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# The Contrasting Role of Ability and Poverty on Education Attainment: Evidence from Indonesia

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# ABSTRACT

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Daniel Suryadarma and Asep Suryahadi

This study measures the relative role of poverty and scholastic ability on education attainment in developing countries, where a substantial portion of the population still live in poverty and poor people are markedly credit constrained. Different from most studies in developing countries, this paper uses a multiple-wave and long-spanning panel dataset that follows a cohort of children beginning from primary school until they are well over schooling age. We find that poverty has a statistically-significant and negative effect on junior high attainment, while it has a negligible effect on senior high completion. In contrast, scholastic ability plays no role in ensuring junior high completion but is crucial in increasing a child's chance to graduate from senior high school. In addition, we find that high- and low-ability poor children have a similarly low chance of finishing junior high school. Based on our findings, we formulate several policy recommendations to increase education attainment.

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# I. INTRODUCTION

Improving the education attainment of the population is an important requirement to foster development of a country. Hence, it is imperative to understand the factors that affect education attainment, in particular in the context of developing countries, where poverty is a major impediment in access to education. There is already available a large literature on the relationship between individual characteristics, family background, and education attainment. While there are competing methodological arguments in measuring the importance of various characteristics, there is a consensus that growing up in poverty has adverse effects on education attainment, while scholastic ability has a positive effect on education attainment.

The purpose of this study is to measure the relative importance of poverty and scholastic ability on secondary education attainment in Indonesia, where a substantial portion of the population still live in poverty. Most studies in developing countries focus on only one of the issues, with studies on the former (e.g., World Bank, 2004) being much more abundant than the latter (e.g., Glewwe, 2002). To our knowledge, there is only one study in developing country context whose main focus is the interaction of poverty and ability on education outcomes. Using Filipino data, Bacolod and Ranjan (2008) find that both household wealth and child ability play an important role in determining whether a child goes to school, works, or does neither. More importantly, they also find that even in poor households, high-ability children are more likely to be in school relative to low-ability children.

In this study, we use a long-spanning longitudinal dataset that allows us to follow a cohort of children from when they were in primary school until they were adults. Since the dataset consists of four waves, we observe the dynamics of poverty that our sample experiences. This allows us to look at both the effect of short- and long-term poverty on education outcomes. In addition, we have a direct measure of scholastic ability that is taken when the sample was around 12 years old. These two characteristics of the dataset enable us to measure the relative role of poverty and scholastic ability on an individual's education attainment.

We find that poverty has a statistically-significant and negative effect on junior high attainment, while it has a negligible effect on senior high completion. In contrast, scholastic ability plays no role in ensuring junior high completion but is crucial in increasing a child's chance to graduate from senior high school. In addition, we find that high- and low-ability children from poor families have a similarly low chance of finishing junior high.

We organize the rest of the paper as follows. The next section provides an overview of Indonesia with regards to poverty and education attainment. Section III describes the details of the Indonesian education system, specifically related to the cost of education and the national examination system. Section IV discusses a conceptual framework regarding the effect of poverty and scholastic ability on education progression. Section V describes the dataset. Section VI provides descriptive statistics on education attainment. Section VII contains our estimation strategy and the estimation results. The final section concludes.

## II.  INDONESIA: COUNTRY OVERVIEW

Indonesia is the fourth most populous country in the world after China, India, and the United States. In 2007, its population numbered at around 230 million people. With an income per capita of around US$2,000 in 2008, it is included in the group of lower middle income countries by the World Bank. Starting in the early 1970s, Indonesia enjoyed a rapid economic growth averaging 7% annually until the Asian economic crisis in 1997/98 grounded it to a halt. In 1998, the Indonesian economy contracted by more than 13%. Post-crisis recovery was relatively quick, but a decade later the economic growth had not returned to the high growth during the pre-crisis era, averaging around 5% annually.

### 2.1  Poverty

Three decades of high economic growth from the 1970s to the 1990s brought about large improvements in social welfare of the Indonesian people. This is notable in the reduction of the proportion of people living below the government's poverty line. Figure 1 shows that the poverty rate declined markedly from around 40% in 1976 to 11.3% in 1996. However, the advent of the 1997/98 economic crisis reversed the continuously declining poverty rate. In 1999, Statistics Indonesia (BPS—Badan Pusat Statistik) upgraded the standard it used in determining the poverty line and recalculated the 1996 poverty rate using the new standard. Based on this new standard, the crisis had caused the poverty rate to increase from 17.3% in 1996 to 23.4% in 1999.
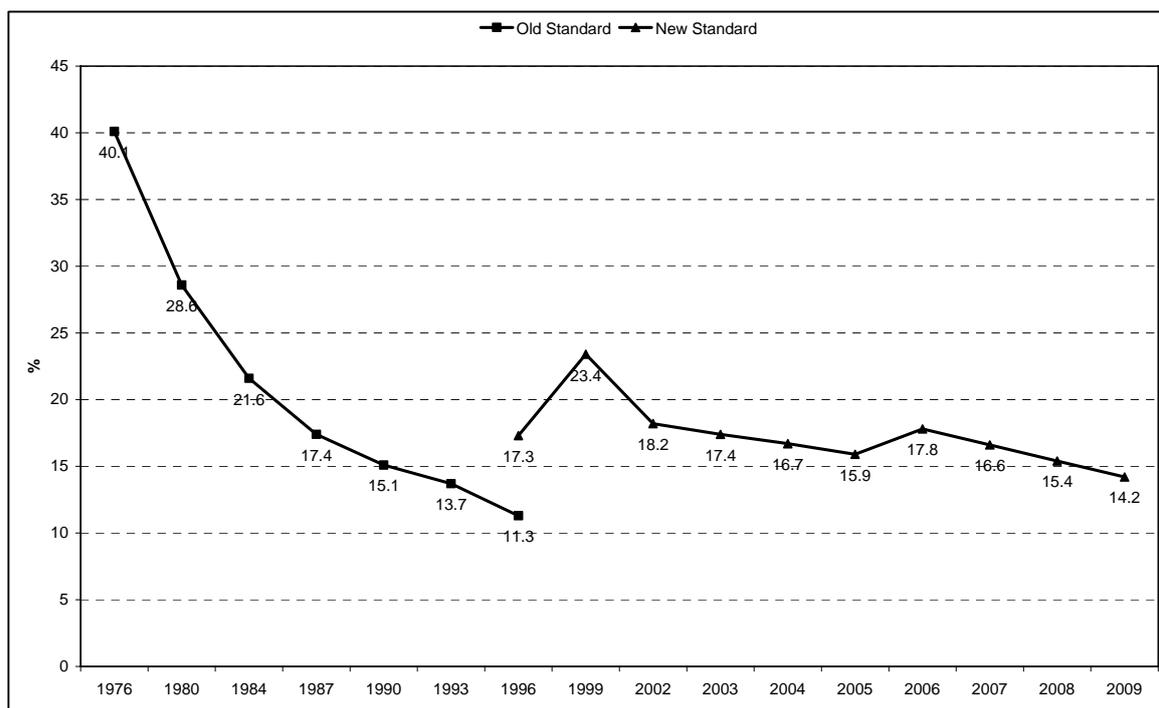


