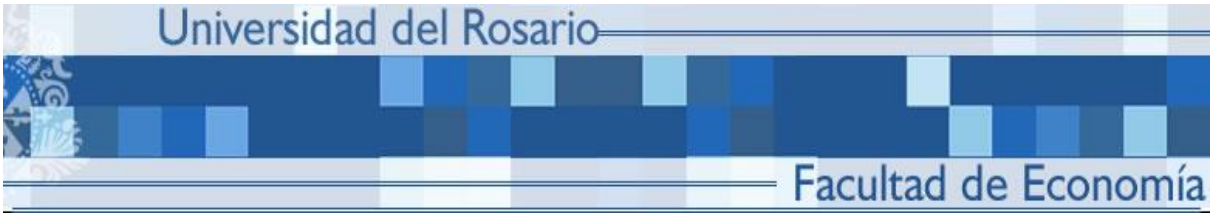

DO COLOMBIAN STUDENTS UNDERESTIMATE HIGHER EDUCATION RETURNS?

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Do Colombian students underestimate higher education returns?*

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Abstract

We analyze the determinants of subjective returns of higher education in Colombia. The information on expectations has been collected in categories, motivating the use of interval regression and an ordered probit approaches for modeling the relationship between beliefs and measures of ability, conditioning on individual, school and regional covariates. The results suggest that there are considerable differences in the size of the expected returns according to some population groups and a strong dominance of college against technical education. Gender gaps disappear in college education but it is found that girls tend to believe that professional wages are more concentrated into higher income categories than boys. Finally, it seems that Colombian students overestimate the pecuniary returns to education.

Keywords: Subjective expectations, ex-ante returns, Colombia, schooling choices
JEL: I25, J24, D84

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1 Introduction

People make investments under uncertain schemes seeking goals such as profitability, better quality of life, wealth and so on. Education is not an exception. As Oreopoulos and Salvanes (2009) suggest, individuals spend money and time to increase human capital, in hopes of greater lifetime wealth in return. But wealth is not the only goal since some people think that education also generates many experiences and affects various dimensions of skill that, in turn, affect central aspects of individuals' lives both inside and outside the labour market. Educational investments include multiple steps where there is a change in the identity of the individual who makes the decision. For basic and middle education, parents are in charge of choosing the type of school they want for their children. Parent investments could be determined by their expectations and goals (Banerjee and Duflo, 2012; Alsop et al., 2006; Flechtner, 2014). For higher education it is, at least in most cases, the individual herself who chooses her most preferred option for studying or not in the future based on her own expectations.

There are multiple factors affecting this choice, including the perceived rate of return, self-perceived skills, the availability of the program and motivation regarding career. From the human capital framework, if the benefits people expect from having more education are greater than the costs of investing in schooling, parents will encourage more education and the individuals (students) will undertake the risk. The main problem of evaluating this choice comes from the fact that costs are probably easier to estimate than returns. People choose based on what they perceive to be the returns of their education, and these perceptions may be inaccurate due to information problems, causing events such as poverty traps when the returns effectively achieved are smaller than the money invested (bank credits plus interest). Financial costs could be considerably high when the period involved in obtaining an employment is long. Information asymmetries about the quality of education provided or changes in labour market conditions are also factors that affect returns. They are beyond the individual control, at least in some part. Alsop et al. (2006) mention that minorities tend to under-invest in their human capital accumulation as a consequence of beliefs such as that others are more capable and there is no sense in making choices that perpetuate their conditions. This situation is seen as a risk aversion that limits the probability of obtaining better future conditions. In contrast, privileged people tend to be highly optimistic about their own limits. Although education makes

people more informed about their rights and consequences of their choices, it is not clear that education will improve their future. Jensen (2010) finds that teenagers do not expect important benefits from secondary education. The low motivation could be translated into low effort and lower goals. St-Hilaire (2002) found that less than 75% of 8th and 9th students believe that they will finish college, and about 60 percent really does. Among the possible causes of these low aspirations we can mention the following: i. Poorer people have fewer resources and low access to credit, which makes them risk averse. ii. Misinformation about education benefits is more prevalent in developing countries (Banerjee and Duflo, 2012).

The literature about ex post returns of higher education is extense, but this is not the case for ex ante returns. Recent evidence about ex post returns to education includes works about the returns of schooling (Manski and Dominitz, 1996; Heckman et al., 2006) as well as works about the econometric problems involved in earning equations (Hansen et al., 2004; Carneiro et al., 2011; Heckman, 1979). This literature tries to disentangle the importance of each factor on labour income but their main restriction is that time and space are changing the 'expected returns' distributions. The information available to each person, -when she opts for studying or not-, differs according to the environment and its own effort. Uncertainty about future wages can vary according to socioeconomic contexts, parental involvement in education and economic perspectives. Additionally, the way in which people build their own expectations is still being researched.

Recent studies on student's ex-ante perceptions about future salaries provide some intuitions that allow policy makers to discover student perceptions. The importance of insulation in Costa Rica (Jensen, 2010), the role of reference points in Madagascar (Nguyen, 2008), or the influence of credit constraint on student choices (Attanasio and Kaufmann, 2009). Career choice is also studied from other perspectives (Klaauw, 2012) but it is important to know that some of the returns in the students minds are also non pecuniary, as mentioned Oreopoulos and Salvanes (2009). There is also evidence of the role played by external or internal test on expected returns, choices and motivation in students (Stinebrickner and Stinebrickner, 2009; Wiswall and Zafar, 2013; Zafar, 2011, 2013; Reuben et al., 2013; Sequeira et al., 2013).

This study is focused on the case of Colombia, which has been experiencing an internal conflict with the presence of several armed groups since the second half of the twentieth century. As a result, the central government has allocated more resources from National

Budget to the struggle against irregular groups than to education or health. However, some social indicators are improving slowly. For example, the illiteracy rate was about 15 percent at the end of the decade of the 1970s. The net enrollment rate in higher education was under 30 percent and about 60 percent for basic education in 1981. During recent years, Colombia has experienced a good economic situation (low unemployment and inflation rates, a stable economic growth and a reduction in fiscal deficit) as well as a reduction in internal conflict. These indicators have claimed the attention of international investors as one sign of a country with high potential for economic growth in the near future. Since 2000, under the so-called "Plan Colombia" program, some initiatives as "Familias en Accion" (a conditional cash transfer program) encourage enrollment in education as a way to avoid participation in armed conflict.

Using the biggest household survey in Colombia (GEIH: Gran Encuesta Integrada de Hogares), we estimate that the average hourly income for any worker who only has secondary education is about $1.9 dollars (that is, the wage of someone who works 216 hours per month would be equivalent to $410.4 dollars) while someone with an undergraduate diploma earns approximately $5.6 dollars on average ($1209 dollars). These values are highly different around the country as are other economic indicators. It is also found that wages ranges from $1.3 (people with basic education) to $6,6 dollars (higher education) at the state level. These differences are the result of a combination of factors (structural and transitory) that are often unknown by students when they decide whether or not continue their studies.

The purpose of this document is to identify differences in the subjective returns of higher education in Colombia and define their main determinants. This goal is accomplished by using a random sample of individuals for whom some questions were included in the national mandatory test at the end of middle education (SABER 11). The sample is equivalent to 10 percent of the total population enrolled in the last course of middle education, randomized at the inscription of the test. It is a very novel study given that there is no evidence about expected wages representative for an entire country that question different scenarios according to the type of higher education the student can adopt. We exploit the variation from the complete structure of the Colombian society and the sources of economic growth claims in order to understand the expectations of young generations that come from different living conditions.

Our results suggest the existence of important differences in the return expectations

on investing in higher education. These are explained in part by the existence of natural resources or illegal activities that influence the perceived importance of education, and the socioeconomic background. Technical education seems to be less appreciated than college but gender differences exist even before going to labour markets. The evidence also confirms that people with some liabilities feel less optimistic about the profitability of higher education. The structure of the paper is as follows. Section 2 discusses the formation of wage expectations. Section 3 describes the database and the main controls introduced into the empirical strategy. Section 4 presents the empirical strategy adopted throughout the paper. Section 5 summarizes the most relevant results under different methodologies. Section 6 offers a brief conclusion.

2 Expected wages

Our paper essentially analyzes the formation of the wages expectations of teenagers. Our students, most of them aged between 15 to 18 years old, are in the last year of their secondary level studies and have to decide whether they to continue their education. As discussed before, at least one considerable fraction of this decision is based on the pecuniary benefits of obtaining more education. Under the neoclassical framework, wages are typically a function of labour productivity, which depends on the human capital provided by the employee and on particularities of the production function. Equation 1 shows the relationship $f(\cdot)$ between wages $W_{ij,t+1}$ and education $S_{ij,t}$ of the individual i living in region j in period $t+1$. This relationship varies according to individual characteristics X_{ij}, to those of the labour market $M_{j,t+1}$ and to other unobserved variables at period $t+1$. Expectations in t are based on these factors but they have to choose $S_{ij,t}$ at t under incomplete information. In other words, they have to forecast how the labour markets will remunerate their current schooling choices given their personal characteristics. Our main goal is to determine how students perceive that present characteristics X_{ij} and $M_{j,t}$ are related to the potential future wages $W_{ij,t+1}$ conditional on their schooling choices: $E_{ij,t}[W_{ij,t+1}|S_{ij,t}]$.

$$W_{ij,t+1} = f(S_{ij,t}, X_{ij}, M_{j,t+1}, v_{ij,t+1}) \tag{1}$$

Obtaining a good estimate of the pecuniary benefits (future wages) as a consequence of schooling choices $S_{ij,t}$ is neither trivial nor free of bias. First, schooling is decided several

years before the realization of wages, which means that the fundamental conditions might change considerably in global as well as in relative terms. Second, the flow of information is not perfect and some students might do not have accurate knowledge about M_j even in the the time period when thir choice is made(For instance, see (Jensen, 2010)). And third, what do the students know about X_{ij}? For instance, X_{ij} might include the "relative ability" of the student, which is something that she might not understand very well, since her beliefs might be conditioned by her academic environment. In many cases, environment is so isolated that the information set excludes external factors to the municipality.

