

Evidence on Canadian graduates who pursue further post-secondary education

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Abstract

The majority of students are faced with two options upon graduation: Enter the workforce or continue their education. Of those students who delay entry into the workforce, some will pursue a second degree at the same level, while others switch between different levels of post-secondary institutions to attain more education. Drawing on the Youth in Transition Survey Cohort A, this paper documents the transitions of bachelor's graduates from Canadian universities. Regression analysis is used to estimate which factors impact the student's decision to enter a second program and the level of that program. Results show that the major factors related to students' decisions regarding further education and the level at which it is pursued are academic performance indicators, participation in an experiential learning program, majoring in business in the student's first program, and province of study. In particular, majoring in business, management, and public administration, participating in an experiential learning program, and studying in the Prairies or British Columbia in the student's first program have a negative impact on the decision to enter a second program.

Introduction

The pathways students take throughout their educational careers and into the labour market have been of particular interest to policymakers in recent years. Enrollment rates at all levels of post-secondary education (PSE) have risen steadily in the last two decades, but recently, this trend has been accompanied by high rates of youth unemployment that have persisted since the 2008 recession. It is reasonable to assume that poor economic conditions faced by young Canadian graduates—and thus increased competition among new entrants to the labour market—have made the prospect of securing a first job challenging, causing some to delay entry into the labour market and pursue further post-secondary education (FPSE); however, the lack of a national survey that tracks students across programs and institutions has limited research on the educational pathways of Canadian students.

Better understanding the decision to pursue further education, and the subsequent movements students make between levels of post-secondary education, is relevant to policymakers, institutions, and students themselves. During a period when Canadian youth are facing a particularly challenging set of economic conditions as they enter the labour market for the first time, this knowledge is becoming increasingly valuable. Anecdotal evidence suggests that many bachelor's graduates—particularly those from the social sciences and humanities—are returning to school at the college level upon unsuccessful entry into the labour market, contributing to the current debate surrounding the skills students are (or are not) acquiring in traditional bachelor's programs taught at universities. Alternatively, there are many graduates who do not immediately re-enter the education system, suggesting that they may have been able to find work upon graduation. What sets these students apart from their classmates who return to any level of higher education is an important policy question.

The purpose of this paper is two-fold. Firstly, this research attempts to extend the Canadian literature on access to and persistence in post-secondary education by analyzing the factors that affect a student's decision to continue studying once he or she has accessed and persisted through a post-secondary program. Of particular interest is the relevance of the background and parental characteristics found to be critical in analyses on PSE access, but negligible for student transitions once they have accessed the PSE system.

Secondly, this paper contributes to the Canadian literature by providing a national-level portrait of students who pursue further post-secondary education using the most recent cycles of the Youth in Transition Survey Cohort A (YITS-A). This paper examines the pathways of bachelor's graduates from Canadian universities who enter a second PSE program upon graduation. Specifically, the proportion of students who go on to enroll in a second program is documented, in addition to the level of their second program.

This study goes on to use regression analysis to estimate the correlates of students' decisions to pursue FPSE and the level at which their second program is taken. Regressors include personal and parental characteristics, education and work experiences of the students during high school and their first program, and the field of study and province of the students' first program. An emphasis is placed on using variables related to the field of study, various types of work experiences, and the province of study in the student's first program, are included in the regression analysis, as these factors are thought to impact the decision to pursue more schooling, and thus continue to be of growing interest to policymakers.

It is found that 39.4% of bachelor's graduates enroll in a second program by the September following the year in which they graduated. Of these students who pursue FPSE, 45.4% enter a program above the bachelor's level, the majority of which enter master's programs; 31.6% continue studying at the bachelor's level, and 23.0% enter programs below the

BA level, mainly at the college level. Academic performance indicators, such as high school and first-year grades, participation in an experiential learning program, majoring in business in the student's first program, and province of study have statistically significant effects on the decision to enter FPSE and the level at which this schooling is pursued. In particular, majoring in business, management, and public administration, participating in an experiential learning program, and studying in the Prairies or British Columbia in the student's first program have a negative impact on the decision to enter a second program. These effects are statistically significant at the 1% level.

The remainder of this paper is organized as follows: Section 2 situates the study of FPSE within the broader context of previous research on access to and persistence in post-secondary education. Subsequently, the literature to date on the pathways of bachelor's graduates who pursue FPSE and the characteristics of these students is reviewed. Section 3 discusses the key features of the YITS-A with respect to this work, and details the sample selection and variables used in this analysis. Section 4 explains the methodology used, and outlines some potential estimation issues. Section 5 details the pathways of Canadian graduates who pursue FPSE, and Section 6 presents the results from the regression analysis. The paper concludes with key results and policy implications, as well as some ideas for future research.

Canadian students who access, persist, and continue: What do we know?

Before exploring the Canadian literature on post-secondary graduates who pursue further education, it is important to situate this research within the broader literature on access to and persistence in post-secondary education, both of which have important implications for this research. For example, the findings of literature on the factors that affect access to university versus college programs motivates the decision of this work to analyze the post-schooling

experiences of bachelor's graduates separately from other types of PSE graduates. Research on the factors that affect persistence in and transitions through first PSE programs informs the results of this work on how those same factors affect the decision to pursue further post-secondary education.

During the early to mid-2000s, the majority of the literature¹ on access to post-secondary education in Canada concentrated on the financial barriers to higher education, such as tuition fees and parental income. This research primarily focused on the impact of tuition increases during the 1990s, and subsequently, on the effects of rising tuition on access in general and for specific groups, such as students from low-income families.

In an extensive review, Junor and Usher (2004) find little evidence that supports the view that the rising costs of PSE creates a barrier to overall access. Alternatively, Johnson and Rahman (2005) find that higher tuition levels in the 1990s reduced the probability that 17–19 year olds entered university relative to a province-specific trend indicating rising participation in university. With respect to those from low-income families, Coelli (2005) reports that rising tuition in the late 1990s had an adverse effect on university participation by students from low-income families compared to those from middle- to high-income households. In general, the literature shows that university attendance is more sensitive to parental income than college attendance.²

Much of this work is based on data from the Labour Force Survey and the Survey of Labour Income Dynamics, which are limited in scope. The release of data from the Youth in

¹ Due to space constraints, only a handful of papers of interest are mentioned in this literature review. See Mueller (2008) for a comprehensive review of the literature on access to (and persistence in) post-secondary education in Canadian up until 2007.

² See Corak et al. (2003); Frenette (2005).

Transition Survey³ broadened the type of analyses and level of detail possible for research on post-secondary access in Canada, and thus expanded perspectives on the barriers to post-secondary participation. In particular, the detailed information provided by Cohort A of the YITS on the student's parents, home environment, and academic performance contributed to new findings related to non-financial barriers to education.

In their work on access to university and college, Finnie and Mueller (2008) find that the effect of parental income on PSE access is significantly diminished upon controlling for parental education. Furthermore, controlling for various high school performance indicators reduces the effect of parental education on access, though the impact of parental education is not eliminated and remains strong for university participation. The authors suggest that the environment, or “culture”, in which students are raised appears to matter more for PSE participation than simply being from a high-income family. Similar results are found when analyzing outcomes for students from low-income households. Frenette (2008) finds that the differences in university attendance by students from the highest and lowest income quartiles can be largely accounted for by differences in parental education, reading scores, and overall high school grades—not family income.

Findings enabled by the longitudinal design of the Youth in Transition Survey have also had a major impact on the perception of persistence through post-secondary education, allowing for more detailed analyses of the transitions made by students in their early PSE pathways. One of the most interesting findings—and with significant implications for this work—is that upon accessing a PSE program, background (or family) characteristics and high school performance indicators have negligible effects on subsequent decisions.

³ This survey, including information on the timeframe, cohorts, and the data gathered, is discussed at length in Section 3 of this paper.

Drawing on data from Cohort B of the YITS, Martinello (2007) analyzes the pathways of two samples of students: those whose first PSE program in a bachelor's degree and at the college level. Using a series of probit models, he estimates how various factors affect a student's decision to leave his or her first program, enter a second program, and the level at which the second program is taken if pursued. The author finds that parental education and the importance of PSE to the student's parents have no impact on the probability that his or her first program is completed. Background characteristics and high school performance variables also produce limited effects on the outcomes of interest.

