the residents who pursue university education out of province will return within a year of graduation. For instance, training nurses is expensive for the NB government; and rather than increasing the number of seats in NB nursing programs, perhaps encouraging nursing students to complete their degrees outside NB could be a cost-effective avenue to having more nurses in the province.



# Introduction

## Background

To date, research on post-graduate outcomes in New Brunswick (NB) has investigated the retention rates and incomes of graduates from post-secondary education (PSE) institutions in the province. One of the biggest takeaways from these studies (Bhuiyan et al., 2021; Boco et al., 2021) is that post-secondary graduates who are originally from NB have high retention rates.

Among New Brunswickers, there is a general narrative of high levels of out-migration among post-secondary credential holders. These perceptions reflect that a low proportion of out-of-province students attending NB universities remain in the province after graduation. Residents of NB who graduate from NB PSE institutions are actually very likely to remain in NB after graduation.

It is encouraging to see that NB is not losing a large percentage of its post-secondary educated population to other provinces or countries. However, while these studies have shed light on an important issue, they only discuss NB residents who are educated *within the province*. Little is known of the return rates and retention rates of NB residents who pursue education elsewhere.

Each year, around 7,000 students graduate from public secondary schools in NB and make decisions about the next phase of their lives (Statistics Canada [StatCan], 2021). A large share of high school students pursuing further education tend to remain not only in province, but also close to where they attended high school. Research shows that many youths who choose to attend university do so near their region of residence. In 1996, 80 percent of NB students pursuing post-secondary education enrolled in a university within commuting distance (defined as 80 kilometres) of where they resided during high school (Frenette, 2006).<sup>1</sup>

While many factors may impact the decision to attend a college or university close to home, an important consideration is the cost associated with leaving and the students' emotional ties to home. For the students who decide to go outside the province for their post-secondary studies, this report aims to find out what percentage come back and what the possible reasons are behind the decision to return to or remain in their province of study or other provinces.

## Study Objective

The objective of this study is to present data on the return migration patterns of university graduates who reside in NB prior to admission to PSE but graduate from university in other

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<sup>1</sup> In a survey taken of Grade 12 students in NB, results show that 44.1 percent of Anglophone respondents and 47.7 percent of Francophone respondents planned to stay in the province after their high school graduation (Education and Early Childhood Development [EECD], 2021). In the same survey, when asked about post-high school plans, more than 50 percent of Anglophone respondents and about 70 percent of Francophone respondents said they planned to attend a public university or college in NB. Less than 20 percent of respondents in either linguistic group had plans to attend a university or college outside NB (EECD, 2021).

provinces. We examine the number of graduates who consider NB their permanent province of residence at admission but graduate from post-secondary institutions in other provinces, and we look at the proportion of those graduates who return and stay in NB. We analyze these graduates' return rates by their gender, study region, level of study, and field of study 1, 3, and 5 years after graduation. We also analyze their earnings to assess if university credentials from other provinces generate different returns on investment than NB university credentials.

For this study, we use a Statistics Canada dataset linking the Postsecondary Information System (PSIS), which contains data on all graduates from Canadian public institutions, with tax return data available in the T1 Family File. The longitudinal nature of these datasets allows graduate earnings and mobility decisions to be observed over time.

The following sections present a detailed discussion of the datasets, the data and methodology used in this report, our findings, and, finally, a summary of the main results, along with recommendations for policy and future research.

## **Data and Methodology**

### **Data**

This report uses linked university and college registrar data available in the Postsecondary Student Information System (PSIS) and tax records available in the T1 Family File from 2011 to 2017. These are two of the three datasets available in the Educational and Labour Market Longitudinal Linkage Platform (ELMLP), the third being the Registered Apprenticeship Information System (RAIS). The longitudinal nature of the three datasets in the ELMLP allows for the analysis of individuals who are enrolled in or have graduated from post-secondary institutions or trade programs in Canada. We do not consider apprentices in this report.

### **Postsecondary Student Information System (PSIS)**

The PSIS is a national dataset that provides information on graduates from all publicly funded post-secondary institutions in Canada. It contains longitudinal student records that enable analysis of post-secondary issues including enrollment, persistence, graduation, and program changes. Our analysis concerns all post-secondary graduates who declare NB their permanent province of residence upon admission to a PSE institution. Because we focus on PSE graduates, individuals who have not completed post-secondary programs are excluded from our analysis.

There are some limitations to using PSIS data to assess student outcomes and mobility. First, while a variable detailing a graduate's field of study is provided, the variable specifying the particular program of study is not detailed for all graduates in the data. For instance, some students have "Master of Science" listed as their program name with no information on the specific field in which the Master of Science is received. Second, programs which are offered remotely cannot be identified except for an indication that the institution is strictly online (in which case, an

assumption can be made). This is especially important as more institutions are incorporating remote learning.

Third, students in programs that have “seating arrangements” with institutions in other provinces (such as NB has with the medical schools in Newfoundland and Labrador, Nova Scotia, and Quebec) cannot be isolated in the data. Despite these students likely residing in a province different from their study province, there is currently no way of identifying them, especially since the specific program of study also cannot be seen.

## **T1 Family File**

The T1 Family File contains tax records derived from the T1 schedule for Canadian income tax. Tax returns are often filed in the spring following the reference year – for example, tax records in the 2017 tax year are filed by April of 2018. The T1 Family File contains demographic and geographic characteristics such as age and province of residence as of December 31<sup>st</sup> of the tax year, as well as earnings information for census families, working-age individuals, and seniors.

It should be noted that although province of taxation is used to determine residence in this report, a graduate may not be physically residing in their reported taxation province. Province of taxation simply means the province to which graduates' taxes are paid.

## **Methodology**

This report links university and college data in the PSIS and tax records in the T1 Family File to analyze the mobility decisions and earnings of NB residents after they graduate from their post-secondary studies (with graduation years between 2011 and 2016).

As with previous studies using tax records to analyze mobility (see Boco et al., 2021), this report uses the declared province of taxation to determine where graduates reside in the years after graduation. As with all Canadian taxes, residence is based on December 31<sup>st</sup> of the tax year. We limit the final sample for mobility and earnings outcomes to those who consistently file Canadian taxes each year after graduation until 5 years after, or as far as the data allow. A 2013 graduate, for instance, must have filed taxes in 2014, 2015, 2016, 2017, and 2018 to be included in the final sample. This is due to residual disclosure concerns associated with small sample sizes.

As a result of this sample restriction, it should be noted that about 20 percent of graduates in the linked datafile are excluded from the final sample (i.e., 20 percent of graduates in the sample did not consistently file their taxes in each year of the 5 years since graduation – in some cases because they left Canada).

## **Return Rates**

The sample for return rate calculations is limited to graduates who complete their post-secondary studies at institutions outside NB but declare NB as their permanent province of residence at the time of admission. This encompasses NB residents who graduate from institutions

outside NB. Return rates are therefore defined as the percentage of these graduates that return to NB after graduation and are calculated as the proportion of tax-filing graduates in this group who declare NB as their province of taxation 1, 3, and/or 5 years after graduation.

For example, for the 2011 cohort of graduates from institutions outside NB, their return rate denominator is calculated as the number of graduates in that cohort who filed taxes in 2012, 2013, 2014, 2015, and 2016. The numerator for the 1-year return rate is the number of graduates who filed taxes in NB in 2012. The numerator for the 3-year return rate is the number of graduates who filed taxes in NB in 2012, 2013, and 2014. The numerator for the 5-year return rate is the number of graduates who filed taxes in NB in 2012, 2013, 2014, 2015, and 2016.

Return rates after the first year can, in essence, be looked at as retention of returned graduates. This method was chosen to eliminate the risk of residual disclosure. Nevertheless, when return rates are calculated as the percentage of tax-filing out-of-province graduates who return to NB 1, 3, and 5 years after graduation, rates remain in close range to what is reported in this paper. This is because the majority of observed returns occur in the first year after graduation. Returns that occur after the first year (i.e., in the third and fifth year post-graduation) are small enough to trigger residual disclosure concerns if reported.

It should be noted that there are scenarios in which a student graduates from a university or college outside the province but is physically present in NB for their studies. These students are either remote learners or students of out-of-province programs with "seats" in an NB university. For instance, Athabasca University is an online institution whose students attend classes virtually. Additionally, Université de Moncton has about 24 seats each year for physicians who are enrolled at Université de Sherbrooke in Quebec. These students attend classes on the Université de Moncton campus while officially being students of Université de Sherbrooke.

In these scenarios, this report looks strictly at study province, and these students are considered out-of-province graduates. Not only can the current data not account for universities that have seats with NB universities, but the number of NB students also graduating from online universities is too small to impact results.

## **Retention Rates**

For comparison to out-of-province return rates, we compute the retention rates of graduates who complete their post-secondary studies at NB institutions and had declared NB as their permanent province of residence at the time of admission. Retention rates are calculated as the proportion of these graduates who still file taxes in NB 1, 3, and/or 5 years after graduation.

## **Income**

The income definition used in this report is for taxable income (i.e., total income less deductions). We use this definition rather than employment income, as employment income in the tax records of PSIS students excludes self-employment income. We report the median taxable income for each graduation year cohort between 2011 and 2016. We examine median rather

than average income, as the former is less affected by those who report zero or negative income. In our regression analysis, we use only those graduates with positive reported taxable income, and we use the logarithm of taxable income as our outcome measure.

## Results

### Where Are NB Residents Going for Their Post-Secondary Studies?

As of 2018, over 7,000 NB residents graduate from publicly funded post-secondary institutions in Canada, and roughly 80 percent of them graduate from post-secondary institutions in NB ([Table 1](#)). The percentage of university versus college graduates within the 80 percent of students who graduate from a post-secondary institution in NB is almost evenly split, with slightly less than half graduating from an NB university and slightly more than half graduating from an NB college.

Previous research has shown that NB residents who are college graduates are less likely to leave NB for school and are more likely to remain in NB after graduation relative to university graduates (Bhuiyan et al., 2021; Boco et al., 2021).

Of the New Brunswickers who move out of province to pursue higher education, the majority attend university. The share of graduates who attend college outside NB is only around ten percent. Outside NB, the other Atlantic provinces are a popular choice for NB residents pursuing post-secondary studies, as about 10 to 12 percent of NB residents who graduate from public post-secondary institutions choose institutions within the Atlantic region. Five percent of NB residents graduate from an institution in Ontario, while three percent graduate from one in Quebec. Overall, very few NB residents (two percent) who complete post-secondary education venture west of Ontario for their studies.

[Table 1](#) shows NB residents by their province of study and selected universities. For the Atlantic region, Dalhousie University and St. Francis Xavier University (St. FX) are popular university choices for NB residents, while Holland College is a popular college choice (see Appendices). For NB residents who attend university outside the Atlantic region, the University of Ottawa (Ontario), Université Laval (Quebec), and Université de Sherbrooke (Quebec) are the most frequently attended by NB residents graduating each year.<sup>2</sup> For NB residents who graduate from Western Canadian universities, Athabasca University and the University of Alberta are popular choices.

Seeing that a student graduated from a school outside NB does not necessarily mean they were not physically present in the province. As Athabasca University in Alberta is largely an online university specializing in distance education, it is likely that NB students of Athabasca reside in NB

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<sup>2</sup> For Université Laval and Université de Sherbrooke, the presence of NB students is likely driven by seat agreements with NB universities. As such, there is a percentage of graduates from these institutions who never leave NB but are considered out-of-province graduates.

during their studies. Further, some universities in NB have seating agreements with universities outside the province, and although individuals may be considered graduates from these non-NB universities, they may be physically in NB for their studies. For example, Dalhousie University's medical school admits 30 students into the Dalhousie Medicine New Brunswick (DMNB) program each year, and some of these students stay in NB for their studies.

Our results still consider these individuals out-of-province graduates for two reasons. First, with the case of Athabasca University, the number of graduates per year is small, representing between 20 and 30 individuals out of around 1,500 graduates from non-NB PSE institutions (about two percent). As these graduates likely remain in NB during their studies, they may have a higher likelihood of residing in NB after graduation than other out-of-province graduates, which will introduce a small upward bias to the calculated return rate.

In other cases, like with the seating arrangements, there is the likelihood that some New Brunswickers are physically present in the study province during their studies for at least some period of time. Unfortunately, the variable in the PSIS that highlights graduates' specific program of study does not do so for all graduates and, as such, is not used to identify students graduating from non-NB programs that have seating agreements with NB universities.