For simplicity, equation 2 imposes a parametric specification to the relationship from equation 1.

$$w_l = E_{ij,t}[W_{ij,t+1}|S_{ij,t} = l] = r_l + r_{lX}X_{ij} + r_{lM}M_{j,t} + r_{lM}\eta_{t+1,l} + v_{ijl,t+1} \tag{2}$$

First, we allow individual and regional characteristics to have different (linear and additive) relationships with wages according to the schooling level $l \in 0, ..., L$. Second, we are assuming that $E[M_{j,t+1}] = M_j + \eta_{t+1} \quad \forall j$. That is, students expect at most a systematic variation in the local economies following years which we will restrict it to be unrelated to current observed characteristics[1]. Though this model imposes strong assumptions on the beliefs structure, it provides a basic framework for the analysis of wage expectations. Apart from the set of parameters $\hat{r}$ in our model, we are interested in how the variables $M_{j,t}$ and X_{ij} possibly determine schooling choices. The students from our analysis are close to obtaining education level $l = 0$ so now they face the decision to either stop studying, pursue technical education studies, $l = 1$, or professional studies $l = 2$. Each choice involves different pecuniary and non-pecuniary costs and benefits. The present analysis provides information about one of the dimensions of such a process and is about the pecuniary returns, $R_{l,1}$, to study l against keeping only the high school degree. Equation 3, where c_l are the costs of obtaining level l, illustrates this concept. One could consider that an individual would decide to proceed to further education if $R_{l,0}$ is above a particular threshold which depends on individuals' tastes.

$$R_{l,0} = \frac{(w_l - c_l) - w_0}{w_0} \tag{3}$$

We would like to know how this measure of the returns varies across the distribution

[1]For example, a general increase in wages every year for everyone in similar proportions.

of X. Even though the returns involve a measure of the costs c_l, we will assume that they are constant with respect to X as shown in equation 4 for some levels of wages $\bar{w_1}$ and $\bar{w_0}$.

$$\frac{\partial R_{l,0}}{\partial X} = \frac{\partial \frac{w_l - w_0 - c_l}{w_0}}{\partial X} = \frac{(\frac{\partial w_l}{\partial X} - \frac{\partial w_0}{\partial X})\bar{w_0} - \frac{\partial w_0}{\partial X}(\bar{w_1} - \bar{w_0} - c_l)}{\bar{w_0}^2} \tag{4}$$

For the case of discrete variables, we compute the variation from $X = 0$ to $X = 1$. Equation 5 shows the calculation, where the apostrophe denotes the value of the wages under the $X = 1$ scenario.

$$\begin{aligned}
\frac{\Delta R_{l=1}}{\Delta X} &= \frac{\bar{w_1'} - \bar{w_0'} - c_l}{\bar{w_0'}} - \frac{\bar{w_1} - \bar{w_0} - c_l}{\bar{w_0}} \\
&= \frac{\bar{w_1'}}{\bar{w_0'}} - \frac{\bar{w_1}}{\bar{w_0}} + c_l \frac{\bar{w_0'} - \bar{w_0}}{\bar{w_0'}\bar{w_0}} \\
&= \frac{\bar{w_1} + (\bar{w_1'} - \bar{w_1})}{\bar{w_0} + (\bar{w_0'} - \bar{w_0})} - \frac{\bar{w_1}}{\bar{w_0}} + c_l \frac{\bar{w_0'} - \bar{w_0}}{(\bar{w_0} + (\bar{w_0'} - \bar{w_0}))\bar{w_0}} \qquad (5) \\
&= \frac{\bar{w_1} + \Delta w_1}{\bar{w_0} + \Delta w_0} - \frac{\bar{w_1}}{\bar{w_0}} + c_l \frac{\Delta w_0}{(\bar{w_0} + \Delta w_0)\bar{w_0}} \qquad (6)
\end{aligned}$$

In the following section we will discuss our empirical strategy, which aims to provide an idea of the underlying parameters of the model r, the average wages $\bar{w_0}$, $\bar{w_l}$ and the marginal effects $\frac{\partial w_l}{\partial X}$, $\frac{\partial w_0}{\partial X}$ for continuous variables and Δw_0, Δw_1 for discrete ones. Given these estimators, and assuming that $c_l = 0$ in order to focus only on income expectations, we will perform the analysis in the results section.

3 Empirical Strategy

Our main object of interest is to understand the subjective distribution of $\frac{\Delta w}{w}$. That is, the relative gains in terms of earnings of obtaining education above secondary school, vary with respect to a set of characteristics X. However, the estimation of the underlying parameters of the model described in section 2 is not straightforward as we do not observe w directly but a transformation of it. In other words, we can only observe a categoric version of the income in each scenario and we need to derive the variation of the returns which is a continuous measure. In consequence, we need to impose some restrictions on the way the answers in the data are related to the real object. We opt for using inverval

regression and ordered probit analysis as our methods to undertake this drawback.

3.1 Interval Regression

Stewart (1983) introduced the estimation of linear models which deal with information grouped in intervals, as in our case. The underlying variable w^* is observed in C intervals defined by the cutoffs $\{\kappa_1, ..., \kappa_{C-1}\}$: if w^* is between the values κ_{c-1} and κ_c, the categoric counterpart is going to take the value number w^c (see equation 7).

$$\begin{aligned} w^*_{ijl} =& \theta \cdot Z_{ijl} + u_{ijl} \\ =& \sum_{l=0}^{2} (r_l + r_{lX} X_{ij} + r_{lM} M_j) \cdot S_{ijl} + e_{ijl} \end{aligned} \tag{7}$$

Our objective is to recover the structural parameters from the model in section 2 summarized in vector θ by imposing a restriction on the way the truncation is done. That is, we need to model the probability of an individual choosing a particular category w^c, as in equation 8.

$$\begin{aligned} \Pr(w^c_{ijl}) =& \Pr(\kappa_{c-1} \leq w^*_{ijk} \leq \kappa_c) \\ =& \Pr(\kappa_{c-1} - \theta \cdot Z_{ijl} \leq e_{ijl} \leq \kappa_c - \theta \cdot Z_{ijl}) \\ =& F_e(\kappa_c - \theta \cdot Z_{ijl}) - F_u(\kappa_{c-1} - \theta \cdot Z_{ijl}) \end{aligned} \tag{8}$$

We can assume $F_e \sim N(0, \sigma^2)$ for simplicity, so the model can be easily estimated by maximum likelihood. As we assume that the category thresholds are credible, the marginal effects can be understood in the usual way (we are identifying both scale and direction of the model in section 2).

In terms of the consistency of our estimations, there are several details to take into account. First, consistency is achieved if we assume e_{ijt} is uncorrelated with respect to X_ij. This might be a strong assumption as unobserved characteristics as motivation might be related to better academic achievement and with higher expected returns; that would be reflected in an upward bias of our estimates. Second, the numbers in terms of 'pesos' of our estimates are highly determined by the values of the thresholds. How would the results change if the cutoffs were chosen in another way? This is provided by the normality

assumption of e_{ijt}. Hence, we need to be very cautious when analyzing the numbers. The ordered probit analysis, which follows, will relax some of these assumptions as a robustness check of the direction of the coefficients, but still causal links are not guaranteed without further information.

3.2 Ordered model approach

A slightly less restrictive approach would be to believe that the category cutoffs are completely meaningless. As a result, the R categories can only be interpreted as ordered values (see section 4.2). In that case, instead of observing a censored version of w, the question is related to a latent index or future earnings $y^*_{i,j,k}$. Hence, equation 7 under this relaxed assumption can be stated as follows:

$$\begin{aligned} y^*_{ijl} =& \tilde{\theta} \cdot Z_{ijl} + e_{ijl} \\ =& \sum_{l=0}^{2} (\tilde{r_l} + \tilde{r_{lX}} X_{ij} + r_{lM} M_j) \cdot S_{ijl} + e_{ijl} \end{aligned}$$

As a result, if we consider the empirical model in equation 8, our objective is to estimate the set of parameters $\{\tilde{\theta}; \kappa_1, ..., \kappa_{C-1}\}$. Notice that the sole differences are that we need to estimate the additional 5 cutoffs values, and, more important, our estimates $\tilde{\theta}$ cannot identify both direction and scale from our structural model in section 2 (as we do not know what it exactly y^* means). Under this set of assumptions, we can identify the increase on the probability to be in a specific response category y^c by increasing one of the "determinants" under different schooling scenarios.

4 Data

4.1 Main sources of information

The analysis of subjective returns requires the inclusion of multiple factors surrounding the students. It is common to suppose that parental background can help to increase the information set available to students in order to reduce information asymmetries. Other factors such as their own performance or information achieved through peers allow them to modify their knowledge (information set) about education profitability. On the other

hand, it is also true that external shocks might modify monetary returns from education. External shocks could be general for the entire country (i.e. changes in international export prices) or they also could be idiosyncratic affecting only relative or individual wages (i.e oil and coffee booms, parental unemployment or divorces that affect purchasing power).

The main source of information comes from the inscription form of the national mandatory test (SABER 11) administered by the ICFES[2]. All students have to take this test the last year of middle education,and most of the private universities use students scores for admission selection or to allocate scholarships. It is important to mention that the students fill out the application form at the beginning of the last year of middle education, and they take the test three months before the end of the course. These dates are associated with the coexistence of two principal school calendars in Colombia. For the year 2013, a set of questions was added to the on-line form answered by 10% of students on the two dates of the test (first and second semester). 56.822 students were asked these questions (88,8% from "calendar A" and 11,2 % from "calendar B"). The sample includes information for 24 out of the total 32 *departmentos*[3] (similar to states) of Colombia, and it includes between 8.3% and 10.2% of the students who took the test. Included municipalities (1041 out of 1123) are represented on average by 10% of their students (at least 3.7%, at most 20%). Finally, schools included in the sample follow a similar figure: 10% of their students (at least 5%, at most 50%). The database required a cleaning process due to various reasons. The final set was composed of 44481 observations.[4].

The main characteristics of the dataset are summarized in Tables 1 and 2. The average age of the sample is 16 years, reflecting that the choice of future investments in education is made by very young people. There is considerable dispersion in the mathematics and verbal performance at the individual level. It is important to note that exam results are determined after the questions regarding expected returns module are completed, so our expectations are not affected by the updating process of prior beliefs. The family's socioeconomic index, which is constructed using a set of variables that describe the physical assets owned by the household, reflects that the living conditions are equivalent to those

[2]Colombian Institute for evaluation of education, which is part of the Colombian Ministry of Education.

[3]This is the 97% of the test-takers. Arauca, Amazonas, Casanare, Guania, Guaviare, Putumayo, San Andres y Providencia,Vaupes and Vichada were not included due to missing information on wages.

[4]Missing information or extreme cases (scores equal to 0 or above 100) and students who come from different modalities of schools and people older than 30 years are dropped out of the analysis. See Table 9 in the appendix A

of middle-low class[5]. It is also important that the differences along the distribution are considerable, that is, the maximum is three times the mean. In addition to individual controls, a set of school and geographic variables are also included in order to control for economic and political differences. At the school level, there is higher incidence of cohorts above 90 students where boys are less numerous than girls. In addition to the information obtained from the application form, we add some controls from other sources (see table 3 for more details) in order to have information about other important phenomena that the student could experience. For example, we include a set of variables related to the poverty level around the country (average poverty per municipality, index of standard of living) , other set of variables that quantify indicators of armed conflict (civilian fatalities, anti drugs operations, guerrilla attacks and total number of armed clashes). Since the existence of booms could affect subjective preferences toward education, we also include the number of licenses for extracting minerals (gold, silver, emeralds and so on). The set of variables related to armed conflict and violence seems to suggest that there are great differences among municipalities. For example, the homicide rate ranges from 0 to 417 per one hundred thousand inhabitants. The number of attacks carried out by armed groups between 2005 and 2009 is 9 on average, but on the upper side of this distribution we find more than 23 attacks during this period. This variable allows us to control the possible influence of illegal activities to enrollment in the educational system. Table 2 also contains some descriptives for those variables that are dummies. The main characteristics to highlight are that more than 60 percent of the student population come from households with low educational background. That is, the fraction of students whose mother has professional education is less than 7% and less than 8% in the case of the father reflecting a similar situation of people around the country. Human capital in parents is crucial for the support provided to enroll in higher education but also because of its incidence on the student's motivation. It is interesting to note that the incidence of gold mines is near 14%. The proportion of students by gender is slightly lower for boys (45,3%) and about 77% come from public managed schools. Another aspect worth mentioning is the low incidence of students with any type of handicap (visual, auditory, physical movement and so on), but its inclusion is crucial in terms of perceived limitations and expectations for the future.

