

Skills Research Initiative

Initiative de recherche sur les compétences

Educational Attainment in Canada: Effects of Individual Attributes and Expected Outcomes

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Abstract

In this paper, we estimate the effects of expected future earnings and parental education on educational attainments in Canada. Apart from documenting these effects on highest grade completed, this paper also considers these effects on the choice of post-secondary program. Our findings suggest that educational attainments increase significantly as expected future earnings increase. The effect is grade level dependent, and the largest effect is found for grade levels beyond high school. We also find smaller effects of parental education than what has previously been reported. Finally, the choice of post-secondary program appears to be significantly related to expected future earnings, but not to parental education.

Résumé

Les auteurs évaluent les effets des gains futurs escomptés et de l'éducation des parents sur les niveaux de scolarité des Canadiens. En plus de documenter ces effets sur le niveau d'études le plus élevé terminé, les auteurs examinent le rôle de ces effets sur le choix du programme d'études postsecondaires. Les résultats laissent supposer que le niveau d'études augmente sensiblement avec la hausse des gains futurs escomptés. L'effet est lié au niveau d'études, et l'effet le plus important est observé dans le cas des niveaux d'études supérieurs à celui de l'école secondaire. Selon les auteurs, le rôle que joue l'éducation des parents est moins important que ce qui avait déjà été observé. Enfin, le choix du programme d'études postsecondaires semble être lié de façon importante aux gains futurs escomptés mais non à l'éducation des parents.

1 Introduction

It is well recognized that investments in human capital are essential for innovations and economic growth. Until recently, the economics literature had primarily focused on determining educational attainments in general (as well as the economic outcomes associated with such attainments) while less attention was being paid to determinants of higher education. However, over the last five years, a number of studies have investigated individual determinants of higher education (see for instance Coelli (2005), Drolet (2005), Finnie et al (2005), Frenette (2005), Rivard and Raymond (2004), Corak et al (2003), Frenette (2003), and Christofides et al (2001) for Canadian studies and Arcidiacono (2004), Long (2004), and Cameron and Heckman (1998 and 2001) for US studies). Investigating the individual determinants of higher education is important, especially given that today's labor market is more oriented towards skilled workers compared to the labor market 20 years ago and that the financing of higher education is high on the policy agenda.

While governments at both the federal and provincial levels in Canada recognize the benefits associated with a high-skilled work force, access to higher education may have been restricted during the 1990s when tuition fees rose significantly across Canada (with the exceptions of the provinces of British Columbia and Quebec). Corak et al (2003) report that average tuition fees for undergraduate arts students almost doubled from 1990-91 to 2000 (expressed in \$2001, average tuition fees increased from \$1,866 in 1990-91 to \$3,456 in 2000). The increase across all undergraduate disciplines was similar, see Frenette (2005). Statistics Canada (2001) has also documented an inability of parents to save for their offsprings higher education. This is especially the case among low-income households. Less than 20% of households with incomes less than \$30,000 were saving for the post-secondary education of their children which should be compared to around 67% among high-income households (households with incomes above \$80,000). During the same period, student borrowing levels and debt burdens have increased (see Finnie (2002)), partly because of changes in student aid programs. While it appears that access to higher education may have been more restricted during this period, full-time enrollment in university education (Bachelor's and other undergraduate degree) increased by 9 percent between 1993 and 2002 (Statistics Canada (2005)). There are many possible reasons for enrolment increases despite increased costs. For instance, the return to higher edu-

cation may have increased, offsetting much or all of the higher direct costs (see Boothby and Drewes (2004) for evidence on increases in the earnings premium for Bachelor's degree between 1980 and 1995). Further, student aid programs designed to ease the burden for needy students may also have offset some of the cost increase.

In this paper, we will investigate the role of both socio-economic characteristics and average wages of high educated workers on educational attainments in Canada using data extracted from the 1991 School Leavers Survey (as well as from the follow-up survey in 1995). While a number of studies have already examined the effects of parental education and income on post-secondary education attendance in Canada (e.g. Coelli (2005), Drolet (2005), Finnie et al (2005), Frenette (2005), Rivard and Raymond (2004), Corak et al (2003), Frenette (2003), and Christofides et al (2001)), these studies have generally ignored important data features occurring prior to the decision of whether to enroll in post-secondary education or not (one recent exception is Coelli (2005)). In particular, because of dynamic self-selections, educational decisions must be modeled sequentially and therefore the decision to complete high school must also be considered in a general model of post-secondary education. Attendance and completion of post-secondary education is clearly linked to high school completion as a high school diploma (or the equivalence of such a diploma) is generally a requirement for admission to post-secondary education. Consequently, assuming that individuals are forward looking, provincial differences in the structure of educational institutions for post-secondary education might affect attendance not only at the post-secondary level but also at the secondary level. It is therefore not surprising that regional differences in high school drop out rates are strongly correlated with regional differences in attendance and completion of post-secondary education. For example, using data from the 1996 Canadian census, the high school drop out rate is 31.4% in Quebec which is significantly greater than the corresponding figure for Ontario (26.8%). Moreover, completion rates of post-secondary education are significantly lower in Quebec (43.8%) than in Ontario (50.6%).

A general result from the literature on the importance of parental background and family environment on schooling attainments is that socioeconomic status is one of the major causal determinants of the probability of transiting from one grade level to the next. For example, Coelli (2005), using a grade transition model similar to the one used in this paper, finds that

having a parent who completed university significantly increase the probability of attending university. Parental income plays a smaller role unless the income change is relatively large (for instance due to a job loss). Rivard and Raymond (2004) and Frenette (2003), using more restrictive empirical specifications, also report that university attendance is significantly related to parental education and to a lesser extent to parental income. Drolet (2005) finds that parental background (in particular parental education) is a main determinant of university attendance in Canada. Drolet also finds that despite a significant increase in tuition fees for higher education during the 1990s, the correlation between parental education and university attendance has remained stable. Finnie et al (2005), using the same data as in this paper, also report significant effects of family background (such as parental education, family type and ethnicity) on post-secondary education participation. They also recognize the sequential nature of educational attainments and address this issue using a reduced form, recursive system. However, their empirical model fails to model the effects of parental background on educational outcomes prior to post-secondary education. A positive correlation between individual schooling attainments and parents education is also well established in the U.S. literature, see for instance Cameron and Heckman (1998 and 2001) using reduced-form dynamic models, and Keane and Wolpin (1997), Eckstein and Wolpin (1999), and Belzil and Hansen (2002 and 2003) using structural dynamic programming models. The strong intergenerational education correlation may be explained by the prevalence of more generous parental transfers among the more educated families and (or) by intergenerational skill transfers. Furthermore, intergenerational skill transfers may take place through parental investments in children or through genetical transfers.

