Educational Choices, Subjective Expectations, and Credit Constraints

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Abstract

In this paper we analyze the link between people's "subjective" expectations of returns to schooling and their decision to invest into schooling. We use data from a household survey on Mexican junior and senior high school graduates that elicits their own and their parents' beliefs about future earnings for different scenarios of highest schooling degree. These data allow us to derive measures of expected idiosyncratic returns to schooling as well as measures of individual risk perceptions of earnings and unemployment risk. Therefore we can analyze for two important school attendance decisions, high school and college, whether parents' or adolescents' expectations matter and whether expected returns or risk perceptions are important for these two decisions. We find that both adolescents' and parents' expectations matter in terms of the high school attendance decision, while for the college attendance decision the adolescents' expectations appear to be the relevant ones. These results suggest that adolescents play an important role in the intra-family decision process about human capital investments. While often neglected in the literature, risk perceptions are important predictors for high school attendance decisions. College attendance decisions on the other hand depend on expected returns to college. Making use of our data on subjective expectations, we provide evidence on the existence of credit constraints based on the argument that credit constraints would break the link between expectations and schooling decisions. Our results point towards an important role of credit constraints in college attendance decisions and thus provide one explanation for the large inequalities that can be found in particular in higher education in Mexico.

JEL-Classification: I21, I22, O15

KEYWORDS: Schooling Decisions, Subjective Expectations, Expected Returns, Perceived Earnings and Employment Risk, Credit Constraints, Mexico.

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1 Introduction

The accumulation of human capital has been perceived as a fundamental component of the development process. And yet, for many countries in the developing world, the process has been painfully slow. The pace of human capital accumulation has been particularly slow for Latin America, compared to other countries and regions with similar levels of income and development. Moreover, the distribution of years of schooling and, more generally of human capital, is extremely unequal in the region. Access to higher education, and in particular, college, remains very low among youths coming from poor families, although the returns to college education, as measured by the difference in compensation of individual with college education relative to individuals with less than college, are extremely high and have been increasing in recent years.

There might be many reasons for this type of phenomena. One hypothesis that is often mentioned is the presence of binding credit constraints that prevent the access to credit to finance higher education on the part of poor families. And yet, there is very limited evidence in the literature of the relevance of credit constraints in schooling decisions in Latin America.

For the U.S, many papers have investigated the importance of credit constraints in higher education. Cameron and Heckman (1998), Cameron and Heckman (2001) and Carneiro and Heckman (2002), for example, come to the conclusion that differences in college attendance rates between poor and rich in the U.S. can be attributed to differences in "college readiness". As stated in Carneiro and Heckman (2002), "most of the family income gap in enrollment is due to long-run factors that produce abilities needed to benefit from participation in college." These papers argue that, in the U.S., credit constraints are relatively unimportant by showing that once one controls for ability and parental background measures (which proxy for returns to college and preferences), parental income ceases to have a significant effect on college attendance. The reality of developing countries, however, might be quite different. One important difference between Mexico and the US, for instance, might be the wider availability of scholarships and student loans in the US, which can not be found in Mexico for higher education.[1] It is possible that credit constraints might play a more important role in determining human capital investment choices in developed countries, although other alternatives are possible. And yet, very little direct evidence on the relevance of liquidity constraints in determining human capital investment choices is available in developing countries.

One important aspect in which poor and rich households might differ is in their expectations about their own future returns to schooling and in their perceptions about future earnings and employment risk for different schooling scenarios. Differences in expected returns or perceived risk could be justified and, if correlated with parental income, could lead to a spurious positive correlation between parental income and school attendance decisions. Having data on each individual's

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[1]The conditional cash transfers, such as PROGRESA/Oportunidades, that have received much attention are only available until the end of high school.

distribution of future earnings for different schooling scenarios would enable one to address this concern directly.

In this paper, we use a unique data set from Mexico to provide direct evidence on the role that expected returns to education have on education choices. We also argue that the responsiveness of education choices to its expected return provides evidence on the relevance of credit constraints.

Our data set is unique in several dimensions. First, it contains information on subjective expectations elicited directly from respondents that allows us to derive the entire probability distribution of future earning under a number of alternative scenarios for education investment. Second, we observe education choices for the same individuals whose subjective expected return to education were elicited. This allows us to to model education investment as a function of expected return to education as well as other moments of the subjective probability distribution. Third, we observe expectations held by both mothers and youths. Fourth, our sample, being made of beneficiaries of a welfare programme, is composed of youths from very poor households, who are the most likely to be affected by credit constraints. Finally, our data on expectations and education choices are also complemented by a wealth of data on a wide range of variables, from academic achievement to parental background.

In what follows, we model the decision of youths who have just finished junior high school to enroll (or not) in senior high school and that of youth who have completed senior high school to enroll (or not) in college. We use our subjective expectations data to construct measures of expected returns to education and study the extent to which these expectations affect education choices.

Most papers in the literature neglect the importance of risk as a determinant of educational choice and assume no uncertainty or certainty equivalence (see, e.g., Cameron and Taber (2004) and Carneiro, Heckman, and Vytlacil (2005)). Given the nature of our data, we are able to take into account the perceived risks associated to different investment choices directly and determine whether they affect investment choices. Earnings risk might be particularly relevant for the credit constraints issue, as it might, for example, not be optimal for poor individuals to attend college despite high expected returns, if they face particularly risky college earnings. It should be stressed that our data on people's subjective distribution of future earnings allows us to derive measures of risk perceptions that do not confound "true" risk with unobserved heterogeneity (as would be the case using earnings realizations) and to take into account that ex-ante perceptions matter.

The evidence we obtain on the relationship between schooling choices and expected returns to education speaks directly to the importance of credit constraints. If individual households 'react' to expected returns in making their education choices, one would conclude that credit constraints might be playing a relatively minor role: individuals with relatively high expected returns enroll in school, regardless of their background, maybe because they have enough savings or are able to borrow to cover costs of tuition, transport and costs of living. However, if one were to observe that

the only youths for whom there is a positive relationship between expected returns and enrolment decisions, are those living with the less poor parents, then one would conclude that credit constraints might be playing an important role in determining who attends school. Credit constraints break the link between expected returns (or perceived risk) and the attendance decision. In what follows, we formalize this idea by interacting expected returns with different parental income categories and parental income and wealth quartiles. In the presence of credit constraints, subjective expectations should be significant for higher income categories, but not for lower ones.

Our data also allows us to shed some light on one aspect of intra-household decision processes, that is whose expectations about future outcomes play a role in this process. In particular, we analyze this question in the context of secondary and post-secondary schooling choices. Especially in the case of older children, it is quite likely that the parents are not the only ones who have a say in schooling decisions, because the older the children are the higher the possibility of earning income and becoming fully autonomous. Thus whether and at which age children should be considered as economic agents in household decisions is an empirical issue. This is an important question to address, as not taking into account that also children might be playing a role in household decisions –when they actually do– could lead to deficient explanations of important decisions such as investment into higher education. In our context one might conclude for example that (adolescents') subjective expectations do not matter for schooling decisions, while in fact the ones of the parents' are the relevant ones (or the reverse). Moreover, this issue may have implications for the design of public policy: the program *Oportunidades,* for instance, is considering the possibility to pay part of their schooling grants directly to the youths.

Investigating the link between expectations and investment into schooling, we find that measures of individual subjective expectations of earnings help to predict school attendance decisions: perceptions of future earnings and employment risk are relevant to predict high school attendance decisions, while expected returns to college help to predict college attendance decisions. For high school attendance decisions, both parents' and adolescents' expectations seem to play a role, while for the college attendance decision only the ones of the adolescent seem to be relevant.

Concerning the relevance of credit constraints we find that parental income, wealth and father's occupation remain significant determinants of college attendance decisions even after controlling for perceived returns and earnings and employment risk. Furthermore we find that subjective expectations are significant predictors for rich but not for poor individuals. Thus our results consistently point towards the importance of credit constraints in college attendance decisions, while they seem less relevant in high school decisions, which is consistent with higher costs for college and low availability of fellowships and loans at the level of higher education.[2]

Our paper is part of a recent literature studying data on individual "subjective" expectations,

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whose use has been eloquently advocated by Manski (2004). There is a growing literature using subjective expectations in developing countries (for recent surveys, see Attanasio (2009) and Delavande, Giné, and McKenzie (2009)), for example in the areas of household income expectations by Attanasio, Meghir, and Vera-Hernandez (2005) on Colombia, on risk perceptions of HIV/Aids by Delavande and Kohler (2008), on expectations that farmers have regarding the timing of the onset of the monsoon by Giné, Townsend, and Vickerey (2008) and on migration by McKenzie, Gibson, and Stillman (2007). A paper that has looked at expectations of the return to education is Dominitz and Manski (1996). They illustrate for a small sample of Wisconsin high school and college students that people are willing and able to answer subjective expectations questions in a meaningful way.

The two papers closest to ours are Jensen (2008) and Kaufmann (2008). Jensen (2008) investigates the link between perceived returns to education and investment into schooling using data from the Dominican Republic. He finds that the students in his sample of 8th graders significantly underestimate returns to schooling. Informing a random subset of them about higher measured returns leads to a significant increase in perceived returns and in attained years of schooling among these students. Kaufmann (2008) uses subjective expectations to analyze the importance of credit constraints in college attendance decisions in a more structural setting: she derives expected returns to college for people at the margin of attendance (using a Local Instrumental Variables approach by Heckman and Vytlacil (2005)) and evaluates potential welfare consequences of introducing a governmental student loan or fellowship program. She finds that "marginal" expected returns are higher than average returns of people who already attend college, which suggests that credit constraints are an important obstacle to human capital investments in higher education, and that student loan programs could be welfare improving.

Two papers that take into account risk as a determinant of education choices are Padula and Pistaferri (2001) and Belzil and Hansen (2002). The former employs subjective expectations but aggregates perceived employment risk for education groups to analyze whether the implicit return to education is underestimated when not taking into account effects of different schooling levels on later earnings and employment risk.

The rest of the paper is as follows: section 2 describes the data. Section 3 provides evidence on the quality of the data on subjective expectations, in particular it analyzes how earnings expectations vary with adolescents' characteristics and average earnings in the municipality of residence. Section 4 analyzes, whether expected returns to schooling and perceptions of earnings and employment risk are important determinants of senior high school and college attendance choices and whose expectations matter, the ones of the mother or of the adolescent herself. Section 5 provides evidence on the importance of credit constraints in schooling choices in Mexico. Section 6 concludes.

2 School Choice and Earnings Expectations

The main purpose of this paper is to model schooling decisions of young poor Mexicans and show how they relate to their expectations on the return and risk to that investment. One possible avenue would be the construction of a full dynamic optimization model where individuals choose current activities taking into account current and future benefits and costs of the alternative choices. This type of models have been proposed, for instance, by Keane and Wolpin (1997) and used in a variety of contexts (see for instance, Attanasio, Meghir, and Santiago (April 2005)). In this paper, rather than following this route, we present probit regressions that relate the probability of enrolment to several control variables and subjective expectations. In a structural framework, the entire probability distribution of future earnings under alternative scenarios determines schooling decisions. Here we assume that the effect of this distribution can be summarized by a few moments of the distribution of earnings at age 25. In addition, we control for current labour market conditions through state dummies and for family background and ability through several variables we observe in our data set.