[5]This variable was constructed using the weights defined by the (ICFES, 2010) but excluding parents education, as its variation is going to be analyzed separately.

4.2 Subjective Income Expectations

The main question added to the test was: *In five years, What monthly income do you think you would earn in each of the following situations?*

a) *You only finish middle education and no more studies are carried out*

b) *You study a technical career*

c) *You finish higher education (any major) in a college or university*

The answer options were categories established in terms of the minimum wage (MW)[6]. These categories, selected by the ICFES, were:

1. *Less than 1 MW*
2. *Between 1 and 2 MW*
3. *Between 3 and 4 MW*
4. *Between 5 and 7 MW*
5. *Between 8 and 10 MW*
6. *More than 10 MW*

It is true that the values of the categories are misleading as they are avoid the possibility of some intervals (ex. between 2 and 3 MW) and they are completely arbitrary. Though these are the most obvious problems (which we are going to address in the robustness checks by modifying the values of the cut-offs), there are conceptual issues that are harder to tackle. In particular, the fact that we are imposing values for the thresholds might generate *anchoring*; that is, individual responses might be determined in part due to the way the options are presented [7]. Hence, even though we present some numbers that can be interpreted in terms of Colombian currency, they are mainly for illustrative purposes. In fact, our analysis will be mostly in terms of order rather than magnitude.

The distribution of students according to these questions are summarized in table 4. The proportion of the total population that earns more than 10 MW in Colombia is less

[6]For 2013, the minimum wage earned in Colombia was $589500 COP equivalent to $ US 320 American dollars. But it is important to mention that the employer has to pay an additional amount for social security that increase the salary up to $ 470 American dollars in the case of formal markets

[7]Attanasio et al. (2005); Attanasio (2009); Delavande et al. (2011) are recommended for a deeper discussion of the main particularities of eliciting subjective survival probabilities.

than 15%. The fraction of students who believe that this category is possible is closest to zero. On the opposite side of the income distribution, an exploratory checking of the data suggests that the proportion of girls who perceive lowest incomes is higher than that of boys (60,34% against 55,7%), but in both cases most students (92%) think that they will receive less than 2 MW. When students are faced with the choice between technical or college education, their expectations are more optimistic for the latter. Having technical education, might provide between 3 and 4 MW for 28,3% of girls and 31,5% of boys, while more than 20% of students think that will earn 5 MW or more with a professional degree.

There are several points to analyse when we compare two scenaries (high school vs. technical or high school vs. university). First, the distribution of expected returns from technical or college education is on the right of wages expected from high school distribution as shown in figures 1 and 2. Thus, it is clear that more years of education will provide better wages in the case of college but not of technical education. Second, we obtain that the fraction of boys self-reported in the category 1-2 MW decreases from 90% to 59% and 16% with completion high school, technical school and college, respectively. Girls show similar changes as compared with boys. Households with parents with high education tend to be more optimistic about the returns of college, but they do not perceive substantial differences between high school or technical education in terms of future wages. A complementary view of this fact emerges when one looks to students from private institutions. College will provide higher salaries for students from private schools than public ones, according to the perspective of the students themselves. This is an interesting fact, because it could reflect the perceived importance of the educational system in a population with notorious differences (See Table 4).

There are not relevant differences in wage expectations between boys and girls because their distribution is very similar with the exception of technical education. In this case, the proportion of girls is 5 percentage points higher than for boys in the lower wage range. The importance of human capital and socioeconomic environment is evident in this non-conditional distribution. The fraction of students from low-quality schools (very inferior and inferior) who think their labour compensation associated with high school will be 1-2 MW is about 90%. It decreases to 69% and 20% in the case of studying a technical or college program. On the opposite side, students in high quality schools are more optimistic: Only 4.8% expect to earn the lowest category of wages in the case of having a college degree. It seems that education is perceived as more profitable in

high quality schools. The comparison of public against private managed schools suggests that technical studies do not provide much money. Parental education exhibits similar patterns. The proportion of students self ranked into the highest wage category increases with their parents' level of schooling. Having professional education reduces the fraction of students in the lower salary (1-2 MW) to less than 10%. Parents from lower socioeconomic backgrounds often have limited hopes for their children's education success, and these low expectations can be translated to the children themselves, leading them to underestimate their potential and future path and trapping them in a negative cycle throughout their lives. Those parents who underestimate the economic benefits of education are less likely to encourage their children. They provide fewer resources for studying market. The main problem with lower aspirations is that it could imply self-fulfilling undesired prophecies Dalton et al. (2010).

Finally, perhaps the most striking results came from comparing current labour market realizations and students expectations as shown in figures 3 and 4. Here we have constructed a distribution of observed wages in 2013, from the GEIH, based on our students ages[8] and gender. That is, we have constructed their wages in five years assuming that 2013 observed wages will not change at all within the age, gender and schooling level. While this assumption is excessively strong, as one could expect at least that wages will follow the inflation rate, it allows us to show a striking result: Colombian students do not underestimate college's graduated wages. Instead, they highly overestimate them. The nominal growth of wages should be employed to match the 2013 observed and 2018 expected wages distribution from figure 4. There are several points to take into account in order to analyse these figures. First, it is likely that overestimation is a result of the anchoring: students tend to grade college with a higher income category college wages just because they perceive them as "high". Second, students overestimate the income of high schools graduates as well; however, this seems to be unimportant relative to college wages. Third, since the question design omitted some categories, the central values of our distribution are biased. Fourth, our observed wage distribution came from a selected sample, so we do not know what would happen if the potential wages of those who do not work were included. Even if we take these concerns into account , they are unlikely to drive the differences. Our present data is unable to give a proper response to these questions.

[8]Their observed age plus 5 years

5 Results

The estimation procedure included interval regression as well as a probit regression. For the former, we show the marginal effects for income labels and for the returns (See eq.3). In order to obtain a more accurate idea about the determinants of subjective returns, several controls are used. The set of variables included in the estimations contains personal characteristics (gender, age, the existence of any handicap, parents schooling and the type of school), academic variables (math and verbal scores, size of the school and gender composition of the cohort), variables about their place of residence (poverty level proxied by the IPM index, armed attacks, the rate of homicides, presence of gold mines) and a socioeconomic index.

The set of results using interval regression are summarized in the tables 5 and 6. This expression is obtained after using different functional forms that include different controls (see Tables 10 and 11 in the appendix A: the first three columns show the marginal effects for each academic level (high school, technical and professional) on income levels). The two final columns present the coefficients for returns of technical or College education. The first variable to highlight is the existence of any physical or cognitive limitation (handicap). It seems that people with any physical limitation perceive worse future for themselves that do other students. This is not a surprising finding, because it is possible that barriers to studying, high cost of health treatments or the perception of labour market discriminations are still common in developing countries. Although the fraction of people in this condition is a small part of the sample (less than 1%), there is a notable increase in the coefficient as educational level increases. It is also found that better students expect to earn lower salaries when they face different alternatives to college education. That is, higher the performance in math and verbal analysis are related to lower marginal effects in high school and technical school but higher effects in professional studies. This means that there could be a positive effect on self-confidence on future earnings. This fact is also reflected in the returns coefficient. An increase of 1 SD in verbal or math increases the perceived returns of professional education in 15.77 or 13.82 pp. with respect to completion of high school. This result comes from the fact that most students value middle education less than higher education. There are also gender differences in perceived returns. Boys tend to expect higher wages from basic and technical education than girls, but this difference disappears when incomes from colleges are studied. However, gender gaps

tend to disappear in nominal terms (note that college returns for girls will be higher than boys' returns, which is reflected in a negative value). Parental education matters when parents' have a professional degree and students perceive lower incomes from technical education. When returns are analyzed, students whose parents have technical education feel very pessimistic about the returns of investment in this modality of education or in college education. They perceive lower returns, which is important in terms of the future they expect and their difficulties in improving living conditions. At a school level, it is found that students from better schools (high average performance on Saber 11) and private schools perceive higher incomes from all the possible scenarios. This is also found in the returns perceived by students from top ranked schools in math, and in the case of students from private schools' valuation of technical education.

The characteristics of the place of residence are very important in the expectations formation. This fact motivates the inclusion of variables about poverty conditions, violence and mining. The intuition behind this choice is that people who face positive transitory income shocks might be more prone to go to work instead of studying because they think more about short-term opportunity costs in the short run. Violence can also affect educational investments through perceptions about the future in each city. That is, when violence comes from activities such as trafficking, people might prefer to enroll in illegal activities and drop out of the school. The results seem to suggest that the existence of gold mines decreases expectations about income earned after some educational investment. This is not a surprising finding, since people in these municipalities live under the -gold boom- that disincentivizes human capital accumulation. At the same time, students from places with high incidence of violence seem to perceive that education is a good choice, due to they belief that education will increase their future incomes. Finally it is found that higher education provides higher returns in big cities, probably as a consequence of the availability of more educative institutions and better developed labour markets (see Tables 5 and 6). As a complementary way to show our results, we plot the predicted income using the interval regression procedure in the Figure 5. It is easy to see that there is a hierarchy among educational choices in favor of college education.

As a complementary view, we estimate an ordered probit model using the fact that perceived future incomes are collected in categories. The set of controls are the same as those in the interval regression, and their results are shown into the Tables 7 and 8. As the ordered model does not collapse categories into a single measure, the probability in each

one is an outcome itself. For simplicity, these tables only show marginal effects for the extreme cases (lowest and highest categories). As the underlying parametric assumptions are the same as in the interval regressions, the main results are going to be the same in terms of direction. The comparison of probabilities tells us how the distribution is moving over the six categories. For instance, in the case of math or verbal scores, a higher value is related to a higher probability of reporting the lowest categories in high school and even technical education, but a higher probability of being in the highest income categories in the case of professional education. We can better understand the structure of gender differences using the ordered probit results. Being male reduces the probability of reporting the lowest income category conditional on high school (-4.5pp) and technical information(-1.26pp) and slightly increases the probability of being in the highest category (0.01pp and 0.12pp respectively). For males compared with females, the probability of being in the lowest category is increased in 3.26pp. (4.54pp.), if they get a technical (professional) degree. As before, we can interpret this as the existence of an *expected* gender gap which only disappears under professional education. In addition, girls are more likely than boys to believe that professional wages are more concentrated into higher income categories.

