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POST-SECONDARY STUDENT PERSISTENCE AND PATHWAYS: EVIDENCE FROM THE YITS-A IN CANADA

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Abstract

The Youth in Transition Survey is used to follow the postsecondary education (PSE) pathways and outcomes of Canadian youth over the mid 2000s. Separate analyses are done for students who started at community colleges and those who started at four year universities. First program outcomes are reported, showing that significant numbers of students leave their first programs but remain in PSE by switching to other programs, institutions, or levels. Multinomial regression is used to estimate the correlates of students' first program switching and leaving decisions. Five year graduation rates are calculated to show the importance of different pathways (across programs, institutions, and levels) to earning a PSE credential; in the aggregate and for subgroups of students. Differences between institution specific and system wide measures of persistence, PSE leaving, and graduation rates are shown throughout.

Introduction

There is a great deal of interest in what happens to students once they start their postsecondary education (PSE). This is not surprising given the large investments of time and money involved (both private and public), and the substantial psychic costs that can be incurred. Until recently, research on Canadian students' progress (or lack of progress) in their PSE was stymied by a lack of data sets that follow students over the course of their PSE. The release of the Youth in Transition Survey (YITS), however, addresses this gap by providing data on the education and work activities of Canadian youth over roughly eight years, starting in the late 1990s. Most importantly, the YITS data follow students if they transfer across post secondary institutions or if they interrupt their PSE (a stop out). Thus the data allow us to address a crucial issue in the literature; namely, the differences between institution specific and system measures of persistence and degree completion due to the complex pathways that students take in their PSE. See, for example, Adelman (2009) for a forceful examination of the differences and their implications within the context of international comparisons.

This study uses cohort A of the YITS to follow a representative sample of Canadian youth from ages 15 to 23. The sample is restricted to those who enrolled in a post secondary institution and separate analyses are done for those starting at community colleges and those starting at four year universities. We follow students' first programs and document the extent to which they continue in that first program to graduation, transfer to another program, or exit PSE entirely over each of their first five years in PSE. Transfers are broken down further to show whether they are within the same institution or to another institution, and whether the new programs are at different levels than the first (e.g. at community colleges rather than four year universities, or the reverse). The transfer rates are used to highlight the difference between

institution and system measures of students' persistence in PSE.

Multinomial regression analysis is then used to estimate the marginal relations between students' first program outcomes (continuing, switching to another program, or leaving PSE) and student, parent, and family characteristics; with and without controls for high school and PSE performance and experiences.

Lastly, we report graduation rates, five years after the start of students' first program, broken down by pathway; i.e., graduation from the first program, or after switching to another institution or level. These show the importance of alternative pathways for students' completion of post secondary credentials and the extent to which institution specific graduation rates understate the true system wide graduation rates.

Survey of the literature on Canadian Students

The literature on the PSE persistence and program completion of Canadian students is fairly small but it has grown rapidly in recent years. Surveys that concentrate on Canadian students include Grayson and Grayson (2003), Mueller (2007), and Parkin and Baldwin (2009).

In one of the earliest papers, Gilbert & Auger (1988) constructed their own data set by following first year students at the University of Guelph in 1986 over two years. 76% of the initial cohort persisted, and leavers were split evenly between voluntary leavers (12%) and those required to withdraw (12%). Of the leavers, 67% of them were transfers, 38% were stop outs and only 13% left PSE completely. Another early study, Gilbert (1991), used administrative data from Canadian universities on full time students enrolled in the fall of 1985. Their five year completion rate was 58% and decreasing, partly because the time to degree completion was increasing. Chen & Oderkirk (1997) used data from the Enhanced Student Information System

(ESIS) to follow students who entered Ontario universities in the early 1980s. The data follow transfers across Ontario universities but transfers to community colleges or other provinces are classified as leavers. By 1993 (after 8 to 12 years) 68% had graduated, 2% were continuers and 30% were not graduated and not continuing. The 1995 School Leavers Follow-up provided another early data set that followed Canadian students across institutions. Butlin (2000) used the data to run logistic regressions on the probability of dropping out of PSE, with separate regressions for university and community college students.

The publication of the YITS data sparked a rapid increase in research on Canadian PSE students. A series of Statistics Canada papers used the YITS to report on PSE participation rates; rates of continuing, graduating, or dropping out; experiences in PSE; and reasons for dropping out; often disaggregated by region, type of institution , and student and family characteristics. See Shaienks & Gluszynski (2007); Shaienks, Gluszynski & Bayard (2008); and the references cited therein. There is little emphasis in this work, however, on students' switching (transferring) behaviour across institutions or programs and its effect on their continuing in PSE or graduation.

The Finnie et al. (2008) volume contains several studies of Canadian students' persistence in PSE, including Finnie & Qiu (2008) who use cohort B of the YITS to report first program outcomes, transition and graduation rates, and rates of return of PSE leavers. Johnson (2008) examines differences in persistence in university programs across Canadian provinces and finds that they are not related to tuition differences across those provinces. Day (2008) attempts to untangle the relationship between financial aid and persistence for both community college and university students with mixed results. The basic method of analysis used in Finnie & Qiu (2008) has also been applied to subsets of Canadian students. For example Finnie & Qiu (2009) focus on students attending universities in Canada's four Atlantic provinces while Finnie

et al. (2010 and 2012) restrict their attention to Ontario students, with the former concentrating on Ontario community college students.

Dooley, Payne & Robb (2012) use detailed administrative data from four Ontario universities to report on students' persistence and academic success. The data do not track transfers across PSE institutions so all of the results are institution specific. Dooley, Payne & Robb (2013) apply a regression discontinuity approach to the data from two of the universities to show that university scholarships and bursaries have little impact on students' persistence and academic success.

Materials and Method

Data.

The data consist of five cycles of the Youth in Transition Survey, Cohort A (YITS-A), which tracks the education and work activities of a stratified representative sampling of 29,687 Canadian youth who were 15 years old (and typically in grade 10 of high school) as of December 31, 1999. The first YITS-A interviews included the Program for International Student Assessment (PISA) and interviews with parents. Subsequent interview were done every two years with the fifth covering 2006 and 2007, and ages 22-23. See Motte et al.(2008) for more details on the YITS surveys.

