Is post-secondary education a safe port and for whom? Evidence from Canadian data*

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Abstract

Previous studies document that adverse labor market conditions, proxied by the unemployment rate, stimulate post-secondary enrollment. This paper shows for the first time that unemployment not only affects total enrollment but also changes the composition of the student body and students educational path, with important consequences for intergenerational mobility. Results show that unemployment stimulates university enrollment especially among individuals with highly educated parents. This has consequences for educational inequality. Students are also more likely to choose university over college when unemployment rises. Thus, labor market conditions affect the type of education and skills that students acquire. Further, unemployment has a nontrivial impact on the decision to drop out of school and the decision of workers to return to school.

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1 Introduction

Young and unskilled individuals are hit strongly by recessions since they face a high unemployment risk and earn low wages (e.g. Mukoyama and Şahin, 2006; Storesletten et al., 2001). However, post-secondary education could mitigate this impact. The benefits of education and human capital accumulation are well understood by economists. Human capital impacts individuals' productivity and earnings (Mincer, 1974) but it also stimulates economic growth and generates other positive externalities, such as lower crime rates and increased civic participation (Hanushek and Woessmann, 2008; Oreopoulos and Salvanes, 2011). If adverse economic conditions increase human capital accumulation, both individuals and society may benefit.

In North America, post-secondary education has been a safe port during economic storms over the last 50 years. In the United States, aggregate unemployment stimulated post-secondary enrollment (e.g. Betts and McFarland, 1995; Dellas and Koubi, 2003; Méndez and Sepúlveda, 2012) and increased aggregate time spent studying (Aguiar et al., 2013). Enrollment in community colleges has been more responsive to the unemployment rate than university enrollment, possibly due to colleges' open admission policies (Betts and McFarland, 1995; Dellas and Sakellaris, 2003). Overall, post-secondary education acted as a buffer and played the role of an automatic stabilizer.

Among studies on Canadian provinces, Handa and Skolnik (1975) and Foot and Pervin (1983) show that youth unemployment increased undergraduate enrollment in Ontario during the 1950s through 1970s. However, enrollment in community colleges and graduate degree programs was not significantly affected. More recent Canadian studies focus on oil prices rather than unemployment but reach similar conclusions. For oil producing provinces, an increase in oil prices stimulates wage growth and employment in the natural resource sector. As a result, labor force participation increases and school enrollment declines (Neill and Burdzy, 2010; Emery et al., 2012; Morissette et al., 2015).

This paper contributes to the existing literature by showing that the impact of unemployment on enrollment is heterogeneous and more complex than previously shown. By using Canadian data from the Survey of Labor and Income Dynamics (1993-2011), I find that not everyone enrolls in post-secondary education (PSE) when unemployment rises and not all types of PSE institutions are considered a safe port. Unemployment changes the composition of the student body as well as students' educational path. Oreopoulos et al. (2012) and Kahn (2010) documented the impact of labor market conditions on university graduates' wages and other outcomes. This paper shows that unemployment also impacts individuals at the time of enrollment by affecting their educational path and the type of skills they acquire. This in turn can influence their future labor market outcomes.

I focus on Canada because of its peculiarity. Canada has the highest post-secondary attainment among OECD countries and the highest fraction of students with a non-university post-secondary

degree (e.g. college diploma, trade certification). In comparison, individuals in other countries are more likely to attend university than college or vocational programs (see Table 1). Therefore, Canada is particularly suited to investigate the impact of unemployment across different types of post-secondary institutions. Further, contrary to the majority of studies in the literature, I use panel data. This allows to investigate the impact of labor market conditions on education decisions after enrollment, such as the decision to drop out of school or return to school. The results in this paper suggest that we should pay more attention to what happens after enrollment. Centering the analysis around enrollment leads to incomplete results.

The paper contributes to the literature by presenting the following new results. First, college enrollment in Canada does not respond to changes in unemployment, whereas university enrollment is strongly affected by labor market conditions. This finding is in contrast with previous American studies (Betts and McFarland, 1995; Dellas and Sakellaris, 2003). Government policies and the structure of the Canadian education system may explain these differences. Second, I find that individuals with highly educated parents are more likely to choose university over college when unemployment increases, and to continue studying after receiving a post-secondary degree. Thus, labor market conditions affect the type of post-secondary education chosen and the set of skills that students acquire. This partially explains why college enrollment does not increase with unemployment. Third, unemployment reduces intergenerational education mobility. Unemployment stimulates university enrollment especially among individuals with highly educated parents. In contrast, students from less-educated families are more likely to drop out of PSE when unemployment increases. The effect of parental education is independent of family income. Fourth, labor market conditions also affect the decision of workers to return to school. Changes in unemployment encourage workers to return to school to acquire occupation-specific skills through college or trades education, but have no effect on the decision to return to university and acquire general skills.

Understanding how labor market conditions affect education is important for several reasons. Higher enrollment during economic contractions could explain the sharp decrease in labor force participation experienced in Canada during the Great Recession. Among Canadians aged 15-24, the participation rate fell from 67.9% in October 2008 to 63.2% in November 2010[1]. Flows into education may help to explain this phenomenon. Further, if unemployment stimulates human capital accumulation, adverse labor market conditions may increase workers' productivity and may have some positive impact on the economy. Counter-cyclical education (i.e. higher enrollment when macroeconomic conditions worsen) may also help individuals climbing the social ladder if they earn degrees that they would not have earned otherwise.

The paper proceeds as follows. The next section provides information about the Canadian

[1]Source: Statistics Canada, Cansim Table 282-0087.

post-secondary education system. An overview of the dataset used for the analysis is presented in Section 3. Sections 4 and 5 discuss the results regarding the cyclicality of enrollment and the role of parental background. In Sections 6 and 7, I analyze the impact of labor market conditions on the decision to drop out of school and return to school after a period of employment. Finally, Section 8 concludes by summarizing the main findings.

2 Post-secondary education in Canada

In Canada, the majority of PSE institutions are public and education is a responsibility of provincial governments. Provinces provide funding and have control on tuition policies as well as enrollment levels. For this reason, the education system differs from province to province. Students usually graduate from secondary school after completing 12 or 13 years of schooling depending on the province. Then, if a student desires to attend higher education, he or she can pursue a university degree (which usually requires 4 years), a college diploma (which usually lasts 2-3 years and is comparable to an American community college degree) or a certificate at a trade/vocational school (which requires 1-4 years). Following the International Standard Classification of Education (ISCED) developed by UNESCO, university corresponds to ISCED level 5A, college refers to ISCED level 5B, trade/vocational education refers to ISCED level 4. The last two categories are more closely tied to labor market needs and aim at developing occupation-specific skills. The type of credentials achieved by students also differ in that universities offer university degrees, whereas colleges and trade schools offer college diplomas and certificates. Compared to college and university attendees, students in trades and vocational programs are older, more likely to be married with children and more likely to work while studying.

The province of Quebec represents an exception. In this province, high school students typically graduate after 11 years of schooling and must complete a two-year college degree (*Collège d'enseignement général et professionel*, CEGEP) before entering university.

Table 1 documents the importance of post-secondary education, and especially non-university PSE, in Canada. The table reports the proportion of 25-64 year-olds by highest level of education for the top 10 countries ranked by post-secondary attainment. Among OECD countries, Canada has the highest proportion of 25-64 year-olds with a post-secondary degree and this is primarily due to the high fraction of students with a college education. Compared to other countries, also the proportion of individuals with a trade or vocational certification is very high.

3 Data

I use data from the Survey of Labor and Income Dynamics (SLID), which covers the period 1993-2011. This survey was conducted by Statistics Canada and targeted all individuals living in Canada,

excluding residents of the Territories and Indian reserves. Individuals were selected from the monthly Labor Force Survey and followed annually for six years up until 2010. A new panel was introduced every three years, thus some panels overlap. The last survey year, 2011, does not include longitudinal information. Therefore, individuals in the last panel (2007-2010) represent an exception because they have been followed for 3 years only.

This survey was designed to complement the Labor Force Survey and it is the only Canadian longitudinal survey that (i) spans over a relatively long period of time, which is important to study the cyclicality of schooling decisions, (ii) follows individuals for several years[2] and (iii) provides detailed information on educational activity and parental background. The importance of parental background will be discussed in Section 5. For these reasons, SLID is particularly suitable for the present analysis.