While the effects of parental education and income on post-secondary education attendance have been well studied, less, if any, attention has been paid to the effects of expected outcomes for those with post-secondary education. The human capital theory (Becker (1964) and Mincer (1974)) predicts that individuals acquire a post-secondary degree if the net present value of such a degree is positive (i.e. if the present value of life-time earnings with a post-secondary degree exceeds similarly defined earnings with a high school degree). Thus, a principal component of the decision to acquire higher education is the expected earnings difference, discounted to present value, controlling for direct costs of higher education. However, few, if any, studies of

determinants of individual schooling include such a measure. There are a number of difficulties associated with incorporating such a measure. First, incorporating expectations of future outcomes, given current information, as determinants of educational attainments require a model with forward-looking behavior. If individuals are not forward-looking, there is no reason why they should care about future outcomes as consequences of their current actions. However, most of the existing studies on educational attainments are based on reduced form models that ignores forward looking behavior (recent exceptions include Keane and Wolpin (1997), Eckstein and Wolpin (1999), and Belzil and Hansen (2002 and 2003) who formulates and estimates structural dynamic models of schooling). Second, even abstracting from the issue of forward-looking behavior, incorporating expectations about future outcomes is not trivial. Identification of estimates associated with such outcomes may be problematic as there may not be sufficient variation in expected outcomes across individual decision makers. Despite these concerns, we attempt to provide some results on the impact of expected future outcomes on educational attainments, even if our current model specification ignores forward-looking behavior. While it would be interesting to include such expectations in a forward-looking model (expectations about future outcomes are embedded in the structural dynamic models referred to above, although no estimates of the impact of changes in expected future wages are provided in these papers), it is beyond the scope of this paper. In order to identify the effects of expected future wages on schooling decisions, we rely on provincial differences in average wages for different grade levels, calculated using data from the 1996 Canadian Census. We allow the effect of average earnings for those with high education to affect schooling decisions at all grade levels, with the possibility that the effect differ across grade levels and provinces.

The recent literature on higher education has acknowledged the fact that there exist different forms of post-secondary education, such as community colleges, trades institutions, etc. However, less attention has been paid to different fields of study.¹ It may however be interesting to investigate the effect of an increase in expected future earnings on the choice of field of study. It may also be interesting to study the allocation of students into

¹Boothby and Drewes (2004) is one recent exception. They report estimates on wage differences across post-secondary educational institutions and major field of study, but do not estimate determinants of attending a particular field of study.

different programs. The programs considered in this paper are: Agriculture, Arts, Business, Education, Engineering, Health, Humanities, Math, Social Science, and Other.

The main results in this paper indicate that schooling hazard rates (the probability of leaving school at given grade levels) are negatively related to expected future earnings. This suggests that, as average earnings among highly educated workers increase, the probability that individuals stay in school longer increase. As mentioned above, university enrollment in Canada increased over the 1990s, despite increases in tuition fees at the same time. One reason for such an enrollment increase may be higher expected returns to higher education. Our results are consistent with this possibility. We also found that the effect of expected future earnings increase with grade levels. It is lowest in high school and highest in grades 14 and 15. This suggests that the effect of increasing wages for university graduates has a stronger effect for those enrolled in university studies (increase their probability of completing their studies) than those in high school. Given similar discount rates for the two groups, this result is what we would expect. Regarding the effects of parent's education, we find that father's education generally matters more than mother's education. The effect is also grade dependent, and the effect of having a father who graduated from some post-secondary institution is largest for grades up to, and including, high school. This would suggest that credit constraints (assuming parental education and income transfers to the children are correlated) are not a major issue in Canada. This result is consistent with some of the Canadian studies that included information on both parental education and income, and also with some of the US literature. Finally, we found that the choice of post-secondary program is generally unrelated to parental education but significantly related to expected future earnings. An increase in expected future earnings significantly increases the probability of choosing all fields of study, except humanities. For humanities, the effect of expected future earnings is negatively related to the probability of choosing this program. The largest positive effect was found for studies in business, suggesting that this field is the most sensitive in terms of responses towards future earnings changes.

The remainder of the paper is organized as follows. In the next section, we provide a description of the data. Section 3 contains a description of the methodology used to study schooling attainments. Results are provided in Section 4 while Section 5 concludes the paper.

2 Data: The School Leavers Survey

The analysis in this paper is conducted on a sample extracted from the School Leavers Survey which was undertaken by Statistics Canada in 1991 as well as from the 1995 School Leavers Follow-up Survey. Initially, Statistics Canada collected information on school and labor market experience of more than 9,000 young Canadians who were between 18 and 20 years old in 1990. The main objective was to determine high school dropout rates in Canada. In 1995, Human Resources Development Canada commissioned Statistics Canada to re-interview the same individuals. The response rate was around 67%, leading to a sample of 6,284 individuals. At the time of the re-interview, the respondents were aged 23 to 25. The follow-up survey was aimed at obtaining information on education, training and labor market experiences beyond high school. Overall, these surveys represent a unique opportunity to study transitions from school to work as well as transitions from secondary to post-secondary education in Canada.

By combining the two surveys, the resulting data not only contains detailed information pertaining to the early labor market experience and the school to work transition of young individuals (hours of work, occupation, industry, training opportunities and wages) but also contains a wide range of individual and household characteristics. In particular, the survey provides information on parental education (reported as a class variable) as well as family composition (whether the young individual resided with both biological parents while in high school). Thus, this survey appears well suited for this paper. However, because of the young ages of the sampled individuals, we may lack sufficient information on post-schooling wages, and this information may instead be collected from other data sources, such as the Canadian Census.

