The Returns to Flexible Postsecondary Education: The Effect of Delaying School

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Abstract. We investigate empirically the returns to postsecondary education allowing the returns to vary among delayers and non delayers post secondary graduates. Using a unique survey that collects information on a representative cohort of graduates, we are able to estimate the effects of delaying school among successful graduates abstracting from specific macroeconomic conditions at the time of graduation. Our results show that graduates that delayed their education receive a premium relative to graduates that did not, even after considering other factors such as experience or labour market connections. These estimates are robust to the possibility of selection in the decision to delay school.

1. Introduction

This paper estimates the returns to delaying school among post secondary school graduates using the Canadian National Survey of Graduates (SOG), a unique data set that collects the early labour market experiences of the 1995 cohort of postsecondary graduates. We find a substantial short term premium for delaying school. The premium exists for both types of institutions, colleges and universities, and, in some cases, persists up to five years after graduation. These estimates are, in general, robust to the possibility of selection in the decision to delay postsecondary schooling.

We develop a simple framework to understand the decision to delay schooling as a function of uncertain future returns to education and then use standard selection correction methods to estimate the effect of the delay on earnings. In this framework, individuals decide whether or not to go to school taking into account the idiosyncratic cost of schooling and the differences in returns due to education-enhanced productivity. Our empirical strategy consists in comparing the wages of graduates who completed their first postsecondary degree right after high school, with the wages of individuals who were not in school before enrolling in the same program. We use variation in the labor market conditions at the time of the interruption and re-enrolment decisions to assess the causal effect of the delay. Our results show that delay of postsecondary education involves a substantial short term premium that is robust to the possibility of selection in the decision to return to school.

The SOG collected information about labor market experiences of the 1995 cohort since graduation in 1997 and again during its Follow-up Survey (FSOG) in 2000. This is, to our knowledge, the first study to analyze the returns to delaying postsecondary education using a representative survey of graduates. The data is uniquely suited for the analysis. First, the sample is large enough to obtain precise estimates on the effect of less traditional patterns of educational choices, such as delay and multiple degrees. In addition, since all individuals graduated at the same time we are able to avoid the confounding effects of differences in the economic environment at the time of graduation, which could potentially bias the estimates.

There exists ample evidence on the benefits of education. These involve increases in lifetime earnings, better health outcomes, higher assimilation rates in the mainstream economy for minority groups and immigrants, lower crime rates and lower unemployment

rates among the better educated.[1] The general framework used to estimate these effects implicitly assumes that individuals acquire education continually until the gains of an extra year of education equal the costs, at which point they enter the labour market to work. However, maintaining this assumption is increasingly problematic in light of the changes in the economic environment surrounding the decisions to attend postsecondary institutions. First, the demands of emerging technologies are inducing more individuals to return to school after a period of absence to acquire new, or upgrade existent skills. Second, the increasing costs of postsecondary education force some students to delay the completion of a degree until they have a clearer picture of the rewards involved, or until they are able to finance their education. As a result, more and more individuals engage in education after some time away from learning institutions.[2] The image of the "typical" graduate that proceeds in a linear, uninterrupted fashion from primary school to the highest level of education desired is becoming less and less common.[3]

The consequences of recognizing the flexibility of educational choices are not trivial. The estimates of the returns to postsecondary education motivate education related policies, including subsidies to postsecondary education and regulation of tuition fees. They are also central to labour market access policies, like training programs for unemployed youth or displaced workers. However, under the assumption of linear investments in education these estimates may be non representative for substantial subgroups of the population. Further, understanding the effects of school delay on labour market outcomes becomes crucial to guide policies that affect school enrolment incentives.[4]

The majority of the studies on school delay focus on differences between individuals of the same age cohort who delay compared to those who do not (Marcus 1984, Light, 1995a

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[1] Coelli, Green and Warburton (2007), Lleras-Muney (2005), Lochner and Moretti (2004), Oreopolous (2003), Dicks and Sweetman (1999)

[2] According to the 2001 Canadian Census of Population, 21% of postsecondary students are 25 to 29 years old, and 13% are between 30 and 34 years of age.

[3] In the US one third of the 1995-96 starting class of postsecondary students waited a year or more after finishing high school to enrol (US Dpt. of Education, NCES 2005-152). In Canada, 28% of the class of 1995 had delayed their first postsecondary degree by one year or more. This is in line with estimates from other surveys which show that 20% of 20 year-olds postsecondary students had delayed their enrolment for at least one year (Bushnik and Tomkowicz,, 2003)

[4] Political debates on the improvement of educational standards and access to higher education are on-going in western economies. (Human Resources Development Canada (2002) and US Department of Education (2006))

and 1995b). This approach seems adequate when one focuses, as these studies did, on the interruption decision of low income, low educated individuals. If students are perceived as having "missed out" on education the relevant way to asses this lost is to compare with those individuals of the same age cohort that followed a "normal" path in educational choices. A shortcoming of these studies, however, is that the luck of those who postpone education maybe influenced by labour market conditions at the time of entry. Moreover, given the above mentioned changes in the educational landscape, the view of what constitutes a "normal" path to education no longer holds. We offer an alternative perspective on the returns to delay by focusing on graduating cohorts, rather than on age cohorts. That is we analyze earning differences between those who graduate after some time out of school (delayers) and those who are graduating for the first time. Consequently, our view addresses a different type of question. Rather than asking about the penalty to interrupt, which is the focus of previous studies, we ask about the relative value of returning to school within the graduating cohort. Are those returning to school going back to square one, starting new careers from scratch, or are they upgrading existing skills and building on previous knowledge or experience? Given the mentioned high rates of school returners observed in recent graduating cohorts, this question is central to estimating the "true" value of post secondary education.