**Table 1: NB Residents by Province/Region of Study at Graduation<sup>3</sup>**

	2011	2012	2013	2014	2015	2016	2017*	2018*
<b>Atlantic Region (Excludes NB)</b>	930	780	800	880	900	920	820	890
<b>New Brunswick</b>	6,480	6,410	6,610	6,280	6,090	5,950	6,030	5,780
<b>Ontario</b>	380	430	380	420	350	360	190	220
<b>Quebec</b>	250	250	270	250	280	240	250	250
<b>Western Canada and Territories</b>	150	140	130	140	130	150	140	150
<b>Total</b>	<b>8,190</b>	<b>8,010</b>	<b>8,190</b>	<b>7,970</b>	<b>7,750</b>	<b>7,620</b>	<b>7,430</b>	<b>7,290</b>

\*Some Ontario colleges and universities do not have complete data available for these years.

Note: Some Canadian colleges have not released data prior to 2015.

<sup>3</sup> The sample for this particular table includes all graduates regardless of their tax-filing frequency after graduation.

## What Factors Are Associated with the Decision to Leave NB for Post-Secondary Studies or After Graduation from Post-Secondary Studies?

Table 2 shows the percentage of post-secondary graduates within each level of study (undergraduate, graduate, and college) who receive credentials from institutions outside NB.<sup>4</sup>

At the undergraduate level, between 20 to 25 percent of NB students graduate from institutions outside the province. At the graduate level, the proportion increases to over 50 percent.

Currently, four<sup>5</sup> public institutions in NB are authorized to award undergraduate degrees, and three<sup>6</sup> are authorized to award both graduate and undergraduate degrees. As such, availability is one of the likely explanations as to why a larger percentage of NB residents leave the province for their graduate-level studies.

**Table 2: Percentage of NB Residents Who Graduate from Out-of-Province Post-Secondary Institutions by Level of Study**

	2011	2012	2013	2014	2015	2016	2017	2018
<b>Undergraduate</b>	23%	20%	22%	24%	24%	24%	21%	25%
<b>Graduate</b>	55%	50%	52%	56%	56%	59%	52%	58%
<b>College</b>	11%	9%	9%	10%	11%	11%	10%	9%

Note: "Undergraduate" includes all undergraduate-level credentials and is not restricted to bachelor's degrees. As there were no graduate-level diplomas or degrees in the sample, "graduate-level" only includes graduate degree holders.

At the college level, only about ten percent of NB residents who graduate with college-level credentials attended college outside NB. This is supported by research which shows that NB community college students, compared to other levels of study, are the least likely to venture outside the province when choosing a college (Bhuiyan et al., 2021).

For the college-level graduates who do study out of province, program availability and/or program popularity are likely drivers behind institution choice. For instance, while the New Brunswick Community College (NBCC) offers a Culinary Arts program at its Moncton campus, the Holland College Culinary Arts program in Prince Edward Island (PEI) is more widely known in the Atlantic region.

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<sup>4</sup> It should be noted that level of study is determined by a combination of credential type and program type. As a result, not all graduates in the undergraduate-level group graduated from a university, and not all graduates in the college-level group graduated from a community college. However, for each group, the percentage of these types of graduates is less than ten percent of the sample.

<sup>5</sup> These include Mount Allison University (MTA), St. Thomas University (STU), the University of New Brunswick (UNB), and Université de Moncton (UdeM).

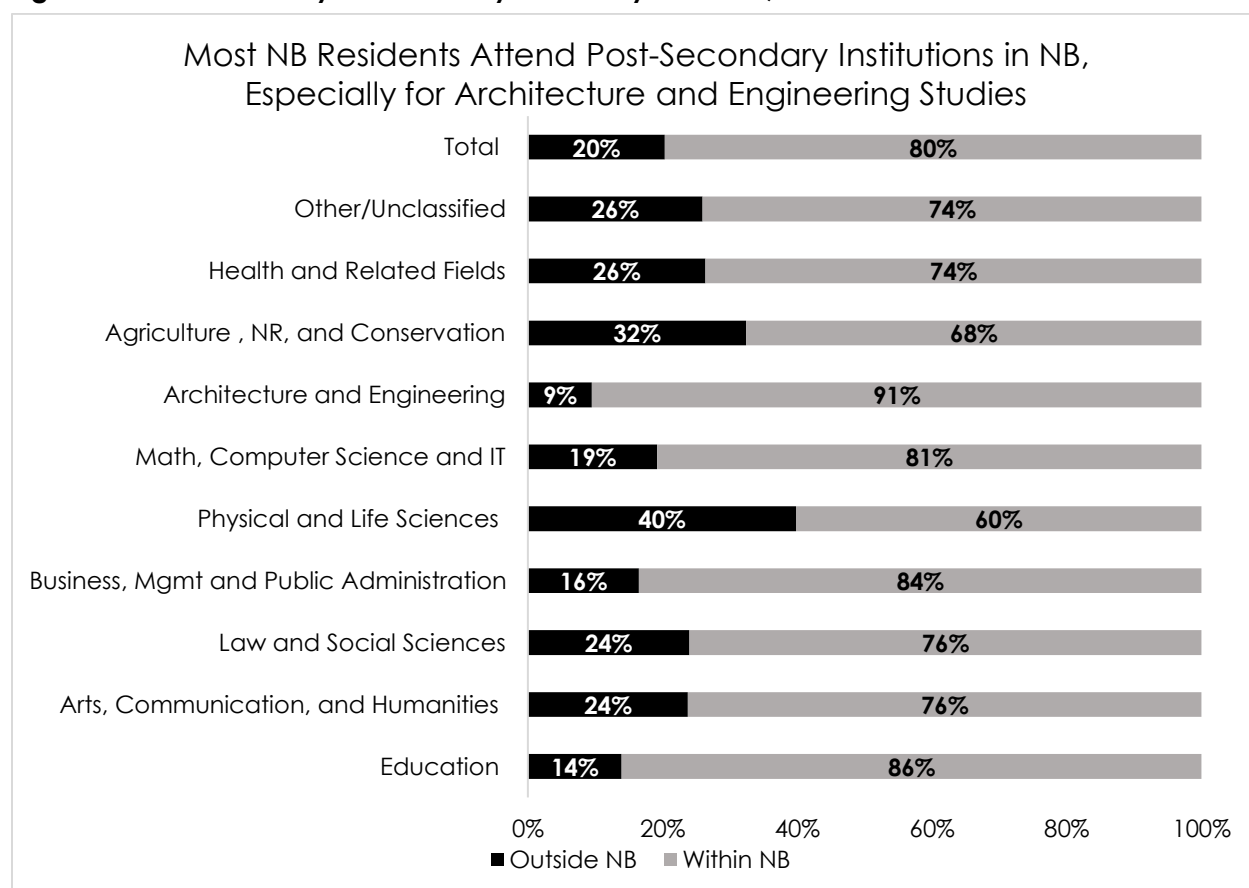
<sup>6</sup> These include MTA, UdeM, and UNB.

Figure 1 below shows NB residents by their program of study and location of study ("study province"). While most NB residents choose NB institutions for their post-secondary studies, this figure shows that they are willing to do so for some programs more than others. For Physical and Life Sciences programs, 40 percent of graduates are from an institution outside NB even though these programs are available in three of the four publicly funded NB universities.

On the other hand, Architecture and Engineering program graduates are the least likely to study out of province, with only nine percent of graduates in this field graduating from an institution outside NB. UNB and UdeM are the only universities to currently offer programs in Architecture and Engineering. However, public colleges in NB offer a wide range of programs within the field.

NBCC and Collège Communautaire du Nouveau Brunswick (CCNB) currently offer programs in building, civil, electrical, mechanical, and power engineering. As previously noted, college graduates are the most likely to stay in NB for their studies. With a wide range of programs in this field being offered at the two largest public colleges in the province, it is likely that the majority graduates in this field are college-level, hence the smaller percentage of graduates choosing out-of-province institutions to study.

**Figure 1: NB Residents by Field of Study and Study Province, 2011-2018**





## What Determines Graduation from a University Outside NB?

Table 3 shows the degree to which field of study, level of study, and other demographic factors influence the likelihood of graduating from a university outside NB. As previous reports on student mobility have highlighted, college-level graduates are much less likely to graduate from a non-NB post-secondary institution compared to university graduates (Bhuiyan et al., 2021; Boco et al., 2021). As such, the sample in Table 3 is limited to university graduates only.

All factors being equal, a graduate's gender, socioeconomic status (i.e., parental income), age, marital status, field of study, and level of study have statistically significant effects on the decision to study at and graduate from a non-NB university.

Results show that NB men are about five percent less likely than women to choose a non-NB university.<sup>7</sup> Parental income, which is used as a measure of socioeconomic status, has a positive relationship with a graduate's decision to pursue studies at a non-NB university. Graduates whose parents report earnings above \$130,000 in the students' graduation year are 16 percent more likely to graduate from a non-NB university.

Choosing an out-of-province institution is often a more expensive option for NB residents, not only in terms of general cost of living but also tuition. In general, domestic in-province tuition fees required by NB universities are often lower than the domestic out-of-province tuition fees required by the non-NB universities from which the majority of NB residents graduate (see Table 16 in the Appendices).

Results suggest that if a graduate's parents are better able to afford a more expensive university, the graduate is more likely to choose the more expensive option. For instance, the University of Ottawa in Ontario,<sup>8</sup> McGill University in Quebec,<sup>9</sup> and Dalhousie University in Nova Scotia<sup>10</sup> each required higher amounts on average in their domestic undergraduate tuition fees than UNB<sup>11</sup> in the 2021/22 academic year.

Students under the age of 30 are 17 percent more likely than those over 30 to graduate from a non-NB university, while married graduates are about 20 percent less likely than unmarried graduates to graduate from a non-NB university. As age is often positively correlated with the likelihood of being married, it comes as no surprise that older graduates and married graduates are less likely to leave NB for university. This is likely due in part to ties that are formed as individuals age (e.g.,

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<sup>7</sup>Some of this difference may reflect the fact that a higher percentage of males aged 20-29 live in the parental home compared to females of the same age group. In 2011, 41 percent of males aged 20-29 were living in the parental home compared to 32 percent of females aged 20-29. These percentages are lower than the average for Canadians aged 20-29, among whom rates of young adults living in the parental homes are high in the large cities (StatCan, 2020).

<sup>8</sup> <https://www.uottawa.ca/university-fees/>

<sup>9</sup> <https://www.mcgill.ca/student-accounts/tuition-fees/tuition-and-fees-tables-and-rates/tuition-rates-information/undergraduate-tuition-rates-fallwinter-2021-22>

<sup>10</sup> [https://www.dal.ca/admissions/money\\_matters/tuition\\_payments/fee\\_calculator.html](https://www.dal.ca/admissions/money_matters/tuition_payments/fee_calculator.html)

<sup>11</sup> <https://www.unb.ca/moneymatters/tuition-fees.html>

children, property ownership, etc.) but also the fact that graduate-level students are also more likely to be older and/or married relative to their undergraduate counterparts.

Other factors being equal, graduates from programs in the Physical and Life Sciences and Technology field of study and the Agriculture, Natural Resources, and Conservation field of study are more than twice as likely to graduate from a non-NB university than those in the Arts, Communication, and Humanities field of study. All other fields show a lower likelihood.

When comparing university graduates at various levels of study, those at the graduate level in each field of study are more likely to graduate from a non-NB university. This is especially true for those in Health and Related Fields: they are more than 40 times as likely as their undergraduate counterparts to graduate from a non-NB school – the highest likelihood of all the graduate-level fields of study.

It should be noted that although some fields of study show a lower likelihood of students graduating from a non-NB university, when undergraduates are compared to the graduate-level sample, there is a higher likelihood of graduating from a non-NB university among graduate degree holders. As claimed earlier, program availability is one of the likely causes for this trend, as only three universities in the province are authorized to award graduate-level degrees.

Overall, graduation from a non-NB university has become more likely since 2013. This might be an indication of an increased interest in non-NB universities among university-bound New Brunswickers. When the sample is stratified by gender, these trends are mostly the same. However, factors like the graduates' field of study, marital status, and graduation year either lose or gain statistical significance in the male-only sample. This essentially means that the decision to study outside NB is not determined by these factors for male graduates the way it is for female graduates.