The reduced form probit regressions we present will be informative about three sets of issues. First, they will determine the role played by subjective expected return and subjective measures of risk (such as the variance of future earning and the probability of unemployment) in investment decision. Second, we will study the issue of whose expectations are relevant for schooling decisions. Finally, the analysis of the role of expectations for different groups can be informative about the relevance of liquidity constraints,

In this section, we present our empirical specifications and discuss their usefulness. We start with a basic model, to move to the issue of who makes decisions and, finally, to the consideration of liquidity constraints.

2.1 A Basic Model

We begin with the decision to register in senior high school, having completed junior high. To analyze its determinants, we use the following latent index model for the decision to attend senior high school to be estimated on the sample of junior high school graduates ($S = 1$ if the individual decides to attend and $S = 0$ otherwise):

$$S = 1 \Leftrightarrow S^* = \alpha + \sum_{z=1}^{3} \beta_z * Exp \log Earn_z + \sum_{z=1}^{3} \gamma_z * Var \log Earn_z + \sum_{z=1}^{3} \delta_z * Prob \, of \, Work_z + X'\theta + U > 0. \quad (1)$$

where $z = 1, 2, 3$ denotes junior high school, senior high school and college, respectively. The vector X contains a number of control variables that are likely to affect the schooling decision, ranging from measures of individual ability to parental background and θ denotes the corresponding

parameters. $Exp \log Earn_z$ is the expected value of the distribution of (log) earnings at age 25 under the hypothesis that degree z ($z = 1, 2, 3$) is the highest completed by the youth.

In addition to the expected value of earnings, we also want our empirical model to take into account the possibility that the riskiness of a given investment might affect schooling decisions. For this reason, we enter, as determinants of the schooling decision, the variances of the future earnings under different schooling scenarios $Var \log Earn_z$. As the questions on future expected earnings are conditional on working, we enter the subjective probability of unemployment under different scenarios, $Prob\ of\ Work_z$, as an additional proxy for risk.

One would expect a high perceived earnings risk with a junior high school degree to have a positive effect on the probability of continuing to senior high school, and a high variance of log earnings with a senior high school degree to have a negative effect. On the other hand, for the decision to continue to senior high school, a high variance of log earnings after *college* actually increases the option value of continuing to senior high school, as one can wait for additional information until one has to decide about college and then benefit from a potential upside or still decide not to attend college if the new information points to lower future college earnings. The specification in equation (1) is flexible enough to be able to capture all these aspects.

Obviously, alternative specifications are possible. One might want, for instance, to consider different moments of the probability distribution of future earnings. Another attractive possibility, which we entertain in some specifications we estimate below, is to consider expected returns, rather than expected earnings. Expected returns to college (over high school) would be defined as the expected value of the difference of log earnings with a college degree and log earnings with a senior high school degree. Analogously, the return to high school would be log earnings with a senior high school minus log earnings with a junior high school degree.

An equation analogous to (1) can be used to model the decision to enroll in college taken by youths who have just completed senior high school. The only modification we need to make is that we consider only the distributions of earnings under the two relevant scenarios in terms of completed schooling: high school and college ($z = 2, 3$). This gives us:

$$S = 1 \Leftrightarrow S^* = \widetilde{\alpha} + \sum_{z=2}^{3} \widetilde{\beta}_z * Exp \log Earn_z + \sum_{z=2}^{3} \widetilde{\gamma}_z * Var \log Earn_z + \sum_{z=2}^{3} \widetilde{\delta}_z * Prob\ of\ Work_z + X'\widetilde{\theta} + V > 0, \ (2)$$

In addition to expected returns and perceived risk, we control for individual and family background characteristics and for regional fixed effects. In conventional approaches, ability measures, such as GPA and parental education, are supposed to capture differences in psychological costs of attending college as well as in the ability to benefit from high school or college through higher expected returns.[3] One advantage of being able to control for expected returns directly is due to the multi-dimensionality of skills that can hardly be captured even with good data on test scores, while

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[3]For example, Cameron and Heckman (1998) and Cameron and Heckman (2001) address the question of credit

the individual has idiosyncratic knowledge about these skills. More importantly, what matters for the individual's decision is her perception of her skills and her beliefs about how they affect future earnings, conditional on her information set at the time of the college attendance decision. This provides a strong rationale for using "perceived" returns and "perceived" risk. We control for GPA and parental education to proxy for the probability of completing senior high school or college and to control for preferences for education, both of which turn out to be very important determinants of the two schooling decisions.

Apart from parental income and wealth, we also control for fathers' occupation, as this could have an effect on the ability of families to finance their children's education that is independent of its' effect on the level of family income and wealth. The coefficients on these variables will provide first evidence on the importance of credit constraints in high school and college attendance decisions.

2.2   Whose Expectations Matter for Schooling Decisions, Mothers' or Adolescents'?

In the context of schooling decisions, it is interesting and important to learn more about the decision-making process within the household.[4] Especially for senior high school students, the assumption that all decisions are taken by parents might be too strong. This is relevant from a policy perspective, for example, as it could affect who should receive scholarship money. One goal of this paper is to shed some light on one aspect of the decision process, which is whose expectations matter in schooling decisions. This is likely to depend on the age of the child/adolescent and thus to differ for the decision to attend primary, secondary and higher education, so that one could expect to find different results for the two schooling decisions we are modeling.

If one had data on both parents' and youths' expectations one could address this question from an empirical point of view. In particular, neglecting the variance terms, the model we would want to estimate for both school attendance decisions is as follows:

$$S = 1 \Leftrightarrow S^* = \alpha + X'\beta + \gamma_M * Mothers\prime Expectations + \gamma_A * Youths\prime Expectations + W > 0. \quad (3)$$

As we discuss below, our data does contain some information on the subjective expectations held by mothers. As these data is not as complete as the ones for youth expectations, the estimation of equation (3) involves the solution of a number of econometric problems we discuss below.

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constraints in college attendance decisions in the US by controlling for ability measures, such as AFQT score and parental education, that are supposed to capture differences in how much people can benefit from attending college. They show that as a result parental income loses significance, which they interpret as evidence against credit constraints in higher education in the USA.

[4]See for example Dauphin, Lahga, Fortin, and Lacroix (September 2008) for one of the very few papers that address the question in how far children are involved in household decision processes.

2.3 Liquidity Constraints

As we mentioned in the introduction, the presence of binding liquidity constraints is often mentioned as a plausible explanation of the slow accumulation of human capital among the poor in developing countries. We aim at providing some evidence on the plausibility of this explanation. One possible definition of liquidity constraints is that individuals do not act to exploit an investment opportunity with a high rate of return. Therefore, if we were to find that individual schooling decisions are insensitive to the expected return to schooling, this would constitute evidence that liquidity constraints could be important. An alternative explanation, of course, could be that the data on expected returs are just to noisy to measure anything meaningful.

If we were to find that expectations are important determinants of investment only for some groups of the population and these groups happen to be those that are least likely to be liquidity constraints, then we would have reasonably strong evidence that liquidity constraints are indeed an issue for the education investment of these individuals. For this reason, we also estimate versions of equations (1) and (2) allowing the effect of expected returns to be different for youths with different parental background.

3 Data

The conditional cash transfer program *Oportunidades,* previously known as PROGRESA, has been associated since its inception with attempts to evaluate its impacts. In this spirit, when the program introduced in 2002/3 a new module, known as *Jovenes con Oportunidades,* an evaluation was started for that new module. The data we use was collected in 2005 as part of that evaluation. As we discuss below, in addition to standard variables, the survey contained a detailed information module which we use extensively. In this section, we describe the data and its structure. We also describe in some detail the module used to elicit information on subjective expectations and report some evidence on the quality of these data.

3.1 The Survey

The survey "Jovenes con Oportunidades" was conducted in fall 2005 on a sample of about 23,000 15 to 25 year old adolescents in urban Mexico. The sample was collected to evaluate the component *Jovenes con Oportunidades* of the main conditional cash transfer program in Mexico. *Jovenes con Oportunidades* provides an additional grant to youths in the last three years of high school (preparatoria). This grant is deposited into a bank and can be accessed only upon graduation, if the recipient engages in one of several activities (such as going to college or starting a micro enterprise). Alternatively, the recipient has to wait for a year during which time the amount, about US$300, accumulates at the market interest rates.

The primary sampling units of the evaluation sample are individuals who are eligible for this

program. There are three eligibility criteria: being in the last year of junior high school (9th grade) or attending high school (10 to 12th grade), being younger than 22 years of age, and being from a family that benefits from Oportunidades.

The survey consists of a family questionnaire and a youth questionnaire administered to each household member aged 15 to 25. As a consequence, the youths for whom we have data are not only the primary sampling units but also their siblings, provided they are aged 15 to 25.

The survey provides detailed information on demographic characteristics of the young adults, their schooling levels and histories, their junior high school GPA, and detailed information on their parental background and the household they live in, such as parental education, earnings and income of each household member, assets of the household and transfers/remittances to and from the household . The youth questionnaire contains a section on individuals' subjective expectations of earnings as discussed next.

3.2   The Expectations Module

The subjective expectations module was designed to elicit information on the individual distribution of future earnings and the probability of working for different scenarios about the highest completed school degree. The module starts with a simple explanation of probabilities. In particular, individuals are shown a ruler, graded from zero to one hundred, which is then used to express the probability of future events. The example that is used to illustrate the concept of probability is the event of rain the following day.

After explaining the use of the ruler to express probabilities and having practised that with the rain example, the interviewer moves on to discuss future earnings and the probability of working under different scenarios. The scenarios differ for students graduating from junior high school and those graduating from senior high school. For the former, the interviewer asks to consider three different possibilities: that the student stops at junior high, that the student goes on to senior high, completes it and stops and that the student goes on to college and completes it. For the latter, only two scenarios are considered: that the students stops at senior high school and that the student goes on to college and completes it.

For each of the relevant scenarios, the youth is then asked questions about the probability of working at the age of 25 and about future earnings at age 25. For example, in the case of the last scenario for a senior high school student, the questions are:

1. *Assume that you complete College, and that this is your highest schooling degree. From zero to one hundred, how certain are you that you will be working at the age of 25?*

2. *Assume that you complete College, and that this is your highest schooling degree. Assume that you have a job at age 25.*

   (a) *What do you think is the maximum amount you can earn per month at that age?*

(b) *What do you think is the minimum amount you can earn per month at that age?*

(c) *From zero to one hundred, what is the probability that your earnings at that age will be at least x?*

where x is the midpoint between maximum and minimum amount elicited from questions (a) and (b) and was calculated by the interviewer and read to the respondent.

This type of subjective expectations questions has been used extensively in a variety of contexts. In a companion paper (Attanasio and Kaufmann (2008)), we discuss the internal and external validity of the answers to these questions in our survey. In that paper, we show that respondents seem to have understood the questions reasonably well and that the data pass a number of internal and external validity tests. Below, we briefly report some of these results and refer the interested reader to our paper for further details.