This result is also encountered by Finnie & Qiu (2008), who find variables such as parental education have ambiguous effects on the decision of university students to leave or return to school. The authors conclude, "it may be that once students from families that face certain disadvantages with respect to family background make it into the system, their chances of success are relatively more even" (p. 25). They note this could represent selection effects, in which students from disadvantaged backgrounds who access PSE are particularly strong students, reducing the effect of these socio-economic barriers.

Despite the rich body of literature on access to and persistence in post-secondary education, research on the pathways of Canadian students who pursue further post-secondary education is limited. This is not due to lack of interest in the subject, but the absence of a national dataset that tracks students' academic experiences throughout their lifetimes. The Postsecondary Student Information System (PSIS) collects annual enrollment and graduation data on students studying in Canadian institutions; however, there is no longitudinal identifier assigned to students by which information on their post-secondary experiences—such as switching between programs and/or institutions, degree completion, further post-secondary education—can be recorded. Although PSIS data demonstrate rising participation rates in all forms of higher education in

Canada, the proportion of graduates who have already obtained a PSE credential is not evident within overall enrollment figures.

Over the past two decades, longitudinal surveys have been conducted on the education and employment experiences of students and recent graduates in Canada. Most notably, the Youth in Transition Survey Cohort B (YITS-B) and the National Graduates Survey (NGS) provide national-level data on Canadian students that has yielded work on the educational pathways and characteristics of students who pursue further post-secondary education. The YITS-B tracked a sample of youth between 18 and 20 years old over five cycles, giving information on these students at 26–28 years old in the last cycle. The National Graduates Survey provides a snapshot of graduates two years after graduation, and then five years out with the Follow-up Survey of Graduates (FOG) survey. This survey is conducted on an infrequent basis, with the most recent data on the graduating class of 2010 being released this year, and reflecting data from a follow-up three years after graduation.

Although the pathways of all PSE graduates are of interest, this group represents a sample of students with vastly different backgrounds and post-secondary experiences. As discussed above, research on access to post-secondary education in Canada shows that the type of students who enter college and university are very different, and thus work on the pathways of PSE graduates should be much more nuanced. The following literature focuses on the limited research that has been done on bachelor's graduates who pursue further education.⁴

Using the 1992 National Graduates Survey and the 1995 Follow-up Survey of Graduates, Butlin (2001) analyzes the pathways of students who graduated from a bachelor's degree program in 1990. The author finds that 47% of bachelor's graduates returned to school within

⁴ See Table A.1 in the Appendix for some of the work that's been done on Canadian PSE graduates who pursue further education; Table A.2 contains a summary of the work that's been done on bachelor's graduates who pursue FPSE, also outlined in the literature review.

two years of graduation; this proportion increases to 59% after five years. More recently, Martinello (2007) uses data from the first three cycles of the YITS-B, capturing the education decisions made by students between 1997 and 2003. Similar to Butlin, Martinello reports that 43.9% of bachelor's graduates continue schooling upon graduation; given these students are between 22 and 24 years of age in 2003, these findings are comparable to the two-years-out statistic reported by Butlin. Both authors also detail the level of study of the second programs in which these students enter. Although they use slightly different methods of categorizing second programs, Butlin (2001) and Martinello (2007) find just under 40% of these students continue studying above the bachelor's level in master's, PhD, and first professional degree programs, and around 20% enter programs at college.

Butlin (2001) provides the only analysis of Canadian bachelor's graduates to date that examines how social-demographic and enrollment-related factors affect the odds of pursuing different types of further post-secondary education. Using a multinomial logit model, he assesses how each predictor affects the odds of pursuing FPSE at various levels compared to those who do not enter a second program; a second multivariate analysis assesses the impact of these variables on the odds of studying at various levels compared to those students who study at the MA or PhD level. The author finds graduates from commerce, management, and business programs have lower odds of participating in FPSE compared to social science graduates; in general, "graduates from fields of study that are job-specific have lower odds than social science graduates pursuing further post-secondary education" (p. 25). He also finds that participation in co-operative education and visible minority status had no effect on the odds of pursuing FPSE at any level and that younger graduates were more likely to pursue FPSE. Positive correlates of participation in master's or doctoral programs included parental education level, being male, and graduates

having \$15,000 or more in student loans, while bachelor's graduates with more than two years work experience had lower odds of pursuing an MA or PhD.

Based on the review of this literature, the purpose of this paper is two-fold. Firstly, this research attempts to extend the Canadian literature on access to and persistence in post-secondary education by analyzing the factors that affect a student's decision to continue studying once he or she has accessed and persisted through a post-secondary program. Of particular interest is the relevance of the background and parental characteristics found to be critical in analyses on PSE access, but negligible for student transitions once they have accessed the PSE system.

Secondly, this paper builds on the previous work on FPSE by Martinello (2007) and Butlin (2001) and contributes to the Canadian literature by providing a national-level portrait of students who pursue further post-secondary education using the most recent cycles of the YITS-A. The level of detail on the student's experiences provided by the YITS-A, in addition to the larger samples sizes enabled by using data from all six cycles of the survey, make it possible to estimate the correlates of students' decisions to continue studying at different levels. In particular, information on the field of study, various types of work experiences, and the province of study in the student's first program are included in the regression analysis, as these topics continue to be of growing interest to policymakers.

Youth in Transition Survey: A decade of information on Canadian youth

The Youth in Transition Survey is a longitudinal study designed by Statistics Canada and Human Resources and Skills Development Canada.⁵ It was created to provide detailed information on the education, training, and work decisions of Canadian youth. The survey targets two populations: A cohort of individuals who were 15 years old on 31 December 1999 (Cohort A) and a cohort who

⁵ Currently, Employment and Social Development Canada.

were 18–20 years old on 31 December 1999 (Cohort B). This research relies on data from the former. By the completion of the survey in 2010, the YITS-A had run for six cycles, interviewing students every two years between 2000 and 2010 until they were 25 years old. This survey thus gives very detailed information on the PSE experiences of these students early in their post-secondary pathways.

The student's post-secondary programs are a key aspect of this analysis. The YITS-A defines a post-secondary program as any formal education above high-school level; toward a diploma, certificate, or degree; and requiring three months or more to complete. This analysis focuses on the experiences of students whose first completed PSE program is a bachelor's degree at the university level. The sample begins with 14,180 students who recorded a program at the bachelor's level. The observations are dropped if the student does not record a graduation date by the sixth cycle or if the graduation date is missing, yielding a sample of 5,199 BA graduates. An additional 616 observations are deleted because the bachelor's degree was not the student's first completed program. This results in a sample of 4,583.

A complication arises because of Quebec's CEGEP system.⁶ The YITS classifies CEGEP as a post-secondary education program. This results in the first completed PSE program for many students in Quebec being recorded at the college level; however, the experience of students attending CEGEP institutions compared to those attending another type of PSE institution are quite different in terms of costs and distance away from home. In order to control for these differences, the YITS-A's Post-Secondary Engagement Roster, which records information on the student's first PSE program, includes a derived variable that identifies whether the student's PSE experience is: 1) the respondent's first or second; 2) in or outside Quebec; and 3) in a CEGEP

⁶ In Quebec, students leave high school after Grade 11 and typically enter a *Collège d'enseignement général et professionnel* (CEGEP) program of two years in length. These programs are meant to prepare students for further education in university, college, or entry into the labour market.

institution. Students whose first PSE experience is in Quebec and in a CEGEP are excluded. Theoretically, those students whose second PSE program is in Quebec, in a non-CEGEP institution, could be kept, and thus the students left in the sample who attended high school in Quebec are those who have already completed CEGEP and are in a second program at the university level. However, the students remaining who met these criteria were missing values from the PSE Engagement Roster, forcing them to be dropped from this analysis. The small number of students who completed their undergraduate studies in Quebec is comprised of out-of-province students.