**Figure 1. The official poverty rates in Indonesia, 1976–2009**

Since then, poverty rate quickly decreased, reaching 18.2% in 2002 and 17.4% in the following year, which is about the level of the pre-crisis poverty rate in 1996. Poverty continued to decrease afterwards although at a slower rate compared with the pre-crisis high growth period. The exception was in 2006 when the poverty rate jumped to 17.8% from 15.9% in the previous year. This was due to the government policy to increase the domestic price of fuel by

an average of around 120%. At that time, the fast-increasing price of oil in the international market had caused a burgeoning oil subsidy in the government budget. To ease this budget pressure, the government decided to drastically increase the domestic sale price of fuel in order to reduce the oil subsidy. Following this episode, the poverty rate has returned to its gradual reduction, reaching 14.2% in 2009.

## 2.2  Education Attainment

During the pre-crisis high growth period, Indonesia invested heavily in its education sector, resulting in an expansion of education infrastructure across the country (Duflo, 2004). However, since it started from a very low base, the education profile of the Indonesian population is still dominated by primary education level. Figure 2 shows that in 2005 more than a half of the Indonesian labor force had only primary education or less. Among the rest, around 20% had junior high education, another 20% had senior high education, and only around 6% had tertiary education.
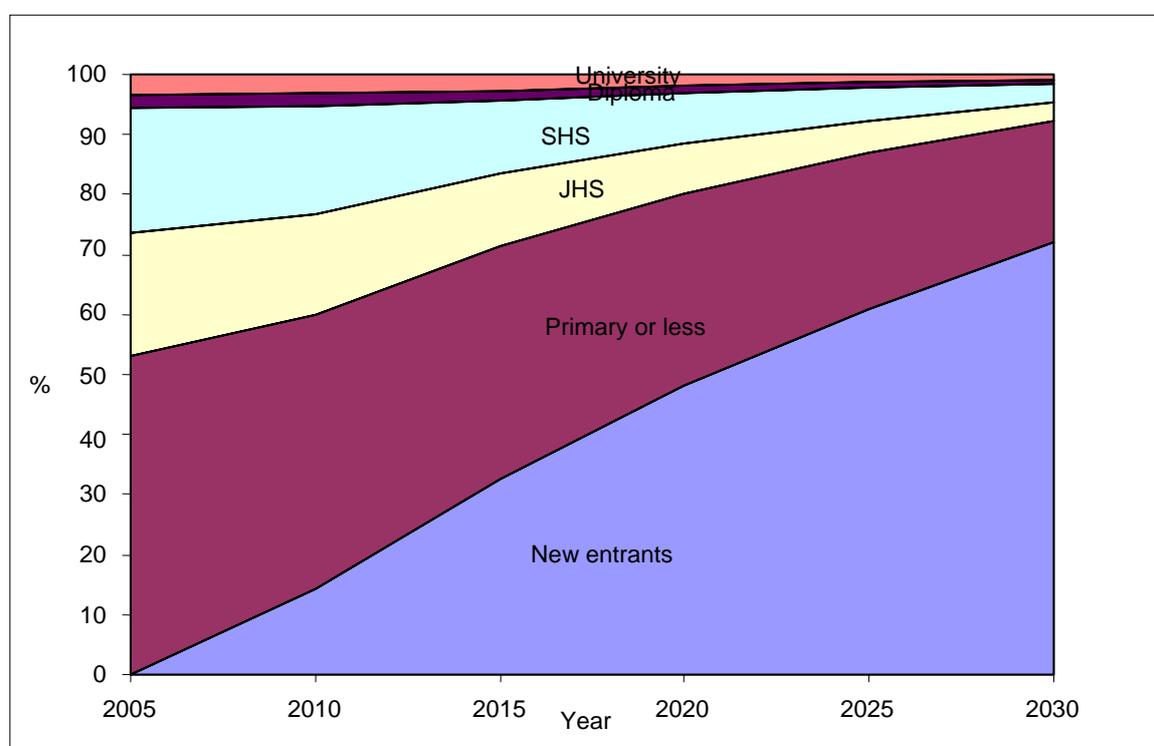


**Figure 2. The distribution of Indonesian labor force by education level**

Source: Adioetomo (2005) until 2025; linearly extended to 2030.

The figure also shows that a large proportion of this cohort of labor force will remain in the labor market long into the future. In fact, around 25% of them will remain part of the labor force even 25 years later. Since there is only a very small probability that the existing cohort will upgrade their educational attainment over time, the education profile of the future Indonesian labor force will be very much influenced by the education attainment of the new entrants into the labor force. Therefore, it is important to identify and overcome the existing barriers to education.

# III. THE INDONESIAN PRIMARY AND SECONDARY EDUCATION SYSTEM

Delivery of education in Indonesia is decentralized, meaning that it is the local government's responsibility to maintain schools and pay teacher salaries. The role of the central government is limited to designing the core curriculum and providing grants to schools that need additional funding.[1] There are three characteristics of the Indonesian education system that are relevant to the issues we focus on in this study.

The first characteristic is the categorization of primary and secondary education. Primary education is six years long, followed by junior high education for three years and senior high education for another three years. Typically, children enter the primary education system at around 7 years of age and, assuming no class repetition, graduate from senior high education at around 18 years of age.

The second characteristic is the cost of education, which is important given our focus on the effect of poverty on education attainment. The only comprehensive study on this issue in Indonesia that we could find is Ghozali (2006). According to his estimates, the total actual annual cost per pupil is around Rp8.5 million for the primary level, Rp10.4 million for the junior high level, and Rp13.5 million for the senior high level. Furthermore, he also breaks down the spending according to out of pocket household expenditure and public expenditure. At the primary level, on average households bear 81% of the annual cost. Similarly, at the junior and senior high levels, the share of the cost bore by households is 78% and 80% respectively.

The poverty line in Indonesia in 2006 was Rp114,619 per person per month. For a family of five, this is equivalent to Rp6.9 million per year. This means that the out of pocket education expenses are equal to 100% of the poverty line for primary level, 118% of the poverty line for junior high level, and 157% of the poverty line for senior high level. Hence, it is obvious that for poor families, the cost of education is a major impediment in accessing education services.

