"HUMAN CAPITAL" AND REGIONAL DIFFERENCES IN DEVELOPMENT: HIGH SCHOOL ENROLLMENT ON JAVA AND BALI

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Intisari

Dari analisis data Susenas 1993 ditemukan bahwa angka partisipasi sekolah di Jawa dan Bali untuk penduduk usia 16-18 tahun adalah sekitar 40 persen, namun variasinya cukup berarti bila memperhatikan perbedaaan antarpropinsi dan perbedaan desa-kota. Dengan asumsi bahwa biaya sekolah lanjutan tidak murah, penulis berhipotesis bahwa latar belakang sosial ekonomi dan variasi antar daerah, terutama school availability, adalah variabel-variabel yang dapat menjelaskan tingkat partisipasi sekolah tersebut. Guna membuktikannya dan mendapatkan model yang memadai, penulis menggunakan probit model sebagai teknik analisis. Hasilnya menunjukkan bahwa variabel desa-kota memiliki peranan yang paling berarti, sementara status sosial ekonomi secara keseluruhan juga tidak bisa diabaikan. Berdasarkan hasil tersebut saran yang diajukan antara lain adalah perlunya perhatian terhadap masalah variasi antar wilayah dalam hal pembangunan di bidang pendidikan.

Introduction

The term "human capital" has come into vogue to describe the importance of human resources in economic production, in contrast to physical capital, such as machinery and industrial plants (World Bank, 1980, Boediono, 1993). The transition from industrial to post-industrial economies, where the majority of economic activity occurs in the service or information sector, necessitates such terminology to adequately describe a country's changing resource base. However, while the term gives us the ability to speak about the human side of economic development, we should bear in mind that the notion of human resources is a much more problematic concept than physical capital because of the inherent social and psychological heterogeneity of human beings. While it is possible to isolate and quantify the productive capacity of a machine, the productivity of individuals is always connected to social and cultural systems more elaborate than economic theory alone.

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The correlation between educational attainment and individual economic welfare is more complex than it is often made out to be. While the term "human capital" is useful to describe the important individual and social returns to investment in education, it can also obscure significant structural socioeconomic inequalities. Indeed, the underlying theory of "human capital" depends upon a number of assumptions that are only approximately valid, such as equal access to educational facilities and perfect lending markets to finance educational investment (Becker, 1974).

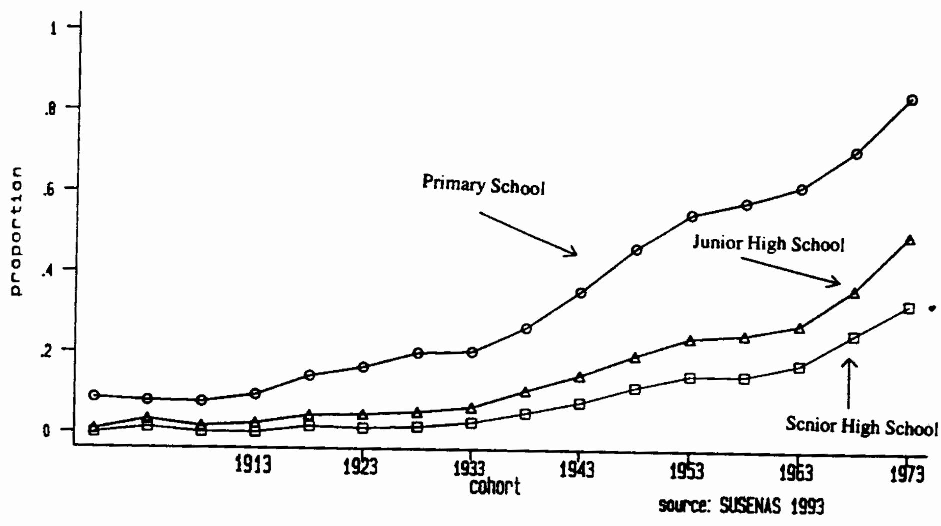
In the context of rapid social and economic change, it is important to realize the limitations of conventional measures of human capital. Rapid economic development tends to manifests itself in an temporary, but significant, increase in overall social inequality. Because the importance of childhood education for future prosperity and economic productivity is clear, the significance of social and spatial factors on school attainment suggests this underlying social inequality may tend to reproduce and magnify itself through the school system. The significance of measures of social class on education, such as family income and parents' level of education, may suggest two different things: 1) that the children of parents of higher social class are more intelligent, and benefit more from education, or 2) that their parents have more access to financial and social resources to support higher educational attainments for their children. This is a very important distinction. Empirically, however, it is difficult to distinguish between the two and often the choice between them is primarily on the basis of ideological preference. The first choice indicates education on the basis of merit, the second on the basis of social class. In contrast to human capital theory, which stresses the gains in productivity due to education, the concept of *credentialism* suggests that the degree itself is more important for getting a highly paid job than differences in ability. In this sense, individual educational attainment is a sign which indicates class standing. A prudent position is perhaps to recognize that the term "human capital" cannot possibly capture all of the factors which influence individual behavior with respect to educational decisions, and that notions such as credentialism carry a significant amount of truth.