Also of importance to this analysis is how the second program is defined. In the YITS-A, a second program is recorded if the student enrolls in another institution, changes their level of study (i.e. type of degree), changes to a program of a different name (from a bachelor of arts to bachelor of science), or interrupts their studies at the time of the interview. Because this analysis is interested in university students who pursue further PSE, a second program is defined as the program the student enters upon completion of his or her first degree; in reality, this could be the students' third or fourth program as defined by the YITS. The definition of a second program is further restricted to those enrolled in a second PSE program by September of the year following graduation from a bachelor's program; this restriction controls for the impact of time on a student's decision to enter a second program. Students who enter a second program beyond this threshold are dropped from the sample. Whether the second program is completed is not considered in this study; the student simply needs to access a second program.

Upon merging data from the student's main file, first and second programs (given a second program is taken), and the PSE Engagement Roster, as well as excluding any remaining students from Quebec, the sample of students whose first completed program is a bachelor's degree at the university level and are observed until September of the year following graduation

contains 3,959 students. Of this sample of BA graduates, 1,608 were excluded,⁷ resulting in an unweighted sample of 2,351.

One of the major data limitations encountered in this work occurs upon merging the variables from the PSE Engagement Roster with the master file, in which approximately 950 observations from the latter could not be matched, resulting in a missing value. This problem is not related to coding, but the survey design and how the YITS-A defines a PSE program. As mentioned previously, the YITS uses a loose definition of what constitutes a new PSE program, and the PSE Engagement Roster only collects data on the student's first PSE program. Thus, if a student's first program was taken at the college level, and then he or she switches into and completes a bachelor's program, this student would be included in the sample of 3,959 BA graduates; however, information collected by the PSE Engagement Roster will be on his or her experiences in the first program, taken at the college level. Of the 1,608 variables dropped from the sample, missing values for variables in the PSE Engagement Roster accounts for almost 90% of the observations dropped.

Table A.3 in the Appendix provides a list of the variables used in this analysis, and a brief description of each one. The selection of these variables is primarily based on previous research on persistence⁸ and further education, in addition to an interest in field of study and work experience variables.

Personal, or background, characteristics are collected by the student and parent in cycle 1, and include gender, whether the student gave a rural address in high school, and immigrant

⁷ 1,455 observations were dropped because data were missing for program one, including 947 that could not be matched from the PSE Engagement Roster to the master file. Because this work focuses on graduates of Canadian universities, 48 students who graduated from PSE programs outside of Canada were dropped. Lastly, observations were dropped because the level of second program was unsuitable for this study, including 63 students who entered professional licensing programs, 35 students whose second program was documented as "other level of PSE", four observations were missing level of program data, and three students who entered university transfer programs.

⁸ Martinello (2007), in particular.

status, defined as whether one parent or the child reports being an immigrant. Additionally, data on the highest level of education obtained by the student's parents, the highest level of education the parent hopes his or her child will achieve, and whether the parents have begun to save for the child's post-secondary education are all collected from the parent during cycle 1, when the student is 15 years of age. Both parental education and parental expectations are represented in the model by categorical variables; with respect to parental education, possessing a high school diploma is the omitted category, and the expectation that the student obtain a bachelor's degree is the omitted category for parental expectations.

Indicators of academic performance and engagement are also used from the student's main file in cycle 1. The student's self-reported overall average at age 15 is included as a categorical variable with the groups: 90%–100%; 80%–89% (omitted category); 70%–79%; and <70%. The measure of overall high school engagement is a derived variable based on similarly constructed measures of academic and social engagement also captured by the survey in cycle 1. This variable can take on a value between -5.55 and 3.60, with a higher value indicating higher levels of engagement.

The right-hand-side variables also capture information on the student's first program, including academic and work experience, field of study, and province in which the first program occurred. Similar to high school grades, first-year grades are included as a categorical variable with the categories: 90%–100%; 80%–89% (omitted category); 70%–79%; 60%–69%, and <60%. Work experience is a categorical variable that equals 0 if the student did not work during the school year (omitted category); 1 if the student worked between 1 and 14 hours a week; and 2 if the student worked 15 hours or more. The experiential learning, or co-operative education, variable captures whether the student participated in a work experience program as part of their degree. Data on the student's first program experiences are from the first non-missing cycle in the

data. If the student enters a post-secondary program by cycle 2, then the data on first-year grades, work, and co-op are picked up from that cycle. One limitation that arises from this method is that the coding will not capture a student who records different work experiences later in their program, which could affect the results. It would be reasonable to assume students participate in a work experience program—or begin working in any type of job—at higher rates as they progress through their degree.

The student's main field of study is based on the two-digit code provided by the Classification of Instructional Programs (CIP) system that groups field of study into 13 high-level categories. As shown in Table A.3, for the purposes of a regression analysis, some of these categories are further merged; however, in the descriptive statistics section of this paper, 12 categories are maintained. Approximately 10% of students did not record their field of study, which has been reclassified here as "other" in order to keep the observations. In the regression analysis, social and behavioural sciences, and law is the omitted category. Additionally, the province of study of the student's first program is recorded. The categories include Atlantic Canada, Quebec (which only contains out-of-province students), Prairies (includes Manitoba, Saskatchewan, and Alberta), and British Columbia, with Ontario as the omitted category.

Table 1 contains the means and standard of errors of these variables for the full sample, in addition to the samples of those who pursue FPSE and those who do not. In this table, and in all estimations in this paper, probability weights are applied in addition to the survey weights. In Table 1, statistically significant differences in the means between the FPSE and non-FPSE groups are indicated.

Table 1: Means and standard of errors

Variable	Full sample	FPSE	No FPSE
Female	0.583 (0.017)	0.621 (0.027)***	0.558 (0.021)**
Rural high school	0.186 (0.012)	0.170 (0.019)*	0.196 (0.015)
Immigrant status	0.265 (0.017)	0.240 (0.027)*	0.281 (0.021)
Parent's highest level of education			
Below high school	0.019 (0.004)	0.017(0.006)	0.020 (0.006)
High school	0.112 (0.011)	0.116 (0.020)	0.109 (0.013)
Some PSE	0.056 (0.008)	0.050 (0.013)	0.060 (0.011)
College	0.249 (0.015)	0.261 (0.025)	0.241 (0.018)
Below BA	0.064 (0.008)	0.080 (0.015)***	0.053 (0.010)*
BA	0.292 (0.016)	0.252 (0.023)***	0.320 (0.021)***
Above BA	0.208 (0.014)	0.224 (0.022)	0.198 (0.018)
Parent's education expectations			
High school	0.002 (0.001)	0.003 (0.002)**	0.001 (0.001)
College	0.104 (0.010)	0.095 (0.017)	0.110 (0.013)
BA	0.593 (0.017)	0.565 (0.028)**	0.611 (0.021)*
Above BA	0.302 (0.016)	0.337 (0.027)***	0.279 (0.019)**
Parents saved for child's education			
Overall average at 15			
90–100%	0.211 (0.013)	0.252 (0.024)***	0.183 (0.015)***
80–89%	0.552 (0.017)	0.507 (0.028)***	0.581 (0.021)***
70–79%	0.192 (0.014)	0.194 (0.023)	0.190 (0.017)
<70%	0.046 (0.009)	0.047 (0.016)	0.045 (0.011)
Measure of overall engagement	0.375 (0.034)	0.396 (0.053)	0.361 (0.044)

