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Why Are Youth from Lower-income Families Less Likely to Attend University? Evidence from Academic Abilities, Parental Influences, and Financial Constraints

by Marc Frenette

Business and Labour Market Analysis
24-I, R.H. Coats Building, 100 Tunney's Pasture Driveway, Ottawa, K1A 0T6

Telephone: 1-800-263-1136

Statistics Canada

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How to obtain more information:
National inquiries line: 1-800-263-1136
E-Mail inquiries: infostats@statcan.ca

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Abstract

In this study, I use new Canadian data containing detailed information on academic abilities, parental influences, financial constraints, and other socio-economic background characteristics of youth to try to account for the large gap in university attendance across the income distribution. I find that 96% of the total gap in university attendance between youth from the top and bottom income quartiles can be accounted for by differences in observable characteristics. Differences in long-term factors such as standardized test scores in reading obtained at age 15, school marks reported at age 15, parental influences, and high-school quality account for 84% of the gap. In contrast, only 12% of the gap is related to financial constraints. Similar results hold across different income quartiles and when I use standardized test scores in mathematics and science. However, reading scores account for a larger proportion of the gap than other test scores.

Keywords: university participation, income access gap, standardized test scores, school marks, parental influences, financial constraints.

Executive summary

It is well known that economically disadvantaged students in Canada are less likely to pursue a university education than students from well-to-do families. Slightly more than one-half (50.2%) of youth from families in the top quartile of the income distribution attend university by age 19, compared to less than a third of youth from families in the bottom quartile (31.0%). Even youth from families in the third income quartile have a considerable advantage in attending university (43.4%) over youth from the bottom income quartile. Youth in the second quartile are only slightly more likely to attend university than youth in the bottom quartile.

These large gaps in university attendance have raised concerns among student groups, parents, policy analysts and education planners since they potentially have negative implications for the intergenerational transmission of earnings. Until recently, data limitations made it very challenging to understand the reasons behind the gaps. With the release of the third cycle of the Youth in Transition Survey, Cohort A, it is now possible to link university attendance of 19-year-old youth to a plethora of information on these youth when they were aged 15, including results from standardized tests, high-school marks, feeling control (or mastery) over one's life, self-esteem, parental income, parental education, parental expectations, peer influences, high school attended, and financial constraints, among others. The purpose of this study is to attempt to further understand the income gap in university participation with this new data source.

Compared to students from lower-income families, youth from well-to-do families generally perform better on standardized reading, mathematics and science tests; generally report higher marks; are far more likely to live with two birth parents and far less likely to live with only one parent; are more likely to have university-educated parents; are more likely to have parents who expect them to complete a university degree; and a larger proportion of their friends plan on furthering their education following high school. Moreover, students from well-to-do families are more likely to attend high schools that have a high propensity to produce university-bound students after accounting for student characteristics. Youth from higher-income families are also less likely to report financial reasons for not attending university.

Although most of the characteristics mentioned above are associated with university attendance, some factors matter more than others. Specifically, standardized test scores, high-school marks, parental education, parental expectations, high-school quality, and financial constraints tend to exert the strongest influence on the probability of going on to university.

The contribution of the differences in these factors in accounting for the gaps in university attendance across the income distribution is the main focus of the study. To this end, I apply a series of decompositions, which allocate the total gap in university participation into a portion that is accounted for by differences in observable characteristics and a portion that can not be accounted for by such differences. Furthermore, the component that can be accounted for by differences in characteristics can be further broken down by individual characteristic.

I find that 96% of the total gap in university attendance between youth from the top and bottom income quartiles can be accounted for by differences in observable characteristics. Differences in long-term factors such as standardized test scores in reading obtained at age 15, school marks reported at age 15, parental influences, and high-school quality account for 84% of the gap. In contrast, only 12% of the gap is related to financial constraints. Similar results hold across different income quartiles and when I use standardized test scores in mathematics and science. However, reading scores account for a larger proportion of the gap than other test scores.

Family income may pose different barriers to attending university. First, differences in academic performance across the income distribution may themselves be the result of differences in family income. Families with more financial resources may spend more money on books for children, take their children to museums, spend more on daycare in the early years, locate in neighbourhoods with better schools, etc. These actions may result in higher performance on standardized and scholastic tests, and thus, in a higher probability of attending university in the future. Second, upon deciding to attend university, students may be faced with another barrier that is related to their family's financial position: credit constraints. However, the evidence presented in this study casts some doubt on the *widespread* existence of credit constraints in Canada. Carneiro and Heckman (2002) also found very little evidence of credit constraints in the United States.

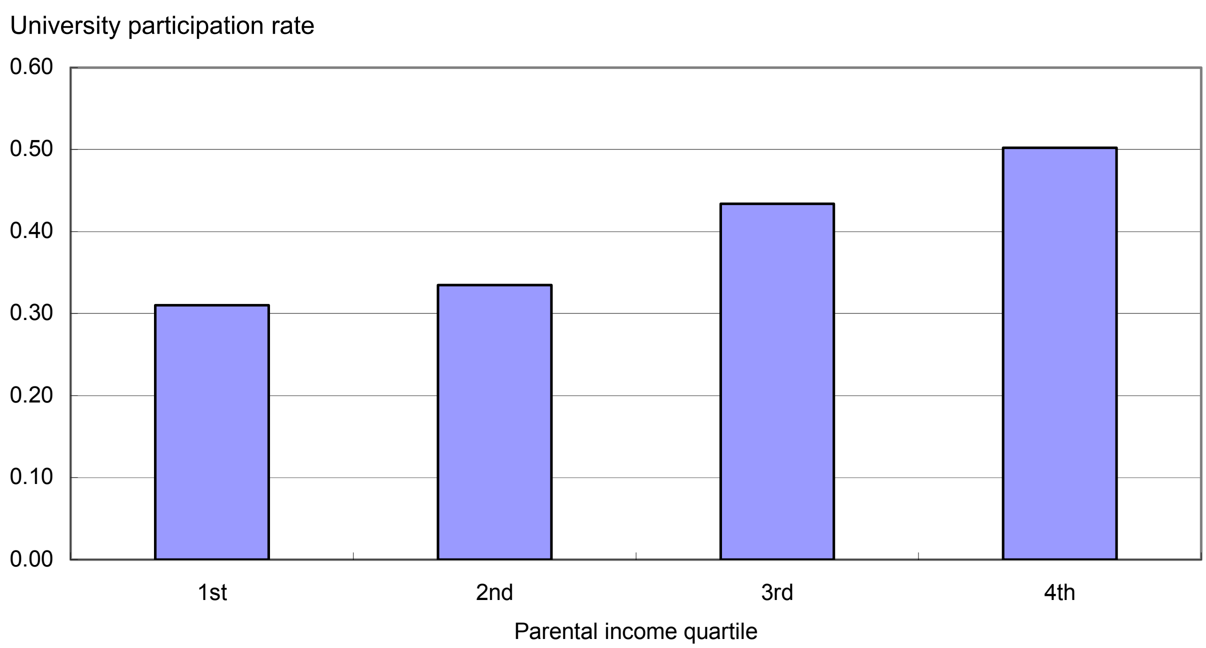
Despite the weak evidence on credit constraints, there are two important caveats to keep in mind. First, even if credit constraints do not matter a lot for the population of youth as whole, they may matter for certain groups of students in some instances. For example, Ontario students from middle-class backgrounds saw a large decline in their probability of pursuing a professional degree following the large and sudden tuition fee deregulation in these programs in Ontario universities (Frenette, 2005b). Another example is students who grew up living out of commuting distance from a university. The additional cost of attending a university away from the parental home is greater than $5,000 (Barr-Telford et al., 2003), which appears to reduce enrolment among students from lower-income families who must move away to attend (Frenette, 2004). Second, even if credit constraints could be 'ruled out,' it is important to note that this would be conditional on the existing financial aid system. Removing that system may (or may not) introduce credit constraints.

What the findings of the study suggest is that, given the weak evidence on the existence of widespread credit constraints, our focus should now shift towards trying to further understand why students from lower-income families tend to perform more poorly on standardized and scholastic tests than students from higher-income families.

1. *Introduction*

It has been widely reported in Canada and in other countries that students from lower-income families are considerably less likely to attend university than students from more well-to-do backgrounds. The steepness of the income gradient in university participation shown below in Figure 1 has raised concerns among student groups, parents, policy analysts and education planners alike since it potentially has negative implications for the intergenerational transmission of earnings. The figure shows university participation rates of 19-year-old youth by quartile of parental income adjusted for family size of these youth when they were aged 15. Only 31.0% of youth in the bottom 25% of the income distribution attend university, compared to 50.2% in the top 25%, and 43.4% in the third quartile. Even youth in the second quartile are at a considerable disadvantage compared to youth in the top half of the income distribution. In fact, they are only slightly more likely to attend university than youth in the bottom quartile. In the United States, the dispersion of attendance rates is even larger (Frenette, 2005a).

Figure 1 University participation rate of 19-year-old youth by parental income[1] quartile



1. Adjusted for family size of youth when they were aged 15.
Source: Statistics Canada, Youth in Transition Survey, Cohort A.

An often cited explanation for the gap revolves around credit constraints (e.g., Kane, 1994; Ellwood and Kane, 2000; Card, 2001). Essentially, it is argued that economically disadvantaged youth can not afford to pay for the cost of a university education through their own means, and must rely on student loans. However, they may not be able to secure enough loan money to comfortably cover the full cost of attending.

An alternative explanation advanced by others (e.g., Carneiro and Heckman, 2002) suggests that youth from economically disadvantaged families are lacking in parental resources or influences, which can have a negative impact on cognitive abilities, motivation, study habits, perception of the benefits of a university education, social environments, etc. According to this view, disadvantaged youth often do not choose to attend university because they do not perform well in school, they do not have any interest in furthering their education, their friends are less likely to go on to university, etc. Even if they are able to borrow enough money, some may be averse to debt because they underestimate the economic benefits of a university education over a lifetime.

There exists a larger number of potential levers available to address the gap in university participation, such as tuition fees, student loans, scholarships, early learning intervention and programs geared towards increasing awareness of the benefits of a university education, among others. Given that some of these levers address financial constraints while others address knowledge gaps (i.e., academic performance or awareness of benefits), a more complete understanding of the reasons why lower-income youth are less likely to attend university is important for policy design.

The empirical evidence on credit constraints often relies on estimating the relationship between the income access gap and changes in tuition fees. In the United States, Kane (1994) reports that university enrolment among students in the lower parts of the income distribution is more sensitive to increases in tuition fees than in higher parts of the income distribution. However, Cameron and Heckman (1999 and 2001) report that there is no differential response once differences in cognitive abilities and parental influences are taken into account.

In Canada, there exist two studies that suggest a possible differential response according to family background. Frenette (2005b) investigates a large and sudden deregulation of tuition fees in Ontario professional programs in the late 1990s, using provinces where tuition fees were stable as a control group. The study finds that enrolment in professional programs declined considerably for Ontario students whose parents had a college certificate or a regular undergraduate degree (a sort of middle-class for the purposes of the study). This decline may have resulted from tuition fees increasing quite dramatically in a very short period of time. Although additional student loans were made available by the universities (as a condition of deregulation), many middle-class students may not have qualified for the additional aid since several eligibility factors may have been indirectly related to the parent's income (e.g., income from a Registered Education Savings Plan, the value of stocks and other assets, ownership of a car, etc.). Neill (2006) accounts for the possible endogeneity of increases in tuition fees by using the political party in power as an instrumental variable. She estimates that a $1,000 increase in tuition fees is associated with a two-percentage-point decline in university enrolment. Similar to Frenette's study, she also finds that the largest effect was in the middle of the parental education distribution. In short, the Canadian evidence suggests that if there is a differential response to tuition fee increases, it is youth from middle-class families who appear to be most affected.[1]

Some authors claim that the literature on the returns to schooling provides some insight into the presence of credit constraints (e.g., Card, 2001). In this literature, it is common to find that instrumental variable (IV) estimates of the returns to schooling are greater than estimates from

1. Descriptive evidence by Corak, Lipps and Zhao (2003) and Drolet (2005) suggest that the income gap in university participation remained stable at the national level as undergraduate tuition fees were increasing in the 1990s.

ordinary least squares (OLS). This view purports that since IV estimates can be interpreted as the returns for those induced to change their school status based on the value of the instrument, finding higher marginal returns among changers implies that they are credit constrained individuals who face higher marginal costs according to this view.

Carneiro and Heckman (2002) challenge this view on the basis of three arguments. First, most of the instruments used in the literature on the returns to schooling are invalid. They are either not correlated with schooling, or they are correlated with omitted abilities. Second, a larger coefficient in IV estimation is consistent with theories of self-selection or comparative advantage in the labour market. High-skilled workers may have chosen more schooling because they would not be productive in jobs with very little skill requirements. Third, credit constrained youth may choose to attend less expensive (and possibly less lucrative) universities and/or programs. Accounting for quality of the program in a theoretical framework, Carneiro and Heckman demonstrate that the true rate of return to schooling for credit constrained individuals may actually be lower than the OLS estimates.

Not surprisingly, there is no consensus in the academic literature as to the extent of credit constraints, or whether they exist at all. What is clear is that the work of Heckman and his co-authors has cast some doubt among proponents of the credit constraints theory. For example, Ellwood and Kane (2000) concede that credit constraints likely play a smaller role in the university enrolment decisions of economically disadvantaged American youth than cognitive abilities and parental resources do, although they re-emphasize that the role played by credit constraints is still substantial. Carneiro and Heckman (2002) took this statement to task and estimated the proportion of credit constrained males in the United States relative to various postsecondary outcomes (college delay, enrolment, and completion) with detailed information on standardized test scores and family background. They find that, at most, only 8% of males are credit constrained.[2]

Until recently, it was impossible to examine the issue in Canada due to a lack of available data. With the release of the third cycle of the Youth in Transition Survey (YITS), Cohort A, it is now possible to link university attendance of 19-year-old youth to a plethora of information on these youth when they were aged 15, including results from standardized tests, high-school marks, feeling control (or mastery) over one’s life, self-esteem, parental income, parental education, parental expectations, peer influences, high school attended, and financial constraints, among others. In other words, it is now possible to assess the extent to which disadvantaged students are less likely to attend university because of their performance on standardized tests, overall marks, parental influences, peer influences, etc., or for financial reasons. The purpose of this study is to attempt to further understand the income gap in university participation with this new data source.