From SLID, I pool together individuals interviewed during the period 1993-2011 and collect information on school attendance, educational attainment, employment status, age, ethnicity, gender, marital status, parental education, family resources and residence. I focus on respondents aged 16 years or older. After dropping observations where the respondent has missing information on educational activity, the panel includes 185,093 individuals. In Canada, it is sometimes possible to obtain a college diploma or trade certificate without completing high school. Therefore, the sample includes both high-school graduates and dropouts. Later I discuss how the results are affected if high-school dropouts are excluded from the sample.

If weighted, the SLID sample is representative of the Canadian population. However, one may be concerned that the sample is no longer representative after dropping observations with missing information on education. If information on educational activity is systematically missing for specific groups in the population (e.g. individuals with a low schooling level), the results may be biased. For this reason, Table 2 compares the summary statistics generated from the sample to those regarding the whole Canadian population published by Statistics Canada. The table confirms that the sample is still representative of the population and generates statistics that are very similar to those obtained from Census and administrative data[3].

On average, individuals in the sample are 43 years old, married and living in metropolitan areas. Among individuals aged 18-25, 49% are enrolled in post-secondary education, which includes any level of education beyond high school: 28% are enrolled in university, 14% in college and 7% in other PSE institutions.

Appendix A describes data sources and variable definitions in details. Here I discuss how the main variables are derived. The paper focuses on the impact of labor market conditions on (1) the propensity of being enrolled in PSE, (2) the decision to continue studying after receiving a

[2] In comparison, the Labor Force Survey follows individuals for six months only. Even if labor market conditions affect the decision to enroll or drop out of school, it is difficult to capture this effect within a short period of time.

[3] All regressions in the paper will include sample weights provided by SLID.

post-secondary degree, (3) the decision to drop out of PSE and (4) the decision to return to PSE after having acquired some labor market experience. For this reason, from SLID, I construct the following binary indicators related to post-secondary education.

EnrollPSE is a binary indicator for PSE enrollment. This variable takes a value of one if the respondent is enrolled in PSE, and zero otherwise.

Continue takes a value of one if the respondent is still enrolled in school after having received a PSE degree, and zero if the respondent is no longer enrolled.

ReturnPSE takes a value of one if the respondent returned to post-secondary education after having acquired some labor market experience. It takes a value of zero if the respondent did not return to school. Note that, based on this definition, individuals who return to school after being on the labor market may or may not have some prior post-secondary education.

DropPSE refers to the decision to leave from post-secondary school without completing the program of study. This variable takes a value of one if the respondent dropped from post-secondary school without completing a degree. It takes a value of zero if the respondent did not drop.

From SLID, I also construct a series of variables that have an important impact on schooling decisions and may be affected by labor market conditions: the fraction of high school graduates in a given year for each province, and the PSE earnings premium at the provincial level computed as log-difference between earnings of PSE graduates and high-school graduates. The average PSE premium is 0.30, which is consistent with previous studies in the literature on the Canadian PSE earnings premium (see Caponi and Plesca, 2009, for an overview). Further, a log differential of 0.30 implies a ratio between average earnings of PSE graduates to average earnings of high school graduates of 1.35, which is very close to the corresponding OECD estimate, 1.40 (OECD, 2011).

To the dataset, I add the following variables obtained from Statistics Canada: annual provincial unemployment rate and the weighted provincial tuition level at public universities for domestic students enrolled in undergraduate programs. The unemployment rate is used as an indicator of current labor market conditions.

4 Post-secondary attendance

Following the literature on the cyclicality of schooling, I estimate the following model:

$$EnrollPSE_{ipt} = \alpha_0 + \alpha_1 UR_{pt} + \alpha_2 X_{ipt} + \alpha_3 Z_{pt} + u_{ipt} \tag{1}$$

$EnrollPSE_{ipt}$ is equal to one if individual i living in province p is enrolled in post-secondary education at time t and zero otherwise. UR is the provincial unemployment rate and is the main variable

of interest. Its coefficient indicates the impact of labor market conditions on the propensity of being enrolled in PSE. The unemployment rate has been widely used in previous studies to analyze the cyclicality of enrollment. In this paper, I use the provincial unemployment rate for two reasons. First, student and worker mobility is low in Canada. For example, in 2011, only 12.2% of university degree holders who graduated from Canadian universities studied outside their province of origin. The percentage is lower among college diploma holders (9.1%) and trades certificate holders (7.1%). In the same year, only 3.2% of employed people aged 15 and over changed province of residence compared to five years earlier[4]. Thus, the relevant labor market is the provincial labor market. Second, there is substantial variation in economic conditions among provinces.

The vectors X_{ipt} and Z_{pt} include control variables that are consistent with previous studies on the determinants of PSE attendance. X_{ipt} includes the following individual characteristics: age, gender, marital status, aboriginal background, mother's and father's education[5], a binary variable indicating residence in rural areas, family income, family size and the number of earners in the household. Beside demographics, several variables affect the propensity to be enrolled in PSE. I include parental education because individuals with highly educated parents are more likely to pursue post-secondary education as discussed in Section 5. Living in a rural area decreases the propensity of being enrolled[6]. Instead, the last three variables capture family resources and the ability to afford education.

Z_{pt} is a vector of provincial variables that affect schooling decisions: university tuition[7], the PSE premium and the fraction of high-school graduates. I include these variables because they may affect the decision to pursue post-secondary studies and they may also be correlated with macroeconomic conditions, including the unemployment rate that is the main variable of interest. For example, if tuition decreases during periods of high unemployment, there is an additional incentive for students to enroll when labor market conditions worsen. Thus, excluding tuition biases the estimated coefficient of interest, $\hat{\alpha_1}$, upward. Similarly, if adverse labor market conditions decrease the PSE premium and if a lower premium decreases the propensity to be enrolled, excluding PSE premium from the regression biases $\hat{\alpha_1}$ downward. Regarding high-school graduates, it is not

[4]Source: National Household Survey 2011. Student mobility: http://www12.statcan.gc.ca/nhs-enm/2011/as-sa/99-012-x/99-012-x2011001-eng.cfm#a5 ; Worker mobility: http://www12.statcan.gc.ca/nhs-enm/2011/as-sa/99-012-x/99-012-x2011002-eng.cfm#a8 .

[5]Parents' education is measured by their highest educational attainment, which is classified into 7 categories: elementary school or no schooling, some high school, completed high school, non-university PSE, unspecified university degree, bachelor's degree, degree above bachelor's. The 5th category (unspecified university degree) is available only for respondents who joined the survey in 1993 and 1994. Each category is assigned a numerical value so that the variable becomes continuous. Although these numerical values do not have a specific meaning, higher educational levels receive a higher value. For example, "bachelor's degree" receives a higher numerical value than "elementary education".

[6]Geographic location impacts PSE attendance as discussed in Frenette (2006).

[7]Given the unavailability of data on tuition for college and trade schools, university tuition is used as proxy for tuition at any PSE institution.

clear how the results would be affected. The number of high-school graduates could either increase or decrease the likelihood of being enrolled. A higher number of graduates reduces the chances of being admitted to PSE but it also increases competition in the labor market and could lead some students to enroll in PSE in order to signal their ability. In any case, if labor market conditions affect the number of high school graduates, which in turn may affect the decision to enroll in PSE, excluding high-school graduates biases the results. The findings presented in this section will show that the size of these biases is quite small.

Further, $u_{ipt} = v_p + \varepsilon_{ipt}$, where v_p refers to province fixed effects[8]. The term v_p captures time-invariant differences across provinces that may affect enrollment including population size, the structure of the education system, labor market regulations affecting the opportunity cost of education, and persistent differences in terms of employment opportunities among provinces. Later in the paper I also test the robustness of the results to the inclusion of year fixed effects. Finally the error term, ε, is clustered by province because the identifying variation in labor market conditions is at the provincial level[9].

The specification in equation 1 is estimated using a linear probability model. However, a logistic regression model generates very similar marginal effects. Table B1 in Appendix B shows the comparison between the marginal effects from the baseline specification and those estimated with a logistic regression.

Table 3 presents the estimated coefficients from equation 1. The main specification is reported in column 4, which shows that a one-percentage point increase in the unemployment rate increases the propensity of being enrolled in PSE by 0.32. On average, the propensity of being enrolled is 0.12, thus an increase of 0.3 is a sizable change. From 2007 to 2009 provincial unemployment rates increased on average by 1.8 percentage points. Thus, according to the estimates in Table 3, the propensity to be enrolled increased by 0.57. This result can be explained by the fact that unemployment stimulates education by reducing its opportunity cost (i.e. forgone labor market opportunities).

