"The Returns to Flexible Post-secondary Education in Canada: The Effect of Delaying School"

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Abstract. This paper investigates the returns to flexible postsecondary education by relaxing the standard assumption that this education proceeds in a continuous manner with lower, more general, degrees being attained first, and higher, skill specific degrees, being attained later. 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. This allows us to abstract from specific macroeconomic effects at the time of graduation that may affect labour market success. Our results show that graduates that delayed their education experience a premium relative to graduates that did not. These estimates are, in general, robust to the possibility of selection in the decision to interrupt schooling. Therefore, these findings add to previous studies that suggest that individuals with higher opportunity costs of schooling may have relatively high returns to education.

1 Introduction

The increasing importance of acquiring postsecondary education occurs in tandem with significant changes in the usual timeline of academic careers. Rapidly changing technologies and increasing costs of postsecondary education induce individuals to delay education or to return to school to update productive skills. With few exceptions, traditional models that analyze the returns to education do not take into account the flexibility of schooling choices. This paper considers flexible post secondary educational choices, and estimates the returns to delaying school using the Canadian National Survey of Graduates (NSG) 1995. In contrast with previous research, we find substantial short term premiums for delaying school that in some cases persist five years after graduation. However, significant differences in these returns exist between graduates from non-university and university post secondary institutions, and also between those who obtained a second post secondary degree relative to those obtaining their first post secondary degree. These estimates are, in general, robust to the possibility of sample selection in the decision to interrupt schooling.

The demands of emerging technologies are inducing more individuals to return to school to acquire new, or upgrade existent skills. From the Government perspective, there seem to be no doubt that higher education is the key to success in the global economy, and that life-long learning is an essential part of today's worker career.[1] At the same time, 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, the fraction of individuals who engage in education after some time away from learning institutions increases. The image of a "typical" graduate that has proceeded in a linear, uninterrupted fashion from primary school to the highest level education desired is becoming less and less common.[2]

[1] Current debates on the improvement of educational standards and access to higher education are on-going in western economies. See Advisory Council on Science and Technology (2000),Human Resources Development Canada (2002) and US Department of Education (2006)

[2] In the US one third of the 1995-96 starting class of postsecondary students had waited a year or more after finishing high school to enrol (US Department of Education, NCES 2005-152. In Canada, 25% of 20 year-olds postsecondary students had delayed their enrolment for at least one year (Tomkowicz and Bushnik, 2003)

Our purpose is to gain a better understanding of the returns to postsecondary education by lifting the assumption that individuals engage in continuous, linear schooling before entering the labour market. This information is not only of interest for students and the institutions of learning. At a time of intense debate about how government, institutions, and students should share the costs of postsecondary education, it is important to have as complete as possible knowledge of the returns to different programs and disciplines of study. Learning about returns to education for individuals who do not follow a traditional sequence of studies may help us to identify venues by which individuals who have spent some time out of the labour force may re-enter employment with minimum disruption. Examining this relatively unexplored source of variation in the returns to postsecondary education is a prerequisite to the proper design of educational and labor market access policies. In addition, we conduct separate analysis for universities and colleges, which allows us to contribute to the debate about the value of the skills learned in different institutions.

The theory of human capital predicts that individuals who attain more education will receive higher wages derived from higher levels of productivity acquired at school. Ample evidence confirming this prediction exists for the case of North America.[3] These studies consistently find substantial returns to a variety of postsecondary degrees. The common underlying assumption in most models that study 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 his/her lifetime. Furthermore, only the highest postsecondary degree obtained matters in terms of explaining earnings. This assumption, although convenient given the structure of the data sets usually available for analysis, is not totally satisfactory. The common perception is that the luck of postsecondary graduates differs considerably depending on the paths they take (Mincer and Ofek (1982)). Confirmation of the disparities in returns to different types of postsecondary education is extensive. Kane and Rouse (1993) discuss variation in returns to different types of college degrees in the US, Allen (1998) and Sweetman (2004) present evidence on the differences in returns across fields of study in Canada. There is also evidence that returns to postsecondary education differ between immigrant and non-immigrant groups and between

[3] See Card (1999) for an exhaustive survey on the literature of the returns to education. Vaillancourt and Bourdeau-Primeau (2002) provides recent Canadian evidence

immigrants by quality of schooling and field of study (Bratsberg and Ragan (2002), Sweetman (2004), and Ferrer and Riddell (2004)).

The effects of a more realistic assumption about the academic careers of young men and women have been examined in the US literature. Griliches (1980) and Marcus (1984) estimate the returns to interrupted schooling using the young men cohort of the National Longitudinal Survey. Light (1995) uses a superior data set to explore the effects of school interruption on the wages of a cohort of young white men in the US. She shows that, for the same number of years of schooling, those who interrupted their schooling earn less than those educated continuously, with two exceptions: those with 12 years of schooling, and those with more than 16 years of schooling. For these two groups, she finds no difference between returns to continuous or interrupted education. She also finds that the 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). In contrast our results suggest that individuals who delay postsecondary education earn a premium over individuals who completed the same amount of schooling continuously. Although we find that this premium tends to vanish over time, it is still substantial five years after graduation.

This difference in the results is not surprising due to the very dissimilar nature of the data set used for analysis. Light (1995) uses panel data for a cohort of young US men (14-22 years old at the onset of the panel), following them for ten years (from 1979 to 1989). We use the 1997 Canadian National Survey of Graduates (SOG) and its 2000 Follow-up Survey (FSOG) conducted by Statistics Canada. These surveys collect information on the labour market experience of the 1995 graduates from universities, community colleges, and trade/vocational programs who are interviewed two and five years after graduation. Differences in the characteristics of the labour market experienced by these two groups alone would be likely to produce different estimates.[4] Moreover, rather than a birth cohort we are considering a cohort of postsecondary graduates, comparing those who interrupted their education at some point after high school to those who were continuously enrolled in school. The main advantage of the Canadian data is that since all subjects 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

[4] The returns to different levels of education and employment probabilities have changed considerably across time for both countries.

could potentially bias our estimates.[5] In addition, the NSG supplies a richness of information on the educational and labour choices of graduates, together with a sample large enough to obtain significant evidence about the experiences of non traditional venues of academic learning. To our knowledge, this is the first study to use a representative survey of graduates to analyze the returns to postsecondary education while relaxing the assumption of linear, uninterrupted schooling.[6]

Canadian studies on the returns to post secondary education have pointed out the great diversity that exists in the wage premium of postsecondary graduates (Butlin (2001), Finnie (2000) and Finnie and Frennette (2003)). However, the effect of school delay on the returns to education has not received much attention in Canada despite the fact that the Canadian educational system provides numerous opportunities to return to school at different points in life. Zhang and Palameta (2006) use the Survey of Labour and Income Dynamics to examine both the characteristics and the returns to education of Canadian students who go back to school after spending at least one year not enrolled in a learning institution. Their analysis stresses the importance of age and returning to a previous employer after obtaining a postsecondary certificate.