In what follows, we relate educational decisions to subjective expectations. This is possible because of the timing of the survey and because of an assumption we make about the accrual of information about future earnings. The Jovenes survey was conducted in October/November 2005, that is two or three months after high school and college had started and enrolment decisions had been made. To use the subjective expectations for the analysis of high school and college attendance decisions, we have to make the assumption that individuals' information sets have not changed during this short period or, if they have changed, that they left expectations about future earnings at age 25 (i.e. seven to ten years later) unchanged. We believe that this is not a very strong assumption.

Students who graduate from junior high school have usually spend three years with their fellow students and then either continue together to senior high school or stop school. For them it is unlikely to learn more about how their own skills (or other factors influencing future earnings) compare to those of the other students in the two/three months after graduation.

In terms of senior high school graduates deciding about attending college or not, the following two arguments support the assumption: first, individuals learn about their ability relative to their peers before their attendance decision in July/August, because of entrance tests to college in February/March or in June/July, which individuals have to take to be admitted. Results of these tests are made public before the actual college attendance decision.[5] It is unlikely that individuals will learn significantly more about their ability in the first two or three months at university in addition to what they learned from their relative results at entrance exams. Second, additional learning about future college earnings has been shown to happen in the last year(s) of college (see Betts (1996) for evidence on the US) and not in the first few months. This is supported by evidence from our data: there is no significant difference in the cross-sections of expected returns to college for

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[5]Individuals can and usually do take entrance tests at several universities and if they are not admitted, they can continue to take tests at other universities.

students, who just started college, compared to the one of students who are in their second year. On the other hand, return distributions are significantly different for students in higher years.

An additional potential concern is the possibility that individuals try to rationalize their choice two or three months later, i.e. individuals, who decided to attend college, rationalize their choice by stating higher expected college earnings (and/or lower expected high school earnings), and those, who decided not to attend, state lower expected college and higher high school earnings. A similar argument can be made for individuals deciding about high school attendance. To address this concern, we use the cross-section of expected returns of a cohort that is one year younger, i.e. just starting grade 12 (or grade 9 in the case of senior high school) as a counterfactual distribution for the cross-sectional distribution of expected returns of the senior (junior) high school graduate sample before they had to decide about college (high school) attendance. We find no significant differences between the distributions of expected returns, neither for the junior high school graduate sample nor for the senior graduates.[6]

3.3 Calculation of Expected Earnings, Perceived Earnings Risk, and Expected Gross Returns to Schooling

The answers to the three survey questions (2(a)-(c)) (see preceding section) are used, with some additional assumptions, to compute moments of the individual earnings distributions and expected gross returns to college (compare Guiso, Jappelli, and Pistaferri (2002)). As a first step, we are interested in the individual distribution of future earnings $f(Y^z)$ for all three possible scenarios of highest schooling degree, where $z = 1, 2, 3$ denotes having a junior high school degree, a senior high school degree and a college degree, respectively, as the highest degree. The survey provides information for each individual on the support of the distribution $[y_{min}^z, y_{max}^z]$ and on the probability mass to the right of the midpoint, $y_{mid}^z = (y_{min}^z + y_{max}^z)/2$, of the support, $p = Pr(Y^z > y_{mid}^z)$. Thus we need an additional distributional assumption, $f(\cdot)$, in order to be able to calculate moments of these individual earnings distributions, using the three pieces of information on y_{min}^z, y_{max}^z and p.

In Attanasio and Kaufmann (2008), we use three different distributional assumptions, step-wise uniform, bi-triangular and triangular, where the first and latter two represent relatively extreme cases on a spectrum. The last two give more weight to the middle of the support and less to the extremes. The first, instead, implies a relatively large value for the total variance (we rule out the possibility that the density function is U-shaped, giving more weight to the extremes). In our companion paper, we show that the first moment of the individual distribution is extremely robust with respect to the underlying distributional assumption, while the second moment is obviously larger for the step-wise uniform distribution that puts more weight on extreme values. In this paper

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[6]A Kolmogoroff-Smirnov test on equality of the distributions and t-test on means can not reject the null of equality (results from the authors upon request).

we present results based on the triangular distribution, but we perform robustness checks using the other two distributional assumptions and point out differences if they occur.

With an assumption on the functional form of the individual distribution, $f(.)$, we can express expected earnings and variance of earnings for schooling degrees $z = 1, 2, 3$ for *each* individual as follows:

$$E(Y^z) = \int_{y_{min}^z}^{y_{max}^z} y f_{Y^z}(y) dy$$

$$Var(Y^z) = \int_{y_{min}^z}^{y_{max}^z} (y - E(Y^z))^2 f_{Y^z}(y) dy.$$

We will perform the following analysis in terms of log earnings:

$$E(\ln(Y^z)) = \int_{y_{min}^z}^{y_{max}^z} \ln(y) f_{Y^z}(y) dy$$

$$Var(\ln(Y^z)) = \int_{y_{min}^z}^{y_{max}^z} (\ln(y) - E(\ln(Y^z)))^2 f_{Y^z}(y) dy$$

and we can thus calculate expected (gross) returns to senior high school ($z = 2$) and college ($z = 3$) as:

$$\rho^z = E(\ln(Y^z)) - E(\ln(Y^{z-1})).$$

3.4 Mother and Child Expectations

To estimate an equation like (3) and determine whose expectations matter for enrolment decisions, one would need data on both mothers' and youths' expectations. Unfortunately the questions on subjective distributions of earnings were not asked to both mother and children at the same time. However, for all surveyed families mothers were asked a differently phrased question on expected future earnings of her children.

The question on mothers' expectations about future earnings of her children was phrased in the form of point expectations:
Assume that the adolescent finishes Junior High School (Senior High School/College), and that this is his/her highest schooling degree. Assume that he/she has a job at age 25.
What do you think can he/she earn per month at that age?

While this information is certainly useful, the fact that the question is framed in a completely different way from the questions asked to the youth raises a number of issues. First, one has to rely on the point expectation without being able to compute any moment of the distribution. Second, one is not even sure which measure of location of mothers' earning distribution this question answer and how it relates to the mean. However, an additional feature of the data allows us to address, to a certain degree, this second issue.

The interviewer visited the primary sampling units and their families in October and November 2005 and interviewed the household head or spouse using the family questionnaire and youths

between age 15 and 25 using the "Jovenes" (youth) questionnaire. If a youth was not present, the household head or spouse answered the Jovenes questionnaire as well. As a result, for almost half the sample, the questions on the subjective distribution of future earnings were not answered by the youth herself. Instead mothers stated their expectations about future earnings of her child(ren) that are not present during the interviewer's visit. For this part of the sample, therefore, we have both point expectations and the probability distribution of future earnings perceived by the mother. In a companion paper (Attanasio and Kaufmann (2008)) we study extensively how mothers' points expectations of future earnings relate to mothers' expected earnings as derived from the subjective probability distribution. Here, we report some evidence on this issue in Section 4.3.

The fact that for half the sample the earnings expectations questions were answered by youths, while for the other half the questions were answered by the mother allows to address another important issue. If subjective expectations of mother and youths were objective and rational expectations based on the same information, it would not matter who would answer (and the issue of whose expectations matter would be a moot one). It is therefore interesting to establish, whether the expectations of future earnings are systematically different depending on who answered the question.

In Section 4, we compare the expectations of mothers and youths (both asked in the form of a distribution of earnings) and find that they are systematically different, even after controlling for observable characteristics. These differences can arise either because the questions answered by the mother and by the youth are measuring two different and distinct objects (the subjective probability held by the mother and the subjective probability held by the youth) or because the sample of youths absent from the interview (and for whom the question is answered by the mother) is systematically different from those present during the visit.

We correct for the possibility that the differences are induced by systematic differences in who answers the question using the standard Heckman two-step approach for sample selection (see Heckman (1979)) or an analogous procedure in the case of the binary outcome variable "attend high school (college)". In our context we have a set of variables that determine the probability that the question is answered by the youth rather than the mother and that, plausibly, does not affect the answer of either: information on the timing of the interview (week of the year, day of the week and time of the day). These variables are strongly significant determinants of who is the respondent (see Table 12 in Appendix B).

3.5 Some Descriptive Statistics

3.5.1 Individual and Family Background Characteristics

Table 1 reports summary statistics of individual and family background characteristics. We present results separately for the two samples of mother and adolescent respondents to investigate whether there are potential sample selection problems, and also separately for the two cohorts of junior and

senior high school graduates.

About 53% of the adolescents are female and females are particularly over-represented among adolescent respondents, i.e. they are more often at home during the interviewer's visit and can thus answer the youth questionnaire themselves.

In what follows, we make use of data on GPA (grade point average between 0 and 100) of junior high school as a proxy for cognitive skills. Table 1 shows that individuals of the older cohort have a higher GPA than those of the young cohort, possibly reflecting the fact that the senior high school graduates ("old" cohort) are a self-selected sample compared to the junior high school graduates ("young" cohort) who might or might not attend and finish senior high school. In the case of the young cohort, there are significant but small differences between the sample of mother and adolescent respondents with higher GPA for the "mother sample".

We create three per capita income categories, where the thresholds are equal to twice and four times the minimum wage and thereby correspond to eligibility criteria for fellowships.[7] About half the sample is in the lowest income category and thus relatively poor –reflecting the fact that our sample only consists of adolescents from Oportunidades families–, while 30% are in the second highest and the remaining 20% in the top income category. For the old cohort the sample of mother respondents is slightly less poor.

To control for parental education as one the most important determinants of children's schooling choices, we use information on parents' years of completed schooling in the form of four education dummies for both mother and father (unless the household is single headed): for primary education, junior and senior high school and university. About 70 to 80% of mothers and fathers have only some primary education, while around 20% have attended junior high school. Fathers' education is slightly higher than that of mothers: about 5-6% have attended senior high school (3% for mothers) and 1-2% have some university education (less than 1% for mothers). Comparing the youth and the mother sample, parents are slightly more highly educated in the youth sample.

In terms of father's occupation, 38% of fathers are unskilled workers, another 36% employees and around 22% are self-employed. 3% of fathers are family workers and 1% are employers. Fathers in the youth sample are significantly less likely to be unskilled workers or self-employed and more likely to be employees.

To conclude: the features of the sample reflect that we are working with families that are beneficiaries of a welfare program targeted to the poorest sector of Mexican society. There are some (usually small) but significant differences in individual characteristics and family background variables between the subsample where the earning expectations questions were answered by youth and the subsample where it was answered by the mother, pointing towards a potential sample selection in our analysis of these questions. We now turn to differences in subjective expectations.

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[7]See Appendix B for a detailed description of which income measures were used and how and why we constructed the described per capita income categories. In addition we use an index created from information on family income and wealth (see Appendix B).

3.5.2 Subjective Expectations

Table 2 presents summary statistics for expected log earnings, expected (gross) returns, perceived earnings and employment risk for three different schooling degrees, junior and senior high school and college. We also report statistics on the skewness of the individual distributions. We summarize these measures separately for the two cohorts of junior and senior high school graduates, and separately for mother and youth respondents. While the first four columns refer to the main sampling unit, the last column also includes their siblings aged 15 to 25, for whom we have information.

Not surprisingly, but reassuringly, expected log earnings increase in schooling level (see Table 3 for a comparison with Census earnings). Mother's expectations about future earnings of her children are significantly higher than the expectations for the adolescent sample.

Gross returns to schooling –measured as difference between expected log earnings of two consecutive schooling degrees– are large and larger for college than high school (again see table 3 for comparison with Census data). Mothers' and youths' responses are only significantly different for returns to senior high school.