2. Carneiro and Heckman use the National Longitudinal Survey of Youth (NLSY) data to estimate the percentage of credit-constrained males. Within each tercile of the standardized test score available in the data (i.e., the Armed Forces Qualification Test [AFQT]), the percentage of males in income quartile *q* that is constrained is defined as the gap in the percentage enroled in (or who did not delay, or who completed) college between students from income quartile *q* and the top income quartile. This proportion was then expressed as a proportion of the overall population of males. The sum of all these proportions across all income quartiles and all AFQT terciles was used as an estimate of the percentage of credit-constrained males. Note that it was assumed that all males in the top income quartile were not credit constrained.

In the next section, I describe the YITS data in detail, as well as the basic methodology employed in the study. I then turn to the data, beginning with a breakdown of how students from various parts of the income distribution have different standardized test scores, school marks, parental influences, etc. Next, I describe how such characteristics tend to mediate the income–enrolment relationship. The core of the paper follows, where I formally decompose the gaps in university participation across different parts of the income distribution into explained and unexplained components (i.e., portions of the gap that are accounted for and those that are not accounted for by differences in observable characteristics, respectively). The result of this exercise is unequivocal: I find that 96% of the total gap in university attendance between youth from the top and bottom income quartiles can be accounted for by differences in observable characteristics. Differences in long-term factors such as standardized test scores in reading obtained at age 15, school marks reported at age 15, parental influences, and high-school quality account for 84% of the gap. In contrast, only 12% of the gap is related to financial constraints. Similar results hold across different income quartiles and when I use standardized test scores in mathematics and science. However, reading scores account for a larger proportion of the gap than other test scores. In the conclusion, I put the results into perspective. To this end, I argue that the findings suggest that the evidence on the existence of widespread credit constraints is quite weak, and as a result, our focus should now shift towards trying to further understand why students from lower-income families tend to perform more poorly on standardized and scholastic tests than students from higher-income families.

2. Methodology

The data for the study are drawn from the Youth in Transition Survey (YITS), Cohort A, which was collected in conjunction with the Programme for International Student Assessment (PISA), a project of the Organisation for Economic Co-operation and Development (OECD). The target population consists of students enroled in an educational institution in Canada on December 31, 1999 who were 15 years old on that day (i.e., they were born in 1984). Students living in the territories or on Indian reserves, students who were deemed mentally or physically unable to perform in the PISA assessment and non-native speakers with less than one year of instruction in the language of assessment were excluded. Also excluded were various types of schools for which it would have been infeasible to administer the survey, such as home schooling and special needs schools. All of these exclusions represent less than 4% of 15-year-olds in Canada.

The survey design consisted of a two-stage approach. In the first stage, a stratified sample of schools was selected to ensure adequate coverage in all 10 Canadian provinces (including adequate coverage of minority school systems in certain provinces). The stratification was based on the enrolment of 15-year-olds in the school in the previous academic year. In the second stage, a simple random sample of 15-year-old students within the school was selected. To account for this complex survey design, all variance measures were bootstrapped with 1,000 replicate weights.

Students were initially interviewed in April or May 2000, and re-interviewed in February to May 2002 and February to June 2004. In the current study, I focus on students who were in Grade 10 on December 31, 1999 (the usual grade for students turning 15 years old in a given year), and held a high-school diploma on December 31, 2003 (when students were 19 years old) since credit constraints are operative following high school when students must decide whether or not to go on. The main outcome is university participation by December 31, 2003.

Four measures of academic abilities are used in the study. The first three are taken from PISA. The PISA assessment was conducted in 2000, and was administered in the language of instruction of the school, which was either English or French. It consisted of standardized tests in the areas of reading, mathematics, and science. All students were assessed in reading, which was the main focus of the test. Half of the students were also assessed in mathematics, while the other half was also assessed in science (based on a random sub-sample of PISA students within schools). The assessment was based on a two-hour written test, and the reading component consisted of having students perform a range of tasks with different kinds of text, including retrieving specific information, demonstrating a broad understanding of text, interpreting text, and reflecting on the content and features of the text. The texts included standard prose passages and various types of documents such as lists, forms, graphs, and diagrams. The fourth measure of academic abilities is the student's overall mark in Grade 10. Conditional on one's performance on a standardized test, school marks may reflect one's ability to capitalize on these skills in a more structured setting (Jacob, 2002). Jacob even goes further and treats school marks as "non-cognitive" abilities, once cognitive abilities are taken into account. In any event, I examine overall school marks and standardized test scores of 15-year-old students concurrently since they may measure different abilities; however, separate models are estimated for the three standardized test scores (i.e., one model has standardized test scores in reading as well as school marks, and similarly for mathematics and science test scores).

The YITS also contains two other measures of "non-cognitive abilities." The first is feeling control (or mastery) over one's life. Respondents were asked seven questions related to the extent they felt they could change their destiny or success in life. A scalar measure was constructed from the seven responses. The second is a measure of self-esteem. Respondents were asked ten questions related to how they felt about themselves. Again, a scalar measure was constructed from the 10 responses. Both measures were standardized to have a mean of zero. I use the average of the two measures in the analysis. Heckman, Stixrud and Urzua (2006) use a similarly constructed variable in their study.

Five other pieces of information were taken from the student questionnaire. First, students were asked how many of their friends were planning to pursue their education after high school. This information can capture peer influences on student educational outcomes. For the purposes of this study, the answers were grouped into three categories: "some or none," "most," or "all." Second, students were asked to what extent they agreed with the notion that getting a good job later in life depends on their success in school now. This is the closest measure of the student's perception of the returns to schooling in the survey. For the purposes of this study, students who disagreed (or strongly disagreed) are deemed to have a low (or a very low) perception of the returns to schooling, while those who agreed (or strongly agreed) are deemed to have a high (or a very high) perception of the returns to schooling. The region of residence (Atlantic Provinces, Quebec, Ontario, Manitoba–Saskatchewan, Alberta, and British Columbia) and the student's sex are also used in the study. Finally, students are categorized as financially constrained or not. I define a financially constrained student as one who did not attend university despite wanting to do so, and cited finances as one reason why he or she did not attend.[3]

3. In a separate specification, only students who cited finances as the only reason for not attending were deemed financially constrained. This yielded no substantial changes in the results.

The parents of the students were also administered a questionnaire in 2000. Four pieces of information are used in this study: the quartile of total income in 1999 (including earnings, investment income, and government transfer income), the presence of parents in the home (for the purposes of this study: one parent present, two parents present with one or none being a birth parent, or two birth parents present), the highest level of education of either parent (for the purposes of this study: no postsecondary certificate, a non-university postsecondary certificate, an undergraduate degree, or a graduate or professional degree), and parental expectations of the highest level of educational outcome of the child (for the purposes of this study: a university degree or not).

To account for differences in family size and their associated economies of scale, I calculated 'equivalent' income by dividing parental income by the square root of the family size.[4] Based on equivalent income, students were separated by quartile. The threshold levels of equivalent income for each quartile are $20,409 (25th percentile), $30,531 (50th percentile), and $41,000 (75th percentile).[5,6]

The impact of the high school was also taken into account. Although most schools in Canada are publicly-funded, not all jurisdictions fund education equally. There may also be teacher selection according to neighbourhood and/or student quality. Furthermore, many schools rely, in part, on fundraising campaigns organized by parents (e.g., book sales, bake sales.) To the extent that schools located in well-to-do neighbourhoods can generate more funds from these campaigns, it is possible that students from more favourable backgrounds may benefit from more school resources. Finally, universities may be more likely to recruit from certain schools. In an attempt to account for differences in high-school quality, I created an index of the propensity of a high school to generate university-bound students, accounting for the composition of students in the high school. To do so, I regressed a binary university participation variable on a set of dummy variables indicating the high school attended and a set of control variables for the student's characteristics. The coefficients on the high-school dummies can be interpreted as the school's intrinsic ability to produce a university-bound student, after accounting for the student's characteristics. The coefficients were then used as a measure of high-school quality (i.e., the propensity to generate university-bound students).

The econometric framework for the core of this study is quite simple given the plethora of information available. The goal is to decompose the gap in university attendance into an explained component and an unexplained component (i.e., portions of the gap that are accounted for and not accounted for by differences in observable characteristics, respectively). Blinder (1973) and Oaxaca (1973) suggest a simple approach to decompose the gap in the mean value of a dependent variable that is based on ordinary least squares (OLS). I begin by regressing a dichotomous university participation variable, U, on a series of explanatory variables, X (described above), in separate

4. See Skuterud, Frenette and Poon (2004) for a more detailed discussion of equivalent income.

5. For a family of four, these are equivalent to twice these levels in unadjusted terms: $40,819 (25th percentile), $61,062 (50th percentile), and $82,000 (75th percentile).

6. Using the 2000 income data in the census, Frenette, Green and Milligan (2007) found that equivalent incomes among all families (including those without a 15-year-old) at the 25th, 50th, and 75th percentiles, are, respectively, $19,589, $32,137, $47,956 (these numbers do not appear in the paper).

models for each income quartile.[7] In OLS, the regression line (plane, hyperplane) passes through a point representing the sample means of all variables in the model. In other words, the following relationship holds for youth in quartile *q*:

(1) $$\overline{U}q = \overline{X}qb_q$$

Note that the mean of the dependent variable ($\overline{U}$) can be interpreted as the university participation rate. Applying simple algebra, the gap in the university participation rate between, say, the top and the bottom income quartile can be written as follows:

(2) $$\overline{U}4 - \overline{U}1 = (\overline{X}4 - \overline{X}1)b_4 + \overline{X}1(b_4 - b_1): \text{Method 1}$$

Alternatively, it may be written as

(3) $$\overline{U}4 - \overline{U}1 = (\overline{X}4 - \overline{X}1)b_1 + \overline{X}4(b_4 - b_1): \text{Method 2}$$

In both cases, the first term on the right-hand side refers to the explained portion of the gap, while the second term on the right-hand side refers to the unexplained portion of the gap. Since we are dealing with a simple linear combination, the explained portion of the gap can be further decomposed by specific explanatory variable.

The two alternate ways of expressing the gap can be distinguished by the weighting factors applied in each. For example, the method shown in Equation (2) (hereafter, Method 1) evaluates the gap in mean explanatory variables in the same way that the characteristics of youth in the top income quartile are evaluated (i.e., b_4 is used as the weight). In Method 2, the weight is b_1. Since the two methods can yield slightly different results, I apply and show results from both techniques in this study.

However, to avoid ambiguity, the preferred results will follow from an extension of the basic Oaxaca-Blinder approach used by Neumark (1988) and Oaxaca and Ransom (1994). In this approach (hereafter, Method 3), the coefficients from a pooled model (*p*) of the two groups in question are used as weighting factors for the explained portion of the gap:

(4) $$\overline{U}4 - \overline{U}1 = (\overline{X}4 - \overline{X}1)b_p + \left[\overline{X}4(b_4 - b_p) - \overline{X}1(b_1 - b_p)\right]: \text{Method 3}$$

As before, the first term on the right-hand side denotes the explained portion, while the second term is the unexplained portion, which can be further broken down into the advantage of the top quartile

7. I apply ordinary least squares despite the dichotomous nature of the dependent variable (i.e., I estimate linear probability models). This is a reasonable approach when the empirical probability is not close to 0 or 1, which is the case here. Marginal probability effects from logit and probit models yield similar results. See Moffitt (1999) for more details on the appropriateness of the linear probability model and Fairlie (2003) for a decomposition technique that is useful when the empirical probability is close to 0 or 1. For examples of the Oaxaca-Blinder decomposition applied to binary outcomes, see Fairlie and Sundstrom (1997) or Manning and Robinson (2004).

of income or the disadvantage of the bottom quartile of income. This approach has been used by Jacob (2002) in an analysis of the gender university enrolment gap in the United States.

As alluded to earlier, separate models were estimated for each standardized test. In each case, however, high-school marks were also included in the model since they may capture a different set of abilities than standardized tests and may factor into entrance qualifications in a more direct fashion.

3. Results

Descriptive evidence

The large enrolment gaps shown in Figure 1 suggest that some students have a clear advantage in terms of attending university, and that this advantage is somehow related to their parent's income. But what distinguishes students from different parts of the income distribution, and how do these factors influence their probability of attending university? In Table 1, I show sample means of variables used in the analysis by quartile of parental income. In this table, I use the Programme for International Student Assessment (PISA) reading test as a measure of academic abilities. In the appendix, similar tables are shown for the sub-samples of youth who wrote the mathematics test (Table A.1) and of those who wrote the science test (Table A.2).