We attempted to keep sample restrictions to a minimum. However, some respondents were eliminated from the sample because of incomplete information on variables that are central to the analysis. For instance, around 900 individuals provided invalid or incomplete information of parental education, family situation or their immigrant background. An additional 510 respondents were lost because lack of information on their high school grades, 136 individuals provided no information on their or their parents' attitudes towards school. Finally, 54 respondents filed inconsistent answers regarding their educational attainments or did not provide valid answers to questions

regarding province of residence (or province where their high school education took place). After these sample exclusions, we are left with a sample of 4,699 young adults. It should be noted that some of these exclusions, as well as the exclusions obtained by using both SLS and SLFS, may yield a sample that is not entirely representative. This may especially be the case for the missing information on individuals who choose not to conduct the second interview. However, we feel reasonable comfortable with the remaining sample and we have used sample weights provided in the data throughout this paper (both at the descriptive level and at the estimation level) to ensure that the statistics are as representative as possible for the population of young adults in Canada. To verify that our restrictions yield a reasonably representative sample, we calculated proportions with highest level of schooling equal to (i) less than high school, (ii) high school only, and (iii) more than high school, using three different samples. In addition to our restricted sample ($N=4,699$), we used the entire Follow-up sample ($N=6,284$) and a sample extracted from the 1996 Canadian Census (using the same age restrictions as the in Follow-up sample). The results are presented in Table 1, and indicate that our restricted sample yields proportions that are quite similar to those obtained in the other two samples. The proportion of high school drop-outs is slightly lower and the proportion having more than high school is slightly higher in our reduced sample than in the full sample. Similarly, the fraction of high school drop-outs is somewhat lower and the proportion having more than high school is slightly higher in the full sample than in the Census.

The outcome variable in the first part of this paper, which deals with grade transitions, is the highest grade completed as of 1995 (obtained from the SLFS). Grades up to high school completion are well documented in the data and straightforward to compile. However, for educational attainments beyond high school, the survey provides information on attendance in post-secondary education (such as trade or vocational school, college or CEGEP, and university) and whether the education was completed or not. For incomplete attendance, there is no information on grade level achieved in that particular program. We therefore had to impute levels for this group of students based on last year of attendance in post-secondary education and last year of high school studies.² Provincial-specific features, such as the ex-

²The SLFS contains relatively detailed information on early work experiences which means that the imputations can be reasonably well approximated.

istence of a Grade 13 in high school in Ontario and CEGEP in Quebec has been accounted for in the construction of highest grade completed.

Table 2 reports the grade distributions obtained as described above in 1995, by region. We distinguish between 5 regions: Atlantic Provinces (Newfoundland and Labrador, Nova Scotia, Prince Edward Island, and New Brunswick), Quebec, Ontario, Prairies (Manitoba, Saskatchewan, and Alberta), and British Columbia. The reason for aggregating the 10 provinces into 5 regions are sample size restrictions which prevents complete province-specific model specifications. Completion of secondary education normally requires completion of grade 12. The exceptions are Quebec, where students graduate from secondary school at grade 11 and then may progress to CEGEP before attending university, and Ontario, where students graduate from high school after completing grade 13. Considering this, the drop-out rates from secondary school are 7.9% for the Atlantic provinces, 10.1% for Quebec, 9.1% for Ontario and the Prairies, and 6.4% for British Columbia. These numbers are substantially lower than those presented in the introduction, which were obtained from the 1996 Canadian Census and this mainly reflects cohort differences in educational attainments. The information in Table 2 also shows attendance in any schooling beyond high school completion. The proportions that have obtained any education or training beyond secondary school vary between 71.9% for British Columbia and 76.8% for Quebec. However, the standard errors for each region vary between 0.011 (for the Atlantic provinces) and 0.019 (for British Columbia), which suggests that none of the regional differences are significant at conventional levels.

Descriptive statistics for the sample, ordered by post-secondary education participation, are shown in Table 3. The entries suggest that post-secondary education is more common among females and foreign-born individuals. There is also a strong link between parents' education and their children's education. For example, over 36% of children whose mother had more than high school had some post-secondary education in 1995, while the figure for those whose mothers had completed grade 9 or more but not received a high school diploma is only 15%. A similar pattern can be observed for father's education, where again children to high educated fathers are significantly more likely to attend post-secondary education than children whose fathers have completed high school or less. These figures are consistent with previous findings in the literature and suggest the existence of strong intergenerational ties in educational attainments. However, it is

not possible at this stage to conclude if parents' education have a causal effect on their offspring's education or if other factors generate the observed correlation structure. The data also provides information on parents' occupations and consistent with the finding regarding parental education, there is a positive (and significant) correlation between post-secondary education attendance and an indicator for whether the parent is white collar or not. Another factor that has been shown to be an important determinant in the previous literature is family stability, which in this paper is captured by an indicator for whether the child was living with both biological parents or not during high school. Post-secondary education attendance is significantly higher among those who lived in an "intact" family as opposed to those living with only one of their biological parents.

Finally, the SLS contains information on respondents' attitudes towards school and on self-reported high school grades. Not surprisingly, those students who reported that they had mainly A's in high school are more likely to attend post-secondary education than those who reported mainly C's. Whether or not the respondent enjoyed school or participated in any extracurricular activities also seems to be related to participation in higher education.

To gauge the importance of parental education and other family background variables on educational attainment, holding other things constant, we used the highest grade completed as the dependent variable in an ordered Probit model. The estimates (along with their standard errors) from this exercise are shown in Table 4 and suggests again that parental education is important. Regarding mothers' education, schooling beyond high school has a positive and significant effect on their children's education while schooling up to and including high school has no significant effect. For fathers' education however, all three categories of education are positive and significant and the magnitudes of the estimated coefficients are substantially larger than those for mothers' education. Thus, it appears that fathers' educational attainments are more important than the schooling levels of the mothers. The variable NUCLEAR, which represents living with both biological parents, is also positive and significant. Once controls for parental education are included, parents' occupation has no significant effects on educational attainments. The results also suggest that females stay longer in school than males, holding other observable characteristics constant. Finally, there are also large and significant regional differences in educational attain-

ments, where the highest schooling levels are found in Ontario (the excluded region) and the lowest levels are found in Quebec.

As mentioned in the introduction, one objective of this paper is to assess the extent to which students respond to expected future changes in the labor market. While this encompasses many factors, we limit our attention to earnings. In particular, we use data from the 1996 Canadian Census to calculate average earnings by educational attainments and province. These earnings are presented in Table 5, which shows how earnings (unconditionally) increase with educational attainments and how earnings differ across provinces for given levels of education. In the analysis in this paper, we use the average earnings among those who have 18 years or more of education.³ For this level of schooling, average earnings (in 1995 dollars) range from \$40,808 (Prince Edward Island) to \$46,605 (Ontario). It should be noted that identification of these effects requires strong assumptions. In particular, we are not able to separately identify expected future earnings from provincial specific effects. Further, as mentioned in the introduction, estimating the effects of expected future outcomes requires a model with forward-looking behavior which is beyond the scope of the current paper. Nevertheless, we believe that the results presented in this paper are informative and suggestive for the existence of such effects. We leave it for future research to formulate and estimate a forward-looking model that introduces expected future outcomes in a more coherent fashion.