The final sample includes 12,077 respondents whose first PSE program was at a Canadian institution: 5,537 in community colleges and 6,640 in universities. Universities are all four year institutions that award Bachelors and usually higher level degrees. Community colleges typically offer one, two, or three year programs and award certificates, diplomas, or trade designations. A diploma is like an associate degree but the latter term is not commonly used in

Canada.

Student characteristics considered here include sex (virtually even in the community college sample but 59.3% female in the university sample) and whether their parents characterized them as aboriginal (2.4% and 1.6% in the college and university samples, respectively). A broad definition of students with a disability is employed. It includes physical, sensory or cognitive disabilities plus difficulties in or restrictions on activities at home, school, or elsewhere; as reported by parents. 12.5% and 8.3% of community college and university students, respectively, are identified as having a disability. Family characteristics include whether students (at age 15) were in single mother families (13.5% and 10.9% of the college and university samples, respectively), their total household income, and parents' highest education level. Students classified as rural attended a high school (at age 15) that was outside the Metropolitan Influence Zone of any urban centre. Rural students make up 26.9% of the community college and 18.9% of the university samples. The YITS-A also reports high school grades (overall and for specific courses), PISA reading scores, and measures of academic and social engagement in high school. Data on first year PSE grades and social and academic experiences are also reported.

A student's PSE program is the basic unit of observation for the analysis. It is defined by the institution attended and the type and level of credential awarded (e.g. certificate, diploma, or bachelors). Students are classified as switching programs if they transferred to another institution (at the same or different level) or transferred to a program that awards a credential with a different name. The latter case could be a transfer to a different level (e.g. from a four year bachelors to a two year diploma) or a transfer to a program at the same level but with a different name (e.g. from a Bachelor of Science to a Bachelor of Arts program). Students who transfer

across programs with the same graduation credential (e.g. from English to Sociology, both Bachelor of Arts programs), within the same institution, are classed as continuers in their programs and not switchers.

Method of analysis.

The first part of this paper describes the outcomes of students' first PSE programs over each of the first five years of PSE. Regression analysis is then used to estimate correlates of the first program outcomes. The second part concentrates on PSE graduates. Graduation rates for the various pathways to graduation are reported and disaggregated according to student, parent and family characteristics. In every case, separate analysis is done according to whether students started PSE at a community college or a university. The start of a student's first PSE program is designated as "Year 1" regardless of the calendar year or the student's age. Students' progress and outcomes are then tracked over subsequent years (up to Year 5) starting from the start of their first PSE program.

First program outcomes.

Table 1 reports the transitions or outcomes of students' first PSE program. For each year, the hazard rates show the percentage of students (in that year) who graduated, switched to another program, left (exited) PSE, or continued in their first program into the next year. The switchers category is broken down further to show whether students transferred to a different institution or changed levels. After each year the graduates, switchers and leavers are removed from the sample and only the continuers are included in the hazard rates for the subsequent year. Thus only outcomes from students' first PSE program are shown. Table 1 also reports the cumulative effects of the hazard (or yearly) rates. The cumulative rates are calculated from the hazard rates and they show the percentage of the original total sample of students who graduated,

switched programs, left PSE, or are continuing in their first program, up to and including that year.

Multinomial regression analysis is used to estimate correlates of the first program transitions, controlling for other factors (Table 2). Each student-year counts as a separate observation in the regressions and dummy variable are included to control for the year of the observation in the student's program. The dependent variable indicates whether students continued in their PSE program (the base case), switched to another PSE program, or left PSE in that year. The observations cover the transitions in students' first PSE program only so, again, students are removed from the sample after they graduate, switch to another program, or leave PSE. Two specifications show the estimated marginal effects of student, parent and family characteristics; with and without controls for age 15 PISA reading scores, high school grades and engagement, and first year PSE grades and experiences. In addition to the year dummy variables noted above, controls for region, linguistic minorities, immigrant and Canadian born visible minorities, immigrant not visible minorities, and single father and other family structures are included in every specification, but not reported to save space. The full estimates are available upon request.

Graduation rates.

Graduation rates over different pathways to graduation are reported in Tables 3 and 4. The top panels show the cumulative graduation rates over each of five years. The panels that follow report the five year cumulative graduation rates for subgroups of students. In every case the rates show the percentage of starting students who graduated from their first PSE program or after switching to another program. Switchers are followed over as many programs as they attended, over the stated time period, until they finally graduated. The switching graduates are

classified according to whether they changed institutions or levels of study. Students who stopped or dropped out for some period of time and then returned (and graduated) are included in the graduation rates.

Results

First program outcomes (rates).

The top row of Table 1 shows that the first year dropout rate (i.e., leaving PSE entirely) for students who start their PSE at a community college is 15.4%. The dropout rate is lower in each of the next three years. This reinforces the conventional wisdom that the first year of PSE is critical for student persistence. The cumulative leaving rate, shows that 24.3% of starting community college students have left PSE (without graduating) after five years so over half of those who leave PSE do so in the first year (15.4% vs. 24.3%).

A similar pattern occurs with switching PSE programs. 11.5% of community college students switch to a different program within their first year. The rate falls to 7.4% in the second year and is smaller in subsequent years. Over half of those who transfer out of their first program within five years do so in their first year (11.5% vs. 17.6%).

First program community college graduation rates are naturally quite low in the first year (14.3%), given that most programs are two years, and rise in subsequent years (39.7%, 55.7% and 55.4% in years two, three and four, respectively). The cumulative rates show that most graduate by their third year (51.8% by Year 3 vs. 57.4% after five years). In fact, well over half of those who graduate within five years do so by the end of their second year (37.6% vs. 57.4%).

