

## **Have Tuition Fee Hikes in the Late 1990s Undermined Access to Post-secondary Education in Canada?**

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### **I. Introduction**

University tuition fees have increased dramatically over the 1990s. Between the fall of 1995 and the fall of 2000, tuition fees have increased by 28 per cent in real terms. As was recently the case in BC, each tuition hike has been met with considerable outcry from student groups, and criticized as seriously compromising access to university education.

While the escalation of university tuition fees has received much media attention, increases in college fees have largely gone unnoticed despite the drastic changes that occurred in some provinces. For example, average college tuition fees in New Brunswick have increased by 226 per cent between the fall of 1995 and the fall of 2000, from \$736 to \$2,400 in constant 2000 dollars. Similarly, tuition fees have climbed from \$1,021 to \$2,339 in Alberta over the same period. This situation is potentially problematic given that colleges have traditionally provided a less expensive post-secondary education (PSE) alternative to university for students with lesser financial means.

Despite these increases, PSE participation has remained roughly constant at 54-56 per cent throughout the 1990s.<sup>2</sup> While this may suggest that access has been unaffected, the composition of university and college student bodies could still have changed markedly according to family income. In fact, constant youth PSE participation rates could have prevailed even while fewer low-income students enrolled in post-secondary programs if more students from wealthier families – less sensitive to the rising price tag of higher education - had entered such programs.

Since most jobs in the Canadian labour market nowadays require some form of PSE, it is of crucial policy relevance to encourage all youth who wish and have the ability to pursue at the post-secondary level to do so. Participation should, indeed, not be determined by family resources as much as by interest and academic skills. Understanding the influence of tuition fees on PSE participation among individuals with different financial resources is a crucial step in the promotion of valuable labour market skills.

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<sup>2</sup> Education in Canada, 1997 and 2000 editions. It measures the participation in higher education of all 18-21 year-olds regardless of whether or not they have earned high school credentials.

This study uses a new data set – the Youth in Transition Survey 18 to 20 – to estimate the effect of financial considerations on the decision to participate in PSE while controlling, among other things, for academic preparation and opportunity cost. More specifically, it attempts to answer the following question: do PSE participation price (tuition) elasticities vary according to family resources?

The paper is organized as follows: the following section outlines recent trends in provincial tuition fees, while Section III reviews evidence presented in the Canadian literature on the impact of tuition fees on PSE participation. Section IV then lays out the econometric framework employed to model the decision to attend a PSE program or not, and if so, the choice of program. Section V describes the different sources of data used in the analysis. In Section VI, descriptive statistics serve to illustrate the relationship between fees and participation in Canada before turning to preliminary regression results on the effect of price-income interactions on PSE participation. A discussion of these results concludes in Section VII.

## II. What happened to tuition fees in the late 1990s?

To give a sense of perspective, Figures 1 and 2 show the evolution of average tuition fees in constant 2000 dollars by province over the course of academic years 1995-96 to 2000-01 at the college and university levels respectively. The discussion presented below is however concerned only with changes that occurred between 1996-97 and 1998-99, as this is the period spanned by our participation data (further details in Section V). The percentage change in tuition between 1996-97 and 1998-99 is indicated for each province on the graphs. Note that because college education (CEGEP) remained free of charge in Quebec throughout the period, the province is omitted from Figure 1.<sup>3</sup>

As the figures make apparent, Canadian students faced a considerable amount of variation in tuition fees across provinces and over time. Outside of Quebec, the lowest college tuition fee was found in Nova Scotia in 1996-97 (\$925) while the highest reached \$1,924 in New Brunswick in 1998-99. While tuition fees increased more rapidly at colleges than at universities (20% vs. 12% during the period under study), a year of university tuition nevertheless remained between 1.7 to 3 times more expensive than a year of college (see Appendix A). University tuition ranged from \$1,824 in 1996-97 in Quebec to \$4,279 in Nova Scotia in 1998-99 (Appendix A). Students in New Brunswick witnessed the most dramatic change in college tuition between 1996-97 and 1998-99: a 71% increase over three years. Meanwhile, both college and university fees remained fairly stable in British Columbia and Quebec over the period, and so did college tuition fees in Prince Edward Island.

This variation over time and across provinces offers a unique opportunity to investigate the effect of tuition on PSE participation particularly given that there were no major institutional changes (such as to the Student Loan Program) during the period of interest.

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<sup>3</sup> Individual CEGEPs do have ancillary fees that vary by program. Community colleges in the other provinces also have ancillary fees with associated with their various programs. To our knowledge, there is no unique information source on ancillary fees in community colleges or CEGEPs.

### III. The influence of tuition fees

Few empirical studies investigate the determinants of post-secondary education participation in Canada and none focus on the role of tuition fees on participation.<sup>4</sup> Most of this research is descriptive and qualitative in nature and seeks to identify which factors influence the participation of various clienteles (Seddon, 2001). The consensus arrived at in this literature is that parental education, family revenues or aggregates of these two measures (Socio-economic indicators) are strong, if not the strongest predictors of PSE participation.<sup>5</sup>

Some interpret these findings as evidence that financial constraints limit the access to PSE within some groups (see for example Canadian News Facts, 2000; University of Alberta, 2000; Clift et al, 1997). In other words, they believe that the elasticity of PSE participation with respect to income is different from zero and of significant magnitude. Yet, this evidence is insufficient to firmly establish that access is unequal and that family income is instrumental in determining who goes on and who does not. As long as analyses do not account simultaneously for family resources and parental education as well as for other factors such as academic preparation, the true influence of each component cannot be identified.

To the authors' knowledge, only one study by Christofides et al. (2001) examines the effect of family resources on the PSE participation of Canadian youth (18-24 year olds) in a multi-variate context. The authors hypothesize that low-income individuals use proportionally more of their resources to achieve a desired level of schooling than do high-income individuals, or, put differently that PSE income elasticity is decreasing in income. They test whether the remarkable increase in PSE participation among children of low-income families in the 1970s and 1980s was brought about by rising average incomes (the idea being that low-income families experiencing positive income shocks would allocate more of their resources to higher education). Their results suggest that although there exists a positive and significant relationship between income and participation, the elasticity of PSE with respect to income is low and constant across income groups. Therefore, it appears that the observed convergence in participation rates cannot be attributed to higher income elasticity among low-income individuals.

Their study also controls for the effect of tuition fees and parental education on participation. Not surprisingly, they find that parental education strongly influences PSE decisions. On the other hand, their results on tuition fees are inconclusive. This probably

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<sup>4</sup> Stager (1996) finds that large changes in tuition result in very small changes in the rates of return. Hence, he suspects that tuition changes would also lead to small changes in enrolment, i.e. that the price elasticity to university attendance is small and maybe insignificant. His work covers the period 1960 to 1990, a period during fees in real terms decreased. Clift et al (1997) reviews the literature and draws the conclusions that fee levels have little effect on the overall participation rates.

<sup>5</sup> For example, Butlin (1999) finds that high school graduates with university-educated parents are 3.5 times more likely to go to university than individuals with high school educated parents. Junor and Usher (2002) show that for the mid 1990s, participation rose with after-tax family income.<sup>5</sup> However, when PSE is divided between university participation and college participation, it becomes clear that family income has only an effect on university participation and none on the college one. Furthermore, the differences in university participation by quartile of family income are significant for the lowest and the highest quartile.

stems from their use of an imperfect measure of tuition fees – the authors control only for the fees charged by the largest university in each province. Moreover, the data they employ did not allow the authors to distinguish between high school graduates and high school dropouts. Since a high school diploma is the minimum requirement to apply to the majority of PSE programs, including in the analysis high school dropouts who cannot enrol in PSE programs and for whom, therefore, tuition fees are irrelevant will generate imprecise estimates.

American evidence points to low overall price responses for PSE (Heller, 1996). A \$100 increase in tuition fees typically gives rise to decreases in enrolment of the order of 0.5 to 1 per cent. Higher responses are found for low-income families than for wealthier ones (Heller, 1996; Jackson & Weathersby, 1975). Clearly, tuition fees in Canada range on a smaller interval, but it still remains a valid question to ask whether fees are influential or not and if family resources have some bearing on who will access higher education.

The current study aims at statistically establishing the influence of both family background and tuition fees on the decision to participate. It will supplement the evidence on income elasticity provided by Christofides et al. by investigating possible interactions between tuition fees and parental income, and their effect on PSE participation and on the choice of program. The inclusion of information on both college and university tuition fees and the clear identification of high school graduates will help in estimating with an adequate level of precision the price, income and cross-elasticities of post-secondary education participation.