Our work fits naturally within empirical studies on the returns to human capital. These studies consistently find substantial returns to a variety of postsecondary degrees.[5] The common underlying assumption in most models analyzing returns to education is that schooling proceeds in a linear and uninterrupted fashion from primary school to the highest level of education the individual attains in her lifetime. This assumption, although convenient, is not totally satisfactory. Indeed, the common perception is that the luck of postsecondary graduates differs considerably depending on the paths they take (Mincer and Ofek (1982)). Several studies confirm the disparities in returns to different types of postsecondary education (Kane and Rouse (1993), Boudarbat (2003)).

Differences in the returns to education by the timing of postsecondary schooling are rather heterogenous. Several studies look into the impact of adult education programs.

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[5] See Card (1999) and Heckman, Lochner and Todd (2006) for exhaustive surveys on the literature of the returns to education. Vaillancourt and Bourdeau-Primeau (2002) provides recent Canadian evidence

Although generally no specific mention of delayed is used in these studies, it is implied that those attending adult education programs have interrupted their education. The evidence from European studies is mixed. Blundell, Dearden and Meghir (1996) finds positive returns in Britain to all forms of training of older individuals leading to formal qualifications. Egerton (2000) and Jerkins et al. (2003), however, do not find such positive returns. These studies reveal that episodes of adult education, particularly in occupational training, have positive effects on employment but limited effect on wages, except for the least qualified individuals. In Sweden, Albrecht, van den Berg and Vroman (2004) follow the large expansion of the Swedish adult education program during 1997 through 2002, called "Knowledge Lift" (KL), to estimate the impact on annual earnings and employment of increasing formal schooling for the low skilled. Their results show no effect of KL programs on earnings or employment, with the exception of an increase in the employability (but not earnings) of young men. A small number of North American studies find substantial returns to formal certification for older individuals (Leigh and Gil (1997), Jacobson et al. (2005)). A recent Canadian paper (Zhang and Palameta (2006)) looks at the returns of adult schooling. Interestingly, the results show significant differences in these returns depending on whether or not the individual returned to the same employer, with individuals who went back to previous employers earning higher returns.

Specific consideration of the effects of school interruption has been analyzed for the U.S.. Griliches (1980) and Marcus (1984) estimate the returns to interrupted schooling using the young men cohort of the National Longitudinal Survey. Light (1995a) uses the National Longitudinal Survey of Youth to explore the effects of school interruption on the wages of a cohort of young white men. Her paper shows that, controlling for the number of years of education, individuals who interrupted their schooling earn generally less than those educated continuously. The two exceptions are individuals with exactly 12 years of education, and those with more than 16 years of education. For these two groups, she finds no difference between returns to continuous or interrupted education. She also finds that the earnings gap between individuals with similar amounts of schooling and total experience, but who differ in the timing at which these were acquired, tends to diminishes and generally disappears over time (after 4 years of post schooling experience). However, the focus of these papers is on comparing individuals of the same cohort who delayed education with those who proceeded

continuously, as such these estimates cannot account for differences in the labor market conditions individuals faced at the time of graduation.[6]

This paper contributes to the existing literature by offering a perspective on the returns to delaying school that is not based on within cohort comparisons but rather on comparison within graduating cohorts. This allows us to abstract from specific macroeconomic conditions at the time of graduation. Our results show that graduates that delayed their education receive a premium relative to graduates that did not, even after considering other factors such as experience or labour market connections. These estimates are robust to the possibility of selection in the decision to delay school.

We proceed to review the methodology we use in the next section. In section 3 we describe the data and present the results in section 4. The final section concludes.

2. An Empirical Framework for Analyzing School Delay

To interpret the results of our estimation within a familiar decision framework, consider a simple economy with only two employment opportunities: skilled work (S), which requires the worker to have a postsecondary degree, and pays $w^S_{tb} = S_b + \varepsilon^S_t$, and unskilled work (U), which does not require a degree and pays w^U_0, where b is the period the job began and $\varepsilon^S_{t,}$ is a job specific shock.

Individuals going on to postsecondary education decide whether to enrol today in postsecondary education or wait for another period, based on an idiosyncratic cost of schooling ($c_{it,}$) and the expected gains in the labor market given their education. The cost reflects pecuniary costs and is drawn at the beginning of the period and determined at the time of making schooling decisions. In period 0, those who delay enter the labour market and work, earning w^U. Those who enrol today pay the cost of post secondary education. In the next period, individuals who delayed enrol in school and pay the current cost of schooling, while individuals who acquired their education last period, work as skilled workers at current wages. Once they start working as skilled workers, individuals collect the expected present value of wages:

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[6] Evidence on the importance of labour market conditions at the time of entering the labour market have long existed (Beaudry and DiNardo (1989), Jacobson et Al. (1992))

$$V^b = \sum_{t=b}^{\infty} \beta^{t-b}(S_b + \varepsilon_t); \qquad b=1,2$$

The payoffs are as follows:

Expected payoff if delaying: $\qquad w^U_0 + \beta[c_{i1} + \beta V^2]$

Expected payoff if not delaying: $\qquad c_{i0} + \beta[V^1]$

Individuals will delay if and only if the payoff of doing so is greater than the payoff of enrolling now. That is,

$$Delay \iff (w^U_0 - \beta S_1) + \frac{\beta^2}{(1-\beta)}(S_2 - S_1) \geq (c_{i0} - \beta c_{i1}) \qquad (2)$$

Equation (2) indicates that individuals will delay schooling when the difference in schooling cost is smaller than the difference in the present discounted value of the skill premium. The skill premium - the left hand side of (2) - has two components. One is discounted value of foregone wages if continuously enrolled $(w^U_0 - \beta S_1)$. The second term, $\frac{\beta^2}{(1-\beta)}(S_2 - S_1)$, is the discounted life time expected value of starting a job after delaying entrance in the labour market. The model suggests that in the decision to delay differences in earnings profiles that depend on initial contract conditions faced by workers upon entrance in the labour market are important. Our data allows us to abstract from this consideration and base the decision to delay on indicators of economic conditions at the time of interruption and enrolment in school.