The final characteristic pertains to the national exit examinations.[2] At the end of each education level, a student is required to pass a national examination in order to successfully graduate. Students who fail the examination are required to redo the final grade and retake the examination the year after. The national examinations are designed by the central government and are comparable across the country. At the primary level, students are tested on five subjects: mathematics, social science, natural science, Indonesian language, and moral studies. At the junior high level, the tests include the same five subjects plus English. At the senior high level, the test subjects differ according to the student's chosen major of either social or natural sciences.

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[1]In addition to a general education system, there is an Islamic education system that is centralized under the Ministry of Religious Affairs. Compared with the general education system, the Islamic education system is relatively small. In 2007, only 8.4% of students were enrolled there. In this paper, we abstract away from the Islamic education system.

[2]The current national examination system is different. The system that we describe in this paper pertains to the system in the early 1990s, which is relevant to our dataset.

Given the national examination's characteristics of being nationally comparable and testing skills in multiple subjects, we use a person's score at the primary school national examination as our measure of scholastic ability. The availability of each child's score in our dataset is an important strength of this study.

# IV. CONCEPTUAL FRAMEWORK

In this section, we discuss the effect of poverty and scholastic ability on education attainment. Starting with the former, while poverty itself has a negative effect on children's education attainment, a poor child may still be able to continue his or her schooling if he or she receives some forms of financial aid. In fact, if the financial aid is specifically targeted at poor families, children coming from poor families may even have a higher chance to stay in school than children coming from near-poor families. Sparrow (2007) finds that pro-poor school scholarship programs increase primary school enrollment among poor children in Indonesia, while Cameron (2009) finds that it also reduces dropouts at junior high level.

With regards to scholastic ability, it is generally accepted that scholastic ability has a positive effect on education attainment. However, poor families may not be able to afford to send their children to school, which eliminates the positive effect of scholastic ability on the education attainment of poor children. To compound the issue, assuming that scholastic ability is rewarded in the labor market, poor families may find it more beneficial to send their high-ability children to work rather than to school. In this case, we could see a negative association between scholastic ability and education attainment.

In summary, the conceptual framework is not able to unambiguously predict the effect of poverty and scholastic ability on education attainment. However, depending on the net effect that we observe from the results of the estimations, we can investigate which factor dominates and whether there is a scope for government intervention.

# V. DATA

In this study, we use the Indonesia Family Life Survey (IFLS) dataset. IFLS is a longitudinal household survey that began in 1993. There are three additional waves done in 1997, 2000, and 2007 respectively. The sample represents about 83% of the Indonesian population, covering 13 major provinces out of a total of 33 provinces in Indonesia. In 1993, IFLS contained information of around 7,200 households. It has since grown to around 10,000 households in 2000 and 13,000 households in 2007 as children in the original sample marry or leave their parents' households. The attrition rate is relatively low, around 5% between waves. Overall, 87.6% of households that participated in IFLS1 were interviewed in each of the subsequent three waves (Strauss et al., 2009).

In addition, we also use the Village Census (Podes—Potensi Desa) dataset, which contains basic information on facilities in every village in Indonesia. Podes is conducted three times every decade. We use Podes 1993, 1996, and 2000 to acquire district-level data on the number of schools, the share of private schools, and available infrastructure. Finally, we use the National Labor Force Survey (Sakernas—Survei Angkatan Kerja Nasional) to calculate the

district-level unemployment rates in 1993, 1997, and 2000. Sakernas is an annual, nationally-representative, repeated cross-section, labor force survey that collects activity data of individuals in the sampled households, although its representativeness varies by year. Every year, Sakernas has an average of around 200,000 observations on individuals at or above 15 years of age, the labor force age threshold that is used in Indonesia.

The fact that Indonesia has a long-spanning longitudinal household survey is a key advantage compared with most of the other developing countries. It allows tracking of an individual who was still in primary school in 1993 up to 2007, when he or she is already well into adulthood. Thus, we face no difficulties with censored data or with individuals who dropped out of school and re-enrolled later. The latter point is especially important in developing countries context. Pradhan (1998) investigates the determinants of enrollment and delayed enrollment in Indonesia and finds that delayed enrollment makes up between 13% and 33% of total enrollment at various grades in the secondary level.

Moreover, the fact that the first three rounds of IFLS were conducted roughly within three-year intervals is coincident with the secondary education system in Indonesia, whose two levels are each three years long. The fact that our data allows us to relatively precisely pinpoint the poverty status is crucial as family background could have different effects at different education levels. Given that in Indonesia most children finish a school level once they enroll in one (Suryadarma, 2009), we focus on the cohort that was in the last years of primary school in 1993. We then use the 1993 family information in examining the role of poverty on junior high completion three years later. Similarly, we use the 1997 family information to examine the role of poverty on senior high completion. Finally, we use the 2000 family information to look at the probability of college enrollment.

The final advantage of IFLS is that it records a wealth of information on a person's experience and performance at school. It has data on the type of school the person attended, the number of grade repetitions, the year he or she graduated from a particular school level, the work activities during school, and, most importantly, the person's score in the national examinations at the end of each school level. As we mentioned in Section III, in this study, we use the national examination score in the primary school as an indicator of a person's scholastic ability.

We construct the sample the following way. We limit the sample to individuals who were in the fifth and sixth grades in 1993. Afterwards, we match the individuals with the 2007 wave of IFLS, which results in a 95-percent match. Out of those, 96% were already out of school.

# VI. POVERTY, ABILITY, AND EDUCATION ATTAINMENT

As discussed in Section IV, there is no unambiguous effect of poverty and scholastic ability on education attainment. Both factors can have both positive and negative effects on an individual's educational attainment. In this section, we explore the effects empirically.

## 6.1 Constructing Poverty and Ability Variables

We define a household to be poor if its per capita monthly expenditure falls below the poverty threshold. The poverty threshold that we use is a set of region-specific poverty lines developed by Pradhan et al. (2001), which use the same basket of goods for every region and

whose nominal differences only reflect price differences across regions.[3] To ensure comparability over time, we deflate the poverty lines using deflators calculated by Suryahadi, Sumarto, and Pritchett (2003). Hence, the poverty estimates calculated from these lines are consistent across regions and over time.

For the measure of scholastic ability, we use the primary school national examination score. We standardize the score based on the year a child took the exam to take into account the possibility of changes in the difficulty of the examination across years.