Turning to the sample of university students, we find that the first year dropout rate is much lower than for the community college sample (6.6% vs. 15.4%). Like college students, the

highest hazard dropout rate occurs in first year, but university dropout rates continue to fall while the college rates remain roughly constant and even increase slightly in the fourth year. Of the university dropouts, more than half drop out in their first year, and 77% do so by the end of their second year.

Community college and university first year switching rates are very similar (11.5% and 11.6%). Presumably this is due to an initial "sorting" process where students learn early on that they are not in a program that is right for them and they switch to another. The switching rate for university students falls to 8.6% in the second year and continues to decline in subsequent years. Just under half of the university students who switch out of their first program within five years do so in their first year. After five years, the switching rate for university students is higher than the college student rate (23.4% vs. 17.6%) so all of the extra program switching done by university students occurs after first year.

Given their longer program lengths, graduation rates are quite low for university students in Years 1, 2 and 3. Only 37.1% of all university starters graduate from their first program by their fourth year. After five years, 55.5% of university students have graduated from their first program and this rate will surely be higher after six years.

Table 1 shows the important differences between institution retention rates and the persistence rates for the PSE system. In the first year of community college, only 15.4% of the starting students actually dropped out of PSE. The average institution, however would also include the 4.8% (3.8+1.0) who switched to another institution in their dropout rate thereby overstating the dropout problem. For first year university students, the actual rate of leaving PSE is only 6.6% but the average institution dropout rate would overstate it by another 5.9% (3.8+2.1); almost double the actual rate.

Further analysis (not reported here) follows students who leave their first PSE program into their second or third (or later) programs; up to their first graduation. Including subsequent programs in later years reveals even larger discrepancies between institutional retention rates and persistence rates for the PSE system as a whole. For students who start at community college, 7.5% of the original starting class are still enrolled in PSE, but at a different institution in their second year and the number increases to 8.1% by Year 3. For university starting students, 9.4% are still enrolled but at a different institution in their second year and the number increases to 9.8% in Year 3.

First program outcomes (regression estimates).

Table 2 shows the estimated marginal effects on students' first program transitions (continue, switch programs, or exit PSE) from multinomial logit regressions, for both college and university starters. For categorical variables, the omitted category is shown in brackets on the variable heading line. Column (1) reports the baseline case where student, parent and family characteristics are included as right hand side variables. Column (2) reports the estimates when controls for PISA reading scores, high school grades and engagement, and PSE grades and experiences are included. The coefficient estimates for the PSE experience variables are not reported to save space.[1] All unreported estimates are available upon request.

First program at a community college.

Table 2 shows that among community college students, females are 4 percentage points less likely to leave PSE than males, but the estimated difference is reduced to 2.5 percentage points when the high school and PSE controls are included. This suggests that differences in educational performance account for some, but not all, of women's lower likelihood of leaving

[1] The PSE social and academic experiences are: "Instructors show interest in helping students succeed", "There are people at school to talk about personal things", and "The first year helped students obtain skills useful for the job market".

PSE. Students identified by their parents as Aboriginal are estimated to be much more likely to leave PSE, but the effect becomes statistically insignificant once PSE grades and experience variables are included. Differences in family structure and attending an urban versus rural high school are all estimated to have statistically insignificant effects on switching programs or leaving PSE for starting college students. Disabled students (as defined here) are estimated to be more likely to switch to another PSE program but their leaving estimates are small and overwhelmingly statistically insignificant. Students who begin their first college program more than two years after the normal starting age are less likely to switch programs and more likely to leave PSE in all of the specifications. All of the other starting age estimates are statistically insignificant. Students from higher income families are more likely to switch programs and less likely to leave PSE in both specifications. Those with lower incomes are not estimated to be significantly different from the middle income ($50,000 to $75,000) omitted category. Differences in parental education are estimated to be mostly statistically insignificant.

For college students, the model estimates that a high school overall grade 10 percentage points higher is associated with a 4.4 percentage point lower leaving rate, even after controlling for PSE grades. The grades in specific high school courses (Math, Language and Science), PISA reading scores and engagement in high school are all estimated to have statistically insignificant relations to first program outcomes. First year PSE grades are, as expected, highly correlated with switching or leaving PSE. A college student with overall first year PSE grades in the 80s rather than in the 70s (out of 100) is 6.5 percentage points less likely to leave their program and 3.3 percentage points less likely to switch to another.

First program at a university.

The rightmost two columns of Table 2 presents the regression estimates for students who

started PSE at university. Female university students are also significantly less likely to leave PSE. But the difference is 1.5 percentage points so it is smaller than the estimate for college students and it changes little when the high school and PSE variables are included. The differences across Aboriginal status and family structure are estimated to be much more important for university students than for community college students. Aboriginal students are five to seven percentage points more likely to leave PSE after controlling for the other variables; with the smaller estimates occurring, not surprisingly, when the controls for high school and PSE outcomes are included. Students from single mother families are estimated to be less likely to switch programs, but no more likely to leave PSE, than students from two parent families in all specifications.

As with college students, there are no statistically differences between students who attended rural or urban high schools. Unlike college students, university students with an activity disability are not more likely to switch programs, but they are again (mostly) found to be no more likely to leave PSE. Students who start their university program later are more likely to leave PSE but the estimated effects are much smaller after controlling for the high school and PSE outcomes in column 2. The estimates differ from those for college students in that the higher leaving is also shown for students just one year older, and older students are not more likely to switch programs than normal or younger starting age students.

Also contrary to the college student results, differences in family income are not significantly related to university students switching programs or leaving PSE. As for differences in parents' education, the only significant result is lower leaving rates for those whose parents did not complete high school, which is potentially the result of stronger self selection in the decision about whether to attend university by students in this group.

The estimates for the high school and PSE variables on university student outcomes are very similar to those reported for the sample of community college programs. University students with higher overall high school grades are less likely to leave PSE, but the estimated effect is much smaller than for college students. University students with higher PSE grades are also less likely to switch programs or leave PSE, but the differences are again much smaller than for college students and the switching differences are only significant for students with PSE grades below the omitted 70 to 79 (out of 100) category. Age 15 PISA reading scores, grades in other high school courses, and high school academic and social engagement are all estimated to be statistically insignificant.

