

Determinants of Education Attainment in Developing Countries: Can Higher Skills Compensate for Poverty?^Ψ

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Abstract

This study measures the relative role of poverty and cognitive skills 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 skills accrued by an individual at the time he or she completes primary school has a large and positive effect on secondary school completion. Furthermore, our results show that a higher skill is able to compensate for the adverse effect of poverty on junior secondary school attainment. Finally, the effect of poverty on senior secondary completion is small and statistically insignificant.

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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 (for example Wolfe and Haveman, 1995; Glewwe, 2002).

In developing countries, the two factors that significantly influence demand for education are household wealth and child cognitive skills. Using Filipino data and specifically focusing on the interaction of poverty and skills, Bacolod and Ranjan (2008) find that both household wealth and child skills plays 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-skills children are more likely to be in school relative to low-skills children. On the other hand, Appleton, Hoddinott, and Knight (1996) find that skills gained during primary education has an additional benefit in the form of higher chance of post-primary school completion.

In this paper, we examine the relative influence of household wealth and scholastic aptitude on secondary school attainment in Indonesia.¹ Indonesia has a long-spanning longitudinal dataset, the Indonesian Family Life Survey (IFLS), which allows us to follow a cohort of children from when they were in primary school until they were adults. In addition, we have a direct measure of cognitive skills 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 cognitive skills on an individual's education attainment.

Our results show that skills accrued by an individual at the time he or she completes primary school has a large and positive effect on secondary school completion. In addition, our results show that higher skills is able to compensate for the negative effect of poverty on junior secondary school attainment. Finally, the effect of poverty on senior secondary completion is small and statistically insignificant.

We organise 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

¹ In Indonesia, 95 percent of students complete a level that they are enrolled in (Suryadarma 2009). Therefore, differentiation of, for example, junior secondary enrolment and junior secondary completion, is not as pertinent as in countries where many students fail within levels, such as in Pakistan (Sawada and Lokshin, 2009). In this paper, we choose to focus on completion. The results are very similar if we focus on enrolment.

Indonesian education system, specifically in relation to the cost of education and the national examination system. Section IV discusses a conceptual framework regarding the effect of poverty and cognitive skills on schooling decisions. 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 percent annually, until the Asian economic crisis in 1997-98 grounded it to a halt. In 1998, the Indonesian economy contracted by more than 13 percent. Post-crisis recovery has been relatively quick, but a decade later the economic growth has not returned to the high growth during the pre-crisis era, averaging around 5 percent annually.

a. Poverty

Three decades of high economic growth from 1970s to 1990s has 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 has declined markedly from around 40 percent in 1976 to 11.3 percent in 1996. However, the advent the 1997-98 economic crisis has reversed the continuously declining poverty rate. In 1999, Statistics Indonesia (BPS) 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 has caused the poverty rate to increase from 17.3 percent in 1996 to 23.4 percent in 1999.

[FIGURE 1 IS HERE]

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

domestic price of fuel by an average of around 120 percent. At that time, the fast increasing price of oil in the international market has 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 percent in 2009.

b. 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 labour force have only primary education or less. Among the rest, around 20 percent have junior secondary education, another 20 percent have senior secondary education, and only around 6 percent have tertiary education.

[FIGURE 2 IS HERE]

The figure also shows that a large proportion of this cohort of labour force will remain in the labour market long into the future. In fact, around 25 percent of them will remain part of the labour 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 labour force will be very much influenced by the education attainment of the new entrants into the labour 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 decentralised, 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.² There are three characteristics of the Indonesian education system that are relevant to the issues we focus on in this study.

² In addition to a general education system, there is an Islamic education system that is centralised under the Ministry of Religious Affairs. Compared to the general system, the Islamic education system is relatively small.

The first characteristic is the categorisation of primary and secondary education. Primary education is six years long, followed by junior secondary education for three years, and senior secondary education for another three years. Typically, children enter the primary education system at around seven years of age and, assuming no class repetition, graduate from senior secondary 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 Rp 8.5 million for the primary level, Rp 10.4 million for the junior secondary level, and Rp 13.5 million for the senior secondary 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 percent of the annual cost. Similarly, at the junior and senior secondary levels, the share of the cost bore by households is 78 percent and 80 percent respectively.