Table 1 Means of variables by parental income quartile in reading sample

	Parental income quartile			
	1st	2nd	3rd	4th
University participation	0.310	0.335	0.434	0.502
Reading score<P5	0.074	0.045	0.051	0.029
P5≤Reading score<P10	0.064	0.055	0.044	0.037
P10≤Reading score<P25	0.184	0.159	0.122	0.122
P25≤Reading score<P50	0.266	0.260	0.244	0.225
P50≤Reading score<P75	0.232	0.250	0.262	0.258
P75≤Reading score<P90	0.114	0.143	0.162	0.187
P90≤Reading score<P95	0.036	0.045	0.051	0.069
Reading score≥P95	0.029	0.042	0.064	0.072
Overall mark<60%	0.056	0.049	0.046	0.041
60%≤Overall mark≤69%	0.167	0.161	0.135	0.143
70%≤Overall mark≤79%	0.352	0.332	0.337	0.301
80%≤Overall mark≤89%	0.301	0.339	0.357	0.383
Overall mark≥90%	0.064	0.074	0.092	0.106
Mastery/self-esteem<P5	0.058	0.058	0.043	0.041
P5≤Mastery/self-esteem<P10	0.061	0.053	0.043	0.043
P10≤Mastery/self-esteem<P25	0.166	0.142	0.146	0.147
P25≤Mastery/self-esteem<P50	0.220	0.229	0.232	0.224
P50≤Mastery/self-esteem<P75	0.276	0.270	0.276	0.273
P75≤Mastery/self-esteem<P90	0.132	0.154	0.159	0.155
P90≤Mastery/self-esteem<P95	0.045	0.046	0.050	0.058
Mastery/self-esteem≥P95	0.043	0.049	0.051	0.057
One parent	0.303	0.148	0.082	0.050
Two parents, one or none being a birth parent	0.097	0.107	0.119	0.119
Two birth parents	0.600	0.745	0.799	0.831
Parents have no postsecondary certificate	0.469	0.350	0.246	0.175
Parents have a non-university postsecondary certificate	0.355	0.434	0.379	0.313
Parents have an undergraduate degree	0.118	0.149	0.242	0.296
Parents have a graduate or professional degree	0.045	0.058	0.127	0.210
Parents expect university degree	0.620	0.652	0.729	0.794
Very low perception of returns to schooling	0.017	0.016	0.017	0.016
Low perception of returns to schooling	0.067	0.067	0.061	0.064
High perception of returns to schooling	0.499	0.496	0.504	0.485
Very high perception of returns to schooling	0.417	0.421	0.419	0.436
Few or no friends plan to further education after high school	0.205	0.194	0.150	0.140
Most friends plan to further education after high school	0.505	0.485	0.515	0.485
All friends plan to further education after high school	0.290	0.321	0.335	0.375
Atlantic provinces	0.123	0.096	0.060	0.052
Quebec	0.177	0.185	0.156	0.150
Ontario	0.361	0.384	0.443	0.483
Manitoba–Saskatchewan	0.097	0.089	0.078	0.058
Alberta	0.087	0.097	0.113	0.125
British Columbia	0.156	0.150	0.150	0.132
Female	0.549	0.529	0.523	0.501
High-school quality<P5	0.054	0.057	0.045	0.040
P5≤High-school quality<P10	0.045	0.046	0.055	0.055
P10≤High-school quality<P25	0.146	0.174	0.140	0.135
P25≤High-school quality<P50	0.247	0.270	0.258	0.234
P50≤High-school quality<P75	0.262	0.230	0.256	0.251
P75≤High-school quality<P90	0.142	0.129	0.150	0.174
P90≤High-school quality<P95	0.058	0.046	0.047	0.052
High-school quality≥P95	0.046	0.048	0.049	0.058
Financially constrained	0.134	0.109	0.079	0.059
Sample size	4,327	3,930	3,298	3,147

Note: Percentiles are denoted by 'P.'

Source: Statistics Canada, Youth in Transition Survey, Cohort A.

What is evident from Table 1 is that university participation rises with parental income, but so too does the likelihood of possessing characteristics which may foster higher educational attainment. Moreover, the increases are monotonic, in the sense that they tend to increase at every level of income.

In terms of reading abilities, students in the top income quartile (Q4) are far more likely to be at the top of the reading distribution compared to students in the bottom income quartile (Q1). For example, 7.2% of students in Q4 perform in the top 5% of all youth on the reading test, compared to only 2.9% of students in Q1. Conversely, only 2.9% of students in Q4 perform in the bottom 5% on the reading test, compared to 7.4% of students in Q1.

If we use the top and bottom 25% of the reading distribution as a yardstick, the difference in performance across the income distribution is equally compelling. Among students in Q4, 32.8% perform in the top 25% on the reading test, while only 18.8% perform in the bottom 25%. In contrast, only 18.0% of students in Q1 perform in the top 25%, while 32.3% of these youth perform in the bottom 25%.

Similar differences can be gleaned from Tables A.1 and A.2 in the appendix. That is, youth from families in the top income quartile generally perform better on standardized mathematics and science tests, and generally report higher marks than students from the bottom of the income distribution. Moreover, similar patterns emerge from the distribution of overall marks.

Going back to Table 1, differences in the mastery/self-esteem score across the income distribution are much smaller, albeit non-negligible. Among students in Q4, 27.1% are in the top 25% of the mastery/self-esteem distribution, while only 23.1% are in the bottom 25%. In contrast, only 22.0 % of students in Q1 are in the top 25% of the mastery/self-esteem distribution, while 28.4% are in the bottom 25%.

In terms of parental presence, only 5.0% of students in Q4 have only one parent in the home, compared to 30.3% of youth in Q1. Among families with two parents present, students in Q4 are also far more likely to have two *birth* parents present.

Not surprisingly, parental education is very unequally distributed across income quartiles. Students in Q4 are almost five times as likely to have at least one parent who possesses a graduate or professional degree than students in Q1 (21.0% compared to 4.5%). Slightly more than half of all students in Q4 (50.6%) have at least one parent who possesses a university degree. Among students in Q1, only 16.3% have at least one parent who possesses a university degree. At the other end of the spectrum, 46.9% of students in Q1 do not have a parent who possesses a postsecondary certificate, compared to only 17.5% of students in Q4.

Given the large differences in parental education, it is not surprising that parental expectations vis-à-vis a university education tend to rise with family income. In fact, 79.4% of students in Q4 have parents who expect them to obtain a university degree. Among students in Q1, only 62.0% of parents expect them to obtain a university degree.

Despite the fact that students at the bottom of the income distribution are not raised by highly educated, highly paid parents, they tend to attribute as much importance to schooling in determining their future success in the labour market as students at the top of the income distribution do. Of course, this could be the result of seeing their low-educated parents work in low-paying jobs (i.e., they see the negative impact of *not* pursuing higher education).

Students with higher levels of parental income also tend to report that a larger proportion of their friends plan to pursue further education after high school. Among students in Q4, 37.5% state that all of their friends plan to further their education after high school, compared to only 29.0% among students in Q1. Students who are higher up in the income distribution are also less likely to live in the Atlantic provinces, Quebec, Manitoba–Saskatchewan, or British Columbia and are more likely to live in Ontario and Alberta. These students are also slightly less likely to be female, largely because girls tend to live with their mothers following divorce, and families headed by lone mothers generally have lower levels of income than other family types. Students at the top of the income distribution are somewhat more likely to have attended a high school with a relatively high propensity to produce university-bound students. Finally, and not surprisingly, youth from lower-income families are more likely to report being financially constrained than others (13.4% compared to 5.9%). Overall, only 8.5% of youth report being financially constrained, which matches quite closely the imputation results of Carneiro and Heckman (2002) on U.S. data.

Whether the large differences in socioeconomic characteristics displayed in Table 1 can go some distance in explaining the large gaps in university participation across the income distribution also depends on the extent to which these characteristics influence the decision to attend university. As a first step towards demonstrating this, I have recalculated university participation rates by parental income quartile for each characteristic displayed in Table 1. The results are shown in Figures A.1 to A.12 in the appendix. At the top of the bars, I show the ratio of the university participation rate among students in Q4 to the university participation rate among students in Q1. For comparative purposes, I also show the university participation rate by income quartile among all youth at the far right of each figure. Since no other factors are taken into account, no definite conclusions should be drawn from these figures. However, they do provide a clear and intuitive way of demonstrating the possible mediating role of various characteristics.

Beginning with Figure A.1, it is clear that conditioning on reading abilities tends to reduce the gap in university participation in most instances. Overall, the Q4/Q1 ratio is 1.62. At most levels of reading abilities, however, the Q4/Q1 ratio is considerably lower. This suggests that differences in reading abilities may be partly responsible for the observed gaps in university participation across the income distribution. Conditioning on the overall mark and the mastery/self-esteem score also tend to reduce the income access gap, although less so than when I condition on reading abilities (Figures A.2 and A.3).

In Figure A.4, the university participation rates by parental income quartile are shown for different categories of parental presence. Although students in Q4 are far more likely to have two birth parents present in the home than students in Q1, the gap in university participation does not fall substantially when I condition on this family type. Moreover, conditioning on other family types actually raises the Q4/Q1 ratio of university participation.

The exercise is repeated in Figure A.5 for different categories of parental education. In this case, the gap in university participation declines quite substantially. In fact, the gap between the top and the bottom income quartile is reduced by almost 50% or more at each level of parental education.

Conditioning on parental expectations also reduces the gap (Figure A.6). Among students whose parents expect them to complete a university degree, the Q4/Q1 ratio falls to 1.38. The gap either widens or narrows when I condition on the perceptions of returns to schooling (Figure A.7). However, conditioning on peer influences (Figure A.8) or sex (Figure A.10) does not substantially alter the income gradient in university participation. Interestingly, the income access gap is generally larger within provinces than at the national level (Figure A.9). For example, the relative gap in Quebec (a low-tuition province) is 2.29 (the highest of all regions), compared to 1.62 nationally. Finally, conditioning on school quality also alters the income access gap, although it may either reduce or widen the gap (Figure A.11).

Finally, the results shown in Figure A.12 suggest that there still exists a substantial gap in university attendance related to parental income among youth who do not report any financial constraints. This hypothesis will be examined more rigorously in the econometric section.

Econometric evidence

In this section, I account for differences in all of the factors listed in the previous section in trying to explain the gap in the university participation rates across income distribution. The first step involves estimating linear probability models for each measure of academic abilities and for each income quartile. The regression results for the models that use the Programme for International Student Assessment (PISA) reading scores are shown below in Table 2. Results for the models that use different measures of academic abilities appear in the Appendix Tables A.3 and A.4. Note that regression coefficients in the linear probability models can be interpreted as the marginal effect of a variable on the probability of university attendance expressed in percentage points. Also note that in some of the decompositions that follow, I have applied coefficients from pooled regressions. The pooled regression results are available upon request.

Table 2 Linear probability model results by parental income quartile using reading score

	Parental income quartile							
	1st		2nd		3rd		4th	
	b	t	b	t	b	t	b	t
P5≤Reading score<P10	0.103	2.37	0.031	0.80	-0.018	-0.33	0.048	0.77
P10≤Reading score<P25	0.136	4.55	0.028	0.84	0.027	0.62	0.144	3.08
P25≤Reading score<P50	0.198	6.47	0.117	3.97	0.147	3.18	0.210	5.14
P50≤Reading score<P75	0.275	8.72	0.197	5.20	0.196	3.97	0.234	5.81
P75≤Reading score<P90	0.339	8.65	0.222	5.54	0.246	4.98	0.329	7.84
P90≤Reading score<P95	0.271	4.86	0.224	4.77	0.229	3.71	0.348	7.40
Reading score≥P95	0.321	6.36	0.298	6.87	0.301	5.22	0.373	8.18
60%≤Overall mark≤69%	-0.010	-0.37	-0.039	-1.37	-0.041	-1.35	-0.012	-0.30
70%≤Overall mark≤79%	0.001	0.05	0.015	0.54	0.072	2.29	0.087	2.45
80%≤Overall mark≤89%	0.152	5.39	0.190	6.27	0.270	8.06	0.240	6.15
Overall mark≥90%	0.334	8.07	0.383	8.86	0.338	8.81	0.326	7.19
P5≤Mastery/self-esteem<P10	-0.007	-0.13	-0.083	-1.36	-0.046	-0.77	0.112	1.94
P10≤Mastery/self-esteem<P25	0.039	0.86	-0.051	-1.29	-0.035	-0.70	0.087	2.05
P25≤Mastery/self-esteem<P50	-0.054	-1.16	-0.018	-0.45	0.003	0.05	0.033	0.77
P50≤Mastery/self-esteem<P75	0.005	0.10	-0.022	-0.54	-0.033	-0.78	0.056	1.40
P75≤Mastery/self-esteem<P90	-0.025	-0.46	0.001	0.03	0.024	0.50	0.050	1.22
P90≤Mastery/self-esteem<P95	0.018	0.27	-0.040	-0.77	-0.059	-1.04	0.090	1.75
Mastery/self-esteem≥P95	-0.014	-0.20	-0.070	-1.37	-0.057	-0.85	0.123	2.20
Two parents, one or none being a birth parent	-0.052	-1.86	-0.037	-1.07	-0.021	-0.46	-0.073	-1.55
Two birth parents	0.013	0.57	0.027	0.99	0.040	0.94	-0.006	-0.17
Parents have a non-university postsecondary certificate	0.028	1.35	0.013	0.67	0.033	1.51	0.049	2.06
Parents have an undergraduate degree	0.148	4.72	0.077	2.86	0.140	5.33	0.155	5.93
Parents have a graduate or professional degree	0.137	3.33	0.176	3.56	0.200	6.09	0.217	7.36
Parents expect university degree	0.131	7.67	0.159	8.55	0.145	6.79	0.122	4.57
Low perception of returns to schooling	-0.017	-0.32	-0.007	-0.10	-0.038	-0.50	0.083	1.17
High perception of returns to schooling	0.030	0.66	-0.034	-0.56	-0.034	-0.50	0.050	0.79
Very high perception of returns to schooling	0.087	1.79	0.003	0.05	0.035	0.51	0.075	1.13
Most friends plan to further education after high school	0.014	0.57	0.049	2.37	-0.014	-0.67	0.030	0.95
All friends plan to further education after high school	0.036	1.37	0.066	2.46	0.008	0.33	0.056	1.85
Québec	0.043	1.53	-0.025	-0.79	-0.016	-0.41	-0.083	-2.02
Ontario	0.058	2.37	-0.012	-0.56	-0.011	-0.49	-0.038	-1.67
Manitoba–Saskatchewan	0.021	1.12	0.023	1.22	-0.029	-1.30	-0.018	-0.74
Alberta	0.084	2.84	0.053	1.78	-0.017	-0.57	-0.027	-0.94
British Columbia	0.088	3.61	0.004	0.15	0.009	0.34	-0.072	-2.56
Female	0.052	2.41	0.061	4.09	0.064	3.50	0.086	4.75
P5≤High-school quality<P10	0.068	2.07	0.089	2.31	0.083	2.34	0.078	2.02
P10≤High-school quality<P25	0.118	4.30	0.136	4.95	0.186	4.72	0.171	4.54
P25≤High-school quality<P50	0.228	7.21	0.250	7.26	0.301	7.16	0.282	6.36
P50≤High-school quality<P75	0.326	9.64	0.341	9.84	0.425	9.23	0.397	8.60
P75≤High-school quality<P90	0.436	11.34	0.441	11.03	0.476	10.27	0.491	10.02
P90≤High-school quality<P95	0.485	10.83	0.516	9.30	0.579	11.54	0.533	10.65
High-school quality≥P95	0.586	15.49	0.575	13.06	0.624	11.10	0.596	11.41
Financially constrained	-0.292	-17.05	-0.270	-12.53	-0.325	-13.84	-0.358	-14.34
Intercept	-0.459	-5.87	-0.329	-3.84	-0.396	-3.64	-0.555	-5.32
Adjusted R^2	0.400		0.422		0.457		0.441	
Sample size	4,327		3,930		3,298		3,147	

Note: The t statistics are bootstrapped with 1000 replicate weights. Percentiles are denoted by 'P.'
Source: Statistics Canada, Youth in Transition Survey, Cohort A.