The other coefficients are consistent with previous studies. Female, young and single persons living in urban areas are more likely to be enrolled. Both the number of earners in the family and parental education increase the propensity to be enrolled. One may be surprised by the fact that parental income has a negative effect on the decision to enroll. However, the next table will show

[8]By performing a Hausman test, I reject the null that the coefficients in the fixed-effects and random-effects models are the same.

[9]When observations within clusters are correlated, standard errors tend to be understated. This may happen in panel datasets, for example, when the error terms in different years are correlated for a given individual or geographical unit. Clustering corrects the standard errors by controlling for error correlation within clusters. In this case, one may cluster by province, economic region or individual. I cluster the standard errors by province, since this is a more conservative choice. However, it is worth mentioning that clustering does not significantly alter the findings. These results are available upon request.

that this is only true for colleges and trade schools (see Table 4). This suggests that individuals from low-income families are more likely to pursue non-university post-secondary education.

Since high school graduation is usually required to enroll in university, I also run a separate regression for high-school graduates (see column 5 in Table 3). 72% of all respondents in the sample have completed high school, thus excluding dropouts reduces the sample size by roughly a third[10]. Not surprisingly the estimated coefficient on UR is higher when the sample excludes high school dropouts since they are less likely to pursue post-secondary education. Thus, labor market conditions have a stronger effect on high school graduates.

The impact of unemployment on enrollment may also depend on the type of post-secondary institution considered. For this reason, I run separate regressions for enrollment in university, college and other institutions. To the best of my knowledge, there is no study in the literature on the impact of unemployment on trade school enrollment. However, there are studies that distinguish between university and college.

Betts and McFarland (1995) and Dellas and Sakellaris (2003) document that enrollment in American community colleges, which are comparable to Canadian colleges, is strongly counter-cyclical (i.e. enrollment increases when macroeconomic conditions worsen). A 1 percent increase in the unemployment rate increases full-time attendance by 4%. In comparison, university enrollment is less responsive to changes in unemployment. Dellas and Sakellaris (2003) find that a one-percentage point increase in unemployment raises the probability of being enrolled in college by 0.43 and in university by 0.19. This finding may partially depend on the fact that American colleges have open admission policies, whereas university policies are less flexible.

Canadian studies focused on two provinces only, Ontario and Alberta. In the 1970s and 1980s, unemployment had a negative but non-significant effect on college enrollment in Ontario (Foot and Pervin, 1983). More recently, Neill and Burdzy (2010) focus on Alberta, a major oil-producing Canadian province. They estimate that a reduction in oil prices by $50 per barrel reduces the opportunity cost of education and therefore increases university enrollment among young individuals by 3 percentage points. They find a lower effect on college enrollment.

This paper uses nationally representative data and shows that college enrollment is a-cyclical whereas university enrollment is counter-cyclical. This is partially due to the fact that, in Canada, some individuals choose university over college when unemployment rises.

I estimate equation 1 separately for the following dependent variables:

$EnrollUni_{ipt}$=1 if respondent i living in province p is enrolled in university at time t and zero otherwise;

$EnrollCol_{ipt}$=1 if respondent i living in province p is enrolled in college at time t and zero other-

[10]N decreases by 28% but the decrease in N×T is not exactly 28%. This is partly due to the fact that individuals in the last panel were followed for three years instead of six. Thus, T is not constant across individuals.

wise;
$EnrollTr_{ipt}$ =1 if respondent i living in province p is attending a trade or vocational school at time t and zero otherwise.

Table A1 in Appendix A provides more details about the construction of these variables and reports their mean values, while Table 4 provides the estimated coefficients. For each institution type, the first column reports a basic specification with age and gender as control variables, while the second column includes all control variables discussed at the beginning of this section. As expected, there are some differences among institutions. Females are more likely to enroll in universities and colleges but less likely to enroll in trade schools. This result partly depends on the type of programs offered by trade schools, which tend to be in occupations traditionally preferred by men. Further, family resources and parental education matter more for university enrollment than enrollment in colleges and trade schools. Individuals living in rural areas are less likely to enroll in university and more likely to enroll in trade schools.

Also labor market conditions play an important role. The second column shows that a one-percentage point increase in the unemployment rate increases the propensity of being enrolled in university by about 0.2. A one-percentage point increase in unemployment has a stronger impact than a one-unit increase in parental education, a $10,000 increase in family income or a $10,000 decrease in tuition. This result is in line with previous studies documenting that university enrollment is counter-cyclical. Dellas and Sakellaris (2003) found a similar effect for American universities. According to their estimates, a one-percentage point increase in unemployment raises the probability of being enrolled by 0.19.

Also enrollment in trade or vocational schools is affected by labor market conditions. A one percentage point increase in the unemployment rate increases the propensity to be enrolled in trade schools by 0.04 (see column 6 of Table 4) but has no significant impact on the decision to enroll in college. As already mentioned, in the U.S. the increase in post-secondary enrollment is mainly driven by college enrollment. In Canada, instead, unemployment mainly affects enrollment in universities and trade schools but has no significant impact on the propensity to be enrolled in college. The presence of a third option, such as post-secondary non-tertiary education (e.g. trade and vocational schools), may affect students' decisions and lead to different results. Further, among Canadian males, returns to trades are similar to returns to college (Caponi and Plesca, 2009)[11]. At the same time, trade schools offer shorter and cheaper programs. When labor market conditions worsen, students may be more sensitive to the returns and costs of post-secondary education. This could partially explain their preference for university and trade schools versus college education. The next section further investigates this finding and offers new insights by showing that, in Canada,

[11]This is not true among women who face significantly higher returns to college compared to trades. Likely, this is due to the fact that the majority of vocational programs are in male-dominated fields.

some students decide to enroll in university rather than college when unemployment increases. On the contrary, American students do not seem to substitute between PSE institutions when economic conditions worsen.

5 The role of parental education

Parental education is known to have a strong impact on post-secondary attendance, as confirmed by the results in Table 3. Besides inherited ability, educational achievements greatly depend on early human capital investments made by parents on behalf of their children and the parental environment. These variables are strongly correlated with parental education. Therefore, individuals with highly educated parents may have a greater ability (both inherited and created), be more motivated to attend school, have access to more educational resources (e.g. books) and receive a stronger financial support[12].

In this section, I further investigate the role of parental education and show that it also has an important effect on the cyclicality of enrollment. This effect is independent of parental income and has important implications for intergenerational mobility. Specifically, equation 1 is re-estimated by including the interaction terms between unemployment and two parental background variables: father's education and family income. The estimated coefficients of these two variables reveal whether parental background affects the impact of labor market conditions on enrollment. I include family income because it is correlated with parental education and it is an important determinant of PSE attendance. Belley et al. (2014) show that there is a strong correlation between parental income and post-secondary attendance both in Canada and in the U.S., although parental income plays a bigger role in the United States. Family income also affects the cyclicality of university enrollment. On average, family resources decrease when unemployment rises and education becomes less affordable (Christian, 2007).

Table 5 reports the estimated coefficients from the baseline specification with province fixed effects. Table B2 in Appendix B shows that the results are robust to the inclusion of year fixed effects. The results are also robust to the inclusion of interaction terms between unemployment and other family variables (e.g. the number of earners in the family)[13].

The interaction between family income and the unemployment rate has a positive impact on the propensity to be enrolled in university, but the coefficient is low and not significant (see the first two columns of Table 5). This result is consistent with Corak et al. (2003), who show that over time the link between parental income and university attendance has weakened in Canada. On the contrary, the link between parental education and university attendance is strong and fluctuates according to

[12] For a review of the empirical and theoretical studies on the impact of parental education on an individual's educational achievement, see Cunha et al. (2006) and Carneiro and Heckman (2003).

[13] These results are available upon request.

labor market conditions. It becomes stronger during periods of high unemployment and weaker during periods of low unemployment. A positive interaction between unemployment and father's education suggests that individuals are more likely to enroll in university when labor market conditions worsen if their parents attended PSE. The results are robust when mother's education is used instead of father's education (see Table B3).

I find opposite results for college enrollment: individuals from more educated families are less likely to enroll in college when unemployment increases. They prefer university to college education when economic conditions worsen. Therefore, part of the increase in university enrollment is due to people choosing university over college rather than an increase in the overall number of PSE students. Previous studies mainly focused on university enrollment and ignored the role of parental education, therefore it was not possible to understand the full dynamics.