**Table 3: Likelihood of Graduating from a University Outside NB**

<b>Variable</b>	<b>Overall Odds Ratio (robust SE)</b>	<b>Male Odds Ratio (robust SE)</b>	<b>Female Odds Ratio (robust SE)</b>
<b>Male (Reference Category: Female)</b>	0.941* (0.032)	x	x
<b>High Income Parents<sup>12</sup> (&gt;\$130,000)</b>	1.159*** (0.042)	1.274*** (0.042)	1.093* (0.052)
<b>30 and Under (Reference Category: Above 30 years)</b>	1.172*** (0.063)	1.182** (0.102)	1.160** (0.080)
<b>Married<sup>13</sup></b>	0.798*** (0.041)	0.903 (0.074)	0.747*** (0.049)

<sup>12</sup> The income threshold of \$130,000 is based on the earnings of parents earning in the top 25 percent of the sample in the student's graduation year.

<sup>13</sup> "Married" shows marital status in a student's graduation year, including common-law partnerships.

<b>(Reference Category: Not Married<sup>14</sup>)</b>			
<b>Field of Study (Reference Category: Arts, Communication, and Humanities)</b>			
<i>Education</i>	0.538*** (0.045)	0.567*** (0.086)	0.546*** (0.055)
<i>Law and Social Sciences</i>	0.955 (0.121)	0.768** (0.089)	1.066 (0.087)
<i>Business, Management, and Public Administration</i>	1.050 (0.068)	0.963 (0.099)	1.088 (0.092)
<i>Physical and Life Sciences and Technologies</i>	2.049*** (0.157)	1.600*** (0.193)	2.442*** (0.243)
<i>Math, Computer, and Information Sciences</i>	0.694*** (0.093)	0.556*** (0.093)	1.013 (0.255)
<i>Architecture, Engineering, and Related Technologies</i>	0.857** (0.072)	0.648*** (0.074)	1.436*** (0.201)
<i>Agriculture, Natural Resources, and Conservation</i>	2.562*** (0.326)	1.268 (0.259)	4.277*** (0.726)
<i>Health and Related Fields</i>	0.574*** (0.040)	0.621*** (0.087)	0.600*** (0.050)
<b>Graduate Level (Reference Category: All Undergraduate Fields of Study)</b>			
<i>Arts, Communication, and Humanities</i>	10.402*** (1.391)	8.641*** (1.674)	11.469*** (2.144)
<i>Education</i>	1.263*** (0.136)	1.275 (0.136)	1.263** (0.163)
<i>Law and Social Sciences</i>	3.602*** (0.276)	3.804*** (0.488)	3.532*** (0.342)
<i>Business, Management, and Public Administration</i>	2.157*** (0.175)	1.741*** (0.207)	2.500*** (0.279)
<i>Physical and Life Sciences and Technologies</i>	1.841*** (0.201)	1.963*** (0.297)	1.770*** (0.284)

<sup>14</sup> "Not Married" includes those who are single, widowed, or separated.

<b>Math, Computer, and Information Sciences</b>	11.717*** (2.391)	9.136*** (2.372)	13.003*** (4.627)
<b>Architecture, Engineering, and Related Technologies</b>	3.232*** (0.399)	3.363*** (0.500)	2.490*** (0.581)
<b>Agriculture, Natural Resources, and Conservation</b>	1.334 (0.285)	2.155** (0.708)	0.909 (0.259)
<b>Health and Related Fields</b>	44.544*** (3.955)	59.390*** (12.449)	40.150*** (3.918)
<b>Graduation Year (Reference Category: 2011)</b>			
<b>2012</b>	1.017 (0.065)	1.141 (0.113)	0.939 (0.078)
<b>2013</b>	0.978 (0.061)	0.938 (0.095)	0.999 (0.079)
<b>2014</b>	1.116* (0.069)	1.015 (0.100)	1.176** (0.069)
<b>2015</b>	1.161** (0.071)	1.105 (0.107)	1.192** (0.095)
<b>2016</b>	1.152** (0.071)	1.124 (0.109)	1.166** (0.093)
<b>2017</b>	0.879** (0.056)	0.856 (0.086)	0.876* (0.056)
<b>2018</b>	1.147** (0.071)	1.080 (0.107)	1.147** (0.071)
<b>N</b>	<b>25,260</b>	<b>9,370</b>	<b>15,890</b>

Notes: '\*\*\*' indicates significance at the 1% level. '\*\*' indicates significance at the 5% level. '\*' indicates significance at the 10% level. 'x' indicates not applicable. 'Robust SE' = Robust Standard Errors. This table presents information on university graduates only.

## Retention of Graduates from NB Universities in the Province

Before presenting results on the return, and subsequent retention, of out-of-province graduates, we present the retention of NB graduates from NB universities, post-graduation. This provides an important comparison group for understanding the role of province of study in population change.

For graduates who decide to remain in NB after graduating from a university in the province, their decisions vary by gender, socioeconomic status (i.e., parental income), age, marital status, field of study, and level of study (see [Table 4](#)).

Other factors being equal, male graduates from NB universities are 27 percent more likely than females to leave NB within 3 years of graduation, and students 30 years of age and younger are 52 percent more likely to leave than those over 30. Students whose parents have a higher socioeconomic status are about 21 percent less likely than those with parents with a lower socioeconomic status to leave within 3 years of graduation.

As expected, married graduates are less likely (14 percent) than their unmarried counterparts to leave within 3 years of graduation. As seen in the previous table, older and/or married graduates are more likely to remain in NB after graduation, reinforcing the significance that ties formed with age have on mobility decisions.<sup>15</sup>

For NB university graduates from programs in Law and Social Sciences, Physical and Life Sciences and Technologies, and Architecture, Engineering, and Related Technologies, there is a higher likelihood of leaving NB within 3 years of graduating relative to graduates from Arts, Communication, and Humanities programs. While results in [Table 3](#) show that graduates from programs in Architecture, Engineering, and Related Technologies are more likely than Arts, Communication, and Humanities graduates to graduate from a university in NB, these graduates are twice as likely to leave within 3 years of graduating. This suggests that the NB labour market may not be as attractive as other provincial labour markets for these graduates.

Graduates from Health and Related Fields as well as Business, Management, and Public Administration have a lower likelihood of leaving within 3 years of graduating than Arts, Communication, and Humanities graduates. As health care professionals represent some of the greatest occupational needs within NB, the retention of graduates in this field<sup>16</sup> is an important topic for consideration in NB.

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<sup>15</sup> Regarding gender and marital status, several studies have documented that marriage, cohabitation, and children reduce working women's mobility to a larger extent than working men's mobility. Shauman and Xie (1996) find lower geographic mobility for working women (in their study, scientists), which is tied to being in dual career marriages (i.e., both spouses have a career) and children. Similarly, Jürges (2006) documents that marital status and cohabitation reduce geographic mobility more for women than men.

<sup>16</sup> Majors within this field include the following: Health services/allied health/health science, Chiropractic, Communication disorders sciences and services, Dentistry, Advanced/graduate dentistry and oral sciences, Dental support services and allied professions, Health and medical administrative services, Allied health and medical assisting services, Allied health diagnostic, intervention and treatment professions, Clinical/medical laboratory science/research and allied professions, Health/medical preparatory programs, Medicine, Medical scientist, Mental and social health services and allied professions, Optometry, Ophthalmic and optometric support services and allied professions, Osteopathic medicine/osteopathy, Pharmacy, pharmaceutical sciences and administration, Podiatric medicine/podiatry, Public health, Rehabilitation and therapeutic professions, Veterinary medicine, Veterinary biomedical and clinical sciences, Health aides/attendants/orderlies, Medical illustration and informatics, Dietetics and clinical nutrition services, Bioethics/medical ethics, Alternative and complementary medicine and medical systems, Alternative and complementary medical support services, Somatic bodywork and related therapeutic services, Movement and mind-body therapies, Energy-based and biologically-based therapies, Registered nursing, nursing administration, nursing research and clinical nursing, Practical nursing, vocational nursing and nursing assistants, and Health professions and related clinical sciences, and Other. (Government of Canada, 2017)

Other factors being equal, graduate-level graduates from NB university programs in Math, Computer, and Information Sciences and Physical and Life Sciences and Technologies are more likely than undergraduate-level graduates to leave NB within 3 years of graduation. The more specialized a graduate is in a field (especially niche fields), the fewer job opportunities there are for them in any labour market. The number of jobs requiring a minimum of a bachelor's degree will always outnumber those requiring a minimum of a graduate-level degree. As such, it is not surprising that graduates in these fields explore options outside the province.

Graduates from graduate-level Education programs are 47 percent less likely than their undergraduate-level counterparts to leave NB within 3 years of graduation. A possible reason for this is the earnings incentives provided by NB for experienced and highly educated Education professionals. While graduates in other fields also have earning premiums for more experience or higher education, these are more of a guarantee for Education graduates, particularly NB teachers. Further, the majority individuals pursuing graduate-level study in Education are current teachers, established in NB schools, who can receive study leave to do so – again, likely prompted by NB earnings incentives.

By gender, factors determining a graduate's presence in NB within 3 years of graduation vary. For women, being married remains a determinant, whereas for men it does not. This supports previously detailed research on the impact of marriage on working women versus working men. For women, having high-earning parents is not statistically significant, whereas the opposite is true for men.

For both men and women, being a graduate of a certain field of study is not always a statistically significant determinant of residence in NB after graduation. For both genders, graduating from a program in Architecture, Engineering, and Related Technologies is associated with an increased likelihood of leaving NB within 3 years of graduation (more so for women than men). At the graduate level, having a degree in Education is associated with a decreased likelihood of leaving NB within 3 years of graduation for both genders, while a degree in Math, Computer, and Information Sciences has the opposite effect (more so for women than men).

**Table 4: Likelihood of Leaving NB within 3 Years after Graduating from a University in NB**

<b>Variable</b>	<b>Overall Odds Ratio (robust SE)</b>	<b>Male Odds Ratio (robust SE)</b>	<b>Female Odds Ratio (robust SE)</b>
<b>Male (Reference Category: Female)</b>	1.271*** (0.075)	x	x
<b>High Income Parents<sup>17</sup> (&gt;\$130,000)</b>	0.806*** (0.055)	0.687*** (0.071)	0.900 (0.082)
<b>30 and Under (Reference Category: Above 30 years)</b>	1.524*** (0.135)	1.481*** (0.214)	1.531*** (0.175)

<sup>17</sup> The income threshold of \$130,000 is based on the earnings of parents earning in the top 25 percent of the sample in the student's graduation year.

<b>Married<sup>18</sup></b> <b>(Reference Category: Not Married<sup>19</sup>)</b>	0.860** (0.071)	0.969 (0.818)	0.797** (0.086)
<b>Field of Study</b> <b>(Reference Category: Arts, Communication, and Humanities)</b>			
<i>Education</i>	0.826 (0.099)	0.749 (0.169)	0.850 (0.256)
<i>Law and Social Sciences</i>	1.287** (0.141)	1.621*** (0.303)	1.152 (0.157)
<i>Business, Management, and Public Administration</i>	0.778** (0.087)	0.863 (0.154)	0.709** (0.104)
<i>Physical and Life Sciences and Technologies</i>	1.299* (0.198)	1.310 (0.297)	1.258 (0.266)
<i>Math, Computer, and Information Sciences</i>	0.722 (0.170)	0.685 (0.193)	1.080 (0.561)
<i>Architecture, Engineering, and Related Technologies</i>	2.124*** (0.273)	1.845*** (0.332)	4.748*** (1.154)
<i>Agriculture, Natural Resources, and Conservation</i>	1.281 (0.341)	1.077 (0.401)	1.552 (0.592)
<i>Health and Related Fields</i>	0.741*** (0.082)	0.720 (0.161)	0.750** (0.098)
<b>Graduate Level</b> <b>(Reference Category: All Undergraduate Fields of Study)</b>			
<i>Arts, Communication, and Humanities</i>	1.655 (0.533)	1.812 (0.791)	1.279 (0.626)
<i>Education</i>	0.530*** (0.091)	0.538* (0.183)	0.530*** (0.107)
<i>Law and Social Sciences</i>	0.948 (0.153)	0.620* (0.160)	1.188 (0.246)
<i>Business, Management, and Public Administration</i>	1.158 (0.181)	1.035 (0.223)	1.239 (0.286)
<i>Physical and Life Sciences and Technologies</i>	1.859*** (0.457)	1.606 (0.509)	2.163** (0.847)
<i>Math, Computer, and Information Sciences</i>	7.175*** (3.628)	3.846** (2.274)	13.988*** (14.609)
<i>Architecture, Engineering, and Related Technologies</i>	1.219 (0.271)	1.058 (0.271)	1.152 (0.556)
<i>Agriculture, Natural Resources, and Conservation</i>	0.955 (0.471)	1.432 (0.974)	0.561 (0.410)
<i>Health and Related Fields</i>	0.989 (0.268)	1.952 (0.996)	0.797 (0.265)
<b>Graduation Year</b> <b>(Reference Category: 2011)</b>			

<sup>18</sup> "Married" shows marital status in a student's graduation year, including common-law partnerships.