The results suggest that university participation tends to increase substantially with the reading score. Students at the top of the reading distribution enjoy a very large advantage over students at the bottom. Differences across the reading distribution often surpass 30 percentage points (between the top and the bottom). High-school marks are also positively associated with university participation, especially beyond 80% (relative to below 60%). University participation is generally not associated with the mastery/self-esteem score.[8] The number and type (birth or other) of parents present in the home plays a minimal role in the decision to attend university, which confirms the descriptive findings in the previous section. Parental education, on the other hand, is very strongly associated with university participation. Youth with at least one university-educated parent enjoy a large advantage in university participation over youth with no postsecondary-educated parent, roughly in the range of 15 to 20 percentage points. The same is true for parental expectations: students whose parents expect them to complete a university degree enjoy a 12- to 16-percentage-point advantage in university participation over other students. Perceptions of the returns to schooling are generally not associated with university participation. Students who report that all of their friends plan to pursue further education after high school are generally more likely to pursue university than students who report that few or none of their friends plan to further their education after high school. Some regional differences appear to be evident, although the differences are not large by any means since we control for student composition and high-school quality. Females are more likely to go on to university than males even after conditioning on reading abilities, high-school marks, parental influences, and detailed socio-economic characteristics. There are also very large differences in university participation based on the type of high school attended. Finally, being financially constrained is associated with a 30-percentage-point decline in university participation, all else equal.

So far, I have shown that students whose parents have different levels of income tend to have very different academic abilities, parental influences, and peer influences. Furthermore, they tend to grow up in different parts of the country, attend different types of high schools, and are more or less likely to be financially constrained. Many of these observable characteristics tend to influence the decision to attend university, although some more than others. I now turn to the main focus of the paper, which is to attempt to explain the gap in university attendance across various income quartiles with the observable characteristics.

In Table 3, I show the decomposition results for the models using the PISA reading score. Results from each of the three methods appear from top to bottom (see the methodology section). The top row shows the total gap in the university participation rate, which is 19.2 percentage points between the top and the bottom income quartiles.

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8. In a recent study, Heckman, Stixrud and Urzua (2006) demonstrate that non-cognitive abilities are a very strong determinant of the probability of males being a university graduate by age 30. Since I can only look at university participation by age 19, it is possible that non-cognitive abilities may have longer-term effects on the probability of attending university that I can not capture with the data at hand. Alternatively, non-cognitive abilities may be reported with considerable error, which would bias estimates towards zero if the error is random. Another possibility is the correlation between academic and non-cognitive abilities. To address this, I ran models after dropping academic abilities from the specifications. The association between non-cognitive abilities and university participation became stronger and more statistically significant as a result, yet their explanatory power was still not large by any means.

Table 3 Decomposition of the university participation gap across parental income quartiles using reading score

	Decomposition across parental income quartiles					
	4th−1st	3rd−1st	2nd−1st	4th−2nd	3rd−2nd	4th−3rd
Total gap in university participation	0.192	0.123	0.025	0.167	0.099	0.068
Method 1						
Explained proportion of gap	0.965	1.023	1.443	0.903	0.843	1.025
Unexplained proportion of gap	0.035	-0.023	-0.443	0.097	0.157	-0.025
Proportion of gap explained by differences in:						
Reading scores	0.202	0.219	0.579	0.134	0.119	0.179
Overall mark	0.152	0.201	0.449	0.110	0.125	0.110
Mastery/self-esteem	0.003	0.011	0.057	0.010	-0.002	0.015
Parental presence	-0.015	0.061	0.145	-0.008	0.019	-0.003
Parental education	0.321	0.279	0.234	0.298	0.251	0.341
Parental expectations	0.111	0.128	0.204	0.104	0.113	0.116
Perception of returns to schooling	0.002	0.001	0.005	0.002	-0.001	0.008
Peer influences	0.021	0.002	0.042	0.018	-0.003	0.019
Region	-0.006	-0.004	-0.007	0.001	-0.002	0.005
Sex	-0.021	-0.013	-0.047	-0.015	-0.004	-0.028
High-school quality	0.057	-0.004	-0.493	0.143	0.129	0.160
Financial constraints	0.138	0.143	0.274	0.105	0.097	0.103
Method 2						
Explained proportion of gap	0.906	0.883	1.389	0.836	0.779	0.980
Unexplained proportion of gap	0.094	0.117	-0.389	0.164	0.221	0.020
Proportion of gap explained by differences in:						
Reading scores	0.184	0.202	0.645	0.119	0.113	0.135
Overall mark	0.139	0.147	0.374	0.124	0.115	0.128
Mastery/self-esteem	-0.007	-0.016	-0.082	-0.003	0.001	-0.013
Parental presence	0.009	0.011	0.055	0.011	0.010	0.019
Parental education	0.249	0.245	0.355	0.218	0.187	0.322
Parental expectations	0.119	0.116	0.169	0.135	0.125	0.138
Perception of returns to schooling	0.006	0.003	0.007	0.003	-0.002	0.016
Peer influences	0.014	0.014	0.033	0.021	0.025	0.011
Region	0.032	0.042	0.075	0.002	0.006	-0.002
Sex	-0.013	-0.011	-0.040	-0.010	-0.004	-0.021
High-school quality	0.059	0.001	-0.497	0.136	0.123	0.153
Financial constraints	0.113	0.129	0.296	0.079	0.081	0.093
Method 3						
Explained proportion of gap	0.962	0.943	1.587	0.902	0.770	0.970
Unexplained proportion of gap	0.038	0.057	-0.587	0.098	0.230	0.030
Proportion of gap explained by differences in:						
Reading scores	0.197	0.211	0.598	0.131	0.103	0.151
Overall mark	0.143	0.171	0.475	0.118	0.103	0.121
Mastery/self-esteem	-0.001	-0.002	0.058	0.001	0.001	0.003
Parental presence	0.001	0.016	0.188	0.009	0.005	0.009
Parental education	0.299	0.268	0.312	0.284	0.197	0.295
Parental expectations	0.116	0.124	0.198	0.115	0.116	0.136
Perception of returns to schooling	0.004	0.002	0.007	0.004	-0.001	0.010
Peer influences	0.017	0.008	0.032	0.009	0.018	0.017
Region	0.024	0.026	-0.010	0.001	0.022	0.004
Sex	-0.017	-0.011	-0.048	-0.013	-0.003	-0.024
High-school quality	0.058	-0.002	-0.522	0.142	0.126	0.160
Financial constraints	0.120	0.133	0.298	0.099	0.083	0.086

Note: In Method 1, the explained portion of the gap is weighted by the coefficients of the higher income quartile. In Method 2, it is weighted by the coefficient of the lower income quartile. In Method 3, coefficients from a pooled model are used.
Source: Statistics Canada, Youth in Transition Survey, Cohort A.

Our main focus is on Method 3. Almost all of the gap between students in the top and bottom income quartiles can be explained by differences in observable characteristics (96%). Only 12% is related to financial constraints. In contrast, 84% is related to long-term factors. The most important of these characteristics is parental education, which accounts for 30% of the gap. Reading scores account for 20% of the gap, while marks account for 14%. Note that, collectively, reading abilities and marks account for 34% of the total gap, which is slightly greater that the portion explained by parental education. Parental expectations account for 12% and high-school quality accounts for 6% of the gap. The remaining factors do not account for a large proportion of the total gap.

These results are largely invariant to the choice of method. Using Method 1, 97% of the gap is explained. Parental education is again the most important factor (accounting for 32% of the gap), followed by reading abilities (20%), marks (15%), financial constraints (14%), and parental expectations (11%). High-school quality again accounts for 6% of the gap. Using Method 2, most of the total gap can still be explained (91%). Once again, parental education is the most important factor (accounting for 25% of the gap), followed by reading abilities (18%), marks (14%), parental expectations (12%), financial constraints (11%), and high-school quality (6%).

The gap in university attendance between students in Q3 and students in Q1 is also substantial (about 12 percentage points). Again, differences in observable characteristics account for almost all the gap (94% based on Method 3), and the same factors come into play.

Similar results hold when I decompose the gap between other income quartiles. In general, most of the gap can be explained by differences in observable characteristics. Moreover, financial constraints never play a larger role than student and parental characteristics.

Results for models using mathematics and science standardized test scores appear in the appendix (Tables A.5 and A.6). The results are more or less similar to those shown in Table 3, except that a somewhat smaller proportion of the total gap in university participation can be explained by differences in test scores.[9] Finally, I also ran the decompositions by dropping Quebec residents, given how different the schooling system is in that province. This exercise yielded no qualitative change in the results.

4. Conclusion

It is well known that economically disadvantaged students in Canada are less likely to pursue a university education than students from well-to-do families. This has raised concerns among student groups, parents, policy analysts and education planners since it potentially has negative implications for the intergenerational transmission of earnings. Until recently, data limitations made it very challenging to understand the reasons behind this gap. With the release of the third cycle of the Youth in Transition Survey, Cohort A, it is now possible to link university attendance of 19-year-old youth to a plethora of information on these youth when they were aged 15, including results

9. One possible reason for the lower explanatory power of the mathematics and science test scores is that the Programme for International Student Assessment (PISA) evaluation focused mainly on reading. Alternatively, it may actually be the case that reading abilities are a more discriminating factor in university attendance than mathematics or science abilities.

from standardized tests, high-school marks, feeling control (or mastery) over one's life, self-esteem, parental income, parental education, parental expectations, peer influences, and high school attended, among others. The purpose of this study is to attempt to further understand the income gap in university participation with these new data.

I find that 96% of the total gap in university attendance between youth from the top and bottom income quartiles can be accounted for by differences in observable characteristics. Differences in long-term factors such as standardized test scores in reading obtained at age 15, school marks reported at age 15, parental influences, and high-school quality account for 84% of the gap. In contrast, only 12% of the gap is related to financial constraints. Similar results hold across different income quartiles and when I use standardized test scores in mathematics and science. However, reading scores account for a larger proportion of the gap than other test scores.

Family income may pose different barriers to attending university. First, differences in academic performance across the income distribution may themselves be the result of differences in family income. Families with more financial resources may spend more money on books for children, take their children to museums, spend more on daycare in the early years, locate in neighbourhoods with better schools, etc. These actions may result in higher performance on standardized and scholastic tests, and thus, in a higher probability of attending university in the future. Second, upon deciding to attend university, students may be faced with another barrier that is related to their family's financial position: credit constraints. However, the evidence presented in this study casts some doubt on the *widespread* existence of credit constraints in Canada. Carneiro and Heckman (2002) also found very little evidence of credit constraints in the United States.

Despite the weak evidence on credit constraints, there are two important caveats to keep in mind. First, even if credit constraints do not matter a lot for the population of youth as a whole, they may matter for certain groups of students in some instances. For example, Ontario students from middle-class backgrounds saw a large decline in their probability of pursuing a professional degree following the large and sudden tuition fee deregulation in these programs in Ontario universities (Frenette, 2005b). Another example is students who grew up living out of commuting distance from a university. The additional cost of attending a university away from the parental home is greater than $5,000 (Barr-Telford et al., 2003), which appears to reduce enrolment among students from lower-income families who must move away to attend (Frenette, 2004). Second, even if credit constraints could be 'ruled out,' it is important to note that this would be conditional on the existing financial aid system. Removing that system may (or may not) introduce credit constraints.

What the findings of the study suggest is that, given the weak evidence on the existence of widespread credit constraints, our focus should now shift towards trying to further understand why students from lower-income families tend to perform more poorly on standardized and scholastic tests than students from higher-income families.