Moreover, column 7 shows how the decision of PSE graduates to continue studying is affected by unemployment. In this case the dependent variable, *Continue*, takes a value of one if the respondent received a PSE degree at time $t-1$ and is still enrolled in post-secondary school at time t. It takes a value of zero if the respondent is no longer enrolled at time t after receiving a degree at time $t-1$. The average marginal effect in column 7 is positive but not significant, suggesting that labor market conditions mainly impact students who enroll in PSE for the first time. However, the impact of unemployment is heterogeneous and depends on parental education. The interaction between parental education and unemployment is positive and significant. These results are even more pronounced when year fixed effects are included (see Table B2). In this case, the marginal effect of unemployment is negative and significant for individuals whose parents did not complete high school: these individuals are less likely to pursue further studies[14].

Given the importance of parental education for academic achievements, it is not surprising that individuals with highly educated parents are more likely to enroll in school during normal times. However, why do they choose university over college during periods of high unemployment? Students may want to accumulate more general and transferable skills during difficult times in order to be more competitive in the labor market. Further, university graduates earn higher salaries and face lower unemployment rates on average. During difficult times, students may be more oriented towards university education because it offers better prospects and a better insurance against future unemployment spikes. This is more likely to affect students from highly educated families for several reasons: these families are less credit constrained, tend to be more informed on returns to education and are more likely to invest in education.

These results have important implications. First, among highly educated families, adverse economic conditions stimulate the acquisition of a more general type of education, rather than practical

[14]One may be surprised by the fact that the interaction between family income and unemployment is negative. However, a high fraction of PSE graduates do not live with their family of origin and, therefore, have a low household income.

or job-oriented education. Unemployment affects both the propensity to be enrolled and the type of PSE institution that students choose. These in turn may affect future labor market outcomes, including wages, occupational choices and career paths. The literature has documented the effects of labor market conditions on university graduates (e.g. Oreopoulos et al., 2012). However, based on the results in this paper, labor market conditions affect individuals not only at the time of graduation but also at the time of enrollment by influencing students' educational path and therefore future labor market outcomes.

Second, the results presented in Table 5 have implications on inequality and intergenerational mobility. Adverse macroeconomic conditions, such as recessions, tend to increase earnings inequality in Canada (Brzozowski et al., 2010), partially because low-income individuals are more likely to lose their job during an economic contraction. However, counter-cyclical education may also play a role. Individuals who are more likely to attend university in normal times are even more likely to do so when unemployment increases. Thus, unemployment tends to amplify educational inequality, which in turn affects earnings inequality.

Interestingly, American studies show that schooling decisions made by low-skill individuals and those from less-educated families are very sensitive to labor market fluctuations. Unskilled workers (Méndez and Sepúlveda, 2012) and individuals with less educated parents (Alessandrini et al., 2015) are more likely to enroll in PSE during recessions compared to the rest of the population. Along the same line, Black et al. (2005) found that the Appalachian coal boom in the 1970s increased wages of low skilled workers and decreased high school enrollment. The subsequent bust had the opposite effect: it reduced wages and stimulated high school enrollment (i.e. stimulated enrollment among low-skill individuals). The results in Table 5 complement these studies and show two new results. First, in Canada, individuals from more-educated families are more likely to enroll in university when unemployment rises. Second, these individuals are more likely to enroll in university rather than college. Thus, unemployment affects the type of education that students receive.

These differences between Canada and the U.S. could partially depend on their education systems and policies. For example, Belley et al. (2014) document that grants and student loans in the U.S. are more generous to individuals from low socio-economic backgrounds, whereas in Canada they are more generous towards the middle class. Also other Canadian government programs, such as the Registered Education Savings Plan (RESP)[15] tend to disproportionately benefit wealthier families (Milligan, 2005; Essaji and Neill, 2012). This suggests that government policies and institutions may potentially mitigate or amplify the negative effect of unemployment on intergenerational mobility.

[15]This savings plan was instituted to encourage families to save for post-secondary education. Any income earned on contributions to the plan is nontaxable as long as it stays in the RESP. The federal government contributes to this plan on top of the family's contributions if family income is below a certain threshold.

6 *Employment-to-school transition*

The panel structure of SLID also allows to study the transition from work to school. Do people return to school when labor market conditions worsen? The previous sections analyzed how unemployment affects enrollment without distinguishing between young individuals, who decide to enroll in post-secondary education right after graduation, and more mature students who return to school after having acquired some labor market experience. This section will show that students with some labor market experience respond differently to unemployment possibly because they return to school for different reasons.

King and Sweetman (2002) investigated the transition from work to school by using Canadian administrative data on the number of workers who quit their job to return to PSE. They focused on workers over age 25 and documented that, during the period 1979-1993, more workers chose to return to school and switch occupation during economic booms rather than recessions. In other words, skill retooling is pro-cyclical.

This paper complements their work by studying, for the first time, the decisions to return to university, college and other institutions separately. I show that the decision to return to college is procyclical but this is not the case for other PSE institutions. These results are based on the same sample described in Section 3. Therefore, the time period of my analysis is 1993-2011.

I estimate the following model:

$$Y_{ipt} = \alpha_0 + \alpha_1 UR_{pt} + \alpha_2 X_{ipt} + \alpha_3 UR_{pt} \times W_{ipt} + \alpha_4 Z_{pt} + u_{ipt} \tag{2}$$

where $Y_{ipt} = (ReturnUni_{ipt}, ReturnCol_{ipt}, ReturnTr_{ipt})$, W includes father's education and family income, while X_{ipt} and Z_{pt} include the same variables listed in the previous section. Table A1 provides details about how the dependent variables are constructed and reports their mean values. In summary, *return* variables are dichotomous variables indicating whether the respondent has transitioned from work to school from one year to another. For example, $ReturnUni_{ipt}$ takes a value of one if respondent i living in province p has worked for at least 20 weeks at time $t-1$ (without being enrolled in school) but is enrolled in university at time t. The variable takes a value of zero if the respondent is still not enrolled at time t. Following King and Sweetman (2002), I impose the constraint on the number of weeks worked to filter out individuals returning to school after a summer job. *ReturnCol* and *ReturnTr* are created in a similar fashion, and refer to the decision to return to school and enroll in college or a trade school[16].

Table 6 shows the estimated coefficients from equation 2 for the main variables of interest: the unemployment rate and its interactions with parental background variables. Columns 1-4 of B4 in the Appendix report the estimated coefficients of the control variables. The coefficients are low in

[16]Note that from SLID it is not possible to determine whether workers leave the labor market voluntarily or not.

magnitude, but the mean values of the return variables are also low. Therefore, small changes can have big impacts on the propensity to return to school. Overall, macroeconomic conditions do not have a significant impact on the transition from work to post-secondary education (see the average marginal effects in columns 1 and 2). However, there is heterogeneity among institutions. Workers return to school and enroll in college when unemployment is low, which is consistent with the procyclicality of skill retooling documented by King and Sweetman (2002). A 1 percentage point decrease in unemployment increases the propensity to return to college by 0.06, when year fixed effects are included. Once again, the impact is stronger for individuals with highly educated families: the interaction between unemployment and father's education is negative and significant. In other words, the negative impact of unemployment is amplified when parental education increases.

Further, the decision to return to school to pursue a trade/vocational certification is countercyclical. This result suggests that the rise of enrollment in trade schools during periods of high unemployment is partially driven by workers with some labor market experience who return to school. A one-percentage point increase in the unemployment rate raises the propensity to return to study and enroll in a trade/vocational school by 0.09. However, unemployment does not have a significant impact on the decision to return to school and pursue a university degree. Unemployment mainly impacts university enrollment of recent high-school graduates or university graduates (as shown in Section 4). They are more likely to enroll in university or pursue further studies when unemployment rises. However, it does not have a significant impact on more mature students who return to school after having acquired some labor market experience. These results are consistent with skill retooling and the idea that workers return to school mainly to switch occupation. In this case, individuals should be more likely to invest in specific human capital and accumulate occupation specific skills through college or vocational education.

7 *The decision to drop out of PSE*

Unemployment stimulates post-secondary enrollment and, to some extent, the decision to return to school. However, does it also affect the propensity to drop out of school? Smith and Naylor (2001) study the impact of unemployment on the decision to drop out of university in the United Kingdom. They focus on students entering university in the autumn of 1989 and find that county-level unemployment increases the probability of dropping out of university. They also show that students from low socio-economic backgrounds (proxied by parental occupation) are more likely to drop out of school when unemployment rises.