#### IV. To go or not for post-secondary education

##### *A. Empirical Framework*

A high school graduate faces a number of options upon graduation, which, for simplicity, we characterize in the following way: 1) to forego any further education and to start working full-time; or, 2) to enter a post-secondary program. If the post-secondary stream is chosen, the graduate must further decide whether to enrol in a two-year college program or to undertake a four-year university degree. This sequential characterization is chosen to reconcile differences in the educational system across Canada. Indeed, as illustrated in Figure 3, while the decision process could simply be modeled as a one-time choice between three options (work, college, university) in most provinces, such a representation would not be accurate for Quebec or Ontario where PSE decisions occur sequentially. Moreover, representing PSE participation as a two-stage decision process allows us to estimate separately the general effect of tuition fee increases on PSE (to go or not), and the potential displacement effect from university to college programs of these increases.

In theory, an individual's decision to attend PSE represents a deterministic outcome that maximizes his utility subject to his ability to finance the upfront cost of the educational option chosen. As researchers however, we do not know enough about all of the factors affecting this decision – or their actual values – to replicate the underlying calculation accurately. For example, beyond assuming that the individual expects to earn more with a post-secondary degree than without, we cannot determine what he expects his incremental financial returns to be for pursuing beyond the high school level.

Nevertheless, observations of individual academic preparation and choice of post-secondary options provide sufficient information to make probabilistic statements. In particular, the probability that individual  $i$  chooses to pursue at the PSE level can be represented by

$$P_i^{PSE} = \Pr(V^{PSE}(Z_i, \beta) + \varepsilon_i > 0)$$

where individual characteristics in the vector  $Z_i$  represent the observable determinants of the utility function ( $V$ ), the weights on these explanatory factors are estimated as  $\beta$ , and the unknown characteristics such as expected income are captured in  $\varepsilon_i$ .

The second stage of the decision process – choosing between a four-year university program and a two-year college program – also follows from solving a maximization problem where the arbitration is made between the value of a college degree and that of a university degree. The probability that individual  $i$  chooses university over college is a function of the relative benefits of each option. If the difference in utility is positive under the university option then that is the program that will be chosen.

$$P_i^U = \Pr(V^U(Z_i, \delta) + v_i > 0)$$

The observable characteristics that enter the empirical models pertain to demographics, academic preparation, family resources and characteristics, and to the opportunity cost of acquiring additional education beyond the high school level (wages and unemployment rates). The models also obviously include information on tuition fees.

In the first stage of the estimation, tuition fees are intended to capture the price effect of attending PSE. In the second stage, the difference between university and college tuition fees will be used to evaluate the relative price effect on the choice of programs. Terms of interaction between fees and family income will be used to help establish whether access to PSE overall and to university programs is uniform across income groups.

We assume that high school graduates observe only the fees charged by college and university institutions in the province in which they resided during their last year of high school.<sup>6</sup> Thus, a Manitoba graduate who last attended high school during the 1997-98 school year bases his decision only on fees charged by colleges and universities across Manitoba in 1997-98. Moreover, we allow the first stage of the decision making process – whether to pursue at the PSE level or not – to be made on the basis of two alternate measures of the price of tuition: the minimum cost of a PSE program (corresponding to college in all provinces), and the average cost of a first year of PSE. The latter is computed as a weighted average of college and university tuition fees where the weights are given by the split in enrolment between universities and colleges in each province. The second stage of the decision process – type of program to undertake – is made to be a function of the relative price of a university programs versus college program.

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<sup>6</sup> In other words, their decision is a function of own province tuition fees only. Although limiting, this assumption appears reasonable based on mobility numbers from the Youth in Transition survey (only 5% of post-secondary participants in our sample had moved to another province to attend a post-secondary institution) and on our own encounters with high school graduates-to-be (Raymond and Rivard, 2001).

### B. Marginal effects with interaction terms

As mentioned above, both stages of the decision process will be estimated using probits. It is well known that coefficients of probit regressions are not directly interpretable and that to evaluate how responsive the dependent variable is to changes in independent variables, it is necessary to derive the marginal effect of these independent variables. The marginal effect of a variable is simply the product of its parameter and of the normal density of the index, evaluated, as a general practice, at the mean of all explanatory variables. To illustrate, suppose the probability of going to PSE is a function of only two variables: tuition fees (FEES) and family income (INC):

$$P^{PSE}_i = \Phi(\beta_0 + \beta_1 FEES_i + \beta_2 INC_i)$$

Then, the marginal effect of *FEES* for example is:

$$\frac{\partial}{\partial FEES_i} (\Phi(\beta_0 + \beta_1 FEES_i + \beta_2 INC_i)) = \beta_1 \phi(\cdot)$$

Most standard statistical packages correctly report these marginal effects. As pointed out by Ai and Norton (2003), they do not however produce the correct marginal effects when interaction terms are included in the regression for these interaction terms and their components.

When interaction terms are added, the marginal effect of the interacted variables also becomes a function of the interaction parameter and variable. In the above example we thus have the marginal effect of *FEES* equal to

$$\frac{\partial}{\partial FEES_i} (\Phi(\beta_0 + \beta_1 FEES_i + \beta_2 INC_i + \beta_{12} FEES_i * INC_i)) = \beta_1 \phi(\cdot) + \beta_{12} \phi(\cdot) INC_i$$

And the marginal effect of the interaction term is given by the cross-derivative with respect to *FEES* and *INC*.

$$\frac{\partial^2 \Phi(\cdot)}{\partial FEES_i \partial INC_i} = \beta_{12} \phi(\cdot) + (\beta_1 + \beta_{12} INC_i) (\beta_2 + \beta_{12} FEES_i) \phi'(\cdot)$$

Statistical packages invariably employ the “standard” marginal effect formula -  $\beta_k \phi(\cdot)$ . Therefore when interaction terms are employed, neither the sign nor magnitude of the marginal effects, nor the statistical significance of the underlying coefficients that are reported can be trusted for interacted variables.

Following Ai and Norton (2003), we calculate the correct marginal effects and standard errors. These standard errors can then be used to perform t-tests on the marginal effects. The derivation of the standard errors can be found in Appendix C.

## V. Data

### A. Data Sources

Information on participation to PSE is derived from Statistics Canada’s new Youth in Transition Survey 2000 (YITS). Respondents were individuals aged 18 to 20 during the reference year of 1999. YITS is particularly interesting for the purposes of this study not

only because its target population is composed of young individuals of PSE decision-making ages but also because the survey collects a wealth of information regarding the respondents' high school experience, academic preparation and parent's education and background.

Unfortunately, however, YITS does not provide any information with respect to family income or wealth. To circumvent this limitation, we complement the dataset with representative earnings figures taken from the 2001 Canadian Census.<sup>7</sup> Average earnings for the year 2000 are computed from the Census by sex, province and 4-digit occupational group and matched to parental characteristics. Where a parent is working but no occupation is listed, a value corresponding to the average earnings within his province and for his gender is attributed. The same imputation rule is employed when a parent's occupation is known but Census tables provide no information on earnings for that profession (as is the case when the number of observations in a cell is too low to compute reliable estimates; ex. no earnings are reported for "conference and event planners" in PEI). Imputed earnings figures are used to calculate total family earnings. YITS collects information on up to 4 parents. For the purposes of the analysis however, the sum of family earnings is computed only for the first two parents.<sup>8</sup>

Tuition data is taken from two sources. Statistics Canada's Tuition and Living Accommodation Costs Survey<sup>9</sup> provides the value of tuition fees at 64 Canadian university degree-granting institutions for academic years 1995-96 to 1998-9. For each institution, the reported fee corresponds to the average computed across 11 faculties<sup>10</sup> and weighted by enrolment. The source for college tuition fees is an informal telephone survey conducted on an annual basis by the Manitoba Council on Post-Secondary Education with each province's Ministry of Education.<sup>11</sup> Both tuition series have been rebased in constant 2000 dollars and provincial averages are matched onto the YITS dataset according to the respondents' province of residence when they were last in high school. As mentioned above, these two series are used to derive a third one representing the average price of a first year of PSE. To do so, each series is weighted according to the province- and year-specific proportion of students attending college and university respectively. These proportions are taken from *Education in Canada*.<sup>12</sup>

Finally, in order to account for the opportunity cost of pursuing an education beyond high school, information drawn from the Labour Force Survey on gender- and province-

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<sup>7</sup> Census, Statistics Canada, Cat. No. 97F0019XCB01003.

<sup>8</sup> As part of the survey, respondents are asked which parents they lived with during most of the time they were in high school and, if they were away at that time, who were the parents or guardians of their family home. We choose to use information on only the first two parents because very few – see appendix – respondents report more than two parents and, those who do, generally report grandparents or stepparents as third and fourth guardians. It is unclear to us which role these additional guardians exert on the respondents' educational outcomes; e.g. do grandparents contribute additional financial resources to the household or are they a financial burden?