The poverty line in Indonesia in 2006 is Rp 114,619 per person per month. For a family of five, this is equivalent to Rp 6.9 million per year. This means that the out of pocket education expenses are equal to 100 percent of the poverty line for primary level, 118 percent of the poverty line for junior secondary level, and 157 percent of the poverty line for senior secondary level. Hence it is obvious that for poor households the cost of education is a major impediment in accessing education services.

The final characteristic pertains to the national exit examinations (*Ebtanas*).³ 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 resit 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 secondary level, the tests include the same five subjects plus English. At the senior secondary level, the test subjects differ according to the student's chosen major of either social or natural sciences.

In 2007, only 8.4 percent of students were enrolled there. In this paper we abstract away from the Islamic education system.

³ 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 cognitive skills. The availability of each child's score in our dataset is an important strength of this study.

IV. Conceptual Framework

The theoretical underpinnings of human capital investment go back to the work of Becker and Tomes (1979), who relax their perfect capital market assumptions in Becker and Tomes (1986). Poverty negatively affects schooling decisions directly through the budget constraint and indirectly through the fact that poor households often lack access to a credit market, where they could borrow to pay for the children's schooling costs. Empirically, however, it is possible for a poor child 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 households, children coming from poor households may even have a higher chance to stay in school than children coming from near-poor households. Sparrow (2007) finds pro-poor school scholarship programs increase primary school enrolment among poor children in Indonesia, while Cameron (2009) finds that it also reduces dropouts at junior secondary level.

With regards to cognitive skills, meanwhile, human capital theory suggests that it would positively affect schooling decisions because it improves a child's learning efficiency. Therefore, the price for an extra year (or level) of schooling is cheaper for children with high cognitive skills. Note that in the context of secondary schooling decisions, the cognitive skills that would play a role is the child's cognitive skills when he or she has finished primary school and whose parents are deciding whether the child should attain secondary level education.

Empirically, however, it is possible that—assuming that high skills is rewarded in the labour market—poor households may end up sending their high-skills children to work rather than to school. In this case, there would be a negative association between cognitive skills and education attainment.

In summary, the conceptual framework is not able to unambiguously predict the effect of poverty and cognitive skills 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 percent of the Indonesian population, covering 13 major provinces out of a total of 33 provinces in Indonesia. In 1993, IFLS contains 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 percent between waves. Overall, 87.6 percent of households that participated in IFLS1 are interviewed in each of the subsequent three waves (Strauss et al., 2009).

In addition, we also use the Village Census (*Podes*) 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 Labour Force Survey (*Sakernas*) to calculate the district-level unemployment rates in 1993, 1997, and 2000. Sakernas is an annual, nationally representative, repeated cross-section, labour 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 labour force age threshold that is used in Indonesia.

The fact that Indonesia has a long-spanning longitudinal household survey is a key advantage compared to most 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 enrolment and delayed enrolment in Indonesia and finds that delayed enrolment make up between 13 percent and 33 percent of total enrolment 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 enrol 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 secondary completion three years later. Similarly, we use the 1997 family information to examine the role of poverty on senior secondary completion.

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, number of grade repetitions, the year he or she graduates from a particular school level, work activities during school, and, most importantly, the person's score in the national examinations at the end of each school level. Finally, IFLS administers a cognitive skills module, the EK module, to every respondent between 7 and 24 years old. It contains two sets of cognitive test modules, EK1 and EK2, targeted at 7-14 years old individuals and 15-24 years old individuals respectively. The former contained five numeracy problems and 12 shape matching problems, while the latter contained five numeracy problems and eight shape matching problems. The numeracy problems in EK2 are significantly more complex than those in EK1. The EK module was first administered in the 2000 round.

We construct the sample the following way. We limit the sample to individuals who were in 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 percent were already out of school. Given that we are interested in secondary school completion and we need the primary Ebtanas score, we further limit the sample to individuals who have completed primary school.

Constructing the Skills Variable

As we mention in Section III, we use the primary school Ebtanas score as the measure of cognitive skills. We standardise 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.