Overall average in first year of program one			
90–100%	0.043 (0.006)	0.053 (0.009)*	0.037 (0.008)**
80–89%	0.245 (0.014)	0.244 (0.023)	0.246 (0.018)
70–79%	0.520 (0.017)	0.543 (0.028)*	0.505 (0.022)
60–69%	0.175 (0.013)	0.144 (0.021)***	0.195 (0.017)**
<59%	0.017 (0.004)	0.016 (0.007)	0.017 (0.004)
Hours worked in program one			
0 hours	0.582 (0.017)	0.566 (0.027)	0.592 (0.021)
1–14 hours	0.253 (0.015)	0.249 (0.023)	0.256 (0.019)
15+ hours	0.165 (0.012)	0.185 (0.021)**	0.152 (0.014)*
Co-op experience in program one			
Humanities major	0.184 (0.013)	0.223 (0.024)***	0.158 (0.015)***
Social sciences major	0.237 (0.015)	0.258 (0.026)*	0.223 (0.019)
Business major	0.120 (0.011)	0.049 (0.011)***	0.166 (0.017)***
Science major	0.239 (0.014)	0.240 (0.023)	0.239 (0.018)
Other major	0.220 (0.014)	0.230 (0.023)	0.214 (0.017)
Atlantic	0.130 (0.007)	0.136 (0.012)	0.126 (0.009)
Quebec	0.062 (0.007)	0.070 (0.012)	0.057 (0.008)
Ontario	0.540 (0.016)	0.597 (0.025)***	0.504 (0.022)***
Prairies	0.170 (0.009)	0.131 (0.013)***	0.196 (0.013)***
British Columbia	0.098 (0.009)	0.067 (0.011)***	0.118 (0.012)***
Sample size (weighted)	2,153	870	1,283

Note: *** indicates statistically significant difference at the 1% level between the mean of the FPSE group versus the non-FPSE group; ** indicates statistically significant at the 5% level; * indicates statistically significant at the 10% level.

Methodology

In order to estimate the correlates of a student's decision to pursue more schooling upon graduation, two methods could be used. The first involves a two-step approach. First, a logit model estimates the correlates of a student's decision to pursue FPSE, with a binary dependent variable equal to 1 if the student enters a second program and 0 if not. Second, a multinomial logit model estimates the correlates of a student's decision to pursue FPSE at various levels—below, at, and above the bachelor's level—given that the decision to enter a second program has already been made.

The results of this method are presented in Table A.4 in the Appendix of this paper; however, this is not the preferred estimation method. The estimates given by the first logit model are not very meaningful, as the effects of pursuing a second program are averaged out across the three levels of study—and in some cases, they may present opposite effects on the decision to pursue FPSE. For example, having a first-year of average of 90% or higher may have a strong positive effect on pursuing a second program above the BA level, and an equally strong, negative effect on the decision to study below the BA level; however, using this approach would result in these effects cancelling each other out. Although there may be less variation in the characteristics of BA students by second program destination than between students who attend university versus college, the differences are enough to reduce the meaningfulness of the interpretation of these estimates.

The better approach is to estimate the correlates of a student's decision to pursue more schooling upon graduation using a multinomial logit model that includes both those students who pursue FPSE at various levels and those who do not. This model enables the comparison of the effects of each regressor on all four groups. Additionally, by summing the marginal effects for

each level of study and comparing it to the marginal effect for the group that does not pursue FPSE, one can assess the net effect of each regressor on the FPSE decision.

In this model, it is assumed that the student faces two discrete choices at one point in time after graduation—to continue studying or not, and at what level—and that he or she selects the option that results in the greatest utility, based on a set of observable and unobservable factors. Specifically, a multinomial logit model will estimate the relationship between the probability of second program choice and a set of controls⁹:

$$\text{fpse_level} = \beta_1 + \beta_2 U + \beta_3 V + \beta_4 W + \beta_5 X + \beta_6 Y + \beta_7 Z + \varepsilon \quad (1)$$

where $\text{fpse_level} = 3$ if the student enrolls in a PSE program above the BA level;¹⁰ $\text{fpse_level} = 2$ if the student enrolls in a PSE program at the BA level; $\text{fpse_level} = 1$ if the student enrolls in a PSE program below the BA level; and $\text{fpse_level} = 0$ if the student does not enter a second PSE program within the graduation threshold. U is a vector of personal characteristics of the student; V is a vector of characteristics of the students' parents; W is a vector of high school performance indicators; X is a vector of information on activities during first program; Y contains information on the field of study of the student's first program; and Z is a vector of regions in which the student's first program occurs. ε represents the stochastic error term, which is independently and identically distributed.

One key motivation for the selection of particular right-hand-side variables related to academic performance and engagement is in order to control for a potential ability bias that may arise. Interestingly, in this model, one could envision this bias working in two directions. On the one hand, a student who is highly motivated, does well in school, and enjoys learning would

⁹ For a more detailed explanation of the choice probabilities underlying the model, see Appendix A.

¹⁰ Not all PSE programs included in the YITS-A questionnaire are included in this definition of further PSE. The specific program types included are outlined in the following section.

appear to be more likely to want to continue his or her education upon completion of a bachelor's degree than an unmotivated, academically weak student. Here, ability—assumed to be positively correlated with the decision to pursue FPSE and other independent variables, such as high school or first-year university grades—creates an upward bias in the estimates.

Alternatively, it is also reasonable to imagine this weaker student enters the labour market upon the completion of his or her degree and is unsuccessful in finding a job due to the aforementioned factors related to ability. This student may choose to return to schooling in hopes of improving his or her chances of finding a job upon re-entry. In this case, the estimates will be biased downward. A similar argument can be made with respect to the incidence of a self-selection bias due to differences in motivation among the sample of students who pursue further post-secondary education.

The YITS-A offers a range of variables that could be used as a proxy for ability in order to control for its impact on both the decision to pursue further education and other variables in the model. In particular, the survey gathers data on students' overall high school average and includes a constructed scale of high school engagement based on self-reported measures of academic and social engagement. All of these variables are collected in the first cycle of the YITS-A, in which the students surveyed are 15 years of age. Including these variables in the model is an attempt to control for the ability of the student.

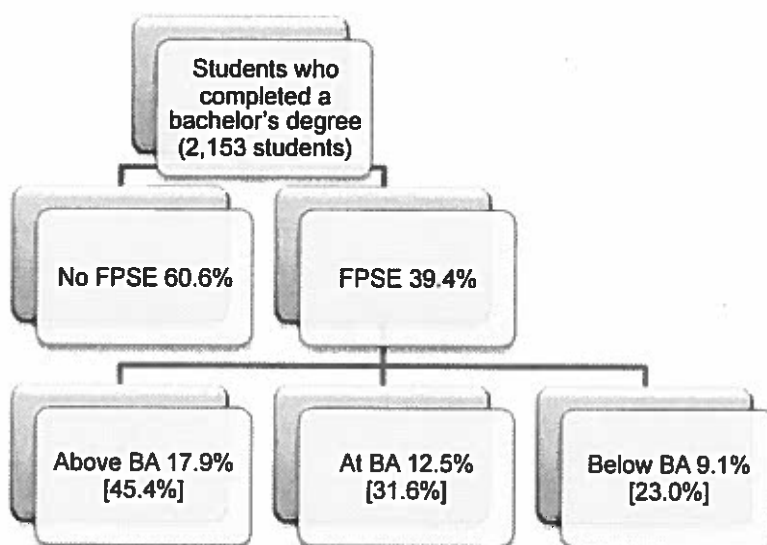
Documenting the pathways and characteristics of bachelor's graduates

Figure 1 illustrates the pathways of students whose first completed program is a bachelor's degree at the university level. Of the 2,153 students in this weighted sample, 60.6% do not pursue further PSE, while 39.4% enroll in a second program by September of the year following graduation. This is less than the proportion found by both Butlin (2001) and Martinello (2007).

Because the students in this sample are given until age 25 to enter a second program, the timeframe is adequate in capturing the short-term transitions of students who would, on average, finish a bachelor's between 21 and 23 years of age. This result suggests that students are entering second programs at a lower rate than they were in the early 2000s.

Students' second programs are divided into three levels of study: Above, at, and below the bachelor's degree level. The programs within these levels of study are outlined in Table 2. Nearly half (45.4%) of graduates who continue studying do so above the BA level, with the majority entering master's programs; 31.6% enter a second bachelor's degree program, and 23.0% continue studying below the BA level. In contrast, Martinello (2007) reports that the majority of students entering second programs remain at the bachelor's level, followed closely by those studying above the BA level. The same proportion of students who enroll in programs below the bachelor's level is found, which is the same proportion found by Butlin (2001) using the NGS.