One of our main concerns is the existence of predetermined cutoffs which also were specified in a very particular way. We would like to know how robust our results are to the values of the cutoffs. As we have just seen with the ordered probit analysis, the interpretation of the direction of the correlations is not going to change, as it is determined by the parametric structure of the model. The ideal exercise, if there is no other option that using categorical questions, might be to randomize different cutoffs across students in order to validate the sensitivity of individual responses. This is not an option for the present exercise.

What we see in Tables 12 and 13 are the possible values of the relationship if we use other cutoffs in order to translate the same order probit categories and probabilities into a single measure in thousands of pesos. First, our categories are defined as intervals of the type $[A, B], [C, D]$ so we construct different options by modifying B and C cutoffs. *Lower cutoffs* panel redefine the categories as $[A, B], [B, D]$, reducing the left boundary of all the middle categories so it constitutes a lower bound for the estimates. *High cutoffs* increase the right boundaries. In our example the new categories would be $[A, C], [C, D]$. Hence, it constitutes an upper bound of the estimates. Finally, the *midpoint cutoffs* split the uncovered domain equally; in our example, $[A, (B + C)/2], [(B + C)/2, D]$ which ends

up being very similar to our main results estimates. This exercise is closer to the idea of set identification: the true parameter would be somewhere in the interval defined by a set of assumptions different than the one we impose. For instance, 1 additional SD in the maths test scores is associated with a bonus in wages which is between $21000 and $27000 pesos. This region will be even larger if we consider the confidence intervals.

6 Conclusions

Nowadays nobody doubts the importance of educational policies for economic growth. However, one important aspect to which less attention is paid is the self-motivation of students and their perception about the future benefits of education. Students are influenced by their parents, classmates and other social factors in their formation of the perceived returns of education. The economic situation of the household might determine the rate of return of education by different channels. It is reasonable to believe that students and their parents are not well-informed about future returns of schooling in developing economies.

On one hand, the existence of multiple types of employment or sources of income might reduce the importance of having more education when people feel that it is not necessary for obtaining an important amount of money. On the other hand, the environment where the students live and their socioeconomic condition is a crucial factor in their subjective expectations. On one side, since low income households are risk averse and face severe credit constraints that limit their expectations of any educational investment, they tend to under-invest on education, as found by Fletchner (2004). On the opposite side, those who are more privileged are more likely to invest in education because they already have the economic resources and have information about their own conditions. In case of failure, they have financial support to recover. Students from small cities far from the center of economic activity might learn only about returns for activities specific to their city, rather than learning about returns in other developed areas, where jobs related to higher levels of schooling are more common.

Through this document we make use of small but representative data that seem to suggest the existence of heterogeneity in the returns formation. Having highly educated parents is positively related to higher expected incomes, but it is also true that education benefits are better valued in big cities (markets are developed and there are more higher education institutions) than in rural areas. The existence of gold mines and violent events

near to home have contrary effects on expectations: more gold means more easy money and more violence is related to more incentives to accumulate education. The opportunity cost of being part of the conflict could be considerable, but when the student does not have alternative choices of being part of educational system the results are undesirable. It is also found that people who face some handicap are more pessimistic. In other words, they expect lower salaries and low returns from invest on education. Such differences in the expected returns should be taken into account on the design of new programs for higher education at colleges as well as in technical institutions. Thus, these results should be used as an input for an ongoing research agenda about the permanent evolution of student's expectations and their determinants under continuous technological change and economic growth. Developing countries as Colombia, who faced a strong armed conflict, need to increase human capital stock in order to foster economic development and to provide better opportunities for all their inhabitants. But it also requires that people feel that educational investments are profitable for improving their lives. They will not accumulate education if higher education is seen as a poverty trap (high cost and low returns). As a result, it is necessary to deepen the analysis about the channels through with expectations are formed and the influence of mass media, local factors and teaching practices on the perceived value of education. There is not much evidence to think that individuals with similar information form their expectations in the same way. It is still not clear how many factors influence students' and parents' choices about education. The existence of pecuniary and non-pecuniary benefits motivates investments, but we do not know how the process works. These are crucial questions for understanding the profitability of public policies targeted to foster human capital accumulation. New sources of information are needed to have a better comprehension of people's expectation patterns. Up until now, the use of external rewards as scholarships has been the most common initiative to increase enrollment, but there is not much evidence on the use of strategies to increase the perceived value of education.

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Figure 1: Expected income for Technical education

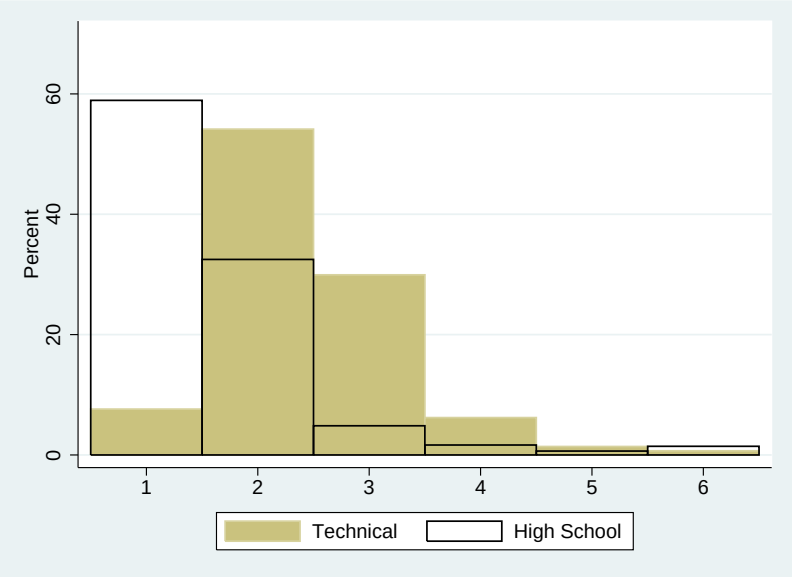

Figure 2: Expected income for Professional degree (College)

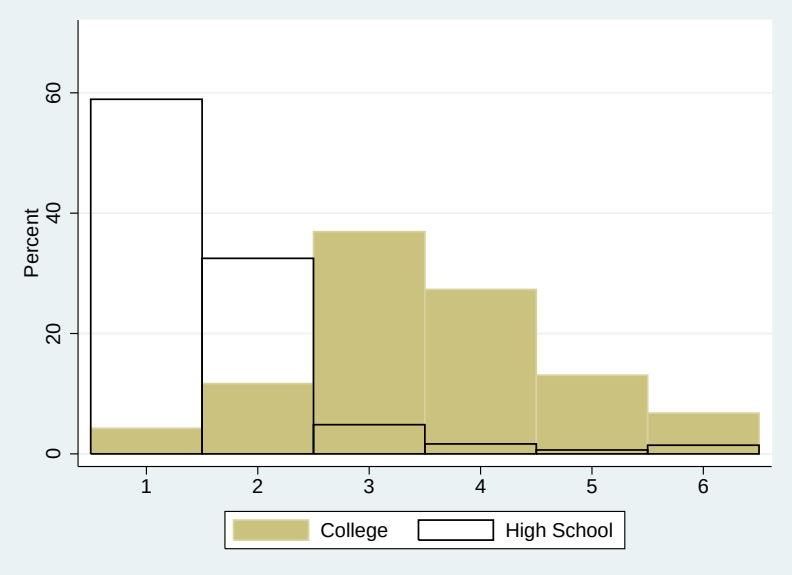

Figure 3: Expected vs. Observed Incomes (High School Only)

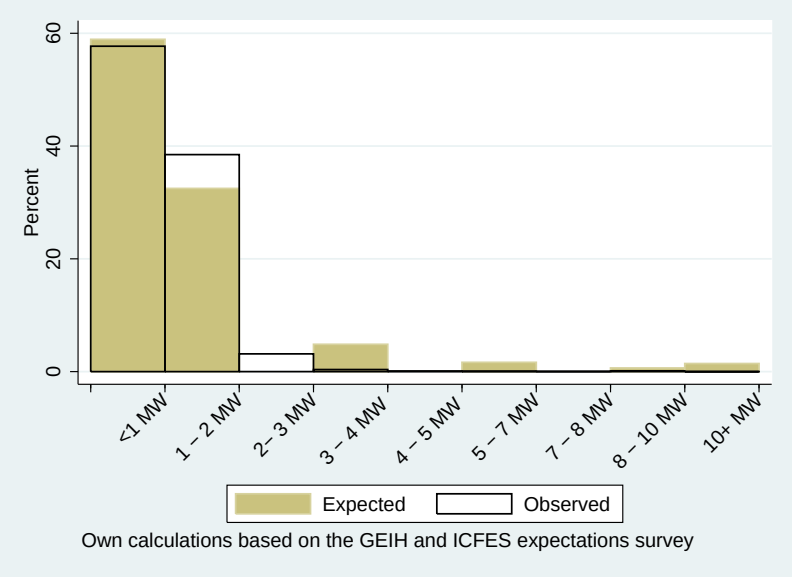

Figure 4: Expected vs. Observed Incomes (College)