Although a child's skills at primary school completion is the relevant measure of skills for our purposes, as primary education attainment is universal in Indonesia and we are interested in secondary school decisions, it is possible that the decision for a child to attain secondary school diploma was made prior to the child entering primary school. If so, then presumably the resources invested on the child during primary school are higher than the resources invested on a child for whom the decision to continue to secondary school was only made after he or she completed primary school. Hence, the higher investment during primary school would result in the first child having a higher Ebtanas score than the second child.

To attempt to control for these differences, we use a second measure of cognitive skills at primary school completion. Namely, we estimate the predicted Ebtanas score by estimating a least squares regression of the actual Ebtanas score on parental education level, household conditions in 1993, experience during primary school, and the individual's performance in the IFLS EK module. While it is also important to include schooling input in the estimation, unfortunately we cannot gather any information on the primary school that the children went to. Therefore, we include a district fixed effects as an attempt to control for differences in the quality of the primary schools across the sample. The estimation results are shown in Table 1.

[TABLE 1 IS HERE]

Constructing the Poverty Variable

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.⁴ Since the Pradhan et al (2001) poverty lines are for 1999, we deflate the poverty lines using deflators calculated by Suryahadi, Sumarto, and Pritchett (2003) to get the 1993 and 1997 poverty lines. Hence, the poverty estimates calculated from these lines are consistent across regions and over time.

VI. Estimation Strategy and Results

Estimation Strategy

There is a consensus in the literature on education progression that one needs to take into account the dynamic structure of education levels, i.e. the fact that a child must be enrolled in the junior secondary level and complete that level before he or she is able to enrol in the senior secondary level. Lillard and Willis (1994) and Pal (2004) estimate a sequential probit estimation in Malaysia and Peru, while Sawada and Lokshin (2009) estimate a full information maximum likelihood model in Pakistan.

In this paper, we follow Lillard and Willis (1994) and Pal (2004) by estimating sequential probit. It assumes that educational outcomes result from two sequential decisions: to enrol in and subsequently graduate from junior secondary; and then to enrol in and

⁴ Region-specific means that there is a specific poverty line for each urban and rural area in all provinces in Indonesia. Given that Indonesia has 25 urban-rural provinces and one exclusively urban province, Pradhan et al (2001) calculate 51 poverty lines. The definition of urban-rural that is used is based on BPS classification.

subsequently graduate from senior secondary. Therefore, there are three possible outcomes for an individual: not enrol in junior secondary ($O = 1$); enrol in junior secondary but not enrol in senior secondary ($O = 2$); and enrol in junior secondary and enrol in senior secondary ($O = 3$).

Therefore, we formulate the model as a correlated two-equation sequential probit model:

$$W_{ijk} = \beta x_j + \gamma z_{ik} + u_{ijk}, i = 1, 2 \quad (1)$$

where $i=1$ is the enrolment decision at the junior secondary and $i=2$ is at the senior secondary level for person j living in household k . Meanwhile, x_j are a vector of individual factors that do not vary over the two stages, including our measure of cognitive skills, and z_{ik} are a vector of household and community factors, which could vary over the two stages, including the household's poverty status. The other variables in z_{ik} include, among other things, parental 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).⁵ In addition, we also control for the supply of education by including the number of schools in the district that the child lives in as an independent variable. The full list of control variables and the summary statistics of all the variables are in Appendix 1. Finally, u_{ijk} is the residual and could be correlated between the two levels.

An individual would enrol in school level i if $W_{ijk} > 0$. Therefore, when we observe the individual in 2007, at which point the schooling decisions in 1997 and 2000 had been taken, the probabilities of each of the three outcomes are:

$$P(O = 1) = P[W_{1,jk} \leq 0] \quad (2)$$

$$P(O = 2) = P[W_{1,jk} > 0, W_{2,jk} \leq 0] \quad (3)$$

$$P(O = 3) = P[W_{1,jk} > 0, W_{2,jk} > 0] \quad (4)$$

⁵ The complex relationship between parental education and children outcomes, including the debate of nurture versus nature, is beyond the scope of this paper.