We proceed to review the methodology and data used in our analysis in the next section. In Section 3 we present our results. The final section concludes.

2. A Framework for Analyzing School Interruption

In order to focus the ideas about school interruption, we develop the following simple model of schooling choice.

Each individual in the population of high school graduates has an ability distribution $F(a_i)$. Ability is unknown at high school graduation, but it becomes known with either postsecondary education or labour market experience.[7] Individuals have an idiosyncratic positive

[5] Beaudry and DiNardo (1991) propose that the timing of entry in the labour market may have long scarring effects on earnings and employment patterns.

[6] A limitation of the sample is that we are confined to illustrate differences in the returns to postsecondary graduates depending on the path taken to achieve their degree and cannot offer any insight on the effects of interrupting schooling at lower education levels.

[7] This is plausible if we consider that high school graduation conveys only general skills that do not completely inform individuals about potential earnings in skill-specific jobs.

cost of education $c_i \in (0,1)$. We assume that costs are independent of ability. In any period t, wages are paid to individuals according to their ability and skills obtained. For simplicity consider that there are only two possibilities: skilled, if the individual has a postsecondary degree, and unskilled, if the individual does not.

Skilled	$w^S_{i,t} = \alpha_t \, a_i$	$\alpha_t > \beta_t$
Unskilled	$w^U_{i,t} = \beta_t a_i$	

where α_t represents the effect of other wage determinants like experience or tenure. At time 0, individuals decide whether or not to enrol in postsecondary education. Those who do not go to study enter the labour market and work, earning $w^U_{i,0}$, which we normalize to 0. At time 1, all individuals learn their ability. Those who acquired an education in the first period simply go to work and those who worked in the initial period consider whether to continue working or return to school. At time 2 all individuals work and collect last period wages. This simple game can be solved by backward induction.

- **<u>At time 2</u>**. there is no choice, each worker collects wages according to their ability and skill level, $w^S_{i,2} = \alpha_2 \, a_i$, $w^U_{i,2} = \beta_2 a_i$
- **<u>At time 1,</u>** individuals choose whether or not to return to school, if they were not in school the previous period, based on their realized ability, idiosyncratic cost and current and future wages. Individuals who just graduated from a postsecondary degree in period 0 work as skilled workers (no choice).

Skilled Payoff if working:	$w^S_{i,1} + E[w^S_{i,2}] = \alpha_1 a_i + \alpha_2 \, a_i$	$\alpha_2 > \alpha_1$
Unskilled Payoff if working:	$w^U_{i,1} + E[w^U_{i,2}] = \beta_1 a_i + \beta_2 a_i$	$\beta_2 > \beta_1$
Payoff of returning to school:	$- c_i + E[w^S_{i,2}] = -c_i + \alpha_2 \, a_i$	
Unskilled person max	Max $\{ w^U_{i,1} + E[w^U_{i,2}] ; -c_i + \alpha_2 a_i \}$ Max $\{(\beta_1 + \beta_2)a_i , -c_i + \alpha_2 a_i \}$	
Return to school condition ⟷	$-c_i + \alpha_2 a_i > (\beta_1 + \beta_2)a_i$ $a_i > (c_i) / (\alpha_2 - \beta_1 - \beta_2)$;	$\alpha_2 > \beta_2 + \beta_1$

The probability of return (π^R) depends on the education cost (c_i), ability (a_i) and other determinants of current and future wages (β_1, α_2, β_2). A non trivial solution where not everybody chooses education implies that ($\alpha_2 > \beta_2 + \beta_1$).

- **<u>At time 0</u>, ability is unknown.** All individuals choose whether or not to continue schooling or to start work based on individual costs, expected ability, current wages and the realization that they will have the option of re-enrolling next period, once ability is known. If continuing, they incur the cost now and get the skilled wage for two periods. If they choose not to go to school this period, they receive the unskilled wage today and have an expected future payoff, which involves the decision to return next period.

Payoff continuing: $V^C = -c_i + E_a\,[w^S_{i,1} + w^S_{i,2}]$

Payoff interrupt: $V^I = E_a[w^U_{i,0}] + E_a[\max\{w^U_{i,1} + w^U_{i,2}, -c_i + E_a[w^S_{i,2}]\}$

Delay ←→ $V^I > V^C$

$$\underbrace{E_a[\max\{(\beta_1+\beta_2)a_i, -ci+\alpha_2 a_i\}]}_{(A)} > \underbrace{-ci + E_a[(\alpha_1+\alpha_2)a_i] - E_a(\beta_0 a_i)}_{(B)}$$

The functions in the max operator are linear and increasing in ability, one with slope α_2 and intercept $-c_i$, and the other with slope $\beta_2 + \beta_1$ and intercept 0. They will cross once at a point $a^*(c_i) = (c_i) / (\alpha_2 - \beta_1 - \beta_2)$. Therefore the solution to (A) is;

$$\int_0^{a^*} (\beta_1+\beta_2)\,E(a_i)\,dF(a_i) + \int_{a^*}^{1} (-c_i + \alpha_2 E(a_i))\,dF(a_i) =$$
$$(\beta_1+\beta_2)\,E(a_i)\,F(a^*(c_i)) + (-c_i + \alpha_2 E(a_i))*(1 - F(a^*(c_i)) =$$
$$(\beta_1+\beta_2-\alpha_2)\,E(a_i)\,F(a^*(c_i)) - (1 - F(a^*(c_i))\,c_i + \alpha_2 E(a_i)$$

and the solution to (B): $(\alpha_1+\alpha_2)E(a_i) - (c_i + \beta_0\,E(a_i))$. Hence,

$$(\beta_1+\beta_2-\alpha_2)\,E(a_i)\,F(a^*(c_i)) - (1 - F(a^*(c_i))\,c_i + \alpha_2 E(a_i) > (\alpha_1+\alpha_2)E(a_i) - (c_i + \beta_0\,E(a_i))$$
$$(\beta_1+\beta_2-\alpha_2)\,E(a_i)\,F(a^*(c_i)) + F(a^*(c_i))\,c_i > (\alpha_1)E(a_i) - \beta_0\,E(a_i))$$
$$(\alpha_1-\beta_0)E(a_i) < F(a^*(c_i))\,[\,c_i - (\alpha_2 - (\beta_1+\beta_2))E(a_i)]$$

If ability is uniformly distributed

$$(\alpha_1-\beta_0)\,E(a_i) < ((c_i) / (\alpha_2 - \beta_1 - \beta_2))*[\,c_i - (\alpha_2 - (\beta_1+\beta_2))\,E(a_i)]$$
$$(\alpha_2 - \beta_1 - \beta_2)\,E(a_i)\,(c_i + \alpha_1 - \beta_0) < (c_i)^2$$

To illustrate the problem, assume that c_i can take two values, c_H, with probability p and c_L with probability $(1-p)$ and let c* solve the above quadratic function. Then, if $c_L < c^* < c_H <$,

people with high cost will delay and people with low cost will continue. After that, at time 1, those who delayed schooling and have ability at least equal to $a^*(c_i)$ will come back to school.