Figure 1: FPSE outcomes for bachelor's graduates



Note: In the last row, percentages in square brackets reflect the proportion of students studying at each level of those who enter FPSE; the percentages above represent the proportion of students studying at each level of the total number of students who have completed a bachelor's degree.

Table 2 also depicts the program destinations of students who pursue a second program. The most common program choice is a master's degree, with 36.7% of students who enroll in a second program entering an MA. Bachelor's degrees are the second most common choice (31.6%), followed by college programs (13.6%). The remaining programs have less than 6.0% enrollment.

Table 2: Destination of students who pursue FPSE

Level of study	Programs	Proportion of students
Above BA level	First professional degree	3.8%
	Graduate-level diploma or certificate above BA, below MA	4.9%
	Master's degree	36.7%
	PhD	2.3%
At BA level	Bachelor's degree	31.6%
Below BA level	Private business school or training institute diploma or certificate	6.0%
	College program	13.6%
	College post-diploma or graduate level program (college diploma or higher needed first)	1.1%
	University diploma or certificate below BA	3.2%

Correlates of bachelor's graduates' decision to pursue FPSE

A multinomial logit model is used to estimate equation (1). Table 3 (see pp. 30–32) reports the marginal effects of the right-hand-side variables on the probability of each outcome in this model. The marginal effects presented in Table 3 are the average marginal effects, calculated differently for the categorical and continuous variables in the model. The marginal effects for the categorical variables, treated as factor variables in the estimation of the model, gives the discrete first difference from the base category (or omitted category, specified in Section 3). The

coefficient in the first row, first column of Table 3 can thus be interpreted as how the probability of not participating in FPSE changes as the variable gender goes from 0 to 1 (i.e. the effect of being female on the decision to pursue FPSE). For the sole continuous variable in the model, the marginal effect simply measures how a change in the variable impacts the probability each outcome occurs.

From left to right, these outcomes include the decision to not enroll in a second program, and to enroll in a program below, at, or above the bachelor's level. As mentioned previously, the total weighted sample size of bachelor's graduates is 2,153. The sample size for each outcome is listed in the last row of Table 3.

Beginning with the personal characteristics of the student, having a rural address in high school and immigrant status have no significant impact on the decision to pursue further post-secondary education. A Wald test of the significance of these variables reveals no evidence against the null hypothesis; rural and immigrant status are not very useful in predicting the outcome variable. Gender, however, is significant. Being female increases the probability of entering a program below the bachelor's level by 6.1 percentage points; this effect is significant at the 1% level.

Furthermore, almost every variable related to parental education, parental expectations, and whether parents had financially prepared for their child's education were not statistically significant. Indeed, a Wald test on the joint significance of the parental education, expectations, and financial preparation variables indicated no evidence against the null hypothesis. One might also expect that these parental variables are highly correlated, reducing their individual impact on the outcome variable. However, running the model upon removing parental education, and then parental expectations, and then both parental education and expectations, yields similar results;

the statistical significance of the parental variables remaining—in addition to that of the other regressors—remains unchanged.

Although not statistically significant, having a parent with a degree below or above the bachelor's level has a negative effect on the student's decision to not re-enter PSE upon graduation. The only statistically significant parental education variable relates to the decision to study below the BA level. Students who have a parent with some PSE as their highest level of education are 11.5 percentage points less likely to continue studying below the bachelor's level than those students with a parent who only has a high school education; this effect is statistically significant at the 1% level. Having a parent with a college diploma is the only variable that has a positive impact on the probability the student enters a second bachelor's degree, while having a parent with below high school or a college diploma has a negative effect on the student entering a second program above the bachelor's level.

Although not statistically significant, a parent who expects his or her child will obtain multiple PSE degrees is positively related to the decision of the student to enter a second program at the bachelor's level or above.

There are two possible explanations for the lack of significance of the background characteristics, both of which may be impacting these results. Firstly, these variables are correlated with other regressors. For example, a bivariate analysis indicates that gender and co-op are positively related; having a parent with an education level above a BA is positively related to parental expectations of multiple PSE degrees.

Secondly, similar to the literature on persistence, the sample upon which these effects are conditioned must be considered. Although variables such as immigrant status, or parental education and expectations, have been shown to have a significant impact on access to post-secondary education, background characteristics exert minimal effects on the decisions of

students who have already accessed PSE. In this work, the students in this sample have already accessed and completed a bachelor's degree—indicating they are a very strong set of students—hypothetically diminishing the impact of these variables to a greater extent than found by Martinello (2007) and Finnie and Qiu (2008).

Also similar to results in persistence literature, high school performance indicators are not overly significant in this analysis. The student's overall high school average at age 15 has mixed effects on the FPSE decision. Having a high school average between 90% and 100% (compared to the base group, 80–89%) increases the probability that the student enters a second program. Students within this group are 8.3 percentage points more likely to continue studying above the bachelor's level, significant at the 5% level. It is reasonable to expect that a student who performs well in high school is likely to succeed in university and continue studying at a master's level or higher, which explains the significance of this variable on studying above the BA level. Having an overall average between 70% and 79% (versus 80–89%) increases the probability that the student enters a second program at the bachelor's level. Additionally, the measure of overall engagement has a small, positive effect on the probability the student continues studying at the bachelor's level, significant at the 10% level.

Performance in the student's first program produces a number of statistically significant results. Interestingly, having an overall average between 90% and 100% (versus 80–89%) in first year increases the probability that the student enters a second program below the bachelor's level by 12.7 percentage points; this result is significant at the 5% level. Being in this range also lowers the probability that the student enters a second bachelor's degree by 5.5 percentage points, significant at the 1% level. Similar to the effects of high school grades, being in the 70–79% range has a small but positive and significant effect on studying at the BA level.

The results for students with low first-year grades are less surprising. Having a first-year average between 60% and 69%, and below 60%, reduces the probability the student enters a second program above the BA level by 10.8 and 15.6 percentage points, respectively; both effects are significant at the 1% level. Additionally, having an average below 60% in first year increases the probability that the student enters a second BA program by 19.9 percentage points.

First-year experiences related to working¹¹ and experiential learning programs show statistically significant effects on FPSE decisions. Working at any type of job for 1–14 hours a week during the student’s first program has a positive impact on returning to study below the BA level, significant at the 5% level. Having worked more than 15 hours a week increases the probability that the student pursues FPSE, also significant at the 5% level.

Alternatively, completing a bachelor’s degree that includes a work experience program, such as co-op, increases the probability that the graduate does not take up a second program by 21.6 percentage points; this result is statistically significant at the 1% level. Doing a co-op program has a negative and statistically significant effect to pursuing FPSE at any level, ranging from 4.8 percentage points at the BA level to 9.4 percentage points above the BA level. These results suggest that students who participate in a co-op or experiential learning programs during their undergraduate studies are less likely to re-enter another program upon graduation, perhaps because their employment experiences better prepared them to enter the labour market, or even resulted in a job upon graduation.¹²

Similar to work done by Butlin (2001), students who complete a first program in business, management, or public administration are less likely to enter a second program relative to

¹¹ It is important to note that these variables are taken from the first non-missing cycle in the student’s first program, reflecting a decision made relatively early in their degree.

¹² The data available in the YITS-A would enable this hypothesis to be tested; this is discussed further in the Conclusions section of this paper.

students who major in the social sciences. In this study, being a student from this field increases the probability of not pursuing FPSE by 23.7 percentage points, statistically significant at the 1% level. Moreover, completing a first program in this field has a negative impact on continuing studies at all levels. In particular, being a business major reduces the probability of entering a program below or above the BA level by over 10 percentage points, both significant at the 1% level. This pathway of business and management students is unsurprising, given the practical nature of business programs and the requirement of two years work experience in order to enter most master's in business administration programs and the short, post-graduation timeframe of this research. Interestingly, every other field of study shows no statistically significant effects on the FPSE decision.