Standard deviations of log earnings are one possible measure of (perceived) earnings risk and commonly used for measuring risk in the case of observed earnings. It is important to point out that having information on the individual earnings distributions (e.g. in the form of minimum, maximum and probability above the midpoint) allows us to derive a measure of "true" risk, while using the variability of observed earnings data will confound risk with unobserved heterogeneity. Moreover, observed variability will not distinguish between predicted and unpredicted changes. Perceived earnings risk is higher for adolescents in the cases of junior and senior high school earnings. Interestingly, perceived earnings risk (conditional on having a job) decreases in completed schooling degree.

In addition to earnings risk people face the risk of unemployment. As with earnings variability, the probability of unemployment decreases in completed schooling degree. Thus lower income risk could be another important motivation, in addition to higher expected earnings, for achieving higher schooling. Again there are significant but small differences between youths and mothers (less than 2 percentage points).

Lastly we summarize skewness of the individual earnings distributions: On average individual earnings distributions are left-skewed (i.e. the probability to have earnings above the midpoint is larger than 0.5) and increasingly left-skewed with increasing schooling level. The only significant difference between mother and youth respondents is for junior high school earnings.

Note that there is a considerable amount of heterogeneity in expectations, as reflected by standard errors in brackets. This still holds after controlling for an extensive set of individual and family background characteristics (see Tables 4 and 5) reflecting the importance of unobserved heterogeneity in cognitive and social skills and differences in information sets e.g. about skill prices.[8]

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[8]An alternative explanation is that the remaining "heterogeneity" reflects noise. But we show that subjective

4 Validation of Expectations Data.

Before using the data on subjective expectations to model schooling choices, we provide some evidence on their quality. Further details on internal and external validity checks are contained in the companion paper Attanasio and Kaufmann (2008). Firstly, we compare the two different expectation measures (the one derived from subjective earnings distributions and the point estimates in terms of levels) to data on Census earnings. Secondly, we test how expectations vary with individual and family background characteristics and with average earnings in the municipality of residence. Finally, we regress mothers' expectations from the questions on individual distributions on mothers' point expectations and again an extensive set of controls to compare the two different ways of asking expectations questions.

4.1 Earnings Expectations Based on Different Ways of Eliciting Expectations and Observed Census Earnings

Table 3 compares expected earnings based on the questions about the individual distribution of earnings, mothers' point expectations about future earnings of her children and Census data. We have already discussed how we compute expected (log) earnings and the nature of the question on mothers' expectations. The Census data refer to the year 2000 and are the average log earnings (by gender and by schooling degree) in the municipality of residence of each youth in the sample. While the expectations questions refer to earnings at age 25, we use earnings of individuals who are between 25 and 30 years old to get a sufficiently large sample size (for each municipality).

While the comparison between the subjective expectations data and the Census data is certainly informative, if nothing else to check whether the subjective expectations data are roughly of the same order of magnitude, a direct comparison and a formal test of equality between the two would be misleading. There are many reasons why the Census data and the subjective expectations would be different. First, the former refer to a specific year (2000) and are therefore affected by specific aggregate shocks that might have been relevant in that year. To test some version of Rational expectations, one would need several years of realizations to average out aggregate shocks. Second, the data refer to individuals who were between 25 and 30 in 2000 and therefore belong to a different cohort from the individuals whose expectations were elicited in our survey. Finally, the Census data report realizations for individuals who self-selected into a specific education level and do not contain "counterfactual" earnings, which are instead elicited in the expectations questions.

From these considerations, it should be clear that to establish whether the elicited expectations are 'rational' is probably impossible. And, in a sense, it is not too important: for modeling education choices what matters is whether the elicited expectations reflect the subjective expectations that

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expectations are able to predict schooling choices even after controlling for an extensive set of individual and family background characteristics. This suggests that at least part of the heterogeneity captures factors, such as skills, which influence expected earnings.

people base their decisions on.

Table 3 shows that average log Census earnings for junior high school lie in the interval between average expectations based on mothers' point expectations and those based on the distribution of earnings, where the former are significantly larger than the latter. Expected log senior high school earnings based on distributions are similar to observed earnings, while those based on point estimates are larger. Independent of the measure of expectations, mothers and adolescent respondents expect a rise of college earnings in the future which is consistent with a continuation of recent trends. In terms of recent developments, people have seen a slight fall in real terms of earnings for lower skilled jobs, thus their expectations of junior high school earnings that stay constant (or slightly fall) is not inconsistent with recent evidence (see Binelli (2008)).

As for the different measures of subjective expectations, Table 3 shows that there are large level differences between expectations based on point estimates and those that are based on the earnings distributions, in particular for lower schooling levels. Implied returns to high school and college are smaller when based on expectations from point estimates and in this case are relatively close to observed returns.

Nevertheless, it is worrisome that expectations differ quite substantially depending on how the questions were asked. Yet if this only represents a shift in the level, but both measures capture unobserved heterogeneity in expectations (e.g. due to unobserved skill differences and heterogeneity in information sets) in a similar way, then this does not pose a major problem for our analysis of the role of expectations in schooling choices. In Section 4.3, we provide some evidence on this question: we will show that even after controlling for individual and family background characteristics and Census earnings in the municipality of residence, mother's point expectations and her expectations based on distributions are still strongly correlated suggesting that both measures are able to capture important unobserved individual differences.

4.2 Predictors of Earnings Expectations: Individual and Family Characteristics and Local Earnings.

In this subsection we relate subjective expectations to various observable variables. While the results we obtain are not intended to be interpreted as estimates of a behavioral model of expectation formation, it is of substantive interest to learn how earnings expectations vary with individual attributes. Why should individual characteristics and family background be able to predict expectations? Rational expectations would imply that the same factors that predict actual earnings also predict expectations (conditional on these factors being in the information set of the individual). For example people with higher test scores have been shown to have higher earnings. Thus more able people should also expect higher earnings, if they are rational and know that they are able.

A comparison of the relation between subjective expectations and observable variables on the one hand, and actual earnings and the same set of variables on the other hand, could be seen as a

test of rationality. We should remember, however, that a formal test of rationality would be difficult due to the same issues that we discussed when presenting the comparison of (unconditional) means. Moreover, as we mentioned above, subjective expectations do not have to be rational to be valid or useful. Having said this, however, we would expect people to draw inferences about their own potential earnings from what they observe from others (at least to some degree). Thus finding that expectations vary with observable characteristics in a way similar to observed earnings lends support to their validity.

To pursue this line of investigation, in Tables 4 and 5 we regress expected individual earnings on a number of individual, household and municipality level variables. Table 4 refers to the young cohort, while Table 5 refers to the older one of youths finishing senior high school. In both Tables we report separate regressions for answers provided by the youth and answers provided by the mother. As discussed above, we correct for the possibility of selection bias using a standard Heckman selection model, where the exclusion restriction in the equation that determines who gives the answer are variables capturing the timing of the interview. In Table 4, which refers to the younger cohort, we report the regressions for expected earnings under the three possible scenarios about completed schooling at age 25 for this cohort. In the case of the old cohort, whose results are in Table 5, there are only two possible scenarios, as these youths have just completed senior high school.

The municipality level determinants of subjective expectations we consider in our regression are average (log) Census earnings in the municipality of residence for the three schooling levels we are considering (junior high school, senior high school and college). These variables are meant to capture local labour market conditions and differences. The individual variables we add to our regression are gender and GPA. Finally, the household level variables we consider are dummies for mothers' education, for per-capita income and for fathers' occupation.

Starting with Table 4, we notice that the coefficients have, by and large, the expected sign. Municipality average earnings by education level (and gender) seem to be very important. The fact that the gender dummy is not significantly different from zero in any of the specification is not surprising in the light of the fact that the average earnings variable we have in the regression are gender specific: a negative coefficient on such a dummy, therefore, would imply that women systematically expect lower earnings than what they observe in terms of women's earnings in their municipality.

An interesting feature of Table 4 are the differences between the regression for mother and youth earnings expectations. The size and sometimes even the sign of some coefficient is systematically different between the two regressions. Interestingly, GPA averages seem to be much more important in the mothers' expectations than in the youths' ones. The same is true for household income and father occupation. Higher parental income and having a father who is employer is also correlated with higher expected earnings, potentially resulting from parents who are better "connected" or

might be able to employ their children themselves. The inverse Mills ratio seems to be significant (and strongly so) only in the youth regressions.

Moving to Table 5 for the older cohort, we notice once again the importance of the Census average earnings data by gender and municipality. This time the female dummy is significantly negative in the youth equation for Senior High school expected earnings. The GPA is relevant (in both mother and youth regressions) for college earnings but not for high school earnings. Finally, fathers' education is significant in the youth equation but not in the equation for mothers. In some instances having a mother with some university education is negatively correlated with junior and senior high school earnings, which is hardly consistent with evidence on realized earnings and might have some behavioral explanation (see Attanasio and Kaufmann (2008) for a more detailed analysis). Finally, as with the previous table, the inverse Mills ratio seems to play a more important role in the youth equation, although it is not strongly significant this time.

4.3 Earnings Expectations Based on Point Estimates and on Subjective Distributions of Earnings

In Table 6 we report the coefficients of a regression of mother's expected earnings (derived from the elicited probability distribution) on her point expectations, an extensive set of individual and family background characteristics and on average earnings (by gender) in the municipality of residence. The results show that the two measures of expectations are strongly correlated, even after controlling for all the observable variables we consider. This evidence suggests that both measures capture important unobserved individual differences arising for example from unobserved heterogeneity in skills and information.

5 School Choices: the Role of Earnings Expectations and Risk Perceptions

In this section, we show that individuals' expected returns to schooling, employment probabilities and perceived earnings risks for different schooling scenarios are important predictors of their educational decisions. As mentioned above, we also investigate whose expectations are relevant for schooling decisions: the ones of the parents or the ones of the youths.

We present the estimation results on the two subsamples we consider: youths deciding whether to enrol in senior high school having completed junior high and youths deciding whether to enroll in college, having completed senior high school.

As discussed in Section 3.4, we control for potential sample selection stemming from the fact that the sample of youths who completed the youth questionnaire themselves is not a representative one, by adding a selection equation that determines, whether the respondent is the adolescent or

not, $R = 1$:

$$R = 1 \Leftrightarrow R^* = \delta + X'\kappa + Z'\lambda + \epsilon \geq 0, \tag{4}$$

where the vector of variables Z reflects a set of variables (week of the year, day, time of the day and interactions between day and time of the day when the interview was conducted), which are assumed to affect the probability that an adolescent answers the expectations questions herself, but not to affect earnings expectations. We estimate the participation equation (4) jointly with the schooling choice equation, assuming that the latent errors of these two equations are bivariate normal and independent of the explanatory variables with a zero-mean normal distribution and unit variances (see Table 12 in Appendix B).

This analysis has two important caveats. First, we concentrate on one aspect in intra-household decision-making that has rarely been investigated, that is what is the role of the adolescent compared to her parents. Children most likely do not have exactly the same expectations of their own potential future earnings as their parents, but similarly mothers' and fathers' expectations are unlikely to be the same. Nevertheless, our data can provide some interesting insights into this question. For example we find that for the high school attendance decision mothers' and youths' expectations matter, while for the college attendance choice only the youths' appear to be relevant. This points towards the importance of taking into account expectations of both parents and children, in particular in post-secondary education decisions, and suggests that further research in this area is warranted.