## 6.2  Poverty and Education Attainment

Figure 3 shows the relationship between poverty and education attainment in our sample. Since we are following a cohort's progression through school, the poverty status is concordant to the year when the cohort was at a particular education juncture.[4] Education attainment rate decreases at higher levels as more individuals leave school. Figure 3 shows that poverty already plays a significant role in reducing primary school completion. While the primary school completion rate among nonpoor children is 98%, only 93% of poor children manage to finish primary education.
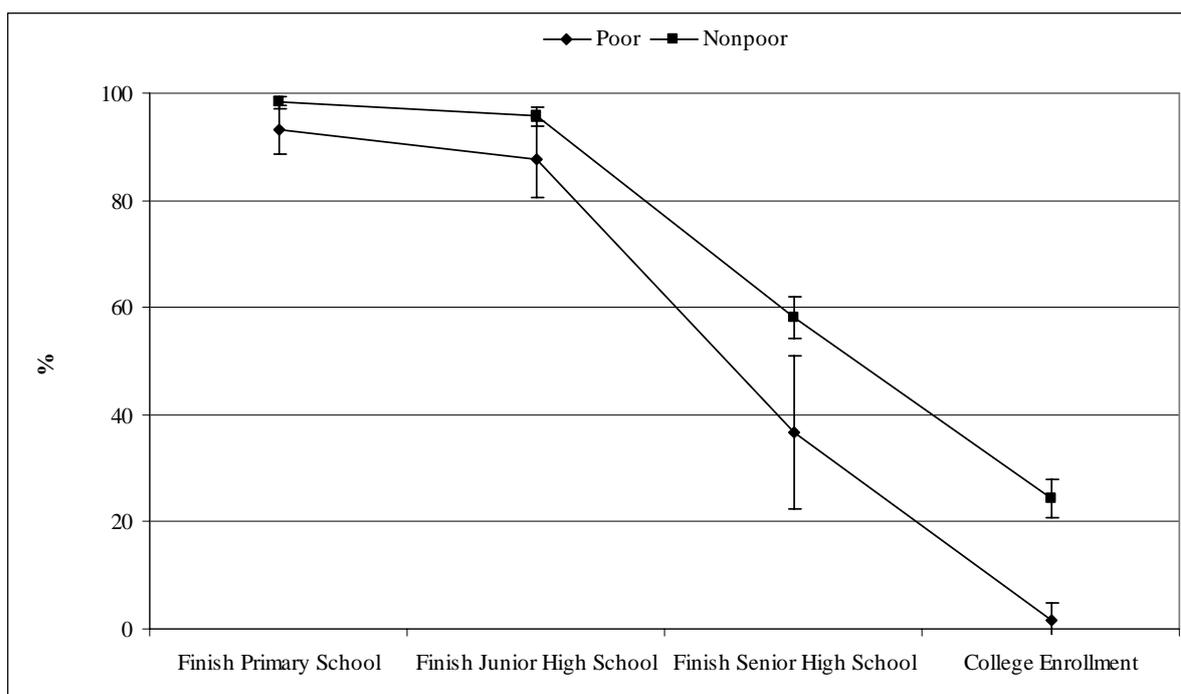


**Figure 3. Poverty and education attainment**

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Furthermore, about 96% of nonpoor children complete junior high school, while only 88% of poor children complete the level. The line connecting primary and junior high completion is steeper for poor children, indicating that the gap in education attainment between poor and nonpoor children widens. The gap further widens at senior high completion. Only 37% of poor children manage to finish senior high, while about 58% of nonpoor children graduate from the level. Finally, only 2% of poor children enroll in college, compared with 24% among nonpoor children. In summary, Figure 3 unsurprisingly corroborates the general consensus regarding the detrimental effect of poverty on education attainment.

## 6.3 Scholastic Ability and Education Attainment

Figure 4 plots the education attainment of high- and low-scholastic-ability children, defined as scoring above and below the median national examination score.[5] Since we have examination score only for children who finish primary school, we examine attainment at secondary level and college enrollment.
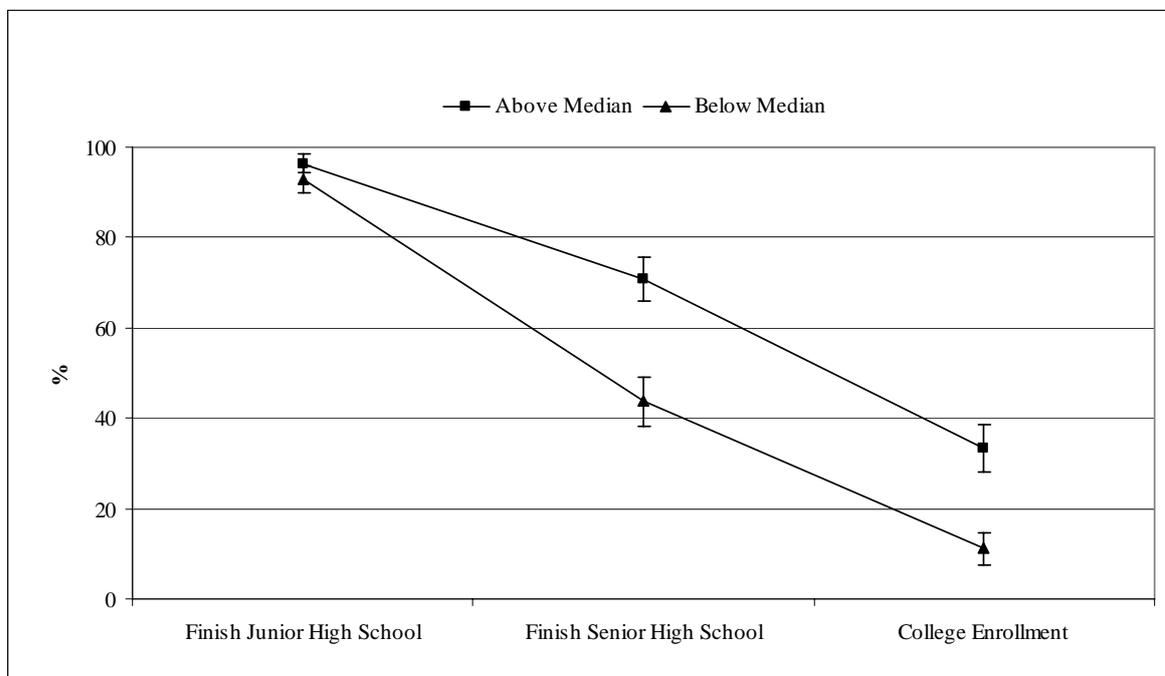


**Figure 4. Ability and education attainment**

Figure 4 shows that scholastic ability does not play an important role in explaining whether an individual finishes junior high education or not. However, it becomes important at higher education levels. High-ability children have 27 percentage points higher senior high completion rate than low-ability children, although the gap narrows to 22 percentage points at college enrollment. At the highest level, only 11% of low-ability children enroll in college, while about 33% of high-ability children are enrolled. These results show that ability does matter for education attainment. However, it only matters at education levels that entail substantial household cost to complete.