Apart from documenting educational attainments generally, this paper also investigates choice of program at the post-secondary level. The data allow us to distinguish between concentrations or specializations in education, arts, humanities, social science, commerce, agriculture and biological science, engineering, health, mathematics, and other. The category of "other" includes studies that were not classified or studies with no reported specialization. For this analysis, we retained only respondents who had attended any post-secondary education as of 1991. This reduced sample consists of

³Alternatively, we could have used average earnings differences at different grade levels (e.g. average earnings for those with 13 years and 12 years of education for transitions between grade 12 and 13, and so on). This alternative measure would be better suited if there are provincial differences in how earnings increase with additional education. A related issue is inter-provincial migration which is likely to vary with educational attainments. If such migration is common, the use of average earnings in the province of residence may be inaccurate. However, it is not clear how, or if, the omission of mobility affects our results.

2,366 individuals and descriptions of their choices, by region are provided in Table 6. In all regions, except Quebec, the most common specialization is commerce, and between 18% and 23% chooses this field of study. In Quebec, social science is the most common choice (23.3%) closely followed by commerce at 21%. A notable difference between Quebec and Ontario is the high proportion that chooses humanities in Ontario (19.2%) compared to only 4.2% in Quebec.⁴ The least popular choices in all regions appear to be arts and agriculture, attracting between 2% and 7%.

3 Methodology: Modeling Schooling Attainments

The basic econometric model is a hazard function model of grade transitions.⁵ The transition from one grade level to the next will be modeled as a reduced-form dynamic discrete choice (Cameron and Heckman, 1998 and 2001) and the model will allow for different type of factors; family and individual characteristics, gender, expected future outcomes, and provincial or regional effects. The probability of transiting from one grade level (E) to the next ($E+1$), denoted $H_{E,i}$, is defined as follows

$$H_{E,i} = \frac{1}{1 + \exp(\alpha_E + \beta'_E X_i)} \quad (1)$$

where X_i is a vector of observable characteristics and β'_E represents grade specific effects of these characteristics. The probability of acquiring grade level E^g , $\Pr(S_i = E^g \mid X_i)$, is given by

$$\Pr(S_i = E^g \mid X_i) = (1 - H_{E^{g-1},i}(X_i)) * \Pi_{s=0}^{E^g-1} H_{s,i}(X_i)$$

and the likelihood function is composed of these probabilities (for each possible level of S_i), matched with observed grade levels (see Cameron and Heck-

⁴It is possible that some of this Ontario-Quebec difference is due to terminology. The distinction between humanities and social sciences may not be as obvious in French (lettres et sciences humaines vs sciences sociales) as it is in English.

⁵As in Cameron and Heckman (2001), the grade transition model admits a semi-structural interpretation. This is done by assuming that the latent variable is linear in its arguments.

man (1998 and 2001) for more details on the construction of the likelihood function).

To estimate the effects of both individual attributes and expected outcomes on the type of post-secondary education to attend (conditional on attendance), a standard multinomial logit model is used. For example, the probability of choosing a type j education will be parameterized as follows

$$\Pr(Y = j|X) = \frac{\exp(\alpha_j + \beta'_j X_{ij})}{\sum_{m \in M} \exp(\alpha_m + \beta'_m X_{im})}$$

where M denotes the set of possible types of post-secondary education identified in data (education, arts, humanities, social science, commerce, agriculture and biological science, engineering, health, mathematics, and other).

4 Empirical Results

4.1 Results from a grade transition model

The results obtained from the grade transition models are found in Tables 7-9 while those obtained for the post-secondary education program choice are found in Table 10. Given the form of the hazard specification in equation (1), it is important to note that the sign of the parameter estimates indicate the direction of the effect of a variable on the exit rate out of school. Thus, a negative estimate will typically imply a positive effect on expected grade completion (or on the probability of reaching higher education). In the ordered probability model (in Table 4), however, the parameters should be given a standard regression interpretation (a positive parameter implies a positive effect on schooling attainments).

Because of the non-linear structure of both the grade transition model and the multinomial logit model, we report "marginal effects" instead of parameter estimates.⁶ The "marginal effects" for the grade transition model were obtained by comparing hazard rates, evaluated using estimated coefficients and average values of observable characteristics, before and after a "marginal" change in a specific covariate. In Table 7, we report such "marginal effects" of expected future earnings on school hazard rates. To be precise,

⁶All parameter estimates are available upon request from the authors.

the entries show the change in the hazard rate from increasing the average wage of people with 18 years of school or more (obtained from the Census, see Table 5) with 10 percent, controlling for the same set of observable characteristics as in the ordered Probit model. The overall effect, which assumes that the effect of the earnings increase is common across provinces and grade levels, is -0.025. The standard error of this effect is small (0.004) indicating that the effect is significant at conventional levels.⁷ This suggests that as expected future earnings associated with higher education (approximated by average earnings of high educated workers) increase, the probability of continuing in school increases. Thus, it appears as if students, to some extent, react to changes in the labor market for high educated workers.

The second set of results in Table 7 provides provincial differences in the effect of expected future earnings on the school hazard rate. All provincial marginal effects should be interpreted as differences relative to the effect for Ontario. This means that a positive estimate for a province indicate a smaller school hazard rate (less negative or closer to zero) in that province relative to Ontario. The table entries suggest that the effect on the school hazard rate from a 10 percent earnings increase of high educated workers is larger in Ontario than in all other provinces (and significantly larger than in Quebec, Manitoba, Saskatchewan, and British Columbia). Thus, it appears as if students in Ontario are more sensitive towards expected earnings than students in other provinces.

The last set of results in Table 7 assumes constant effects across provinces, and instead considers how the reactions to changes in expected future earnings differ across grade levels. The results imply that students at low levels of schooling (10 years or less) are less sensitive towards changes in average earnings of high educated workers than students at higher school levels (12 years or more). This pattern appears reasonable, as the effect of expected earnings associated with high levels of education should be smaller at lower grade levels (where other factors may be more important, such as preferences, ability etc.) than at higher grade levels. It appears as if a substantial increase in high educated workers' earnings significantly affect the high school

⁷The standard error was obtained as follows. First, we draw 5,000 values from the estimated distribution of the parameter estimates. For each draw, we calculated a "marginal effect". We then summarize the distribution of marginal effects (which varies only because of variations in estimated parameters) by calculating the mean and standard deviation. The entries in Tables 7-9 are these means and standard deviations.

completion decision as well as the participation decision in post-secondary education.