Graduation rates.

Starts PSE at a community college.

The last row of the top panel of Table 3 shows that 72.7% of all the students who started their first PSE at a community college graduated from some PSE program within 5 years. The row also shows that the 72.7% total graduation rate consists of: a) 56.4% of starting students who graduated from the first PSE program that they started, b) another 13.4% who graduated after transferring to another institution and/or program, and c) 3.0% who said they graduated but their program was unknown or missing.[2] Thus, 18.4% of graduates chose a switching pathway, while 77.6% graduated from the first program that they started, and 4% are unknown.

The bottom row of the top panel of Table 3 also shows the types of transfers made by graduates. 6.1% (5.5+0.6) of starting community college students, representing 8.4% of all graduates, stayed at their first institution but graduated from a different program. 7.2% (6.0+1.2) transferred to another institution and graduated within 5 years. Only 1.8% (0.6+1.2) of starting

[2] Note that the first program graduation rates in Table 3 and 4 are slightly different from those reported in Table 1. This due to a different treatment of programs deemed ineligible in the YITS, which is required so that students can be followed across programs and stop-outs, as is done in Tables 3 and 4.

students, or 2.5% of the graduates, changed the level of their program (e.g. from a 2 year diploma program to a one year certificate or to a four year bachelors program) and graduated within five years.

The very small percentage of students (1.2%) who transferred from community college to another program, at a different level, shows a distinctive feature of the Canadian PSE system. Most Canadian provincial jurisdictions do not have well established pathways for students to complete two years of study at a community college and then transfer into the third year of a four year university program. The exceptions are Alberta and British Columbia, although other provinces are attempting to establish that pathway.

Consistent with Table 1, over 90% of those who graduated from their first program (51.1 of the 56.4 percent) did so within the first three years. Not surprisingly, those who switched programs or institutions take longer to graduate with less than half graduating by Year 3. Only 75% of the switcher graduates have done so by Year 4. From Year 4 to Year 5, most of the increase in the total graduation rate comes from the increase in the graduation rate of switchers.

The Year 5 row in Table 3 shows the extent to which institutional graduation rates understate the true graduations rates for the starting PSE class. An average institution would report a 62.5% graduation rate (ignoring the don't knows) while the actual graduation rate is more than ten points higher at 72.7%.

The remainder of Table 3 shows graduation rates for subsets of the community college starter sample. As expected, women have higher graduation rates than men and it is true across all pathways with the small exception of graduating after switching to a program at a different level. Aboriginal students are much less likely to graduate, both from their first program and after switching programs. Students who lived with two parents at the time of the first interview

(during high school) have a higher overall graduation rate, but are less likely to have graduated from the first program they started. While the difference in the overall graduation rate is fairly small, students from two parent families are proportionately much more likely to have graduated after switching to another program or institution. Students with an activity difficulty are also less likely to graduate from their first program and more likely to graduate after switching programs but the differences are not as large as those for family structure. Students who attended high school in a rural area are less likely to graduate after switching programs, so their higher overall graduation rate results from a much higher likelihood of graduating from their first program.

The next two panels show that overall graduation rates rise with parental education and income, but the increases are not monotonic. The graduation rates from the students' first program, however, are seemingly not related to parents incomes. The differences in the total graduation rates are due to those who quit their first program and then switched to another program or institution. Although not monotonic, students of higher income and higher education parents are much more likely to have graduated from a second or later program or institution. Any student may find that their first PSE program, something that they chose while still in high school, is no longer the best choice for them. It appears that higher parental socioeconomic status (SES) and two parent families make students more willing and able to make adjustments to their PSE pathway by leaving their first program and switching to another program or institution. These adjustments or changes in their pathways result in higher total graduation rates. We speculate that higher parental SES and two parent families provide more security and financial support that allows students to make more changes along their pathway to graduation. In addition, two parents and more educated parents may provide more resources and direct advice about the different opportunities for switching available and how to achieve them.

Starts PSE at a university.

The last row of the top panel of Table 4 shows that, after five years, 74.2% of starting university students had graduated from some program, with 56.3% completing their first program and 16.1% (representing 21.7% of all graduates) graduating after switching institutions or programs. Thus the overall graduation rates of university and community college starting students are similar, but university starting students are more likely to follow a switching pathway. Given the longer university programs, most of the graduations occur in the fourth and fifth year and it is likely that the university graduation rates will increase further above the college rates in Year 6. Another difference is that 4.7% of university starters (versus 1.2% for college starters) switch to another program at a different institution and level before graduating. This likely represents university students dropping out of university and transferring to community college programs to complete a credential. An average institution would report a 63.5% five year graduation rate (ignoring the don't knows) which understates the true system wide rate of 74.2%.

The second panel of Table 4 shows that women who started PSE at university were much more likely to graduate than men. This holds across all pathways and the differences are larger than for college starting students. Women are proportionately much more likely to graduate by switching to another program or institution in contrast to college starters where men's and women's switching paths are roughly equal. Aboriginal students are much less likely to graduate than non-aboriginals after starting university. Although the sample size is small, the difference is due to not completing their first program since aboriginal students switch programs and then graduate at a higher rate than non-aboriginals. Students from two parent families have higher graduation rates, but in this case the switching rates are very similar and the difference is due to a

higher first program completion rate. In contrast to the result for college students, university starting students with activity difficulty have a much lower overall graduation rate driven mostly by a much lower first program completion rate. Also in contrast to college starters, university students from rural areas have lower overall graduation rates driven by lower first program completion, but the differences are small and much smaller than those for college students.

As with college students, parental income and education levels are positively related to the total graduation rates. Although first program graduation rates also rise with parental education and income, university starters (like the college starters) are much more likely to graduate after switching from their first PSE program if their parents are higher income or higher educated. Again, the increased use of switching pathways to graduation may be the result of greater security and support or better knowledge and ability to take advantage of alternative PSE pathways.