The model implies that individuals who delayed postsecondary education because of an adverse cost realization have higher ability than those who proceeded continuously with schooling.[8] The model also helps to understand the limitations of our sample. Given that we only observe graduates of postsecondary education at time 2, we are constrained to estimate the joint effect of delaying and returning, since we do not observe those who do not return. An empirical consequence of this fact that we discuss below in more detail, is that any consideration of selection bias involves taking into account the effect of both costs and abilities in the delaying *and* return decision.

Empirical Framework

The general empirical framework to analyze earnings generation can be found in the work of Mincer (1974). His proposed reduced form equation states individual wages as a function of a series of individual characteristics, mainly levels of human capital and skills. The standard wage equation for individual *i* is of the form:

$$LnY_i = \beta X_i + \gamma S_i + \varepsilon_i \qquad (1)$$

where Y represents wages or a close measure of income, S is a vector of human capital and skills variables, such as education and experience, X is a vector of additional controls and ε is an independent and identically distributed vector of error terms. The coefficients β and γ are vectors of parameters. The γ coefficients of the human capital variables can, under certain assumptions, be interpreted as the rate of return to those levels of education and experience.

The stylized equation in (1) 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 acquisition of additional education. Therefore, if a student chooses to interrupt her schooling, the effect of this interruption is not considered to affect the returns to education. Further, because it does not allow for multiple

[8] This implication relies on the independence between costs and abilities.

degrees, equation (1) implicitly assumes that degrees are substitutes and the highest degree determines labour market outcomes. Educational careers are, however, likely to exhibit both delays, and progressions that do not go from lower to higher levels of education. Separating the effect of delaying postsecondary schooling from the effect of obtaining multiple postsecondary degrees may be of importance if skills obtained with different degrees are complements rather than substitutes. In the case of skill substitution, students typically choose to obtain their education in steps, where each additional degree could be considered a substitute of the previous one. This is usually the case if students complete a college degree before proceeding to obtain a university degree in the same field of study.[9] It could be the case, however, that a university graduates may feel the need to complement skills already obtained with an additional non-university degree in a different field. In this case, the traditional approach may underestimate the true returns to the university degree, whose value is enhanced by the additional, lesser, degree.

This need for flexibility on the part of school demand is mimicked on the supply side, as educational systems in general, and the Canadian educational system in particular, are flexible and diverse, offering many opportunities for individuals to come back to their studies at different stages in their lives. This diversity is lost, or simply ignored, to pursue other research venues in traditional studies of the returns to education. Examination of the educational attainment of Canadians reveals that they are likely to follow many paths in the pursuit of postsecondary education.[10] Table 1 shows the previous education of 1995 graduates. Around one third of the 1995 graduates has previous postsecondary education. Further, 27% of all graduates obtained a non university degree while having a previous university degree. This is suggestive of the extent to which the skills acquired in "higher" and "lower" degrees may be complements rather than substitutes.

We plan to improve conventional estimates by disaggregating the returns to postsecondary education by previous level of education and previous activity and obtain a measure of the differences in returns between those proceeding in the linear manner described above and those following a different pattern. For all individuals in the sample we know pre-

[9] University Transfer programs are precisely designed for this purpose. These programs are offered through Canadian colleges and technical institutes that have agreements with universities. British Columbia, Manitoba and Quebec have significant transfer programs. http://www.cmec.ca/postsec/transferabilit.en.stm

[10] Ferrer and Riddell (2002) document that around one fourth of all Canadians with a university degree, have additional postsecondary degrees and that returns between these two groups differ substantially.

1995 degrees (high school, or different levels of postsecondary education) and their main activity before enrollment in the program that lead to the degree obtained in 1995. Therefore, we modify equation (1) to account for the type of activity (schooling or no schooling) before enrollment and for the presence of multiple degrees.

$$LnY_i = \beta X_i + \gamma S_i + \lambda M_i + \varphi D_i + \varepsilon_i \qquad (2)$$

where *D* is a dummy variable indicating whether the individual was engaged in non-schooling activities before enrolling in the program for the 1995 degree, that is, if she has delayed to school. *M* is an indicator variable equal to 1 if the 1995 degree is not the first postsecondary degree, that is, the individual has "multiple" postsecondary degrees. The coefficients φ and λ are vectors of parameters reflecting the effect of delaying school and of multiple degrees respectively.

A substantial branch of the literature on the returns to education concerns the proper estimation of equation (2). Conventional OLS estimates do not take into account individual heterogeneity affecting educational choices. To the extent that individuals are not homogeneous, unobserved heterogeneity introduces a bias in OLS estimates of the returns to education. This problem is usually referred to as "ability bias".[11] When estimating the difference between earnings of college graduates and those with no degree, the appropriate earnings comparison is between what an individual earns with a college diploma and what he earns without. This difference (averaged over all individuals) is the (average) premium of going to college. However, typically, we only observe one outcome, either the individual has a college diploma or not. Conventional OLS procedures offer estimates based on differences between the returns of those who are college graduates and those without a degree. However, this is the "true" return to a college diploma only if individuals are homogeneous that is, if everybody would earn the same wage with a college diploma or without one. In our case, we are less concerned about the effect of ability on the returns to education. This is one aspect in which our focus on a cohort of graduates has important implications for the interpretation of results. All individuals in our sample have graduated from at least one postsecondary degree in 1995. Therefore, it is likely that the unobserved heterogeneity plaguing most studies on the returns to education that use a representative sample of individuals is substantially reduced here. More so, since we have also

[11] An excellent survey of the implications of the selection problem and its solutions can be found in Card (2001).

separated the sample by the type of institution, college or university, that has granted the degree. Both features are likely to leave us with a relatively homogenous ability sample in each category.

Nevertheless, we are still concerned about the endogeneity of the delay variable (*D*). The distribution of students over the categories delayed/continuous education is likely not random, even within the above narrowly defined groups. According to the simple model specified above, we expect individuals with higher costs/low school productivity to delay their studies. Among these, those closest to the cutoff point, that is those with the lowest cost/highest school productivity, are more likely to return. If costs and abilities are independent, the ability levels of graduates who interrupted and returned to school will be to the right of the ability distribution of students who continued their education and the OLS estimate of the school delay will be downward biased.