<sup>19</sup> "Not Married" includes those who are single, widowed, or separated.

<b>2012</b>	1.125 (0.096)	1.107 (0.147)	1.147 (0.131)
<b>2013</b>	1.192** (0.100)	0.920 (0.122)	1.409*** (0.154)
<b>2014</b>	1.132 (0.097)	1.006 (0.132)	1.220* (0.140)
<b>2015</b>	1.031 (0.087)	0.788* (0.104)	1.239** (0.138)
<b>N</b>	<b>9,190</b>	<b>3,210</b>	<b>5,970</b>

Notes: '\*\*\*' indicates significance at the 1% level. '\*\*' indicates significance at the 5% level. '\*' indicates significance at the 10% level. 'x' indicates not applicable. 'Robust SE' = Robust Standard Errors. This table shows information on university graduates only.

The next two sections detail the rate at which out-of-province graduates make their way back to NB after graduation and provides possible explanations as to why they leave NB at all.

### What Proportion of NB Residents Who Graduate from Out-of-Province Institutions Return to and Remain in NB After Graduation?

The sample of returning graduates for mobility and earnings outcomes is limited to those who consistently file Canadian taxes each year after graduation until 5 years post-graduation. The denominator for calculating the return rates for the 2013 cohort of graduates includes all those who filed taxes in 2014, 2015, 2016, 2017, and 2018.

In this scenario, the 1-year return rate is the proportion of the denominator who filed taxes in NB in 2014. The 3-year return rate is the proportion who filed taxes in 2014, 2015, and 2016. The 5-year return rate is the proportion who filed taxes in 2014, 2015, 2016, 2017, and 2018.

#### Overall Sample<sup>20</sup>

Slightly over half of the NB residents who graduate outside NB return to NB within 1 year of graduation ([Table 5](#)). Five years later, less than half are still in NB. These rates have remained stable over the years, with roughly the same proportion of graduates returning to NB each year.

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<sup>20</sup> As noted earlier, the final sample in this report is limited to those who consistently filed taxes in each of the 5 consecutive years since graduation. This method excludes about 20 percent of graduates from the sample of graduates who completed their post-secondary studies at institutions outside NB because this proportion did not consistently file taxes each year leading up to 5 years since graduation.



**Table 5: Return Rates of NB Residents Who Graduate from Out-of-Province Post-Secondary Institutions by Year of Graduation**

	2011	2012	2013	2014	2015	2016
<b>Number of Tax Filers (1-5 Years After Graduation)</b>	1,320	1,320	1,310	1,470	1,450	1,570
<b>1-Year Return Rates</b>	57%	54%	51%	54%	54%	56%
<b>3-Year Return Rates</b>	47%	43%	42%	44%	44%	
<b>5-Year Return Rates</b>	42%	38%	37%			

**Table 6: Return Rates of Undergraduate-Level NB Residents Who Graduate from Out-of-Province Universities**

	2011	2012	2013	2014	2015	2016
<b>Number of Tax Filers (1-5 Years After Graduation)</b>	590	610	590	655	685	670
<b>1-Year Return Rates</b>	51%	52%	53%	45%	50%	53%
<b>3-Year Return Rates</b>	42%	43%	42%	43%	42%	
<b>5-Year Return Rates</b>	40%	39%	38%			

Notes: After the first year, return rates should be considered retention of returned students. Due to residual sample size regulations, the return rates for graduate- and college-level graduates 1, 3, and 5 years after graduation could not be released. However, those rates are in close range to what is reported in this study.

Graduates from post-secondary institutions outside NB at the undergraduate level ([Table 6](#)) have 1-year return rates that are lower than the overall sample but which are not as different 3 and 5 years after graduation. Unfortunately, due to sample size restrictions, return rates for graduate- and college-level graduates could not be released without collapsing the categories. Nevertheless, it is likely that graduate- and college-level students have higher 1-year return rates with higher attrition from NB over the next two years than undergraduate degree holders.

To understand the net loss of university- and college-educated graduates who were previously NB residents, we calculated the retention rates of NB residents and non-NB residents who study in NB using the same method used for calculating return rates ([Table 5](#)). While the overall report considers only NB residents, we consider non-NB residents who graduated from NB universities in this section for comparison purposes.

Each year, between 600 to 760 NB residents who study in NB leave the province within 1 year of graduation ([Table 7](#)). Within 3 years, between 940 and 1,130 graduates leave; and within 5 years, over 1,200 no longer call NB home. For non-NB residents who study in NB, around 200 to 300 remain in NB after graduation ([Table 8](#)).

When these 200 to 300 students are added to the 670 to 880 graduates that return to NB within 1 year of graduating, or to the 490 to 650 that remain 3 and 5 years after graduation (see [Table 4](#)), this leaves a loss of over 300 university- or college-educated NB residents who are not being replaced.

These results show that the number of returning graduates and non-NB residents who study in NB and remain in NB after graduation is not enough to replace the residents who leave. This is supported by recent research which shows that the Atlantic provinces have seen net losses to other provinces every year for the last decade (Atlantic Canada Opportunities Agency, 2020).

**Table 7: Retention Rates of NB Residents Who Graduate from NB Post-Secondary Institutions**

	2011	2012	2013	2014	2015	2016
<b>Number of Tax Filers (1-5 Years After Graduation)</b>	5,680	5,660	5,780	5,690	5,530	5,680
<b>1-Year Retention Rates</b>	89%	88%	87%	87%	89%	90%
<b>3-Year Retention Rates</b>	83%	81%	80%	81%	83%	
<b>5-Year Retention Rates</b>	79%	77%	77%			

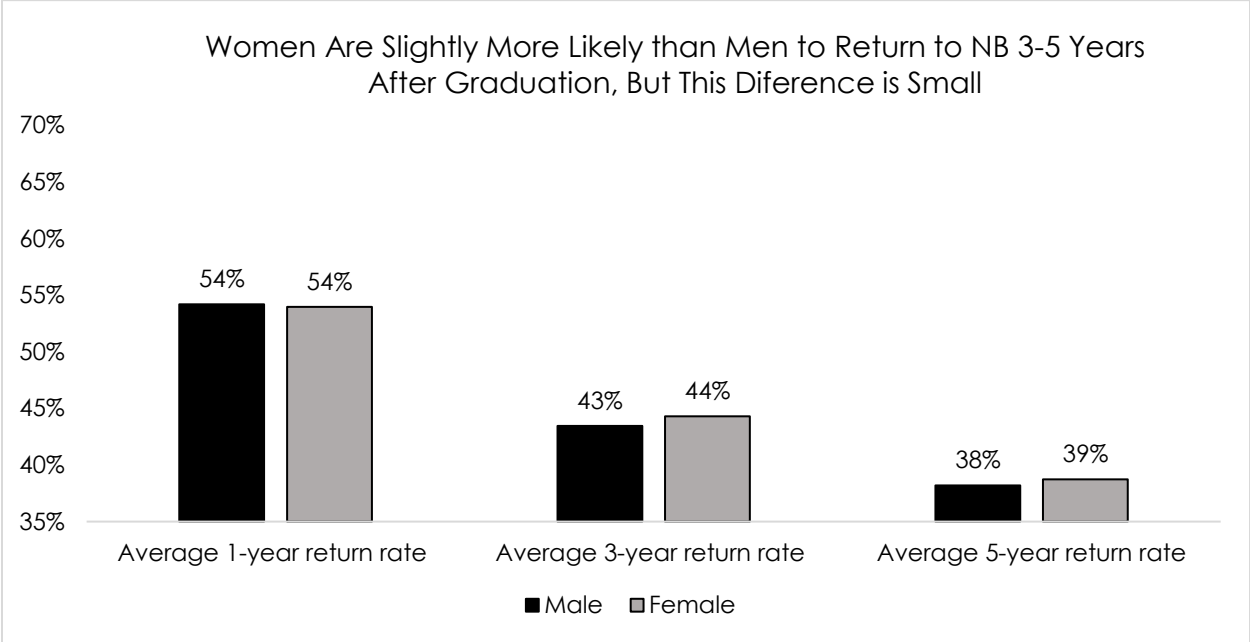
**Table 8: Retention Rates of Non-NB Residents Who Graduate from NB Post-Secondary Institutions**

	2011	2012	2013	2014	2015	2016
<b>Number of Tax Filers (1-5 Years After Graduation)</b>	1,180	1,220	1,320	1,360	1,410	1,590
<b>1-Year Retention Rates</b>	20%	20%	17%	20%	23%	24%
<b>3-Year Retention Rates</b>	15%	15%	13%	15%	17%	
<b>5-Year Retention Rates</b>	12%	13%	11%			

**By Gender**

Figure 2 shows that women have slightly higher 3- and 5-year average return rates than men. However, right after graduation, men and women have about the same return rates. This means that numerically, after the initial return, women are more likely to remain in the province years after graduation relative to men. However, these differences are small (about one percentage point) and may not be tied to belonging to one gender versus another.

**Figure 2: Average Return Rates by Gender**



As no other substantial differences in gender-based outcomes were observed, further outcomes classified by gender are omitted from this section, and gender-based analysis will continue to be considered in future work.

**By Study Region**

Return rates by study region show that NB residents who graduate from a post-secondary institution in the Atlantic region are more likely to return to NB than those who study in Quebec, Ontario, or the Western provinces.

More than half of NB residents who graduate from institutions within the region are back in NB within 1 year. Five years after graduation, around 40 percent of them are still living in NB. On the other hand, for NB residents who choose institutions outside the Atlantic region, less than half are back in NB within 1 year of graduation. Five years after graduation, an average of 36 percent of them are still in NB.

**Table 9: Return Rates by Study Region**

		2011	2012	2013	2014	2015	2016
<b>Atlantic* (excludes NB)</b>	<b>Number of Tax Filers (1-5 Years After Graduation)</b>	800	660	660	780	800	860
	<b>1-Year Return Rates</b>	61%	56%	55%	59%	60%	64%
	<b>3-Year Return Rates</b>	50%	45%	44%	47%	50%	
	<b>5-Year Return Rates</b>	45%	39%	38%			
<b>Not Atlantic*</b>	<b>Number of Tax Filers (1-5 Years After Graduation)</b>	520	660	650	690	660	700
	<b>1-Year Return Rates</b>	48%	50%	49%	49%	45%	47%
	<b>3-Year Return Rates</b>	42%	41%	40%	39%	36%	
	<b>5-Year Return Rates</b>	37%	36%	35%			

\*Both groupings are collapsed into single categories due to sample size restrictions.

Notes: After the first year, return rates should be looked at as retention of returned students. Due to residual sample size regulations, the return rates for college- and graduate-level graduates 1, 3, and 5 years after graduation could not be released. However, those rates are in close range to what is reported in this study.

### By Field of Study

Health care professions represent some of the greatest occupational needs within NB. Among other factors, staffing shortages and emergency room closures in the province have created a crisis within NB's health care system. Therefore, Health and Related Fields graduates are an important group of graduates to retain in NB for work.

Each year, about 1,000 NB residents graduate with degrees in Health and Related Fields from institutions within NB ([Table 10](#)). In comparison, each year, between 250 and 400 NB residents graduate with Health and Related Fields degrees from institutions outside NB.

Of the roughly 1,000 Health and Related Fields graduates from NB PSE institutions, over 80 percent are still in the province within 5 years of graduation, meaning about 200 of them leave NB within 5 years ([Table 11](#)).

When compared to the number of graduates who return to NB 1 year after graduation from studying out of province, around 60 percent of graduates return to NB, adding fewer than 150 to 240 health graduates (and likely less in 5 years) to the province's labour supply.