Appendix

Table A.1 Means of variables by parental income quartile in mathematics sample

	Parental income quartile			
	1st	2nd	3rd	4th
University participation	0.321	0.351	0.424	0.502
Mathematics score<P5	0.069	0.041	0.053	0.030
P5≤Mathematics score<P10	0.046	0.049	0.045	0.034
P10≤Mathematics score<P25	0.175	0.161	0.126	0.119
P25≤Mathematics score<P50	0.273	0.251	0.267	0.240
P50≤Mathematics score<P75	0.234	0.261	0.232	0.241
P75≤Mathematics score<P90	0.125	0.142	0.145	0.201
P90≤Mathematics score<P95	0.042	0.045	0.061	0.066
Mathematics score≥P95	0.036	0.050	0.070	0.068
Overall mark<60%	0.052	0.049	0.047	0.037
60%≤Overall mark≤69%	0.167	0.158	0.138	0.151
70%≤Overall mark≤79%	0.374	0.332	0.338	0.309
80%≤Overall mark≤89%	0.277	0.340	0.348	0.379
Overall mark≥90%	0.077	0.083	0.096	0.098
Mastery/self-esteem<P5	0.044	0.051	0.044	0.044
P5≤Mastery/self-esteem<P10	0.066	0.060	0.038	0.033
P10≤Mastery/self-esteem<P25	0.159	0.132	0.164	0.166
P25≤Mastery/self-esteem<P50	0.238	0.228	0.238	0.232
P50≤Mastery/self-esteem<P75	0.289	0.281	0.266	0.264
P75≤Mastery/self-esteem<P90	0.113	0.152	0.150	0.152
P90≤Mastery/self-esteem<P95	0.053	0.046	0.047	0.055
Mastery/self-esteem≥P95	0.040	0.049	0.053	0.053
One parent	0.300	0.140	0.081	0.044
Two parents, one or none being a birth parent	0.099	0.113	0.117	0.131
Two birth parents	0.601	0.747	0.802	0.825
Parents have no postsecondary certificate	0.468	0.337	0.235	0.170
Parents have a non-university postsecondary certificate	0.358	0.426	0.379	0.310
Parents have an undergraduate degree	0.125	0.162	0.246	0.303
Parents have a graduate or professional degree	0.042	0.063	0.131	0.212
Parents expect university degree	0.635	0.663	0.733	0.797
Very low perception of returns to schooling	0.012	0.017	0.020	0.017
Low perception of returns to schooling	0.065	0.075	0.055	0.068
High perception of returns to schooling	0.499	0.500	0.533	0.490
Very high perception of returns to schooling	0.425	0.409	0.393	0.425
Few or no friends plan to further education after high school	0.186	0.199	0.161	0.127
Most friends plan to further education after high school	0.535	0.490	0.513	0.485
All friends plan to further education after high school	0.280	0.311	0.326	0.388
Atlantic provinces	0.129	0.095	0.059	0.049
Quebec	0.180	0.187	0.165	0.158
Ontario	0.339	0.379	0.444	0.486
Manitoba–Saskatchewan	0.106	0.087	0.075	0.051
Alberta	0.086	0.095	0.103	0.124
British Columbia	0.161	0.156	0.154	0.132
Female	0.554	0.525	0.542	0.503
High-school quality<P5	0.052	0.066	0.045	0.041
P5≤High-school quality<P10	0.044	0.045	0.063	0.058
P10≤High-school quality<P25	0.149	0.163	0.149	0.139
P25≤High-school quality<P50	0.249	0.267	0.256	0.230
P50≤High-school quality<P75	0.252	0.230	0.251	0.243
P75≤High-school quality<P90	0.143	0.136	0.136	0.176
P90≤High-school quality<P95	0.062	0.046	0.049	0.050
High-school quality≥P95	0.049	0.048	0.052	0.063
Financially constrained	0.137	0.108	0.084	0.057
Sample size	2,389	2,185	1,826	1,746

Note: Percentiles are denoted by 'P.'
Source: Statistics Canada, Youth in Transition Survey, Cohort A.

Table A.2 Means of variables by parental income quartile in science sample

	Parental income quartile			
	1st	2nd	3rd	4th
University participation	0.286	0.341	0.429	0.509
Science score<P5	0.070	0.051	0.040	0.035
P5≤Science score<P10	0.072	0.051	0.036	0.036
P10≤Science score<P25	0.180	0.159	0.141	0.119
P25≤Science score<P50	0.261	0.225	0.247	0.222
P50≤Science score<P75	0.229	0.270	0.267	0.239
P75≤Science score<P90	0.128	0.146	0.175	0.201
P90≤Science score<P95	0.032	0.049	0.047	0.072
Science score≥P95	0.028	0.049	0.049	0.077
Overall mark<60%	0.055	0.052	0.043	0.045
60%≤Overall mark≤69%	0.196	0.144	0.124	0.145
70%≤Overall mark≤79%	0.348	0.343	0.344	0.301
80%≤Overall mark≤89%	0.293	0.348	0.370	0.375
Overall mark≥90%	0.059	0.072	0.086	0.110
Mastery/self-esteem<P5	0.066	0.062	0.041	0.032
P5≤Mastery/self-esteem<P10	0.062	0.047	0.044	0.046
P10≤Mastery/self-esteem<P25	0.173	0.143	0.147	0.140
P25≤Mastery/self-esteem<P50	0.209	0.236	0.234	0.227
P50≤Mastery/self-esteem<P75	0.269	0.268	0.269	0.275
P75≤Mastery/self-esteem<P90	0.141	0.157	0.161	0.160
P90≤Mastery/self-esteem<P95	0.044	0.044	0.054	0.061
Mastery/self-esteem≥P95	0.036	0.044	0.050	0.058
One parent	0.293	0.151	0.081	0.051
Two parents, one or none being a birth parent	0.093	0.110	0.112	0.125
Two birth parents	0.614	0.739	0.807	0.824
Parents have no postsecondary certificate	0.466	0.338	0.247	0.174
Parents have a non-university postsecondary certificate	0.359	0.451	0.381	0.319
Parents have an undergraduate degree	0.116	0.147	0.242	0.284
Parents have a graduate or professional degree	0.040	0.056	0.125	0.214
Parents expect university degree	0.605	0.665	0.744	0.792
Very low perception of returns to schooling	0.017	0.018	0.017	0.010
Low perception of returns to schooling	0.075	0.074	0.065	0.067
High perception of returns to schooling	0.514	0.491	0.498	0.475
Very high perception of returns to schooling	0.395	0.418	0.420	0.447
Few or no friends plan to further education after high school	0.215	0.185	0.132	0.148
Most friends plan to further education after high school	0.488	0.506	0.511	0.496
All friends plan to further education after high school	0.296	0.309	0.358	0.356
Atlantic provinces	0.124	0.099	0.058	0.054
Quebec	0.173	0.198	0.160	0.138
Ontario	0.373	0.367	0.434	0.478
Manitoba–Saskatchewan	0.092	0.093	0.078	0.064
Alberta	0.083	0.090	0.122	0.127
British Columbia	0.156	0.153	0.148	0.138
Female	0.549	0.531	0.515	0.506
High-school quality<P5	0.050	0.057	0.048	0.038
P5≤High-school quality<P10	0.048	0.047	0.055	0.052
P10≤High-school quality<P25	0.144	0.182	0.131	0.132
P25≤High-school quality<P50	0.242	0.260	0.277	0.232
P50≤High-school quality<P75	0.272	0.226	0.257	0.246
P75≤High-school quality<P90	0.138	0.132	0.138	0.192
P90≤High-school quality<P95	0.056	0.048	0.047	0.054
High-school quality≥P95	0.049	0.050	0.047	0.054
Financially constrained	0.132	0.120	0.074	0.073
Sample size	2,449	2,100	1,866	1,658

Note: Percentiles are denoted by 'P.'
Source: Statistics Canada, Youth in Transition Survey, Cohort A.

Table A.3 Linear probability model results by parental income quartile using mathematics score

	Parental income quartile							
	1st		2nd		3rd		4th	
	b	t	b	t	b	t	b	t
P5≤Mathematics score<P10	0.106	1.74	-0.053	-0.79	-0.098	-1.19	0.206	2.08
P10≤Mathematics score<P25	0.146	2.76	0.023	0.45	0.042	0.61	0.069	0.98
P25≤Mathematics score<P50	0.226	5.33	0.080	1.61	0.050	0.78	0.145	2.35
P50≤Mathematics score<P75	0.290	6.12	0.178	3.20	0.123	1.78	0.176	2.68
P75≤Mathematics score<P90	0.341	6.14	0.138	2.49	0.117	1.49	0.238	3.88
P90≤Mathematics score<P95	0.367	5.55	0.171	2.23	0.191	2.34	0.319	5.33
Mathematics score≥P95	0.272	3.39	0.284	3.65	0.179	2.16	0.303	4.59
60%≤Overall mark≤69%	-0.040	-0.96	-0.010	-0.23	-0.057	-1.19	-0.044	-0.72
70%≤Overall mark≤79%	0.015	0.35	0.035	0.81	0.065	1.30	0.069	1.22
80%≤Overall mark≤89%	0.142	2.80	0.186	3.63	0.247	4.88	0.240	4.03
Overall mark≥90%	0.349	5.52	0.390	5.91	0.339	4.97	0.324	5.13
P5≤Mastery/self-esteem<P10	-0.088	-1.03	-0.112	-1.46	0.004	0.05	0.078	0.87
P10≤Mastery/self-esteem<P25	-0.029	-0.41	-0.097	-2.02	-0.016	-0.25	0.051	0.89
P25≤Mastery/self-esteem<P50	-0.090	-1.25	-0.084	-1.81	0.053	0.84	-0.001	-0.02
P50≤Mastery/self-esteem<P75	-0.039	-0.51	-0.057	-1.33	0.047	0.76	-0.002	-0.04
P75≤Mastery/self-esteem<P90	0.014	0.18	-0.001	-0.01	0.113	1.68	0.017	0.30
P90≤Mastery/self-esteem<P95	-0.029	-0.33	-0.032	-0.48	-0.002	-0.03	0.113	1.66
Mastery/self-esteem≥P95	-0.042	-0.54	-0.042	-0.65	0.038	0.41	0.037	0.51
Two parents, one or none being a birth parent	-0.006	-0.15	-0.046	-0.83	0.011	0.17	-0.109	-1.55
Two birth parents	0.050	1.44	0.001	0.02	0.123	2.02	-0.054	-0.94
Parents have a non-university postsecondary certificate	0.063	2.29	0.021	0.73	0.020	0.76	0.071	2.03
Parents have an undergraduate degree	0.130	3.03	0.064	1.82	0.127	3.81	0.161	4.38
Parents have a graduate or professional degree	0.132	2.05	0.169	2.42	0.209	4.89	0.265	6.66
Parents expect university degree	0.128	4.93	0.203	7.97	0.128	4.68	0.104	3.14
Low perception of returns to schooling	-0.006	-0.09	0.087	1.03	-0.054	-0.60	0.030	0.32
High perception of returns to schooling	0.115	2.04	0.069	0.93	-0.046	-0.55	0.021	0.27
Very high perception of returns to schooling	0.142	2.46	0.056	0.76	0.010	0.12	0.020	0.27
Most friends plan to further education after high school	0.010	0.31	0.085	2.48	-0.018	-0.63	0.107	2.42
All friends plan to further education after high school	0.038	0.98	0.098	2.29	-0.015	-0.40	0.125	3.02
Quebec	0.018	0.41	-0.061	-1.33	-0.011	-0.22	-0.104	-1.95
Ontario	0.053	1.49	0.004	0.14	0.018	0.48	-0.034	-0.99
Manitoba–Saskatchewan	0.006	0.23	0.012	0.48	-0.067	-1.88	-0.030	-0.85
Alberta	0.075	1.58	0.083	1.82	0.026	0.58	0.001	0.03
British Columbia	0.089	2.60	0.000	0.01	0.007	0.19	-0.070	-1.66
Female	0.094	3.32	0.091	4.07	0.111	3.82	0.114	4.16
P5≤High-school quality<P10	0.089	1.75	0.114	2.38	0.061	1.14	0.046	0.93
P10≤High-school quality<P25	0.147	3.17	0.134	3.33	0.174	3.15	0.189	3.99
P25≤High-school quality<P50	0.230	4.11	0.239	5.28	0.320	5.26	0.278	5.30
P50≤High-school quality<P75	0.373	6.48	0.346	7.47	0.444	6.75	0.436	8.20
P75≤High-school quality<P90	0.487	8.06	0.430	7.99	0.547	8.36	0.561	9.44
P90≤High-school quality<P95	0.506	6.66	0.542	7.57	0.643	8.61	0.566	8.11
High-school quality≥P95	0.641	9.63	0.594	9.42	0.671	9.04	0.633	9.09
Financially constrained	-0.309	-12.41	-0.286	-10.22	-0.320	-9.27	-0.369	-9.90
Intercept	-0.620	-5.70	-0.431	-3.66	-0.485	-3.24	-0.490	-4.00
Adjusted R^2	0.390		0.407		0.429		0.447	
Sample size	2,389		2,185		1,826		1,746	

Note: The t statistics are bootstrapped with 1000 replicate weights. Percentiles are denoted by 'P.'
Source: Statistics Canada, Youth in Transition Survey, Cohort A.

Table A.4 Linear probability model results by parental income quartile using science score