We estimate the returns to school based on a two-step least square estimation procedure that takes into account the decision to re-enroll. Consider the following model:

$$\begin{aligned} LnY_i &= \beta X_i + \gamma S_i + \lambda M_i + \varphi D_i + \varepsilon_i \\ D_i &= \beta X_i + \gamma S_i + \alpha Z_i + dW_i + v_i \end{aligned} \qquad (3)$$

where Z_i is a vector of exogenous variables capturing the decision to re-enroll. Based on our model, the vector Z contains variables related to the opportunity cost of delaying school. The opportunity cost of returning to school is captured by the provincial unemployment rate the year before enrollment in the program to account for variation in job opportunities (as an alternative to schooling). In addition, since individuals that return to school have previously chosen to interrupt, *W* captures factors leading to interrupting education. These include the national unemployment rate the year before obtaining the previous degree (either high school diploma or previous postsecondary degree), indicators of parental postsecondary education, which we take as proxies for pecuniary costs of schoolings, and an indicator for whether or not the individual had young children at the time he graduated from the previous degree which accounts for non pecuniary costs of schooling.[12]

There is evidence in the literature that postsecondary enrollment rates are anti-cyclical. For example, Betts and McFarland (1995) show that unemployment increases community

[12] Unfortunately, we do not know the province of residence at the time of graduation from the previous degree.

college enrollment in the US. 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.

Data Description

To explore the questions posted above, we use data from the 1997 Canadian Survey of Graduates (SOG) and its Follow-up Survey (FSOG) conducted by Statistics Canada in partnership with Human Resources Development Canada. The 1997 SOG examines the labour market experiences of 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, including characteristics of the programs of study, activities before and after graduation, and socioeconomic background. It comprises 43,000 individuals representing almost 300,000 graduates.[13] The sample plan is a non-replacement stratified random plan including systematic selection of graduates within strata where graduates were previously sorted by program. Stratification is based on province where educational establishment is located, level of certification and field of study.

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:

1. graduates from university programs leading to bachelor's, master's, or doctoral degrees or to specialized certificates or diplomas;
2. 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;

[13] In all, 38,483 usable interviews were obtained from the initial sample of 61,558, from which 2,898 units were deemed out-of-scope, for a response rate of 65.6%. More information about the survey can be found in http://www.statcan.ca/bsolc/english/bsolc?catno=81M0011X

3. graduates from skilled trades (pre-employment programs that are normally three months or more of duration) in trade/vocational schools[14].

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.

As mentioned, 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. In addition, they may have been previously full time students 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 plausible paths, we consider two different 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 were working full time *and not in school*, 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.[15] We define four types of 1995 graduates according to these characteristics:

- *Single degree continuing graduates* are those who, while being in school before they enrolled in the program leading to the 1995 degree, did not have a previous postsecondary degree. This group is comprised mainly of high school graduates that proceeded directly to postsecondary education and constitutes our base category.

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

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

- *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 1 shows the previous education of 1995 graduates. Around one third of the 1995 graduates have previous postsecondary education, 16% have a degree from non-university postsecondary institutions and 19% have a previous university degree. Table 2 shows the main activity of 1995 graduates before enrolment in the program. Only half of all postsecondary students that graduates in 1995 report being in school during the year before enrolling in the program, while 7% report being 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. Interestingly, 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.[16] Approximately one third of the 1995 graduates returned to school within three years of completing their previous degree.

Table 3 shows, by type of institution (non-university or university), the fraction of 1995 graduates that falls into each of the categories described above. We distinguish between these two groups because we expect the characteristics of graduates from non university and university institutions to differ considerably as different programs vary in terms of their financial and time commitments. 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. Among graduates from non-university institutions, those with a single degree constitute the majority of the sample, around 82%. They are roughly equally divided between those who were previously in school -- the continuing graduates who transited to non-university post-secondary from secondary school-- and those who

[16] There are some gender differences regarding the fraction of graduates dedicated to non-labour market activities other than studying, with more females than males involved in household activities.

were not studying before enrollment. However a significant portion, 18% 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 around 5% are continuing graduates transiting from one post-secondary degree to another without interrupting their studies. University graduates are equally divided between single degree graduates 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 (the non-continuing graduates). They are just above a third of all university graduates. Among single degree university graduates, four fifths are continuing graduates coming from high school. Multiple degree graduates are similarly divided among continuing and non-continuing graduates with roughly twice as much graduates having advanced continuously from a previous post-secondary degree to another.

The SOG 1995 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 full time/part time job status.[17] For those who held previous post-secondary education, it records graduation year, the type of degree and field of study obtained. The SOG also records 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, wages and usual hours per week). In addition, it provides similar information about the job held in the reference week, plus information about wages. 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.[18] We 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). Indicators for province of residence at the time of

[17] Unfortunately, it does not provide wages for jobs held before graduation.
[18] Individuals report their earnings as annual, monthly, bi-weekly, weekly, daily or hourly, as well as the usual hours of work. Statistics Canada imputes a measure of annual earnings using all information available. However, a reliable measure of hourly earnings could not be computed for most of the sample due to a reporting error.

the interview include Ontario, Quebec, Maritimes, British Columbia and the Northern Territories (includes Yukon), the omitted category is the indicator for the Prairies (Alberta, Manitoba and Saskatchewan).

Table A1 in the appendix describes the main variables used in the analysis.

3. **The Effect of Non Linearities in the Path of Education**

We explore differences between 1995 graduates that delayed their schooling and those who were continuously enrolled in Table 4. Graduates that delayed their schooling tend to be older, are more likely to be immigrants and to have children, and their parents are less likely to have postsecondary education. They are also 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 be at the same job by the follow-up interview. Part of this success could be attributed to stronger labour market networks (a greater fraction of delaying graduates comes back to jobs held before graduation and have more full time experience). It is unlikely that this is the whole story. If such was the case, we would expect that this advantage would vanish over time as the continuously enrolled graduates build networks and labour market knowledge of their own. However, while this effect declines for non university graduates, the advantage remains quite strong for university graduates that delayed their education.

Regression Results

Table 5 shows the results of estimating the wage equation stated in (1) using information from the 1997 survey. The columns labeled "Base Case" specify the standard log-wage regression equation as a function of human capital variables and demographic controls for comparison purposes. Columns labeled "Non Linear" augment the model to account for non-linearities in the schooling path. It includes variables to assess the effect of multiple degrees (Second Degree), school delay (Previous Activity not in School), as well as an interaction term. The columns labeled "Detailed" disaggregate these effects by various types of previous activity

and previous level of schooling. Results are shown separately for the sample of non-university and university graduates.[19]

For all types of graduates, age has a significant effect on wages, slightly under a year for college graduates and between 1.5% and 2% for university graduate. Other job characteristics, such as full time job and returning to a previous employer, have also a positive, strong influence on wages as reported elsewhere in the literature.[20] Demographic characteristics have the expected effects, which vary to some extent depending on the type of degree obtained (university/non university). The gender gap diminishes for university graduates, whereas the immigrant gap is only significant for non-university graduates. Similarly, the (positive) bilingual premium is only significant among university graduates.