A second potential problem could result from using expectations for mothers and adolescents that are elicited in different ways and thus one measure might be more noisy and less able to capture "true" perceptions than the other. Yet the following results provide some evidence against this concern: we find that for high school decisions mothers' expectations are particularly important, while for college attendance the ones of the adolescent matter. This suggests that the results are not driven by one measure being more noisy. This line of argument is also supported by the summary statistics in Table 3 that show that there are no significant differences in the "noisiness" of point expectations and expectations based on distributions.

5.1 Results

5.1.1 High School Attendance Choice

Mothers' as well as adolescents' expectations seem to matter in high school attendance decisions, in particular expected college earnings are significantly positively correlated with the decision to attend high school (see first column of Table 7).

Individual and family background variables have the expected signs: the probability of high school attendance is increasing in GPA and in mothers' and fathers' education. Having a father who is a family worker has a significant negative effect. Parental income is not significant, thus

not supporting the hypothesis of credit constraints in high school attendance decisions, which is consistent with free public secondary education.

5.1.2 College Attendance Choice

Tables 8 and 10 presents results for the college attendance decision. Expected senior high school earnings (and expected returns to college) are a significant predictor of college attendance decisions. But only the ones of the adolescent seem to matter, as mothers' expectations are insignificant and the coefficient only about a third of the one on expected returns of the adolescent.

Again controls for the probability of completing college and for non-monetary preferences for education, such as GPA and parental education, are highly significant.

In the college attendance model we also add measures of direct costs of attending college, such as distance to the closest university and tuition costs, which have a highly significant negative effect (for the data source and construction of the data, see Kaufmann (2008)).

In contrast to the high school attendance decision, per capita parental income (the top category) is now strongly significant in the decision to attend college. In addition having a father who is self-employed has a strong negative effect. The income of a self-employed individual is likely to be more risky than that of an employee or employer, which affects the planning security of how to finance several years of higher education. Fathers' occupation will also affect his likelihood of receiving loans from a bank, e.g. to finance college education of his children (though it will in general be very difficult to receive loans for human capital investments due to moral hazard problems and lack of collateral).

Thus both results are consistent with credit constraints, as parental income and father's occupation both directly or indirectly affect the ability to finance education. We will investigate the question of credit constraints in more depth in Section 6.

5.2 What Matters for Schooling Decisions, Expected Returns or Risk Perceptions?

As we only have point estimates for mothers' expectations, we can not include risk perceptions for both mothers and adolescents. Results from the last section suggest that for high school decisions both mothers' and adolescents' expectations matter, while for college attendance decisions the adolescent's expectations seem to be the ones that are relevant.

Therefore we estimate schooling choices including measures of employment and earnings risk perceptions in the following way: for the senior high school decision we show results for both samples, the one with mother and with adolescent respondents, while keeping in mind that the coefficients on subjective expectations in either sample are likely to be driven in part due to omitting the expectations of the other "party" (as mothers' and adolescents' expectations can be shown to be correlated, see companion paper Attanasio and Kaufmann (2008)).

In terms of the college attendance decision we present results for the adolescent sample, as we only found the adolescents' expectations to be significant.

5.2.1 High School Attendance Choice

Table 9 suggests that perceptions of earnings and employment risk are important predictors of high school attendance decisions: If people perceive senior high school earnings to be particularly risky, they are more likely to stop school after junior high school. At the same time the probability of attending high school is increasing in the perceived probability of having a job after completing a college degree, as attending senior high school generates the option to go to college and benefit from high employment probabilities.

These results underline the importance of taking into account risk perceptions in the analysis of schooling choices, which, as we discussed in the introduction, has been largely neglected in this literature. Data on subjective distributions of future earnings has the important advantage of delivering measures of individual risk perceptions that do not confound unobserved heterogeneity with "true" risk and take into account that ex-ante perceptions matter.

5.2.2 College Attendance Choice

For college attendance decisions, expected returns seem to be more relevant than risk perceptions (see table 10).

We present results of two different specifications: one includes per capita income categories and the other one dummies for parental income and wealth quartiles (see Appendix B for a detailed description). In both specifications (and all previous specifications) the highest income category and the highest income and wealth quartile have a strong positive effect on college attendance. In addition having a self-employed father has a significantly negative effect. Thus our results consistently point towards the relevance of credit constraints in higher education decisions among poor Mexicans. We will investigate this question further in the next section.

6 Some Evidence on Credit Constraints

The former two sections have shown that parental income and father's occupation –both of which determine the availability of resources and the ability to collateralize and receive loans– are important predictors of the college attendance choice. Interpreting the significance of parental income as a sign for credit constraints usually raises the concern that parental income is significant only because it picks up unobserved ability that affect future earnings expectations or differences in information about skill prices for example. Using data on quantitative subjective expectations, we have addressed this concern by controlling directly for people's expectations of future returns

to schooling and for their risk perceptions, thus providing a strong case of further analysis of the importance of credit constraints in college attendance decisions.

This is true to a much lessor extent for the decision to attend senior high school, which is consistent with significantly lower costs of attending high school, and with the fact that Mexico provides fellowships for high school attendance, while fellowships and loans for college attendance played only a very minor role in 2005.[9]

To analyze the evidence of credit constraints more closely, we make use of the following idea: The former section illustrated that subjective expectations are important determinants of educational choices. But expectations can only be a predictor for schooling decisions if individuals are not credit constrained. Credit constrained individuals have high expected returns to schooling, but do not continue schooling, because they cannot afford it due to low family income/wealth and the inability to borrow for human capital investments. Thus credit constraints will break the link between expected returns and the educational choice. We formalize this idea by interacting expected returns with different parental income categories and parental income and wealth quartiles. In the presence of credit constraints, subjective expectations should be significant for higher income categories, but not for lower ones.

Table 11 illustrates that expected returns to college have a large and significant impact only for per capita incomes above 5,000 pesos and for the two highest parental income/wealth quartiles.[10] Again having a father who is self-employed has a significant negative effect. These results and evidence from previous sections is consistent with credit constraints playing an important role in college attendance decisions.

At the same time further investigation in this important issue is needed, as there could potentially be explanations other than credit constraints that explain why poor individuals are not very responsive to expected returns. Furthermore, to give informed policy recommendations it is important to evaluate welfare implications of government policies such as fellowships or student loan programs.[11]

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[9]Public schools are free of tuition and transport costs (or costs-of-living) are smaller as people usually live within short distance of a high school, which is not necessarily true for universities. Conditional cash transfers from Progresa/Oportunidades were extended to senior high school attendance in 2002, while higher education is underfinanced even compared to other Latin American countries (see Kaufmann (2008) for further background information on Mexico's higher education system and financing of higher education in Mexico).

[10]It is important to point out that the support of expected returns is largely overlapping for the poor and the rich and mean returns to college are not significantly different. Kaufmann (2008) shows that low college enrollment of the poor cannot be explained by lower expected returns of the poor.

[11]Compare for example Kaufmann (2008) who provides further evidence that credit constraints provide an important obstacle to investments in higher education and that introducing a student loan or fellowship program could lead to important welfare gains.

7   Conclusion

The goal of this paper was to improve our understanding of human capital investment decisions, in particular the decisions about receiving secondary and post-secondary education.

We have analyzed three aspects of this decision process: firstly we analyzed the link between people's subjective expectations and schooling decisions, taking into account one determinant that has often been neglected in this analysis, that is perceptions of earnings and employment risk for different schooling scenarios. We find that expected returns to schooling and risk perceptions are important determinants of schooling decisions, but play different roles in the decision to attend senior high school and college. While risk perceptions seem be more important in high school decisions, expected returns appear more relevant in college attendance decisions.

Secondly, we shed some light on the decision-making process within the household in terms of the question whose expectations matter in schooling decisions. We find that for the high school choice both mothers' and adolescents' expectations matter, while for the college attendance choice only the ones of the adolescent appear relevant. Due to data limitations further research into this question is warranted.

Thirdly and most importantly, data on subjective expectations helps us to provide evidence on the importance of credit constraints in secondary and post-secondary schooling decisions. Our findings suggest that credit constraints constitute an important obstacle for poor Mexicans to obtain higher education, which is consistent with the fact that fellowships and students loans are basically non-existent at the level of college education.

One implicit goal of this paper was to illustrate that data on subjective expectations of earnings can be used as an important input into addressing further interesting policy questions. Subjective expectations can be used in structural models of educational choices that take into account perceived earnings and employment risk as an important additional determinant. Furthermore, data on expectations for several children in a family can inform the debate about intra-family household allocation in terms of human capital investments: Do parents invest in those children with the highest expected earnings and provide transfers to the others (if they have preferences for equalizing the utility of their children)? Are there differences in investment patterns between rich and poor families?

Our paper adds to the literature on subjective expectations in illustrating that –also in developing countries, at least conditional on a certain level of education– people seem able and willing to respond meaningfully to questions about their perceptions of future earnings and employment and that these data can improve our understanding of important economic decisions, such as investment into human capital.

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Table 1: Individual and Family-Background Characteristics

Cohort:	Young Cohort			Old Cohort			Full
Resp:	**Adol**	**Mother**	**Diff**	**Adol**	**Mother**	**Diff**	**Sample**
	Mean		(P-Val)	Mean		(P-Val)	Mean
	(SE)			(SE)			(SE)
Female	0.553	0.503	(0.002)	0.583	0.495	(0.000)	0.537
	(0.497)	(0.500)		(0.493)	(0.500)		(0.499)
GPA of Jr HS (Scale 0-100)	80.71	81.28	(0.040)	82.18	82.31	(0.679)	81.77
	(8.15)	(8.971)		(7.17)	(10.33)		(8.75)
Per Cap Income - 5 to 10k	0.295	0.295	(0.987)	0.240	0.270	(0.057)	0.277
	(0.456)	(0.456)		(0.427)	(0.444)		(0.447)
Per Cap Income - above 10k	0.212	0.195	(0.190)	0.166	0.170	(0.334)	0.191
	(0.409)	(0.397)		(0.373)	(0.376)		(0.393)
Mother's Educ - Primary	0.718	0.742	(0.137)	0.792	0.791	(0.921)	0.754
	(0.450)	(0.438)		(.406)	(0.407)		(0.430)
Mother's Educ - Jr HS	0.241	0.226	(0.324)	0.176	0.176	(0.983)	0.210
	(0.428)	(0.418)		(.381)	(0.381)		(0.407)
Mother's Educ - Sr HS	0.035	0.023	(0.052)	0.027	0.031	(0.529)	0.029
	(0.184)	(0.150)		(.161)	(0.173)		(0.167)
Mother's Educ - Univ	0.006	0.009	(0.341)	0.006	0.003	(0.260)	0.007
	(0.076)	(0.094)		(.075)	(0.051)		(0.082)
Father's Educ - Primary	0.704	0.714	(0.591)	0.760	0.757	(0.879)	0.730
	(0.457)	(0.452)		(0.427)	(0.429)		(0.444)
Father's Educ - Jr HS	0.230	0.213	(0.349)	0.182	0.185	(0.867)	0.204
	(0.421)	(0.410)		(0.386)	(0.388)		(0.403)
Father's Educ - Sr HS	0.058	0.057	(0.906)	0.050	0.042	(0.409)	0.054
	(0.234)	(0.232)		(0.217)	(0.200)		(0.226)
Father's Educ - Univ	0.009	0.019	(0.125)	0.008	0.016	(0.106)	0.013
	(0.093)	(0.125)		(0.089)	(0.125)		(0.112)
Father's Occup - Unsk. Work	0.333	0.362	(0.105)	0.415	0.454	(0.062)	0.382
	(0.471)	(0.481)		(0.493)	(0.498)		(0.485)
Father's Occup - Employee	0.456	0.391	(0.001)	0.311	0.256	(0.004)	0.359
	(0.498)	(0.488)		(0.436)	(0.390)		(0.479)
Father's Occup - Employer	0.008	0.004	(0.205)	0.010	0.005	(0.250)	0.008
	(0.087)	(0.062)		(0.097)	(0.072)		(0.089)
Father's Occup - Self-Empl.	0.182	0.215	(0.029)	0.224	0.250	(0.153)	0.220
	(0.385)	(0.411)		(0.417)	(0.433)		(0.414)
Father's Occup - Fam. Work	0.022	0.027	(0.428)	0.040	0.034	(0.481)	0.031
	(0.147)	(0.162)		(0.196)	(0.182)		(0.172)
Number of Observations	2095	1771		1496	1544		9988