<sup>9</sup> Tuition and Living Accommodation Costs Survey, Statistics Canada, Cat. No. 81C0049

<sup>10</sup> Faculties included are Agriculture, Architecture, Commerce, Dentistry, Education, Engineering, Household Sciences, Law, Medicine, Music, and Science.

<sup>11</sup> College tuition fees are available only at the provincial level.

<sup>12</sup> We use the proportion of 18 to 21 year-olds enrolled full-time in post-secondary institutions as reported in Statistics Canada (2000) "Education in Canada", table 23, Cat. No. 81-229 XIB.

specific unemployment rates and median wages for individuals aged 15 to 24 for the years 1997 to 1999 is added to the dataset. The unemployment rate is that of individuals with a high school diploma; the median wage refers to full-time workers.

## B. Working Sample

The working sample is restricted to high school graduates who last attended high school between the academic school years of 1995-96 and 1998-99. In 1995-96, respondents were at most 16 years of age (1995 – Year of birth of oldest YITS respondents: 1979). Given that the elementary and secondary school program is shorter by at least one year in Quebec than in other provinces, 16 year-old graduates in our sample are only found in Quebec.<sup>13</sup> The 1995-96 cohort is thus composed exclusively of graduates from that province.

Individuals who graduated from high school in Ontario were deleted from the sample on the grounds that their PSE behaviour appears very much at odds with 1) that of graduates from other provinces, and 2) official statistics.<sup>14</sup> Indeed, post-secondary participation by high school graduates from this province increases by as much as 30 percentage points between 1997 and 1999 whereas the increase is considerably more modest in other provinces and more in line with trends computed using administrative data.<sup>15</sup>

For the purposes of this analysis, post-secondary participants are defined as those high school graduates who enrolled in a post-secondary institution within 12 months of leaving high school. Hence, an individual graduating from high school in June of 1997 and entering a post-secondary program in September of 1998 instead of September 1997 is characterized in the sample as a non-continuer. This rule is employed in order to restrict the group of PSE participants to individuals going directly from high school to PSE (as opposed to, say, taking a year off to travel the world prior to enrolling in a PSE program). Some 17 per cent of the individuals observed to pursue at the post-secondary level delay entry by more than a year. The question of who delays entry into PS programs and why is interesting in its own right. We leave it to be addressed by future research.

Table 1 below illustrates the makeup of the final working sample. Of the 11,310 individuals composing this sample,<sup>16</sup> roughly 63 per cent are post-secondary participants. Forty-seven per cent of respondents are men, and 8 per cent have a mother tongue other than French or English, 43 per cent had an overall grade point average equal or above 80 per cent in their last year of high school, and 74 per cent had taken university preparatory math level classes in high school. The average value of family earnings is \$54,000 and parents' highest level of education typically consists of 12 years of education – which corresponds to a high school diploma. Moreover, a year of college cost \$840 for respondents in this sample while the average cost for one year of post-secondary education cost rises to \$1,573.

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<sup>13</sup> The number of observations was too small in the other provinces, less than 50.

<sup>14</sup> By official statistics we mean numbers reported in Statistics Canada's Education in Canada publication.

<sup>15</sup> We have raised this issue with persons in charge of the survey at Statistics Canada's Education Division. They were unable to provide us with an explanation for this observation at the time when this version of the paper was written. An upcoming meeting with methodologists from the Division should clear up the issue and allow us to conduct the analysis anew using observations on high school graduates from Ontario.

<sup>16</sup> A few less than 200 observations had incomplete information and were dropped.

Table 1. Characteristics of High School Graduates in the Sample

|   | All    | Non-PSE | PSE    |
|---|--------|---------|--------|
| <b>PSE Participation</b>                                | 63%    |         |        |
| <b>Male</b>   | 48%    | 54%     | 44%    |
| <b>Not French or English</b>                            | 8%     | 8%      | 9%     |
| <b>High School GPA 80%<sup>+</sup></b>                  | 43%    | 25%     | 53%    |
| <b>University Preparatory Math</b>                      | 74%    | 62%     | 81%    |
| <b>Family Earnings (Constant \$2000)</b>                | 54,147 | 51,455  | 55,745 |
| <b>Mother's Years of Education</b>                      | 12.9   | 12.4    | 13.2   |
| <b>Father's Years of Education</b>                      | 12.8   | 12.3    | 13.2   |
| <b>College Tuition (Constant \$2000)</b>                | 840    | 1,097   | 688    |
| <b>Average First Year PSE Tuition (Constant \$2000)</b> | 1,573  | 2,009   | 1,315  |
| <b>No. of Observations</b>                              | 11,310 | 4,185   | 7,125  |

Splitting the sample along the lines of post-secondary participation reveals that those who pursue beyond high school are more often women, have a language other than French or English as mother tongue, have better grades and are more likely to have taken university preparatory math courses. They also come from families with higher earnings and somewhat more parental education, and face lower tuition fees.

## VI. Tuition fees: a barrier or barely influential?

### A. Trends

As shown in Figures 1 and 2, the cost of attending a PSE program has risen substantially over the period of interest. Did PSE participation decline overall or among low-income individuals as a result of this?

Figure 4 goes part of the way in answering this question as it plots PSE participation as a function of both college tuition and average first year tuition – top and bottom panels respectively. Each data point represents the fee observed in a province for a given year (1997, 1998 and 1999). Everywhere except in Quebec where tuition fees were equal to zero throughout the period, the highest tuition fee always corresponds to the most recent data point (Appendix A).

It is difficult to establish a clear relationship between tuition fees and participation on the basis of these graphs. What is obvious however is that PSE participation in Quebec - and to some extent in Nova Scotia - is much higher than in the rest of Canada. When these two provinces are excluded, there seems to exist, as one would expect, a negative relationship between fees and participation in the top panel. In the bottom panel, however the relationship appears to be positive.

Of course, a number of factors other than tuition fees are likely to influence PSE participation. Among them is the amount of family resources upon which a prospective student can draw to cover the cost of additional schooling. This, according to Figure 5, seems indeed to matter as PSE participation increases steadily across family earnings quintiles such that a difference of 13 percentage points exists between individuals from the highest and lowest family earnings quintiles.<sup>17</sup>

Is there a more obvious relationship between tuition fees and participation once family earnings have been accounted for? If the claim that tuition fee hikes have particularly jeopardized access to PSE for individuals from low-income families, one would expect to see a strong negative relationship between tuition and participation among lower income quintiles and a much weaker one (if any) within the top quintile. The message, as portrayed in Figures 6 and 7, is again mixed according to the measure of tuition chosen. Higher *college* tuition fees appear to lower participation among the bottom quintile and do not seem to matter for the higher family earnings quintiles, while higher *average first year* fees seem to raise participation among the bottom quintile.

### *B. Regression analysis*

In order to account for yet more confounding factors in the decision to pursue or not at the post-secondary level, the remainder of the study is conducted using regression analysis.

Table 2 reports the preliminary results from regressions of the probability of PSE participation using no interaction terms. The relationship is estimated by maximum likelihood probit and the marginal effects calculated at sample mean values of the regressors. The left panel corresponds to specifications estimated with college tuition as the measure of PSE tuition fees while the right panel reports values specifications using average tuition fees. Within each set, the first regression includes family earnings as a regressor; the second, family earnings and parents' education; and the third adds to these the square of family earnings.

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<sup>17</sup> These figures line up with participation levels as reported in “The Price of Knowledge” by Junor and Usher, Figure 2.V.1, which uses a different Canadian data source.