The general empirical framework to analyze earnings generation proposes a reduced form equation of individual wages stated as a function of different measures of skills, usually education and experience. The coefficients of these skill measures can, under certain assumptions, be interpreted as the rate of return of education and experience. This framework has been widely used in labor economics to assess the effect of schooling on earnings. The education estimates rest under the assumption that individuals follow a linear and continuous education path, progressing uninterruptedly in their schooling, from high school into college or university. Schooling continues until the returns to one more year of education do not compensate the costs involved in the acquisition of additional education. Therefore, if a student delays her schooling, the effect of this delay is not considered to affect the returns to

education. Within this framework one could disaggregate the returns to postsecondary schooling by the type of activity before enrollment (schooling or no schooling) to provide a measure of the differences in returns between those students proceeding in the linear and continuous manner described above and those who choose to delay.

$$LnY_i = \beta X_i + \gamma S_i + \varphi D_i + u_i$$

where Y represents wages or a close measure of productivity, S is a vector of human capital and skills variables, such as education and experience, X is a vector of additional controls and D is an indicator variable for whether the individual was engaged in non-schooling activities before enrolling in the program for her last educational degree, that is, if she has delayed schooling. The coefficients β and γ are vectors of parameters summarizing the effect of X on earnings and the returns to human capital respectively and φ is a parameter reflecting the effect of delaying postsecondary education. Finally, u is a vector of independently and identically distributed error terms.

To the extent that individuals are not homogeneous, unobserved heterogeneity introduces a bias in standard (OLS) estimates of the returns to education.[7] In our case, we are less concerned about the effect of this bias on the returns to education. Because all individuals in our sample have graduated from at least one postsecondary degree in 1995, the unobserved heterogeneity plaguing most studies on the returns to education more generally are substantially reduced here. More so, since we have also separated the sample by the type of institution, college or university, that has granted the degree. Both features of our data are likely to leave us with a more homogenous ability sample within each category than is usual in estimates of the returns to education.

We are left however with addressing the endogeneity of the main variable of interest, D. Empirically, the effect of delaying school can be estimated with a two-step least square procedure that takes into account the endogeneity of the decision to delay.

$$LnY_i = \beta X_i + \gamma S_i + \varphi D_i + u_i$$
$$D_i = \beta X_i + \alpha Z_i + dW_i + v_i \qquad (4)$$

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[7] For a survey of the implications of the selection problem and empirical methods to address it can be found in Card (2001) and more recently in Goldberg and Smith (2007).

where Z_i is a vector of exogenous variables capturing the decision to delay education and W_i is a vector of additional variables relevant to the delay decision. Our model suggests that delay depends on the aggregate labor market conditions at the time of schooling decisions and on the idiosyncratic cost of schooling. We capture the former in vector Z, which includes the national unemployment rate at the time of the interruption decision, the year before obtaining either high school diploma or the previous postsecondary degree, and the provincial unemployment rate at the time of the return decision, the year before enrollment in the current program. Idiosyncratic costs of schooling are captured in the vector W and include indicators of parental postsecondary education.[8]

The choice of our instrument is based on empirical evidence that suggests that postsecondary enrollment rates are countercyclical. In this regard, Light (1995b) and Betts and McFarland (1995) show that unemployment increases community college enrollment in the US. Similarly, Rees and Mocan (1997) find that high unemployment rates reduce dropout rates. Evan and Kim (2005) analyze the impact of local labor market conditions on the demand for education in Indian reservations and find that favorable shocks increase high school dropout rates and reduce college enrollment rates. Similarly, using panel data from 1987 to 2002, Greenbaum (2004) shows that poor labor market conditions increase the number of law school applications. In addition, the literature on the returns to education has a long tradition of using background family variables to deal with non-random selection on different levels of schooling (Card, 1999). We will use both sets of variables separately in our analysis.

3. Data Description

We use data from the SOG and its follow-up survey conducted by Statistics Canada in partnership with Human Resources Development Canada in 1997 and 2000 respectively. The SOG examines the labour market experiences of the 1995 graduates from universities, community colleges, and trade/vocational programs since graduation. The survey collects a broad range of information on the links between education and labour market outcomes,

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[8] Whether or not parental schooling is correlated with the educational choices of the offspring is not clear (Card, 1999). We remain agnostic in the matter and perform the analysis with and without parental education as a determinant of the decision to delay.

including characteristics of the programs of study, activities before and after graduation, and socioeconomic background.[9]

For the purposes of the survey, a graduate is a student that completed the requirements for a degree, diploma, or certificate during the 1995 calendar year in a trade/vocational, college, or university program. The sample includes:

a) graduates from university programs leading to bachelor's, master's, or doctoral degrees or to specialized certificates or diplomas;

b) graduates of postsecondary programs (one year's duration or longer, requiring secondary school completion or equivalent for admission) in Colleges of Applied Arts and Technology (CAAT), Colleges d'enseignement general et professionnel (CEGEP), community colleges, technical schools or similar institutions;

c) graduates from skilled trades (pre-employment programs that are normally three months or more of duration) in trade/vocational schools[10].

Graduates from private postsecondary institutions, from "continuing education" programs not leading to a degree, from part-time trade courses that were working full time, from vocational programs of less than three months or those not in the skilled trades, and those from apprenticeship programs are excluded.