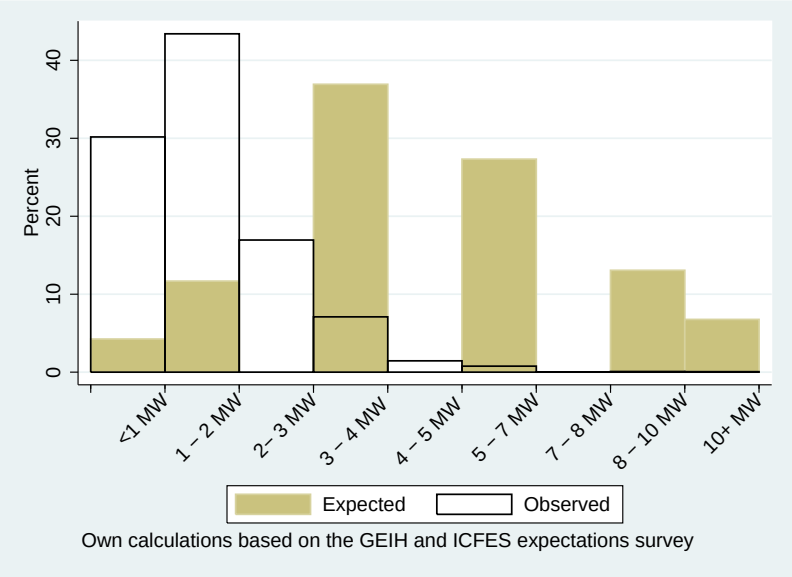

Figure 5: Predicted income

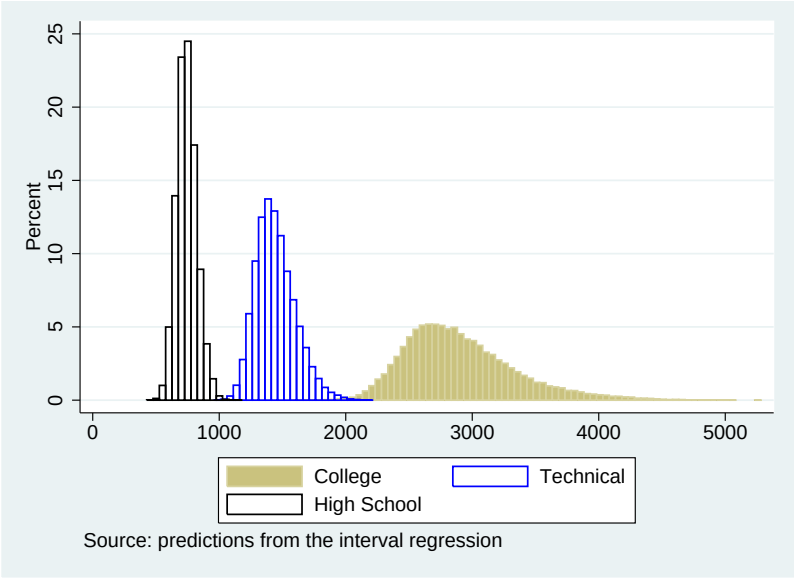

Table 1: Descriptive Statistics I

Continuous Variables	**Mean**	**SD**	**Min**	**P10**	**P50**	**P90**	**Max**
Individual and Family							
Age	16.64	1.23	13.00	16.00	16.00	18.00	30.00
SABER11: Verbal	47.83	7.45	20.00	38.00	48.00	58.00	95.00
SABER11: Maths	45.58	10.37	11.00	34.00	44.00	59.00	100.00
Family socio-economic index	20.67	10.31	0.50	7.81	19.50	34.30	75.78
School							
SABER11: Mean Maths Scores	45.55	5.24	27.14	40.47	44.41	52.09	83.07
SABER11: Mean Verbal Scores	47.82	3.68	31.80	43.38	47.47	52.73	64.76
School: % Male Test Takers	0.45	0.16	0.00	0.29	0.46	0.62	1.00
School: N. Exam-takers	92.36	86.33	2.00	25.00	74.00	168.00	1103.00
Municipality							
Quality of Life	78.45	12.24	25.57	58.78	84.24	89.62	91.92
MD. Poverty rate	0.47	0.21	0.14	0.24	0.41	0.80	1.00
Homicide rate 2009	37.21	32.85	0.00	4.00	27.00	82.00	417.00
Total Population	16.20	25.57	0.01	0.14	2.81	68.40	68.40
Urban-Rural Ratio	106.19	173.15	0.02	0.51	10.82	437.22	539.18
Total Attacks 2005-2009	9.42	9.36	0.00	0.00	6.00	23.00	42.00
Department							
Wage premium 16 to 11 years of educ.	1.60	0.25	1.25	1.27	1.60	1.96	2.23
Avg. wage 11 years of educ.	66.55	11.39	43.84	48.94	67.84	80.03	80.03
Total Ind.	44481						

Source: Own calculations based on a 10% student sample from SABER 11 2013-II.
† data from ICFES official classification for 2010 if 2011 is not available.

Table 2: Descriptive Statistics II

Dummy Variables	Ones	Percent	SD
Individual			
Male	21516	45.03%	49.75pp.
Any handicap	153	0.31%	5.60pp.
Father Education			
Less than High School	32361	67.72%	46.75pp.
High School	11262	23.98%	42.70pp.
Technical Education	730	1.58%	12.49pp.
Professional Education	3100	6.71%	25.02pp.
Mother Education			
Less than High School	29820	62.35%	48.45pp.
High School	12805	27.27%	44.53pp.
Technical Education	908	1.93%	13.77pp.
Professional Education	3920	8.45%	27.82pp.
School			
Full-day journey	14784	30.86%	46.19pp.
Morning journey	24160	51.05%	49.99pp.
Afternoon, evening or weekends journey	8516	18.09%	38.49pp.
Technical Orientation	18918	40.66%	49.12pp.
Private Administration	10305	23.03%	42.10pp.
Non Mixed Gender	3130	7.00%	25.52pp.
Classified as superior or above 2011†	10355	23.11%	42.16pp.
Municipality			
Gold mines	6101	13.01%	33.64pp.
Coal mines	8253	17.62%	38.10pp.

Source: Own calculations based on a 10% student sample from SABER 11 2013-II.
† data from ICFES official classification for 2010 if 2011 is not available.

Table 3: Data Sources

Variables	Year	Source	Description
Municipality			
Quality of Life	2005	DNP	*Indice de Condiciones de Vida*. PCA based index which summarizes human and physical capital characteristics
MD. Poverty rate	2005	DNP	Percentage of people in poverty according to the Multidimensional Poverty Index
Homicide rate*	2009	Medicina Legal†	Per 100.000 inhabitants
Total Population*	2005	DANE	Total residing population over 100.000 from the National Census
Urban-Rural Ratio*	2005	DANE	Based on the National Census
Total Attacks	2005-2009	CINEP	Total number of attacks
Gold mines	2000-2007	SGC	Total mining rights
Coal mines	2000-2007	SGC	Total mining rights
Department			
Avg. wage 11 years of educ.	2013	GEIH	Average monthly wage conditional on having 11 years of education
Wage premium 16 to 11 years of educ.	2013	GEIH	Difference of wages conditional on having 16 and 11 years of education, over 11 years of education wages

*Obtained via SIGOT web page. † National Legal Medicine and Forensic Sciences Institute.
DANE: National Statistics Department. DNP: National Planning Department.
SGC (INGEOMINAS): Colombian Geological Service. CINEP: Popular Education and Research Centre.

Table 4: Expected Income Categories by Covariates

Variables	N.	%	High School		Technical		College	
			1-2	5-6	1-2	5-6	1-2	5-6
Gender								
Male	20031	45.0%	90.6	2.0	59.2	2.2	16.2	20.3
Female	24450	55.0%	92.1	2.1	63.8	2.1	15.7	19.4
Father's education								
Less than High School	30124	67.7%	91.6	2.0	62.9	2.0	17.0	19.0
High School	10668	24.0%	91.3	2.2	60.4	2.1	14.9	20.1
Technical Education	705	1.6%	87.9	3.8	56.0	3.0	12.2	24.4
Professional Education	2984	6.7%	91.3	2.3	56.4	2.6	9.2	25.9
Mother's education								
Less than High School	27734	62.4%	91.6	2.0	62.6	2.1	17.2	19.0
High School	12128	27.3%	91.1	2.1	60.5	2.0	15.3	19.9
Technical Education	860	1.9%	89.5	3.1	60.8	2.7	13.3	24.9
Professional Education	3759	8.5%	91.4	2.5	59.8	2.3	8.9	24.7
Nature of the institution								
Private	10245	23.0%	90.0	2.4	54.6	2.8	10.3	27.5
Public	34236	77.0%	91.8	2.0	63.9	1.9	17.6	17.5
SABER 11 2010 Classification†								
Very Inferior	13	0.0%	100.0	0.0	69.2	0.0	15.4	7.7
Inferior	1718	3.9%	88.9	2.3	69.0	2.9	25.0	12.8
Low	7271	16.5%	90.9	2.2	66.4	2.0	21.2	14.9
Medium	13604	30.8%	92.0	1.9	64.8	1.7	19.2	16.2
High	11355	25.7%	92.0	2.1	60.8	2.0	14.1	20.5
Superior	6746	15.3%	92.2	1.8	58.0	2.1	9.8	23.2
Very Superior	3464	7.8%	88.2	2.9	46.6	3.9	4.8	39.7
Total	44481	100%	91.4	2.1	61.8	2.1	15.9	19.8

Source: Own calculations based on a 10% student sample from SABER 11 2013-II.
† data from ICFES oficial classification for 2010 if 2011 is not avialable.

Table 5: Interval Regression Marginal Effects I

Ed. Level:	A. Income Levels High School	Technical	Professional	B. Returns Technical	Professional
Individual and Family					
Age	0.69	1.25	−7.98	−0.01	−1.42
	(3.66)	(3.80)	(6.46)	(0.87)	(2.01)
Male	45.65***	61.56***	11.61	−3.36	−21.31***
	(9.53)	(10.11)	(16.60)	(2.05)	(4.69)
Any handicap	−173.59***	−202.60***	−518.87***	23.01	29.92
	(44.92)	(66.58)	(120.89)	(16.08)	(39.19)
SABER11: Verbal Score	−22.35***	−25.58***	29.85***	2.35*	15.77***
	(5.85)	(5.95)	(9.75)	(1.37)	(3.20)
SABER11: Maths Score	−19.82***	−21.57***	25.19***	2.23*	13.82***
	(5.53)	(5.82)	(9.58)	(1.28)	(3.03)
Family socio-economic index	6.17***	8.68***	17.11***	−0.43***	−0.99***
	(0.56)	(0.57)	(0.91)	(0.13)	(0.30)
Father Education					
Less than High School	−7.98	−4.61	7.31	1.45	5.24
	(11.65)	(11.98)	(19.55)	(2.74)	(6.50)
Technical Education	97.23**	49.58	25.49	−16.29**	−42.56**
	(44.31)	(41.61)	(64.39)	(8.10)	(19.28)
Professional Education	−10.72	35.76*	105.94***	7.60	19.99*
	(20.78)	(21.74)	(34.69)	(5.03)	(12.01)
Mother Education					
Less than High School	−6.49	1.90	10.07	1.94	4.81
	(11.19)	(11.58)	(18.89)	(2.63)	(6.22)
Technical Education	26.86	−14.51	30.40	−8.52	−9.83
	(36.93)	(36.85)	(59.57)	(7.64)	(19.05)
Professional Education	−26.78	−56.09***	53.66*	−0.58	22.05*
	(19.11)	(19.04)	(31.08)	(4.59)	(11.42)
Number of Obs.			133443		
Number of Indiv.			44481		
LR χ^2 (92) test [p-val]			77434.4842 [0.00]		
Log-likelihood			-267100.2570793371		
AIC			534388.51		
BIB			535309.85		
Percentage of LB hits / UB hits			65.05 / 64.22		

Significance: * 10%, ** 5%, *** 1%.
Calculated by the Delta method at the averages.