Discussion

The results show that transfers from students' first choice for PSE, to different programs and institutions, sometimes at different levels, constitute important pathways for students to make changes to the course of their PSE and obtain PSE credentials. An important consequence of the switching pathways is that institutional measures of persistence and completion understate the true system wide rates. An obvious policy implication is that transfers (across programs, levels, and institutions) should not be considered as negatives and discouraged since they provide options for students to make adjustments or corrections to their PSE and obtain credentials.

A brief international comparison shows that Canadian students do far less switching across PSE pathways than American students, but they persist and graduate at much higher rates

than their American counterparts. For example, estimates of six year graduation rates for American students who start PSE at a community college are around 35% (Radford et al.; 2010, Tinto 2012) although Hoachlander et al.(2003) show that it increases to around 50% if only traditional age students who expect to complete a credential are considered. Radford et al. (2010) also report that 13% of community college starters graduated after switching institutions. These contrast with the 72.2% overall graduation rate for Canadian students, with only 7.2% graduating after switching institutions (Table 3).

For American students starting PSE at four year institutions, Choy (2002) reports a five year graduation rate of 60% while Radford et al.'s (2010) six year rate is 64.3%; both below the 74.2% rate in Table 4. Adelman (2006) considers only bachelors degrees and reports six year graduation rates of 62% to 64% which are still lower than the five year 67.2% (56.3+6.7+4.2) rate calculated for Canadian students from Table 4. Again, American students do more switching with 11% to 13% graduating (with any credential) after switching (Choy 2002; Radford et al. 2010) versus the 8.9% rate shown in Table 4. Lastly, Adelman (2006) reports 8% to 11% of American students graduated with bachelors degrees after changing institutions versus 4.2% for Canadian students, albeit over only five years (Table 4).

References

Adelman, Clifford. (2006). *The Toolbox Revisited: Paths to Degree Completion from High School Through College.* Washington: U.S. Department of Education.

Adelman, Clifford. (2009). *The Spaces Between Numbers: Getting International Data on Higher Education Straight*. Institute for Higher Education Policy.

Butlin, George. (2000). Determinants of university and community college leaving. *Education Quarterly Review*. 6(4), 8-23.

Chen, Edward & Jillian Oderkirk (1997). Varied pathways: The undergraduate experience in Ontario. *Education Quarterly Review*, 4(3), 47-62.

Choy, Susan P. (2002). *Access and Persistence: Findings from 10 years of Longitudinal Research on Students*. Washington DC: American Council on Education.

Day, Kathleen. (2008). A Tangled Web: The Relationship between Persistence and Financial Aid. In R.Finnie, R.E.Mueller, A.Sweetman, & A.Usher (Eds.) *Who Goes? Who Stays? What Matters?* (pp.327-346). Montreal: McGill-Queen's University Press.

Dooley, Martin, Abigail Payne & Les Robb. (2012). Persistence and Academic Success in University. *Canadian Public Policy,* 38(3), 315-39.

Dooley, Martin, Abigail Payne & Les Robb. (2013). *The impact of Scholarships and Bursaries on Persistence and Academic Success in University* . Toronto: Higher Education Quality Council of Ontario.

Finnie, R., R.E.Mueller, A.Sweetman, & A.Usher. (2008). *Who Goes? Who Stays? What Matters?* Montreal: McGill-Queen's University Press.

Finnie, Ross, & Hanquin Qiu. (2008). The Patterns of Persistence in Post-Secondary Education in Canada. In R.Finnie, R.E.Mueller, A.Sweetman, & A.Usher (Eds.) *Who Goes? Who Stays? What Matters?* (pp.179-208). Montreal: McGill-Queen's University Press.

Finnie, R. & Hanquin Qiu. (2009). *Moving Through, Moving On: Persistence in Postsecondary Education in Atlantic Canada, Evidence from the PSIS*. Catalogue no.81-595-M – N0. 072. Statistics Canada.

Finnie, R., Childs,S., & Hanquin Qiu. (2010). *The Patterns of Persistence in Post-Secondary Education Among College Students in Ontario*. Colleges Ontario.

Finnie, R., Childs,S., & Hanquin Qiu. (2012). *Patterns of Persistence in Postsecondary Education: New Evidence for Ontario*. Toronto: Higher Education Quality Council of Ontario.

Gilbert, Sid. (1991). *Attrition in Canadian Universities*. Research Report #1. Commission of Inquiry on Canadian University Education.

Gilbert, S.N. & M. Auger. (1988). *Student Finances and University Attrition* PCS-6-00173. Ottawa: Department of the Secretary of State of Canada.

Grayson, Paul & Kyle Grayson. (2003). *Research on Retention and Attrition.* Montreal: Canada Millennium Scholarship Foundation.

Hoachlander, Gary, Anna Sikora, Laura Horn & Dennis Carroll. (2003). *Community College Students*. NCES 2003-164. Washington: U.S. Department of Education

Johnson, David. (2008). How is Variation in Tuition across Canadian Provinces Related to University Participation. In R.Finnie, R.E.Mueller, A.Sweetman, & A.Usher (Eds.) *Who Goes? Who Stays? What Matters?* (pp.299-326). Montreal: McGill-Queen's University Press.

Motte, Anne, Hanqing Qiu, Yan Zhang, & Patrick Bussière. (2008). The Youth in Transition Survey. In R.Finnie, R.E.Mueller, A.Sweetman, & A.Usher (Eds.) *Who Goes? Who Stays? What Matters?* (pp.63-78). Montreal: McGill-Queen's University Press.

Mueller, Richard. (2007). Access and Persistence of Students from Low Income Backgrounds in Canadian Post Secondary Education: A Review of the Literature. Toronto: Education Policy Institute

Parkin, Andrew & Noel Baldwin. (2009). Persistence in Post-Secondary Education. In J. Berger, A.Parkin, S.Junor, and A.Motte (Eds.) *The price of knowledge: Access and student finance in Canada*. (pp. 65-84). Montreal: Canada Millennium Scholarship Foundation.