This section complements their findings by investigating whether the decision to drop out of post-secondary education in Canada is affected by fluctuations in the unemployment rate. In the sample, in an average year, 16% of PSE students drop out of school. The percentage is lower

among university students and higher among students attending colleges. In an average year, 12% of *university* students drop out of school. This is the percentage of students who leave university without switching to another program. The percentage increases to 29% for *college* students[17]. It is natural to wonder to what extent this decision depends on the state of the economy. Thus, I estimate the impact of unemployment on $dropPSE_{it}$, which represents the propensity to drop out of post-secondary school. This variable takes a value of one if respondent i was enrolled in PSE at time $t-1$ but dropped from PSE at time t without completing the program, and zero if she is enrolled in PSE in both periods. Then, I estimate the following specification:

$$DropPSE_{ipt} = \alpha_0 + \alpha_1 UR_{pt} + \alpha_2 UR_{pt} \times W_{ipt} + \alpha_3 X_{ipt} + \alpha_4 Z_{pt} + u_{ipt} \tag{3}$$

W and X include the same control variables discussed in the previous sections, $u_{ipt} = v_p + \varepsilon_{ipt}$ and ε_{ipt} is clustered by province. In this case I exclude high-school dropouts to remove any influence they may have on the post-secondary dropout rate[18].

Table 7 reports estimated coefficients that are consistent with the findings in Smith and Naylor (2001)[19]. The propensity to drop out of school increases during periods of high unemployment, showing that restricting the analysis to enrollment decisions masks important dynamics in educational attainment. Both flows into and out of education are affected by labor market conditions. However, the impact is significant only when year fixed effects are included. In this case, the provincial unemployment rate captures local labor market conditions only. Instead, when year fixed effects are excluded, the unemployment rate is also affected by changes in labor market conditions at the national level. Based on the results in the table, local labor market conditions appear to have a stronger impact and the introduction of year fixed effects removes some noise from changes in the national labor market.

Further, the impact of unemployment is significant only among students whose father did not attend university, as shown by the marginal effect of UR at different levels of parental education. This finding confirms that unemployment has a negative impact on intergenerational mobility.

8 Conclusions

Previous studies in the literature documented that adverse labor market conditions, proxied by the unemployment rate, stimulate post-secondary enrollment. This paper shows for the first time that

[17] These averages are consistent with Statistics Canada reports on dropout rates. See for example http://www.statcan.gc.ca/pub/81-595-m/2008070/6000003-eng.htm or http://www.statcan.gc.ca/pub/81-595-m/81-595-m2009072-eng.htm.

[18] High-school dropouts who are enrolled in PSE are more likely to drop out of post-secondary school compared to high-school graduates. Including them in the sample increases the effect of unemployment on DropPSE.

[19] Table B4 in the Appendix reports the estimated coefficients for all variables.

unemployment may affect not only the propensity to be enrolled but also the type of institution that students choose. Further, unemployment does not impact all individuals in the economy homogeneously. Unemployment increases the propensity to be enrolled in university especially among individuals with highly educated parents. These individuals are more likely to enroll in university and less likely to enroll in college during periods of high unemployment. Instead, when unemployment increases, individuals with low parental education are less likely to enroll in university, more likely to drop from post-secondary school and less likely to continue studying after receiving a PSE degree. The effect of parental education is independent of family income.

This paper also shows that labor market conditions affect workers and their decision to return to school after having acquired some labor market experience. Individuals tend to return to school to pursue a college degree when unemployment is low and a trade certificate when unemployment is high. However, there is no impact on the decision to return to university, suggesting that workers return to school mainly to acquire occupation-specific skills.

These results lead to three main conclusions. First, the fact that more students enroll in university during periods of high unemployment does not necessarily translate into a higher number of PSE students. In fact, some of these students are only substituting college with university. Thus it is unlikely that counter-cyclical education alone can explain the reduction in labor force participation observed during the recent recession. Second, since unemployment affects individuals' educational path, it also affects the type of skills and knowledge that students acquire. This in turn may affect their wages, occupational choices and career paths. The literature has documented that labor market conditions severely impact university graduates. However, the results in this paper show that labor market conditions also impact individuals at the time of enrollment by affecting the type of post-secondary education they choose. Third, unemployment amplifies educational inequality. Individuals with high parental education, who are more likely to enroll in university during normal times, are even more likely to do so when unemployment is high. We know that recessions can increase inequality because unskilled workers are more likely to lose their job. However, the literature has ignored the role played by counter-cyclical education.

Some of these findings are in contrast with previous American studies showing that (i) college enrollment is more counter-cyclical than university enrollment, and (ii) low-skill individuals and those with less educated parents are more likely to enroll in PSE during recessions. This paper finds opposite results for Canada suggesting that government policies and the structure of the education system could significantly affect how labor market conditions impact individuals' education choices. Governments should take this into account when deciding about education policies and financial support to post-secondary education.

Tables

Table 1: Educational attainment in 2011, proportion of 25-64 year-olds by highest level of education

Country	Total post-secondary	Post-secondary non-tertiary education	College education	University education
Canada	63.17	11.84	24.55	26.77
Ireland	50.65	12.93	14.67	23.05
New Zealand	50.58	11.25	15.51	23.83
Japan	46.40	n/a	20.10	26.30
Israel	46.40	n/a	15.40	31.00
Estonia	43.52	7.20	12.08	24.24
Australia	42.72	4.38	10.44	27.91
United States	42.45	n/a	10.26	32.19
Sweden	42.00	6.83	9.01	26.16
Norway	41.67	3.61	2.22	35.83
OECD average	34.75	5.95	10.23	22.71

Source: Table A1.1a Education at a glance, 2013, OECD. College education refers to tertiary education type B. University education refers to tertiary education type A and advanced research programs (undergraduate and graduate education).

Table 2: Summary statistics (weighted)

Variable	Weighted mean (SLID)	Cansim Data 1993-2011
Age	42.81	44.16
% of individuals aged 16-64	87.40	84.00
% of individuals aged 65+	12.60	16.01
Female (%)	51.36	50.90
Married (%)	58.97	57.66
Single (%)	28.68	28.26
Has aboriginal background (%)	2.66	3.60*
Belongs to visible minority (%)	11.71	14.97*
Family size	3.05	2.93**
House ownership (%)	71.50[1]	67.73*
Resident in metropolitan area (%)	80.28	84.27*
Live in rural area (%)	18.54	20.80*
Live in Newfoundland and Labrador (%)	1.81	1.73
Live in Prince Edward Island (%)	0.44	0.44
Live in Nova Scotia (%)	2.93	3.04
Live in New Brunswick (%)	2.50	2.44
Live in Quebec (%)	25.01	24.30
Live in Ontario (%)	38.09	38.19
Live in Manitoba (%)	3.45	3.63
Live in Saskatchewan (%)	3.01	3.14
Live in Alberta (%)	9.74	9.85
Live in British Columbia (%)	13.01	13.24
Enrollment rate, university[2]	28.05	28.34
Enrollment rate, college[2]	14.02	16.69
Enrollment rate, other PSE institutions[2]	7.05	7.53
High school graduates aged 25-54 (%)[3]	87.34	86.87*
PSE graduates aged 25-54 (%)[3]	59.81	59.08*
Observations (N$\times$T)	713,630	
Individuals (N)	185,093	

* Census Indicator Profile, average among 1996, 2001, 2006 and 2011 censuses. ** Average across years 2000-2011. [1] Home ownership is missing for 5% of the observations due to an error in the data collection in 1999 and 2000. [2] Enrollment rates are calculated as proportion of the population aged 18-25. Data sources: Post-secondary Student Information System and Registered Apprenticeship Information System (Cansim tables 477-0019 and 477-0053) combined with estimates of the population (Cansim table 051-0001). [3] Proportion of population aged 25-54.