	Parental income quartile							
	1st		2nd		3rd		4th	
	b	t	b	t	b	t	b	t
P5≤Science score<P10	-0.008	-0.12	-0.051	-0.73	0.048	0.55	0.017	0.17
P10≤Science score<P25	-0.041	-0.78	0.043	0.95	0.032	0.50	-0.011	-0.10
P25≤Science score<P50	0.082	1.42	0.098	2.25	0.098	1.75	0.085	0.85
P50≤Science score<P75	0.091	1.78	0.188	3.78	0.140	2.48	0.109	1.07
P75≤Science score<P90	0.130	1.89	0.190	3.66	0.177	2.92	0.148	1.47
P90≤Science score<P95	0.167	2.12	0.197	2.80	0.250	3.30	0.212	2.00
Science score≥P95	0.154	2.16	0.185	2.64	0.277	3.35	0.226	2.13
60%≤Overall mark≤69%	0.008	0.23	-0.026	-0.59	0.016	0.32	0.004	0.08
70%≤Overall mark≤79%	0.040	1.31	0.092	2.11	0.142	2.98	0.076	1.59
80%≤Overall mark≤89%	0.210	5.52	0.328	7.35	0.276	5.86	0.232	4.96
Overall mark≥90%	0.373	7.05	0.407	7.57	0.362	6.25	0.356	6.90
P5≤Mastery/self-esteem<P10	-0.001	-0.02	-0.080	-0.87	0.121	1.64	0.040	0.44
P10≤Mastery/self-esteem<P25	0.072	1.47	-0.068	-0.99	0.088	1.43	0.074	1.35
P25≤Mastery/self-esteem<P50	0.019	0.36	-0.022	-0.31	0.091	1.41	0.046	0.88
P50≤Mastery/self-esteem<P75	0.056	1.08	-0.053	-0.75	0.068	1.12	0.054	0.97
P75≤Mastery/self-esteem<P90	0.031	0.50	0.017	0.26	0.123	1.98	0.066	1.16
P90≤Mastery/self-esteem<P95	0.075	0.99	-0.045	-0.56	0.104	1.38	0.079	1.21
Mastery/self-esteem≥P95	0.040	0.49	-0.083	-0.98	0.198	2.06	0.117	1.64
Two parents, one or none being a birth parent	-0.056	-1.63	-0.047	-1.00	-0.117	-2.05	-0.056	-0.88
Two birth parents	0.020	0.71	-0.029	-0.82	-0.067	-1.34	0.005	0.10
Parents have a non-university postsecondary certificate	0.021	0.86	0.028	1.17	0.019	0.53	0.027	0.78
Parents have an undergraduate degree	0.165	4.41	0.132	3.63	0.136	3.57	0.150	3.91
Parents have a graduate or professional degree	0.145	2.61	0.189	2.58	0.181	3.73	0.184	4.88
Parents expect university degree	0.142	5.82	0.164	6.98	0.173	5.76	0.156	4.13
Low perception of returns to schooling	-0.045	-0.54	-0.131	-1.49	0.098	0.89	0.021	0.15
High perception of returns to schooling	0.032	0.47	-0.103	-1.28	0.060	0.60	0.050	0.36
Very high perception of returns to schooling	0.072	1.04	-0.045	-0.55	0.094	0.93	0.089	0.64
Most friends plan to further education after high school	0.020	0.57	0.028	0.94	0.057	2.04	0.034	0.73
All friends plan to further education after high school	0.003	0.07	0.034	1.02	0.098	3.31	0.048	0.98
Quebec	0.033	0.77	-0.031	-0.61	-0.050	-0.89	0.008	0.13
Ontario	0.063	1.86	-0.016	-0.50	-0.027	-0.75	0.035	0.92
Manitoba–Saskatchewan	0.039	1.43	-0.008	-0.27	0.032	0.94	0.047	1.21
Alberta	0.042	1.20	0.016	0.39	-0.037	-0.96	0.024	0.52
British Columbia	0.065	2.04	0.017	0.51	-0.068	-1.96	0.014	0.33
Female	0.088	3.61	0.079	3.64	0.081	3.12	0.081	3.10
P5≤High-school quality<P10	0.027	0.50	0.142	2.68	0.025	0.42	0.024	0.32
P10≤High-school quality<P25	0.067	1.36	0.210	5.37	0.181	3.32	0.124	2.03
P25≤High-school quality<P50	0.203	3.72	0.314	5.54	0.278	4.73	0.246	3.67
P50≤High-school quality<P75	0.293	5.36	0.472	8.37	0.395	6.23	0.343	4.74
P75≤High-school quality<P90	0.408	6.62	0.515	8.05	0.467	7.31	0.441	6.12
P90≤High-school quality<P95	0.395	4.82	0.576	8.32	0.528	6.71	0.469	6.27
High-school quality≥P95	0.519	8.79	0.600	9.68	0.575	7.14	0.554	6.26
Financially constrained	-0.287	-12.72	-0.341	-11.62	-0.362	-12.06	-0.311	-8.98
Intercept	-0.394	-3.58	-0.334	-2.59	-0.520	-3.23	-0.498	-2.65
Adjusted R^2	0.387		0.419		0.456		0.442	
Sample size	2,405		2,128		1,832		1,708	

Note: The t statistics are bootstrapped with 1000 replicate weights. Percentiles are denoted by 'P.'
Source: Statistics Canada, Youth in Transition Survey, Cohort A.

Table A.5 Decomposition of the university participation gap across parental income quartiles using mathematics score

	Decomposition across parental income quartiles					
	4th−1st	3rd−1st	2nd−1st	4th−2nd	3rd−2nd	4th−3rd
Total gap in university participation	0.181	0.104	0.030	0.151	0.074	0.077
Method 1						
Explained proportion of gap	0.896	1.137	0.947	0.921	0.915	0.942
Unexplained proportion of gap	0.104	-0.137	0.053	0.079	0.085	0.058
Proportion of gap explained by differences in:						
Mathematics scores	0.147	0.101	0.309	0.104	0.055	0.126
Overall mark	0.145	0.209	0.380	0.082	0.100	0.072
Mastery/self-esteem abilities	-0.006	0.035	0.142	0.003	-0.010	0.008
Parental presence	-0.077	0.234	-0.032	-0.037	0.090	-0.032
Parental education	0.365	0.332	0.202	0.337	0.317	0.317
Parental expectations	0.097	0.120	0.184	0.096	0.120	0.090
Perception of returns to schooling	-0.001	-0.019	-0.004	-0.001	-0.012	0.002
Peer influences	0.045	-0.004	-0.017	0.059	-0.011	0.060
Region	-0.008	0.043	0.023	0.002	0.034	0.010
Sex	-0.034	-0.013	-0.095	-0.017	0.027	-0.061
High-school quality	0.057	-0.065	-0.435	0.167	0.106	0.218
Financial constraints	0.165	0.164	0.289	0.124	0.100	0.132
Method 2						
Explained proportion of gap	0.900	0.935	1.279	0.808	0.792	0.911
Unexplained proportion of gap	0.100	0.065	-0.279	0.192	0.208	0.089
Proportion of gap explained by differences in:						
Mathematics scores	0.159	0.135	0.398	0.085	0.056	0.109
Overall mark	0.119	0.164	0.367	0.073	0.088	0.068
Mastery/self-esteem abilities	0.018	0.024	0.055	-0.001	-0.008	-0.004
Parental presence	0.026	0.041	0.103	-0.006	-0.004	0.042
Parental education	0.224	0.262	0.376	0.191	0.193	0.284
Parental expectations	0.121	0.128	0.129	0.171	0.183	0.105
Perception of returns to schooling	-0.006	-0.009	-0.077	-0.001	-0.006	0.028
Peer influences	0.026	0.019	0.033	0.041	0.039	-0.007
Region	0.049	0.067	0.092	0.033	0.034	0.033
Sex	-0.028	-0.011	-0.099	-0.014	0.023	-0.057
High-school quality	0.055	-0.042	-0.409	0.141	0.105	0.195
Financial constraints	0.138	0.158	0.311	0.096	0.090	0.114
Method 3						
Explained proportion of gap	0.977	1.005	1.139	0.886	0.839	0.931
Unexplained proportion of gap	0.023	-0.005	-0.139	0.114	0.161	0.069
Proportion of gap explained by differences in:						
Mathematics scores	0.159	0.126	0.371	0.098	0.061	0.115
Overall mark	0.134	0.186	0.360	0.077	0.092	0.073
Mastery/self-esteem abilities	0.011	0.031	0.100	0.007	-0.010	0.003
Parental presence	0.000	0.084	0.050	-0.016	0.030	0.017
Parental education	0.335	0.308	0.286	0.267	0.249	0.294
Parental expectations	0.106	0.125	0.159	0.139	0.157	0.099
Perception of returns to schooling	-0.003	-0.011	-0.038	-0.001	-0.010	0.016
Peer influences	0.032	0.008	0.008	0.048	0.017	0.024
Region	0.034	0.059	0.062	0.023	0.028	0.021
Sex	-0.032	-0.012	-0.096	-0.016	0.024	-0.060
High-school quality	0.056	-0.054	-0.421	0.152	0.104	0.210
Financial constraints	0.144	0.155	0.299	0.106	0.096	0.118

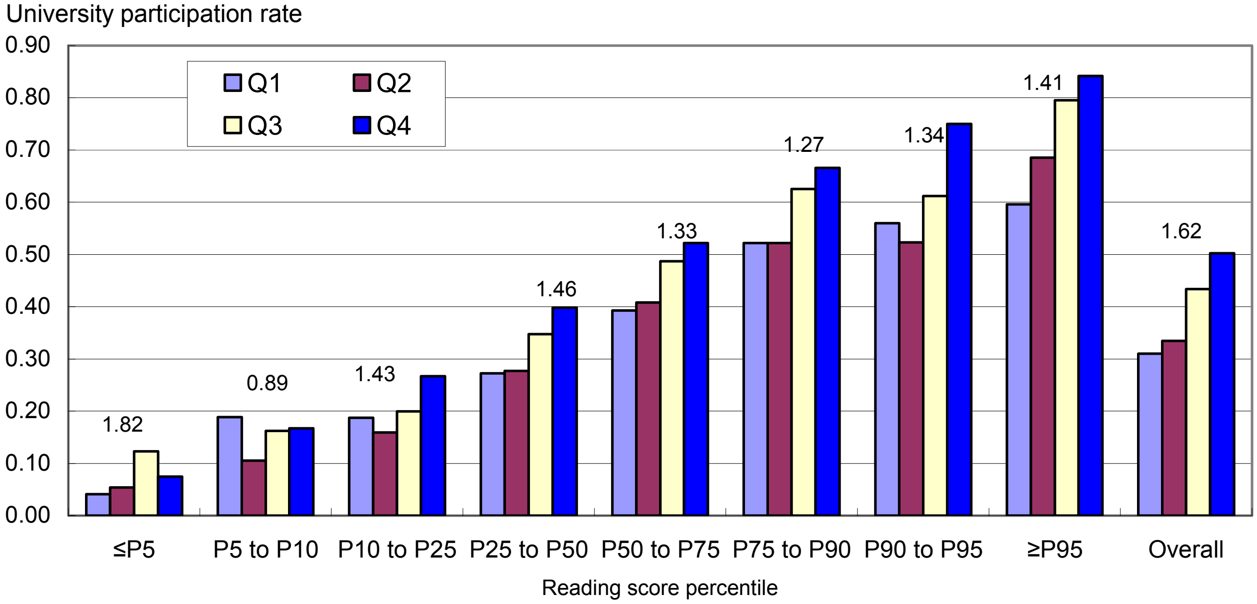
Note: In Method 1, the explained portion of the gap is weighted by the coefficients of the higher income quartile. In Method 2, it is weighted by the coefficient of the lower income quartile. In Method 3, coefficients from a pooled model are used.
Source: Statistics Canada, Youth in Transition Survey, Cohort A.

Table A.6 Decomposition of the university participation gap across parental income quartiles using science score

	Decomposition across parental income quartiles					
	4th−1st	3rd−1st	2nd−1st	4th−2nd	3rd−2nd	4th−3rd
Total gap in university participation	0.223	0.143	0.055	0.168	0.088	0.080
Method 1						
Explained proportion of gap	0.773	0.890	0.788	0.829	0.941	0.741
Unexplained proportion of gap	0.227	0.110	0.212	0.171	0.059	0.259
Proportion of gap explained by differences in:						
Science scores	0.136	0.150	0.274	0.098	0.072	0.146
Overall mark	0.149	0.264	0.324	0.090	0.154	0.051
Mastery/self-esteem abilities	0.026	0.010	0.038	0.026	-0.012	0.021
Parental presence	-0.079	-0.046	0.013	-0.044	-0.024	-0.033
Parental education	0.241	0.233	0.149	0.266	0.268	0.259
Parental expectations	0.145	0.160	0.128	0.131	0.149	0.102
Perception of returns to schooling	0.009	0.012	0.014	0.007	0.003	0.017
Peer influences	0.028	0.019	0.045	0.024	0.021	-0.012
Region	-0.011	0.000	0.005	-0.008	0.007	-0.001
Sex	-0.016	-0.019	-0.034	-0.012	-0.015	-0.008
High-school quality	0.051	-0.031	-0.230	0.151	0.141	0.195
Financial constraints	0.095	0.138	0.062	0.100	0.177	0.004
Method 2						
Explained proportion of gap	0.782	0.807	0.635	0.804	0.876	0.696
Unexplained proportion of gap	0.218	0.193	0.365	0.196	0.124	0.304
Proportion of gap explained by difference in:						
Science scores	0.108	0.111	0.185	0.107	0.075	0.082
Overall mark	0.151	0.178	0.284	0.119	0.124	0.083
Mastery/self-esteem abilities	0.005	0.004	-0.017	-0.019	-0.018	-0.011
Parental presence	0.011	0.019	0.028	0.002	0.008	-0.014
Parental education	0.235	0.235	0.172	0.275	0.283	0.260
Parental expectations	0.119	0.138	0.153	0.090	0.108	0.097
Perception of returns to schooling	0.013	0.012	0.018	0.009	0.002	0.010
Peer influences	0.001	0.004	0.007	0.021	0.055	-0.006
Region	0.023	0.028	0.011	-0.013	-0.009	0.000
Sex	-0.017	-0.022	-0.029	-0.016	-0.020	-0.008
High-school quality	0.059	-0.019	-0.242	0.152	0.125	0.199
Financial constraints	0.075	0.116	0.064	0.077	0.145	0.003
Method 3						
Explained proportion of gap	0.828	0.854	0.709	0.824	0.895	0.721
Unexplained proportion of gap	0.172	0.146	0.291	0.176	0.105	0.279
Proportion of gap explained by difference in:						
Science scores	0.126	0.126	0.232	0.102	0.071	0.118
Overall mark	0.148	0.215	0.302	0.102	0.139	0.069
Mastery/self-esteem abilities	0.015	0.009	0.005	0.002	-0.015	0.004
Parental presence	-0.004	-0.001	0.030	-0.009	-0.007	-0.024
Parental education	0.252	0.237	0.157	0.266	0.270	0.256
Parental expectations	0.130	0.148	0.143	0.108	0.127	0.098
Perception of returns to schooling	0.012	0.013	0.015	0.008	0.002	0.014
Peer influences	0.014	0.008	0.024	0.023	0.039	-0.009
Region	0.013	0.021	0.012	-0.005	-0.001	-0.002
Sex	-0.016	-0.020	-0.032	-0.014	-0.018	-0.008
High-school quality	0.056	-0.026	-0.242	0.155	0.134	0.202
Financial constraints	0.082	0.124	0.063	0.086	0.155	0.003