Radford, Alexandria, Lutz Berkner, Sara Wheeless, & Bryan Shepard. (2010). *Persistence and Attainment of 2003-04 Beginning Postsecondary Students: After 6 Years*. (NCES 2011-151). Washington, DC: National Center for Education Statistics.

Shaienks, Danielle & Tomasz Gluszynski. (2007). *Participation in Postsecondary Education:- Graduates, Continuers and Drop Outs, Results from YITS Cycle 4*. Catalogue no. 81-595- MIE2007059, Ottawa: Statistics Canada.

Shaienks, Danielle, Tomasz Gluszynski, & Justin Bayard. (2008). *Postsecondary Education - Participation and Dropping Out: Differences Across University, College, and Other Types of Postsecondary Institutions*. Catalogue no. 81-595- MIE2008070, Ottawa: Statistics Canada.

Table 1
Transition Rates from First Program by Year, Percentages

First Program at a Community College

	Number of Obs.	Con-tinuers	Grad-uated	Switchers					Don't Know	Leavers
				Total	Same Institution		Different Institution			
					Same Level	Diff. Level	Same Level	Diff. Level		
Hazard Transition Rates										
Year 1	5,172	58.8	14.3	11.5	5.4	0.4	3.8	1.0	1.0	15.4
Year 2	3,042	43.3	39.7	7.4	3.2	0.2	1.9	1.4	0.7	9.6
Year 3	1,319	30.6	55.7	4.6	2.0	--	1.1	0.8	0.4	9.2
Year 4	403	28.2	55.4	6.3	--	--	--	2.1	--	10.1
Year 5	114	30.9	--	--	--	0.0	0.0	0.0	0.0	--
Cumulative Transition Rates										
Year 1	5,172	58.8	14.3	11.5	5.4	0.4	3.8	1.0	1.0	15.4
Year 2	5,172	25.5	37.6	15.9	7.3	0.5	4.9	1.8	1.4	21.0
Year 3	5,172	7.8	51.8	17.0	7.8	0.6	5.2	2.0	1.5	23.4
Year 4	5,172	2.2	56.1	17.5	7.9	0.7	5.3	2.1	1.6	24.2
Year 5	5,172	0.7	57.4	17.6	7.9	0.7	5.3	2.1	1.6	24.3

First Program at a Four Year University

	Number of Obs.	Con-tinuers	Grad-uated	Switchers					Don't Know	Leavers
				Total	Same Institution		Different Institution			
					Same Level	Diff. Level	Same Level	Diff. Level		
Hazard Transition Rates										
Year 1	7,189	80.4	1.4	11.6	4.5	0.6	3.8	2.1	0.7	6.6
Year 2	5,783	85.0	2.3	8.6	4.4	0.3	2.3	1.1	0.4	4.1
Year 3	4,915	85.5	7.9	4.3	2.4	0.5	0.9	0.5	0.1	2.3
Year 4	4,202	47.0	48.7	2.5	1.5	--	0.7	0.1	0.1	1.8
Year 5	1,974	30.3	66.8	2.0	0.3	--	--	--	--	0.9
Cumulative Transition Rates										
Year 1	7,189	80.4	1.4	11.6	4.5	0.6	3.8	2.1	0.7	6.6
Year 2	7,189	68.4	3.3	18.5	8.0	0.9	5.6	3.0	1.0	9.9
Year 3	7,189	58.4	8.7	21.4	9.7	1.2	6.2	3.3	1.1	11.5
Year 4	7,189	27.5	37.1	22.9	10.5	1.2	6.6	3.4	1.1	12.5
Year 5	7,189	8.3	55.5	23.4	10.6	1.2	6.9	3.5	1.2	12.8

Note: -- indicates results suppressed due to Statistics Canada confidentially requirements.

Table 2
Multinomial logit regression of first program outcomes: switching programs or leaving PSE, relative to progressing (continuing) in first program towards graduation.