Table 3: Post-secondary enrollment

Dependent variable: **EnrollPSE**$_{ipt}$

Sample:	All (1)	All (2)	All (3)	All (4)	HS grads (5)
UR_{pt}	0.234**	0.227**	0.278**	0.315**	0.586***
	(0.091)	(0.093)	(0.110)	(0.137)	(0.169)
Age_{ipt}	-0.019***	-0.011***	-0.011***	-0.011***	-0.025***
	(0.002)	(0.001)	(0.001)	(0.001)	(0.002)
Age^2_{ipt} $(/1,000)$	0.137***	0.077***	0.086***	0.086***	0.212***
	(0.014)	(0.008)	(0.008)	(0.008)	(0.014)
$Female_{ipt}$	0.019***	0.023***	0.024***	0.024***	0.023***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
$Married_{ipt}$		-0.092***	-0.080***	-0.080***	-0.111***
		(0.013)	(0.014)	(0.014)	(0.006)
DSW^1_{ipt}		-0.072***	-0.067***	-0.067***	-0.068***
		(0.012)	(0.009)	(0.009)	(0.003)
$Aboriginal_{ipt}$		-0.011**	-0.007	-0.007	0.009
		(0.004)	(0.004)	(0.004)	(0.006)
$Visible\,minority_{ipt}$		0.048***	0.046***	0.046***	0.045***
		(0.012)	(0.013)	(0.013)	(0.011)
$Mother's\,education_{ipt}$		0.014***	0.013***	0.013***	0.010***
		(0.001)	(0.001)	(0.001)	(0.001)
$Father's\,education_{ipt}$		0.012***	0.012***	0.012***	0.010***
		(0.001)	(0.001)	(0.001)	(0.001)
$ln(family\,size_{ipt})$			-0.03***	-0.03***	0.001
			(0.003)	(0.003)	(0.004)
$Earners_{ipt}$			0.026***	0.026***	0.025***
			(0.002)	(0.002)	(0.002)
$Rural\,area_{ipt}$			-0.016***	-0.017***	-0.017***
			(0.002)	(0.002)	(0.003)
$Family\,income_{ipt}$ 1993\$ $(/100,000)$			-0.011***	-0.011**	-0.013***
			(0.003)	(0.003)	(0.004)
$Tuition_{pt}$ 1993\$ $(/100,000)$				0.069	-0.111
				(0.091)	(0.251)
$ln(HS\,graduates_{pt})$				0.006	0.033
				(0.04)	(0.047)
$PSE\,premium_{pt}$				0.018*	0.058***
				(0.009)	(0.019)
N×T	713,630	713,630	713,630	713,630	495,385
R^2	0.12	0.15	0.15	0.15	0.21

Clustered standard errors are reported in parenthesis. All regressions include a constant term, province fixed effects and a variable indicating the panel each respondent belongs to. The omitted category for marital status is single. UR stands for unemployment rate, DSW= divorced/separated/widowed, Aboriginal=dummy indicating aboriginal background, Visible minority=dummy variable indicating whether the respondent belongs to a visible minority group, Earners=number of earners in the household, Rural area=dummy variable indicating residence in rural area, ln(HS graduates)= ln of the number of high school graduates by year and province.

Table 4: Enrollment by PSE institution

Dependent variable:	**EnrollUni**		**EnrollCol**		**EnrollTr**	
	(1)	(2)	(3)	(4)	(5)	(6)
UR	0.189***	0.225***	0.019	0.046	0.021	0.039**
	(0.048)	(0.068)	(0.100)	(0.114)	(0.036)	(0.015)
Age	-0.012***	-0.007***	-0.005***	-0.004***	-0.001	-0.001***
	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)	(0.000)
$Age^2\,(/1,000)$	0.095***	0.057***	0.039***	0.027***	0.007	0.005***
	(0.013)	(0.002)	(0.008)	(0.005)	(0.005)	(0.002)
Female	0.018***	0.022***	0.005**	0.006**	-0.005***	-0.005***
	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)
Married		-0.057***		-0.022***		-0.00***
		(0.002)		(0.006)		(0.001)
DSW		-0.056***		-0.012**		-0.001
		(0.002)		(0.004)		(0.001)
Aborignial		-0.018***		0.009***		0.001
		(0.003)		(0.003)		(0.001)
Visible minority		0.037***		0.008		-0.001
		(0.003)		(0.004)		(0.001)
Mother's education		0.013***		0.001		-2.80e-4
		(0.001)		-4.43e-4		(2.58e-4)
Father's education		0.012***		3.02e-4		-4.1e-4***
		(0.001)		(4.39e-4)		(1.34e-4)
$ln(family\,size)$		-0.02***		-0.006**		-4.85e-4
		(0.002)		(0.002)		(0.001)
Earners		0.018***		0.008***		4.34e-4
		(0.001)		(0.002)		(3.85e-4)
Rural area		-0.016***		-0.001		0.001**
		(0.001)		(0.001)		(0.001)
Family income 1993\$ $(/100,000)$		0.003		-0.012***		-0.002***
		(0.002)		(0.002)		(0.001)
Tuition 1993\$ $(/100,000)$		0.171*		0.135*		-0.203***
		(0.101)		(0.064)		(0.038)
$ln(HS\,graduates)$		0.006		0.045		-0.031**
		(0.03)		(0.038)		(0.014)
Premium		-0.003		2.02e-4		0.008*
		(0.012)		(0.007)		(0.004)
N×T	713,630	713,630	713,630	713,630	713,630	713,630
R^2	0.08	0.12	0.04	0.05	0.01	0.01

Clustered standard errors are reported in parenthesis. All regressions include a constant term, province fixed effects and a variable indicating the panel each respondent belongs to. Variable definitions are reported in Table 3. In the first two columns "Premium" is the log earnings differential between university graduates and high-school graduates. In the other columns it refers to the log earnings differential between non-university PSE graduates and high-school graduates.

Table 5: The role of parental education

Dependent variable:	**EnrollUni**		**EnrollCol**		**EnrollTr**		**Continue**
Sample:	All	HS grads	All	HS grads	All	HS grads	All
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
UR	0.029	0.19	0.29*	0.43	0.02	0.12***	-0.24
	(0.13)	(0.23)	(0.16)	(0.25)	(0.03)	(0.03)	(0.62)
UR×father's education	0.06*	0.08**	-0.09**	-0.11***	0.02	0.01	0.50***
	(0.03)	(0.03)	(0.04)	(0.03)	(0.01)	(0.01)	(0.10)
UR×family income (/100,000)	0.12	0.01	-5.4e-4	-0.05	-0.10	0.18	-2.05**
	(0.08)	(0.11)	(0.10)	(0.18)	(0.07)	(0.11)	(0.74)
Average marginal effect of UR:	0.23**	0.41**	0.05	0.11	0.04**	0.06**	0.53
Marginal effect of UR at father's education =							
elementary school[1]	0.13	0.27	0.19	0.30	0.01	0.06	-0.48
some high school	0.20**	0.35*	0.10	0.19	0.02	0.05	-0.11
completed HS	0.27***	0.43**	0.002	0.08	0.04**	0.05	0.31
non-university PSE	0.33***	0.51**	-0.09	-0.02	0.06***	0.06**	0.74
university degree[2]	0.36***	0.59***	-0.19	-0.12	0.10***	0.09***	1.54
bachelor's degree	0.45***	0.67***	-0.28	-0.24	0.09***	0.05*	1.52
above bachelor's	0.52***	0.75***	-0.38	-0.35	0.11**	0.04	1.95
Province fixed effects	✓	✓	✓	✓	✓	✓	✓
Control variables	✓	✓	✓	✓	✓	✓	✓
N×T	713,630	495,385	713,630	495,385	713,630	495,385	15,085
R^2	0.12	0.16	0.05	0.05	0.01	0.08	0.08

[1] Includes no schooling. [2] No level specified (this level of education is available only for respondents who joined the sample in 1993 and 1994). All regressions include a constant term and a variable indicating the panel each respondent belongs to. Control variables include age, gender, marital status, aboriginal background, visible minority status, mother's and father's education, family income (1993$), family size, number of earners in the households, dummy variable indicating residence in rural area, tuition (1993$), PSE premium, log of high school graduates.