It is worth emphasizing again that we are not able to separately identify effects of expected future earnings from provincial specific effects.⁸ In particular, our findings of significant effects of future earnings of school hazard rates may to some extent be driven by other provincial characteristics that are correlated with provincial differences in average earnings of high educated workers and that also determine provincial differences in educational attainments. However, we believe that our results are useful as they provide a first (to our knowledge) examination of how educational attainment in Canada is reacting to changes in labor market outcomes. Nevertheless, more work is needed in the future in order to quantify such effects more precisely.⁹

In order to evaluate the effects of parental education on educational attainments, we have estimated a number of specifications of the grade transition model described by equation (1) above. In Table 8, we present estimated "marginal effects" of mother's and father's education on the school hazard rate for three different specifications. In the first column, the entries were obtained using a model specification where we omitted any provincial information as well as any information on grades or school attitudes. We find that if the mother has some post-secondary education, the hazard rate is smaller (i.e. the student stay in school longer). Education below post-secondary level has no significant impact. Regarding father's education, we find that students whose father has high school or more stay longer in school. Further, the effect of post-secondary education of the father is larger than the effect of high school only. These results are generally consistent with previous research that has often reported a non-linear relationship between educational attainments and parental education.¹⁰ The entries in column two are based

⁸We do not have enough variation in our measure of expected future earnings to separately estimate provincial specific effects and effects of expected future outcomes. Identification would require more details on the earnings distribution of high educated workers than what we currently have access to.

⁹Future work in this area should build on a framework compatible with forward-looking behavior and also model wages jointly with educational decisions. In a partial equilibrium setting, the models estimated in Belzil and Hansen (2002 and 2003) may be used to infer effects of expected future outcomes.

¹⁰A number of studies have assumed a common effect of parents' education (e.g. Coelli (2005), Drolet (2005), Frenette (2003)). A general finding in these studies is that having a parent with a university degree significantly increase the probability of attending

on a specification that adds provincial specific effects. This has no significant impact on the effects of parents' education. Finally, in column three, we also add information on high school grades (self-reported), attitudes towards school (whether the student enjoyed school and found school interesting), and participation in extracurricular activities. This type of information is generally not observed in traditional survey data used to estimate the effect of parents' background on schooling attainments and reduce the need to incorporate controls for unobserved, individual specific effects.¹¹ When controlling for these additional individual characteristics, we find that mother's education is not significantly related to educational attainments, while father's education is. Further, the effects of father's education, while somewhat smaller in magnitude, are not significantly different from the effects obtained in the more restrictive specifications.

The specifications estimated in Table 8 impose restrictions of the effects of parental education. Specifically, provincial (or regional) and grade specific differences in the effects are omitted.¹² The entries in Table 9a (mother's education) and 9b (father's education) are based on grade transition models that were estimated separately for the Atlantic Provinces (Newfoundland and Labrador, Nova Scotia, Prince Edward Island, and New Brunswick), Quebec, Ontario, the Prairies (Manitoba, Saskatchewan, and Alberta) and British Columbia.¹³ We also allowed the effects of the regressors to vary according to grade levels: high school or less and more than high school.¹⁴ Similar to

university. Rivard and Raymond (2004), allowing for different effects of mother's and father's education, finds that the only significant parental education variable for university attendance is the indicator for father having a university degree. Finnie et al (2005), also allowing for different effects of mother's and father's education, reports a similar finding.

¹¹We believe that information on grades (representing scholastic ability), school attitudes (representing preferences towards school), or extracurricular activities (representing motivation and ambition) to a large extent measure what is often referred to as unobserved heterogeneity in these types of models. In most data, this type of information is indeed unobserved to the researcher, and ad hoc stochastic assumptions about this type of heterogeneity must be imposed.

¹²Provincial (or regional) specific effects of parental education have also been omitted in the previous literature. Further, as mentioned earlier, previous work has typically focused on post-secondary education attendance and ignored grade transitions up to and including high school.

¹³Note however that these model specifications exclude controls for expected future earnings.

¹⁴Because of the inclusion of provincial/regional specific marginal effects of parental

the estimated marginal effects obtained above, the effects were obtained by evaluating the hazard rates, using estimated coefficients and average values of remaining observable characteristics, at different grade levels (high school or below and more than high school). The first set of entries in Table 9a shows the difference in hazard rates between when the mother has completed grades 9, 10 or 11 (but has not received a high school diploma) and when she has completed less than grade 9. As can be seen, this educational increment has no significant effect on the hazard rate, regardless of grade level of the student and of region.

The differences in hazard rates between those whose mothers have a high school diploma but no additional schooling and those with less than grade 9 are shown in the second panel of Table 9a. Generally, the differences are insignificant, with the exception of the Atlantic provinces where the estimated difference is -0.021 for grade levels equivalent of high school or less. The third set of results in Table 9a shows differences in hazard rates between those with mothers who have some post-secondary education and those with low-educated mothers. The differences are generally negative, as expected, but only significant for the Atlantic provinces and the Prairies (again at grade levels equivalent of high school or less).

The entries in Table 9b suggest a negative relationship between the hazard of leaving school (at high school or below) and father's education. The more educated the father is, the more likely is the child to remain in school. Having a father who has some post-secondary education significantly reduce the risk of stopping school before high school completion in all regions. For grade levels beyond high school, the effect is only significant for Quebec and British Columbia. Moreover, it appears as if father's education (regardless of educational level) has stronger effects on the hazard rates at higher grade levels in British Columbia, but not in other regions of Canada. The result that father's education has the largest effect in Quebec and British Columbia appears counterintuitive as these are the only provinces where tuition fees were virtually unchanged over much of the 1990s. However, the data used in this analysis refer to 1994, and most of the tuition increases in the 1990s occurred after 1994.

education and because we allow the marginal effects to differ across grade levels, the results in Table 9a and 9b are based on much more general empirical model specifications than what has been used in the previous literature.