The path to postsecondary education is a complex one. Graduates of the 1995 class may have had high school degrees prior to their postsecondary enrollment or they may have already obtained postsecondary degrees. Indeed, in some provinces in Canada attending college prior to university is the usual way to proceed.[11] In addition, they may have been students during the year prior to enrolling in the 1995 program, or they may have been involved in other activities in or out of the labour market (unemployment, paid work, or unpaid household work). To investigate all likely venues, we consider two different

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[9] More information about the survey can be found at
http://www.statcan.ca/bsolc/english/bsolc?catno=81M0011X

[10] A trade/vocational school is a public educational institution offering courses to prepare people for employment in specific occupations. Many community colleges and technical institutes offer these certificates as well.

[11] In Quebec, CEGEPS are a required and normal stage between high school and university. In British Columbia transfer credits from colleges to university are also common. For a view of the provincial structure of postsecondary education in Canada see "Provincial Postsecondary Systems and Arrangements for Credit Transfer", at (http://www.cmec.ca/postsec/CreditTransfer.en.pdf)

characteristics of the 1995 graduates. The first characteristic regards activity before enrollment, whether or not the graduate was in school before registering for the degree obtained in 1995. We will refer to these groups as continuing and delayed graduates respectively. Graduates who were studying full time, or working and studying are considered continuing graduates. Delayed graduates are those that during the year before enrolling in the 1995 program were not in school but either working full time, unemployed, or out of the labour force. The second characteristic regards previous postsecondary education. It indicates whether or not the 1995 degree is the first postsecondary degree obtained. We will refer to these as single degree holders and those who report having a previous postsecondary degree as multiple degree holders.[12]

There are 24,433 individuals in the sample that report positive earnings in the week of reference in 2007 and are 45 years old or younger. Tables 1 and 2 show previous levels of schooling and previous main activity by type of institution (non university or university). We make this distinction because we expect the characteristics of graduates from non university and university institutions to differ considerably as their programs vary in terms of their financial and time requirements. Each of these groups is potentially different in terms of the reasons that lead them to school and in terms of the gains that they obtain from further education. Therefore, we will perform separate analysis to address these differences. Looking at the previous level of education (Table 1), around one third of the graduates already hold postsecondary degrees, 16% had a degree from non-university postsecondary institutions and 18% had a previous university degree. Table 2 shows the main activity of graduates before enrolment in the program. 48%, while 7% reported both working and attending school. A significant fraction of graduates – 46% -- were not attending school before enrollment in the 1995 program, most of them because they were working. However, around 15% of those who returned to non-university institutions and 5% of those who returned to a university institution were either unemployed or out of the labour force. Approximately one third returned to school within three years of completing their previous degree.

We define four types of graduates according to these characteristics:

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[12] Because the graduate is only asked about her highest degree before enrolling in the program leading to the 1995 degree, it is strictly possible that she holds more than one postsecondary degree before enrolling. Therefore, we refer to these graduates more generally as multiple degree holders.

- *Single degree continuing graduates* are those who were in school before they enrolled in the program leading to the 1995 degree but did not have a previous postsecondary degree. These are mainly high school graduates that proceeded directly to postsecondary education and it constitutes our base category.

- *Multiple degree continuing graduates* include those who were also in school before enrollment, but had obtained at least one previous postsecondary degree.

- *Single degree delayed graduates* are those who delayed their postsecondary education after high school to work or to pursue other activities.

- *Multiple degree delayed graduates* are those who attained some level of postsecondary education but delayed the completion of additional postsecondary education to work or pursue other activities.

Table 3 shows, by type of institution, the fraction of graduates that falls into each of the categories described above. Among graduates from non-university institutions, those with a single degree constitute the majority of the sample, around 83%. They are roughly equally divided between those who were previously in school -- the continuing graduates who transited to a non-university postsecondary program from secondary school-- and those who were not studying the year before enrollment. However a significant portion, 17% of non-university graduates, already had a postsecondary degree (multiple degree graduates). Most of them were not in school before enrollment in the 1995 degree program (non-continuing graduates) while 5% of non university graduates are continuing students transiting from one postsecondary degree to another without interrupting their studies. University graduates are roughly equally divided between single and multiple degree graduates. Since the opportunity cost of university degrees is likely to rise with the years of school separation, it is not surprising that fewer university graduates than non-university graduates were out of school before enrollment (non-continuing graduates). They are just below a third of all university graduates. Among single degree university graduates, four fifths are continuing graduates coming from high school. 27% of multiple degree graduates are continuing students while 21% are not.

The SOG provides detailed information about the degree obtained in 1995, education and activities before enrollment, as well as activities during the two years after graduation. For

those who worked before enrollment, it records the type of job, occupation and usual hours of work.[13] For those who have previous postsecondary education, it provides graduation year, type of degree and field of study obtained. The SOG also contains information about additional education obtained after graduation in 1995, whether the individuals returned to a job held before enrollment, and characteristics of other jobs held between graduation and the time of the interview (duration, occupation and industry, earnings and usual hours per week). In addition, it provides similar information about the job held in the reference week, plus information about wages. From this information we construct a variable for potential experience before graduating in 1995 (age – 6 – years of education) and a variable accounting for months of experience acquired after graduation in 1995. Demographic characteristics of the graduates, such as province of residence, parental education, number of children and marital status, are also reported at the time of the interview. We measure the returns to education using the log of positive annual earnings from the job held in the reference week in 1997.[14]

In order to conduct our analysis we further eliminate observations without information on experience or place of residence. We are left with 9,645 and 8,360 observations for non university and university graduates respectively. The main variables used in the analysis are described in Table A in the appendix.