Estimation Results

We use two measures of education attainment, junior secondary and senior secondary completion, as our dependent variables. In addition, we use the two measures of skills and also two measures of household wealth, poverty status and per capita household expenditure, to check for robustness of our results. Table 2 provides the estimation results without controlling for other household or community controls, while Table 3 includes all the control variables. In these tables, columns (1) and (3) use standardised primary Ebtanas score, while columns (2) and (4) use standardised predicted primary Ebtanas score as the measure of skills. For the measures of household wealth, columns (1) and (2) use poverty status, while columns (3) and (4) use per capita household expenditure.

[TABLES 2 AND 3 ARE HERE]

Looking at the relationship between Ebtanas score and junior secondary completion, the results in both tables indicate that a higher Ebtanas score at the primary education significantly improves an individual's chances to complete junior secondary education. The result is robust to the inclusion of control variables or if we use the predicted Ebtanas score. Looking at the results of more complete specifications in Table 3, the effect of one standard deviation increase in the Ebtanas score increases the probability to complete junior secondary education by between 6.6 and 8.7 percentage points. Given that the average probability of finishing junior secondary in our sample is 84 percent, this is a relatively modest effect. Meanwhile, living in a poor household significantly reduces a child's probability to finish junior secondary school by 8.2 percentage points. If we treat these results as a two-horse race, they show that a higher skills compensates the adverse effect of living in poverty on junior secondary completion.

Moving on to senior secondary completion, the results in Table 3 show that a one standard deviation increase in Ebtanas score increases an individual's probability to finish senior secondary school by between 8.4 and 14.5 percentage points. Given that the baseline probability to attain this level of education is only 57 percent, the effect is large. In addition, it appears that poverty has a negative but statistically insignificant effect on senior secondary completion.

In summary, we find evidence that skills accrued by an individual at the time he or she completes primary school has a large and positive effect on secondary school completion. This result corroborates the finding of Appleton, Hoddinott, and Knight (1996) in Africa.

More importantly, our results show that higher skills is able to compensate for the negative effect of poverty on junior secondary school attainment, supporting the finding of Bacolod and Ranjan (2008). Finally, our additional finding that the effect of poverty on senior secondary completion is small and statistically insignificant further augments the importance of skills for poor children.

VII. Conclusion

This paper investigates the effect of poverty and cognitive skills 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 enrolment, censoring, and cohort effects. In addition, the rich dataset allows us to measure poverty status of households at around the time when they have to decide whether to enrol 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, labour market conditions, and school supply.

Our main finding is that the positive effect of skills is as large as the negative effect of poverty at the junior secondary level. This implies that a child's cognitive skills at the end of primary school is a key factor that compensates for the detrimental effect of poverty on education attainment. What are the factors that determine cognitive skills? Basically, we believe that the fundamental determinants are primary school quality and household factors. Although they are very much intertwined, as children endowed with favourable household conditions have a higher chance to go to higher quality primary school, the government should strive to continue to improve the quality of primary schools. This is especially of utmost importance in rural areas, where there is a lack of choice of primary schools. In addition, developing early childhood programs that are designed to develop cognitive skills from early age will also be beneficial.

Moreover, we find that poverty has no effect on senior secondary completion. Hence, we support the findings of previous research in Indonesia regarding the importance of school scholarship for the poor (Sparrow, 2007; Cameron, 2009). Our findings imply that the scholarships would be of utmost benefit if they are given to households with children in junior secondary schools.