Table 6: Interval Regression Marginal Effects II

Ed. Level:	A. Income Levels			B. Returns	
	High School	Technical	Professional	Technical	Professional
School					
SABER11: Mean Maths Scores	39.94**	120.44***	259.36***	5.71	13.25
	(20.08)	(20.94)	(33.89)	(4.56)	(10.97)
SABER11: Mean Verbal Scores	−32.49	5.88	165.91***	9.12*	39.17***
	(23.07)	(23.76)	(38.72)	(5.29)	(12.52)
SABER11: % Male Test Takers	21.51	56.42	−21.84	1.96	−14.27
	(37.59)	(37.87)	(57.26)	(8.44)	(19.94)
SABER11: N. Exam-takers	0.03	0.21***	0.41***	0.02**	0.04
	(0.05)	(0.06)	(0.10)	(0.01)	(0.03)
Afternoon, evening or weekends journey	−8.95	9.91	31.52	3.65	9.02
	(11.95)	(12.59)	(21.01)	(2.90)	(6.80)
Technical Education	7.40	−0.39	−19.72	−1.93	−6.46
	(9.63)	(9.94)	(16.38)	(2.19)	(5.13)
Private Administration	35.36***	21.69	61.83***	−5.93**	−10.04
	(12.88)	(13.57)	(21.97)	(2.66)	(6.53)
Non Mixed Gender	10.26	−37.80	−51.01	−7.54	−12.02
	(22.94)	(23.37)	(36.06)	(4.93)	(11.79)
Municipality					
Quality of Life	3.79***	3.31**	10.02***	−0.54*	−0.68
	(1.32)	(1.45)	(2.35)	(0.30)	(0.72)
MD. Poverty rate	253.65***	174.60*	504.87***	−41.97**	−67.23
	(84.17)	(90.91)	(148.03)	(19.58)	(46.09)
Homicide rate 2009	−0.21	−0.57***	−1.14***	−0.02	−0.04
	(0.16)	(0.16)	(0.26)	(0.04)	(0.09)
Total Attacks 2005-2009	3.61***	4.55***	7.49***	−0.32	−0.92*
	(0.93)	(0.95)	(1.52)	(0.21)	(0.51)
Total Population	−2.74***	−1.03	2.47**	0.57***	1.78***
	(0.74)	(0.74)	(1.20)	(0.17)	(0.40)
Urban-Rural Ratio	0.14*	0.08	−0.25**	−0.03	−0.11**
	(0.08)	(0.08)	(0.12)	(0.02)	(0.04)
Gold Mines	−47.52***	−49.05***	−103.62***	6.08*	12.16
	(13.68)	(14.25)	(23.62)	(3.41)	(8.08)
Coal mines	6.63	21.65	38.46*	1.16	1.58
	(12.97)	(13.38)	(21.62)	(2.97)	(7.01)
Department					
Avg. wage 11 years of education	3.19***	3.87***	2.55*	−0.30	−1.35***
	(0.82)	(0.82)	(1.34)	(0.19)	(0.45)
Wage premium 16 to 11 years of educ.	51.46*	39.00	74.95	−8.04	−17.28
	(28.94)	(29.05)	(48.17)	(6.71)	(15.80)
Constants		625.16	1402.82		

Significance: * 10%, ** 5%, *** 1%.
Calculated by the Delta method at the averages.

Table 7: Ordered Probit Marginal Effects I

	Lowest Category					Highest Category				
	On Income Levels			Difference		Income Levels			Difference	
	HS	Techn.	Profes.	Techn.	Profes.	HS	Techn.	Profes.	Techn.	Profes.
Individual and Family										
Age	−0.45**	0.02	0.05**	0.47**	0.50**	0.00**	−0.00	−0.17**	−0.00	−0.17**
	(0.22)	(0.08)	(0.02)	(0.20)	(0.21)	(0.00)	(0.01)	(0.07)	(0.01)	(0.07)
Male	−4.52***	−1.26***	0.01	3.26***	4.53***	0.01***	0.12***	−0.05	0.12***	−0.06
	(0.56)	(0.20)	(0.05)	(0.51)	(0.56)	(0.00)	(0.02)	(0.17)	(0.02)	(0.17)
Any handicap	10.96***	4.19**	1.81***	−6.77*	−9.15**	−0.01***	−0.30***	−4.00***	−0.29***	−3.99***
	(3.92)	(1.85)	(0.64)	(3.53)	(3.94)	(0.00)	(0.10)	(0.85)	(0.10)	(0.85)
SABER11: Verbal Score	1.67***	0.33***	−0.12***	−1.35***	−1.80***	−0.00***	−0.03***	0.46***	−0.03**	0.46***
	(0.33)	(0.12)	(0.03)	(0.30)	(0.33)	(0.00)	(0.01)	(0.10)	(0.01)	(0.10)
SABER11: Maths Score	1.33***	0.24**	−0.10***	−1.09***	−1.42***	−0.00***	−0.02**	0.36***	−0.02*	0.36***
	(0.32)	(0.12)	(0.03)	(0.29)	(0.32)	(0.00)	(0.01)	(0.10)	(0.01)	(0.10)
Family socio-economic index	−0.43***	−0.17***	−0.04***	0.26***	0.39***	0.00***	0.02***	0.16***	0.02***	0.16***
	(0.03)	(0.01)	(0.00)	(0.03)	(0.03)	(0.00)	(0.00)	(0.01)	(0.00)	(0.01)
Father Education										
Less than High School	0.92	0.11	−0.00	−0.81	−0.92	−0.00	−0.01	0.01	−0.01	0.01
	(0.66)	(0.24)	(0.05)	(0.60)	(0.66)	(0.00)	(0.02)	(0.20)	(0.02)	(0.20)
Technical Education	−3.81*	−0.78	−0.03	3.04	3.78*	0.01	0.08	0.11	0.07	0.10
	(2.26)	(0.77)	(0.17)	(2.04)	(2.25)	(0.00)	(0.08)	(0.63)	(0.08)	(0.63)
Professional Education	0.86	−0.83**	−0.26***	−1.69	−1.12	−0.00	0.08*	1.06***	0.09**	1.06***
	(1.16)	(0.40)	(0.08)	(1.04)	(1.15)	(0.00)	(0.04)	(0.35)	(0.04)	(0.35)
Mother Education										
Less than High School	0.37	0.08	−0.01	−0.29	−0.38	−0.00	−0.01	0.05	−0.01	0.05
	(0.64)	(0.23)	(0.05)	(0.58)	(0.63)	(0.00)	(0.02)	(0.19)	(0.02)	(0.19)
Technical Education	−0.36	0.38	−0.07	0.74	0.29	0.00	−0.04	0.26	−0.04	0.26
	(2.01)	(0.72)	(0.15)	(1.82)	(2.01)	(0.00)	(0.07)	(0.58)	(0.06)	(0.58)
Professional Education	2.67**	0.91**	−0.18**	−1.76*	−2.85***	−0.00***	−0.08**	0.69**	−0.08**	0.69**
	(1.07)	(0.38)	(0.07)	(0.96)	(1.06)	(0.00)	(0.03)	(0.31)	(0.03)	(0.31)

Number of Obs.	133443
Number of Indiv.	44481
LR χ^2 (92) test [p-val]	36516.3025 [0.00]
Log-likelihood	-168191.5554382479
AIC	336577.11
BIB	337527.85

Significance: * 10%, ** 5%, *** 1%. Calculated by the Delta method at the averages.

Table 8: Ordered Probit Marginal Effects II

	Lowest Category					Highest Category				
	On Income Levels			Difference		Income Levels			Difference	
	HS	Techn.	Profes.	Techn.	Profes.	HS	Techn.	Profes.	Techn.	Profes.
School										
SABER11: Mean Maths Scores	−2.47**	−2.25***	−0.55***	0.21	1.92*	0.00**	0.22***	2.03***	0.21***	2.02***
	(1.17)	(0.41)	(0.09)	(1.05)	(1.16)	(0.00)	(0.04)	(0.33)	(0.04)	(0.33)
SABER11: Mean Verbal Scores	2.14	−0.03	−0.51***	−2.17*	−2.65**	−0.00	0.00	1.88***	0.01	1.88***
	(1.36)	(0.48)	(0.11)	(1.22)	(1.35)	(0.00)	(0.05)	(0.40)	(0.05)	(0.40)
% Male Test Takers	−1.49	−0.49	0.07	1.00	1.56	0.00	0.05	−0.27	0.04	−0.27
	(1.96)	(0.71)	(0.15)	(1.74)	(1.94)	(0.00)	(0.07)	(0.56)	(0.07)	(0.56)
N. Exam-takers	−0.00*	−0.00***	−0.00***	0.00	0.00	0.00	0.00***	0.00***	0.00***	0.00***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Afternoon, evening or weekends journey	0.26	−0.39	−0.10*	−0.65	−0.35	−0.00	0.04	0.36*	0.04	0.36*
	(0.70)	(0.25)	(0.06)	(0.64)	(0.70)	(0.00)	(0.03)	(0.22)	(0.02)	(0.22)
Technical Education	−0.26	0.12	0.08*	0.38	0.34	0.00	−0.01	−0.29*	−0.01	−0.29*
	(0.56)	(0.20)	(0.05)	(0.51)	(0.56)	(0.00)	(0.02)	(0.17)	(0.02)	(0.17)
Private Administration	−2.65***	−0.41	−0.18***	2.23***	2.47***	0.00***	0.04	0.68***	0.04	0.67***
	(0.74)	(0.26)	(0.06)	(0.66)	(0.73)	(0.00)	(0.03)	(0.22)	(0.03)	(0.22)
Non Mixed Gender	−0.07	0.93**	0.21**	1.00	0.28	0.00	−0.08**	−0.73**	−0.08**	−0.73**
	(1.22)	(0.46)	(0.10)	(1.09)	(1.21)	(0.00)	(0.04)	(0.33)	(0.04)	(0.33)
Municipality										
Quality of Life	−0.21***	−0.02	−0.02***	0.19***	0.19**	0.00**	0.00	0.07***	0.00	0.07***
	(0.08)	(0.03)	(0.01)	(0.07)	(0.08)	(0.00)	(0.00)	(0.03)	(0.00)	(0.03)
MD. Poverty rate	−15.12***	−0.94	−0.93**	14.19***	14.19***	0.02***	0.09	3.44**	0.07	3.41**
	(4.99)	(1.87)	(0.42)	(4.48)	(4.95)	(0.01)	(0.18)	(1.55)	(0.18)	(1.55)
Homicide rate 2009	0.01	0.01**	0.00***	−0.01	−0.01	−0.00	−0.00**	−0.01***	−0.00**	−0.01***
	(0.01)	(0.00)	(0.00)	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Total Attacks 2005-2009	−0.15***	−0.07***	−0.02***	0.08*	0.14***	0.00***	0.01***	0.06***	0.01***	0.06***
	(0.05)	(0.02)	(0.00)	(0.04)	(0.05)	(0.00)	(0.00)	(0.02)	(0.00)	(0.02)
Total Population	0.10**	0.01	−0.01*	−0.09**	−0.11***	−0.00**	−0.00	0.02*	−0.00	0.02*
	(0.04)	(0.02)	(0.00)	(0.04)	(0.04)	(0.00)	(0.00)	(0.01)	(0.00)	(0.01)
Urban-Rural Ratio	−0.01**	−0.00	0.00	0.01*	0.01**	0.00	0.00	−0.00	0.00	−0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Gold Mines	2.04**	0.97***	0.31***	−1.07	−1.73**	−0.00***	−0.09***	−1.07***	−0.09***	−1.06***
	(0.82)	(0.31)	(0.08)	(0.73)	(0.81)	(0.00)	(0.03)	(0.23)	(0.03)	(0.23)
Coal Mines	0.67	−0.48*	−0.12**	−1.15*	−0.80	−0.00	0.05*	0.47**	0.05*	0.48**
	(0.76)	(0.27)	(0.06)	(0.68)	(0.75)	(0.00)	(0.03)	(0.23)	(0.03)	(0.23)
Department										
Avg. wage 11 years of education	−0.24***	−0.09***	−0.01*	0.15***	0.23***	0.00***	0.01***	0.03*	0.01***	0.03*
	(0.05)	(0.02)	(0.00)	(0.04)	(0.05)	(0.00)	(0.00)	(0.01)	(0.00)	(0.01)
Wage premium 16 to 11 years of educ.	1.96	−0.52	−0.24*	−2.48	−2.21	−0.00	0.05	0.90*	0.05	0.91*
	(1.69)	(0.60)	(0.14)	(1.54)	(1.68)	(0.00)	(0.06)	(0.51)	(0.06)	(0.51)

Significance: * 10%, ** 5%, *** 1%. Calculated by the Delta method at the averages.