Table 6: Employment-to-school transition

Dependent variable:	**ReturnPSE**		**ReturnUni**		**ReturnCol**		**ReturnTr**	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
UR	0.01	0.02	-0.14*	-0.09	0.01	-0.01	0.08**	0.07***
	(0.14)	(0.14)	(0.07)	(0.08)	(0.05)	(0.04)	(0.03)	(0.02)
UR×father's educ.	0.04	0.04	0.05*	0.05*	-0.03**	-0.03**	0.03	0.03
	(0.04)	(0.04)	(0.03)	(0.02)	(0.01)	(0.01)	(0.02)	(0.02)
UR×family income(/100,000)	-0.14	-0.14	-0.06	-0.07	0.07	0.06	-0.11	-0.12
	(0.10)	(0.10)	(0.06)	(0.06)	(0.08)	(0.09)	(0.08)	(0.09)
Average marginal effect	0.07	0.06	-0.04	0.01	-0.04	-0.06*	0.10**	0.09***
Marginal effect of UR at father's education =								
elementary school	-0.01	-0.01	-0.12*	-0.07	0.01	0.01	0.05	0.05*
some high school	0.03	0.02	-0.07	-0.03	-0.01	-0.04	0.07*	0.07*
completed high school	0.07	0.06	-0.02	0.02	-0.04	-0.06*	0.09***	0.09***
non-university PSE	0.11	0.10	0.03	0.07	-0.07**	-0.09**	0.12***	0.11***
university degree	0.18*	0.17	0.09	0.13	-0.11**	-0.13**	0.17***	0.16**
bachelor's degree	0.19*	0.17	0.12	0.16	-0.12***	-0.14**	0.16***	0.15**
above bachelor's	0.22	0.20	0.17	0.21	-0.14***	-0.17***	0.18***	0.17**
Province fixed effects	✓	✓	✓	✓	✓	✓	✓	✓
Year fixed effects		✓		✓		✓		✓
Control variables	✓	✓	✓	✓	✓	✓	✓	✓
N×T	200,185	200,185	193,308	193,308	194,508	194,508	193,212	193,212
R^2	0.03	0.03	0.01	0.01	0.02	0.02	0.01	0.01

Clustered standard errors are in parenthesis. All regressions include a constant term and a variable indicating the panel each respondent belongs to. Control variables include age, gender, marital status, aboriginal background, visible minority status, mother's and father's education, family income (1993$), family size, number of earners in the family, dummy variable indicating residence in rural area, tuition (1993$), PSE premium, log of high school graduates. The coefficients for the control variables are reported in columns 1-4 of Table B4 in the Appendix.

Table 7: The decision to drop out of school

Dependent variable: **DropPSE**

	(1)	(2)	(3)
UR	0.27*	0.23	0.23
	(0.13)	(0.14)	(0.15)
UR×father's educ.		0.01	0.01
		(0.05)	(0.05)
UR×family income(/100,000)		0.16	0.19
		(0.28)	(0.25)
Average marginal effect of UR =	0.27*	0.33	0.35**
	(0.13)	(0.24)	(0.16)
Marginal effect of UR at father's education =			
elementary school		0.29	0.31**
some high school		0.31	0.33**
completed HS		0.33	0.35**
non-university PSE		0.34	0.37*
university degree		0.33	0.35
bachelor's degree		0.38	0.41
above bachelor's		0.41	0.44
Province fixed effects	✓	✓	✓
Control variables		✓	✓
Year fixed effects			✓
N×T	59,438	59,438	59,438
R^2	0.07	0.08	0.08

Clustered standard errors are in parenthesis. All regressions include a constant term and a variable indicating the panel each respondent belongs to. Control variables include age, gender, marital status, aboriginal background, visible minority status, mother's and father's education, family income (1993$), family size, number of earners in the family, dummy variable indicating residence in rural area, tuition (1993$), PSE premium, log of high school graduates. The coefficients for the control variables are reported in column 5 of Table B4 in the Appendix.

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Appendix A - data sources and variable definitions

The majority of variables were obtained directly or derived from confidential files of the Survey of Labor and Income Dynamics. The files were accessed through Statistics Canada Research Data Centers. The data dictionary can be found at:

http://www.statcan.gc.ca/pub/75f0026x/75f0026x2011000-eng.htm

Specifically, I used the following variables: age26, sex99, mards26, eoabor15, eovm15, edmoth21, edfath21, adsain25, dwtenr25, nbear25, pvreg25, catyp25, sactyp25, urbrur25, atuniv20, atcc20, attr20, studtf26, cmphi18, rcuniv20, rccoll20, hleved18. Variable definitions are described in Table A1. Additionally, I used the following data:

- Data on annual university tuition by province was obtained from Statistics Canada "Tuition and living accommodation costs for full-time students at Canadian degree granting institutions".
- Provincial unemployment rates are from Statistics Canada, Cansim Table 282-0002.
- Family income was adjusted for inflation using the Consumer Price Index for the whole country, obtained from Statistics Canada, Cansim Table 326-0021.

Table A1: Variable definitions

Variable (weighted mean)	Definition	Constructed from SLID variables
$EnrollUni_{ipt}$ (mean=0.07)	=1 if respondent i living in province p is enrolled in university at time t =0 if the respondent is not enrolled in university	atuniv20
$EnrollCol_{ipt}$ (mean=0.04)	=1 if respondent i living in province p is enrolled in college at time t =0 if the respondent is not enrolled in college	atcc20
$EnrollTr_{ipt}$ (mean=0.01)	=1 if respondent i living in province p is enrolled in a trade school at time t =0 if the respondent is not enrolled in a trade school	attr20
$EnrollPSE_{ipt}$ (mean=0.12)	=1 if EnrollUni=1 or EnrollCol=1 or EnrollTr=1 =0 if EnrollUni=0 and EnrollCol=0 and EnrollTr=0	
$Continue_{ipt}$ (mean=0.36)	=1 if respondent i living in province p graduated from PSE at time $t-1$ and continues to be enrolled at time t =0 if the respondent is no longer enrolled in PSE at time t	studtf26, rcuniv20, rccoll20
$ReturnUni_{ipt}$ (mean=0.01)	=1 if respondent i living in province p has worked for at least 20 weeks at time $t-1$ without being enrolled in school and is enrolled in university at time t. =0 if the respondent worked for at least 20 weeks at time $t-1$ and is not enrolled in any institution at time t	studtf26, alhrp28, atuniv20
$ReturnCol_{ipt}$ (mean=0.02)	=1 if respondent i living in province p has worked for at least 20 weeks at time $t-1$ without being enrolled in school and is enrolled in college at time t. =0 if the respondent worked for at least 20 weeks at time $t-1$ and is not enrolled in any institution at time t	studtf26, alhrp28, atcc20
$ReturnTr_{ipt}$ (mean=0.01)	=1 if respondent i living in province p has worked for at least 20 weeks at time $t-1$ without being enrolled in school and is enrolled in a trade school at time t. =0 if the respondent worked for at least 20 weeks at time $t-1$ and is not enrolled in any institution at time t	studtf26, alhrp28, attd20

Table A1: Variable definitions (continued)

Variable	Definition	Constructed from SLID variables
$ReturnPSE_{ipt}$ (mean=0.04)	=1 if respondent i living in province p has worked for at least 20 weeks at time $t-1$ without being enrolled in school and is enrolled in any PSE institutions at time t. =0 if the respondent worked for at least 20 weeks at time $t-1$ and is not enrolled in any institution at time t	studtf26, alhrp28, atuniv20, attd20, atcc20
$DropPSE_{ipt}$ (mean=0.16)	=1 if respondent i living in province p was attending PSE at time t-1 and has dropped out of school at time t =0 if respondent is still enrolled in PSE	atuniv20, rcuniv20, studtf26
$DropUni_{ipt}$ (mean=0.12)	=1 if respondent i living in province p was attending university at time t-1 and has dropped out of school at time t =0 if respondent is still enrolled in university	studtf26, rcuniv20, rccoll20
$DropCol_{ipt}$ (mean=0.29)	=1 if respondent i living in province p was attending college at time $t-1$ and has dropped out of school at time t =0 if respondent is still enrolled in college	studtf26, atcc20, rccoll20
$DropTr_{ipt}$ (mean=0.43)	=1 if respondent i living in province p was attending a trade or vocational school at time $t-1$ and has dropped out of school at time t =0 if respondent is still enrolled in a trade or vocational school	studtf26, attr20, rccoll20

Appendix B - sensitivity analysis

Table B1: Marginal effects from the baseline specification and logistic regressions

Dependent variable	**EnrollUni**		**EnrollCol**		**EnrollTr**	
Model:	Baseline	Logistic	Baseline	Logistic	Baseline	Logistic
	(1)	(2)	(3)	(4)	(5)	(6)
Average marginal effect of UR	0.23**	0.27***	0.05	0.10	0.04**	0.06***
	(0.07)	(0.08)	(0.11)	(0.09)	(0.02)	(0.02)
Marginal effect of UR at father's education =						
elementary school	0.13	0.04	0.19	0.07	0.01	0.03
some high school	0.20**	0.14*	0.09	0.11	0.02	0.06**
completed high school	0.27***	0.28***	0.002	0.11	0.04**	0.06***
non-university PSE	0.33***	0.52***	-0.10	0.10	0.06***	0.08***
university degree	0.36***	0.64***	-0.19	0.12	0.10***	0.11***
bachelor's degree	0.45***	0.92***	-0.28	0.03	0.09***	0.09***
above bachelor's	0.52***	1.15***	-0.38	-0.01	0.11**	0.07***
Province fixed effects	✓	✓	✓	✓	✓	✓
Control variables	✓	✓	✓	✓	✓	✓
UR×family income	✓	✓	✓	✓	✓	✓
N×T	713,630	713,630	713,630	713,630	713,630	713,630
R^2 [and Pseudo R^2]	0.12	[0.24]	0.05	[0.16]	0.01	[0.10]

All regressions include a constant term and a variable indicating the panel each respondent belongs to. Control variables include age, gender, marital status, aboriginal background, visible minority status, mother's and father's education, family income (1993$), family size, number of earners in the households, dummy variable indicating residence in rural area, tuition (1993$), PSE premium, log of high school graduates.