Rapid urbanization in a growing economy may result in a concentration of resources for junior and senior high education in urban areas. It is important to note that the high percentage of individuals having attained at least an elementary school, as exhibited by the cohort born in 1973 in table one, is the result of extensive efforts to extend elementary school opportunities to rural areas. Beyond the elementary school level, however, it is hypothesized that an unequal distribution of educational resources contributes to the gap in enrollment rates.

In addition to the effect of urbanization on human resource development, regional disparities in industrialization may also be significant. While the long term effects of industrialization are to increase material prosperity and real incomes, the short term effects, as noted above, are often unclear. It has been noted elsewhere, for instance, that during the industrial revolution in America the average height of males (a measure of nutritional well-being and poverty in the absence of income statistics) actually decreased affer 1860, and did not reach its former level until 1920 (Fogel, 1994). The increase in inequality may affect educational attainments in several ways. Because, for instance, the educational qualifications for obtaining work in labor intensive industries are not very high, individuals may choose not finish high school if the wages in this sectors may exceed the expected wage for a high school graduate. Thus, it is hypothesized that increasing opportunities and wages in the industrial sector for 16-20 years old, especially the rapid increase in factory employment for women, may actually have a negative impact on high school enrollment, everything else being equal.

An important point to remember is that just because high school graduates, on average, earn higher salaries than those with only a junior high education, it does not mean that all of the difference is due to the higher "human capital" of those with a high school education. A large portion of the difference may be to parental resources such as wealth and connections, which lead to both higher educational attainment and better employment opportunities. This will lead to estimates of the return to education which are biased upwards. For children from poor families, limited parental resources may make working after junior high a more attractive alternative.

Table 1
Educational Attainment by Birth Cohort for Java and Bali

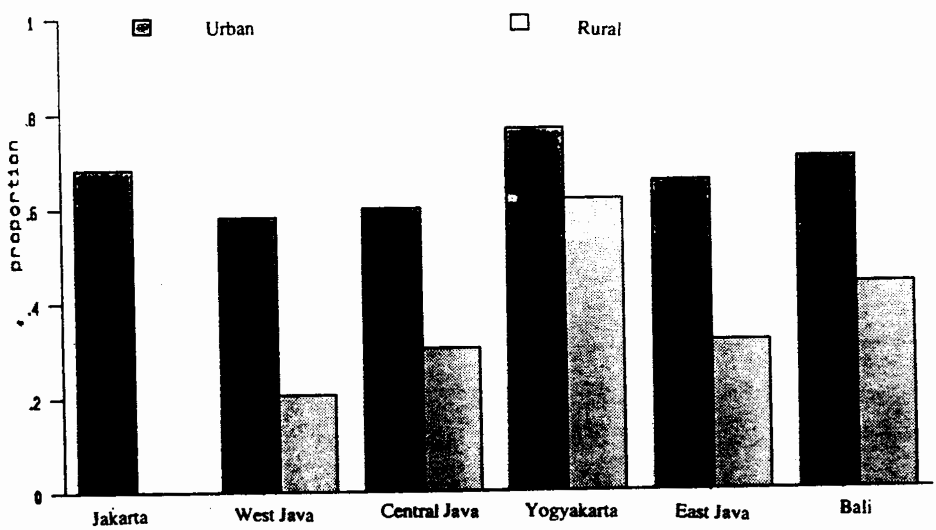


The Indonesian Context

The significant investment of resources in basic education and the rapid extension of these facilities has yielded significant results for education in Indonesia. Table 1 illustrates the dramatic rise in educational attainment by birth cohort for Java and Bali. In comparison to the 1933 birth cohort, the 1973 cohort, 20 years old at the time of the survey, experienced more than a four-fold increase in percentage completion of elementary school. High school graduation, a rarity among the 1933 cohort, has increased to almost 40% among the 1973 cohort. In contrast to many developing nations, for example, there appears to be little gender difference in educational attainment from elementary school through high school (Oey-Gardiner, 1991).