Table 2: Subjective Expectations of Future Earnings

Cohort:	Young Cohort			Old Cohort			Full
Resp:	**Adol**	**Mother**	**Diff**	**Adol**	**Mother**	**Diff**	**Sample**
	Mean		(P-Val)	Mean		(P-Val)	Mean
	(SE)			(SE)			(SE)
Exp Log Earnings							
- Junior HS	7.027	7.190	(0.000)	N.A.	N.A.		7.096
	(0.597)	(0.487)					(0.543)
- Senior HS	7.592	7.703	(0.000)	7.568	7.640	(0.000)	7.623
	(0.548)	(0.444)		(0.504)	(0.436)		(0.491)
- College	8.227	8.320	(0.000)	8.243	8.305	(0.000)	8.269
	(0.518)	(0.439)		(0.480)	(0.438)		(0.475)
Exp Return							
- Senior HS	0.564	0.514	(0.000)	N.A.	N.A.		0.526
	(0.321)	(0.280)					(0.299)
- College	0.635	0.616	(0.107)	0.675	0.668	(0.591)	0.645
	(0.365)	(0.330)		(0.386)	(0.361)		(0.362)
Std Dev of Log Earn							
- Junior HS	0.076	0.070	(0.000)	N.A.	N.A.		0.072
	(0.047)	(0.044)					(0.045)
- Senior HS	0.065	0.061	(0.002)	0.064	0.60	(0.021)	0.062
	(0.041)	(0.039)		(0.039)	(0.0375)		(0.039)
- College	0.054	0.053	(0.191)	0.054	0.052	(0.111)	0.053
	(0.036)	(0.035)		(0.034)	(0.032)		(0.034)
Skewness							
- Junior HS	0.513	0.539	(0.000)	N.A.	N.A.		0.521
	(0.200)	(0.190)					(0.200)
- Senior HS	0.655	0.661	(0.239)	0.647	0.652	(0.493)	0.653
	(0.182)	(0.171)		(0.184)	(0.176)		(0.179)
- College	0.804	0.810	(0.345)	0.788	0.797	(0.167)	0.801
	(0.180)	(0.167)		(0.179)	(0.170)		(0.175)
Prob of Work							
- Junior HS	0.481	0.506	(0.000)	N.A.	N.A.		0.491
	(0.208)	(0.208)					(0.211)
- Senior HS	0.663	0.664	(0.940)	0.665	0.648	(0.009)	0.658
	(0.186)	(0.169)		(0.182)	(0.179)		(0.179)
- College	0.823	0.816	(0.146)	0.824	0.812	(0.034)	0.819
	(0.167)	(0.156)		(0.160)	(0.154)		(0.159)
Observations	2095	1771		1496	1544		9988

Table 3: Expected Earnings, Mothers' Expected Earnings and Census Earnings

| Cohort: | Young Cohort | | | | Old Cohort | | | |
| Resp: | **Adol** | | **Mother** | | **Adol** | | **Mother** | |
	Mean	Implied Return	Mean	Implied Return	Mean	Implied Return	Mean	Implied Return
Exp Log Earnings (from Distr)								
- Junior HS	7.027 (0.597)		7.190 (0.487)		N.A.		N.A.	
- Senior HS	7.592 (0.548)	0.564 (0.321)	7.703 (0.444)	0.512 (0.279)	7.568 (0.504)		7.640 (0.436)	
- College	8.227 (0.518)	0.635 (0.365)	8.320 (0.439)	0.616 (0.329)	8.243 (0.480)	0.675 (0.385)	8.305 (0.438)	0.667 (0.363)
Mother's Point Expect (Logs)								
- Junior HS	7.447 (0.536)		7.549 (0.479)		N.A.		N.A.	
- Senior HS	7.801 (0.513)	0.354 (0.302)	7.894 (0.496)	0.345 (0.252)	7.733 (0.488)		7.838 (0.436)	
- College	8.272 (0.522)	0.471 (0.396)	8.355 (0.517)	0.461 (0.352)	8.232 (0.468)	0.499 (0.385)	8.328 (0.438)	0.490 (0.398)
Log Census Earnings (Resid Municip)								
- Junior HS	7.254 (0.436)		7.249 (0.505)		7.101 (0.471)		7.152 (0.468)	
- Senior HS	7.643 (0.319)	0.342 (0.332)	7.604 (0.357)	0.330 (0.347)	7.538 (0.432)	0.391 (0.433)	7.520 (0.436)	0.350 (0.411)
- College	8.125 (0.268)	0.503 (0.352)	8.134 (0.289)	0.544 (0.429)	8.104 (0.340)	0.588 (0.429)	8.117 (0.438)	0.596 (0.492)
Observations	2095		1771		1496		1544	

Notes: Table displays means of relevant cells and standard errors in brackets.

Table 4: Expected Earnings and Observed Characteristics - Young Cohort

Dep Var:	**Expected Log Earnings**					
Resp:	Adolescent (Young Cohort)			Mother (Young Cohort)		
	Jr HS	**Sr HS**	**College**	**Jr HS**	**Sr HS**	**College**
Log Census Earn (Municip of Resid)	0.088**	0.060	0.132***	0.064*	0.056*	0.095***
by Gender) - Jr HS	(0.045)	(0.041)	(0.040)	(0.037)	(0.033)	(0.034)
Log Census Earn (Municip of Resid)	0.145**	0.135**	0.065	-0.068	-0.068*	-0.068*
by Gender) - Sr HS	(0.060)	(0.055)	(0.054)	(0.043)	(0.039)	(0.039)
Log Census Earn (Municip of Resid)	-0.069	-0.046	0.084*	-0.019	-0.013	0.095**
by Gender) - College	(0.053)	(0.050)	(0.048)	(0.044)	(0.039)	(0.040)
Female	-0.035	-0.020	0.024	0.000	-0.039	-0.015
	(0.034)	(0.031)	(0.031)	(0.031)	(0.028)	(0.028)
GPA of Junior HS (0-100)	0.000	0.001	0.001	0.003**	0.003***	0.004***
	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)
Mother's Educ - Jr HS	-0.066*	-0.043	-0.024	-0.008	-0.006	0.032
	(0.036)	(0.033)	(0.033)	(0.032)	(0.028)	(0.029)
Mother's Educ - Univ	0.042	0.072	0.070	-0.363**	-0.271*	-0.209
	(0.192)	(0.174)	(0.172)	(0.160)	(0.144)	(0.146)
Per cap Income - 5 to 10k	0.011	0.039	0.045	0.054*	0.066***	0.081***
	(0.032)	(0.029)	(0.029)	(0.028)	(0.025)	(0.026)
Per cap Income - more than 10k	0.054	0.049	0.089***	0.045	0.042	0.058**
	(0.037)	(0.034)	(0.033)	(0.031)	(0.028)	(0.029)
Father's Occup - Employer	-0.129	-0.229	-0.259	0.228	0.452**	0.394**
	(0.186)	(0.167)	(0.165)	(0.202)	(0.181)	(0.184)
Observations	3596	3596	3596	3633	3633	3633
Cens. obs.	1793	1793	1793	2117	2117	2117
Chi-Square	485.099	493.734	435.751	434.537	438.112	404.965
Inverse Mills Ratio	0.313	0.197	0.236	0.018	0.052	0.069
S.E. of Inv Mills	0.065	0.059	0.058	0.062	0.056	0.056

Notes: Table displays coefficients and standard errors in brackets. * p<0.1 ** p<0.05 *** p<0.01. Excl. categories: male, lowest per capita parental income category, father's and mother's education primary or less, father's occupation: unskilled worker. Omitted due to space limitations (not significant): mother's education senior high school, father's education junior and senior high school and university, father's occupation employee, self-employed and family worker. All specifications include state FE.

Table 5: Expected Earnings and Observed Characteristics - Old Cohort

Dep Var:	**Expected Log Earnings**			
Resp:	Adolescent (Old Cohort)		Mother (Old Cohort)	
	Sr HS	**College**	**Sr HS**	**College**
Log Census Earn (Municip of Resid, by Gender) - Jr HS	0.061*	0.106***	0.107***	0.090**
	(0.037)	(0.037)	(0.037)	(0.039)
Log Census Earn (Municip of Resid, by Gender) - Sr HS	0.056	0.015	-0.004	0.013
	(0.046)	(0.046)	(0.039)	(0.042)
Log Census Earn (Municip of Resid, by Gender) - College	-0.060	0.017	0.066	0.171***
	(0.047)	(0.047)	(0.040)	(0.042)
Female	-0.083**	-0.011	0.049	0.023
	(0.033)	(0.033)	(0.038)	(0.040)
GPA of Junior HS (0-100)	0.001	0.004*	0.001	0.003**
	(0.002)	(0.002)	(0.001)	(0.001)
Father's Educ - Sr HS	0.113	0.141*	0.009	0.045
	(0.080)	(0.079)	(0.074)	(0.078)
Father's Educ - Univ	0.157	0.113	0.087	0.147
	(0.195)	(0.194)	(0.125)	(0.131)
Per cap Income - 5 to 10k	0.040	0.012	0.054*	0.035
	(0.034)	(0.034)	(0.031)	(0.032)
Father's Occup - Employee	-0.071**	-0.027	0.013	-0.011
	(0.036)	(0.036)	(0.035)	(0.037)
Observations	2790	2790	2728	2728
Cens. obs.	1592	1592	1519	1519
Chi-Square	298.697	283.787	255.401	210.286
Inverse Mills Ratio	0.135	0.102	-0.092	0.029
S.E. of Inv Mills	0.075	0.075	0.105	0.110

Notes: Table displays coefficients and standard errors in brackets. * $p<0.1$ ** $p<0.05$ *** $p<0.01$. Excl. categories: male, lowest per capita parental income category, father's and mother's education primary or less, father's occupation: unskilled worker. Omitted due to space limitations (not significant): mother's education junior and senior high school and university, father's education junior high school, father's occupation employer, self-employed and family worker. All specifications include state FE.