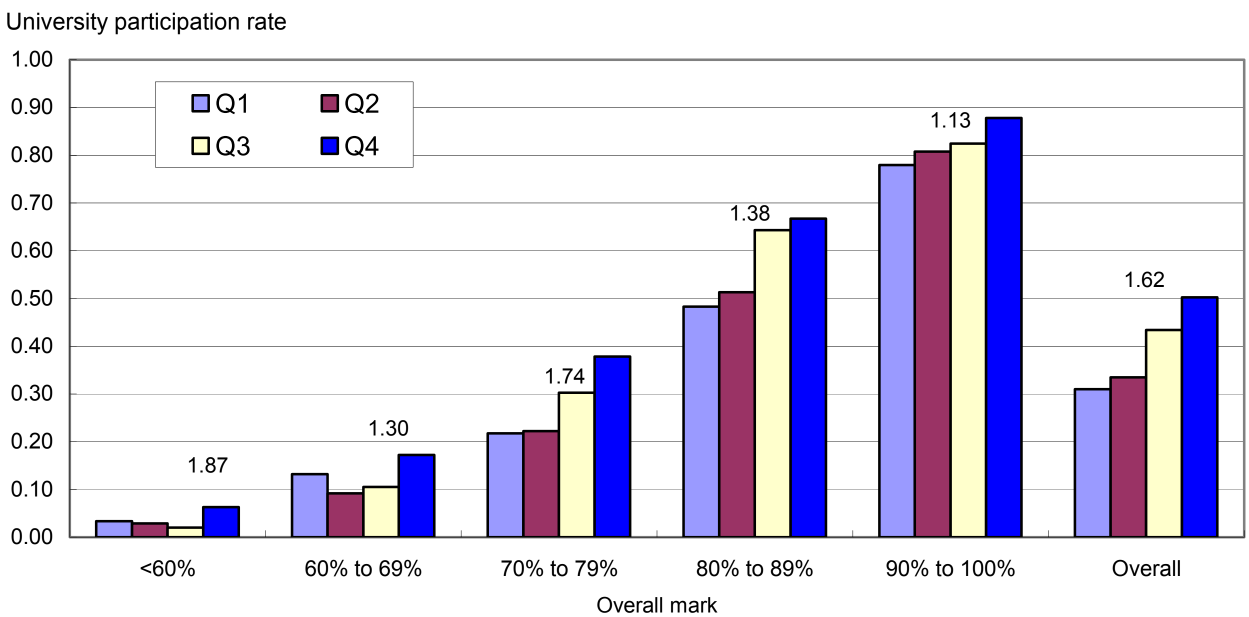
Note: In Method 1, the explained portion of the gap is weighted by the coefficients of the higher income quartile. In Method 2, it is weighted by the coefficient of the lower income quartile. In Method 3, coefficients from a pooled model are used.
Source: Statistics Canada, Youth in Transition Survey, Cohort A.

Figure A.1 University participation rate by reading score percentile and parental income quartile



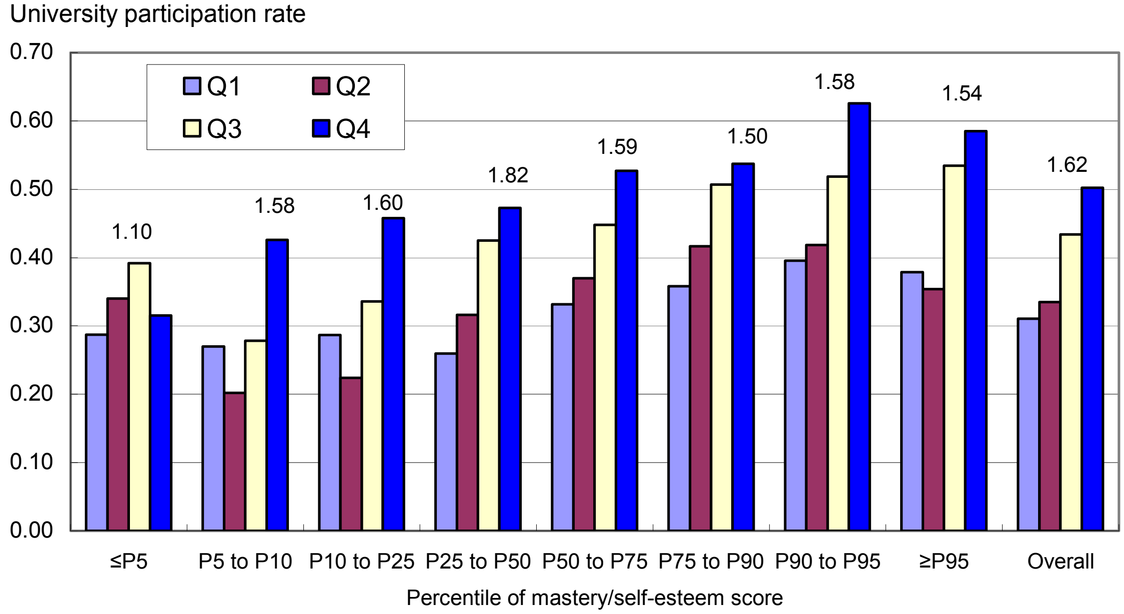
Note: The university participation rates of the top income quartile relative to those of the bottom one are shown above the bars. Percentiles are denoted by 'P.' Quartiles are denoted by 'Q.'
Source: Statistics Canada, Youth in Transition Survey, Cohort A.

Figure A.2 University participation rate by overall mark and parental income quartile



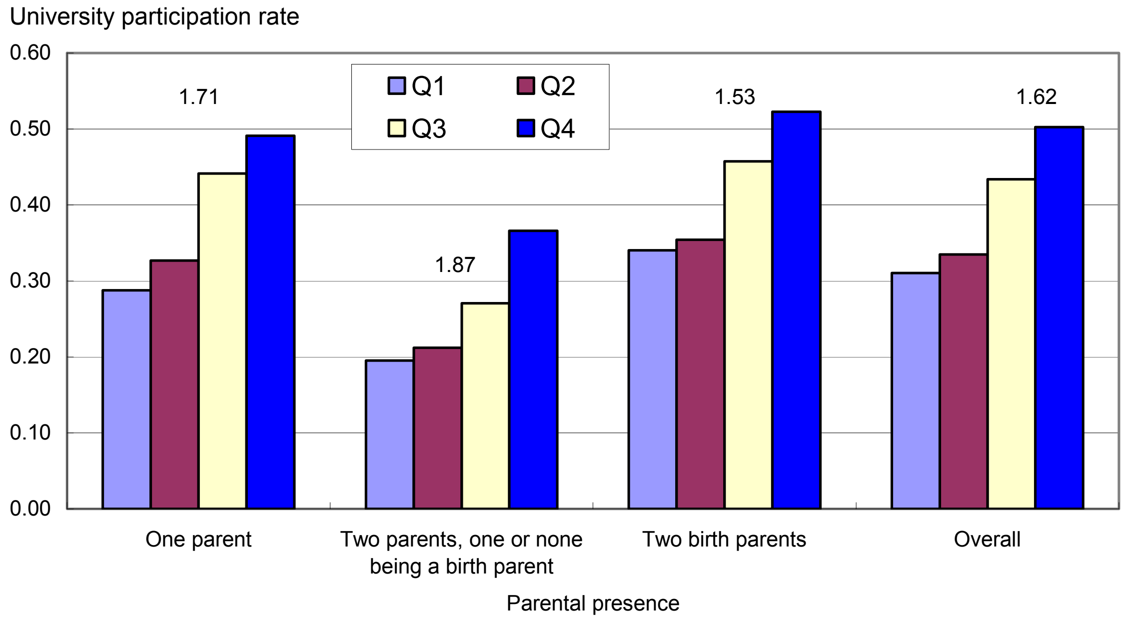
Note: The university participation rates of the top income quartile relative to those of the bottom one are shown above the bars. Quartiles are denoted by 'Q.'
Source: Statistics Canada, Youth in Transition Survey, Cohort A.

Figure A.3 University participation rate by percentile of mastery/self-esteem score and parental income quartile



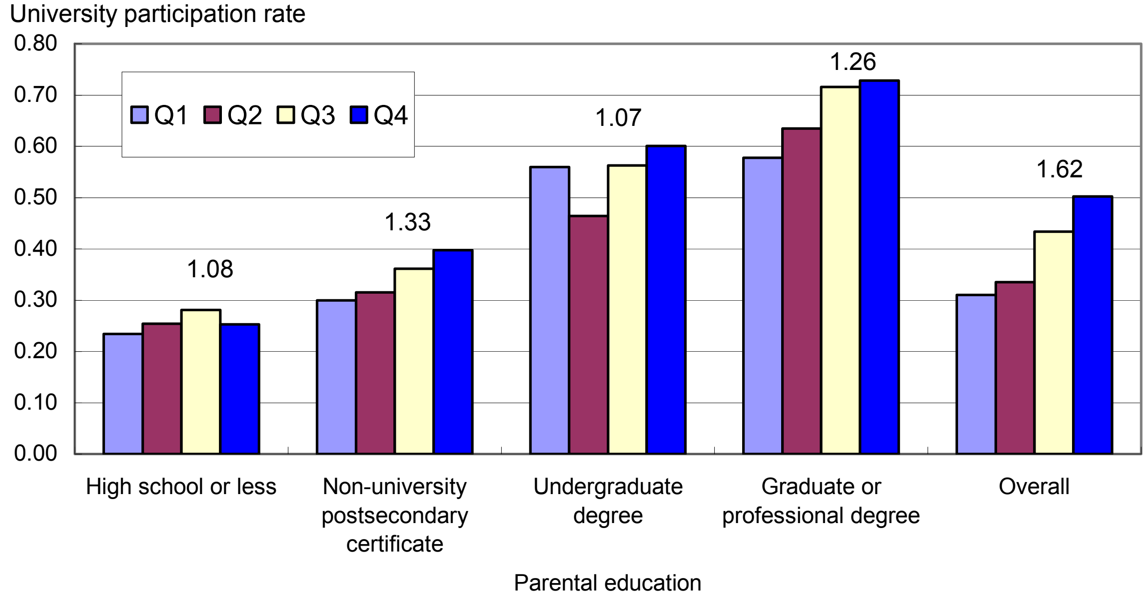
Note: The university participation rates of the top income quartile relative to those of the bottom one are shown above the bars. Percentiles are denoted by 'P.' Quartiles are denoted by 'Q.'
Source: Statistics Canada, Youth in Transition Survey, Cohort A.

Figure A.4 University participation rate by parental presence and parental income quartile



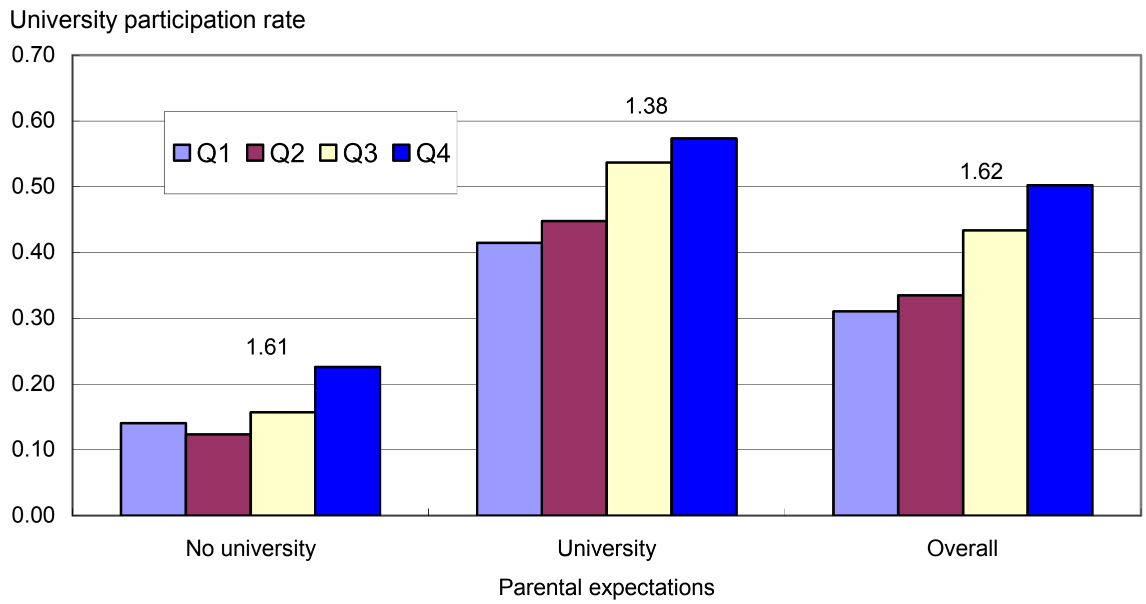
Note: The university participation rates of the top income quartile relative to those of the bottom one are shown above the bars. Quartiles are denoted by 'Q.'
Source: Statistics Canada, Youth in Transition Survey, Cohort A.

Figure A.5 University participation rate by parental education and parental income quartile



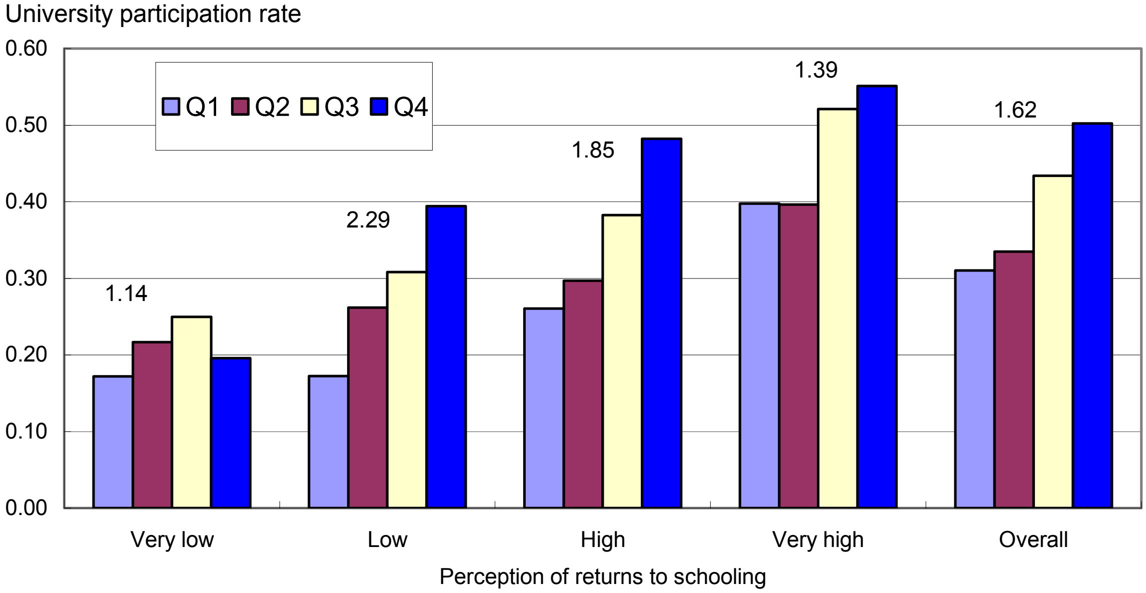
Note: The university participation rates of the top income quartile relative to those of the bottom one are shown above the bars. Quartiles are denoted by 'Q.'
Source: Statistics Canada, Youth in Transition Survey, Cohort A.