Overall, these results suggest that father’s education is an important determinant of educational attainments. The effect is larger, the more education the father has. In the most flexible model specification, educational levels of the father below post-secondary level are however not generally significant. Contrary to the previous literature, we find that the effect of father’s education (post-secondary level) is significant at grade levels equivalent of high school or less, but not at grade levels beyond high school (except for British Columbia and Quebec). The effect of mother’s education appears relatively small and is generally not significantly different from zero. This result is similar to what has been reported in the earlier literature. Finally, the marginal effect from a 10 percent increase in average earnings of high educated workers is similar in magnitude to the marginal effect of increasing father’s education from low levels (less than grade 9) to post-secondary attendance. Thus, improvements in the labor market conditions of high educated workers appear to be as important as father’s education in determining schooling attainments.

4.2 Results from a multinomial model on choice of post-secondary education

A final objective of this paper is to investigate post-secondary educational choices in more detail. In particular, we analyze the effects of parent’s education and expected future earnings on the choice of post-secondary specialization (the data allow us to distinguish between 10 different specializations in post-secondary education: education, fine arts, humanities, social sciences, commerce, agriculture and biological science, engineering, health, mathematics, and other). Using a standard multinomial logit model, Table 10 presents results from the choice of post-secondary program. Instead of presenting the estimated coefficients and their standard errors, we present marginal effects (evaluated at average values for observed characteristics) and the associated standard errors. As is well known, identification requires normalizations and the coefficients for specialization in commerce have all been normalized to zero. The sample used for this purpose is a reduced version of that used for the grade transition models above, as we condition on attendance in post-secondary education (i.e. all respondents who reported not having attended any post-secondary education were excluded). Further, information

of specialization in post-secondary education is available only in the 1991 interview.

A first observation from Table 10 is the lack of significance of parents' education. Thus, while father's education significantly affects the decision to attend higher education, it is not a primary determinant of which type of higher education to attend. However, the effects of mother's education on the choice of "other" (which includes studies that were not classified or studies with no reported specialization), are negative and significant, suggesting that students with educated mothers are less likely to choose this option. While parental education is generally not significant, the effect of expected future wages is significant for all options.¹⁵ An increase in expected future earnings significantly increases the probability of choosing all fields of study, except humanities. For humanities, the effect of expected future earnings is negatively related to the probability of choosing this program. The largest positive effect was found for studies in business, suggesting that this field is the most sensitive in terms of responses towards future earnings changes.

5 Conclusions

It has long been recognized that investments in education are essential for economic prosperity, both at the individual level and at the macro level. This recognition has generated much research into the economics of education. While it is well known that education may be beneficial to economic growth, it is less clear how education, and especially higher education, should be financed. For example, the increases in tuition fees for higher education in Canada during the 1990s may have hurt low-income families by preventing their children to attend college and/or university. Thus, while tuition increases may be justified from an efficiency point of view, it may have undesirable effects on equality of opportunities.

One objective of this paper was to examine how changes in expected future labor market outcomes (represented by earnings) affect educational decisions. We found that educational attainments increase significantly as

¹⁵The expected future earnings (or wages) variable is defined in the same way as in the grade transition model above (and measured in 1995 dollars).

expected future earnings increase. This effect is largest in Ontario and smallest in Quebec. We also found that this effect differ depending on the grade level, with the smallest impact at low grades (less than high school) and the largest impact at studies beyond high school.

Another objective of this paper was to re-examines the relationship between parental background and educational attainments by estimating a flexible grade transition model that allow the effects of socio-economic variables to vary across grade levels. In the previous literature, these effects have typically been assumed constant across grade levels. We find that father's education influence schooling decisions, but mainly at lower grade levels (high school or less) while mother's education is generally not significantly related to schooling attainments. Compared to the previous Canadian literature, we generally find smaller effects of parental education, especially at higher grade levels. We claim that our findings are based on much more general empirical model specifications than what has been used in the previous literature, and that this is the main reason for the difference in findings regarding the effects of parental education.

A third objective with this paper was to assess the impact of family background and expected outcomes on the choice of post-secondary education program. This issue has not, as far as we know, previously been addressed in Canada. The results suggest that parent's education (mother's or father's) have no significant influence on the type of higher education attended (conditional on attendance). On the other hand, expected future earnings significantly determine the choice of program at the post-secondary level. In particular, studies in commerce appear the most sensitive towards changes in earnings outcomes.

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Table 1. Comparison of highest level of schooling, SLFS and 1996 Census.

Highest level of education:	SLFS		1996
	Restricted sample	Full sample	Census
Less than high school	0.125	0.158	0.174
High school	0.124	0.122	0.136
More than high school	0.751	0.719	0.690

Note: Entries show highest level of education for a sample of individuals aged 22 to 24. In the first column, the proportions were obtained from our restricted sample (N=4,699). The proportions in the second column were obtained using all 6,284 respondents in the follow-up survey. Lastly, the proportions in the third column were obtained from the 1996 Canadian Census (using the variable HLOSP). For the SLFS proportions (columns 1 and 2), the entries were weighted with the sample weight provided in the survey data.

Table 2. Grade distributions by region, 1995.

	Atlantic	Quebec	Ontario	Prairies	BC
Grades:					
Grades - 9	0.012	0.040	0.019	0.017	0.013
Grade 10	0.031	0.061	0.018	0.022	0.009
Grade 11	0.036	0.131	0.054	0.052	0.042
Grade 12	0.165	0.145	0.108	0.186	0.217
Grade 13	0.208	0.123	0.046	0.157	0.205
Grade 14	0.168	0.134	0.206	0.211	0.190
Grade 15	0.064	0.062	0.167	0.073	0.068
Grade 16	0.123	0.126	0.092	0.114	0.090
Grade 17	0.116	0.101	0.165	0.089	0.115
Grade 18	0.061	0.056	0.089	0.057	0.035
Grade 19 -	0.017	0.023	0.035	0.022	0.016

Note: Entries calculated from the restricted SLFS sample (N=4,699), weighted with the sample weight provided in the survey data. The regions are defined as follows: the Atlantic provinces include Newfoundland and Labrador, Prince Edward Island, Nova Scotia, and New Brunswick, and the Prairies include Manitoba, Saskatchewan, and Alberta.

Table 3. Descriptive statistics by post-secondary education in 1995.