Table 6: Mother's Expected Earnings and her Point Expectations

Dep Var:	**Mother's Expected Log Earnings**				
Resp:	Young Cohort			Old Cohort	
	Jr HS	**Sr HS**	**College**	**Sr HS**	**College**
Mother's Point Exp (Logs) - Jr HS	0.525***				
	(0.023)				
Mother's Point Exp (Logs) - Sr HS		0.445***		0.377***	
		(0.021)		(0.023)	
Mother's Point Exp (Logs) - College			0.454***		0.494***
			(0.021)		(0.024)
Log Census Earn (Municip of Resid, by Gender) - Jr HS	0.010	0.027	0.071**	0.069**	0.013
	(0.032)	(0.030)	(0.030)	(0.034)	(0.034)
Log Census Earn (Municip of Resid, by Gender) - Sr HS	-0.045	-0.049	-0.044	-0.016	0.019
	(0.037)	(0.034)	(0.034)	(0.036)	(0.036)
Log Census Earn (Municip of Resid, by Gender) - College	0.006	-0.000	0.071**	0.034	0.105***
	(0.038)	(0.034)	(0.035)	(0.036)	(0.036)
Female	-0.032	-0.058**	-0.029	0.009	-0.007
	(0.027)	(0.025)	(0.025)	(0.034)	(0.034)
GPA of Junior HS (0-100)	0.001	0.002*	0.002	0.001	0.003**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Mother's Educ - Univ	-0.337**	-0.196	-0.183	0.073	0.130
	(0.138)	(0.127)	(0.127)	(0.278)	(0.277)
Father's Educ - Sr HS	0.120**	0.079	0.035	0.054	0.081
	(0.056)	(0.051)	(0.051)	(0.067)	(0.066)
Per cap Income - 5 to 10k	0.015	0.041*	0.058***	0.043	0.032
	(0.024)	(0.022)	(0.022)	(0.028)	(0.028)
Per cap Income - more than 10k	0.014	0.016	0.043*	0.008	-0.018
	(0.027)	(0.025)	(0.025)	(0.031)	(0.031)
Father's Occup - Employer	0.073	0.266*	0.219	-0.055	0.161
	(0.174)	(0.160)	(0.160)	(0.154)	(0.154)
Observations	3627	3626	3624	2725	2723
Cens. obs.	2117	2117	2117	1519	1519
Chi-Square	1035.423	951.109	943.215	533.873	656.744
Inverse Mills Ratio	0.044	0.069	0.001	-0.030	-0.063
S.E. of Inv Mills	0.054	0.049	0.049	0.093	0.093

Notes: Table displays coefficients and standard errors in brackets. * p<0.1 ** p<0.05 *** p<0.01. Excl. categories: male, lowest per capita parental income category, father's and mother's education primary or less, father's occupation: unskilled worker. Not included due to space limitations (not significant): mother's education junior or senior high school, father's education junior high school or university, father's occupation employee, self-employed or family worker. All specifications include state FE.

Table 7: High School Attendance Choice: Adolescents' versus Mothers' Expectations of Earnings

Dep Var:	High School Attendance Decision	
	Coeff/(SE)	Coeff/(SE)
Adol Exp Log Earn - Jr HS	-0.071	-0.027
	(0.107)	(0.112)
Adol Exp Log Earn - Sr HS	-0.043	-0.069
	(0.139)	(0.143)
Adol Exp Log Earn - Coll	0.174*	0.145
	(0.102)	(0.104)
Mother's Exp Log Earn - Jr HS	-0.006	0.000
	(0.111)	(0.112)
Mother's Exp Log Earn - Sr HS	-0.145	-0.157
	(0.132)	(0.133)
Mother's Exp Log Earn - College	0.195**	0.182**
	(0.091)	(0.092)
Adol Prob of Work - Jr HS		-0.128
		(0.198)
Adol Prob of Work - Sr HS		0.017
		(0.252)
Adol Prob of Work - College		0.537**
		(0.235)
Adol Var of Log Earn - Jr HS		3.033
		(3.438)
Adol Var of Log Earn - Sr HS		0.584
		(4.781)
Adol Var of Log Earn - College		3.018
		(5.911)
GPA of Junior HS (0-100)	0.028***	0.028***
	(0.004)	(0.004)
Mother's Educ - Jr HS	0.441***	0.441***
	(0.101)	(0.101)
Father's Educ - Sr HS	0.394*	0.382*
	(0.219)	(0.219)
Per cap Income - 5 to 10k	-0.025	-0.026
	(0.077)	(0.077)
Per cap Income - more than 10k	0.113	0.119
	(0.093)	(0.094)
Father's Occup - Fam. Worker	-0.431*	-0.448*
	(0.238)	(0.240)
Obs (Censored)	3877 (1793)	3877 (1793)
Log Likelihood	-3394.332	-3389.939
Sample Sel: Corr of Errors (P-val)	-0.303 (0.093)	-0.274 (0.133)

Notes: Table displays coefficients and standard errors in brackets. * $p<0.1$ ** $p<0.05$ *** $p<0.01$. Excl. categories: male, mother's and father's education primary or less, per capita income less than 5000 pesos, father's occupation: unskilled worker. Omitted due to space limitations (not significant): female, mother's education senior high school or university, father's education junior high school or university, father's occupation employee, employer and self-employed. All specifications include state FE.

Table 8: College Attendance Choice: Adolescents' versus Mothers' Expectations of Earnings

Dep Var:	College Attendance Decision	
	Coeff/(SE)	Coeff/(SE)
Adol Exp Log Earn - Sr HS	-0.172	-0.188*
	(0.110)	(0.112)
Adol Exp Log Earn - Coll	0.171	0.168
	(0.114)	(0.116)
Mother's Exp Log Earn - Sr HS	-0.043	-0.040
	(0.111)	(0.112)
Mother's Exp Log Earn - College	0.075	0.074
	(0.108)	(0.108)
Adol Prob of Work - Sr HS		0.000
		(0.262)
Adol Prob of Work - College		0.132
		(0.300)
Adol Var of Log Earn - Sr HS		-7.674
		(5.716)
Adol Var of Log Earn - College		1.812
		(6.885)
GPA of Junior HS (0-100)	0.030***	0.030***
	(0.006)	(0.006)
Mother's Educ - Sr HS	0.504*	0.476*
	(0.260)	(0.261)
Father's Educ - Jr HS	0.260**	0.281**
	(0.120)	(0.121)
Father's Educ - Sr HS	0.428**	0.430**
	(0.210)	(0.210)
Father's Educ - Univ	1.608***	1.582***
	(0.555)	(0.558)
Per cap Income - more than 10k	0.357***	0.357***
	(0.104)	(0.104)
Father's Occup - Self-Empl.	-0.230**	-0.228**
	(0.116)	(0.116)
Distance to Univ 20 to 40km	-0.283***	-0.287***
	(0.095)	(0.095)
Distance to Univ more than 40km	-0.359***	-0.371***
	(0.113)	(0.113)
Tuition more than 750 pesos	-0.352***	-0.357***
	(0.123)	(0.124)
Obs (Censored)	3089 (1592)	3089 (1592)
Log Likelihood	-2761.802	-2760.631
Sample Sel: Corr of Errors (P-val)	0.090 (0.797)	0.098 (0.781)

Notes: Table displays coefficients and standard errors in brackets. * $p<0.1$ ** $p<0.05$ *** $p<0.01$. Excl. categories: male, mother's and father's education primary or less, per capita income less than 5000 pesos, father's occupation: unskilled worker, less than 20km from closest university, and tuition costs less than 750 pesos. Omitted due to space limitations (not significant): female, mother's education junior high school or university, father's occupation employee, employer or family worker. All specifications include state FE.

Table 9: High School Attendance Decision: Mothers' and Adolescents' Expected Returns and Perceived Employment and Earnings Risk

Dep Var:	**High School Attendance Decision**			
Resp:	Adolescent		Mother	
	Coeff	Marg Eff	Coeff	Marg Eff
	(SE)	(SE)	(SE)	(SE)
Expected Return to Sr HS	0.050	0.011	0.013	0.004
	(0.106)	(0.025)	(0.131)	(0.328)
Expected Return to College	0.135	0.031	-0.170	-0.045
	(0.093)	(0.022)	(0.112)	(4.145)
Prob of Work - Jr HS	-0.109	-0.025	-0.110	-0.029
	(0.194)	(0.045)	(0.232)	(2.684)
Prob of Work - Sr HS	-0.012	-0.003	-0.238	-0.062
	(0.248)	(0.057)	(0.314)	(5.790)
Prob of Work - College	0.580**	0.133**	0.462*	0.121
	(0.231)	(0.056)	(0.278)	(11.257)
Var of Log Earn - Jr HS	2.505	0.575	5.393	1.414
	(3.395)	(0.786)	(4.458)	(131.433)
Var of Log Earn - Sr HS	-0.187	-0.043	-16.060***	-4.210
	(4.738)	(1.088)	(5.030)	(391.372)
Var of Log Earn - College	3.601	0.827	5.147	1.349
	(5.848)	(1.350)	(6.066)	(125.424)
Female	-0.016	-0.004	0.147**	0.039
	(0.067)	(0.015)	(0.074)	(3.580)
GPA of Junior HS (0-100)	0.026***	0.006***	0.024***	0.006
	(0.004)	(0.001)	(0.004)	(0.574)
Mother's Educ - Jr HS	0.461***	0.090***	0.460***	0.104
	(0.101)	(0.021)	(0.115)	(11.061)
Mother's Educ - Sr HS	0.384	0.072*	0.464	0.097
	(0.252)	(0.039)	(0.381)	(11.018)
Father's Educ - Jr HS	0.093	0.021	0.276**	0.066
	(0.104)	(0.022)	(0.120)	(6.736)
Father's Educ - Sr HS	0.417*	0.077**	0.574**	0.114
	(0.217)	(0.032)	(0.290)	(13.347)
Father's Educ - Univ	0.522	0.089	7.681	0.195***
	(0.542)	(0.064)	(1.4e+04)	(0.043)
Per Cap Income - High	0.105	0.023	0.297***	0.072
	(0.093)	(0.021)	(0.102)	(7.237)
Father's Occup - Fam. Work	-0.419*	-0.116	-0.472**	-0.148
	(0.236)	(0.078)	(0.229)	(10.128)
Obs (Censored)	3910 (1793)	3910 (1793)	3910 (2117)	3910 (2117)
Log Likelihood	-3427.099	-3427.099	-3303.343	-3303.343
Sample Sel: Corr of Errors (P-Val)	-0.252 (0.164)	-0.252 (0.164)	0.028 (0.876)	0.028 (0.876)

Notes: Table displays coefficients and marginal effects and standard errors in brackets. * p<0.1 ** p<0.05 *** p<0.01. Excl. categories: male, mother's and father's education primary or less, per capita income less than 5000 pesos, father's occupation: unskilled worker. Not displayed due to space limitations (not significant): mother's education university, per cap income middle, father's occupation employee, employer and self-employed. All specifications include state FE.