A Appendix: Tables

Table 9: Data Restrictions

Original Sample	56822	
Sample restrictions		
Variables	**Obs**	**Percent**
SABER 11: Verbal Scores of 0 or above 100	1393	2.45%
SABER 11: Maths Scores of 0 or above 100	1390	2.45%
Test-taker aged above 30	3176	5.59%
Night journey school	4902	8.63%
Weekends journey school	3097	5.45%
Sample after restrictions (% original sample)	47460	83.52%
Observations lost due to missings after restrictions		
Variables	**Obs**	**Percent**
Father Ed: Less than High School	7	0.01%
Father Ed: Technical Education	7	0.01%
Father Ed: Professional Education	7	0.01%
Mother Ed: Less than High School	7	0.01%
Mother Ed: Technical Education	7	0.01%
Mother Ed: Professional Education	7	0.01%
Wage premium 16 to 11 years of educ.	1219	2.57%
Avg. wage 11 years of educ.	1219	2.57%
Quality of Life	76	0.16%
MD. Poverty rate	64	0.13%
Homicide rate 2009	62	0.13%
Urban-Rural Ratio	62	0.13%
Technical Orientation	2	0.00%
Private Administration	1771	3.73%
Non Mixed Gender	1771	3.73%
Final Sample (% restricted sample)	44481	93.7%

Source: Own calculations based on a 10% student sample from SABER 11 2013-II.

Table 10: Interval Regression Other Covariates Part I

	Specification 1			Specification 2			Specification 3			Main Results		
	H.School	Tech.	Profess.	H.School	Tech.	Profess.	H.School	Tech.	Profess.	H.School	Tech.	Profess.
Individual and Family												
Age	5.32	0.50	−34.50***	0.95	−0.29	−14.35**	0.56	1.63	−7.73	0.69	1.25	−7.98
	(3.58)	(3.72)	(6.39)	(3.65)	(3.78)	(6.50)	(3.66)	(3.79)	(6.47)	(3.66)	(3.80)	(6.46)
Male	42.39***	580.24***	2299.47***	47.53***	63.25***	−12.56	45.85***	60.84***	9.28	45.65***	61.56***	11.61
	(8.97)	(116.06)	(201.04)	(9.12)	(9.61)	(15.78)	(9.54)	(10.13)	(16.64)	(9.53)	(10.11)	(16.60)
Any handicap	−160.65***	0.00***	0.00***	−174.10***	−185.97***	−464.31***	−174.68***	−196.96***	−502.73***	−173.59***	−202.60***	−518.87***
	(45.08)	(0.00)	(0.00)	(44.88)	(66.85)	(122.23)	(44.84)	(66.60)	(120.94)	(44.92)	(66.58)	(120.89)
SABER11: Verbal Score				−22.70***	−8.20	87.39***	−23.01***	−26.63***	27.46***	−22.35***	−25.58***	29.85***
				(5.54)	(5.67)	(9.31)	(5.85)	(5.97)	(9.77)	(5.85)	(5.95)	(9.75)
SABER11: Maths Score				−15.65***	1.80	92.22***	−20.12***	−21.93***	24.50**	−19.82***	−21.57***	25.19***
				(5.17)	(5.48)	(9.03)	(5.53)	(5.83)	(9.60)	(5.53)	(5.82)	(9.58)
Family socio-economic index	6.17***	12.17***	31.02***	6.99***	12.30***	27.19***	6.33***	9.26***	18.13***	6.17***	8.68***	17.11***
	(0.49)	(0.51)	(0.80)	(0.51)	(0.53)	(0.82)	(0.55)	(0.56)	(0.90)	(0.56)	(0.57)	(0.91)
Father Education												
Less than High School	−9.95	0.00***	0.00***	−9.96	−11.54	−11.62	−9.30	−8.61	−3.96	−7.98	−4.61	7.31
	(11.57)	(0.00)	(0.00)	(11.56)	(11.97)	(19.60)	(11.57)	(11.95)	(19.51)	(11.65)	(11.98)	(19.55)
Technical Education	95.68**	0.00***	0.00***	99.76**	67.83	67.39	98.66**	59.30	43.00	97.23**	49.58	25.49
	(44.37)	(0.00)	(0.00)	(44.35)	(41.56)	(64.80)	(44.29)	(41.67)	(64.52)	(44.31)	(41.61)	(64.39)
Professional Education	−14.70	0.00***	0.00***	−6.48	48.24**	144.74***	−9.01	38.76*	111.45***	−10.72	35.76*	105.94***
	(20.73)	(0.00)	(0.00)	(20.74)	(21.71)	(34.77)	(20.77)	(21.73)	(34.71)	(20.78)	(21.74)	(34.69)
Mother Education												
Less than High School	−7.72	0.00***	0.00***	−8.11	−2.64	0.86	−8.48	−1.00	5.85	−6.49	1.90	10.07
	(11.18)	(0.00)	(0.00)	(11.18)	(11.59)	(18.98)	(11.19)	(11.58)	(18.90)	(11.19)	(11.58)	(18.89)
Technical Education	25.99	0.00***	0.00***	30.66	−1.45	64.07	29.24	−9.59	39.99	26.86	−14.51	30.40
	(36.97)	(0.00)	(0.00)	(36.93)	(36.77)	(59.86)	(36.97)	(36.86)	(59.77)	(36.93)	(36.85)	(59.57)
Professional Education	−31.29*	0.00***	0.00***	−22.55	−45.82**	92.34***	−26.18	−58.83***	50.16	−26.78	−56.09***	53.66*
	(18.99)	(0.00)	(0.00)	(19.03)	(18.99)	(31.26)	(19.10)	(19.03)	(31.12)	(19.11)	(19.04)	(31.08)
Number of Obs.	133443			133443			133443			133443		
Number of Indiv.	44481			44481			44481			44481		
LR $\chi^2 test(df)[p-val]$	73068.6720 (32)[0.00]			74580.8835 (38)[0.00]			76202.4043 (62)[0.00]			77434.4843 (92)[0.00]		
Log-likelihood	-268333.2032468044			-268031.9445184394			-267366.9648388891			-267100.2570793371		
AIC	536734.41			536143.89			534861.93			534388.51		
BIC	537067.66			536535.95			535489.22			535309.85		
Percentage of LB hits / UB hits	64.32 / 63.40			64.57 / 63.67			64.90 / 64.05			65.05 / 64.22		

Significance: * 10%, ** 5%, *** 1%.
Calculated by the Delta method at the averages.

Table 11: Interval Regression Other Covariates Part II

	Specification 1			Specification 2			Specification 3			Main Results		
	H.School	Tech.	Profess.	H.School	Tech.	Profess.	H.School	Tech.	Profess.	H.School	Tech.	Profess.
School												
SABER11: Std Mean Maths Scores							34.73*	90.30***	208.74***	39.94**	120.44***	259.36***
							(19.35)	(20.33)	(32.85)	(20.08)	(20.94)	(33.89)
SABER11: Std Mean Verbal Scores							−31.35	64.85***	259.68***	−32.49	5.88	165.91***
							(20.97)	(22.00)	(35.46)	(23.07)	(23.76)	(38.72)
School: % Male Test Takers							19.87	70.18*	7.66	21.51	56.42	−21.84
							(37.42)	(37.67)	(56.96)	(37.59)	(37.87)	(57.26)
School: N. Exam-takers							0.05	0.27***	0.56***	0.03	0.21***	0.41***
							(0.05)	(0.05)	(0.09)	(0.05)	(0.06)	(0.10)
Afternoon, evening or weekends journey							−1.54	34.94***	90.08***	−8.95	9.91	31.52
							(11.59)	(12.15)	(20.32)	(11.95)	(12.59)	(21.01)
Technical Orientation							7.26	−15.98*	−59.07***	7.40	−0.39	−19.72
							(9.20)	(9.63)	(15.96)	(9.63)	(9.94)	(16.38)
Private Administration							40.63***	46.39***	119.53***	35.36***	21.69	61.83***
							(12.76)	(13.34)	(21.59)	(12.88)	(13.57)	(21.97)
Non Mixed Gender							12.00	−45.18*	−55.22	10.26	−37.80	−51.01
							(22.76)	(23.16)	(35.75)	(22.94)	(23.37)	(36.06)
Municipality												
Quality of Life										3.79***	3.31**	10.02***
										(1.32)	(1.45)	(2.35)
MD. Poverty rate										253.65***	174.60*	504.87***
										(84.17)	(90.91)	(148.03)
Homicide rate 2009										−0.21	−0.57***	−1.14***
										(0.16)	(0.16)	(0.26)
Total Attacks 2005-2009										3.61***	4.55***	7.49***
										(0.93)	(0.95)	(1.52)
Total Population										−2.74***	−1.03	2.47**
										(0.74)	(0.74)	(1.20)
Urban-Rural Ratio										0.14*	0.08	−0.25**
										(0.08)	(0.08)	(0.12)
Gold mines										−47.52***	−49.05***	−103.62***
										(13.68)	(14.25)	(23.62)
Coal mines										6.63	21.65	38.46*
										(12.97)	(13.38)	(21.62)
Department												
Avg. wage 11 years of educ.										3.19***	3.87***	2.55*
										(0.82)	(0.82)	(1.34)
Wage premium 16 to 11 years of educ.										51.46*	39.00	74.95
										(28.94)	(29.05)	(48.17)

Significance: * 10%, ** 5%, *** 1%.