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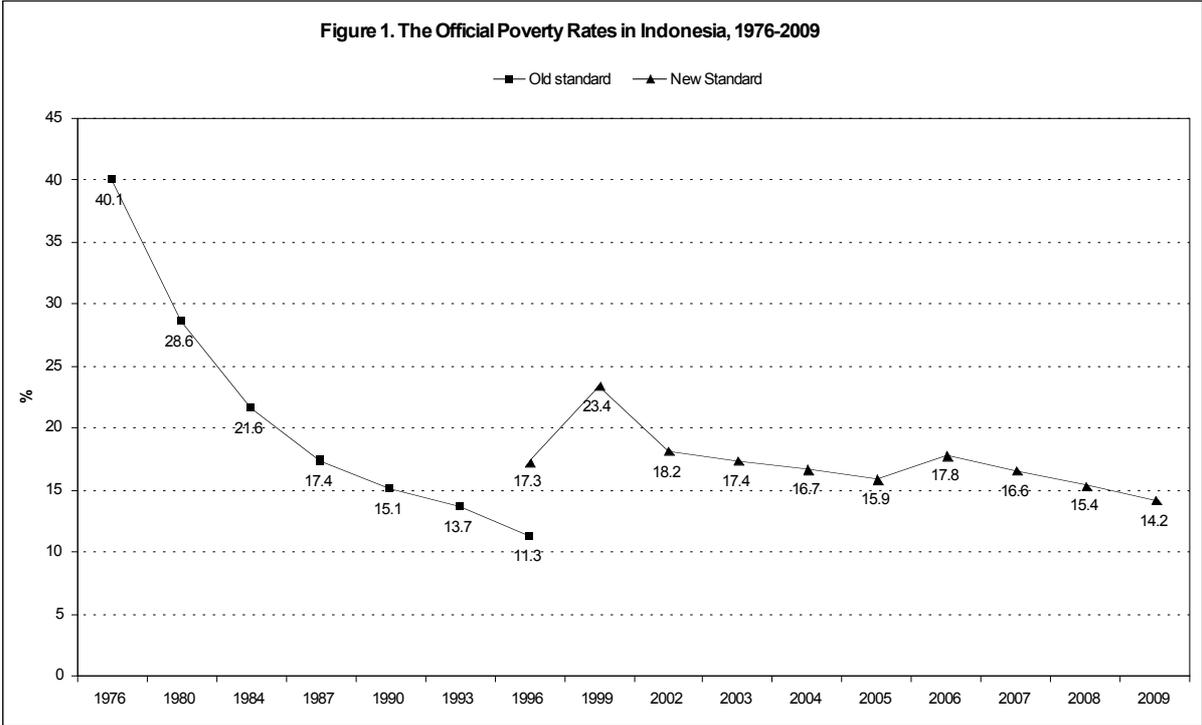
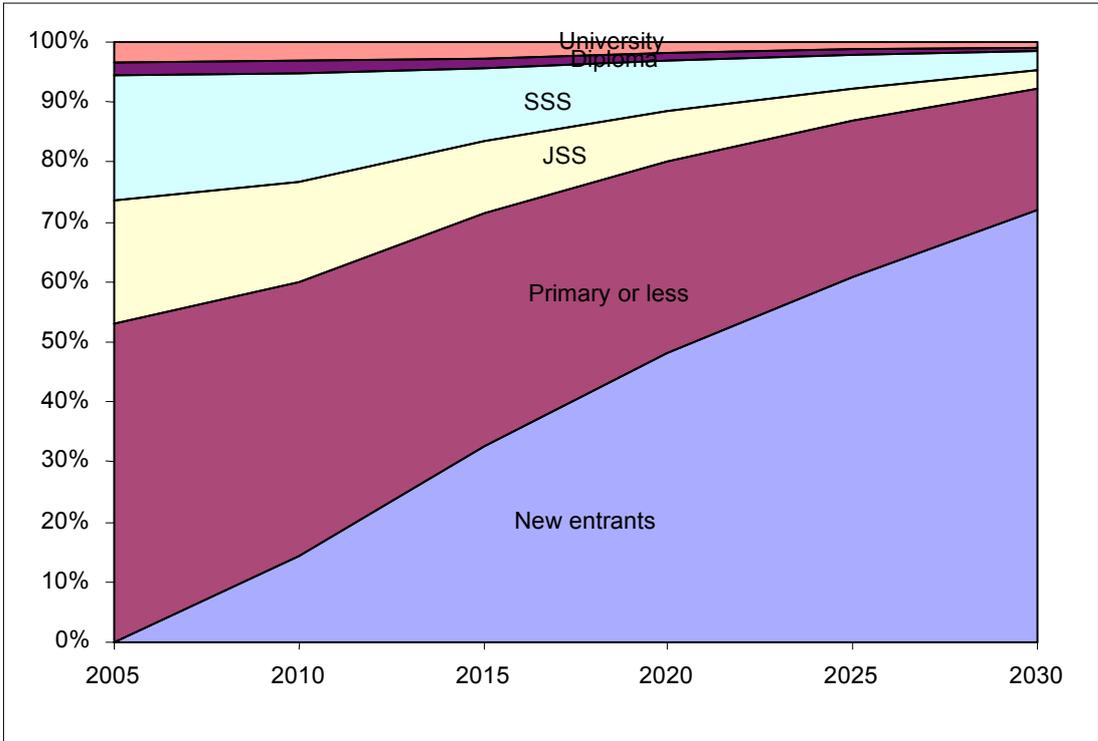