Variable	Community College Students				University Students			
	(1) Baseline		(2) High School and PSE Variables		(1) Baseline		(2) High School and PSE Variables	
	Switcher	Leaver	Switcher	Leaver	Switcher	Leaver	Switcher	Leaver
Gender (Male)								
Female	0.006	-0.040***	0.011	-0.025*	0.004	-0.015***	0.003	-0.013**
	(0.012)	(0.015)	(0.012)	(0.015)	(0.007)	(0.005)	(0.007)	(0.005)
Aboriginal (not Aboriginal)								
Aboriginal	-0.018	0.100*	-0.030	0.031	-0.013	0.069***	-0.015	0.049**
	(0.037)	(0.054)	(0.035)	(0.048)	(0.022)	(0.024)	(0.021)	(0.020)
Family Structure (Two Parents)								
Single Mother	-0.012	-0.021	-0.018	-0.020	-0.022**	0.002	-0.024**	-0.004
	(0.021)	(0.023)	(0.020)	(0.023)	(0.010)	(0.009)	(0.010)	(0.008)
High School Location (Rural)								
Urban High School	0.008	0.019	0.002	0.007	-0.004	-0.007	-0.004	-0.008
	(0.015)	(0.016)	(0.015)	(0.016)	(0.008)	(0.005)	(0.008)	(0.005)
Disability or Activity Difficulty (None)								
Disability, Activity Difficulty	0.066***	0.017	0.063***	0.020	0.013	0.017*	0.012	0.012
	(0.024)	(0.024)	(0.023)	(0.024)	(0.014)	(0.010)	(0.013)	(0.009)
Starting Age (Normal)								
Younger	0.008	-0.024	0.006	-0.011	0.008	0.006	0.006	0.005
	(0.021)	(0.022)	(0.020)	(0.023)	(0.009)	(0.007)	(0.009)	(0.007)
One Year Older	-0.001	0.019	0.005	0.022	0.013	0.023***	0.015	0.014*
	(0.017)	(0.019)	(0.017)	(0.018)	(0.013)	(0.008)	(0.013)	(0.008)
Two Years Older	-0.054***	0.060**	-0.041**	0.072***	0.025	0.058***	0.023	0.036**
	(0.017)	(0.025)	(0.018)	(0.025)	(0.021)	(0.020)	(0.022)	(0.016)
Family Income (50 000 to 75 000)								
$5000 to $25000	-0.006	0.002	-0.006	-0.006	-0.005	0.020	-0.007	0.015
	(0.026)	(0.036)	(0.025)	(0.034)	(0.018)	(0.019)	(0.017)	(0.018)
$25000 to $50000	-0.008	-0.004	-0.007	-0.010	0.011	0.001	0.009	-0.003
	(0.015)	(0.021)	(0.015)	(0.020)	(0.010)	(0.007)	(0.010)	(0.007)
75000 to $100000	0.047***	-0.038*	0.047***	-0.040**	0.012	0.001	0.012	-0.004
	(0.018)	(0.020)	(0.018)	(0.020)	(0.009)	(0.007)	(0.009)	(0.007)
100000 and up	0.037*	-0.056**	0.034	-0.051**	0.015	-0.010	0.016	-0.013*
	(0.022)	(0.023)	(0.021)	(0.023)	(0.010)	(0.007)	(0.010)	(0.007)
Parents Education (High School Completed)								
Less than HS	-0.020	0.051	-0.020	0.038	0.011	-0.022*	0.004	-0.028***
	(0.022)	(0.034)	(0.023)	(0.033)	(0.024)	(0.012)	(0.021)	(0.010)
Some PSE	0.061*	0.001	0.054*	-0.016	-0.003	0.014	0.000	0.021
	(0.032)	(0.032)	(0.031)	(0.032)	(0.016)	(0.013)	(0.016)	(0.014)
Trade/College	0.003	0.019	0.001	0.004	0.004	-0.008	0.006	-0.007
	(0.016)	(0.020)	(0.016)	(0.020)	(0.011)	(0.009)	(0.011)	(0.008)
University-below BA	0.049	-0.013	0.044	-0.020	-0.005	-0.010	-0.005	-0.011
	(0.031)	(0.035)	(0.031)	(0.035)	(0.016)	(0.014)	(0.015)	(0.012)
University-BA	0.016	-0.029	0.016	-0.033	-0.007	-0.016*	-0.003	-0.011
	(0.020)	(0.023)	(0.021)	(0.023)	(0.011)	(0.009)	(0.010)	(0.008)
University-Grad	-0.001	-0.019	-0.011	-0.043	0.002	-0.012	0.005	-0.005
	(0.023)	(0.035)	(0.022)	(0.034)	(0.013)	(0.011)	(0.013)	(0.011)
Other/unknown	-0.119***	0.220	-0.121***	0.229	-0.028	0.202	-0.023	0.174
	(0.013)	(0.262)	(0.013)	(0.239)	(0.050)	(0.181)	(0.053)	(0.173)

Table 2
Multinomial logit regression of first program outcomes: switching programs or leaving PSE, relative to progressing (continuing) in first program towards graduation, concluded.

Variable	Community College Students				University Students			
	(1) Baseline		(2) High School and PSE Variables		(1) Baseline		(2) High School and PSE Variables	
	Switcher	Leaver	Switcher	Leaver	Switcher	Leaver	Switcher	Leaver
High School Grades, Age 15, 10 point increments								
Overall High School Grade			0.009	-0.044***			0.004	-0.008*
			(0.011)	(0.013)			(0.007)	(0.005)
High School Math Grade			0.002	0.001			-0.001	-0.004
			(0.006)	(0.006)			(0.004)	(0.003)
High School Language Grade			0.004	0.011			0.001	-0.000
			(0.007)	(0.009)			(0.005)	(0.003)
High School Science Grade			-0.008	0.005			-0.004	-0.005*
			(0.006)	(0.007)			(0.005)	(0.003)
PISA Reading Score - Age 15								
PISA Reading Score			0.007	0.010			0.000	0.001
			(0.010)	(0.010)			(0.005)	(0.003)
High School Engagement - Age 15								
Academic Engagement			0.003	0.001			-0.000	-0.002
			(0.007)	(0.009)			(0.004)	(0.003)
Social Engagement			0.005	-0.006			0.005	-0.000
			(0.006)	(0.007)			(0.004)	(0.002)
First Year PSE Grades (70 to 79)								
Below 60			0.058	0.202***			0.046**	0.089***
			(0.036)	(0.043)			(0.019)	(0.014)
60 to 69			0.042**	0.055**			0.021**	0.035***
			(0.019)	(0.023)			(0.010)	(0.007)
80 to 89			-0.033**	-0.065***			-0.002	-0.012***
			(0.013)	(0.016)			(0.008)	(0.005)
Above 90			-0.036	-0.119***			0.004	0.004
			(0.029)	(0.018)			(0.015)	(0.018)
Don't Know			0.033	0.196***			0.029	0.074**
			(0.038)	(0.063)			(0.026)	(0.031)
Number of observations	5,124		5,124		15,619		15,619	
Number of individuals	3,777		3,299		6,802		6,035	

Notes. Estimated average marginal effects shown. Estimated standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 3
Graduation Rates by Year and by Characteristics, Percentages - Students starting PSE at Community College

Cumulative Graduation Rates by Year -- All Students

	Number of Obs.	Total	Same (first) Program	Switchers					Don't Know
				Total	Same Institution		Different Institution		
					Same Level	Diff. Level	Same Level	Diff. Level	
Year 1	1,025	14.4	14.3	--	--	0.0	--	0.0	--
Year 2	2,254	39.8	37.5	2.0	0.8	--	1.1	0.1	0.3
Year 3	2,871	57.6	51.1	5.7	2.3	0.2	2.9	0.3	0.8
Year 4	3,151	66.8	55.2	10.1	4.2	0.5	4.7	0.6	1.5
Year 5	3,294	72.7	56.4	13.4	5.5	0.6	6.0	1.2	3.0