Lastly, a number of variables capturing province effects are significant in this analysis. Completing a first program in the Prairies and British Columbia has a strongly positive effect on the decision to not enter a second program relative to Ontario, the omitted province. Graduates from the Prairies and British Columbia are 12.5 and 16.5 percentage points, respectively, less likely to enter a second program than Ontario graduates, significant at the 1% level. These results may be explained by the differences in labour market conditions of these regions. Table A.5 in the Appendix documents youth¹³ unemployment rate by province between 2006 and 2009, the time period in which these students would be making the decision to enter a second program. The unemployment rates in the Prairies and British Columbia were significantly lower than those faced by young graduates in Ontario, supporting the hypothesis that positive youth employment outcomes are negatively related to the decision to pursue further schooling upon graduation. Although the final cycle of the Youth in Transition Survey only captures the education decisions made at the beginning of the most recent recession, these results suggest that an increasing

¹³ Refers to those between 15 and 24 years old.

number of bachelor's graduates likely entered second degrees upon graduation in order to avoid the poor labour market conditions for youth that have persisted since 2009.

Studying in Atlantic Canada has significant effects on studying at all levels, though only significant at the 10% level. Students who completed a bachelor's degree in this region are 4.6 percentage points more likely than Ontario graduates to enter a second program below the BA level, and less likely to continue studying at the BA level and above. This effect likely reflects differences in labour demand between this region and Ontario. Completing a first program in Quebec¹⁴ has a positive impact on entering a second program above the bachelor's level. This impact could reflect the sample: Out-of-province students are willing to move for school, perhaps indicative of the importance of higher education to this group.

Significant effects on the level at which a second program is taken also exist for graduates who studied in the Prairies. Students who completed a first program in Manitoba, Saskatchewan, or Alberta were 5.5 and 6.9 percentage points less likely to go on to study at the bachelor's level or above, respectively. This effect is likely explained by the local labour needs of this region. Completing a bachelor's degree in British Columbia has a statistically significant negative effect on studying below and above the BA level; in fact, it demonstrates negative effects for returning to all levels of study.

¹⁴ It is important to reiterate the students studying in Quebec are out-of-province students.

Table 3: Marginal effects from multinomial logit regression

Dependent variable	No FPSE	FPSE below BA	FPSE at BA	FPSE above BA
Female	-0.045 (0.033)	0.061*** (0.021)	0.025 (0.020)	-0.041 (0.028)
Rural high school	0.023 (0.040)	0.014 (0.025)	-0.018 (0.029)	-0.019 (0.034)
Immigrant status	0.040 (0.043)	-0.019 (0.030)	0.004 (0.026)	-0.024 (0.032)
Parent's highest level of education				
Below high school	0.094 (0.105)	0.012 (0.086)	-0.065 (0.050)	-0.041 (0.074)
Some PSE	0.088 (0.093)	-0.115*** (0.045)	-0.040 (0.053)	0.067 (0.079)
College	0.016 (0.060)	-0.008 (0.048)	0.006 (0.044)	-0.015 (0.044)
Below BA	-0.016 (0.079)	0.061 (0.066)	-0.068 (0.048)	0.022 (0.058)
BA	0.090 (0.060)	-0.057 (0.047)	-0.051 (0.041)	0.017 (0.043)
Above BA	-0.035 (0.066)	-0.027 (0.039)	-0.037 (0.045)	0.029 (0.047)
Parent's education expectations for child				
High school	-0.211 (0.219)	0.212 (0.322)	-0.041 (0.049)	0.041 (0.215)
College	0.019 (0.057)	-0.010 (0.036)	0.034 (0.037)	-0.043 (0.046)
Above BA	-0.025 (0.037)	-0.029 (0.025)	0.011 (0.024)	0.043 (0.031)

Parents saved for child's education	-0.041 (0.042)	0.014 (0.028)	-0.023 (0.029)	0.049 (0.030)
Overall average at 15				
90–100%	-0.090** (0.041)	-0.012 (0.026)	0.018 (0.027)	0.083** (0.037)
70–79%	-0.035 (0.044)	0.012 (0.029)	0.059* (0.028)	-0.037 (0.034)
<70%	-0.023 (0.101)	0.038 (0.077)	0.028 (0.055)	-0.044 (0.013)
Measure of overall engagement	-0.007 (0.017)	0.008 (0.011)	0.017* (0.010)	-0.017 (0.013)
Overall average in first year of program one				
90–100%	-0.106 (0.071)	0.127** (0.060)	-0.055*** (0.019)	0.034 (0.058)
70–79%	-0.036 (0.040)	0.040 (0.026)	0.038* (0.023)	-0.042 (0.032)
60–69%	0.076 (0.050)	0.0002 (0.031)	0.032 (0.033)	-0.108*** (0.037)
<60%	-0.003 (0.105)	-0.039 (0.036)	0.199* (0.107)	-0.156*** (0.045)
Hours worked in program one				
1–14 hours	0.002 (0.039)	0.068** (0.028)	-0.035 (0.025)	-0.035 (0.028)
15+ hours	-0.087** (0.043)	0.041 (0.032)	0.008 (0.032)	0.038 (0.039)
Participated in co-op experience in program one	0.216*** (0.041)	-0.074*** (0.022)	-0.048** (0.022)	-0.094*** (0.032)
Humanities major	-0.066 (0.051)	0.023 (0.035)	0.021 (0.034)	0.022 (0.041)
Business major	0.237*** (0.050)	-0.101*** (0.030)	-0.033 (0.029)	-0.104*** (0.037)

Science major	0.014 (0.049)	-0.030 (0.031)	-0.023 (0.030)	0.039 (0.039)
Other major	-0.038 (0.049)	-0.020 (0.032)	0.031 (0.035)	0.027 (0.039)
Atlantic	0.054 (0.038)	0.046* (0.027)	-0.046* (0.024)	-0.055* (0.029)
Quebec	-0.056 (0.068)	-0.042 (0.034)	-0.007 (0.048)	0.105* (0.062)
Prairies	0.125*** (0.037)	-0.001 (0.024)	0.055** (0.023)	-0.069** (0.028)
British Columbia	0.165*** (0.046)	-0.062** (0.026)	-0.035 (0.028)	-0.068* (0.036)
Sample	1,281	276	200	396

Note: Standard of error is in parentheses.

*** indicates statistically significant at the 1% level; ** indicates statistically significant at the 5% level; * indicates statistically significant at the 10% level.

Conclusions

Using the most recent cycles of the YITS-A, this paper builds on the previous work of Martinello (2007) and Butlin (2001), contributing to the Canadian literature by providing details on the pathways of students who pursue further post-secondary education soon after graduation. A regression analysis that estimates the correlates of students' decisions to enter FPSE and at which level provides new information on the factors that contribute to these decisions, as well as confirming findings from Canadian literature on persistence on the variables that are not so important for predicting post-access decisions. Lastly, the impact of the student's field of study, various types of work experience, and province of study in the student's first program are included in the analysis in order to assess popular perceptions on the impact of these factors on the decision to pursue multiple degrees.

This research confirms various results from previous work that has used both the Youth in Transition Survey and the National Graduates Survey to assess the short-term transitions of BA graduates in Canada. Females are less likely to enter programs above the bachelor's level, as are students who have completed business programs. Additionally, background, family, and high school performance indicators are found to have minimal effects on the FPSE decision; these findings align with previous research on student decisions made after university has been accessed. It also has confirmed previously unexplored but intuitive relationships between level of study and academic performance indicators, in which high school and first-year grades are positively correlated with entering a second program above the BA level.

Most importantly, this work has explored perceived relationships between field of study, work experience during school, and province of study variables and the decision to pursue further post-secondary education. In particular, this work confirms the perception that graduates from fields in which career paths are less obvious—such as the social sciences and humanities—enter second programs at a higher rate than students from programs such as business, architecture, and engineering. Regression analysis confirms a strongly negative relationship between majoring in business and entering a second program.