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[5]Although we focus on the same cohort with respect to grades, there are differences in the year the children sat the national examination. We compare the score of a child relative to the median score in the year he or she took the examination to take into account possible changes in the difficulty of the examination.

## 6.4 The Interactions between Poverty and Ability

The two figures below attempt to shed light on the factor that we are interested in, namely the interplay between poverty and ability. Figure 5 shows the education attainment of poor children based on their scholastic ability, while Figure 6 presents the same figures for nonpoor children. From these results, we can ascertain which of our conceptual explanation is supported by data.
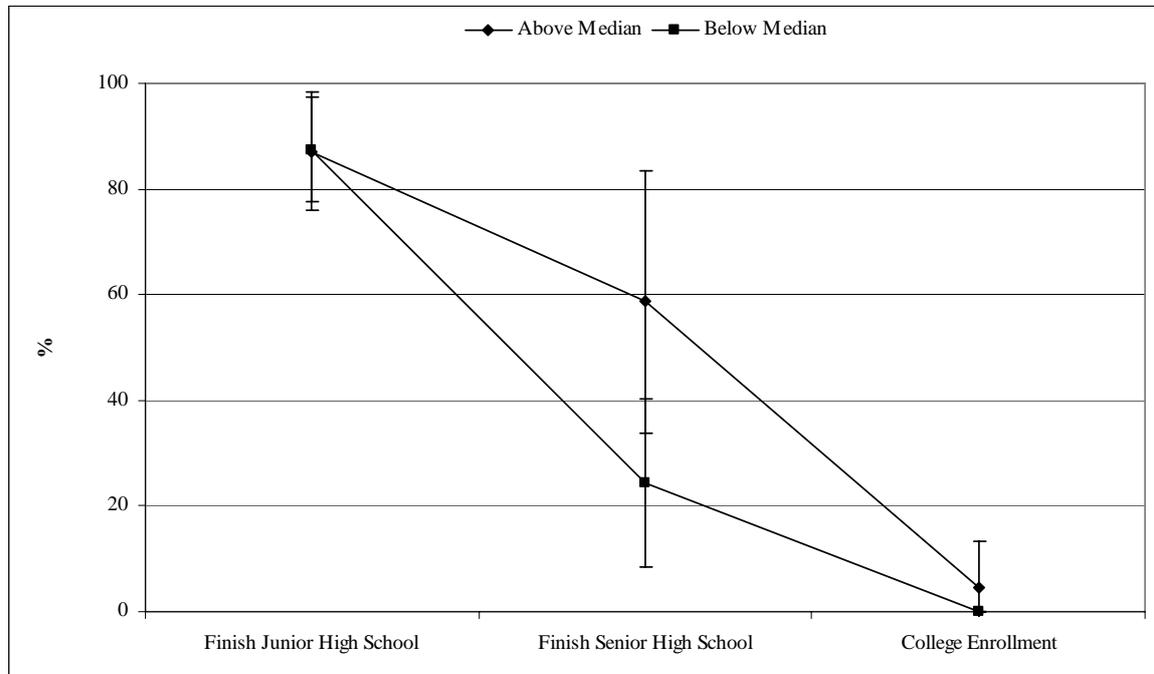


**Figure 5. Ability and education attainment among poor children**

Figure 5 shows that ability plays no role in poor children's chance to complete junior high education. It appears that ability begins to matter for senior high completion or college enrollment among the poor, although the standard errors are too imprecise for the difference to be significant. Hence, our result supports the finding of Appleton, Hoddinott, and Knight (1996) in Africa which indicates that ability gained during primary education has an additional benefit in the form of higher chance of post-primary school completion. Similarly, Figure 6 shows that among nonpoor children, a higher share of high-ability children complete senior high education and enroll in college than low-ability children. However, ability does not seem to matter for junior high completion.
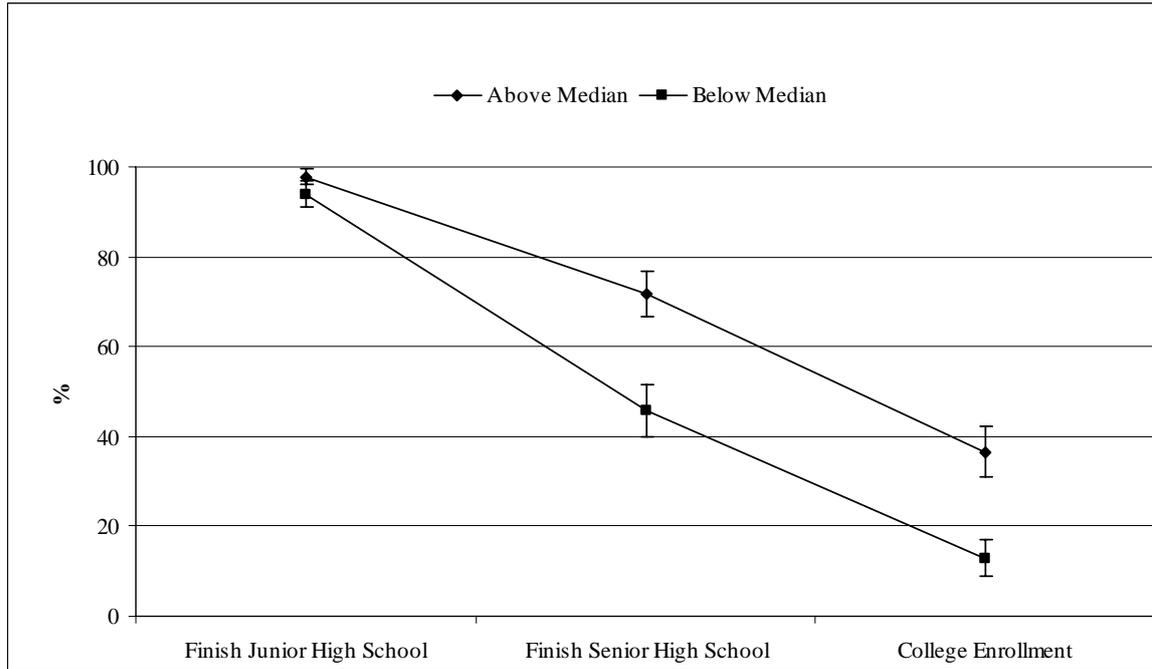
**Figure 6. Ability and education attainment among nonpoor children**

# VII. THE MODEL AND ESTIMATION RESULTS

In this section, we consider the interplay between poverty and ability on education attainment in a regression setting and examine whether the conclusions drawn from the four figures in the previous section hold.