Nonetheless, it is clear that significant regional differences exist in educational attainment. Map 1 illustrates the distribution of school enrollment rates for 16-18 years old by Kebupaten on Java and Bali. The rates of participation, as estimated from the SUSENAS 1993 sample indicate significant geographic variation, from less than 25% to well over 65%. Likewise, Table 2 shows enrollment rates for the same age group by province and according to urban and rural areas. The urban rates of participation vary slightly by province, from a high in Yogyakarta to lows in West Java and Central Java. However, the most striking difference is in the rates of school participation for rural areas. An easy explanation for the difference in urban and rural rates of school enrollment for 16-18 years old is

Table 2
School Enrollment Rates for 16-18 Years Old



Map 1
School Enrollment Rates for 16-18 Years Old
by Kabupaten on Java and Bali

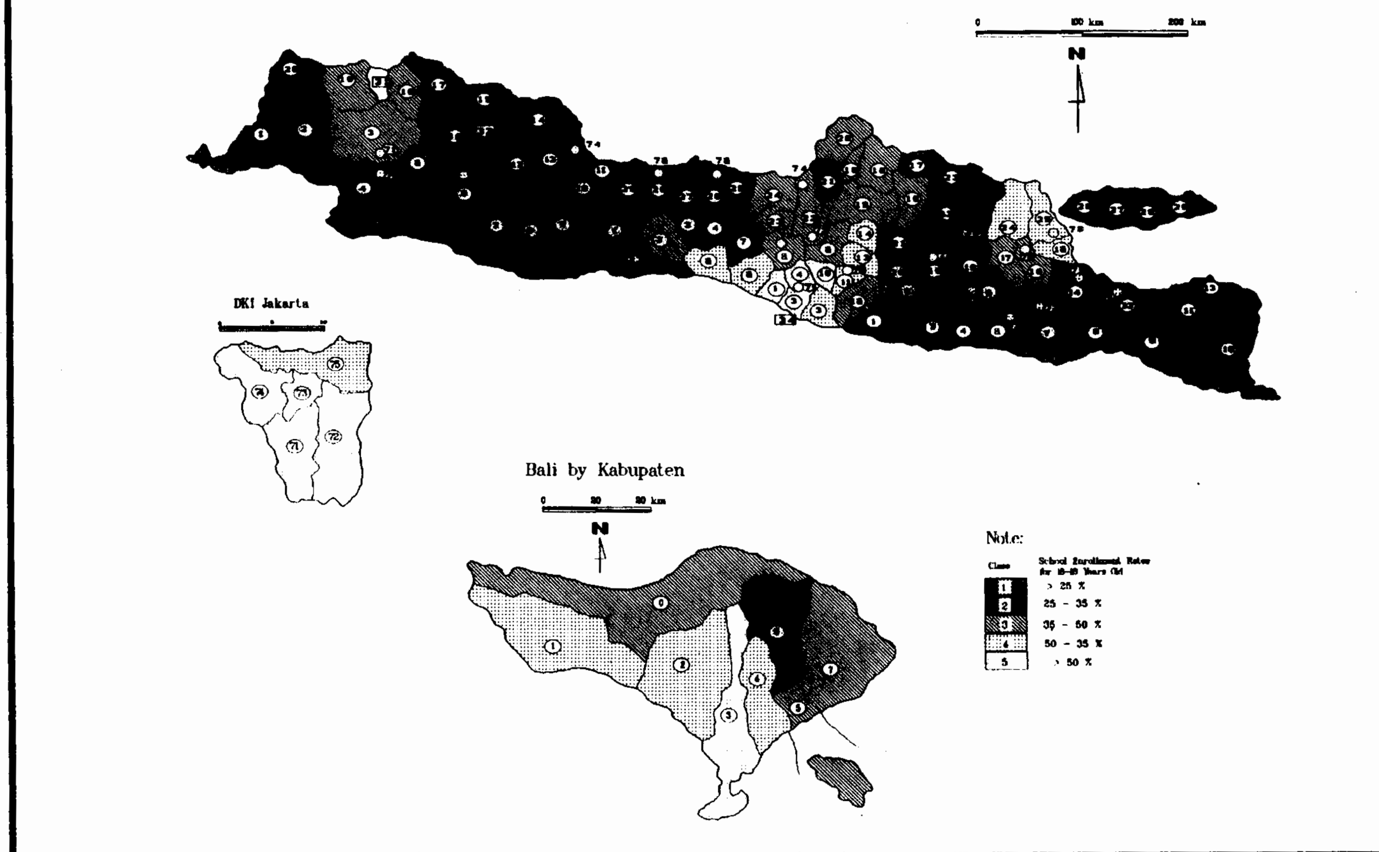


Table 3.
The Average Cost of a Year of School by Level and Province

Province	Urban			Rural		
	SD	SMP	SMA	SD	SMP	SMA
Jakarta	159.20	305.49	452.10	-	-	-
West Java	90.45	223.92	330.39	50.69	158.74	288.68
Central Java	65.22	158.33	245.62	36.08	125.52	212.15