Table 12: Interval Regression Other Cutoffs Part I

	Main Results			Lower Cutoffs			High Cutoffs			Midpoint Cutoffs		
	H.School	Tech.	Profess.	H.School	Tech.	Profess.	H.School	Tech.	Profess.	H.School	Tech.	Profess.
Individual and Family												
Age	0.69	1.25	−7.98	−0.58	0.84	−5.51	2.61	0.47	−9.55	1.01	0.67	−7.57
	(3.66)	(3.80)	(6.46)	(3.42)	(3.32)	(6.45)	(3.92)	(3.93)	(6.45)	(3.66)	(3.61)	(6.45)
Male	45.65***	61.56***	11.61	39.04***	47.95***	11.27	58.84***	60.83***	7.10	48.89***	54.31***	9.25
	(9.53)	(10.11)	(16.60)	(8.90)	(8.85)	(16.78)	(10.18)	(10.35)	(16.48)	(9.49)	(9.56)	(16.62)
Any handicap	−173.59***	−202.60***	−518.87***	−165.31***	−178.84***	−505.28***	−193.98***	−205.61***	−499.53***	−179.57***	−191.80***	−503.45***
	(44.92)	(66.58)	(120.89)	(38.04)	(54.75)	(118.58)	(53.03)	(69.84)	(119.75)	(45.45)	(61.98)	(119.09)
SABER11: Verbal Score	−22.35***	−25.58***	29.85***	−17.61***	−22.66***	25.37**	−25.28***	−23.39***	32.61***	−21.39***	−23.03***	29.12***
	(5.85)	(5.95)	(9.75)	(5.50)	(5.22)	(9.86)	(6.21)	(6.08)	(9.65)	(5.83)	(5.62)	(9.75)
SABER11: Maths Score	−19.82***	−21.57***	25.19***	−17.19***	−19.40***	21.98**	−22.02***	−19.07***	27.46***	−19.57***	−19.24***	24.82***
	(5.53)	(5.82)	(9.58)	(5.19)	(5.10)	(9.71)	(5.90)	(5.95)	(9.46)	(5.52)	(5.50)	(9.59)
Family socio-economic index	6.17***	8.68***	17.11***	5.48***	7.39***	17.38***	7.04***	8.88***	16.82***	6.25***	8.12***	17.13***
	(0.56)	(0.57)	(0.91)	(0.52)	(0.50)	(0.93)	(0.59)	(0.58)	(0.90)	(0.55)	(0.54)	(0.91)
Father Education												
Less than High School	−7.98	−4.61	7.31	−9.29	−3.07	12.60	−11.93	−4.36	6.36	−10.64	−3.70	9.38
	(11.65)	(11.98)	(19.55)	(10.98)	(10.55)	(19.81)	(12.39)	(12.24)	(19.35)	(11.63)	(11.34)	(19.58)
Technical Education	97.23**	49.58	25.49	85.36**	41.60	21.51	95.31**	47.44	20.83	90.13**	44.51	21.42
	(44.31)	(41.61)	(64.39)	(41.45)	(37.02)	(65.73)	(46.44)	(42.32)	(63.35)	(43.77)	(39.52)	(64.55)
Professional Education	−10.72	35.76*	105.94***	−10.65	31.69	105.96***	−13.37	39.57*	104.89***	−12.01	35.55*	105.64***
	(20.78)	(21.74)	(34.69)	(19.57)	(19.37)	(35.76)	(22.05)	(22.05)	(34.04)	(20.72)	(20.63)	(34.90)
Mother Education												
Less than High School	−6.49	1.90	10.07	−4.85	3.06	12.41	−6.29	0.80	8.98	−5.55	1.98	10.64
	(11.19)	(11.58)	(18.89)	(10.52)	(10.18)	(19.15)	(11.91)	(11.83)	(18.71)	(11.16)	(10.96)	(18.93)
Technical Education	26.86	−14.51	30.40	21.53	−5.80	34.03	22.67	−12.75	30.27	22.03	−9.27	32.24
	(36.93)	(36.85)	(59.57)	(34.36)	(32.61)	(60.86)	(38.96)	(37.38)	(58.41)	(36.52)	(34.85)	(59.64)
Professional Education	−26.78	−56.09***	53.66*	−24.35	−45.05***	47.91	−34.54*	−51.69***	54.84*	−29.42	−48.35***	51.65*
	(19.11)	(19.04)	(31.08)	(18.02)	(16.83)	(31.97)	(20.23)	(19.35)	(30.51)	(19.05)	(18.01)	(31.24)
Number of Obs.	133443			133443			133443			133443		
Number of Indiv.	44481			44481			44481			44481		
LR $\chi^2 test(df)[p-val]$	77434.4843 (92)[0.00]			61668.4833 (92)[0.00]			86231.6987 (92)[0.00]			73790.9027 (92)[0.00]		
Log-likelihood	-267100.2570793371			-230546.1182243704			-208132.1712545286			-216302.5017330518		
AIC	534388.51			461280.24			416452.34			432793.00		
BIC	535309.85			462201.57			417373.68			433714.34		
Percentage of LB hits / UB hits	65.05 / 64.22			64.83 / 64.07			65.24 / 64.27			65.10 / 64.23		

Significance: * 10%, ** 5%, *** 1%.
Calculated by the Delta method at the averages.

Table 13: Interval Regression Other Cutoffs Part II

	Main Results			Lower Cutoffs			High Cutoffs			Midpoint Cutoffs		
	H.School	Tech.	Profess.	H.School	Tech.	Profess.	H.School	Tech.	Profess.	H.School	Tech.	Profess.
School												
SABER11: Std Mean Maths Scores	39.94**	120.44***	259.36***	34.93*	99.93***	274.12***	44.01**	119.84***	245.30***	39.38**	109.84***	259.85***
	(20.08)	(20.94)	(33.89)	(18.80)	(18.37)	(34.59)	(21.41)	(21.30)	(33.30)	(20.01)	(19.76)	(33.93)
SABER11: Std Mean Verbal Scores	−32.49	5.88	165.91***	−29.62	10.20	163.16***	−36.31	6.13	168.65***	−32.93	8.10	166.20***
	(23.07)	(23.76)	(38.72)	(21.61)	(20.73)	(39.03)	(24.62)	(24.32)	(38.39)	(23.01)	(22.42)	(38.70)
School: % Male Test Takers	21.51	56.42	−21.84	22.03	57.00*	−11.38	26.77	52.32	−20.62	24.37	54.71	−16.33
	(37.59)	(37.87)	(57.26)	(35.68)	(34.22)	(58.74)	(39.52)	(38.38)	(56.30)	(37.43)	(36.16)	(57.49)
School: N. Exam-takers	0.03	0.21***	0.41***	0.01	0.17***	0.43***	0.04	0.22***	0.42***	0.03	0.19***	0.42***
	(0.05)	(0.06)	(0.10)	(0.04)	(0.05)	(0.10)	(0.05)	(0.06)	(0.09)	(0.05)	(0.05)	(0.10)
Afternoon, evening or weekends journey	−8.95	9.91	31.52	−7.56	6.55	28.21	−8.19	12.30	31.73	−7.86	9.35	30.12
	(11.95)	(12.59)	(21.01)	(11.23)	(11.03)	(21.23)	(12.76)	(12.89)	(20.85)	(11.94)	(11.90)	(21.04)
Technical Orientation	7.40	−0.39	−19.72	6.54	−1.44	−19.96	7.35	−2.65	−22.10	6.94	−2.02	−21.03
	(9.63)	(9.94)	(16.38)	(9.04)	(8.68)	(16.53)	(10.26)	(10.18)	(16.27)	(9.61)	(9.39)	(16.40)
Private Administration	35.36***	21.69	61.83***	33.00***	18.63	66.62***	42.02***	21.80	65.40***	37.47***	20.22	65.97***
	(12.88)	(13.57)	(21.97)	(12.03)	(11.94)	(22.35)	(13.74)	(13.83)	(21.66)	(12.83)	(12.83)	(22.00)
Non Mixed Gender	10.26	−37.80	−51.01	11.90	−27.43	−47.76	9.41	−38.91	−56.79	10.63	−33.11	−52.36
	(22.94)	(23.37)	(36.06)	(21.77)	(21.15)	(37.18)	(24.17)	(23.70)	(35.43)	(22.87)	(22.33)	(36.28)
Municipality												
Quality of Life	3.79***	3.31**	10.02***	3.70***	2.75**	11.17***	4.10***	2.57*	9.35***	3.90***	2.66*	10.26***
	(1.32)	(1.45)	(2.35)	(1.24)	(1.26)	(2.35)	(1.42)	(1.49)	(2.35)	(1.32)	(1.37)	(2.35)
MD. Poverty rate	253.65***	174.60*	504.87***	244.01***	149.93*	583.02***	278.72***	134.52	469.80***	261.07***	142.52*	525.72***
	(84.17)	(90.91)	(148.03)	(79.04)	(79.24)	(148.86)	(90.07)	(93.23)	(147.40)	(84.16)	(85.82)	(148.08)
Homicide rate 2009	−0.21	−0.57***	−1.14***	−0.19	−0.49***	−1.19***	−0.23	−0.52***	−1.06***	−0.21	−0.50***	−1.13***
	(0.16)	(0.16)	(0.26)	(0.15)	(0.14)	(0.26)	(0.17)	(0.16)	(0.26)	(0.16)	(0.15)	(0.26)
Total Attacks 2005-2009	3.61***	4.55***	7.49***	3.10***	4.10***	7.95***	3.47***	4.44***	7.12***	3.27***	4.27***	7.54***
	(0.93)	(0.95)	(1.52)	(0.88)	(0.85)	(1.53)	(0.98)	(0.97)	(1.51)	(0.93)	(0.90)	(1.52)
Total Population	−2.74***	−1.03	2.47**	−2.48***	−0.96	2.28*	−2.64***	−0.98	2.29*	−2.55***	−0.96	2.30*
	(0.74)	(0.74)	(1.20)	(0.69)	(0.65)	(1.21)	(0.78)	(0.76)	(1.19)	(0.73)	(0.70)	(1.20)
Urban-Rural Ratio	0.14*	0.08	−0.25**	0.12*	0.05	−0.25*	0.15*	0.08	−0.23*	0.14*	0.07	−0.24*
	(0.08)	(0.08)	(0.12)	(0.07)	(0.07)	(0.13)	(0.08)	(0.08)	(0.12)	(0.08)	(0.07)	(0.13)
Gold mines	−47.52***	−49.05***	−103.62***	−45.24***	−45.81***	−109.00***	−47.81***	−51.64***	−106.75***	−46.46***	−48.58***	−107.89***
	(13.68)	(14.25)	(23.62)	(12.82)	(12.42)	(23.65)	(14.62)	(14.68)	(23.61)	(13.66)	(13.48)	(23.62)
Coal mines	6.63	21.65	38.46*	3.44	19.66*	36.69*	0.34	24.06*	38.71*	1.82	21.77*	37.78*
	(12.97)	(13.38)	(21.62)	(12.14)	(11.72)	(21.84)	(13.76)	(13.68)	(21.49)	(12.89)	(12.64)	(21.66)
Department												
Avg. wage 11 years of educ.	3.19***	3.87***	2.55*	3.15***	3.09***	2.45*	3.82***	4.02***	2.56*	3.48***	3.55***	2.51*
	(0.82)	(0.82)	(1.34)	(0.78)	(0.72)	(1.35)	(0.87)	(0.84)	(1.34)	(0.82)	(0.78)	(1.34)
Wage premium 16 to 11 years of educ.	51.46*	39.00	74.95	48.42*	39.31	79.26	31.09	38.83	79.95*	39.48	39.08	79.54*
	(28.94)	(29.05)	(48.17)	(27.35)	(25.40)	(48.32)	(30.71)	(29.87)	(48.00)	(28.91)	(27.49)	(48.15)

Significance: * 10%, ** 5%, *** 1%.
Calculated by the Delta method at the averages.