For non-university graduates, the returns to a college degree, relative to a trades certificate are 7.5% (column 1).[21] This estimate increases slightly when we consider differences in the path of education (columns 2 and 3). Graduates previously in school but who are obtaining a second degree, experience a loss of 5% relative to traditional graduates, while graduates who delayed schooling to obtain their first postsecondary degree earn 3% more than traditional graduates. Finally, graduates who interrupted school and returned to obtain a second postsecondary degree earn roughly 10% more than traditional graduates (0.03+0.114+(-0.051)). Column 3 further reveals that the premium for returning to complete a first non-university degree is apparent only for those who were previously working. Graduates who were unemployed or engaged in other activities experience no returns to complete their first non university degree. Similarly, the penalty to complete a second non university degree (without interrupting) is only significant for those with a previous college degree. Graduates who had a trades certificate or diploma actually experience increased earnings.

For those at the university level (columns 4 to 6) the returns to a graduate degree are around 26% higher than those of a bachelor's degree. However, they are reduced to 16% once we account for non-linearities in education. This reduction reflects the fact that the value of a

[19] Since the path to postsecondary education is rather different in Quebec, there is the possibility that our results are driven by these differences. In order to examine this possibility, we performed the same regressions excluding Quebec from the analysis and obtained similar results. These are available upon request.

[20] Although not shown in the table for the sake of brevity, it is worth remarking that the indicators for holding additional jobs since graduation have large and negative coefficients.

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

graduate degree partly steams from the requirement of previous postsecondary degrees. This effect is estimated by the variable "second degree", which amounts to 2.5%. Graduates who interrupted schooling to obtain their first post-secondary degree earn 5% more than traditional university graduates. Neither of these figure is, however, statistically significant. Graduates who delayed the completion of their second postsecondary degree earn roughly 13% more than traditional graduates (0.025+0.045+0.048)). Further disaggregation (column 6) shows that the reason why we do not find significant returns to delaying schooling resides in the differences that exist between types of previous education and types of previous activity. Individuals with previous university degrees earn 9% more than individuals obtaining their first university degree. It is somewhat curious that this return exists for both those with graduate and undergraduate degrees. On the other hand, individuals with a previous college degree experience a 5% penalty with respect to graduates obtaining their first university degree. Regarding the coefficient of delaying school, we find that the insignificant returns are due to the fact that those who were previously working experience substantial returns to delaying school (8%) while individuals who were engaged in other activities experience substantial penalties of around 20%.

2SLS Estimates

Next, we present estimates that attempt to correct for the possible endogeneity of the decision to interrupt and return to school by estimating an equation such as that specified in (3). As determinants of delaying school, we consider the opportunity costs of schooling measured by the variation in job opportunities at the time of enrollment (as an alternative to schooling). Also, since graduates who re-enrolled had previously chosen to interrupt their studies, we also account for factors leading to interrupting education. According to the model outlined in the previous section, we expect that if the reason for the interruption is related to the cost of education, the OLS estimates of school interruption will be downward biased.

The variables we consider to address the endogeneity of returning to school include provincial unemployment rate during the year before enrollment in the program leading to the degree obtained in 1995, the national unemployment rate the year the graduate completed either high school or a previous post-secondary degree.[22],[23] These variables will account for variation

[22] Unfortunately, we do not know the province of residence at the time of graduation from the previous degree.

in job opportunities - as an alternative to schooling - at the time schooling decisions were made. Panels A and B in Table 6 show the distribution of graduates by year of graduation from previous schooling level and by year before enrolment in university and non university institutions. They suggest that substantial variation exist both in the times that students choose to come back to school and in the time since they were in last school. We also run alternative models that include parental post- secondary education and the presence of young children at the time of graduation from previous degree as determinants of school delay. These variables can be thought of as proxies for the cost of schooling. In preliminary analysis they showed significant correlation with the probability of delaying school.

Results are shown in Table 7 for non university (panel A) and university (Panel B) graduates. Specification (1) reports the results without considering the costs of schooling and specification (2) adds these variables. To economize space we show only the coefficient of school delay and the results from the first stage regression, since there are no significant differences between the estimates of the other covariates of the wage equation using OLS or 2SLS methods. All variables used to estimate school delay are significant. The selection term is significant and negative, consistent with the idea that individuals with higher potential earnings are the ones who delay schooling. A test of the joint null hypothesis that the first stage regressors are all zero is rejected, with the pertinent Chi-2 statistic reported at the bottom of the first stage regression. In general, it appears that the returns to school interruption are underestimated by standard OLS regressions. The corrected estimates suggest over 13% and 34% higher returns for college and university graduates who delayed their studies respectively.

One explanation of the higher (relative to the OLS) estimated returns to coming back to school for those who interrupted their education, was suggested by our stylized model. Under the assumption of independence between costs and abilities, individuals who interrupt their schooling because their idiosyncratic cost of schooling is high will have a relatively higher marginal return to school.[24]

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[23]. We also considered using the youth unemployment rate. The results are similar although the explanatory power of the instrument, particularly for university graduates, is lower. We believe that this is due to the fact that at the time of re-enrolment this may not be the relevant unemployment rate to measure their opportunity costs.

[24] A similar explanation was proposed by Card (1993) to explain the downward bias in the OLS estimates of the returns to college education.

Persistence of estimates

One question that naturally arises from our results relates to the persistence of the estimated premium to delaying schooling. We use the Follow-up Survey of Graduates to address this issue. Using the information of the second interview that took place in June 2000, we use data on labour market activities and education since the last interview to estimate the effect of delayed schooling on 2000 wages, five years after graduation. These results are summarized in Table 8. Panel A corresponds to non university graduates and Panel B to university graduates. According to the OLS estimate the premium for delayed schooling five years after graduation declines for all graduates. University graduates who delayed their education experience a penalty when evaluated five years after graduation. The corrected 2SLS estimates again indicate that OLS underestimates the returns to delayed schooling. There still exists a significant premium for delaying schooling, although these premiums are reduced by half relative to the estimates two years after graduation. Non university graduates show a premium around 7.5% (down from 13%), whereas university graduates receive 12% premium for delaying school (down from 24%). Therefore, these estimates reinforce the support for the idea that students who delay their education are likely to have high marginal returns to schooling.