Yogyakarta	49.19	126.64	215.74	32.70	105.51	177.70
East Java	74.61	121.70	271.63	36.52	103.45	190.11
Bali	99.39	236.54	368.46	48.04	147.18	249.71

Source: *Statistik Psndidikan, Survai Sosial Ekonomi Nasional 1992.* BPS, Jakarta

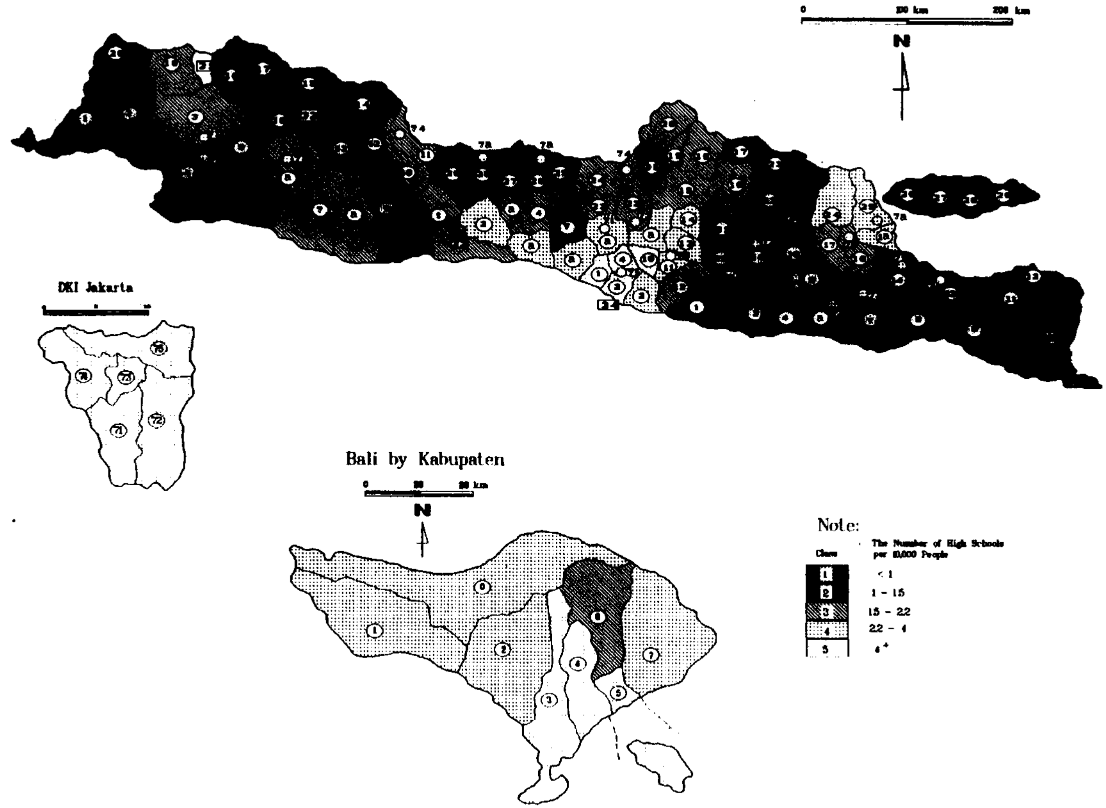
that education is not as important in rural areas. However, the difference in rates between West Java and Yogyakarta and Bali, for example, clearly suggests that a more complex answer is needed. Table 3 shows the average cost of a year of school, by level and province. While this data does not differentiate between private and public schools, thereby making comparisons between provinces largely dependent on the proportion of students in private schools, it is still apparent that yearly educational expenses represent a significant financial burden. Further, if the quality of education varies according to the price charged for it, the difference in both educational attainment and the quality of that education will vary according to the socio-economic status of the student's parents. Lower average incomes in rural areas due to low wages in the agricultural sector and significant under-employment may explain a proportion of the urban/rural differential.