Table 2. Marginal Effects of PSE Participation Determinants

|  | College Tuition    |                    |                    | Average Tuition    |                    |                    |
|--|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
|  | 1                  | 2                  | 3                  | 1                  | 2                  | 3                  |
| <b>Tuition and Family Background</b>             |                    |                    |                    |                    |                    |                    |
| Tuition (in \$100)                               | -0.01<br>(1.58)    | -0.01<br>(1.55)    | -0.005<br>(1.49)   | 0.005<br>(1.66)    | 0.006<br>(1.75)    | 0.006<br>(1.75)    |
| Family Earnings in \$1,000                       | 0.001<br>(2.20)*   | 0.000<br>(0.10)    | 0.001<br>(1.08)    | 0.001<br>(2.17)*   | 0.000<br>(0.07)    | 0.001<br>(1.09)    |
| Family Earnings Squared                          |                    |                    | 0.000<br>(0.84)    |                    |                    | 0.000<br>(0.86)    |
| Imputed Salary for at least one Parent           | 0.010<br>(0.59)    | -0.007<br>(0.44)   | -0.008<br>(0.45)   | 0.009<br>(0.57)    | -0.008<br>(0.45)   | -0.008<br>(0.46)   |
| Mother's Years of Education                      |                    | 0.013<br>(3.84)**  | 0.013<br>(3.68)**  |                    | 0.013<br>(3.79)**  | 0.012<br>(3.63)**  |
| Father's Years of Education                      |                    | 0.015<br>(4.99)**  | 0.015<br>(5.00)**  |                    | 0.016<br>(5.01)**  | 0.016<br>(5.02)**  |
| Missing Parental Education (1)                   | 0.013<br>(0.54)    | -0.013<br>(0.53)   | 0.000<br>(0.01)    | 0.014<br>(0.58)    | -0.012<br>(0.49)   | 0.001<br>(0.04)    |
| Number of Older Siblings                         | -0.02<br>(2.29)*   | -0.01<br>(1.80)    | -0.013<br>(1.72)   | -0.017<br>(2.29)*  | -0.013<br>(1.81)   | -0.013<br>(1.73)   |
| Number of Younger Siblings                       | -0.009<br>(1.34)   | -0.011<br>(1.50)   | -0.010<br>(1.44)   | -0.010<br>(1.39)   | -0.011<br>(1.55)   | -0.011<br>(1.49)   |
| <b>Student Characteristics &amp; Preparation</b> |                    |                    |                    |                    |                    |                    |
| Male   | -0.059<br>(3.18)** | -0.065<br>(3.49)** | -0.064<br>(3.51)** | -0.079<br>(3.56)** | -0.086<br>(3.87)** | -0.084<br>(3.91)** |
| First Language not French or English             | 0.095<br>(3.36)**  | 0.101<br>(3.53)**  | 0.103<br>(3.59)**  | 0.099<br>(3.51)**  | 0.105<br>(3.67)**  | 0.106<br>(3.73)**  |
| High School GPA (default : 70% to 79%)           |                    |                    |                    |                    |                    |                    |
| 69% or less                                      | -0.195<br>(8.50)** | -0.191<br>(8.37)** | -0.191<br>(8.34)** | -0.198<br>(8.57)** | -0.194<br>(8.46)** | -0.193<br>(8.43)** |
| 80% to 89%                                       | 0.156<br>(9.53)**  | 0.148<br>(8.99)**  | 0.148<br>(9.10)**  | 0.157<br>(9.58)**  | 0.149<br>(9.04)**  | 0.149<br>(9.15)**  |
| 90% or more                                      | 0.266<br>(11.24)** | 0.251<br>(10.23)** | 0.250<br>(10.20)** | 0.267<br>(11.26)** | 0.252<br>(10.25)** | 0.251<br>(10.22)** |
| Took University Preparatory Math                 | 0.187<br>(10.74)** | 0.178<br>(10.13)** | 0.178<br>(10.10)** | 0.187<br>(10.68)** | 0.178<br>(10.08)** | 0.177<br>(10.05)** |
| <b>Opportunity Cost</b>                          |                    |                    |                    |                    |                    |                    |
| Unemployment Rate (2)                            | -0.009<br>(4.29)** | -0.009<br>(4.33)** | -0.008<br>(4.29)** | -0.005<br>(1.83)   | -0.005<br>(1.82)   | -0.005<br>(1.81)   |
| Median Wage (3)                                  | 0.005<br>(0.42)    | 0.004<br>(0.37)    | 0.003<br>(0.30)    | 0.021<br>(1.43)    | 0.021<br>(1.45)    | 0.020<br>(1.41)    |

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|                                       | College Tuition   |                   |                   | Average Tuition   |                   |                   |
|---------------------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|                                       | 1                 | 2                 | 3                 | 1                 | 2                 | 3                 |
| <b>Trends &amp; Regional Controls</b> |                   |                   |                   |                   |                   |                   |
| Year of PSE Entry (default = 1998)    |                   |                   |                   |                   |                   |                   |
| 1997                                  | -0.021<br>(1.19)  | -0.020<br>(1.18)  | -0.020<br>(1.15)  | -0.008<br>(0.47)  | -0.008<br>(0.44)  | -0.007<br>(0.42)  |
| 1999                                  | 0.040<br>(2.22)*  | 0.041<br>(2.26)*  | 0.041<br>(2.28)*  | 0.028<br>(1.50)   | 0.028<br>(1.55)   | 0.029<br>(1.58)   |
| Regional Controls (default = West)    |                   |                   |                   |                   |                   |                   |
| Maritimes                             | 0.187<br>(6.54)** | 0.189<br>(6.69)** | 0.190<br>(6.71)** | 0.168<br>(5.12)** | 0.169<br>(5.25)** | 0.170<br>(5.29)** |
| Quebec                                | 0.347<br>(7.87)** | 0.351<br>(7.99)** | 0.352<br>(8.10)** | 0.477<br>(7.62)** | 0.482<br>(7.74)** | 0.482<br>(7.73)** |
| Observations                          | 11310             | 11310             | 11310             | 11310             | 11310             | 11310             |
| Predicted probability (at means)      | 0.653             | 0.654             | 0.654             | 0.653             | 0.655             | 0.655             |

NOTE: The estimation was conducted using sampling weights. Absolute values of robust z statistics for the underlying coefficients are found in parentheses. Marginal effects are calculated at the sample mean of the regressors.

\* significant at 5% and \*\* significant at 1%

(1) Missing for either one or both parents; (2) For 15-24 year-olds with a high school diploma; (3) For 15-24 year-olds working full-time

Tuition fees, be they college or average first year PSE fees, are nowhere significant predictors of the probability of participating in PSE. While college fees are nevertheless of the expected sign in all specifications, average first year fees are not. The positive relationship between the later variable and participation most probably suggests that it does not provide an accurate representation of the fees considered by high school graduates in their decision-making process. The analysis that follows therefore focuses only on results obtained with college tuition fees.

In the most basic specification (column 1), family earnings are positively and significantly associated with the probability of PSE attendance. Once parental education is accounted for, however, family earnings no longer seem to influence attendance whether the square of family earnings is added as a regressor or not (columns 2 and 3). In contrast, parents' education has a large effect and bears a positive and significant relationship to PSE participation. A year of additional education for either parent raises the likelihood of going to PSE by 1.3 per cent to 1.6 per cent.

Demographic characteristics and indicators of academic preparedness all behave as expected: men have a significantly lower probability of participating in PSE while the contrary is true of individuals with mother tongues other than French or English. Moreover, higher marks in high school and having taken university preparatory math courses both increase the probability of participation. In fact, the probability of an individual with a grade point average of 80 to 89 per cent engaging in PSE is 15.6 percentage points higher than that of one with a GPA of 70 to 79 per cent, and 26.6 percentage points higher for a GPA of 90 per cent or more.

Finally, our measures of opportunity cost – provincial unemployment rates and median wages of 15-24 year olds – produce results that are somewhat unexpected. Median wages are not significantly related to PSE participation, but more surprisingly, higher unemployment rates (lower opportunity cost) significantly decrease the probability of participation in the specifications using the minimum cost of PSE.

The above results suggest that, on average, PSE participation does not respond markedly to changes in price or income (earnings) conditions – or, put differently, that post-secondary attendance is inelastic to price and income. Nevertheless, it could still be the case that income and price interact in such a way that significantly influences the chances of pursuing a higher education. To test for this possibility, we first ran regressions with the same set of explanatory variables separately by family earnings quartiles (results appear in Appendix B). If there existed a differentiated response to the cost of PSE according to family earnings, one would expect the marginal effect of tuition fees to vary markedly across earnings quartiles. While some variation exists across quartiles, the differences are slight and the marginal effects are never significant suggesting that the cross price-income elasticity of PSE is null. To further test for this, regressions are estimated with an interaction term between tuition and family earnings. We also explore if an interaction effect exists between tuition and the mother’s education. Marginal effects derived from the estimation of specifications exploring interactions between college tuition and family background are presented in Table 3.<sup>18</sup>

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<sup>18</sup> The specifications include all the same variables as in Table 2. Marginal effects for all variables other than the ones interacted remain essentially unchanged.

Table 3. Marginal Effects of Interacted Terms

|                              | <b>College Tuition</b> |                           |
|------------------------------|------------------------|---------------------------|
|                              | <b>(and)</b>           |                           |
|                              | <b>Family Earnings</b> | <b>Mother's Education</b> |
| Tuition (in \$100)           | -0.004<br>(0.93)       | -0.004<br>(0.61)          |
| Family Earnings (in \$1,000) | 0.0000<br>(0.36)       | 0.0001<br>(0.19)          |
| Mother's Years of Education  | 0.013<br>(3.9)**       | 0.014<br>(2.7)**          |
| Tuition * Family Earnings    | 0.0001<br>(27.4)**     |                           |
| Tuition * Mother's Education |                        | 0.002<br>(22.3)**         |
| Observations                 | 11310                  | 11310                     |

NOTE: The estimation was conducted using sampling weights. Absolute values of robust z statistics for the underlying coefficients are found in parentheses. Marginal effects are calculated at the sample mean of the regressors.