## 7.1 Estimation Strategy

The reduced-form econometric model that we are interested in estimating is formulated in Equation 1.

$$E_{ij} = \alpha + \beta A_i + \gamma P_j + \varepsilon_{ij} \qquad (1)$$

where $E_{ij}$ is the education attainment of child $i$ living in household $j$, as a function of his or her scholastic ability $A_i$ and the poverty status of the family he or she lives in, $P_j$.

In addition, we are also interested in directly measuring the interplay between poverty and scholastic ability, shown in Equation 2.

$$E_{ij} = \alpha + \beta A_i + \gamma P_j + \delta(A_i \times P_j) + \varepsilon_{ij} \qquad (2)$$

Although we have direct measures of scholastic ability, whose absence is the main source of bias in the literature (Plug and Vijverberg, 2005), estimating Equations 1 and 2 would still lead to biased estimates if the independent variables are correlated with the error term. Given that we have no experiments to identify our model, we include a set of control variables that

presumably can cause the bias. These variables are usually unobserved in most developing country datasets.

The control variables include, among other things, parental education, which is highly correlated with household poverty status, child scholastic ability, and child education attainment; employment opportunities in the community and the child's work status; and the number of siblings, which—theory shows—is correlated with both our main independent variables and the dependent variable (Becker and Lewis, 1973).[6] In addition, we also control for the number of schools in the district that the child lives in. The full list of control variables and the summary statistics of all the independent variables are in Appendix 1.

## 7.2 The Effects of Poverty and Ability

We use two measures of education attainment, junior high and senior high completion, as our independent variables. In addition, we also examine primary school completion rate although we cannot include scholastic ability, given that our measure of scholastic ability is the primary school exit examination; there is no such data for children who do not finish primary school. However, we do not consider college enrollment because there are only very few poor or low-ability children that enroll in college. We use the probit estimation procedure since our measure is a binomial variable.

Table 1 provides the estimation results of Equation 1. The first two columns look at the effect of poverty on primary school completion, with Column 1 showing the effect without controlling for any covariates and Column 2 showing the effect after controlling for the set of control variables. It appears that at this stage, controlling for covariates do not significantly change the size of the estimated coefficient. A poor child has around 5.6-percentage-point-lower probability of finishing primary school relative to a nonpoor child. However, this effect is small relative to the average primary school completion rate, which is 97.3%.

### Table 1. Poverty, Ability, and Education Attainment

|  | Primary School Completion | | Junior High Completion | | Senior High Completion | |
|---|---|---|---|---|---|---|
|  | (1) | (2) | (3) | (4) | (5) | (6) |
| Poor | -0.046** | -0.056** | -0.074** | -0.072** | -0.137* | -0.044 |
|  | (0.032) | (0.054) | (0.051) | (0.052) | (0.080) | (0.076) |
| Standardized Ability |  |  | 0.019* | 0.004 | 0.159*** | 0.060*** |
|  |  |  | (0.012) | (0.014) | (0.018) | (0.023) |
| Control variables | No | Yes | No | Yes | No | Yes |
| Mean independent variable | 0.97 | 0.97 | 0.94 | 0.94 | 0.56 | 0.56 |
| Sample size | 736 | 736 | 589 | 589 | 641 | 641 |
| Pseudo R-squared | 0.096 | 0.229 | 0.059 | 0.234 | 0.148 | 0.343 |

Note: ***Significant at 1%, **significant at 5%, *significant at 10%; figures are average marginal effects; robust standard errors clustered at household level in parentheses; statistical significance comes from the estimated coefficient. The full results are in Appendix 2.

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[6]The complex relationship between parental education and children outcomes, including the debate of nurture versus nature, is beyond the scope of this paper.

At the junior high level, Column 4 shows that the chance of a poor child to finish junior high is 7.2 percentage points lower than a nonpoor child. This effect is sizable relative to the mean completion rate, which is 94.5%. Interestingly, the results also show that controlling for poverty, scholastic ability plays no role in junior high attainment. Together with the estimated standard error, we can rule out the possibility that scholastic ability has an effect larger than 3.1 percentage points. Hence, at this education level, it appears that poverty is the main cause of education failure.

In addition, it appears that excluding control variables results in an overestimation of the effect of ability, although the effect as shown in Column 3 is only weakly significant. Since overestimation indicates a bias stemming from an omitted variable that is positively correlated with both the independent and dependent variables, it appears that omitting parental education is the main driver of the bias.

Finally, Column 6 shows the results for senior high completion. The results show that holding everything else constant, poverty is not significantly associated with education attainment. However, the estimate standard error is too imprecise to allow us to rule out large effects. In contrast, scholastic ability has a significant and positive effect on senior high completion. A one-standard-deviation increase in ability increases the probability of a child to finish senior high by six percentage points, which is substantial relative to the mean senior high completion rate of 56.3%.

Comparing the results in Column 6 with the preceding column, it appears that excluding the control variables would lead to attributing poverty as one of the causes of failure to complete senior high and overestimating the effect of ability on senior high completion. Together with the results in Column 4, Column 6 indicates that the poor students who can successfully enroll in senior high schools, regardless of the means, are not affected by their poverty anymore in completing their studies. This points to the importance of ensuring that high-ability poor students can complete junior high education level.

In summary, we find differing effects of poverty and ability on education attainment. At the junior high level, poverty matters, while ability does not. For senior high completion, scholastic ability plays a substantial role in ensuring success in completing secondary education, while poverty is not a crucial factor.

## 7.3 The Relative Importance of Poverty and Ability

With this information at hand, the next analysis we embark upon is to examine whether the positive effect of high scholastic ability is stronger than the negative effect of poverty on school completion. As discussed in Section IV, theory cannot provide a definite answer to this issue. To see which outcome receives empirical support, Table 2 provides the estimation results of Equation 2.

The first column of Table 2 confirms the significantly-negative effect of poverty and the insignificant effect of ability on junior high completion. In addition, the negative sign on the interaction term shows that high-ability poor children has a lower chance of finishing junior high school than an average-ability poor children. However, the effect is imprecisely estimated. Hence, while we cannot convincingly rule out the possibility of ability overcoming poverty, we are reasonably certain that we do not witness the same phenomenon unearthed by Bacolod and Ranjan (2008) in the Philippines, where poor families invest more education in high-ability children than low-ability children. In our result, poor children have a smaller chance of finishing junior high compared with nonpoor children regardless of ability.