4. The Effect of Non Linearities in the Path of Education

In Table 4 we examine average differences between graduates that delayed their schooling and those who were continuously enrolled. Graduates that delayed their schooling are, on average, older, more likely to be immigrants, to have children earlier, and to have parents who did not acquire postsecondary schooling. They are however, more likely to have previous postsecondary education and less likely to complete additional degrees after their graduation date in 1995. Delayed graduates seem to have a smoother transition into labour markets than their continuously enrolled fellow graduates. They earn higher wages two years after graduation and they are more likely to hold the same job at the time of the follow-up interview in 2000. Part of this success could be attributed to stronger labour market

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[13] Unfortunately, it does not provide wages for jobs held before graduation.
[14] All results hold if we use hourly wages instead, however, the sample is further reduced and significance lower in some cases. Results are available from authors

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connections (a greater fraction of delaying graduates comes back to jobs held before graduation and are more likely to have worked full time before graduation). This is unlikely to be the whole story. If such were the case, we would expect that this advantage would vanish over time as the continuously enrolled graduates build labour market connections of their own. A cursory examination of the raw data does not suggest that this is case.

Regression Results

We show estimates of the association between log wages in 1997 and school delay. Columns labeled "Base Case" present basic results of OLS regressions as stated in equation (3). Columns labeled "Non linear" augment the model to account for the effect of multiple degrees (Second Degree), as well as an interaction term between delay and multiple degrees. The columns labeled "Detailed" disaggregate these effects by various types of previous activity and previous levels of schooling. All these regressions include indicators for field of study in humanities, commerce, agriculture, health, engineering, math and applied sciences, and other fields (social sciences/education is the omitted category). We also control for province of residence at the time of the interview.[15] Results are shown separately for the sample of non-university and university graduates.

For all types of graduates, experience before graduation has a significant effect on earnings. Non university students show a significant non linear pattern in the returns to previous experience, while university graduates have smaller and linear returns to years of experience acquired before graduation. This pattern might suggest that university graduates are more likely to change career paths and therefore find previous experience less useful, while non university graduates may be more likely to upgrade existent skills. Proper analysis of this possibility is hampered by the difficulty of properly assessing whether additional education provides a set of new skills or upgrades existent ones. Experience after graduation (entered in a linear fashion since all individuals graduated at the same time) is also significant, increasing the earnings of non university graduates by 3.6% and those of university graduates by 2.6%. Returning to a previous employer has also a positive and strong effect on earnings. Demographic characteristics have the expected effects, which vary

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[15] As mentioned, differences in the educational systems between Quebec and the rest of Canada could be driving these estimates. We performed the same regressions excluding Quebec from the analysis and obtained similar results. These are available upon request.

to some extent depending on the type of degree obtained. The gender gap is smaller for university graduates, whereas the immigrant gap is only significant for non-university graduates. Similarly, the (positive) bilingual premium is bigger among university graduates.

For non-university graduates, the return to a college degree, relative to a trades certificate, is 6% across all specifications. Those who delay schooling experience a 3% premium over and above what can be attributed to higher levels of experience and the extent of labor market connections. In the second column we allow those with additional postsecondary education to have different returns. Relative to single degree continuing graduates, multiple degree continuing graduates experience a loss of 4%, while single degree delayed graduates earn 2% more. These differences however are not statistically significant by themselves. Finally, multiple degree delayed graduates earn roughly 5% more than the base category (-0.043+0.021+0.072)). The next column further reveals that completing a second non university degree (without interrupting) significantly reduces earnings for those with a previous college degree. We find a significant premium for those who delayed the completion of their first postsecondary degree because they were previously working, but not for others.

Among university graduates, those with a graduate degree earn around 27% more than bachelor graduates[16] and the coefficient on the delay dummy is 6%. In the next column we show that those who obtained a second degree (without delaying) and those who delayed schooling before obtaining their first postsecondary degree receive a premium of approximately 2%. Graduates who delayed the completion of their second postsecondary degree earn roughly 9% more than traditional graduates (0.019+0.021+0.051)). Neither of these figures are, however, statistically significant. Further disaggregating these estimates in the "detailed" model suggests that the reason why we do not find significant returns to delaying schooling among university graduates resides in the differences that exist between types of previous education and types of previous activity while not in school. Individuals with previous university degrees earn between 9% and 25% more than individuals obtaining their first university degree. On the other hand, individuals with previous college education experience a 5% penalty with respect to graduates obtaining their first university degree.

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[16] The percentage change in wages implied by the estimated coefficient β is calculated as $(1-e^{\beta})$

Note that accounting for these differences in previous education reduces by half the estimate of obtaining a graduate degree in 1995 (from 26% in column 4 to 15% in column 6). This reduction reflects the fact that the value of a graduate degree partly steams from the requirement of previous postsecondary degrees. Regarding the coefficient on school delay, we find that while graduates that were previously working receive returns of 6% to delaying school, those who were out of the labour force suffer substantial penalties of around 22%.

2SLS Estimates

Next, we present estimates that attempt to correct for the possible endogeneity of the delaying decision estimating an equation such as that specified in (4). According to the model outlined in the previous section, the average ability of individuals who delayed their education depends on the relationship between costs and ability. Under the assumption of negative correlation, if such correlation is strong the average ability of delayers is more likely to be lower than that of continuing graduates and the OLS estimates are more likely to be downward biased.

Because the decision to delay encompasses two decisions: the decision to interrupt *and* the decision to return, we consider as determinants of the delay choice the opportunity costs of schooling both at the time of interruption and at the time of re-enrolment. These are measured using provincial unemployment rates during the year before enrollment in the program leading to the degree obtained in 1995, and national unemployment rates the year graduates completed either high school or a previous postsecondary degree.[17] In additional regressions we also include parental postsecondary education (see footnote 11).

Table 6 presents results for non university (Panel A) and university (Panel B) graduates. Specification (1) reports the results without considering additional family background covariates, specification (2) adds these variables. To economize space we only show the coefficient of school delay and the results from the first stage regression, since there are no significant differences in the estimates of the covariates between OLS and 2SLS methods.

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[17] Results using youth unemployment rates are similar although the explanatory power of the instrument is lower.