Relationships between work experience variables and the decision to pursue FPSE are also explored. Students who participate in co-op programs during their undergraduate degree are much less likely to enter a second program than those students who did not participate in this type of program; co-op is found to have a negative effect on participating in FPSE at all levels. Working in any type of job for 1–14 hours a week is positively related to the decision to enter a second program below the bachelor's level, and working for more than 15 hours a week is positively related to entering a second program. These results reinforce the notion that obtaining a university degree is not sufficient to ensure the success of students upon graduation. Acquiring

work experience—and thus the skills necessary to succeed in the labour market—while in school is also important. One may further infer that co-op programs enable students to obtain more than essential workplace skills; these students are in a position to make connections during their time at work, resulting in a smoother school-to-work transition—and possibly a job upon graduation.

Lastly, this work contributes to the literature on youth employment opportunities and the decision to pursue more schooling. Regression analysis shows a very strong and negative relationship between entering a second program and positive employment outcomes for youth. In particular, graduates who studied in the Prairies or British Columbia are much less likely to enroll in a second program than students from Ontario; these provinces also had below average rates of youth unemployment during the time in which the students in this sample made their decisions. Although province of study variables may encompass a variety of effects, local labour market conditions and demand are likely reflected in the results.

All of these results have the potential to inform the PSE decisions students make in high school, program design of bachelor's degrees provided at universities, and strategies to address youth unemployment and the school-to-work transition—all current priorities of both the federal and provincial governments. Having access to information on graduate outcomes can improve the choices students make with respect to what and where they should study, or whether to select a program that offers a co-op component, for example. University programs could create more opportunities for students to develop workplace training and skills, specifically through co-op programs, which appear to have a positive effect on labour market entry upon graduation. The government's Economic Action Plan 2014 proposed to allocate \$40 million to support 3,000 internships in high-demand fields over the next two academic years; widening the scope of this proposal to include students from other fields could support the school-to-work transition of these students.

Although the Youth in Transition Survey provides the most detailed longitudinal data on the education and employment decisions of Canadian youth to date, the survey has its limitations. Because data for the last cycle of the YITS was collected in 2010, the survey is becoming increasingly outdated. In the context of this work, the economic impact of the recession on the education and employment decisions of youth cannot be adequately assessed within the timeframe of the survey; the timeframe of this survey also prevents looking at the decision to pursue FPSE over a longer time period. Additionally, the recent proliferation of post-graduate certificates—a primary motivation for this research project—and their popularity among university graduates seeking practical knowledge and work experience through these one-year college programs are not captured by the Youth in Transition Survey.

Despite these limitations, the Youth in Transition Survey provides many opportunities to build on the work of this paper and continue the exploration of the education pathways of Canadian youth. In particular, resolving issues with missing values for Quebec students mentioned previously would result in a larger sample size with which the analysis could be conducted. Similarly, this work aimed to carry out an analogous analysis of the experiences of those students who complete a two-year college degree program; however, sample size issues yet to be resolved prevented this analysis from being completed at this time.

The Youth in Transition Survey also provides data on the employment experiences of youth, which could contribute to this analysis by enabling one to control for the differences between those students who pursue more schooling and those who do not with respect to employment experiences after the student's first program. Does being unemployed after graduation positively impact a student's decision to pursue FPSE? Are students from particular disciplines more likely to be unemployed after graduation? Are students who participate in a co-op program during their bachelor's more likely to be employed once they graduate? The Youth in

Transition Survey contains the data to answer these questions, all of which form the foundation for future research on the topic of Canadian graduates who pursue further post-secondary education.

Appendix

Appendix A: Choice probabilities underlying MNL model

Given the model:

$$\text{fpse_level} = \beta_1 + \beta_2 U + \beta_3 V + \beta_4 W + \beta_5 X + \beta_6 Y + \beta_7 Z + \varepsilon \quad (1)$$

The probability that an outcome occurs is defined by the following equations:

$$\text{fpse}_A = \beta_0 + \beta X_A + \varepsilon_A \quad (2)$$

$$\text{fpse}_B = \beta_1 + \beta X_B + \varepsilon_B \quad (3)$$

$$\text{fpse}_C = \beta_2 + \beta X_C + \varepsilon_C \quad (4)$$

$$\text{fpse}_D = \beta X_D + \varepsilon_D \quad (5)$$

where fpse_A represents the decision to study above the BA level;

fpse_B represents the decision to study at the BA level;

fpse_C represents the decision to study below the BA level;

fpse_D represents the decision not enter a second program;

X_A, X_B, X_C, X_D represent vectors of covariates;

$\varepsilon_A, \varepsilon_B, \varepsilon_C, \varepsilon_D$ represent independent and identically distributed stochastic error terms.

Then the probability fpse_D occurs, for example, is equal to:

$$P_D = \frac{\exp(\beta X_D)}{\exp(\beta X_D) + \exp(\beta_0 + \beta X_A) + \exp(\beta_1 + \beta X_B) + \exp(\beta_2 + \beta X_C)}$$

Table A.1: Literature on transitions of PSE graduates in Canada

Survey	Author	Details	FPSE	Level
Youth in Transition Survey	Zeman, K., Knighton, T., & Bussière, P. (2004)	YITS-B, cycles 1-2	38% of PSE graduates enter second programs 26% if Quebec students are excluded	31% at university 39% at college 29% at another type of PSE institution
National Graduates Survey	Adamuti-Trache, M. & Hawkey, C. (2009)	NGS (1992) & FOG (1995)	Approximately 33% of PSE graduates enter second programs within two years of graduation	N/A

Table A.2: Literature on transitions of bachelor's graduates in Canada

Survey	Author	Details	FPSE	Level
Youth in Transition Survey	Martinello (2007)	YITS-B, cycles 1-3	43.9% of BA graduates enter second programs	37.1% above BA level at a university or university college 39.0% at BA level at a university or university college 6.5% below BA level at a university or university college 17.5% below BA level at a college, technical, or business college
National Graduates Survey	Butlin (2001)	NGS (1992) & FOG (1995)	47% of BA graduates enter second programs within two years of graduation	31% at master's or doctoral level 24% at bachelor's level 20% at the college or trade-vocational level 18% at university certificate/diploma level 8% at first professional level

Table A.3: Right-hand-side variables used in regression analysis

<i>Personal characteristics</i>	
Female	female
Rural	gave rural address in high school
Immigrant status	one parent or child is an immigrant
<i>Characteristics of parents</i>	
Parents' highest education	highest level of education achieved by either parent
Parents' aspirations for child	highest level of PSE parent hopes child will receive
Parents saved for child's education	parents saved some money for child's education
<i>High school characteristics</i>	
Overall average at 15	self-reported grade average in cycle 1
Engagement	scale of academic and social engagement in high school
<i>PSE experience, first program</i>	
Overall average in first year	self-reported overall grade average in first year of BA
Work during school	categorical variable recording hours worked per week for pay during school year
Work-experience program	took part in experiential learning program
<i>Program of study, first program (Social and behavioural sciences, and law is the omitted category)</i>	
Humanities major	education; visual and performing arts, and communication technologies; humanities
Business major	business, management, and public administration
Sciences major	physical and life sciences, and technologies; mathematics, computer and information sciences; architecture, engineering, and related technologies
Other major	agriculture, natural resources and conservation; health, parks, recreation, and fitness; personal, protective, and transportation services; other; not stated
<i>Province of study, first program (Ontario is the omitted category)</i>	
Atlantic	Newfoundland; New Brunswick; Nova Scotia; P.E.I.
Quebec	Quebec
Prairies	Manitoba; Saskatchewan; Alberta
British Columbia	British Columbia