Figure 2. The Distribution of Indonesian Labour Force by Education Level



Note: JSS = Junior Secondary School, SSS = Senior Secondary School

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

Table 1. Correlates of Primary School Ebtanas Score

Independent variable	Coefficient
Age in 2007	-0.476** (0.236)
Muslim = 1	-0.362 (0.909)
Female = 1	-0.120 (0.395)
Father completed junior secondary = 1	0.552 (0.502)
Mother completed junior secondary = 1	1.243** (0.560)
<i>1993 household conditions</i>	
Household size	0.322** (0.142)
Number of female children	-0.227 (0.256)
Number of male children	-0.366 (0.256)
Log of per capita household expenditure	0.444 (0.374)
Lived in a rural area in 1993	-2.877*** (0.759)
<i>Primary school experience</i>	
Worked = 1	-0.153 (0.934)
Went to a public school = 1	0.909 (0.768)
Repeated a grade = 1	-0.631 (0.458)
Year completed primary school	-0.465** (0.195)
Score on the IFLS EK test	0.394*** (0.066)
Constant	961.896** (391.678)
District of residence dummy	Yes
Sample size	659
R-squared	0.572

Note: *** Significant at 1%, ** significant at 5%, * significant at 10%; OLS estimation includes indicators for missing variables; robust standard errors clustered at household level in italics; estimations are weighted using person weights provided by IFLS.

Table 2. Sequential Probit Estimation Results of Education Attainment on Poverty and Ebtanas Score, without household and community controls

	(1)		(2)		(3)		(4)	
	Coefficient	Average Marginal Effect						
Stage 1. Junior secondary completion								
Standardised primary Ebtanas score	0.395 *** <i>0.079</i>	0.084			0.378 *** <i>0.080</i>	0.079		
Standardised predicted primary Ebtanas score			0.664 *** <i>0.105</i>	0.125			0.624 *** <i>0.113</i>	0.118
Poor in 1993 = 1	-0.324 ** <i>0.147</i>	-0.076	-0.331 ** <i>0.151</i>	-0.069				
Log of 1993 per capita household expenditure					6.377 *** <i>1.322</i>	0.049	0.212 * <i>0.127</i>	0.040
Stage 2. Senior secondary completion								
Standardised primary Ebtanas score	0.480 *** <i>0.062</i>	0.157			0.457 *** <i>0.064</i>	0.146		
Standardised predicted primary Ebtanas score			0.834 *** <i>0.093</i>	0.244			0.817 *** <i>0.095</i>	0.233
Poor in 1997 = 1	-0.211 <i>0.198</i>	-0.070	-0.147 <i>0.198</i>	-0.043				
Log of 1997 per capita household expenditure					0.315 *** <i>0.088</i>	0.101	0.260 *** <i>0.086</i>	0.074
Household and community controls	No		No		No		No	
Correlation coefficient between residuals of first and second stage	0.883 ***		0.861 ***		0.864 ***		0.860 ***	
Sample size	656		656		656		656	
Log pseudolikelihood	-737.717		-697.427		-726.255		-689.693	

Note: *** Significant at 1%, ** significant at 5%, * significant at 10%; estimations include age, religion, and sex of the respondent; robust standard errors clustered at household level in italics; estimations are weighted using person weights provided by IFLS; the baseline probability of junior secondary completion is 0.84, while the baseline probability of senior secondary completion is 0.57.