Table B2: Post-secondary enrollment - Year fixed effects

Dependent variable:	**EnrollUni**		**EnrollCol**	**EnrollTr**	**Continue**	**EnrollPSE**
Sample:	All	HS grads	All	All	All	All
	(1)	(2)	(3)	(4)	(5)	(6)
UR	-0.13	-0.13	0.26	0.01	-1.12**	0.11
	(0.14)	(0.20)	(0.16)	(0.03)	(0.39)	(0.22)
UR×father's educ.	0.06**	0.08**	-0.09**	0.02	0.44***	-0.01
	(0.03)	(0.03)	(0.04)	(0.01)	(0.12)	(0.05)
UR×family income/100,000	0.16	0.11	-0.004	-0.12	-2.13**	0.01
	(0.09)	(0.11)	(0.11)	(0.07)	(0.66)	(0.10)
Average marginal effect of UR:	0.08	0.15	0.02	0.01	-0.52	0.10
	(0.09)	(0.12)	(0.11)	(0.03)	(0.45)	(0.14)
Marginal effect of UR at father's education =						
elementary school	-0.01	2e-3	0.16	-0.01	-1.46***	0.11
some high school	0.06	0.09	0.07	-0.003	-1.14***	0.10
completed HS	0.13	0.18	-0.03	0.01	-0.77	0.10
non-university PSE	0.19**	0.27**	-0.12	0.03	-0.40	0.09
university degree	0.23**	0.33**	-0.22	0.07	0.36	0.08
bachelor's degree	0.33***	0.45***	-0.31*	0.06	0.27	0.08
above bachelor's	0.40***	0.54***	-0.41*	0.07	0.70	0.07
Province fixed effects	✓	✓	✓	✓	✓	✓
Year fixed effects	✓	✓	✓	✓	✓	✓
Control variables	✓	✓	✓	✓	✓	✓
N×T	713,630	495,385	713,630	713,630	15,085	713,630
R^2	0.12	0.16	0.05	0.01	0.08	0.15

All regressions include a constant term and a variable indicating the panel each respondent belongs to. Control variables include age, gender, marital status, aboriginal background, visible minority status, mother's and father's education, family income (1993$), family size, number of earners in the households, dummy variable indicating residence in rural area, tuition (1993$), PSE premium, log of high school graduates.

Table B3: Comparison between paternal and maternal education

Dependent variable	**EnrollUni**		**EnrollCol**		**EnrollTr**	
Parental education:	father	mother	father	mother	father	mother
	(1)	(2)	(3)	(4)	(5)	(6)
UR	0.03	0.01	0.29*	0.34*	0.02	0.02
	(0.13)	(0.13)	(0.16)	(0.16)	(0.03)	(0.03)
UR×*parental education*	0.06*	0.07**	-0.09**	-0.12**	0.02	0.02
	(0.03)	(0.02)	(0.04)	(0.05)	(0.01)	(0.01)
Marginal effect of UR at parental education =						
elementary school	0.13	0.12	0.19	0.22*	0.01	0.01
some high school	0.20**	0.20**	0.10	0.10	0.02	0.03
completed high school	0.27***	0.27***	0.002	-0.02	0.04**	0.04**
non-university PSE	0.33***	0.34***	-0.09	-0.14	0.06***	0.06***
university degree	0.36***	0.39***	-0.19	-0.26	0.10***	0.10**
bachelor's degree	0.45***	0.49***	-0.28	-0.37	0.09***	0.10**
above bachelor's degree	0.52***	0.57***	-0.38	-0.49*	0.11**	0.11**
Province fixed effects	✓	✓	✓	✓	✓	✓
Control variables	✓	✓	✓	✓	✓	✓
UR×family income	✓	✓	✓	✓	✓	✓
N×T	713,630	713,630	713,630	713,630	713,630	713,630
R^2	0.12	0.12	0.05	0.06	0.02	0.01

All regressions include a constant term and a variable indicating the panel each respondent belongs to. Control variables include age, gender, marital status, aboriginal background, visible minority status, mother's and father's education, family income (1993$), family size, number of earners in the households, dummy variable indicating residence in rural area, tuition (1993$), PSE premium, log of high school graduates.

Table B4: Employment-to-school transition and the decision to drop out of school

Dependent variable:	**ReturnPSE** (1)	**ReturnUni** (2)	**ReturnCol** (3)	**ReturnTr** (4)	**DropPSE** (5)
UR	0.015	-0.090	-0.013	0.074***	0.229
	(0.142)	(0.080)	(0.043)	(0.022)	(0.149)
UR×father's educ.	0.043	0.050*	-0.028**	0.026	0.013
	(0.036)	(0.026)	(0.011)	(0.017)	(0.055)
UR×fam. inc.(1993$/100,000)	-0.140	-0.071	0.058	-0.115	0.189
	(0.097)	(0.064)	(0.087)	(0.087)	(0.249)
Age	-0.014***	-0.003***	-0.007***	-0.004**	0.014***
	(0.001)	(0.000)	(0.002)	(0.002)	(0.004)
Age^2/1,000	0.133***	0.028***	0.071***	0.04*	-0.109*
	(0.011)	(0.003)	(0.017)	(0.018)	(0.05)
Female	0.007***	0.004***	0.006**	-0.003**	-0.028***
	(0.002)	(0.001)	(0.002)	(0.001)	(0.003)
Married	-0.023***	-0.006***	-0.012***	-0.006	0.048***
	(0.002)	(0.002)	(0.002)	(0.003)	(0.011)
DSW	-0.005*	-0.002*	-0.001	-0.002	0.016
	(0.002)	(0.001)	(0.001)	(0.002)	(0.009)
Aboriginal	0.011*	0.00012	0.007	0.003*	0.001
	(0.006)	(0.003)	(0.005)	(0.002)	(0.022)
Visible minority	0.005	0.002	0.002*	4.0e-4	-0.029**
	(0.004)	(0.004)	(0.001)	(0.001)	(0.01)
Mother's education	0.002***	0.002***	-3.9e-5	-1.4e-4	-0.011***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
Father's education	-0.001	-0.002	0.002**	-0.002	-0.008
	(0.003)	(0.002)	(0.001)	(0.001)	(0.007)
ln(family size)	0.007***	-0.001	0.006**	0.002	-0.03***
	(0.002)	(0.001)	(0.002)	(0.003)	(0.006)
Earners	0.007***	0.003***	0.003***	0.002**	0.006
	(0.001)	(0.000)	(0.000)	(0.001)	(0.003)
Rural area	-0.003*	-0.004***	2.6e-4	0.001	0.008
	(0.001)	(0.001)	(0.001)	(0.001)	(0.005)
Family's income (1993$ /100,000)	0.005	0.008*	-0.007	0.004	-0.007
	(0.007)	(0.004)	(0.006)	(0.005)	(0.015)
Tuition (1993$ /100,000)	0.038	0.176***	-0.025	-0.088***	-0.259*
	(0.056)	(0.048)	(0.053)	(0.022)	(0.132)
ln(HS graduates)	-0.089	-0.002	-0.085	-0.072	-0.182
	(0.071)	(0.052)	(0.062)	(0.044)	(0.144)
Premium	0.036**	0.007	0.012	0.018*	-0.016
	(0.015)	(0.012)	(0.015)	(0.009)	(0.07)
Province fixed effects	✓	✓	✓	✓	✓
Year fixed effects	✓	✓	✓	✓	✓
Control variables	✓	✓	✓	✓	✓
N×T	200,185	193,308	194,508	193,212	59,438
R^2	0.03	0.01	0.02	0.01	0.08

Clustered standard errors are in parenthesis. All regressions include a constant term and a variable indicating the panel each respondent belongs to. Variable definitions are reported in Table 3.