4. Conclusion

This paper investigates the returns to flexible postsecondary education by relaxing the standard assumption that this education proceeds in a continuous manner with lower, more general, degrees being attained first, and higher, skill specific degrees, being attained later. Using a unique survey that collects information on a representative cohort of 1995 graduates, we are able to estimate the effects of delaying schooling. This allows us to abstract from specific macroeconomic effects at the time of graduation that may affect labour market success.

Overall our results confirm the diversity in returns that exists among post secondary graduates. Substantial differences in the returns to delaying education not only exist between graduates from university and non-university post secondary institutions, but also between those who obtained a second post secondary degree relative to those obtaining their first degree. Further, in contrast to previous research, we find that graduates that delayed their education experience a premium of 35-57% relative to graduates that did not. In general, these premiums

appear to gradually vanish over time. Five years after graduation they amount to 10-24% wage premium relative to continuous graduates.

These estimates consider the possibility of selection in the decision to delay schooling. Indeed, OLS procedures underestimate the returns to education for students who delayed schooling relative to estimates from a two step procedure that accounts for the endogeneity of the delay. Therefore, these findings also add to previous studies that suggest that individuals with higher opportunity costs of schooling may have relatively high returns to education. Due to the nature of our data, we cannot conclude that this premium would exist for all cohorts of graduates. We can conclude, however, that for those students from the class of 1995 who were back in school after a period of absence from learning institutions, the interruption did not have a negative impact on earnings when compared to continuously enrolled students.

References

Advisory Council on Science and Technology (2000) *Stepping Up: Skills and Opportunities in the Knowledge Economy*. Report of the Expert Panel on Skills. Ottawa: Industry Canada.

Allen, R.C. (1998) "The Employability of University Graduates in the Humanities, social sciences and Education: Recent Statistical Evidence", Discussion Paper 98-15. Vancouver, BC: Department of Economics UBC.

Beaudry, P. and DiNArdo, J. (1991) "The Effect of Implicit Contracts on the Movement of Wages over the Business Cycle: Evidence from Micro Data", *Journal of Political Economy*, Vol. 99(4), pp.: 665-88

Betts. J. and McFarland, L. (1995), "Safe Port in a Storm: The Impact of Labor Market Conditions on Community College Enrollments." *Journal of Human Resources* 30(4):741-765.

Boudarbat, B. (2003) "Earnings, Unemployment and College Field of Study in Canada", Mimeo

Bratsberg, B. and J. F. Ragan (2002) "The Impact of Host-Country Schooling on Earnings: A Study of Male Immigrants in the United States" *Journal of Human Resources,* 37(1), 63-105

Butlin, G. (2001) "Bachelor's graduates who pursue further post-secondary education," *Education Quarterly Review, 7*(2), 22–41.

Bushnik, T and Tomkowicz, J. (2003) "Who goes to post-secondary education and when: pathways chosen by 20 year-olds" Statistics Canada Research Paper Series. Catalogue 81-595 MIE No6

Card, D. (1999) "The Causal Effect of Education on Earnings" in Handbook of Labor Economics vol 3A. ed. by Ashenfelter and Card. Amsterdam and New York, North Holland

_____ (2001) "Estimating the Return to Schooling: Progress on Some Persistent Econometric Problems". *Econometrica,* 69(5), 1127-60

_____ (2003) "Using Geographic Variation in College Proximity to Estimate the Return to Schooling". NBER Working Papers # 4483.

Dicks, G. and A. Sweetman (1999) "Education and Ethnicity in Canada: An Intergenerational Perspective" *Journal of Human Resources*, 34(4): 668-96.

Evan and Kim (2005) "The Impact of Local Labor Markets Conditions on the Demand for Education: Evidence from Indian Casinos," Mimeo

Ferrer, A.M. and W. Craig Riddell. (2002) "The Role of Credentials in the Canadian Labour

Market" *Canadian Journal of Economics,* 35, 879-905.

Ferrer, A.M. and W. Craig Riddell. (2004) "Education, Credentials and Immigrant Earnings"

UBC Working Paper 020, *forthcoming Canadian Journal of Economics* 2008, 40(1)

Finnie, R. (2000) "From school to work: The Evolutions of Early Labor Market Outcomes of Postsecondary Graduates", *Canadian Public Policy,* XXVI no.2, 197-224.

Finnie R. and Frenette M. (2003) "Earning Differences by Major Field of Study: Evidence from Three Cohorts of Recent Canadian Graduates", *Economics of Education Review,* 22(2): 179-92

Greenbaum (2004) “How do Labor Market Conditions Affect the Demand for Law School?,” MIT, mimeo

Griliches, Z. (1980) “Schooling Interruptions, Work while in School and the Returns to Schooling”, *Scandinavian Journal of Economics* 82(2), pp. 291-303

Hausman J. and W. Taylor, (1981) “Panel data and unobservable individual effects,” *Econometrica,* 49, 1377-1398

Heckman, J. and E. Vytlacil (2005) “Structural Equations, Treatment Effects, and Econometric Policy Evaluation,” *Econometrica,* 73(3), 669-738

Human Resources Development Canada (2002) *Knowledge Matters: Skills and Learning for Canadians.* Ottawa:Human Resources Development Canada

Kane, T. and Rouse, C. (1993) “Labor Market Returns to Two and Four Year Colleges” *NBER Working Paper* 4268.

Light, A. (1995) “The Effects of Interrupted Schooling on Wages,” *The Journal of Human Resources*, Vol. 30, No. 3, 472-502.

McBride, S. and Sweetman, A. (2004) "Postsecondary Field of Study and the Canadian Labour Market Outcomes of Immigrants and Non-immigrants,” Analytical Studies Branch Research Paper Series 2004233e, Statistics Canada.

Marcus, R. (1984) “Measuring the Reate of return to Interrupted Schooling” *Journal of Educational Statistics*, 9(4), pp. 295-310

Mincer, J. (1974) Schooling, Experience and Earnings. New York: Columbia University Press.

Mincer, J. and H. Ofek. (1982). “Interrupted Work Careers: Depreciation and Restoration of Human Capital”, *Journal of Human Resources* 17, 3–24.

Oreopolous, P., von Wachter, T. and Heisz, A. (2006) "The Short and Long Term Career Effects of Graduating in a Recession: Hysteresis and Heterogeneity in the Market for College Graduates", "NBER Working Paper number 12159.

Parent, D. (2001) “Return to a High School Diploma and the Decision to drop Out: New Evidence from Canada” CIRANO Working Paper # 2001s-09

Rees, D. and Mocan, N. (1997) “Labor market conditions and the high school dropout rate: Evidence from New York State”, *Economics of Education Review*, Vol. 16(2), pp 103-9.

Sweetman, A. (2004) “Immigrant Source Country Educational Quality and Canadian Labour Market Outcomes,” Analytical Studies Branch Research Paper Series, Statistics Canada.