	No post-sec. educ.		Some post-sec educ.	
	Average	Std err	Average	Std err
Male	0.493	0.023	0.457	0.010
Immigrant	0.048	0.010	0.072	0.005
French	0.195	0.018	0.246	0.009
Not English or French	0.003	0.003	0.015	0.003
Mother's education:				
No high school (9-11)	0.211	0.019	0.154	0.008
High school	0.332	0.022	0.302	0.010
Post secondary	0.205	0.019	0.362	0.010
Father's education:				
No high school (9-11)	0.186	0.018	0.153	0.008
High school	0.266	0.020	0.203	0.008
Post secondary	0.159	0.017	0.403	0.010
Mother's occupation:				
White collar	0.169	0.017	0.278	0.009
Blue collar	0.499	0.023	0.415	0.010
Housewife	0.148	0.016	0.163	0.008
Father's occupation:				
White collar	0.175	0.017	0.292	0.010
Blue collar	0.516	0.023	0.505	0.010
Nuclear	0.736	0.020	0.835	0.008
Grade averages:				
Mainly A's	0.156	0.017	0.356	0.010
Mainly B's	0.446	0.023	0.473	0.010
Enjoyed school	0.875	0.015	0.922	0.006
Found school interesting	0.063	0.011	0.124	0.007
Extracurricular activities	0.639	0.022	0.764	0.009

Note: See note to Table 2.

Table 4. Estimates from an ordered probability model.

	Estimate	Std err
Mother's education:		
No high school (9-11)	0.024	0.087
High school	0.017	0.084
Post secondary	0.227*	0.085
Father's education:		
No high school (9-11)	0.219*	0.086
High school	0.234*	0.085
Post secondary	0.490*	0.084
Immigrant	0.031	0.086
French	0.012	0.107
Nuclear	0.178*	0.077
Male	-0.184*	0.048
Enjoyed school	0.324*	0.085
Found school interesting	-0.025	0.061
Extracurricular activities	0.228*	0.055
Grade averages:		
Mainly A's	0.778*	0.070
Mainly B's	0.447*	0.060

Note: The ordered Probit specification also includes controls for mother's and father's occupation, if mother was a housewife, and provincial dummies. N=4,699. * indicate statistical significance at the 5%-level.

Table 5. Average earnings, by years of education and province (in 1995 dollars).

	Years of education:						
	<10	10	11	12	13	14-17	18+
Province:							
Newfoundland and Labrador	19,884	22,742	25,102	24,339	26,609	31,601	42,180
Prince Edward Island	19,375	18,201	21,596	23,213	23,437	27,594	40,808
Nova Scotia	22,283	22,461	24,309	24,872	25,291	29,839	40,813
New Brunswick	21,523	22,061	24,389	24,275	25,704	30,884	41,761
Quebec	23,862	24,894	26,331	28,120	27,928	33,073	42,171
Ontario	27,879	29,687	29,385	30,602	32,210	36,871	46,605
Manitoba	23,899	24,459	25,947	26,254	27,300	32,191	41,994
Saskatchewan	24,224	24,654	25,475	26,502	25,125	32,733	42,358
Alberta	26,303	27,164	27,337	28,622	28,325	35,687	45,827
British Columbia	27,630	29,483	30,466	31,012	30,344	35,495	45,356

Note: Obtained from the 1996 Canadian Census. Entries show average earnings conditional on being over \$6,000.

Table 6. Choice of post-secondary specialization by region, 1991.

	Atlantic	Quebec	Ontario	Prairies	BC
Specialization:					
Education	0.053	0.044	0.069	0.123	0.058
Arts	0.022	0.043	0.071	0.053	0.033
Humanities	0.139	0.042	0.192	0.113	0.129
Social science	0.064	0.233	0.116	0.121	0.098
Commerce	0.210	0.210	0.195	0.182	0.233
Agriculture	0.060	0.021	0.040	0.044	0.054
Engineering	0.175	0.134	0.110	0.133	0.165
Health	0.037	0.062	0.040	0.057	0.045
Math	0.107	0.145	0.112	0.107	0.119
Other	0.131	0.066	0.055	0.067	0.065

Note: Entries calculated from a restricted SLS sample (N=2,366), weighted with the sample weight provided in the survey data. The regions are defined as follows: the Atlantic provinces include Newfoundland and Labrador, Prince Edward Island, Nova Scotia, and New Brunswick, and the Prairies include Manitoba, Saskatchewan, and Alberta.

Table 7. Marginal effects of expected future wages on school hazard rates.

	Estimate	Std Err
Overall effect:	-0.025*	0.004
Provincial Effects:		
Newfoundland and Labrador	0.0014	0.0015
Prince Edward Island	0.0009	0.0032
Nova Scotia	0.0010	0.0013
New Brunswick	0.0033	0.0017
Quebec	0.0050*	0.0008
Ontario	-	-
Manitoba	0.0032*	0.0014
Saskatchewan	0.0029*	0.0014
Alberta	0.0013	0.0008
British Columbia	0.0022*	0.0008
Grade Specific Effects:		
< 10 years	-0.011*	0.001
10 years	-0.014*	0.001
11 years	-0.029*	0.003
12 years	-0.051*	0.005
13 years	-0.052*	0.006
14-15 years	-0.061*	0.009
16 + years	-0.051*	0.010

Note: Entries show effects on school hazard rates from a 10% increase in average wages for people with 18 years of schooling or more. The specifications include controls for parents' education and occupation, immigrant status, french mother tongue, nuclear family, male, if mother was a housewife, and attitude and grade information. * indicate statistical significance at the 5%-level.

Table 8. Marginal effects of parent's education from the grade transition model.

	Model Specification:		
	(1)	(2)	(3)
Mother has:			
No high school (9-11)	-0.003 (0.008)	-0.004 (0.008)	-0.003 (0.008)
High school	-0.004 (0.007)	-0.005 (0.007)	-0.001 (0.007)
Post secondary	-0.018* (0.007)	-0.020* (0.007)	-0.014 (0.008)
Father has:			
No high school (9-11)	-0.013 (0.008)	-0.015 (0.008)	-0.015 (0.008)
High school	-0.014* (0.007)	-0.016* (0.007)	-0.016* (0.008)
Post secondary	-0.035* (0.007)	-0.037* (0.007)	-0.032* (0.007)

Note: Specification (1) contains no provincial dummies and no grade/attitude information, otherwise it contains the same controls as in Table 7 (except expected future earnings outcomes). Specification (2) is similar to specification (1) but adds provincial dummies. Finally, Specification (3) is similar to specification (2) but adds grade/attitude information. * indicate statistical significance at the 5%-level.

Table 9a. Marginal effects of mother's education from the grade transition model.