**Table 10: Return Rates by Field of Study, Graduates of Non-NB Institutions**

		2011	2012	2013	2014	2015	2016
<b>Health and Related Fields</b>	<b>Number of Tax Filers (1-5 Years After Graduation)</b>	280	310	400	350	380	280
	<b>1-Year Return Rates</b>	61%	57%	56%	54%	57%	61%
<b>Law, Humanities, and Social Sciences</b>	<b>Number of Tax Filers (1-5 Years After Graduation)</b>	310	350	390	370	420	310
	<b>1-Year Return Rates</b>	54%	48%	48%	49%	47%	54%
<b>Math, Technology, Engineering, and Architecture</b>	<b>Number of Tax Filers (1-5 Years After Graduation)</b>	160	130	170	180	200	160
	<b>1-Year Return Rates</b>	63%	38%	53%	44%	55%	63%

Notes: 3- and 5-year return rates are omitted due to sample size concerns. After the first year, return rates should be looked at as retention of returned students. Due to residual sample size regulations, the return rates for college-and graduate-level graduates 1, 3, and 5 years after graduation could not be released. However, those return rates are in close range to what is reported in this study.

**Table 11: Retention Rates of NB-Educated Graduates in Health and Related Fields**

	2011	2012	2013	2014	2015	2016
<b>Number of Tax Filers (1-5 Years After Graduation)</b>	1,120	1,120	1,200	1,100	1,030	950
<b>1-Year Retention Rates</b>	93%	90%	88%	89%	91%	92%
<b>3-Year Retention Rates</b>	88%	85%	84%	84%	86%	
<b>5-Year Retention Rates</b>	86%	82%	82%			

Numerically, NB residents who graduate with degrees in Law, Humanities, or Social Sciences from non-NB institutions are, on average, the least likely of the investigated fields of study to return to NB after graduation (with a 49 percent average return rate within 1 year). Outside of Law, the occupational outlook for most jobs in the Humanities and Social Science fields in NB's three biggest cities (Fredericton, Moncton, and Saint John) are only fair (Government of Canada, 2021). While there are many factors to consider when deciding whether to return after graduation, having good job prospects is likely to be an important determinant.

For Math, Technology, Engineering, and Architecture graduates, an average of 51 percent return to NB within 1 year of graduation. Occupational outlooks in NB's three major cities show predicted growth in professional IT occupations such as software engineers, programmers, and web designers within major NB cities (Government of Canada, 2021).

Table 12 presents the odds of a graduate returning to NB within 3 years of graduation from a university outside NB. Results shows that personal characteristics such as field of study, level of study, gender, age, socioeconomic status, and marital status reflect varying motives that are statistically significant determinants of their return to NB after graduation.

Male graduates are about 14 percent less likely than females to return to NB within 3 years of graduation. Studies on mobility differences by gender suggest that relationships and roots are more important to women than men. In a survey conducted by Pew Research Center, eight in ten women compared with seven in ten men in the US cite family ties as a major reason for continuing to live close to home (2008). More female respondents also cite a sense of belonging and a preference to raise children close to home as a reason why they return to or remain where they grew up (Pew Research Center, 2008).

Graduates from a higher socioeconomic status family are twice as likely as those in a lower socioeconomic class to return to NB,<sup>21</sup> while married graduates are 24 percent more likely than those who are single, widowed, or separated to return. Graduates who are 30 years or younger in their graduation year are 53 percent less likely to return to NB after graduation from a non-NB institution.

The impact of field of study on a graduate's return migration decision varies. Relative to graduates from Arts, Communication, and Humanities programs, graduates from Education, Math, Computer, and Information Sciences, and Architecture, Engineering, and Related Technologies are 36 percent, 59 percent, and 48 percent less likely to return to NB, respectively. On the other hand, graduates from programs in Physical and Life Sciences and Technologies and Agriculture, Natural Resources, and Conservation are 47 percent and 79 percent more likely than Arts, Communication, and Humanities graduates to return to NB.

At the graduate level, graduates in Education, Math, Computer, and Information Sciences, and Health and Related Fields are up to three times more likely than undergraduates to return to NB within 3 years of graduation. Compared to those who graduated from a university in Ontario, all graduates from other universities outside NB are more likely to return to NB. Graduates from Ontario universities are the least likely to return to NB within 3 years of graduation, and graduates from universities in British Columbia are twice as likely as Ontario university graduates to return to NB.

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<sup>21</sup> It should be noted that these graduates are also more likely to have graduated from a non-NB school.

**Table 12: Likelihood of a Graduate Returning to NB within 3 Years After Graduating from a Non-NB University**

<b>Variable</b>	<b>Overall Odds Ratio (robust SE)</b>	<b>Male Odds Ratio (robust SE)</b>	<b>Female Odds Ratio (robust SE)</b>
<b>Male (Reference Category: Female)</b>	0.858** (0.068)	x	x
<b>High Income Parents<sup>22</sup> (&gt;\$130,000)</b>	2.143*** (0.186)	2.335*** (0.342)	2.030*** (0.222)
<b>30 and Under (Reference Category: Above 30 years)</b>	0.471*** (0.052)	0.580*** (0.112)	0.420*** (0.059)
<b>Married<sup>23</sup> (Reference Category: Not Married<sup>24</sup>)</b>	1.249** (0.129)	1.500** (0.280)	1.166 (0.147)
<b>Field of Study (Reference Category: Arts, Communication, and Humanities)</b>			
<i>Education</i>	0.639** (0.148)	0.752 (0.316)	0.577** (0.055)
<i>Law and Social Sciences</i>	0.765 (0.143)	0.833 (0.286)	0.725 (0.164)
<i>Business, Management, and Public Administration</i>	1.295 (0.231)	1.372 (0.418)	1.226 (0.277)
<i>Physical and Life Sciences and Technologies</i>	1.465* (0.301)	1.696 (0.571)	1.329 (0.353)
<i>Math, Computer, and Information Sciences</i>	0.411** (0.178)	0.463 (0.247)	0.332 (0.258)
<i>Architecture, Engineering, and Related Technologies</i>	0.520** (0.124)	0.590 (0.203)	0.453** (0.175)
<i>Agriculture, Natural Resources, and Conservation</i>	1.791* (0.575)	1.726 (0.933)	1.763 (0.717)
<i>Health and Related Fields</i>	0.867 (0.170)	1.124 (0.785)	0.788 (0.181)
<b>Graduate Level (Reference Category: All Undergraduate Fields of Study)</b>			
<i>Arts, Communication, and Humanities</i>	1.055 (0.257)	1.387 (0.552)	0.776 (0.252)
<i>Education</i>	2.879*** (0.848)	2.516 (1.607)	2.926*** (0.990)
<i>Law and Social Sciences</i>	0.863 (0.160)	0.627 (0.217)	0.996 (0.223)

<sup>22</sup> The income threshold of \$130,000 is based on the earnings of parents earning in the top 25 percent of the sample in the student's graduation year.

<sup>23</sup> "Married" shows a student's marital status in graduation year, including common-law partnerships.

<sup>24</sup> "Not Married" includes those who are single, widowed, or separated.

<b>Business, Management, and Public Administration</b>	0.780 (0.149)	0.908 (0.276)	0.694 (0.175)
<b>Physical and Life Sciences and Technologies</b>	0.379 *** (0.104)	0.333*** (0.129)	0.456** (0.179)
<b>Math, Computer, and Information Sciences</b>	3.416*** (1.670)	1.785 (1.163)	6.546** (5.501)
<b>Architecture, Engineering, and Related Technologies</b>	0.971 (0.309)	0.981 (0.376)	0.967(0.548)
<b>Agriculture, Natural Resources, and Conservation</b>	0.165*** (0.081)	0.132*** (0.108)	0.194*** (0.122)
<b>Health and Related Fields</b>	1.590*** (0.238)	1.363 (0.509)	1.619*** (0.267)
<b>Study Province (Reference Category: Ontario)</b>			
<b>Newfoundland and Labrador</b>	1.796*** (0.306)	2.223*** (0.614)	1.581** (0.349)
<b>Prince Edward Island</b>	1.390 (0.304)	1.058 (0.534)	1.404 (0.346)
<b>Nova Scotia</b>	1.837*** (0.174)	2.317*** (0.379)	1.577*** (0.187)
<b>Quebec</b>	1.274** (0.155)	1.398* (0.277)	1.188 (0.187)
<b>Manitoba</b>	1.023 (0.511)	0.886 (0.709)	1.168 (0.773)
<b>Saskatchewan</b>	1.156 (0.861)	1.949 (1.979)	0.644 (0.683)
<b>Alberta</b>	1.401** (0.235)	0.786 (0.286)	1.535** (0.303)
<b>British Columbia</b>	2.319*** (0.575)	2.310** (0.999)	2.340*** (0.719)
<b>Graduation Year (Reference Category: 2011)</b>			
<b>2012</b>	1.208 (0.148)	0.947 (0.195)	1.410** (0.220)
<b>2013</b>	1.120 (0.136)	0.946 (0.200)	1.234 (0.185)
<b>2014</b>	1.273** (0.150)	1.049 (0.209)	1.402** (0.208)
<b>2015</b>	1.160 (0.134)	0.880 (0.169)	1.360** (0.199)
<b>N</b>	<b>3,520</b>	<b>1,280</b>	<b>2,240</b>

Notes: '\*\*\*' indicates significance at the 1% level. '\*\*' indicates significance at the 5% level. '\*' indicates significance at the 10% level. 'x' indicates not applicable. 'Robust SE' = Robust Standard Errors. This table shows information on university graduates only.



## Are There Income Differences Between NB Residents Who Live in NB After Graduation and Those Who Do Not? (University Only)

In this section, we classify NB residents who hold university credentials into four categories based on where they go to school (NB or otherwise) and where they reside after graduation (also NB or otherwise) (see [Table 13](#)).

The sample for earnings comparison is limited to university graduates, as most college graduates remain in NB for their studies, and research shows that NB college graduates earn less than their university counterparts (Boco et al., 2021). Therefore, comparing their incomes to a sample of out-of-province graduates who are mostly university graduates would not be an appropriate comparison. Additionally, as with the previous section, this sample is limited to those who consistently filed Canadian taxes each year after graduation for 5 consecutive years.

**Table 13: Mobility Categories and their Definitions**

Category	Definition
<b>Stayer-Stayer</b>	A graduate from a university <b>in</b> NB who remains <b>in</b> NB after graduation
<b>Mover- Stayer</b>	A graduate from a university <b>outside</b> NB who lives <b>in</b> NB each year after graduation
<b>Stayer-Mover</b>	A graduate from a university <b>in</b> NB who lives <b>outside</b> NB each year after graduation
<b>Mover-Mover</b>	A graduate from a university <b>outside</b> NB who lives <b>outside</b> NB each year after graduation

Note: Graduates who live outside NB (Stayer-Mover and Mover-Mover) do not necessarily have to live within their study region.