Map 2 shows the regional distribution of high schools per 10,000 people by Kabupaten. There is significant variation in the availability of high schools per capita. The density of schools by region is a partial measure of the availability of schools for an individual in that region. A comparison of maps one and two illnstrates the geographic correlation between school availability and level of school enrollment.

Data

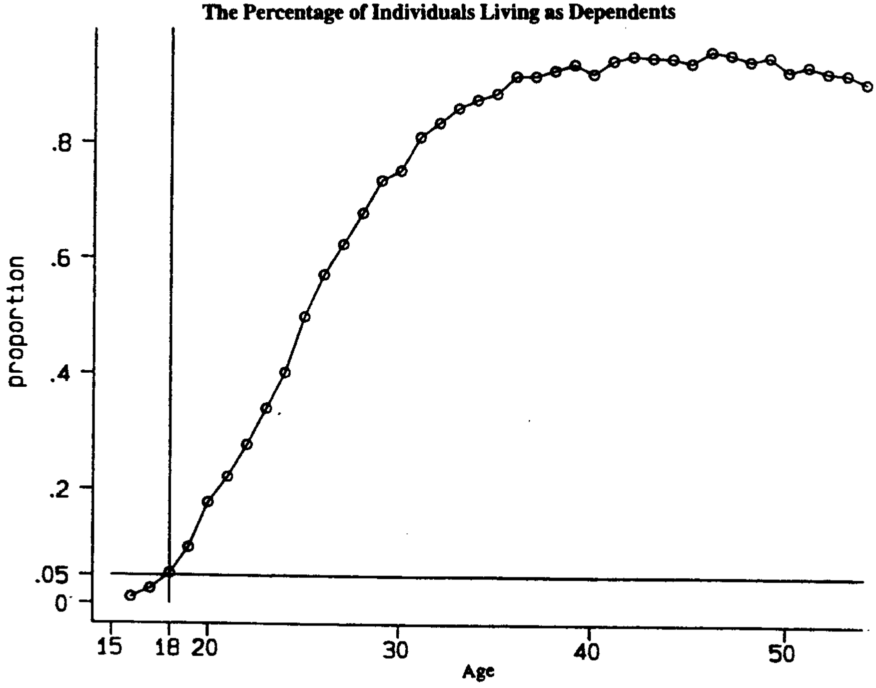
The data used for this analysis is drawn from the 1993 Survai Sosial Ekonomi Nasional (SUSENAS 1993). The survey consists of 202,000 households throughout Indonesia. A sample consisting of all 16-18 years old in the survey on Java and Bali was selected, resulting in 23,398 cases. Computer limitations restricted the analysis to this level. The data for those 16-18 years old who still lived at home and were not married was matched to that of their parents so that