\* significant at 5% and \*\* significant at 1%

Recall from Section IV that marginal effects for interacted variables refer to the sum of their direct ( $\beta_k \phi(\cdot)$ ) and indirect impact ( $\beta_{kj} \phi(\cdot) * X_j$ ) on the decision.

As was the case in Table 2, family earnings and tuition remain insignificant predictors of PSE attendance in these specifications while mother's years of education<sup>19</sup> continue to bear a positive and significant relationship to the dependant.

These results contrast with those obtained by Christofides et al (2002) who report finding a positive and significant influence of family earnings on PSE participation. This divergence could stem from sampling differences. Recall that Christofides and his co-authors are unable to identify high-school drop-outs – who, on average, are more likely to come from low-income families – whereas we can and exclude them from our working sample. Once excluded, it may well be the case that the remaining variation in family earnings is no longer sufficient to have any bearing on the decision to pursue. Another possible explanation lies in differences in the measurement of family resources. Family income is directly reported by respondents in Christofides' dataset whereas in ours it is proxied by occupation-province-and-sex specific earnings averages allowing for measurement errors and less variation. To estimate the role of family income on

<sup>19</sup>A specification including an interaction term between the father's education and tuition was tested. The later was not found to be significant. The specification presented here includes a control for the father's education (not interacted). Since its marginal effect does not change from the value given in Table 2, it is not reported here.

participation with greater precision and confidence would require a dataset where drop-outs are identifiable and income is directly measured.

Turning to the interaction terms, a significant but very small interaction effect between tuition and family earnings appears to exist: as tuition increases by a \$100 dollar, an additional \$1,000 in family earnings raises the likelihood of participation by only 0.01 percentage points. The cross product of tuition with mother's education yields an interaction effect that 20 times larger: in light of a \$100 increase in tuition, a mother acquiring an additional year of education boosts the chances of enrolment by 0.2 percentage points. This is besides the 1.4 percentage point increase for each additional year of education. Thus, the cost of PSE does not alone have a bearing on the decision to pursue a higher education but impacts it by interacting with family background – especially the mother's education.

## VII. Discussion

Tuition fees have increased substantially in the late 1990s. While one would expect these increases to have had a negative impact on post-secondary participation, our estimates suggest otherwise. Indeed, we find no evidence of a negative and statistically significant relationship between tuition and PSE participation for the average Canadian youth.<sup>20</sup> Does this result hold across the income spectrum? Broadly speaking yes. Family earnings are not a significant predictor of the probability of participation in our models, and the effect of tuition fees remains fairly stable across earnings quartiles. Moreover, if interaction terms between tuition and family earnings reveal that participation rises with family earnings when tuition increases, the statistically significant effect is marginal in economic terms.

This finding might, in part, be explained by the existence of government student loans programs. The amounts provided within these programs are means-tested and a function of tuition fees. It is possible thus, particularly for children of lower-earnings families below the relevant income threshold, that tuition increases were offset by higher loans. Unfortunately, the information collected by YITS on student loans is inadequate to allow us to verify this hypothesis.

Another possibility is that we fail to identify differentiated responses to the cost of PSE along family income lines only for empirical reasons. Two caveats of our analysis as it stands are that it excludes high school graduates from Ontario, and that imputed average family earnings are used instead of family income. As a next step, we will attempt to refine our measure of family earnings and to understand the behaviour of YITS' Ontario graduates before reintroducing them in our sample. Tests will also be conducted in order to explore the robustness of our results to other functional forms.

Finally, we will turn to investigating the determinants of the choice of post-secondary programs (college versus university). This part of the analysis will exploit two features of the recent changes in PSE fees: tuition hikes were more pronounced at colleges than at

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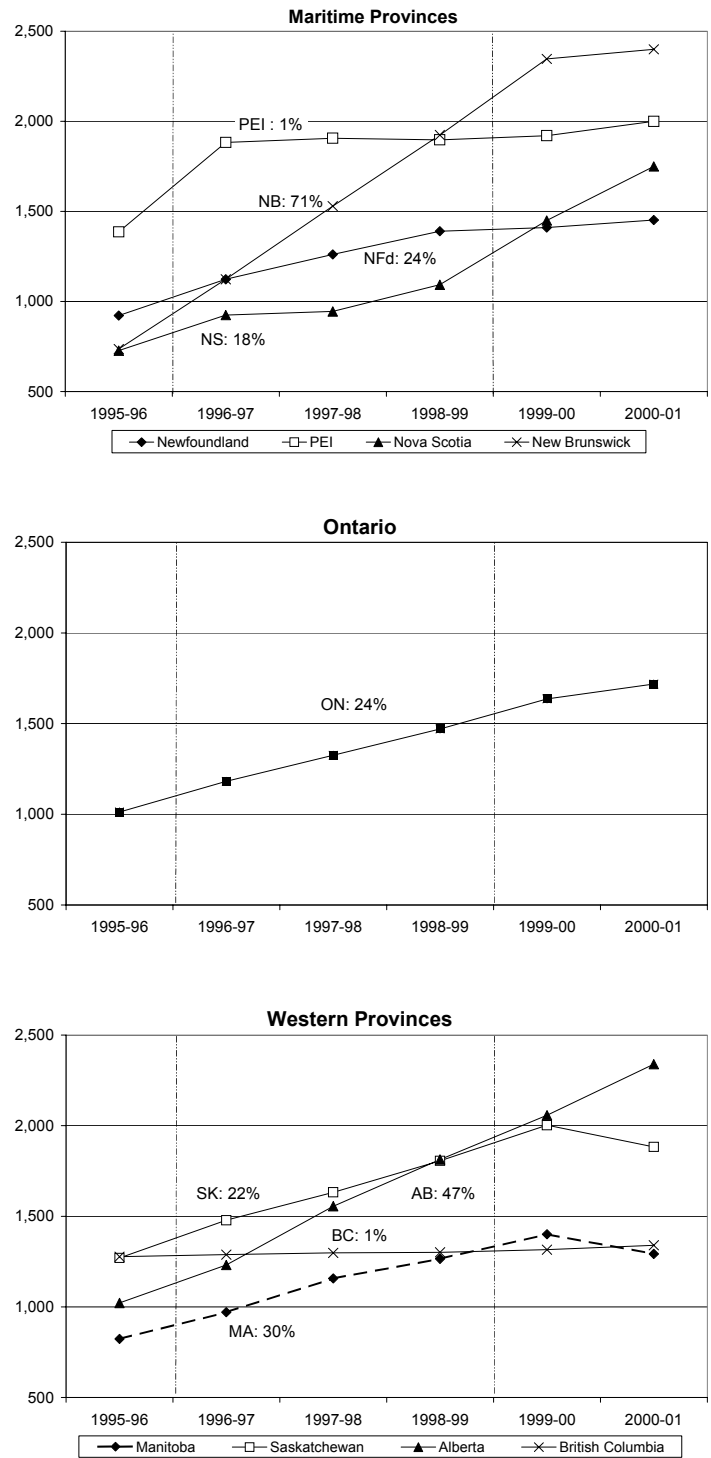
<sup>20</sup> Recall that post-secondary participants are defined here as high school graduates who enrolled in PSE programs within 12 months of last attending high school.

universities; nevertheless, university remains the costliest post-secondary option. The focus again will be on assessing whether differences exist according to family income or, more specifically, whether cost considerations induce children of lower-income families to choose college over university.