US Department of Education (2006) "Meeting the Challenge of a Changing World: Strengthening Education for the 21st Century".

Vaillancourt and Bourdeau-Primeau (2002) “The returns to University Education in Canada 1990 and 1995” in Renovating the Ivory Tower, ed. Laidler (Toronto: CD Howe Institute).

Zhang and Palameta (2006) “Participation in Adult Schooling and its Earnings Impacts in Canada” Statistics Canada Research Paper Catalogue 11F0019MIE-No 276

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	24%	35%	40%	--	65%
Trade	62%	21%	17%	--	1.7%
College	12%	17%	71%	--	14.0%
BA	6%	11%	50%	33%	17.5%
Graduate	4%	6%	32%	58%	1.7%
% of all graduates	20%	28%	46%	7%	26,894

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	26%	45%	62%	37%	48.0%
Working and School	5%	7%	8%	6%	7.0%
Working	47%	38%	26%	51%	36.0%
Unemployed	16%	4%	1%	2%	5.0%
Other	7%	6%	3%	4%	5.0%
Observations	5,802	8,189	11,232	1,671	26,894

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	38%	5%	43%	40%	26%	66%
No	44%	13%	57%	10%	24%	34%
Total	82%	18%	100%	50%	50%	100%
Observations			13,991			12,932

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	25.0	32.4	(0.000)	27.8	36.5	(0.000)
Female	47.9	49.0	(0.205)	53.4	55.0	(0.068)
Immigrant	7.5	10.1	(0.000)	13.0	16.1	(0.000)
Bilingual	4.7	11.3	(0.000)	19.4	17.1	(0.001)
Children 0-6 in 1997	9.2	19.4	(0.000)	10.7	21.6	(0.000)
Children 0-6 in 2000	21.1	24.1	(0.000)	23.4	26.3	(0.000)
Children 0-6 at previous graduation	0.7	1.8	(0.000)	2.1	6.1	(0.000)
Father education-Postsecondary	26.4	19.6	(0.000)	46.7	32.2	(0.000)
Mother education-Postsecondary	25.5	18.3	(0.000)	42.1	31.5	(0.000)
Back to job held before graduation	3.1	9.5	(0.000)	4.7	27.4	(0.000)
Held full time job before graduation	47.8	74.4	(0.000)	57.1	81.5	(0.000)
Permanent job 1997	65.5	64.1	(0.092)	53.2	65.1	(0.000)
Full Time Job 1997	86.5	86.5	(0.967)	85.2	87.8	(0.000)
Positive earnings 1997	19,424	22,524	(0.000)	25,905	39,016	(0.000)
Work same job since 1997	36.7	42.0	(0.000)	36.2	53.3	(0.000)
Permanent job 2000	74.2	69.9	(0.000)	69.2	72.4	(0.000)
Full Time Job 2000	91.4	89.7	(0.001)	90.4	90.2	(0.722)
Positive earnings 1997	32,664	33,677	(0.004)	46,297	53,966	(0.000)
Previous Level of Schooling						
Some PS	16.9	16.1	(0.167)	6.5	5.6	(0.036)
College	7.5	14.4	(0.000)	8.2	10.3	(0.000)
University	3.7	7.2	(0.000)	37.2	68.1	(0.000)
Other Degree after 1995	11.3	9.2	(0.000)	11.8	6.7	(0.000)
Other Degree after 1997	16.0	11.2	(0.000)	22.5	12.1	(0.000)

Table 5. OLS – 1997 Wage Regression. (P-values)

	Non University *			University		
	Base Case	Non Linear	Detailed	Base Case	Non Linear	Detailed
Age	**0.008**	**0.006**	**0.007**	**0.018**	**0.015**	**0.015**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Full Time	**0.504**	**0.504**	**0.504**	**0.508**	**0.508**	**0.498**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Back in 1994 job	**0.276**	**0.265**	**0.258**	**0.296**	**0.280**	**0.270**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Female	**-0.261**	**-0.261**	**-0.256**	**-0.171**	**-0.170**	**-0.160**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Immigrant	**-0.087**	**-0.090**	**-0.089**	-0.014	-0.014	-0.015
	(0.000)	(0.000)	(0.000)	(0.550)	(0.538)	(0.529)
Bilingual	0.023	0.019	0.018	**0.080**	**0.082**	**0.078**
	(0.200)	(0.286)	(0.301)	(0.000)	(0.000)	(0.000)
College 1995	**0.073**	**0.080**	**0.082**			
	(0.000)	(0.000)	(0.000)			
Graduate 1995				**0.229**	**0.205**	**0.146**
				(0.000)	(0.000)	(0.000)
Previous schooling:						
Second Degree in 1995		**-0.051**			**0.025**	
		(0.080)			(0.237)	
Previously Trade			**0.073**			-0.025
			(0.093)			(0.772)
Previously College			**-0.118**			**-0.042**
			(0.000)			(0.091)
Previously Bachelor			0.003			**0.094**
			(0.936)			(0.000)
Previously Graduate			-0.118			**0.090**
			(0.244)			(0.077)
Previous Activity :						
Not in school (NS)		**0.030**			0.045	
		(0.067)			(0.109)	
NS – Working			**0.042**			**0.076**
			(0.012)			(0.007)
NS – Unemployed			-0.020			0.107
			(0.459)			(0.170)
NS – Other			0.015			**-0.182**
			(0.657)			(0.000)
NS * Second Degree		**0.114**	**0.107**		0.048	0.023
		(0.001)	(0.002)		(0.150)	(0.488)
Observations	8,968	8,968	8,968	8,038	8,038	8,038
R-squared	0.256	0.258	0.260	0.340	0.342	0.347

* "Non University" includes Trade/Vocational and College students. "University" includes graduate and BA students.
Note: All regressions include controls for tenure, number of jobs since graduation in 1995, marriage, presence of children under 6, province of residence, an indicator for additional education after 1995, and field of study of the 1995 degree

Table 6.A Distribution of graduates by year before enrolment

	Non University			University	
	total	%		total	%
			Before 1985	363	2.81
			1985	141	1.09
			1986	260	2.01
			1987	415	3.21
Before 1989	171	1.22	**1988**	1,037	8.02
1989	153	1.09	**1989**	2,258	17.46
1990	468	3.35	**1990**	3,293	25.46
1991	1,856	13.27	**1991**	2,394	18.51
1992	3,786	27.06	**1992**	2,016	15.59
1993	6,131	43.82	**1993**	725	5.61
1994	1,426	10.19	**1994**	30	0.23
Total	13,991	100	**Total**	12,932	100

Table 6.B. Distribution of graduates by year of graduation from previous post secondary