Map 2.
The Number of High Schools per 10,000 People
by Kabupaten on Java and Bali



intergenerational variables could be used. One of the reasons for studying high school enrollment with the SUSENAS data rather than college enrollment is that the overwhelming majority of 16-18 years old still live with their parents. Thus information on the education, income, occupation, and marital status of the parents or guardians is available. From this information conjectures can be made about the influence of parents' social class and family welfare on children's educational attainment. Table 4 shows the percentage of individuals living as dependents (not as the head of household of spouse of head of the head of the household) by age group for selected provinces on Java. It is important to note that if the percentage of 16-18 years old who migrate to urban areas to attend school, for example, is high, then it is problematic to make inferences about the effect of parental characteristics on children's behavior. It is clear that the rapid increase in the percentage of individuals who have established independent households between the ages of 19-22 makes the use of parent's characteristics difficult. In this case, a survey which purposefully interviewed children and their parents, whether or not they were in the same household, would be needed. While less than 5% of 16-18 years old have established their own households, according to the definition used by SUSENAS, more than 10% of the sample has already married. Many are still living with their parents or parents-in-law, although many are also classified as "other families" within the household. Parental information for 16-18 years old who are classified as

Toble 4.
The Percentage of Individuals Living as Dependents



heads of households, married, or domestic servants is classified as missing to reduce the bias due to problems of misclassification (i.e., the education of the head of the houschold as a determinant of domestic servant's educational attainment) and endogeneity (income statistics for those 16-18 years old who have established independent households will not measure their parents' income, and will be endogenous with their work status).

As noted above, table 2 illustrates difference in rural and urban rates of school participation at the provincial level. It is clear that there are significant spatial and regional differences. The question is, however, whether or not thesc differences can be explained by empirical factors relating to regional differences in development. Two variables measuring the availability of schools at the SMP and SMA level, respectively, were collected. PCTSMP measures the number of SMPs at the Kabupaten level per 10,000 people. PCTSMA likewise measures the number of SMAs in each Kabupaten per 10,000 people. Ideally, measures of the number of private and public schools would have becn included under the hypothesis that the lower cost of public schools would increase overall enrollment rates and decrease the income effect on enrollment, but this data was not available for one of the provinces studied (East Java). Information on the availability of elementary schools and the average number of teachers at each level of school was also gathered, but proved to be inconsequential to the model. Further, because it was hypothesized that one factor affecting differences in urban and rural rates of high school enrollment was the inequality in schooling opportunities, interaction terms were included between urban areas and school availability.

In order to measure the level of economic activity and degree of industrialization, average wage levels in four different types of occupations (trade, agriculture, industry, and service) were calculated for each Kabupaten from the SUSENAS 1993 data, regressing total expenditures on the number of days worked in each industry in each family. (The SUSENAS data does not contain explicit wage information.) Finally, the data was weighted at the Kabupaten level by urban and rural status, to adjust for the varying sampling rates used by BPS in gathering representative samples at each level (BPS, 1993).

Statistical Model

If we want to estimate the parameters which influence high school enrollment, we have a number of choices:

1) Probit model of school enrollment of all 16-18 years old.
2) Probit model of SMA enrollment of 16-18 years old who are SMP graduates.
3) Sequential Probit Model.

Model #1, using a logit or probit model to estimate school enrollment of 16-18 years old, has the disadvantage that the cumulative effects of variables affecting school enrollment will be estimated, not the variables affecting SMA enrollment. Further, this model has the disadvantage that some 16 years old are still in SMP, and thus are in school but it is not clear if they will continue to

SMA. Thus, the effect of age will be biased. Second, we can estimate actual enrollment in SMA. Again, this leaves us with the problem of what to do with those students still enrolled in SMP. Second, this model does not incorporate individual heterogeneity, i.e., significant but unmeasured factors, which will lead to correlation between the SMP and SMA equations.

In reality, the choice of attending or not attending SMA is limited to those students who have graduated from SMP. If we think of the decision to attend each level of schooling as a dichotomous variable, its sequential nature is apparent. Thus, our data is in reality censored by the fact that those students who do not graduate from SMP do not have the choice of continuing on to SMA. If we restrict our sample to those students who have finished SMP, then we risk a biased estimation of the parameters because of censoring.