The effect of both unemployment rates is significant, suggesting that there is sufficient variation between the circumstances at the point of interruption and at the point of return to use both instruments. This is so even when we include family background variables. A test of the joint null hypothesis that the first stage regressors are all zero is rejected in all cases (see Chi-2 statistic at the bottom of the first stage regression). The effect of unemployment rates at the time of graduation from the previous degree is negative: high unemployment rates induce more delay. This conforms to previous evidence indicating that high unemployment rates increase postsecondary enrolment (reducing interruption and hindering delay). The effect of the unemployment rate the year before enrolment differs by type of institution, being negative for non university graduates and positive for university graduates. There is much less evidence about the whether employment-to-school transitions are also countercyclical. It could be the case that high unemployment rates reduce wages or the stability of current jobs lowering opportunity costs of schooling (and inducing more individuals to return to school). On the other hand, it may be perceived as a bad time to quit a job that is sufficiently secure reducing the incentives to return to school. The first effect is more likely to dominate if both costs and returns to postsecondary degrees are perceived to be high as it is the case of university degrees. According to our estimates, this seems to be the case, as we observe a positive effect of unemployment the year before enrolment on delay (via an increase in the propensity to return to school).[18]

In general, it appears that the returns to school delay are underestimated by standard OLS regressions, suggesting that the correlation between costs and abilities for this particular sample is indeed negative. The corrected estimates suggest over 18% and 30% higher returns for college and university graduates respectively who delayed their studies. The effects are similar when we consider additional covariates.

Our stylized model of Section 2 offers an explanation for the higher (relative to the OLS) estimated returns to delaying education. A (strong) negative correlation between costs and ability will reduce the average ability of the potential population that will contemplate returning to school, since graduates who come back to school are more likely to have lower ability (below the threshold $a*$) than the group who attended school continuously.

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[18] King and Sweetman (2002) show that for older workers with substantial pre-separation labor force attachment, employment-to-school transitions are indeed pro-cyclical.

More interestingly, the results indicate that there is a positive return to delaying postsecondary education, over and above what we can expect due to higher levels of experience and labor market connections obtained during the interruption. To the extent that students delay their education because of uncertainty about its returns, it would appear that the value of postsecondary education is enhanced by solving this uncertainty before entering school. Therefore delaying postsecondary education might have, at least for certain students, a productive value because it allows them to learn about the returns to postsecondary education, or about which skills the market demands.

Persistence of estimates

One question that naturally arises from our results relates to the persistence of the premium to delaying schooling. We use the 2000 Follow-up Survey of Graduates to estimate the effect of delaying schooling on earnings in 2000, five years after graduation. These results are summarized in Table 7. Panel A corresponds to non university graduates and Panel B to university graduates. According to the OLS estimate the premium for delayed schooling in 2000 does not change much relative to that estimated two years after graduation. A small premium (2%) persists for non university graduates and a slightly bigger one for university graduates (around 4%). The corrected 2SLS estimates also indicate that OLS underestimates the returns to delaying school. They point to the existence of significant premium for delaying schooling for non university graduates (8%) although smaller than that estimated for 1997. Estimates for university graduates, on the other hand, do not show evidence of being affected by non random selection five years after graduation. The returns are similar to the OLS estimates (5%) and the Chi2 test does not reject the null of no selection.

Robustness

We consider several robustness checks for these results. First, since unemployment rates (UR) are likely to be autocorrelated, it could be the case that the UR the year before re-enrolment determines both the decision to re-enroll and the observed wage two years after graduation, particularly for very short degrees (Oreopolous, von Wachter and Heisz

(2006)).[19] To examine this possibility, we re-run our estimates using a sample of individuals that graduated from programs that take longer than 6 months to complete. This renders a sample for which the UR the year before enrolment is sufficiently removed from observed labour market outcomes to be considered an exogenous instrument. Our results are similar for this sample, although smaller in magnitude. Second, we checked for the possibility that the results are driven by our definition of delay. Recall that we considered those who reported their main activity during the year before enrolment jointly as working and in-school to be mainly in school and therefore not delaying education. These could lead us to underestimate the magnitude of the delay premium, particularly if theses graduates were actually maintaining strong ties with the labour market. In that case, the effect of these ties could improve their labour market outcomes upon graduation, increasing the average earnings of individuals who do not delay school. We redefined the delay variable eliminating from the sample the group of individuals who report being working and in school the year before enrolment. The results from this sub-sample of individuals suggest that this is not a major concern, as we found only slight differences in the delay premium between the two samples.[20]

4. Conclusion

We find positive returns to postsecondary education delay that exist over and above the returns to experience and labor market connections gained during the interruption period. Substantial differences in the returns to delaying education exist between graduates from university and non-university postsecondary institutions, and also between those who obtained a second postsecondary degree relative to those obtaining their first. These estimates abstract from specific macroeconomic effects at the time of graduation that may affect labour market success and are also robust to the possibility of selection in the decision to delaying education.

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[19] Annual unemployment rate series typically follow an AR(2).