	With Other postsecondary		Without other PS		All graduates	
	Non University (%)	University (%)	Non University (%)	University (%)	Non University (%)	University (%)
Before 1975	10.1	7.2	16.0	7.0	15.0	7.1
1976-85	23.0	19.0	19.0	10.0	19.7	15.3
1986-90	24.3	32.0	28.0	68.0	27.3	46.8
1991-94	42.4	42.0	37.0	15.0	38.0	30.9
Observations	24,79	7,611	11,512	5,321	13,991	12,932

Table 7. Treatment Effects Model – Wage Regression 1997

A. Non University*

	(1)		(2)	
	2SLS	**1-Stage**	**2SLS**	**1-Stage**
Previous Activity: Not in school	**0.135**		**0.125**	
	(0.007)		(0.012)	
Provincial unemployment rate		-0.009		-0.010
year before enrolment		(0.044)		(0.024)
National unemployment rate at the time		-0.225		-0.223
previous graduation		(0.000)		(0.000)
Children 0 to 6 at previous graduation				0.710
				(0.000)
Father Education – Postsecondary				-0.114
				(0.002)
Mother Education – Postsecondary				-0.064
				(0.091)
Lambda / Chi2**	-0.082	1054	-0.076	1080
(SE)	(0.030)		(0.030)	
Observations	7,707	7,707	7,707	7,707

B. University*

	(1)		(2)	
	2SLS	**1-Stage**	**2SLS**	**1-Stage**
Previous Activity: Not in school	**0.239**		**0.213**	
	(0.030)		(0.000)	
Provincial unemployment rate		0.029		0.026
year before enrolment		(0.000)		(0.000)
National unemployment rate at the time		-0.107		-0.105
previous graduation		(0.000)		(0.000)
Children 0 to 6 at previous graduation				0.827
				(0.000)
Father Education – Postsecondary				-0.163
				(0.000)
Mother Education – Postsecondary				-0.142
				(0.000)
Lambda / Chi2*	-0.104	1277	-0.087	1334
(SE)	(0.068)		(0.047)	
Observations	7,218	7,218	7,218	7,218

* "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
Note: The main equation includes controls for gender, marriage, presence of children under 6, hours worked, province of residence, additional education after 1995, and field of study of the 1995 degree.

Table 8. OLS and Treatment Effects. Wage regressions 2000 (FSOG)

A. Non University*	**OLS**	**2SLS**
Previous activity: not in school	**0.029**	**0.0713**
	(0.008)	(0.044)
Second Degree in 1995	**0.094**	
	(0.000)	
Second Degree in 1995*Previous activity NS	-0.008	
	(0.742)	
Lambda /		-0.046
(SE)		(0.032)
Chi2**		1152
Observations	10,257	8,806
	0.380	
B. University*	**OLS**	**2SLS**
Previous activity: not in school	**-0.043**	**0.111**
	(0.008)	(0.015)
Second Degree in 1995	**0.039**	
	(0.002)	
Second Degree in 1995*Previous activity NS	**0.070**	
	(0.000)	
Lambda		**-0.058**
(SE)		(0.028)
Chi2**		397
Observations	9,591	8,672
R-squared	0.371	0.377

* "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 plus an indicator variable if continuously worked at current job since 1997 and an indicator variable if completed additional education since 1997.

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, the national unemployment rate at the time of graduation from the previous degree, indicators for parental post secondary education and an indicator for the presence of children at the time of graduation from the previous degree.

Appendix

Table A.1 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
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 previously 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 (base category is no previous post-secondary education, including some postsecondary)
Previous Field of study	Field of study for postsecondary degrees held before 1995 graduation are reported (base category is no previous field of study)
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
Occupation	Occupation in job held before graduation (base category is
Degree 95	Type of degree obtained upon graduation in 1995 (base category is trades certificate or diploma)
95 Field of study	Main field of study for the 1995 degree (base category is social sciences)
Length of the program	Graduate reports the length of the 1995 degree program. 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 he came back to work with a previous employer
Earnings	Graduate reports total annual earnings in 1997 and 2000
Jobs held after graduation	
Permanent job	Graduate reports whether the job held after graduation was a permanent job
Paid job	Graduate reports the type of job held after graduation (paid, unpaid, self-employed)
Occupation	Occupation of the job held after graduation (base category is
Wage	Graduate reports wage from the job held in 1997 and 2000.
Start and end dates	Graduate reports the start and end dates of the job held in 1997 and 2000.

Table A2. Average Characteristics by Type of Degree obtained in 95

	Non University	University
Individual Characteristics		
Immigrant Status	0.10	0.12
Female	0.53	0.60
Age (june 1997)	29.8	29.6
Children 0 to 6 (1997)	0.14	0.12
Children 0 to 6 (2000)	0.22	0.23
Father – Postsecondary	0.22	0.41
Mother – Postsecondary	0.21	0.37
Activities before Enrollment		
Main Activity 12 m. before enrollment		
Working	0.42	0.29
Studying (includes working and studying)	0.43	0.66
Unemployed	0.09	0.01
Other	0.06	0.03
Previous Degree		
No postsecondary	0.67	0.42
Some postsecondary	0.15	0.08
Non University PS *	0.12	0.19
University PS	0.06	0.31
Previous Field of study		
No field	0.70	0.43
Humanities	0.02	0.06
Social Sciences	0.08	0.19
Commerce	0.06	0.08
Agriculture	0.01	0.03
Engineering	0.06	0.04
Health	0.03	0.06
Math and Applied Sc.	0.01	0.02
Other	0.07	0.10
Ever worked full time before enrollment	0.64	0.64
Occupation		
Management	0.03	0.04
Business	0.10	0.07
Health Sciences	0.04	0.07
Social Sciences & Arts	0.02	0.09
Services	0.15	0.07
Primary Industries	0.02	0.01
Transportation & Manufacturing	0.11	0.02
Graduation Degree 95		
Trade	0.42	--
College	0.58	--
Bachelor's	--	0.87
Postgraduate	--	0.13

95 Field of study		
Social Sciences/Education	0.15	0.42
Humanities	0.02	0.12
Commerce	0.25	0.15
Agriculture	0.06	0.06
Engineering	0.31	0.07
Health	0.13	0.08
Math and Applied Sc.	0.01	0.05
Other	0.07	0.05
Second degree	0.18	0.50
Activities after Graduation		
Annual Earnings (1997)	20,721	26,891
Experience (months)	31.8	42.9
Tenure (months)	25.0	34.0
Permanent Job (97)	0.64	0.56
Full time job (97)	0.84	0.83
Back to Job before graduation	0.08	0.13
Annual Earnings (2000)	33,004	45,392
Experience (months)	38.8	46.9
Tenure (months)	37.3	45.3
Permanent Job (00)	0.72	0.73
Full time job (00)	0.89	0.90
Worked at same job since 97	0.41	0.41
Observations (weighted)	13,991	12,932

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