Table A.4: Marginal effects of two-step approach

Regression	<i>1 = FPSE</i> <i>0 = No FPSE</i>	<i>2 = Above BA level</i> <i>1 = At BA level</i> <i>0 = Below BA level</i>		
Dependent variable	<i>FPSE</i>	<i>FPSE below BA</i>	<i>FPSE at BA</i>	<i>FPSE above BA</i>
Female	0.043 (0.034)	0.049 (0.047)	0.112** (0.046)	-0.161*** (0.052)
Rural high school	-0.020 (0.040)	-0.002 (0.065)	0.038 (0.059)	-0.036 (0.064)
Immigrant status	-0.040 (0.043)	0.015 (0.055)	-0.0001 (0.062)	-0.015 (0.061)
Parent's highest level of education				
Below high school	-0.095 (0.106)	-0.128 (0.125)	0.192 (0.167)	-0.064 (0.142)
Some PSE	-0.096 (0.096)	-0.040 (0.106)	-0.245*** (0.094)	0.284** (0.115)
College	-0.022 (0.060)	0.0003 (0.086)	-0.020 (0.089)	0.019 (0.086)
Below BA	0.010 (0.080)	-0.162* (0.097)	0.106 (0.118)	0.056 (0.108)
BA	-0.093 (0.060)	-0.075 (0.080)	-0.113 (0.087)	0.189** (0.083)
Above BA	-0.039 (0.065)	-0.083 (0.088)	-0.062 (0.094)	0.145 (0.089)
Parent's education expectations for child				
High school	0.250 (0.206)	-0.174** (0.069)	0.037 (0.342)	-0.196 (0.304)
College	-0.010 (0.057)	0.080 (0.085)	-0.023 (0.079)	-0.056 (0.100)

Above BA	0.031 (0.037)	0.008 (0.051)	-0.102* (0.052)	0.094* (0.053)
Parents saved for child's education	0.046 (0.042)	-0.121* (0.069)	0.029 (0.061)	0.092 (0.062)
Overall average at 15				
90–100%	0.098** (0.041)	0.015 (0.056)	-0.091 (0.057)	0.077 (0.061)
70–79%	0.039 (0.044)	0.116* (0.069)	-0.005 (0.068)	-0.111 (0.072)
<70%	0.033 (0.101)	0.064 (0.125)	0.076 (0.134)	-0.141 (0.130)
Measure of overall engagement	0.007 (0.017)	0.054** (0.024)	0.013 (0.026)	-0.067** (0.027)
Overall average in first year of program one				
90–100%	0.108 (0.070)	-0.151*** (0.042)	0.162* (0.098)	-0.011 (0.098)
70–79%	0.032 (0.040)	0.072 (0.049)	0.074 (0.055)	-0.146*** (0.056)
60–69%	-0.074 (0.050)	0.155* (0.083)	0.061 (0.078)	-0.215*** (0.084)
<60%	0.017 (0.114)	0.473*** (0.164)	-0.108 (0.094)	-0.365*** (0.126)
Hours worked in program one				
1–14 hours	-0.006 (0.039)	-0.109** (0.051)	0.171*** (0.058)	-0.062 (0.055)
15+ hours	0.079* (0.043)	-0.023 (0.062)	0.046 (0.063)	-0.023 (0.066)
Participated in co-op experience in program one	-0.212*** (0.045)	0.019 (0.076)	-0.011 (0.078)	-0.008 (0.081)
Humanities major	0.061	0.012	-0.019	0.006

	(0.051)	(0.070)	(0.066)	(0.073)
Business major	-0.240*** (0.050)	0.156 (0.123)	-0.112 (0.107)	-0.044 (0.138)
Science major	-0.007 (0.050)	-0.047 (0.066)	-0.082 (0.070)	0.129* (0.072)
Other major	0.033 (0.051)	0.036 (0.066)	-0.071 (0.063)	0.035 (0.068)
Atlantic	-0.055 (0.038)	-0.082 (0.051)	0.177*** (0.054)	-0.095* (0.051)
Quebec	0.064 (0.068)	-0.023 (0.090)	-0.136* (0.072)	0.159 (0.100)
Prairies	-0.127*** (0.037)	-0.032 (0.057)	0.092 (0.059)	-0.060 (0.056)
British Columbia	-0.164*** (0.047)	0.040 (0.080)	-0.039 (0.084)	-0.001 (0.091)
Sample	2,351	200	276	396

Note: Standard of error is in parentheses.

*** indicates statistically significant at the 1% level; ** indicates statistically significant at the 5% level; * indicates statistically significant at the 10% level.

Table A.5: Youth unemployment rate by province, 2006–09

Province	2006	2007	2008	2009
Newfoundland and Labrador	22.4	20.2	19.4	22.6
Prince Edward Island	14.3	11.3	16.8	17.9
Nova Scotia	13.7	13.0	13.5	17.9
New Brunswick	13.9	11.9	14.5	14.8
Quebec	13.5	12.5	12.1	15.2
Ontario	13.3	13.0	13.7	17.5
Manitoba	8.9	9.2	9.0	10.3
Saskatchewan	8.8	7.8	7.6	9.6
Alberta	6.8	7.2	7.5	12.2
British Columbia	8.4	7.7	8.5	13.3
Canada	11.7	11.2	11.6	15.2

Source: Statistics Canada. Table 282-0002—Labour force survey estimates (LFS), by sex and detailed age group, annual (persons unless otherwise noted), CANSIM (database).

References

- Adamuti-Trache, M. & Hawkey, C. (2009). Canadian post-secondary graduates and further education: Who continues and why? Canadian Council on Learning.
- Butlin, G. (2001). Bachelor's graduates who pursue further postsecondary education. *Education Quarterly Review*, 7(2), p. 22–42.
- Coelli, M. (2005). Tuition, Rationing and Inequality in Post-Secondary Education Attendance. University of British Columbia Working Paper.
- Corak, M., Lipps, G., & Zhao, J. (2003). Family Income and Participation in Post-Secondary Education. Statistics Canada, Analytical Studies, Research Paper No. 210.
- Finnie, R. & Mueller, R. (2008). The Backgrounds of Canadian Youth and Access to Post-Secondary Education: New Evidence from the Youth in Transition Survey. In R. Finnie, R. Mueller, A. Sweetman, & A. Usher (eds.), *Who Goes, Who Stays, What Matters? Accessing and Persisting in Post-Secondary Education in Canada*. Montreal: McGill-Queen's University Press.
- Finnie, R. & Qiu, H. (2008). The Patterns of Persistence in Post-Secondary Education in Canada. MESA project research paper. Toronto, ON, Canadian Education Project.
<http://www.mesa-project.org/research.php>
- Frenette, M. (2005). Is Post-secondary Access More Equitable in Canada or the United States? Statistics Canada, Analytical Studies Research Paper Series No. 244.
- Frenette, M. (2008). Why Are Lower-Income Students Less Likely to Attend University? Evidence from Academic Abilities, Parental Influences, and Financial Constraints. In R. Finnie, R. Mueller, A. Sweetman, & A. Usher (eds.), *Who Goes, Who Stays, What*

- Matters? Accessing and Persisting in Post-Secondary Education in Canada. Montreal: McGill-Queen's University Press.
- Johnson, D. & Rahman, F. (2005). The Role of Economic Factors, Including the Level of Tuition, in Individual University Participation Decisions in Canada. *Canadian Journal of Higher Education* 35(3), 101-27.
- Junor, S. & Usher, A. (2004). The Price of Knowledge 2004: Access and Student Finance in Canada. Montreal: The Canadian Millennium Scholarship Foundation.
- Martinello, F. (2007). Student Transitions and Adjustments in Canadian Post Secondary Education. Working paper. <http://socserv.mcmaster.ca/rdc/RDCwp11.pdf>
- Martinello, F. (2008). Transitions and Adjustments in Students' Post-Secondary Education. In R. Finnie, R. Mueller, A. Sweetman, & A. Usher (eds.), Who Goes, Who Stays, What Matters? Accessing and Persisting in Post-Secondary Education in Canada. Montreal: McGill-Queen's University Press.
- Mueller, R. (2008). Access and Persistence of Students in Canadian Post-Secondary Education: What We Know, What We Don't Know, and Why It Matters. In R. Finnie, R. Mueller, A. Sweetman, & A. Usher (eds.), Who Goes, Who Stays, What Matters? Accessing and Persisting in Post-Secondary Education in Canada. Montreal: McGill-Queen's University Press.
- Shaienks, D. & Gluszynski, T. (2007). Participation in Postsecondary Education: Graduates, Continuers, and Drop Outs, Results from YITS Cycle 4. Catalogue no. 81-595-MIE. Ottawa: Statistics Canada.
- Zeman, K., Knighton, T., & Bussiere, P. (2004). Education and labour market pathways of young Canadians between age 20 and 22: An Overview.