**Table 2. Poverty, Ability, and Education Attainment,
Interaction Terms**

| | Junior High Completion (1) | Senior High Completion (2) |
|---|---|---|
| Poor | -0.081** | -0.006 |
| | (0.053) | (0.084) |
| Standardized Ability | 0.010 | 0.052** |
| | (0.015) | (0.023) |
| Poor x Ability | -0.025 | 0.123* |
| | (0.027) | (0.075) |
| Control variables | Yes | Yes |
| Mean independent variable | 0.94 | 0.56 |
| Sample size | 589 | 641 |
| Pseudo R-squared | 0.238 | 0.346 |

Note: ***Significant at 1%, **significant at 5%, *significant at 10%; figures are average marginal effects; robust standard errors clustered at household level in parentheses; statistical significance comes from the estimated coefficient.

The estimated marginal effect of the interaction term in the second column of the table shows that high ability provides an additional benefit to poor children in finishing senior high education. However, the effect is imprecisely estimated and poverty does not have a statistically-significant effect on senior high completion.

In summary, the regression results shed light on three issues regarding parental decision on education. Firstly, a poor family is less likely to invest in junior high education regardless of the child's ability. Secondly, once a poor child manages to finish junior high education, he or she has the same chance of finishing senior high as a nonpoor child. Thirdly, the important ingredient to improve a child's chance to complete senior high education is scholastic ability. Given that our measure of scholastic ability is taken when a child is around 12 years old, it appears that it is crucial to invest in improving the quality of primary education to increase a child's scholastic ability before he or she finishes primary school.

## 7.4 The Effect of Chronic Poverty

In addition to examining the effect of poverty around the time parents decide whether to invest in their children's subsequent education level, we consider the effect of chronic poverty on education attainment. Chronic poverty is a more entrenched condition than transient poverty (Jalan and Ravallion, 2000); thus it is possible that a child living in a chronically-poor household faces even worse education prospects. We define a household to be chronically poor if it is poor in at least two subsequent periods in the initial three IFLS waves. Table 3 provides the estimation results.

**Table 3. Chronic Poverty, Ability, and Education Attainment**

|  | Primary School Completion (1) | Junior High Completion (2) | Senior High Completion (3) |
|---|---|---|---|
| Chronic Poor | -0.054* | -0.158** | -0.103 |
|  | (0.052) | (0.092) | (0.101) |
| Standardized Ability |  | 0.001 | 0.059*** |
|  |  | (0.013) | (0.023) |
| Control variables | Yes | Yes | Yes |
| Mean independent variable | 0.97 | 0.94 | 0.56 |
| Sample size | 736 | 589 | 641 |
| Pseudo R-squared | 0.188 | 0.235 | 0.345 |

Note: ***Significant at 1%, **significant at 5%, *significant at 10%; figures are average marginal effects; robust standard errors clustered at household level in parentheses; statistical significance comes from the estimated coefficient.

Compared with the results in Table 1, chronically-poor children have the same chance to finish primary and senior high schools as poor children. In contrast, the point estimate in Column 2 shows that the chance of a chronically-poor child to finish junior high is 16 percentage points lower than a non-chronically-poor child. However, while the point estimate is twice the size of the estimate in Column 4 of Table 1, the standard errors are sufficiently large so that we cannot ascertain whether being chronically poor is different from merely being poor in terms of its effect on education attainment.

# VIII.  CONCLUSIONS AND RECOMMENDATIONS

This paper investigates the effect of poverty and scholastic ability on educational attainment in a developing country setting. We take advantage of a long-spanning panel dataset, rarely available in developing countries, to address known difficulties in investigating this kind of topic, such as delayed enrollment, censoring, and cohort effects. In addition, the rich dataset allows us to measure poverty status of families at around the time when they have to decide whether to enroll their children in further education. The dataset also enables us to include a relatively-comprehensive set of controls, including parental education, the children's schooling experience, the number of siblings, labor market conditions, and school supply. We show evidence that including these controls are crucial to address omitted variables bias.

We find that poverty has a statistically-significant and negative effect on junior high attainment. However, conditional on completing junior high school, poverty has a negligible effect on senior high completion. In contrast, scholastic ability plays no role in ensuring junior high completion but is crucial in increasing a child's chance to graduate from senior high school.

From our findings, we support the findings of previous research in Indonesia regarding the importance of school scholarship for the poor (Sparrow, 2007; Cameron, 2009). In addition, we find that this would be of utmost benefit if the scholarships are given to families with junior high-age children.

Given our finding that scholastic ability cultivated prior to primary school completion is the dominating factor in ensuring senior high completion, policymakers should focus on ensuring high quality of primary schools. In addition, developing early childhood programs that are designed to develop scholastic ability from early age will also be beneficial.

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# APPENDICES

## Appendix 1

### Table A1. Mean and Standard Deviation of Variables

|  | Complete Primary | Complete JHS | Complete SHS | Dummy |
|---|---|---|---|---|
| *Dependent variable* | 0.973 | 0.945 | 0.563 | Yes |
|  | (0.162) | (0.228) | (0.496) |  |
| *Individual characteristics* |  |  |  |  |
| Age in 2007 | 25.414 | 25.353 | 25.379 |  |
|  | (0.955) | (0.952) | (0.953) |  |
| Islam | 0.910 | 0.918 | 0.927 | Yes |
|  | (0.286) | (0.274) | (0.260) |  |
| Female | 0.555 | 0.553 | 0.559 | Yes |
|  | (0.497) | (0.498) | (0.497) |  |
| Standardized scholastic ability |  | 0.040 | -0.053 |  |
|  |  | (0.967) | (0.990) |  |
| *Family characteristics* |  |  |  |  |
| Father's education at least JHS | 0.357 | 0.391 | 0.359 | Yes |
|  | (0.480) | (0.488) | (0.480) |  |
| Father's education missing | 0.046 | 0.034 | 0.043 | Yes |
|  | (0.210) | (0.180) | (0.202) |  |
| Mother's education at least JHS | 0.225 | 0.255 | 0.227 | Yes |
|  | (0.418) | (0.436) | (0.419) |  |
| Mother's education missing | 0.018 | 0.016 | 0.018 | Yes |
|  | (0.132) | (0.127) | (0.132) |  |
| Household size 1993 | 5.470 | 5.485 |  |  |
|  | (1.891) | (1.856) |  |  |
| Number of female children in 1993 | 0.676 | 0.660 |  |  |
|  | (0.829) | (0.810) |  |  |
| Number of male children in 1993 | 0.711 | 0.677 |  |  |
|  | (0.841) | (0.808) |  |  |
| Poor in 1993 | 0.187 | 0.153 |  | Yes |
|  | (0.390) | (0.360) |  |  |
| Household size 1997 |  |  | 5.866 |  |
|  |  |  | (2.156) |  |
| Number of female children in 1997 |  |  | 0.730 |  |
|  |  |  | (0.887) |  |
| Number of male children in 1997 |  |  | 0.717 |  |
|  |  |  | (0.876) |  |
| Poor in 1997 |  |  | 0.084 | Yes |
|  |  |  | (0.278) |  |
| *Primary school experience* |  |  |  |  |
| Went to a public primary school | 0.882 |  |  | Yes |
|  | (0.322) |  |  |  |
| Number of grade repetitions in primary school | 0.213 |  |  |  |
|  | (0.485) |  |  |  |
| *JHS experience* |  |  |  |  |
| Working during JHS |  | 0.060 |  | Yes |
|  |  | (0.237) |  |  |