Five Year Cumulative Graduation Rates by Characteristics

	Number of Obs.	Total	Same (first) Program	Switchers					Don't Know
				Total	Same Institution		Different Institution		
					Same Level	Diff. Level	Same Level	Diff. Level	
Gender									
Male	1,553	69.0	53.8	13.2	5.3	0.9	5.5	1.5	1.9
Female	1,741	76.6	59.0	13.6	5.8	0.4	6.5	0.9	4.0
Aboriginal									
Aboriginal	85	59.6	47.9	7.9	6.0	0.0	--	--	3.8
Non Aboriginal	3,204	73.1	56.7	13.6	5.5	0.7	6.1	1.2	2.8
Family Structure									
Two Parents	2,863	73.8	56.6	14.8	6.3	0.8	6.5	1.2	2.4
Single Mother	346	70.2	59.6	7.5	1.9	0.0	4.1	1.4	3.2
Disability or Activity Difficulties									
Either or both	398	73.7	54.0	15.5	8.9	--	5.7	0.6	4.2
None	2,895	72.6	56.7	13.1	5.1	0.7	6.0	1.3	2.8
High School Location									
Rural High School	1,410	76.8	64.2	10.5	3.5	--	5.4	1.1	2.2
Non-Rural High School	1,835	71.4	53.9	14.3	6.2	0.7	6.1	1.2	3.2
Parental Education									
Below High School	274	66.1	55.0	8.2	2.1	--	4.0	--	2.9
High School Completed	744	73.3	60.1	12.1	5.8	0.8	4.4	1.1	1.2
Some PSE	213	64.0	49.5	12.5	3.4	--	7.4	--	2.1
College	1,239	74.5	58.0	11.6	5.0	0.3	5.2	1.1	5.0
University-below BA	155	67.8	45.4	18.3	11.3	0.0	3.0	4.0	4.0
University-BA	475	75.4	54.7	18.9	7.2	--	10.5	--	1.9
University-Grad	190	75.0	56.5	16.0	4.3	--	7.4	2.6	2.4
Family Income									
$5 000 to 25 000	268	66.7	55.6	9.2	2.9	--	3.8	--	1.9
$25 000 to 50 000	988	72.0	57.5	10.8	4.7	--	5.1	0.7	3.8
$50 000 to 75 000	992	71.1	55.4	12.3	4.8	--	5.6	1.5	3.4
$75 000 to 100 000	618	75.3	55.5	17.5	9.2	0.8	6.5	1.1	2.3
$100 000 and up	390	76.4	59.2	15.2	4.1	1.5	8.2	1.4	2.0

Note: -- indicates results suppressed due to Statistics Canada confidentially requirements.

Table 4
Graduation Rates by Year and by Characteristics, Percentages - Students starting PSE at a Four Year University

Cumulative Graduation Rates by Year -- All Students

	Number of Obs.	Total	Same (first) Program	Switchers					Don't Know
				Total	Same Institution		Different Institution		
					Same Level	Diff. Level	Same Level	Diff. Level	
Year 1	105	1.6	1.4	--	--	0.0	--	--	--
Year 2	325	4.3	3.3	0.7	0.1	--	0.1	0.5	0.3
Year 3	777	12.2	8.7	2.9	0.4	0.2	0.3	2.0	0.7
Year 4	2,565	48.0	37.4	9.3	3.8	0.3	1.9	3.2	1.3
Year 5	3,658	74.2	56.3	16.1	6.7	0.5	4.2	4.7	1.8

Five Year Cumulative Graduation Rates by Characteristics

	Number of Obs.	Total	Same (first) Program	Switchers					Don't Know
				Total	Same Institution		Different Institution		
					Same Level	Diff. Level	Same Level	Diff. Level	
Gender									
Male	1,336	68.4	53.9	13.0	5.5	0.3	2.6	4.6	1.5
Female	2,322	78.3	58.1	18.2	7.5	0.7	5.2	4.8	2.0
Aboriginal									
Aboriginal	62	52.2	32.7	18.1	6.3	--	--	7.8	1.5
Non Aboriginal	3,587	74.6	56.7	16.1	6.7	0.5	4.2	4.7	1.8
Family Structure									
Two Parents	3,318	74.9	57.3	15.8	6.9	0.5	4.1	4.4	1.8
Single Mother	279	71.2	54.4	15.6	5.3	--	3.6	6.6	1.2
Disability or Activity Difficulties									
Either or both	304	59.8	43.2	14.9	4.7	2.0	2.9	5.3	1.7
None	3,354	75.6	57.6	16.2	6.9	0.4	4.3	4.6	1.8
High School Location									
Rural High School	1,306	73.1	53.3	17.1	6.0	0.4	4.6	6.1	2.7
Non-Rural High School	2,301	74.2	56.6	16.0	6.9	0.6	4.1	4.5	1.6
Parental Education									
Below High School	91	62.4	41.9	17.3	10.3	0.0	2.0	5.0	3.2
High School Completed	493	71.7	52.3	16.9	6.2	1.5	3.8	5.4	2.5
Some PSE	188	66.0	50.5	13.1	3.6	--	3.3	4.8	2.4
College	1,140	73.3	56.1	14.7	4.7	0.4	3.2	6.4	2.4
University-below BA	197	79.0	59.6	18.6	5.9	--	2.8	9.7	0.8
University-BA	968	77.6	60.0	16.5	8.3	--	4.5	3.5	1.1
University-Grad	580	75.1	56.8	17.0	8.2	--	6.3	1.9	1.3
Family Income									
$5 000 to 25 000	153	61.8	48.7	12.5	5.3	--	2.5	3.9	0.6
$25 000 to 50 000	803	69.4	53.3	13.3	5.0	--	2.8	5.4	2.9
$50 000 to 75 000	1,047	74.6	57.5	15.9	6.3	--	4.6	4.2	1.3
$75 000 to 100 000	930	74.8	57.3	15.4	6.2	0.6	4.4	4.2	2.0
$100 000 and up	700	79.4	59.2	18.7	9.4	0.4	4.9	4.0	1.5

Note: -- indicates results suppressed due to Statistics Canada confidentially requirements.