The sequential probit model has been used extensively in research on education (Lilliard and Willis, 1994). In general, it is an generalization of the basic probit model to allow for multiple, correlated, equations. The simple probit model for a single dichotomous dependent variable Y (0 or 1) is defined as follows:

Let Y^* denote the latent index for Y.

$$Y_j^* = \mathbf{B}'\mathbf{X}_j + u_j,$$

where $\mathbf{X}_j$ is a vector of dependent variables, $\mathbf{B}$ is a vector of parameter estimates, and u_j is an error term with a standard normal distribution (0, 1). The probability that Y is 1 is defined as the probability that the latent index is greater than zero.

$$\text{Probability}(Y=1) = \Pr(Y_j^* > 0) =$$
$$\Pr(\mathbf{B}'\mathbf{X}_j + u_j > 0) = \Pr(u_j > \mathbf{B}'\mathbf{X}_j)$$

Because u is normally distributed, this is equivalent to

$$\Pr(Y=1) = 1 - \Phi(-\mathbf{B}'\mathbf{X}_j) = \Phi(\mathbf{B}'\mathbf{X}_j).$$

The likelihood function is

$$L = P_j \cdot \Phi(\mathbf{B}'\mathbf{X}_j)$$

For a two-stage sequential probit model,

1. $Y_{1j} = 1$ if $Y_{1j}^* = \mathbf{B}'\mathbf{X}_j + u_j > 0$ (SMP graduation)
2. $Y_{2j} = 1$ if $Y_{2j}^* = \mathbf{W}'\mathbf{Z}_j + e_j > 0$ (SMA enrollment) if $Y_{1j} = 1$, Y_{2j} = missing otherwise.

As noted earlier, if the error terms u and e are correlated, then e will be censored. This will be the case if there is a significant but unmeasured factor which affects both equations. The effect of incidental truncation on equation (2) will lead to misleading estimations of the parameters for the dependent variables $\mathbf{Z}$. Taking this incidental truncation leads to a revised joint likelihood function:

1. $L_j = [1 - \Phi(\mathbf{B}'\mathbf{X}_j)]$ if $Y_{1j} = 0$ (did not graduate from SMP)
2. $L_j = [\Phi(\mathbf{B}'\mathbf{X}_j)]$ if $Y_{1j} = 1$, but still in SMP at time of survey
3. $L_j = \Phi(\mathbf{B}'\mathbf{X}_j) + F[(-W'Z_j - E(e_j \mid u_j > -\mathbf{B}'\mathbf{X}_j))/(\sigma_e \mid u_j > -\mathbf{B}'\mathbf{X}_j)]$ if $Y_{1j} = 1$ & $Y_{2j} = 0$
   (graduated from SMP but not enrolled in SMA)
4. $L_j = \Phi(\mathbf{B}'\mathbf{X}_j) + \Phi[(W'Z_j + E(e_j \mid u_j > -\mathbf{B}'\mathbf{X}_j))/(\sigma_e \mid u_j > -\mathbf{B}'\mathbf{X}_j)]$ if $Y_{1j} = 1$ & $Y_{2j} = 1$
   (graduated from SMP and enrolled in SMA)

where $E(e_j \mid u_j > -\mathbf{B}'\mathbf{X}_j)$ is the expected value of the error term e_j given information about u_j (Maddala, 1983).

Example:

To illustrate the use of the sequential probit model for incidentally truncated data, a simulated data set can be used. Let us pretend for a moment that

(1) SMP: $Y_{1j}^* = 3^*$(Family Income) + (Availability of SMP) -2 + u_j
(2) SMA: $Y_{2j}^* =$ (Family Income) + (Availability of SMA) -1 + e_j

and the error terms u_j and e_j have a joint correlation of .5.
Now,

$$SMP = 1 \text{ if } Y_{1j}^* > 0,$$

and

$$SMA = 1 \text{ if } Y_{2j}^* > 0 \text{ and } SMP=1.$$

We have a simulated data set with 10,000 observations:

Variable	Obs	Mean	Std. Dev.	Min	Max
income	10000	0.498923	0.288719	9.44E-06	0.999936
availability of smp	10000	0.500798	0.28941	2.42E-05	0.99995
availability of sma	10000	0.501418	0.290958	0.000038	0.999915
u	10000	-0.01177	0.990291	-3.61746	3.405174
e	10000	-0.00002	0.992914	-3.86683	3.825025
y1*	10000	-0.0142	1.339899	-4.38962	4.986963
y2*	10000	-0.00168	1.074421	-4.24648	3.942667
smp	10000	0.4958	0.500007	0	1
sma	10000	0.3346	0.471874	0	1