Table 10: College Attendance Decision: Adolescents' Expected Returns and Perceived Employment and Earnings Risk

Dep Var:	College Attendance Decision			
	Income		Income/Wealth	
	Coeff	Marg Eff	Coeff	Marg Eff
	(SE)	(SE)	(SE)	(SE)
Expected Return to College	0.196**	0.055*	0.194**	0.054*
	(0.098)	(0.030)	(0.098)	(0.030)
Prob of Work - Sr HS	-0.070	-0.020	-0.080	-0.023
	(0.259)	(0.073)	(0.259)	(0.073)
Prob of Work - College	0.159	0.045	0.161	0.045
	(0.295)	(0.084)	(0.295)	(0.084)
Var of Log Earn - Sr HS	-8.074	-2.270	-8.143	-2.285
	(5.699)	(1.694)	(5.707)	(1.699)
Var of Log Earn - College	1.588	0.446	1.191	0.334
	(6.846)	(1.930)	(6.856)	(1.927)
Per cap Income - more than 10k (d)	0.358***	0.110***		
	(0.103)	(0.042)		
Par income/wealth quart 4 (d)			0.368***	0.113***
			(0.104)	(0.043)
Father's Occup - Self-Empl. (d)	-0.227**	-0.060**	-0.238**	-0.062**
	(0.116)	(0.028)	(0.116)	(0.029)
GPA of Junior HS (0-100)	0.029***	0.008***	0.030***	0.008***
	(0.006)	(0.003)	(0.006)	(0.003)
Mother's Educ - Sr HS (d)	0.487*	0.161	0.507*	0.168
	(0.260)	(0.103)	(0.259)	(0.104)
Father's Educ - Jr HS (d)	0.279**	0.085*	0.286**	0.087*
	(0.120)	(0.045)	(0.120)	(0.045)
Father's Educ - Sr HS (d)	0.408**	0.132*	0.404*	0.130*
	(0.208)	(0.077)	(0.207)	(0.077)
Father's Educ - Univ (d)	1.565***	0.565***	1.558***	0.563***
	(0.556)	(0.174)	(0.556)	(0.175)
Distance to Univ 20 to 40km (d)	-0.263***	-0.070**	-0.269***	-0.071**
	(0.094)	(0.030)	(0.094)	(0.031)
Distance to Univ more than 40km (d)	-0.360***	-0.093***	-0.370***	-0.095***
	(0.112)	(0.031)	(0.112)	(0.032)
Tuition more than 750 pesos (d)	-0.319***	-0.087**	-0.325***	-0.088**
	(0.122)	(0.040)	(0.122)	(0.040)
Obs (Censored)	3111 (1592)	3111 (1592)	3111 (1592)	3111 (1592)
Log Likelihood	-2784.299	-2784.299	-2784.138	-2784.138
Sample Sel: Corr of Errors	0.063	0.063	0.066	0.066
P-val: LR Test of Indep Eqns	0.855	0.855	0.851	0.851

Notes: Table displays coefficients and marginal effects and standard errors in brackets. * p<0.1 ** p<0.05 *** p<0.01. Excl. categories: male, mother's and father's education primary or less, per capita income less than 5000 pesos, father's occupation: unskilled worker, less than 20km from closest university, and tuition costs less than 750 pesos. Omitted due to space limitations (not significant): per capita income between 5000 and 10000 pesos and second and third parental income/wealth, mother's education junior high school or university, father's occupation employee, employer or family worker. All specifications include state FE.

Table 11: College Attendance Decision and Evidence of Credit Constraints: Return-Income/Wealth Interactions

Dep Var:	College Attendance Decision			
	Income		Income/Wealth	
	Coeff	Marg Eff	Coeff	Marg Eff
	(SE)	(SE)	(SE)	(SE)
Exp Return * Low Par Income	0.120	0.034		
	(0.109)	(0.032)		
Exp Return * Middle/High Income	0.339**	0.095**		
	(0.150)	(0.048)		
Exp Return * Par Inc/Wealth Below Median			-0.026	-0.008
			(0.120)	(0.035)
Exp Return * Par Inc/Wealth Above Median			0.493***	0.142**
			(0.172)	(0.059)
Per cap Income - 5 to 10k	-0.049	-0.014		
	(0.149)	(0.041)		
Per cap Income - more than 10k	0.175	0.051		
	(0.153)	(0.049)		
Par income/wealth quart 2			0.087	0.026
			(0.120)	(0.037)
Par income/wealth quart 3			-0.238	-0.064
			(0.168)	(0.044)
Par income/wealth quart 4			0.027	0.008
			(0.159)	(0.047)
Father's Occup - Self-Empl.	-0.222*	-0.058**	-0.244**	-0.066**
	(0.116)	(0.028)	(0.117)	(0.030)
GPA of Junior HS (0-100)	0.029***	0.008***	0.029***	0.008***
	(0.006)	(0.003)	(0.006)	(0.003)
Mother's Educ - Sr HS	0.517**	0.172*	0.528**	0.180*
	(0.259)	(0.104)	(0.263)	(0.107)
Father's Educ - Jr HS	0.245**	0.074*	0.234*	0.072*
	(0.119)	(0.043)	(0.120)	(0.043)
Father's Educ - Sr HS	0.387*	0.124	0.367*	0.119
	(0.208)	(0.076)	(0.211)	(0.077)
Father's Educ - Univ	1.618***	0.581***	1.501***	0.546***
	(0.555)	(0.166)	(0.562)	(0.180)
Distance to Univ 20 to 40km (d)	-0.260***	-0.069**	-0.275***	-0.075**
	(0.093)	(0.030)	(0.094)	(0.032)
Distance to Univ more than 40km (d)	-0.358***	-0.092***	-0.353***	-0.094***
	(0.112)	(0.031)	(0.114)	(0.032)
Tuition more than 750 pesos (d)	-0.319***	-0.086**	-0.315***	-0.088**
	(0.121)	(0.039)	(0.121)	(0.040)
Obs (Censored)	3111 (1592)	3111 (1592)	3111 (1592)	3111 (1592)
Log Likelihood	-2784.440	-2784.440	-2764.968	-2764.968
Sample Sel: Corr of Errors (P-Val)	0.065 (0.851)	0.065 (0.851)	0.029 (0.936)	0.029 (0.936)

Notes: Table displays coefficients and standard errors in brackets. * p<0.1 ** p<0.05 *** p<0.01. Excl. categories: male, mother's and father's education primary or less, per capita income less than 5000 pesos, father's occupation: unskilled worker, less than 20km from closest university, and tuition costs less than 750 pesos. All specifications include state FE.

8   Appendix B: Robustness Checks

Construction of Income and Wealth Measures

The Jovenes survey provides detailed information on income of each household member, savings if existent (only a very selective and richer group of households saves or borrows –4% of households have savings, while 5% borrow), durables and remittances. We create the following two measures: per capita parental income and an index of parental income and wealth. Per capita parental income includes parents' labor earnings, other income sources such as rent, profits from a business, pension income etc. and remittances, divided by family size. Median yearly per capita income is 6066 pesos (approximately 606 US$). The index of parental income and wealth is created by a principle component analysis of per capita income, value of durable goods and savings.

As we do not expect a linear effect of income and wealth on the ability to borrow, we add the measures in the form of dummies and use absolute thresholds for the parental income measure, as for the question of credit constraints absolute poverty in interaction with direct costs of schooling matters. In terms of the score of parental income and wealth without natural unit, we use quartiles (computed separately for each of the four groups). The reason for the chosen income thresholds is their approximate correspondence with eligibility requirements for receiving fellowships.[12] We use per capita income thresholds that are approximately equivalent to less two times the minimum wage (about 5,000 pesos per capita income yearly), which is one of the eligibility criteria for receiving fellowships, and equivalent to four times the minimum wage (around 10,000 pesos per capita income), which captures individuals that are still eligible but not primary beneficiaries, while individuals with income of more than four times the minimum wage are not eligible. Around 50% of adolescents in our sample fall into the first category of less than 5,000 pesos yearly, while about 28% are in the second category and the remaining 20% are in the highest income category of more than 10,000 pesos of yearly per capita income.

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[12]It is important to keep in mind that fellowships in particular for higher education are quantitatively not very important: only 5% of the undergraduate student population received a fellowship in 2004 (for further details, see Kaufmann (2008))

Table 12: First-stage Regression for Whether Adolescent Responds Herself

| Dep Var: | **Adolescent Respondent: Yes/No** | | | |
| Resp: | Young Cohort | | Old Cohort | |
	Model 1	Model 2	Model 1	Model 2
Interview Sunday	0.086	0.097	0.109*	0.076
	(0.059)	(0.060)	(0.063)	(0.064)
Interview Thursday	-0.053	-0.058	-0.089**	-0.092**
	(0.037)	(0.038)	(0.039)	(0.039)
Interview Saturday	0.083*	0.081*	-0.044	-0.052
	(0.044)	(0.046)	(0.045)	(0.047)
Interview Thursday*Aftern.	-0.002	0.000	0.087**	0.070
	(0.041)	(0.042)	(0.043)	(0.044)
Interview Saturday*Aftern.	0.059	0.050	0.102*	0.105*
	(0.052)	(0.054)	(0.055)	(0.056)
Interview Thursday*Even.	0.171**	0.184**	0.130	0.127
	(0.072)	(0.073)	(0.098)	(0.102)
Interview Saturday*Even.	0.164	0.149	0.293***	0.325***
	(0.101)	(0.106)	(0.086)	(0.079)
Interview Week 40	0.079	0.107*	0.128**	0.117*
	(0.057)	(0.057)	(0.063)	(0.064)
Interview Week 41	0.180***	0.210***	0.128***	0.160***
	(0.024)	(0.024)	(0.033)	(0.033)
Interview Week 42	0.147***	0.158***	0.120***	0.123***
	(0.023)	(0.023)	(0.029)	(0.030)
Interview Week 45	-0.136***	-0.130***	-0.058**	-0.073***
	(0.026)	(0.027)	(0.027)	(0.028)
Interview Week 46	-0.255***	-0.242***	-0.034	-0.064
	(0.040)	(0.043)	(0.038)	(0.040)
Female		0.067***		0.101***
		(0.017)		(0.019)
GPA of Junior HS (0-100)		-0.003***		-0.002*
		(0.001)		(0.001)
Mother's Educ - Sr HS		0.105*		-0.045
		(0.057)		(0.066)
Mother's Educ - Univ		-0.072		0.306**
		(0.115)		(0.135)
Father's Educ - Univ		-0.198**		-0.219**
		(0.095)		(0.098)
Per cap Income - more than 10k		0.050**		-0.000
		(0.023)		(0.027)
Father's Occup - Employee		0.025		0.067***
		(0.020)		(0.025)
Father's Occup - Self-Empl		-0.059**		-0.050*
		(0.026)		(0.026)
Observations	3910	3910	3111	3111
Log likelihood	-2569.041	-2451.105	-2109.742	-2025.853
Chi-Sq (df=25)	245.19		86.99	
P-value	0.000	0.000	0.000	0.000

Notes: Table displays marginal effects and standard errors in brackets. * p<0.1 ** p<0.05 *** p<0.01. Excl. categories: Interview on Monday, Interview in the morning, Interview in week 43, male, mother's and father's education primary or less, father's occupation: unskilled worker, per capita income less than 5000 pesos. All specifications include state FE. Dummies are included for distance to university and tuition costs (for the