Continued

Continued

| | Complete Primary | Complete JHS | Complete SHS | Dummy |
|---|---|---|---|---|
| Went to a public JHS | | 0.653 (0.476) | | Yes |
| Number of grade repetitions in JHS | | 0.004 (0.069) | | |
| *SHS experience* | | | | |
| Working during SHS | | | 0.057 (0.233) | Yes |
| Went to a public SHS | | | 0.261 (0.439) | Yes |
| *Community characteristics* | | | | |
| Number of JHS in district | 101.751 (81.675) | 106.365 (85.149) | 103.107 (83.116) | |
| Share of private JHS in district | 0.524 (0.206) | 0.547 (0.197) | 0.534 (0.198) | |
| Number of SHS in district | 62.828 (59.375) | 68.213 (63.824) | 64.609 (61.217) | |
| Share of private SHS in district | 0.683 (0.170) | 0.701 (0.165) | 0.694 (0.165) | |
| Share of villages in district with permanent market | 0.188 (0.140) | 0.202 (0.144) | 0.195 (0.140) | |
| Share of villages in district with asphalt roads | 0.399 (0.288) | 0.416 (0.302) | 0.398 (0.292) | |
| Share of villages in district with electricity | 0.891 (0.121) | 0.899 (0.119) | 0.892 (0.118) | |
| District unemployment rate 1993 | 0.029 (0.021) | 0.030 (0.021) | 0.030 (0.021) | |
| District unemployment rate 1997 | | | 0.050 (0.034) | |

Note: Standard deviation in parentheses; the number of children in the family excludes the relevant sample; JHS = junior high school; SHS = senior high school.

## Appendix 2

## Table A2. Full Estimation Results of Table 1, with Control Variables

| | Finishing Primary School Marginal Effects | Finishing JHS Marginal Effects | Finishing SHS Marginal Effects |
|---|---|---|---|
| *Individual characteristics* | | | |
| Age in 2007 | -0.013*** | 0.001 | -0.042** |
| | (0.003) | (0.010) | (0.027) |
| Islam | -0.010 | 0.097** | -0.215*** |
| | (0.021) | (0.039) | (0.083) |
| Female | -0.010 | 0.009 | -0.072** |
| | (0.014) | (0.019) | (0.040) |
| Standardized scholastic ability | | 0.004 | 0.060*** |
| | | (0.014) | (0.023) |
| *Family characteristics* | | | |
| Father's education at least JHS | 0.071*** | 0.043** | 0.193*** |
| | (0.008) | (0.019) | (0.054) |
| Father's education missing | -0.594*** | -0.212*** | -0.228*** |
| | (0.023) | (0.117) | (0.093) |
| Mother's education at least JHS | 0.043*** | 0.054* | 0.235*** |
| | (0.018) | (0.028) | (0.061) |
| Mother's education missing | -0.615 | -0.398*** | -0.170 |
| | (0.027) | (0.193) | (0.130) |
| Household size 1993 | 0.007 | -0.002 | |
| | (0.006) | (0.006) | |
| Number of female children in 1993 | -0.006 | 0.013 | |
| | (0.009) | (0.014) | |
| Number of male children in 1993 | -0.003 | 0.017 | |
| | (0.007) | (0.014) | |
| Poor in 1993 | -0.056*** | -0.072** | |
| | (0.054) | (0.052) | |
| Household size 1997 | | | -0.002 |
| | | | (0.010) |
| Number of female children in 1997 | | | 0.006 |
| | | | (0.022) |
| Number of male children in 1997 | | | 0.032 |
| | | | (0.024) |
| Poor in 1997 | | | -0.044 |
| | | | (0.076) |
| *Primary school experience* | | | |
| Went to a public primary school | -0.003 | | |
| | (0.023) | | |
| Number of grade repetitions in primary school | -0.014 | | |
| | (0.017) | | |
| *JHS experience* | | | |
| Working during JHS | | -0.056 | |
| | | (0.055) | |
| Went to a public JHS | | -0.009 | |
| | | (0.024) | |
| Number of grade repetitions in JHS | | -0.254*** | |
| | | (0.120) | |

Continued

Continued

| | Finishing Primary School Marginal Effects | Finishing JHS Marginal Effects | Finishing SHS Marginal Effects |
|---|---|---|---|
| *SHS experience* | | | |
| Working during SHS | | | 0.218** |
| | | | (0.109) |
| Went to a public SHS | | | 0.288*** |
| | | | (0.051) |
| *Community characteristics* | | | |
| Number of JHS in district | 0.000 | 0.001 | -0.002*** |
| | (0.000) | (0.000) | (0.001) |
| Share of private JHS in district | -0.141 | 0.135 | 0.150 |
| | (0.129) | (0.117) | (0.185) |
| Number of SHS in district | 0.000 | -0.001** | 0.003*** |
| | (0.000) | (0.001) | (0.001) |
| Share of private SHS in district | 0.107 | -0.250** | 0.055 |
| | (0.116) | (0.151) | (0.201) |
| Share of villages in district with permanent market | 0.011 | 0.129 | 0.148 |
| | (0.056) | (0.118) | (0.141) |
| Share of villages in district with asphalt roads | -0.027 | 0.045 | -0.015 |
| | (0.031) | (0.059) | (0.095) |
| Share of villages in district with electricity | -0.058 | -0.066 | -0.322 |
| | (0.055) | (0.086) | (0.221) |
| District unemployment rate 1993 | 0.349 | 0.323 | 0.980 |
| | (0.379) | (0.575) | (1.255) |
| District unemployment rate 1997 | | | 0.593 |
| | | | (0.781) |

Note: ***Significant at 1%, **significant at 5%, *significant at 10%; standard deviation in parentheses; JHS = junior high school; SHS = senior high school.