[20] These results are available upon request

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Table 1. Previous education level by type of degree in 1995

	Non University		University		% of all graduates
	Trade	**College**	**BA**	**Graduate**	
Previous Education					
No Post secondary	23%	36%	41%	--	66.5%
Trade	63%	21%	16%	--	1.7%
College	12%	17%	71%	--	14.1%
BA	5%	11%	50%	34%	16.3%
Graduate	4%	6%	32%	58%	1.5%
% of all graduates	19%	28%	46%	7%	24,433

Note: Cells indicate row percentages

Table 2. Main activity before enrollment by type of degree in 1995

	Non University		University		% of all graduates
	Trade	**College**	**BA**	**Graduate**	
Previous Main Activity					
School	28%	47%	65%	40%	48.0%
Working and School	5%	7%	8%	6%	7.0%
Working	46%	37%	23%	48%	36.0%
Unemployed	14%	4%	1%	2%	5.0%
Other	6%	5%	3%	3%	5.0%
	100%	100%	100%	100%	100%
Observations	5,145	7,745	10,185	1,418	24,433

Note: Cells indicate column percentages

Table 3. The Path to Postsecondary Education

| | Non University | | | University | | |
| | Multiple Degree | | | Multiple Degree | | |
	No	Yes	Total	No	Yes	Total
Continuing Graduate						
Yes	41%	5%	46%	43%	27%	70%
No	42%	12%	54%	9%	21%	30%
Total	83%	17%	100%	52%	48%	100%
Observations			12,868			11,565

Note: "Non University" includes Trade/Vocational and College students. "University" includes graduate and BA students

Table 4. Sample Characteristics – Mean Values

	Non-University Graduates			University Graduates		
	Continuous Schooling	Delayed Schooling	*p*-value of difference	Continuous Schooling	Delayed Schooling	*p*-value of difference
Age	24.3	30.3	(0.000)	26.9	33.5	(0.000)
Female	48.2	47.9	(0.795)	53.2	52.8	(0.730)
Immigrant	6.6	8.5	(0.000)	11.9	14.5	(0.000)
Bilingual	14.7	11.7	(0.000)	19.7	23.3	(0.000)
Children 0-6 in 1997	9.0	21.6	(0.000)	10.2	25.3	(0.000)
Children 0-6 in 2000	21.8	26.9	(0.000)	23.9	31.5	(0.000)
Children 0-6 at previous graduation	0.7	1.8	(0.000)	2.0	5.1	(0.000)
Father education-Postsecondary	27.3	21.0	(0.000)	47.6	38.7	(0.000)
Mother education-Postsecondary	25.8	19.7	(0.000)	43.4	35.4	(0.000)
UR year before enrolment	11.5	11.2	(0.000)	9.19	9.27	(0.302)
UR year at previous graduation	9.9	8.4	(0.000)	8.71	8.33	(0.000)
Back to job held before graduation	2.7	9.4	(0.000)	4.2	26.3	(0.000)
Held full time job before graduation	46.3	73.0	(0.000)	56.0	79.6	(0.000)
1997 Experience since graduation	1.7	1.72	(0.843)	1.75	1.87	(0.000)
Permanent job 1997	69.1	68.3	(0.367)	56.6	68.0	(0.000)
Full Time Job 1997	86.5	86.9	(0.553)	85.7	88.0	(0.000)
Positive earnings 1997	19,441	22,369	(0.000)	25,490	36,982	(0.000)
Work same job since 1997	37.9	43.2	(0.000)	37.5	54.1	(0.000)
2000 Experience since graduation	4.6	4.1	(0.570)	4.66	4.81	(0.000)
Permanent job 2000	76.2	73.3	(0.000)	71.4	75.7	(0.000)
Full Time Job 2000	92.0	91.0	(0.091)	91.2	90.8	(0.722)
Positive earnings 2000	32,907	34,035	(0.004)	46,582	53,400	(0.000)
Previous Level of Schooling						
Some PS	17.6	16.7	(0.233)	6.8	5.8	(0.065)
College	7.4	14.7	(0.000)	8.5	10.2	(0.000)
University	3.6	6.6	(0.012)	34.6	66.1	(0.000)
Other Degree after 1995	11.1	9.6	(0.000)	11.5	6.5	(0.000)
Other Degree after 1997	15.9	11.6	(0.000)	21.7	12.2	(0.000)

Table 5. OLS – 1997 Wage Regression (Robust Standard Errors)

	Non University *			University		
	Base Case	Non Linear	Detailed	Base Case	Non Linear	Detailed
Experience bfr graduation	**0.030**	**0.030**	**0.030**	**0.023**	**0.021**	**0.018**
	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)	(0.005)
Exp^2 bfr. Graduation	**-0.001**	**-0.001**	**-0.001**	-0.0001	-0.0001	0.0001
	(0.000)	(0.000)	(0.000)	(0.0003)	(0.0003)	(0.0003)
Experience aft graduation	**0.035**	**0.035**	**0.035**	**0.026**	**0.025**	**0.028**
	(0.012)	(0.012)	(0.012)	(0.013)	(0.013)	(0.013)
Back in 1994 job	**0.279**	**0.278**	**0.274**	**0.335**	**0.332**	**0.318**
	(0.025)	(0.025)	(0.025)	(0.028)	(0.028)	(0.028)
Female	**-0.249**	**-0.249**	**-0.246**	**-0.168**	**-0.168**	**-0.158**
	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
Immigrant	**-0.076**	**-0.077**	**-0.081**	0.016	0.016	0.010
	(0.023)	(0.023)	(0.023)	(0.023)	(0.023)	(0.023)
Bilingual	**0.042**	**0.044**	**0.044**	**0.078**	**0.077**	**0.074**
	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)
College 1995	**0.061**	**0.060**	**0.062**	--	--	--
	(0.015)	(0.015)	(0.015)			
Graduate 1995	--	--		**0.235**	**0.216**	**0.143**
				(0.024)	(0.026)	(0.028)
Previous schooling:						
Second Degree in 1995	--	-0.043	--	--	0.019	--
		(0.029)			(0.021)	
Previously Trade			0.057			0.135
			(0.044)			(0.094)
Previously College			**-0.112**			**-0.050**
			(0.033)			(0.025)
Previously Bachelor			0.016			**0.085**
			(0.037)			(0.025)
Previously Graduate			-0.020			**0.225**
			(0.107)			(0.053)
Previous Activity :						
Not in school (NS)	**0.032**	0.021	**--**	**0.056**	0.021	--
	(0.015)	(0.016)		(0.021)	(0.029)	
NS – Working			**0.028**			**0.059**
			(0.017)			(0.029)
NS – Unemployed			-0.023			0.062
			(0.027)			(0.072)
NS – Other			0.032			**-0.202**
			(0.031)			(0.051)
NS * Second Degree	--	**0.072**	**0.074**		0.051	0.025
		(0.035)	(0.036)		(0.035)	(0.035)
Observations	9,645	9,645	9,645	8,360	8,360	8,360
R-squared	0.221	0.221	0.223	0.283	0.284	0.290