Table 3. Sequential Probit Estimation Results of Education Attainment on Poverty and Ebtanas Score, with household and community controls

	(1)		(2)		(3)		(4)	
	Coefficient	Average Marginal Effect						
Stage 1. Junior secondary completion								
Standardised primary Ebtanas score	0.394 *** <i>0.088</i>	0.067			0.387 *** <i>0.090</i>	0.066		
Standardised predicted primary Ebtanas score			0.519 *** <i>0.154</i>	0.087			0.502 *** <i>0.159</i>	0.085
Poor in 1993 = 1	-0.433 ** <i>0.177</i>	-0.082	-0.437 ** <i>0.174</i>	-0.082				
Log of 1993 per capita household expenditure					0.290 * <i>0.155</i>	0.049	0.280 * <i>0.145</i>	0.047
Stage 2. Senior secondary completion								
Standardised primary Ebtanas score	0.336 *** <i>0.074</i>	0.088			0.328 *** <i>0.076</i>	0.084		
Standardised predicted primary Ebtanas score			0.562 *** <i>0.124</i>	0.145			0.561 *** <i>0.126</i>	0.142
Poor in 1997 = 1	-0.212 <i>0.277</i>	-0.056	-0.226 <i>0.246</i>	-0.059				
Log of 1997 per capita household expenditure					0.254 ** <i>0.105</i>	0.065	0.261 *** <i>0.101</i>	0.066
Household and community controls	Yes		Yes		Yes		Yes	
Correlation coefficient between residuals of first and second stage	0.803 ***		0.818 ***		0.758 ***		0.794 ***	
Sample size	656		656		656		656	
Log pseudolikelihood	-644.630		-643.737		-639.693		-638.868	

Note: *** Significant at 1%, ** significant at 5%, * significant at 10%; estimations include age, religion, and sex of the respondent, household and community control variables as listed in Appendix 2, and also indicators for missing variables; robust standard errors clustered at household level in italics; estimations are weighted using person weights provided by IFLS; the baseline probability of junior secondary completion is 0.84, while the baseline probability of senior secondary completion is 0.57.

Appendix 1. Mean and Standard Deviation of Variables (N=656)

	Mean	Std Dev	Dummy
<i>Dependent variable</i>			
Complete junior secondary	0.837	0.370	Yes
Complete senior secondary	0.566	0.496	Yes
<i>Individual characteristics</i>			
Age in 2007	25.387	0.959	
Islam	0.929	0.257	Yes
Female	0.557	0.497	Yes
Standardised Ebtanas score	-0.051	0.990	
Score in IFLS EK module	7.938	3.424	
<i>Family characteristics</i>			
Father education at least JSS	0.366	0.482	Yes
Mother education at least JSS	0.231	0.422	Yes
Household size 1993	5.494	1.876	
Number female children in 1993	0.677	0.824	
Number male children in 1993	0.700	0.824	
Log of household per capita monthly expenditure in 1993	10.583	0.969	
Poor in 1993	0.169	0.375	Yes
Household size 1997	5.836	2.236	
Number of female children in 1997	0.731	0.886	
Number of male children in 1997	0.717	0.876	
Log of household per capita monthly expenditure in 1997	10.899	1.815	
Poor in 1997	0.083	0.276	Yes
<i>Primary school experience</i>			
Went to a public primary school	0.881	0.325	Yes
Number of grade repetitions in primary school	0.225	0.491	
<i>JSS experience</i>			
Working in JSS	0.052	0.222	Yes
Went to a public JSS	0.570	0.495	Yes
Number of grade repetitions in JSS	0.003	0.065	
<i>Community characteristics</i>			
Number of JSS in district	103.432	83.583	
Share of private JSS in district	0.534	0.201	
Number of SSS in district	64.748	61.264	
Share of private SSS in district	0.691	0.171	
Share of villages in district with permanent market	0.193	0.140	
Share of villages in district with asphalt roads	0.398	0.292	
Share of villages in district with electricity	0.887	0.136	
District unemployment rate 1993	0.030	0.022	

Note: the number of children in the family excludes the relevant sample; figures are weighted.