Figure A.6 University participation rate by parental expectations and parental income quartile



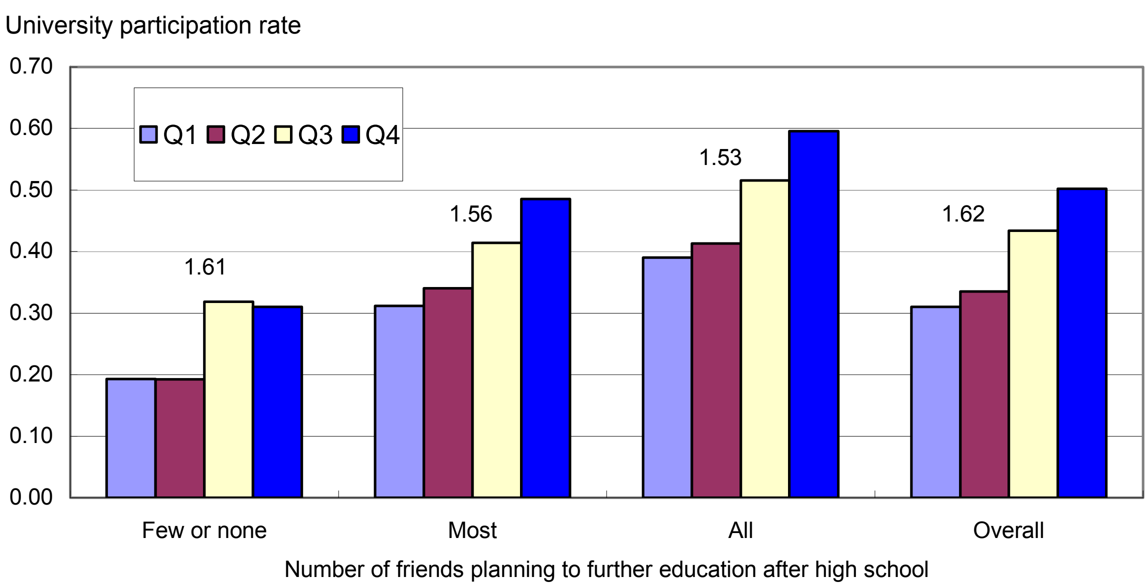
Note: The university participation rates of the top income quartile relative to those of the bottom one are shown above the bars. Quartiles are denoted by 'Q.'
Source: Statistics Canada, Youth in Transition Survey, Cohort A.

Figure A.7 University participation rate by perception of returns to schooling and parental income quartile



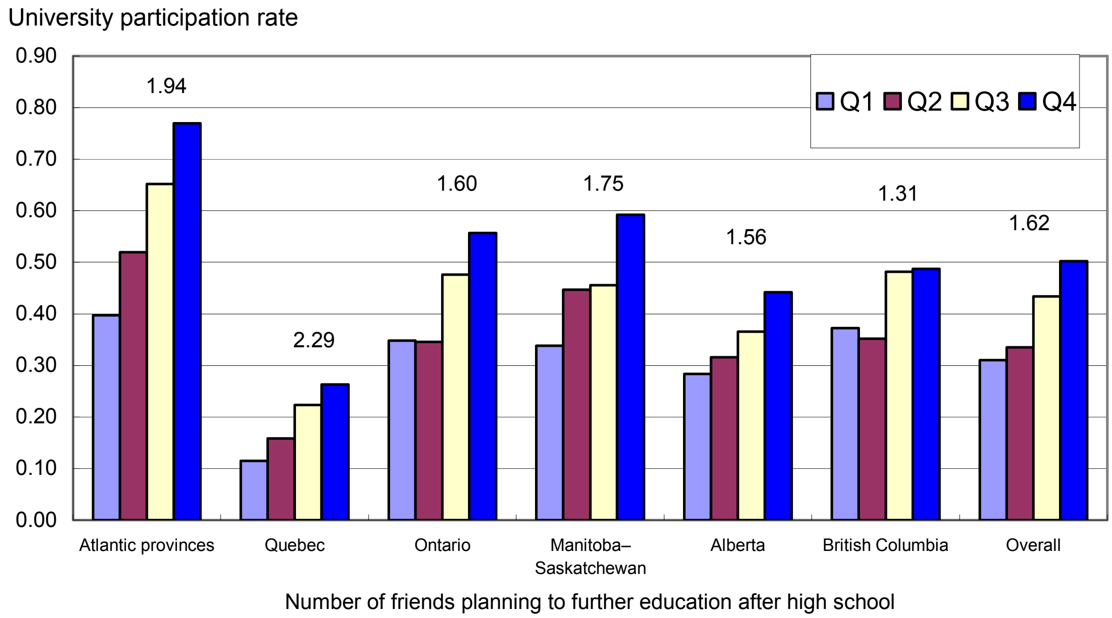
Note: The university participation rates of the top income quartile relative to those of the bottom one are shown above the bars. Quartiles are denoted by 'Q.'
Source: Statistics Canada, Youth in Transition Survey, Cohort A.

Figure A.8 University participation rate by number of friends planning to further education after high school and parental income quartile



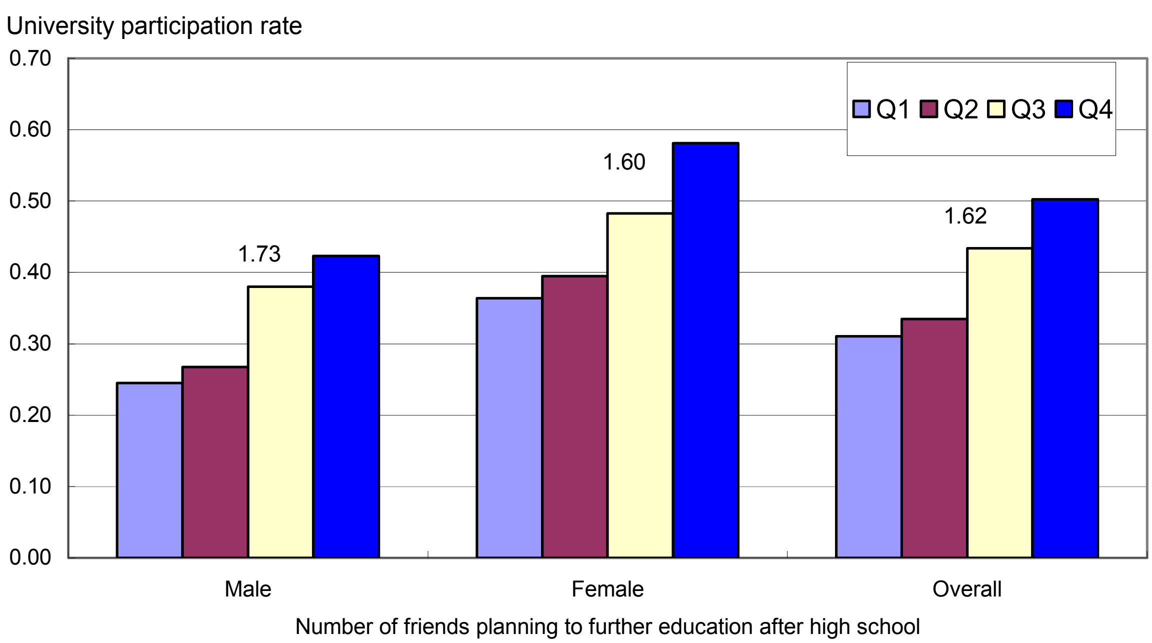
Note: The university participation rates of the top income quartile relative to those of the bottom one are shown above the bars. Quartiles are denoted by 'Q.'
Source: Statistics Canada, Youth in Transition Survey, Cohort A.

Figure A.9 University participation rate by region and parental income quartile



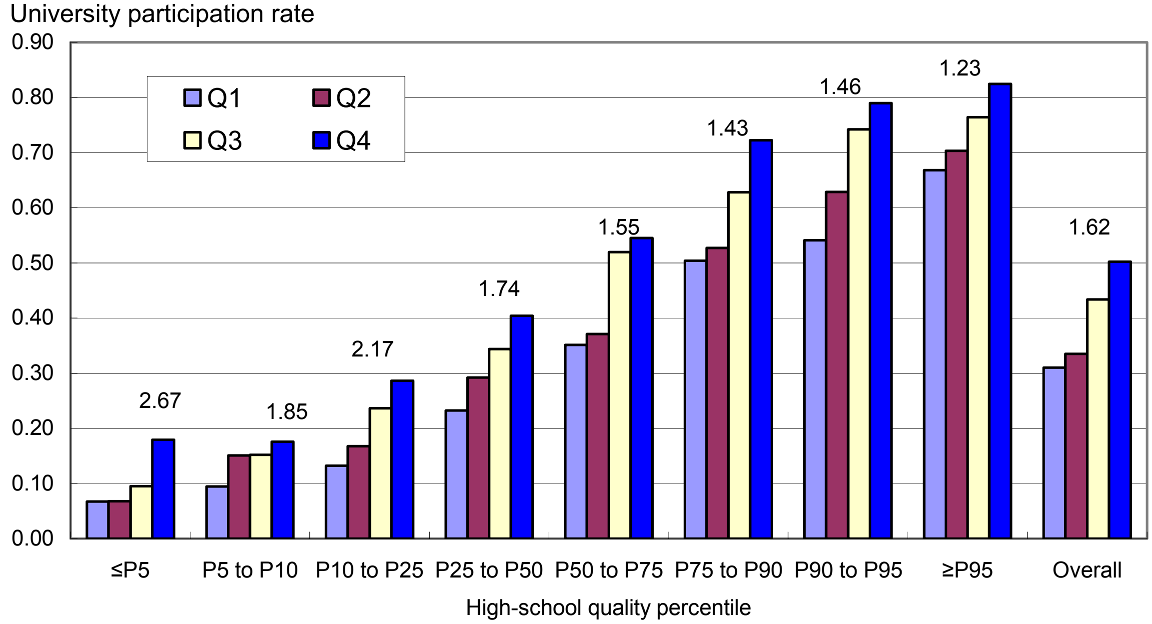
Note: The university participation rates of the top income quartile relative to those of the bottom one are shown above the bars. Quartiles are denoted by 'Q.'
Source: Statistics Canada, Youth in Transition Survey, Cohort A.

Figure A.10 University participation rate by sex and parental income quartile



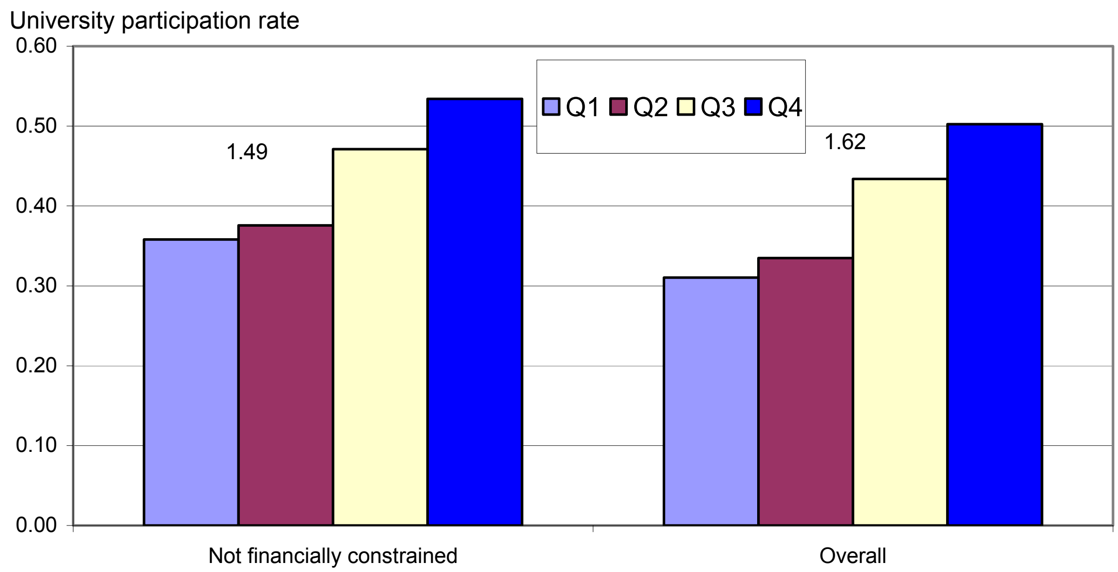
Note: The university participation rates of the top income quartile relative to those of the bottom one are shown above the bars. Quartiles are denoted by 'Q.'
Source: Statistics Canada, Youth in Transition Survey, Cohort A.

Figure A.11 University participation rate by high-school quality percentile and parental income quartile



Note: The university participation rates of the top income quartile relative to those of the bottom one are shown above the bars. Percentiles are denoted by 'P.' Quartiles are denoted by 'Q.'
Source: Statistics Canada, Youth in Transition Survey, Cohort A.

Figure A.12 University participation rate among youth not financially constrained by parental income quartile



Note: The university participation rates of the top income quartile relative to those of the bottom one are shown above the bars. Quartiles are denoted by 'Q.'
Source: Statistics Canada, Youth in Transition Survey, Cohort A.

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