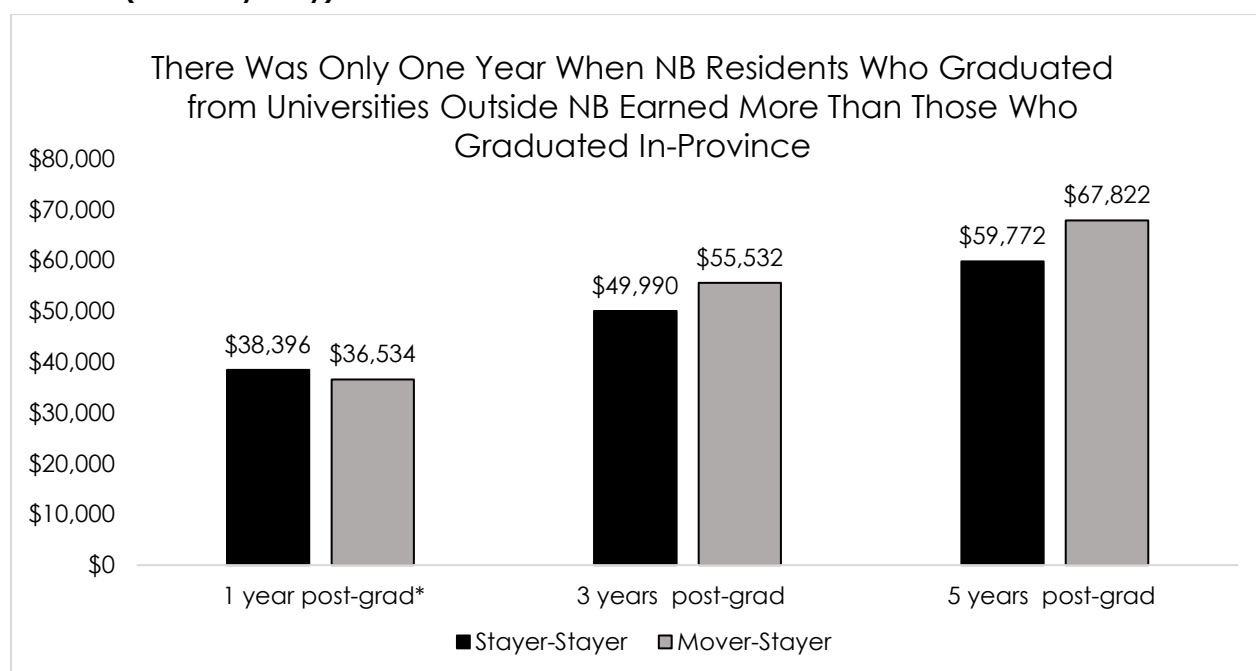
## Overall

For NB residents who graduate from university and live in NB afterwards, there is a difference in income based on the province where they receive their credentials. Those who receive credentials from an NB university (Stayer-Stayer) usually have a lower median income than those who receive credentials outside NB (Mover-Stayer) (Figure 3). It should be noted that graduate degree holders who would have higher incomes than a bachelor's degree holder comprise a larger share of the Mover-Stayer sample relative to the Stayer-Stayer sample. As such, these results may reflect the compositional differences between the two samples.

As these two groups both reside in NB after graduation, this earnings disparity is not likely due to cost-of-living differences. Additionally, most cohorts of Mover-Stayer graduates also have higher earnings growth than their NB-educated counterparts (Stayer-Stayer). These graduates have a median earnings growth of 35 to 52 percent between 1 and 3 years following graduation and a 13 to 22 percent median earnings growth between 3 and 5 years after graduation.

In contrast, Stayer-Stayer graduates have a median earnings growth of between 30 and 37 percent between 1 and 3 years after graduation and around 18 percent median earnings growth between 3 and 5 years after graduation.

**Figure 3: Median Earnings Disparities Between Stayer-Stayer and Mover-Stayer Graduates, 2011 Cohort<sup>25</sup> (University Only)**



\* This is the only time when Mover-Stayer median income is lower than Stayer-Stayer income over the study period. Notes: 2021 constant dollars

<sup>25</sup> The single cohort is presented as an example. See Appendices for earnings differences for all cohorts.

Figure 4 shows the median earnings of NB residents who – consistently – do not live in NB after graduation (Stayer-Mover and Mover-Mover graduates). Earnings for these graduates are considerably higher than for their counterparts who live in NB.

However, several factors can account for this, including higher living expenses outside NB. Average living expenses in NB cities are generally lower compared to cities in larger provinces like Ontario, and this is likely reflected in the wages offered in NB relative to these cities.

Median earnings for Stayer-Mover and Mover-Mover graduates also vary based on whether one is educated in NB. The former group of graduates earns slightly less than the latter despite both groups living outside NB. That said, numerically, earnings growth years after graduation for Stayer-Mover graduates is usually higher, indicating chances of a 'catch-up' with Mover-Mover graduates.

**Figure 4: Median Earnings Disparities Between Stayer-Mover and Mover-Mover Graduates, 2011 Cohort Only<sup>26</sup>**



Notes: 2021 constant dollars

A notable trend in the median earnings of graduates who live in NB after graduation<sup>27</sup> versus those who do not<sup>28</sup> is the narrower gap in income between those outside of NB than those inside NB. The gap in earnings is wider for Stayer-Stayer and Mover-Stayer graduates (Figure 3) than it is

<sup>26</sup> The single cohort is presented as an example. See Appendices for earnings differences for all cohorts.

<sup>27</sup> This includes Stayer-Stayer and Mover-Stayer graduates.

<sup>28</sup> This includes Stayer-Mover and Mover-Mover graduates.

for Stayer-Mover and Mover-Mover graduates ([Figure 4](#)). Additionally, the chance of an earnings catch-up is only evident for Stayer-Mover and Mover-Mover graduates.

The earnings information in [Figures 3](#) and [4](#) does not account for compositional differences in the samples being compared that could account for some of the observed gaps. Field of study, level of study, and gender all influence earnings.

Next, we turn to regression analysis to assess the determinants of post-graduation earnings attributable to province of study after controlling for other determinants of earnings.

### What Factors Influence Earnings Differences Between NB Residents Who Live in NB After Graduation and Those Who Do Not? (University Only)

Results in this section are based on graduates' incomes 3 years after graduation and onwards. This is done so that each graduate in the sample, regardless of when they graduate, has at least 3 years of income reported before their incomes are analyzed and compared. We are interested in determining if a university graduate's province of study is a determinant of earnings after controlling for other factors like field of study, level of study, age, gender, and marital status, which are established correlates with earnings.

In the following analyses, we use linear regression methods to estimate the partial correlations of a variety of observable factors and income. For our models, the dependent variable is the logarithm of income, and the coefficient estimates for the binary indicator explanatory variables are (approximately) the percentage difference in income attributable to the presence of the factor in question.

#### **Stayer-Stayer and Mover-Stayer Graduates**

For the overall sample of these graduates (Stayer-Stayer and Mover-Stayer), we observe the earnings of graduates who file taxes in NB after graduation ([Table 14](#)). Nova Scotia has the highest number of university graduates from NB among Canadian provinces, but there is no significant earnings difference attributable to studying in Nova Scotia over having studied in NB. Having graduated from a university in Quebec or Ontario similarly confers no earnings advantage in the NB labour market compared to having studied in NB.

Other factors being equal, those who graduate from a university in Newfoundland and Labrador, Manitoba, or Alberta earn 13, 26, and 10 percent more, respectively, than those who graduate from an NB university. It is important to note that in the case of Manitoba and Alberta, the number of observed graduates working in NB is small, so the earnings premium for those provinces of study may not be important.

In the case of Newfoundland and Labrador, the number of graduates is small, and the higher earnings may be a result of medical school graduates returning to NB. The field of study variable

for health occupations would not be able to control for this more granular compositional difference in the sample.

**Table 14: Income Determinants for Stayer-Stayer and Mover-Stayer Graduates 3 Years After Graduation**

Variable	Overall Coefficient (robust SE)	Male Coefficient (robust SE)	Female Coefficient (robust SE)
<b>Male</b> (Reference Category: Female)	0.093*** (0.017)	x	x
<b>Age</b>	0.010*** (0.001)	0.014*** (0.002)	0.008*** (0.001)
<b>Married<sup>29</sup></b> (Reference Category: Not Married <sup>30</sup> )	0.031*** (0.010)	0.105*** (0.019)	-0.015 (0.012)
<b>Study Province</b> (Reference Category: NB)			
<i>Newfoundland and Labrador</i>	0.134** (0.061)	0.250*** (0.070)	0.027 (0.092)
<i>Prince Edward Island</i>	-0.041 (0.112)	-0.104 (0.130)	-0.046 (0.136)
<i>Nova Scotia</i>	0.017 (0.029)	0.081* (0.045)	-0.020 (0.038)
<i>Quebec</i>	-0.065 (0.064)	0.025 (0.102)	-0.135 (0.083)
<i>Ontario</i>	0.050 (0.049)	0.175** (0.076)	-0.038 (0.062)
<i>Manitoba</i>	0.259* (0.151)	0.248 (0.304)	0.237* (0.127)
<i>Saskatchewan</i>	0.063 (0.750)	-0.210 (0.278)	0.342*** (0.074)
<i>Alberta</i>	0.104** (0.046)	0.357*** (0.133)	0.060 (0.048)
<i>British Columbia</i>	0.100 (0.080)	0.007 (0.143)	0.115 (0.101)
<b>Field of Study</b> (Reference Category: Arts, Communication, and Humanities)			
<i>Education</i>	0.389*** (0.099)	0.379*** (0.062)	0.390*** (0.036)
<i>Law and Social Sciences</i>	0.063* (0.037)	0.145** (0.075)	0.032 (0.041)
<i>Business, Management, and Public Administration</i>	0.470*** (0.031)	0.495*** (0.057)	0.464*** (0.037)

<sup>29</sup> "Married" shows a student's marital status in graduation year, including common-law partnerships.

<sup>30</sup> "Not Married" Includes those who are single, widowed, or separated.

<b>Physical and Life Sciences and Technologies</b>	-0.055 (0.063)	-0.025 (0.094)	-0.066 (0.089)
<b>Math, Computer, and Information Sciences</b>	0.454*** (0.085)	0.424*** (0.107)	0.697*** (0.132)
<b>Architecture, Engineering, and Related Technologies</b>	0.676*** (0.046)	0.720*** (0.063)	0.569*** (0.124)
<b>Agriculture, Natural Resources, and Conservation</b>	0.095 (0.093)	0.216 (0.158)	-0.001 (0.096)
<b>Health and Related Fields</b>	0.672*** (0.031)	0.551*** (0.070)	0.689*** (0.035)
<b>Graduate Level (Reference Category: All Undergraduate Fields of Study)</b>			
<b>Arts, Communication, and Humanities</b>	0.097 (0.110)	-0.076 (0.153)	0.249 (0.157)
<b>Education</b>	0.358*** (0.030)	0.293*** (0.058)	0.390*** (0.035)
<b>Law and Social Sciences</b>	0.579*** (0.047)	0.488*** (0.089)	0.613*** (0.053)
<b>Business, Management, and Public Administration</b>	0.473*** (0.038)	0.475*** (0.059)	0.415*** (0.052)
<b>Physical and Life Sciences and Technologies</b>	0.250* (0.137)	0.118 (0.534)	0.417** (0.183)
<b>Math, Computer, and Information Sciences</b>	-0.069 (0.130)	-0.067 (0.148)	-0.286 (0.194)
<b>Architecture, Engineering, and Related Technologies</b>	0.084 (0.066)	0.053 (0.067)	0.061 (0.205)
<b>Agriculture, Natural Resources, and Conservation</b>	0.093 (0.151)	-0.040 (0.261)	0.199 (0.250)
<b>Health and Related Fields</b>	0.272*** (0.035)	0.385*** (0.082)	0.287*** (0.040)
<b>Graduation Year (Reference Category: 2011)</b>			
<b>2012</b>	-0.046*** (0.019)	-0.063** (0.033)	-0.036 (0.022)
<b>2013</b>	-0.126*** (0.020)	-0.160*** (0.035)	-0.105*** (0.024)
<b>2014</b>	-0.161*** (0.020)	-0.281*** (0.039)	-0.092*** (0.023)
<b>2015</b>	-0.299*** (0.054)	-0.377*** (0.093)	-0.251*** (0.067)
<b>Tax Year (Reference Category: 2014)</b>			
<b>2015</b>	0.082*** (0.011)	0.091*** (0.019)	0.076*** (0.013)

<b>2016</b>	0.129*** (0.012)	0.167*** (0.022)	0.109*** (0.015)
<b>2017</b>	0.184*** (0.012)	0.236*** (0.024)	0.157*** (0.015)
<b>2018</b>	0.232*** (0.013)	0.319*** (0.023)	0.189*** (0.015)
<b>N</b>	<b>25,580</b>	<b>8,520</b>	<b>17,070</b>

Notes: '\*\*\*' indicates significance at the 1% level. '\*\*' indicates significance at the 5% level. '\*' indicates significance at the 10% level. 'x' indicates not applicable. 'Robust SE' = Robust Standard Errors. This table shows information on university graduates only.

### Stayer-Mover and Mover-Mover Graduates

Turning to New Brunswickers who reside outside NB after graduation, province of study for graduates is not an important determinant of income. Other factors such province of residence, field of study, and level of study being equal, results show that earnings differences by study province between Stayer-Mover and Mover-Mover graduates are not statistically significant except for those who graduated from a university in Ontario ([Table 15](#)).

For instance, males from NB who studied in Ontario universities appear to face a significant income penalty relative to males who studied in NB. This means that for this group of graduates, earnings differences are due to factors apart from a student's province of study (apart from Ontario, where income was nine percent lower compared to NB).