## References

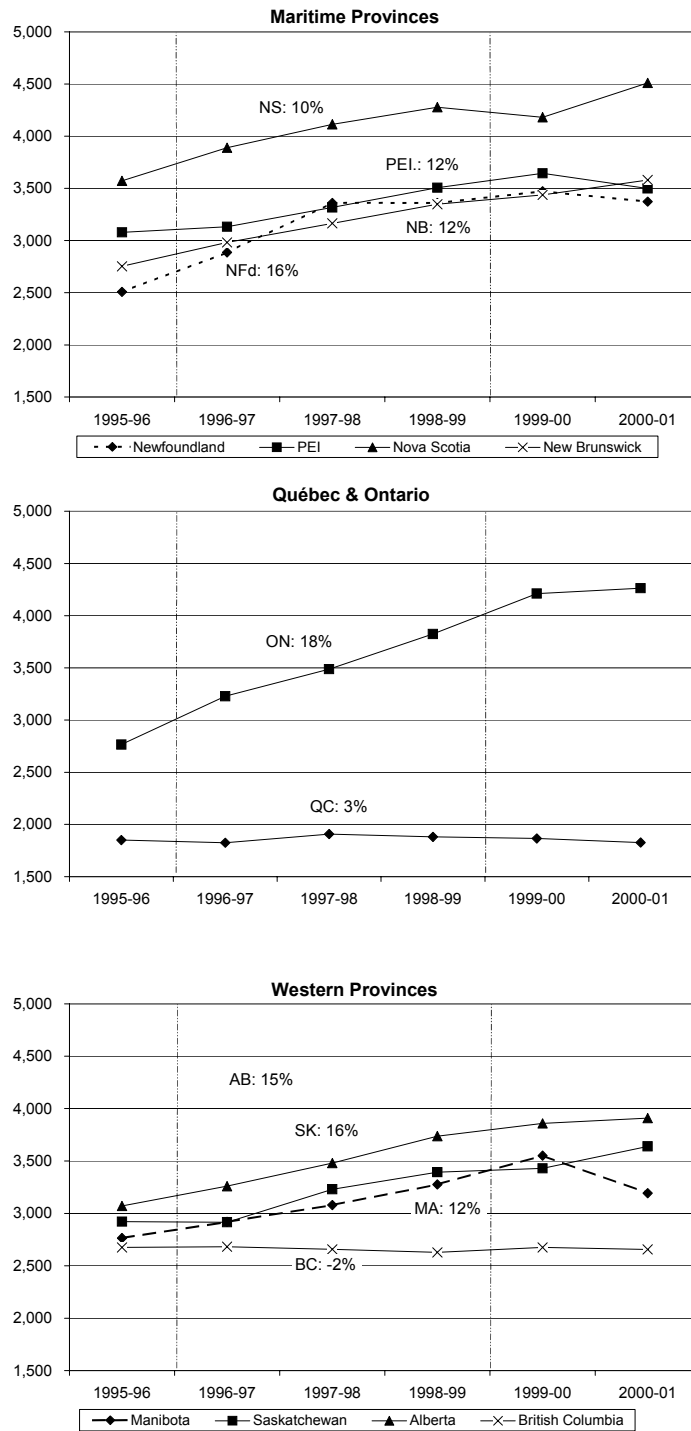
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Figure 1. College Tuition from 1995-96 to 2000-01, Constant 2000 Dollars<sup>21</sup>



<sup>21</sup> The change in tuition fees between 1996-97 and 1998-99, the years of our data, is indicated for each province.

Figure 2. University Tuition from 1995-96 to 2000-01, Constant 2000 Dollars<sup>22</sup>



<sup>22</sup> The change in tuition fees between 1966-97 and 1988-99, the years of our data, is indicated for each province.