	Grade level:	
	High school or less	More than high school
Mother has no high school:		
Atlantic provinces	-0.010 (0.007)	-0.009 (0.030)
Quebec	0.011 (0.022)	-0.002 (0.039)
Ontario	-0.003 (0.013)	-0.005 (0.046)
Prairies	0.002 (0.012)	-0.046 (0.038)
British Columbia	0.014 (0.026)	-0.043 (0.068)
Mother has high school:		
Atlantic provinces	-0.021* (0.007)	-0.029 (0.030)
Quebec	0.001 (0.019)	0.021 (0.037)
Ontario	0.013 (0.013)	0.030 (0.042)
Prairies	0.002 (0.011)	-0.025 (0.036)
British Columbia	-0.018 (0.020)	0.085 (0.063)
Mother has post-secondary:		
Atlantic provinces	-0.045* (0.007)	-0.003 (0.031)
Quebec	-0.034 (0.020)	0.006 (0.040)
Ontario	-0.014 (0.011)	-0.027 (0.043)
Prairies	-0.029* (0.011)	-0.014 (0.038)
British Columbia	-0.026 (0.020)	0.036 (0.063)

Note: Results from the grade transition model described in the text. Specification includes the same controls as specification (3) in Table 8. The regions are defined as follows: the Atlantic provinces include Newfoundland and Labrador, Prince Edward Island, Nova Scotia, and New Brunswick, and the Prairies include Manitoba, Saskatchewan, and Alberta. * indicate statistical significance at the 5%-level.

Table 9b. Marginal effects of father's education from the grade transition model.

	Grade level:	
	High school or less	More than high school
Father has no high school:		
Atlantic provinces	-0.013 (0.007)	0.016 (0.028)
Quebec	-0.011 (0.020)	0.018 (0.044)
Ontario	-0.032* (0.008)	-0.006 (0.048)
Prairies	-0.002 (0.011)	0.028 (0.038)
British Columbia	-0.003 (0.023)	-0.218* (0.053)
Father has high school:		
Atlantic provinces	-0.010 (0.008)	-0.060* (0.027)
Quebec	-0.032* (0.016)	-0.040 (0.037)
Ontario	-0.026* (0.009)	0.009 (0.045)
Prairies	-0.002 (0.011)	0.046 (0.037)
British Columbia	-0.026 (0.019)	-0.156* (0.057)
Father has post secondary:		
Atlantic provinces	-0.033* (0.008)	-0.028 (0.030)
Quebec	-0.070* (0.016)	-0.079* (0.035)
Ontario	-0.048* (0.009)	-0.031 (0.044)
Prairies	-0.022* (0.011)	0.012 (0.035)
British Columbia	-0.052* (0.018)	-0.164* (0.060)

Note: See note to Table 9a.

Table 10. Choice of post-secondary education in 1991 (Marginal effects with standard errors in parenthesis).

	Education	Arts	Humanities
Mother's education:			
No high school (9-11)	0.011 (0.38)	-0.004 (-1.73)	0.022 (0.81)
High school	0.025 (0.86)	-0.019 (-0.12)	0.003 (0.62)
Post secondary	-0.024 (-1.01)	-0.028 (-0.71)	0.016 (1.38)
Father's education:			
No high school (9-11)	-0.034 (-1.72)	-0.035 (-1.53)	0.022 (0.48)
High school	-0.009 (-0.41)	-0.008 (-0.90)	-0.011 (-0.84)
Post secondary	0.003 (0.12)	-0.001 (-0.35)	0.005 (0.31)
Expected future wages	0.00002* (4.62)	0.00001* (3.6)	-0.00037* (-10.82)

Note: Respondents not attending any post-secondary education in 1991 were excluded leaving a sample of 2,366 observations. The category of "other" includes studies that were not classified or studies with no specialization. Asymptotic t-ratios in parentheses. * indicate statistical significance at the 5%-level.

Table 10. Choice of post-secondary education in 1991, continued.

	Social sciences	Commerce	Agriculture
Mother's education			
No high school (9-11)	-0.005 (-0.11)	-0.021 (-0.44)	0.008 (0.36)
High school	0.012 (0.27)	-0.008 (-0.16)	-0.001 (-0.03)
Post secondary	0.025 (0.56)	-0.005 (-0.10)	0.014 (0.58)
Father's education			
No high school (9-11)	-0.010 (-0.25)	-0.040 (-0.88)	-0.005 (-0.27)
High school	0.002 (0.05)	-0.030 (-0.65)	-0.006 (-0.30)
Post secondary	0.009 (0.22)	-0.081 (-1.75)	-0.007 (-0.35)
Expected future wages	0.00006* (7.17)	0.0001* (7.75)	0.00001* (4.68)

Note: Respondents not attending any post-secondary education in 1991 were excluded leaving a sample of 2,366 observations. The category of "other" includes studies that were not classified or studies with no specialization. Asymptotic t-ratios in parentheses. * indicate statistical significance at the 5%-level.

Table 10. Choice of post-secondary education in 1991, continued.

	Engineering	Health	Math
Mother's education			
No high school (9-11)	0.054 (1.48)	-0.007 (-0.39)	-0.039 (-1.21)
High school	0.003 (0.12)	-0.011 (-0.63)	-0.002 (-0.05)
Post secondary	0.028 (1.00)	-0.00004 (-0.01)	-0.015 (-0.46)
Father's education			
No high school (9-11)	0.041 (1.31)	0.013 (0.52)	0.020 (0.44)
High school	-0.028 (-1.30)	0.078 (1.90)	-0.004 (-0.10)
Post secondary	-0.011 (-0.48)	0.024 (1.10)	0.028 (0.74)
Expected future wages	0.00004* (6.10)	0.00002* (5.11)	0.00008* (8.77)

Note: Respondents not attending any post-secondary education in 1991 were excluded leaving a sample of 2,366 observations. The category of "other" includes studies that were not classified or studies with no specialization. Asymptotic t-ratios in parentheses. * indicate statistical significance at the 5%-level.

Table 10. Choice of post-secondary education in 1991, continued.

	Other
Mother's education	
No high school (9-11)	-0.019 (-1.00)
High school	-0.042* (-2.25)
Post secondary	-0.069* (-3.43)
Father's education	
No high school (9-11)	0.010 (0.36)
High school	0.043 (1.32)
Post secondary	0.029 (1.00)
Expected future wages	0.00002* (5.48)

Note: Respondents not attending any post-secondary education in 1991 were excluded leaving a sample of 2,366 observations. The category of "other" includes studies that were not classified or studies with no specialization. Asymptotic t-ratios in parentheses. * indicate statistical significance at the 5%-level.