One interesting comparison between graduates working in NB ([Table 14](#)) and graduates working in other provinces ([Table 15](#)) is that the male income gap relative to female graduates is higher outside of NB (15 percent) than it is in NB (9.5 percent). The earnings disparity between Stayer-Mover and Mover-Stayer graduates is mostly determined by demographic characteristics, field of study, level of study, and years of experience (determined by year of graduation and tax year of the graduate).

**Table 15: Income Determinants for Stayer-Mover and Mover-Mover Graduates (University Only)**

<b>Variable</b>	<b>Overall Coefficient (robust SE)</b>	<b>Male Coefficient (robust SE)</b>	<b>Female Coefficient (robust SE)</b>
<b>Male (Reference Category: Female)</b>	0.151*** (0.023)	x	x
<b>Age</b>	0.009*** (0.003)	0.013*** (0.005)	0.005 (0.003)
<b>Married<sup>31</sup> (Reference Category: Not Married<sup>32</sup>)</b>	-0.047** (0.020)	0.043 (0.157)	-0.117*** (0.026)

<sup>31</sup> "Married" shows a student's marital status in graduation year, including common-law partnerships.

<sup>32</sup> "Not Married" includes those who are single, widowed, or separated.

<b>Province of Taxation (Reference Category: Ontario)</b>			
<i>Newfoundland and Labrador</i>	0.102 (0.080)	0.016 (0.143)	0.160* (0.095)
<i>Prince Edward Island</i>	-0.019 (0.088)	-0.036 (0.096)	0.001 (0.123)
<i>Nova Scotia</i>	-0.013 (0.031)	-0.050 (0.049)	0.016 (0.040)
<i>Quebec</i>	-0.110*** (0.043)	-0.094 (0.067)	-0.128** (0.055)
<i>Manitoba</i>	0.137 (0.077)	0.174 (0.091)	0.112 (0.109)
<i>Saskatchewan</i>	0.085 (0.077)	0.138* (0.104)	0.058 (0.113)
<i>Alberta</i>	0.205*** (0.033)	0.159*** (0.054)	0.237*** (0.043)
<i>British Columbia</i>	0.043 (0.039)	0.027 (0.615)	0.053 (0.054)
<i>Multiple Jurisdictions/Territories/Other</i>	0.344*** (0.057)	0.239*** (0.067)	0.423*** (0.081)
<b>Study Province (Reference Category: NB)</b>			
<i>Newfoundland and Labrador</i>	-0.103 (0.070)	-0.120 (0.109)	-0.087 (0.093)
<i>Prince Edward Island</i>	0.008 (0.074)	-0.116 (0.304)	0.045 (0.094)
<i>Nova Scotia</i>	0.028 (0.026)	0.040 (0.309)	0.036 (0.035)
<i>Quebec</i>	-0.013 (0.047)	-0.084 (0.251)	0.058 (0.060)
<i>Ontario</i>	-0.085** (0.038)	-0.216*** (0.063)	0.023 (0.046)
<i>Manitoba</i>	0.017 (0.297)	-0.356 (0.480)	0.431 (0.320)
<i>Saskatchewan</i>	-0.270 (0.502)	0.151** (0.075)	-0.295 (0.542)
<i>Alberta</i>	0.033 (0.640)	-0.005 (0.160)	0.070 (0.064)
<i>British Columbia</i>	-0.019 (0.099)	-0.050 (0.170)	0.045 (0.120)
<b>Field of Study (Reference Category: Arts, Communication, and Humanities)</b>			
<i>Education</i>	0.461*** (0.055)	0.458*** (0.087)	0.463*** (0.071)



<b>Law and Social Sciences</b>	0.186*** (0.053)	0.271*** (0.083)	0.131** (0.067)
<b>Business, Management, and Public Administration</b>	0.490*** (0.050)	0.548*** (0.071)	0.445*** (0.070)
<b>Physical and Life Sciences and Technologies</b>	-0.078 (0.074)	-0.079 (0.113)	-0.077 (0.096)
<b>Math, Computer, and Information Sciences</b>	0.518*** (0.102)	0.598*** (0.120)	0.277*** (0.232)
<b>Architecture, Engineering, and Related Technologies</b>	0.732*** (0.052)	0.787*** (0.072)	0.645*** (0.082)
<b>Agriculture, Natural Resources, and Conservation</b>	0.294*** (0.096)	0.214 (0.149)	0.333*** (0.124)
<b>Health and Related Fields</b>	0.678*** (0.041)	0.371*** (0.098)	0.732*** (0.066)
<b>Graduate Level (Reference category: All Undergraduate Fields of Study)</b>			
<b>Arts, Communication, and Humanities</b>	0.183 (0.086)	0.371*** (0.123)	-0.047 (0.116)
<b>Education</b>	-0.093 (0.104)	-0.331 (0.244)	0.009 (0.111)
<b>Law and Social Sciences</b>	0.454*** (0.057)	0.405*** (0.095)	0.483*** (0.071)
<b>Business, Management, and Public Administration</b>	0.449*** (0.058)	0.372*** (0.089)	0.462*** (0.078)
<b>Physical and Life Sciences and Technologies</b>	0.464*** (0.099)	0.480*** (0.140)	0.422*** (0.145)
<b>Math, Computer, and Information Sciences</b>	-0.010 (0.173)	-0.020 (0.235)	0.207 (0.271)
<b>Architecture, Engineering, and Related Technologies</b>	-0.012 (0.061)	-0.107 (0.082)	0.121 (0.092)
<b>Agriculture, Natural Resources, and Conservation</b>	0.159 (0.151)	0.215 (0.203)	0.106 (0.216)
<b>Health and Related Fields</b>	0.340*** (0.041)	0.673*** (0.096)	0.268*** (0.044)
<b>Graduation Year (Reference Category: 2011)</b>			
<b>2012</b>	-0.071** (0.032)	-0.083* (0.073)	-0.077* (0.044)
<b>2013</b>	-0.134*** (0.033)	-0.233*** (0.049)	-0.070 (0.043)
<b>2014</b>	-0.215*** (0.035)	-0.342*** (0.051)	-0.131*** (0.047)
<b>2015</b>	-0.269*** (0.036)	-0.405*** (0.096)	-0.184*** (0.047)

<b>Tax Year (Reference Category: 2014)</b>			
<b>2015</b>	0.082*** (0.022)	0.111*** (0.035)	0.065** (0.013)
<b>2016</b>	0.173*** (0.024)	0.249*** (0.038)	0.119*** (0.031)
<b>2017</b>	0.239*** (0.025)	0.349*** (0.039)	0.161*** (0.033)
<b>2018</b>	0.341*** (0.026)	0.443*** (0.040)	0.268*** (0.033)
<b>N</b>	<b>14,170</b>	<b>6,020</b>	<b>8,150</b>

Notes: '\*\*\*' indicates significance at the 1% level. '\*\*' indicates significance at the 5% level. '\*' indicates significance at the 10% level. 'x' indicates not applicable. 'Robust SE' = Robust Standard Errors. This table shows information on university graduates only.

## Discussion of Findings

This report shows the return mobility rates of NB residents who graduate from non-NB institutions, as well as the earnings of NB residents based on where they study and where they reside after graduation. Youth mobility and retention is a topic of interest within the province, as efforts continue to go into attracting and retaining this demographic in NB.

Results show that the majority NB residents choose to graduate from universities and colleges within the province. About 80 percent of NB residents who complete post-secondary education do so from an institution within NB. The percentage of university versus college graduates among the students who graduate from an NB post-secondary institution is almost evenly split, with slightly less than half graduating from an NB university and slightly more than half graduating from an NB college. In comparison, 90 percent of NB residents who graduate from post-secondary institutions in other provinces attended university. NB residents obtaining a graduate degree make up a larger share of out-of-province university graduates than they do among graduates of NB universities.

Of the 20 percent of NB residents who graduate from non-NB institutions, the majority remain close by for their choice of study location, as more than three-quarters of NB post-secondary graduates choose post-secondary institutions in the Atlantic provinces, Ontario, or Quebec.

The availability of study programs is a possible explanation behind the decision for an NB resident to study at an institution outside NB. Results show that NB residents at the graduate level or within the fields of Physical and Life Sciences are more likely to receive their degrees from an institution outside NB. There are currently only three public post-secondary institutions in the province offering graduate-level programs to students (UNB, UdeM, and MTA) and three that offer programs in the fields of Physical and Life Sciences (UNB, UdeM, and MTA). Relative to

undergraduate- or college-level programs and other fields of study such as Arts and Humanities, there are relatively fewer options for graduates in these groups.

Results also show that more than half of NB residents who graduate from out-of-province institutions return to NB within 1 year of graduation.<sup>33</sup> Yet, despite the returning and retained graduates, there is likely still a net loss of university- and college-educated graduates in NB through migration. Research shows that outmigration in Atlantic Canada is greatest among the most-needed demographic, as 60 percent of net migration losses were among people between 20 and 44 years of age (McMahon, 2021).

A study looking at factors affecting graduates' decisions to leave or return to their place of origin shows that a lack of individual access to economic opportunities (jobs and business creation) after graduation as well as good universities and research centres are key factors keeping graduates away (Crezenzi et al., 2017). As well, individuals that are noted to attach significant importance to ethnic diversity and cultural amenities are also significantly less likely to return to their place of origin. The degree to which a graduate is embedded into social networks is key.

Another important factor mentioned in Crezenzi et al. (2017) is how previous job experience outside the place of origin (with the corresponding establishment of social and professional connections) reduces the probability of return. In the context of those who study in NB, while NB universities offer experiential learning opportunities, it is not uncommon to see NB university students look outside the province for these opportunities. This is a possible contributor to the outmigration of NB-educated graduates.

Finally, Crezenzi et al. (2017) state that if an individual fails to establish connections while outside their place of origin (i.e., during their studies), they are more likely – other factors being equal – to return. Ultimately, however, pre-existing networks in the place of origin increase return migration. Social networks are said to play a very relevant role in balancing push and pull migration factors. This means that economic factors are not the only drivers of return migration, at least not in the case of NB.

In our investigation of incomes after graduation, we found that after accounting for graduates' demographic characteristics, program of study, and level of study, their province of study was not a determinant of income. That means that the NB labour market values the credential itself and does not differentiate across credentials. Similarly, we determined that graduates of NB universities working in other provinces have the same incomes as NB residents in other provinces who graduated from non-NB universities.

If the goal of the NB government is to increase the size of the population and workforce, encouraging more NB students to study at NB institutions rather than non-NB institutions is a step in the right direction. Graduates of NB universities earn as much after graduation as graduates

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<sup>33</sup> Return rates after the first year since graduation in this report should be looked at as retention rates of returned graduates. However, when return rates were calculated for the other two time points (3 and 5 years since graduation), rates remained in close range.

from universities in other provinces, but NB university graduates have a much higher probability of remaining residents of NB than New Brunswickers who studied in another province.

However, if the goal is to attract and/or retain graduates with needed credentials at a lower cost to the public treasury, more New Brunswickers should be encouraged to leave the province for their studies. NB taxpayers do not (directly) fund universities in other provinces, and half of the residents who pursue university education out of province will return within a year of graduation. For instance, training nurses is expensive for the NB government; and rather than increasing the number of seats in NB nursing programs, perhaps encouraging nursing students to complete their degrees outside NB would be a cost-effective avenue to having more nurses in the province.