Figure 3. Schooling Systems in Canada

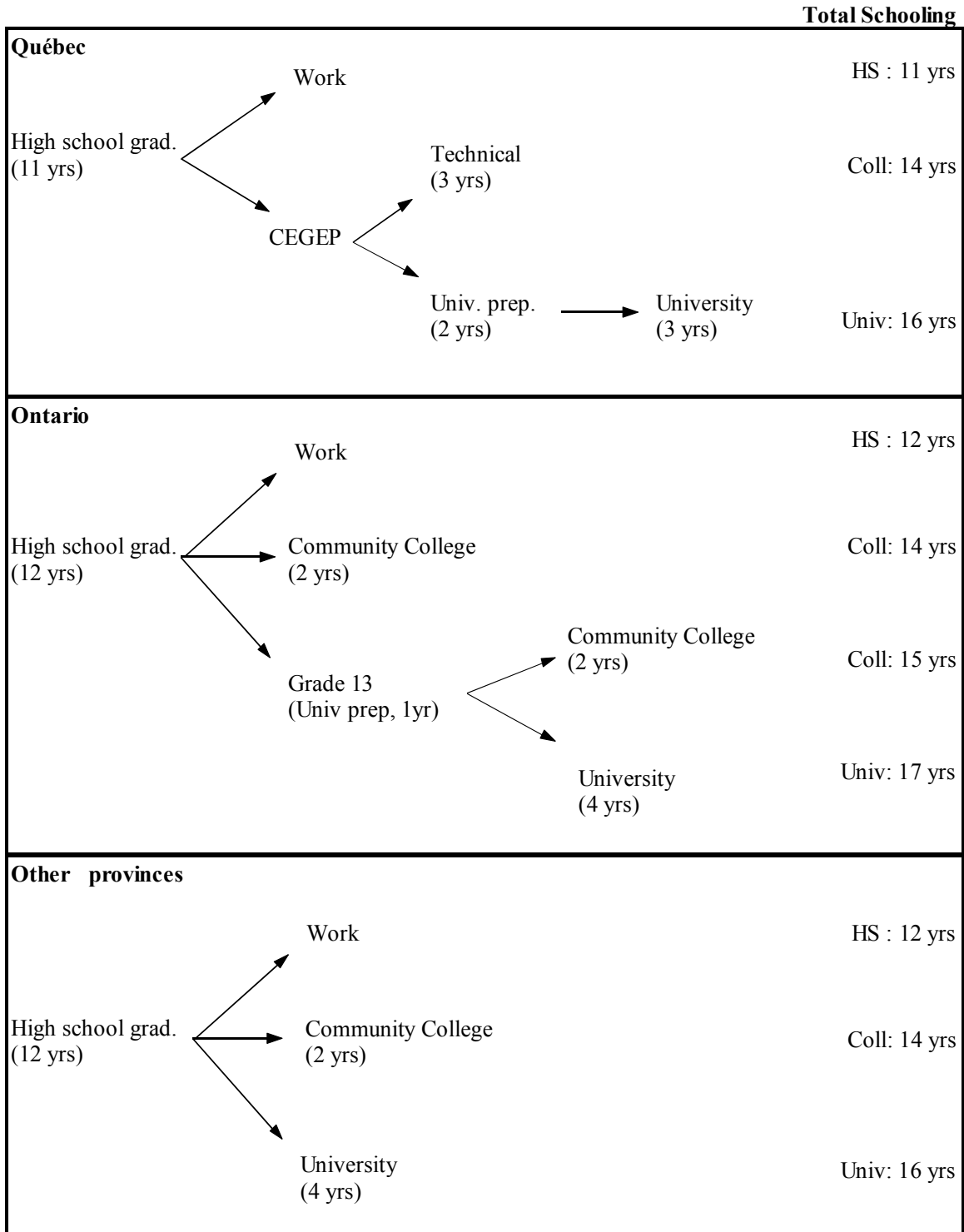


Figure 4. Tuition and PSE Participation

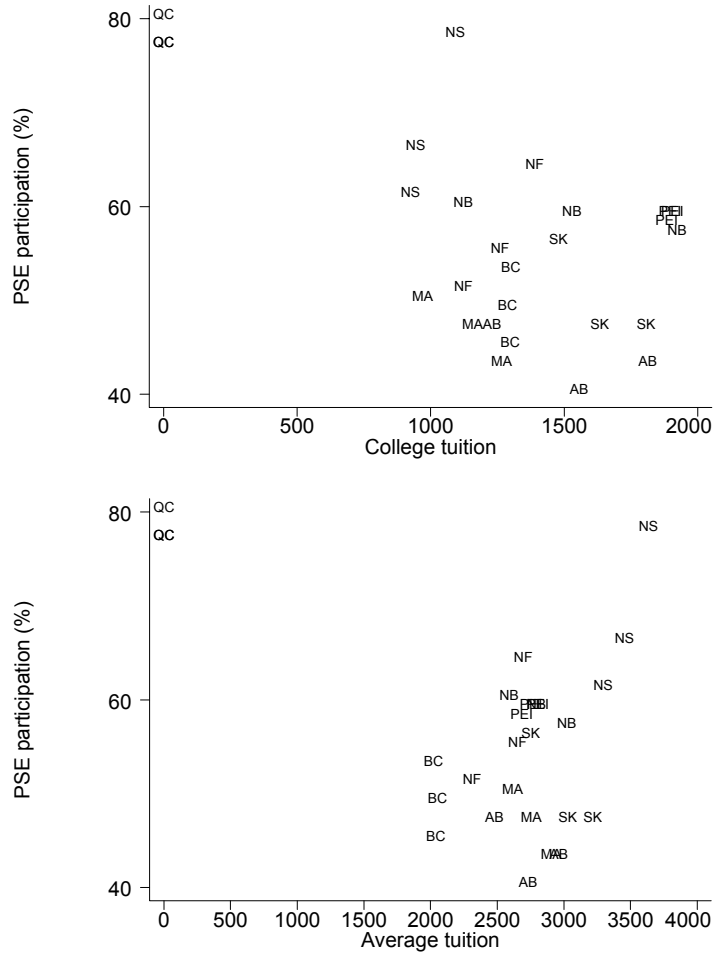


Figure 5. PSE Participation, by Family Earnings Quintile

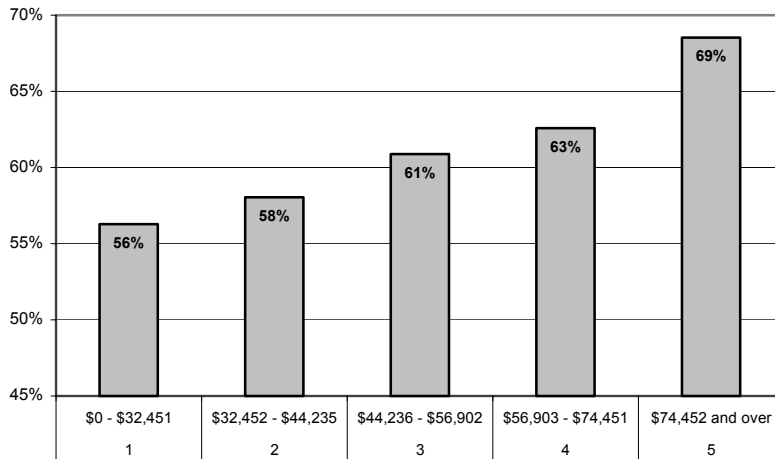


Figure 6. PSE Participation and Minimum Cost of PSE, by Family Earnings Quintile

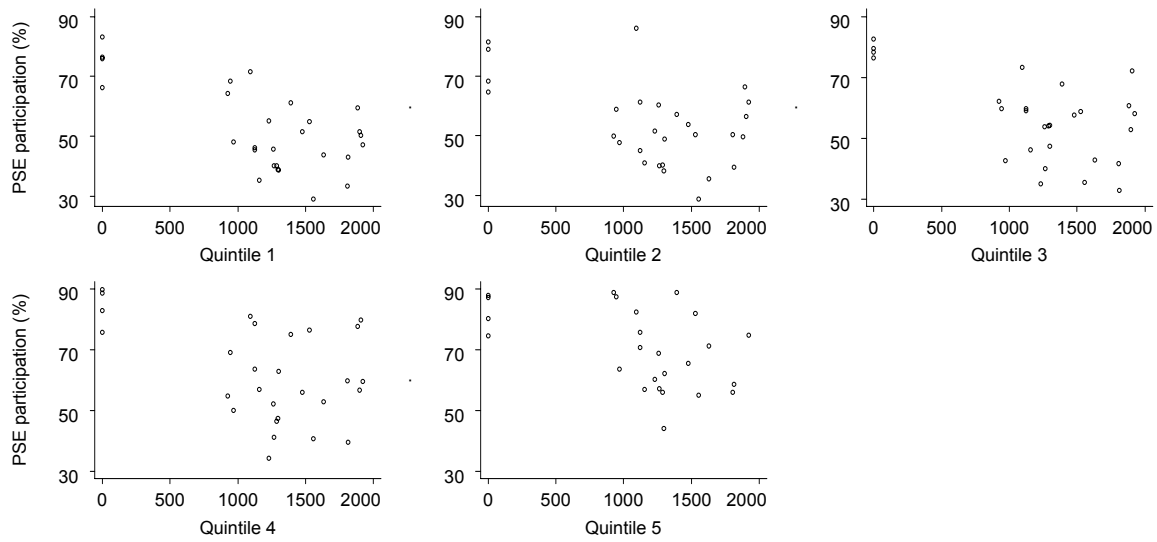
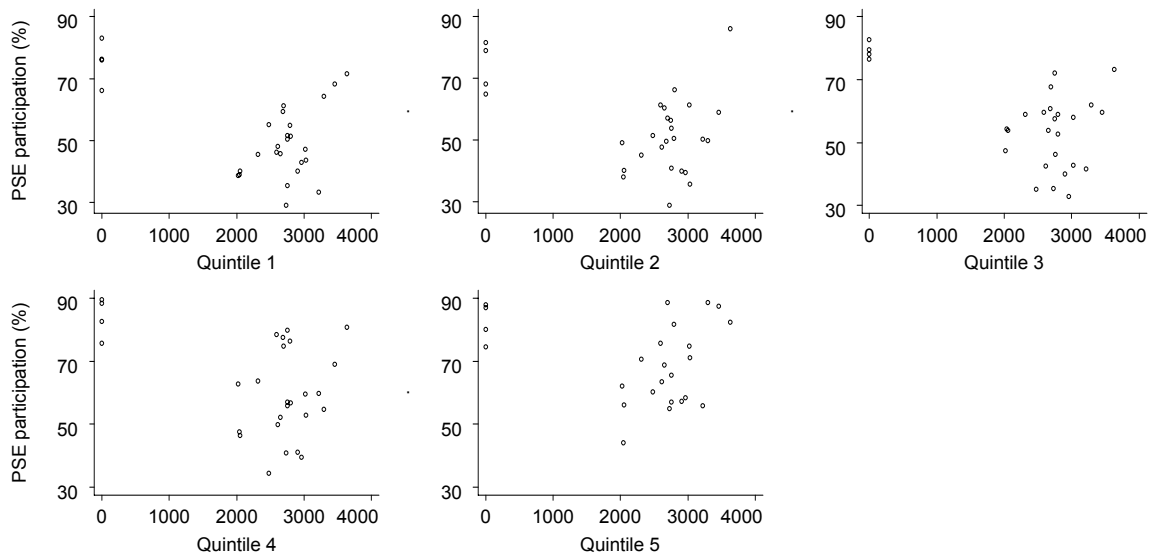


Figure 7. PSE Participation and Average Cost of a First Year of PSE, by Family Earnings Quintile



Appendix A College and University Tuition Fees and Relative Cost of University to College 1995-96 to 2000-01, Constant 2000 Dollars

|                      | <b>University Tuition, Weighted Provincial Average</b> |         |         |         |         |         |
|----------------------|--|---------|---------|---------|---------|---------|
|                      | 1995-96  | 1996-97 | 1997-98 | 1998-99 | 1999-00 | 2000-01 |
| Newfoundland         | 2,508  | 2,886   | 3,361   | 3,360   | 3,472   | 3,373   |
| Prince Edward Island | 3,078  | 3,132   | 3,317   | 3,507   | 3,644   | 3,499   |
| Nova Scotia          | 3,572  | 3,891   | 4,114   | 4,279   | 4,182   | 4,511   |
| New Brunswick        | 2,753  | 2,982   | 3,165   | 3,348   | 3,438   | 3,581   |
| Quebec               | 1,850  | 1,824   | 1,909   | 1,881   | 1,866   | 1,827   |
| Ontario              | 2,766  | 3,228   | 3,488   | 3,825   | 4,212   | 4,263   |
| Manitoba             | 2,765  | 2,919   | 3,080   | 3,277   | 3,552   | 3,193   |
| Saskatchewan         | 2,922  | 2,915   | 3,231   | 3,393   | 3,430   | 3,639   |
| Alberta              | 3,071  | 3,260   | 3,480   | 3,738   | 3,859   | 3,909   |
| British Columbia     | 2,676  | 2,682   | 2,658   | 2,628   | 2,675   | 2,657   |

|                      | <b>College Tuition, Provincial Average</b> |         |         |         |         |         |
|----------------------|--|---------|---------|---------|---------|---------|
|                      | 1995-96                                    | 1996-97 | 1997-98 | 1998-99 | 1999-00 | 2000-01 |
| Newfoundland         | 922  | 1,123   | 1,261   | 1,390   | 1,410   | 1,452   |
| Prince Edward Island | 1,387                                      | 1,883   | 1,906   | 1,897   | 1,921   | 2,000   |
| Nova Scotia          | 727  | 925     | 944     | 1,093   | 1,449   | 1,750   |
| New Brunswick        | 736  | 1,123   | 1,529   | 1,924   | 2,347   | 2,400   |
| Quebec               | 0  | 0       | 0       | 0       | 0       | 0       |
| Ontario              | 1,013                                      | 1,182   | 1,325   | 1,471   | 1,636   | 1,718   |
| Manitoba             | 823  | 970     | 1,157   | 1,265   | 1,400   | 1,292   |
| Saskatchewan         | 1,270                                      | 1,478   | 1,632   | 1,806   | 2,002   | 1,882   |
| Alberta              | 1,021                                      | 1,231   | 1,556   | 1,813   | 2,057   | 2,339   |
| British Columbia     | 1,276                                      | 1,288   | 1,298   | 1,301   | 1,315   | 1,340   |

|                      | <b>University Tuition as a Proportion of College Tuition<br/>(Relative Cost)</b> |         |         |         |         |         |
|----------------------|--|---------|---------|---------|---------|---------|
|                      | 1995-96  | 1996-97 | 1997-98 | 1998-99 | 1999-00 | 2000-01 |
| Newfoundland         | 2.7  | 2.6     | 2.7     | 2.4     | 2.5     | 2.3     |
| Prince Edward Island | 2.2  | 1.7     | 1.7     | 1.8     | 1.9     | 1.7     |
| Nova Scotia          | 4.9  | 4.2     | 4.4     | 3.9     | 2.9     | 2.6     |
| New Brunswick        | 3.7  | 2.7     | 2.1     | 1.7     | 1.5     | 1.5     |
| Quebec               | n.a.   | n.a.    | n.a.    | n.a.    | n.a.    | n.a.    |
| Ontario              | 2.7  | 2.7     | 2.6     | 2.6     | 2.6     | 2.5     |
| Manitoba             | 3.4  | 3.0     | 2.7     | 2.6     | 2.5     | 2.5     |
| Saskatchewan         | 2.3  | 2.0     | 2.0     | 1.9     | 1.7     | 1.9     |
| Alberta              | 3.0  | 2.6     | 2.2     | 2.1     | 1.9     | 1.7     |
| British Columbia     | 2.1  | 2.1     | 2.0     | 2.0     | 2.0     | 2.0     |