* "Non University" includes Trade/Vocational and College students. "University" includes graduate and BA students.
Note: All regressions include controls for usual hours of work, current marital status, presence of children under 6, current province of residence, an indicator for additional education after 1995, and field of study of the 1995 degree

Table 6. Treatment Effects Model – 1997 Wage Regression (Robust Standard Errors)

A. Non University*

		(1)		(2)	
		2SLS	1-Stage	2SLS	1-Stage
Previous Activity: Not in school		**0.164**		**0.148**	
		(0.062)		(0.061)	
Provincial unemployment rate year before enrolment			**-0.010**		**-0.011**
			(0.004)		(0.004)
National unemployment rate at the time previous graduation			**-0.222**		**-0.220**
			(0.007)		(0.007)
Children 0 to 6 at previous graduation					**0.772**
					(0.000)
Father Education – Postsecondary					**-0.101**
					(0.035)
Mother Education – Postsecondary					**-0.068**
					(0.035)
Lambda /	Chi2**	-0.091	1044.6	-0.081	1057.7
(SE) /	Test Rho = 0 (p-value) ***	(0.039)	0.02	(0.038)	0.03
Observations		8,698	8,698	8,698	8,698

B. University*

		(1)		(2)	
		2SLS	1-Stage	2SLS	1-Stage
Previous Activity: Not in school		**0.269**		**0.245**	
		(0.044)		(0.047)	
Provincial unemployment rate year before enrolment			**0.019**		**0.017**
			(0.005)		(0.005)
National unemployment rate at the time previous graduation			**-0.094**		**-0.090**
			(0.008)		(0.008)
Children 0 to 6 at previous graduation			--		**0.722**
					(0.000)
Father Education – Postsecondary			--		**-0.147**
					(0.033)
Mother Education – Postsecondary			--		**-0.128**
					(0.033)
Lambda /	Chi2**	-0.133	134.9	-0.117	192.3
(SE) /	Test Rho = 0 (p-value) ***	(0.023)	0.00	(0.025)	0.00
Observations		7,911	7,911	7,911	7,911

* "Non University" includes Trade/Vocational and College students. "University" includes graduate and BA students.
** Test of the null hypothesis that the identifying restrictions in the first stage are jointly 0
*** Test of independence equations (rho=0)
Note: The main equation includes all controls specified for the OLS regressions in table 5.

Table 7. OLS and Treatment Effects - 2000 Wage Regressions (Robust Standard Errors)

A. Non University*		OLS	2SLS
Previous activity: not in school	**0.020**	**0.021**	**0.091**
	(0.011)	(0.013)	(0.030)
Second Degree in 1995		**0.052**	
		(0.017)	
Second Degree in 1995*Previous activity NS		0.005	
		(0.026)	
Lambda /			-0.052
(SE)			(0.022)
Chi2**			826.5
Rho = 0 (P-value)			0.03
Observations	6,776	6,776	6,117
R-Squared	0.445	0.449	
B. University*		**OLS**	**2SLS**
Previous activity: not in school	**0.030**	**0.035**	**0.089**
	(0.013)	(0.018)	(0.052)
Second Degree in 1995		**0.065**	
		(0.013)	
Second Degree in 1995*Previous activity NS		-0.022	
		(0.021)	
Lambda			-0.049
(SE)			(0.032)
Chi2**			110.2
Rho = 0 (P-value)			0.15
Observations	5,737	5,737	5,427
R-squared	0.477	0.479	

* "Non University" includes Trade/Vocational and College students. "University" includes graduate and BA students.

** Test of the null hypothesis that the identifying restrictions in the first stage are jointly 0.

The OLS regressions include all controls listed in Table 5.

The main equation in the 2-step procedure includes all controls listed for the wage regression. The instruments are the provincial unemployment rate the year before enrolment and the national unemployment rate at the time of graduation from the previous degree.

Appendix

Description of main variables

Dependent variable

Annual earnings	Estimated annual gross earnings for 1997 and 2000, calculated from all jobs information

Demographic Characteristics

Immigrant Status	Whether the Graduate was born in Canada or not
Children 0 to 6	Age and number of children are reported in 1997 and 2000.
Age in June 95	Age is reported in the 1997 interview

Activities before Enrollment	The main activity during the 12 months previous to enrolment in the 1995 program is reported. This variable is used to infer labour force status before enrollment in the program and whether or not the graduate was in school before enrollment in the 1995 program
Previous Highest Degree	Degrees obtained before 1995 graduation are reported
Previous Field of study	Field of study for postsecondary degrees held before 1995 graduation are reported
Date of completion previous degree	Graduate reports the date of completion of previous degrees.
Ever worked full time before	Graduate reports whether or not he worked full time before graduation
Degree 95	Type of degree obtained upon graduation in 1995
95 Field of study	Main field of study corresponding to the 1995 degree
Length of the program	Graduate reports the length of the program completed in 1995. This variable is used together with date of completion of previous degree to calculate length of interruption

Activities after Graduation

Back to previous employer	Graduate reports whether she returned to work with a previous employer
Jobs held after graduation	
Permanent job	Graduate reports whether the job held after graduation was a permanent job
Paid job	Graduate reports if the job held after graduation was paid, unpaid, self-employed
Start and end dates	Graduate reports the start and end dates of the job(s) held in 1997 and 2000.