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## Appendices

**Table 16: NB Residents by Institution and/or Province/Region of Study at Graduation<sup>34</sup>**

	2011	2012	2013	2014	2015	2016	2017*	2018*
<b>Atlantic Region (Excludes NB)</b>	<b>930</b>	<b>780</b>	<b>800</b>	<b>880</b>	<b>900</b>	<b>920</b>	<b>820</b>	<b>890</b>
<i>Dalhousie University</i>	290	230	270	310	290	300	270	300
<i>Holland College**</i>					120	100	80	90
<i>St. Francis Xavier University</i>	90	80	70	80	110	90	70	90
<b>New Brunswick</b>	<b>6,480</b>	<b>6,410</b>	<b>6,610</b>	<b>6,280</b>	<b>6,090</b>	<b>5,950</b>	<b>6,030</b>	<b>5,780</b>
<i>New Brunswick Community College**</i>					1900	1840	1970	2000
<i>University of New Brunswick</i>	1660	1580	1620	1570	1530	1500	1440	1320
<i>Collège Communautaire du Nouveau Brunswick**</i>					1070	1140	1190	1090
<b>Ontario</b>	<b>380</b>	<b>430</b>	<b>380</b>	<b>420</b>	<b>350</b>	<b>360</b>	<b>190</b>	<b>220</b>
<i>University of Ottawa</i>	120	110	110	120	100	100	30	40
<i>University of Toronto</i>	20	40	30	40	30	20	20	20
<i>University of Waterloo</i>	20	20	20	30	30	30	10	20
<b>Quebec</b>	<b>250</b>	<b>250</b>	<b>270</b>	<b>250</b>	<b>280</b>	<b>240</b>	<b>250</b>	<b>250</b>
<i>McGill University</i>	40	40	50	40	50	40	30	50
<i>Université Laval</i>	60	50	60	60	60	50	40	50
<i>Université de Sherbrooke</i>	50	70	50	50	50	70	70	60
<b>Western Canada and Territories</b>	<b>150</b>	<b>140</b>	<b>130</b>	<b>140</b>	<b>130</b>	<b>150</b>	<b>140</b>	<b>150</b>
<i>Athabasca University</i>	30	30	30	20	20	20	20	20
<i>University of Alberta</i>	20	20	20	20	10	20	20	20
<b>Total</b>	<b>8,190</b>	<b>8,010</b>	<b>8,190</b>	<b>7,970</b>	<b>7,750</b>	<b>7,620</b>	<b>7,430</b>	<b>7,290</b>

Notes: The institutions listed are the top two or three universities with the highest number of NB students.

\*Some Ontario colleges and universities do not have complete data available for these years. \*\*Some Canadian colleges have not released data prior to 2015.

<sup>34</sup> The sample for this table includes all graduates regardless of their tax-filing frequency after graduation.

# Incomes by Location of Study and Province of Residence by Years Since Graduation and Graduate Cohort

## Overall Sample

**Table 17: Median Income of Stayer-Stayer Graduates for Overall Sample, 2011-2016**

	2011	2012	2013	2014	2015	2016
<b>Income 1 Year Post-Grad</b>	\$38,396	\$39,782	\$39,132	\$37,917	\$38,157	\$38,549
<b>Income 3 Years Post-Grad</b>	\$49,990	\$52,121	\$50,950	\$51,254	\$52,118	
<b>Income 5 Years Post-Grad</b>	\$59,772	\$61,461	\$60,185			

Notes: 2021 constant dollars

**Table 18: Median Income of Mover-Stayer Graduates for Overall Sample, 2011-2016**

	2011	2012	2013	2014	2015	2016
<b>Income 1 Year Post-Grad</b>	\$36,534	\$43,241	\$42,638	\$41,496	\$38,488	\$43,110
<b>Income 3 Years Post-Grad</b>	\$55,532	\$64,313	\$57,677	\$59,072	\$53,604	
<b>Income 5 Years Post-Grad</b>	\$67,822	\$72,429	\$68,040			

Notes: 2021 constant dollars

**Table 19: Median Income of Stayer-Mover Graduates for Overall Sample, 2011-2016**

	2011	2012	2013	2014	2015	2016
<b>Income 1 Year Post-Grad</b>	\$40,374	\$47,969	\$46,484	\$45,299	\$41,686	\$42,350
<b>Income 3 Years Post-Grad</b>	\$60,282	\$62,076	\$58,449	\$62,982	\$60,185	
<b>Income 5 Years Post-Grad</b>	\$68,153	\$68,845	\$70,588			

Notes: 2021 constant dollars

**Table 20: Median Income of Mover-Mover Graduates for Overall Sample, 2011-2016**

	2011	2012	2013	2014	2015	2016
<b>Income 1 Year Post-Grad</b>	\$47,471	\$48,315	\$47,841	\$49,773	\$50,178	\$49,517
<b>Income 3 Years Post-Grad</b>	\$62,770	\$61,628	\$59,441	\$62,982	\$63,688	
<b>Income 5 Years Post-Grad</b>	\$70,359	\$70,691	\$69,314			

Notes: 2021 constant dollars



## Health and Related Fields

**Table 21: Median Income of Stayer-Stayer Graduates of Health and Related Fields, 2011-2016**

	2011	2012	2013	2014	2015	2016
<b>Income 1 Year Post-Grad</b>	-	-	-	\$56,148	\$59,551	\$58,747
<b>Income 3 Years Post-Grad</b>	-	-	-	\$61,896	\$65,174	
<b>Income 5 Years Post-Grad</b>	-	-	-			

Notes: 2021 constant dollars

2011 to 2013 cohorts omitted due to sample size concerns.

**Table 22: Median Income of Mover-Stayer Graduates of Health and Related Fields, 2011-2016**

	2011	2012	2013	2014	2015	2016
<b>Income 1 Year Post-Grad</b>	-	-	-	\$70,464	\$67,712	\$67,651
<b>Income 3 Years Post-Grad</b>	-	-	-	\$82,419	\$79,398	
<b>Income 5 Years Post-Grad</b>	-	-	-			

Notes: 2021 constant dollars

2011 to 2013 cohorts omitted due to sample size concerns.

**Table 23: Median Income of Stayer-Mover Graduates of Health and Related Fields, 2011-2016**

	2011	2012	2013	2014	2015	2016
<b>Income 1 Year Post-Grad</b>	-	-	-	\$66,773	\$65,617	\$62,004
<b>Income 3 Years Post-Grad</b>	-	-	-	\$67,760	\$74,409	
<b>Income 5 Years Post-Grad</b>	-	-	-			

Notes: 2021 constant dollars

2011 to 2013 cohorts omitted due to sample size concerns.

**Table 24: Median Income of Mover-Mover Graduates of Health and Related Fields, 2011-2016**

	2011	2012	2013	2014	2015	2016
<b>Income 1 Year Post-Grad</b>	-	-	-	\$73,373	\$75,211	\$72,646
<b>Income 3 Years Post-Grad</b>	-	-	-	\$84,374	\$82,688	
<b>Income 5 Years Post-Grad</b>	-	-	-			

Notes: 2021 constant dollars

2011 to 2013 cohorts omitted due to sample size concerns.

## Math, Technology, Engineering, and Architecture

**Table 25: Median Income of Stayer-Stayer Graduates of Math, Technology, Engineering, and Architecture, 2011-2016**

	2011	2012	2013	2014	2015	2016
<b>Income 1 Year Post-Grad</b>	-	-	-	\$49,549	\$48,854	\$49,517
<b>Income 3 Years Post-Grad</b>	-	-	-	\$59,290	\$60,185	
<b>Income 5 Years post-grad</b>	-	-	-			

Notes: 2021 constant dollars

2011 to 2013 cohorts omitted due to sample size concerns.

**Table 26: Median Income of Mover-Stayer Graduates of Math, Technology, Engineering, and Architecture, 2011-2016**

	2011	2012	2013	2014	2015	2016
<b>Income 1 Year Post-Grad</b>	-	-	-	\$39,035	\$24,041	\$38,766
<b>Income 3 Years Post-Grad</b>	-	-	-	\$57,009	\$49,889	
<b>Income 5 years Post-Grad</b>	-	-	-			

Notes: 2021 constant dollars

2011 to 2013 cohorts omitted due to sample size concerns.

**Table 27: Median Income of Stayer-Mover Graduates of Math, Technology, Engineering, and Architecture, 2011-2016**

	2011	2012	2013	2014	2015	2016
<b>Income 1 Year Post-Grad</b>	-	-	-	\$62,076	\$68,705	\$57,878
<b>Income 3 Years Post-Grad</b>	-	-	-	\$75,361	\$74,621	
<b>Income 5 years Post-Grad</b>	-	-	-			

Notes: 2021 constant dollars

2011 to 2013 cohorts omitted due to sample size concerns.

**Table 28: Median Income of Mover-Mover Graduates of Math, Technology, Engineering, and Architecture, 2011-2016**

	2011	2012	2013	2014	2015	2016
<b>Income 1 Year Post-Grad</b>	-	-	-	\$57,043	\$50,178	\$54,620
<b>Income 3 Years Post-Grad</b>	-	-	-	\$62,764	\$69,951	
<b>Income 5 years Post-Grad</b>	-	-	-			

Notes: 2021 constant dollars

2011 to 2013 cohorts omitted due to sample size concerns.

## Law, Humanities, and Social Sciences

**Table 29: Median Income of Stayer-Stayer Graduates of Law, Humanities, and Social Sciences, 2011-2016**

	2011	2012	2013	2014	2015	2016
<b>Income 1 Year Post-Grad</b>	-	-	-	\$22,929	\$22,938	\$25,301
<b>Income 3 Years Post-Grad</b>	-	-	-	\$38,549	\$35,665	
<b>Income 5 years Post-Grad</b>	-	-	-			

Notes: 2021 constant dollars

2011 to 2013 cohorts omitted due to sample size concerns.

**Table 30: Median Income of Mover-Stayer Graduates of Law, Humanities, and Social Sciences, 2011-2016**

	2011	2012	2013	2014	2015	2016
<b>Income 1 Year Post-Grad</b>	-	-	-	\$23,824	\$25,144	\$27,907
<b>Income 3 Years Post-Grad</b>	-	-	-	\$39,526	\$35,347	
<b>Income 5 years Post-Grad</b>	-	-	-			

Notes: 2021 constant dollars

2011 to 2013 cohorts omitted due to sample size concerns.

**Table 31: Median Income of Stayer-Mover Graduates of Law, Humanities, and Social Sciences, 2011-2016**

	2011	2012	2013	2014	2015	2016
<b>Income 1 Year Post-Grad</b>	-	-	-	\$28,186	\$30,107	\$26,279
<b>Income 3 Years Post-Grad</b>	-	-	-	\$44,087	\$44,688	
<b>Income 5 years Post-Grad</b>	-	-	-			

Notes: 2021 constant dollars

2011 to 2013 cohorts omitted due to sample size concerns.

**Table 32: Median Income of Mover-Mover Graduates of Law, Humanities, and Social Sciences, 2011-2016**

	2011	2012	2013	2014	2015	2016
<b>Income 1 Year Post-Grad</b>	-	-	-	\$29,192	\$34,959	\$37,246
<b>Income 3 Years Post-Grad</b>	-	-	-	\$44,413	\$49,358	
<b>Income 5 years Post-Grad</b>	-	-	-			

Notes: 2021 constant dollars; 2011 to 2013 cohorts omitted due to sample size concerns

## Study Region

**Table 33: Median Income of Out-of-Province Graduates Living in NB, 2011-2016**

		2011	2012	2013	2014	2015	2016
<b>Atlantic Institution Graduates*</b>	<b>1 Year Post-Grad</b>	\$33,626	\$33,440	\$35,174	\$37,134	\$33,746	\$36,920
	<b>3 Years Post-Grad</b>	\$51,912	\$46,864	\$46,097	\$49,191	\$45,112	
	<b>5 Years Post-Grad</b>	\$62,639	\$59,072	\$58,169			
<b>Non-Atlantic Institution Graduates</b>	<b>1 Year Post-Grad</b>	\$47,355	\$53,850	\$47,162	\$45,410	\$41,024	\$47,019
	<b>3 Years Post-Grad</b>	\$61,865	\$70,017	\$62,970	\$60,593	\$59,124	
	<b>5 Years Post-Grad</b>	\$69,256	\$77,967	\$72,498			

\*Excludes NB

Notes: 2021 constant dollars

**Table 34: Median Income of Out-of-Province Graduates Living outside NB, 2011-2016**

		2011	2012	2013	2014	2015	2016
<b>Atlantic Institution Graduates*</b>	<b>1 Year Post-Grad</b>	\$40,723	\$41,511	\$45,805	\$41,943	\$44,222	\$41,372
	<b>3 Years Post-Grad</b>	\$55,192	\$53,911	\$55,912	\$52,014	\$55,833	
	<b>5 Years Post-Grad</b>	\$60,213	\$62,004	\$60,610			
<b>Non-Atlantic Institution Graduates</b>	<b>1 Year Post-Grad</b>	\$52,591	\$62,267	\$47,954	\$56,372	\$52,824	\$59,072
	<b>3 Years Post-Grad</b>	\$78,491	\$75,721	\$66,279	\$67,325	\$76,532	
	<b>5 Years Post-Grad</b>	\$86,570	\$81,007	\$76,107			

\*Excludes NB

Notes: 2021 constant dollars