## Appendix B Marginal Effects Calculated from Regressions by Family Earnings Quartile

|  | College Tuition    |                    |                    |                    | Average Tuition    |                    |                    |                    |
|--|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
|  | Q1                 | Q2                 | Q3                 | Q4                 | Q1                 | Q2                 | Q3                 | Q4                 |
| <b>Tuition and Family Background</b>             |                    |                    |                    |                    |                    |                    |                    |                    |
| Tuition (in \$100)                               | 0.00<br>(0.80)     | -0.01<br>(1.62)    | -0.01<br>(0.94)    | 0.004<br>(0.50)    | 0.008<br>(1.44)    | 0.011<br>(1.83)    | -0.070<br>(1.09)   | 0.011<br>(1.45)    |
| Family Earnings in \$1,000                       | -0.002<br>(1.28)   | 0.005<br>(1.49)    | 0.002<br>(0.84)    | -0.001<br>(0.02)   | -0.002<br>(1.28)   | 0.005<br>(1.37)    | 0.002<br>(0.88)    | -0.001<br>(1.06)   |
| Imputed Salary for at least one Parent           | 0.017<br>(0.53)    | 0.024<br>(0.82)    | -0.020<br>(0.57)   | -0.023<br>(0.54)   | 0.020<br>(0.61)    | 0.022<br>(0.76)    | -0.020<br>(0.57)   | -0.022<br>(0.54)   |
| Mother's Years of Education                      | 0.012<br>(1.73)    | 0.016<br>(2.45)*   | 0.009<br>(1.35)    | 0.020<br>(3.01)**  | 0.012<br>(1.66)    | 0.016<br>(2.37)*   | 0.009<br>(1.34)    | 0.020<br>(3.00)**  |
| Father's Years of Education                      | 0.013<br>(2.10)*   | 0.011<br>(2.09)*   | 0.014<br>(2.48)*   | 0.020<br>(3.04)**  | 0.013<br>(2.09)*   | 0.012<br>(2.14)*   | 0.014<br>(2.47)*   | 0.020<br>(3.05)**  |
| Missing Parental Education (1)                   | -0.055<br>(1.77)   | 0.056<br>(0.98)    | -0.050<br>(0.60)   | 0.223<br>(2.72)**  | -0.053<br>(1.69)   | 0.060<br>(1.04)    | -0.051<br>(0.61)   | 0.222<br>(2.72)**  |
| Number of Older Siblings                         | 0.00<br>(0.25)     | -0.01<br>(0.52)    | -0.04<br>(2.35)*   | -0.027<br>(1.71)   | 0.003<br>(0.30)    | -0.009<br>(0.64)   | -0.038<br>(2.36)*  | -0.028<br>(1.70)   |
| Number of Younger Siblings                       | -0.021<br>(1.73)   | -0.022<br>(1.53)   | -0.006<br>(0.41)   | 0.001<br>(0.10)    | -0.021<br>(1.75)   | -0.023<br>(1.62)   | -0.006<br>(0.41)   | 0.002<br>(0.12)    |
| <b>Student Characteristics &amp; Preparation</b> |                    |                    |                    |                    |                    |                    |                    |                    |
| Male   | -0.089<br>(2.59)** | -0.033<br>(0.91)   | -0.073<br>(2.18)*  | -0.049<br>(1.27)   | -0.119<br>(3.09)** | -0.072<br>(1.75)   | -0.050<br>(1.23)   | -0.083<br>(1.68)   |
| First Language not French or English             | 0.037<br>(0.73)    | 0.132<br>(2.55)*   | 0.089<br>(1.33)    | 0.148<br>(2.68)**  | 0.044<br>(0.86)    | 0.145<br>(2.79)**  | 0.089<br>(1.34)    | 0.149<br>(2.74)**  |
| High School GPA (default : 70% to 79%)           |                    |                    |                    |                    |                    |                    |                    |                    |
| 69% or less                                      | -0.124<br>(3.17)** | -0.282<br>(6.24)** | -0.181<br>(3.62)** | -0.173<br>(3.81)** | -0.126<br>(3.28)** | -0.286<br>(6.29)** | -0.179<br>(3.59)** | -0.175<br>(3.86)** |
| 80% to 89%                                       | 0.141<br>(4.78)**  | 0.111<br>(3.47)**  | 0.170<br>(5.44)**  | 0.158<br>(4.70)**  | 0.141<br>(4.77)**  | 0.112<br>(3.50)**  | 0.171<br>(5.46)**  | 0.159<br>(4.77)**  |
| 90% or more                                      | 0.262<br>(5.65)**  | 0.211<br>(4.09)**  | 0.291<br>(7.42)**  | 0.213<br>(4.87)**  | 0.263<br>(5.67)**  | 0.216<br>(4.09)**  | 0.292<br>(7.52)**  | 0.212<br>(4.82)**  |
| Took University Preparatory Math                 | 0.187<br>(5.93)**  | 0.200<br>(5.67)**  | 0.169<br>(4.69)**  | 0.141<br>(3.84)**  | 0.186<br>(5.87)**  | 0.198<br>(5.58)**  | 0.168<br>(4.65)**  | 0.143<br>(3.90)**  |
| <b>Opportunity Cost</b>                          |                    |                    |                    |                    |                    |                    |                    |                    |
| Unemployment Rate (2)                            | -0.008<br>(2.36)*  | -0.007<br>(2.06)*  | -0.007<br>(1.54)   | -0.013<br>(2.46)*  | -0.003<br>(0.73)   | -0.001<br>(0.12)   | -0.010<br>(1.82)   | -0.007<br>(0.98)   |
| Median Wage (3)                                  | 0.001<br>(0.04)    | 0.022<br>(0.97)    | -0.003<br>(0.15)   | -0.005<br>(0.26)   | 0.025<br>(0.65)    | 0.054<br>(1.92)    | -0.022<br>(0.82)   | 0.021<br>(0.72)    |
| <b>Trends &amp; Regional Controls</b>            |                    |                    |                    |                    |                    |                    |                    |                    |
| Year of PSE Entry (default = 1998)               |                    |                    |                    |                    |                    |                    |                    |                    |
| 1997   | 0.059<br>(1.82)    | -0.016<br>(0.46)   | -0.081<br>(2.29)*  | -0.042<br>(1.23)   | 0.074<br>(2.28)*   | 0.005<br>(0.15)    | -0.087<br>(2.37)*  | -0.027<br>(0.75)   |
| 1999   | 0.048<br>(1.42)    | 0.078<br>(2.18)*   | -0.006<br>(0.15)   | 0.038<br>(1.10)    | 0.036<br>(1.04)    | 0.052<br>(1.43)    | -0.003<br>(0.07)   | 0.030<br>(0.85)    |
| Regional Controls (default = West)               |                    |                    |                    |                    |                    |                    |                    |                    |
| Maritimes  | 0.163<br>(3.19)**  | 0.227<br>(4.45)**  | 0.175<br>(2.84)**  | 0.215<br>(3.48)**  | 0.135<br>(2.39)*   | 0.191<br>(3.34)**  | 0.203<br>(3.13)**  | 0.176<br>(2.25)*   |
| Quebec   | 0.359<br>(4.57)**  | 0.362<br>(4.53)**  | 0.317<br>(3.43)**  | 0.403<br>(4.35)**  | 0.530<br>(4.68)**  | 0.598<br>(5.29)**  | 0.259<br>(1.85)    | 0.512<br>(4.14)**  |
| Observations                                     | 3208               | 3101               | 2715               | 2286               | 3208               | 3101               | 2715               | 2286               |
| Predicted probability (at means)                 | 0.612              | 0.610              | 0.633              | 0.690              | 0.612              | 0.611              | 0.664              | 0.690              |

are found in parentheses. Marginal effects are calculated at the sample mean of the regressors.

\* significant at 5% and \*\* significant at 1%

(1) Missing for either one or both parents; (2) For 15-24 year-olds with a high school diploma; (3) For 15-24 year-olds working full-