Model 1: If we estimate model 1, a probit model of SMA enrollment for the whole population, we see that the estimates of the parameters are biased because we have estimated the cumulative effect of the variables, not the specific effect on SMA enrollment itself:

sma	Coef.	Std. Err.	z	P>|z|
income	2.0710	0.0417	40.09	0.0000
availability of sma	0.6328	0.0484	13.09	0.0000
constant	-1.8593	0.0421	-44.19	0.0000

Model 2: if we estimate model 2, a probit model of SMA enrollment on those students who graduated from SMP, we also find inconsistent estimates of the parameters because of the selection bias. That is, the population of students who graduated from SMP is not a random sample with respect to the dependent variables, and omitted variable bias is committed. We see that the estimate of the effect of income is insignificant in this model, while we know from equations one and two above that the effect of income is the most important in deciding school status. Thus, this may be taken as an example where even using the correct sample population will lead to inconsistent estimates of the true parameters because of selection bias.

Probit Estimates if smp=1 — Number of obs = 4958

sma	Coef.	Std. Err.	z	P>|z|
income	0.1468	0.0778	1.89	0.059
av_sma	1.1147	0.0662	16.83	0
_cons	-0.1763	0.0632	-2.79	0.005

Model 3: For model three, however, we find that the full maximum likelihood estimation of the parameters, taking into account the correlation of the error terms, produces consistent estimates. In addition to predicting the effect of income and the availability of SMAs as being close to one, and the constant term close to -1, the model also gives us an estimate of the correlation between the error terms as .55, which is close the actual population value, .50.

	Coef.	Std. Err.	z	P>lzl
SMP:				
income	3.0099	0.0561	53.66	0.0000
availability of smp	0.9789	0.0505	19.39	0.0000
constant	-2.0034	0.0432	-46.37	0.0000
SMA:				
income	1.0527	0.1632	6.45	0.0000
availability of sma	1.0304	0.0671	15.36	0.0000
constant	-1.0836	0.1539	-7.04	0.0000
rho (r):				
constant	.55249	0.1485	3.72	0.0000

The above example illustrates that importance of incorporating the sequential nature of the decision making process if our goal is to isolate that factors that influence a particular step of it. Models which do not account for individual heterogeneity, that is, unmeasured factors specific to each individual which result in correlation among the error terms, risk committing omitted variable bias and arriving at inconsistent estimators.

Results

Applying the sequential probit model to the 1993 SUSENAS data, we model the current enrollment status of 16-18 years old contingent upon junior high school completion. The statistical model jointly estimates the parameters for the SMP and SMA participation equations, allowing for correlation between the error terms for each observation. The parental income and education terms have their expected effect in both equations. While gender is a significant predictor of SMP graduation, it is not for SMA. This is because most of the women who get married before the age of 19 also do not finish junior high school. The model predicts that encouraging later marriages would increase the rate of SMP graduation but not the *marginal* rate of SMA enrollment.

The dummy variables for family status also confirm our intuition on the role of family structure in educational attainment. Students from families which are missing a male or female head of household have a lower chance of finishing SMP. Why the coefficient is greater for those missing mothers as opposed to fathers is debatable. Perhaps a number of those missing fathers is due to seasonal labor migration, while missing mothers represents a more serious breakdown in family structure. In the second equation, we see that SMA enrollment is not affected by these variables, conditional upon SMP graduation. Students who have established an independent household but are not married are much more likely to continue in school. This dummy variable picks up a number of individuals who have migrated to urban areas, the majority for the purposes of continuing their education. Those 16-18 years old who have already married are much less likely to be enrolled in SMA. Furthermore, because they represent almost 12% of the sample, a more complete specification of this model would attempt to deal with the endogeneity of their marital status to schooling decisions.

The effect of school availability is very significant in the first (SMP) equation. Furthermore, the interaction term between urban areas and school

Table 5.
Maximum Likelihood Estimates for Sequential Probit: SMP equation

SMP	Coef.	Std. Err.	z	P|z|
Parental characteristics				
ln(income)	0.5981	0.0382	15.67	0.00
father's education	0.1953	0.0159	12.27	0.00
mother's education	0.2698	0.0200	13.51	0.00
Family Structure Indicators				
mother missing	-0.4237	0.0915	-4.63	0.00
father missing	-0.1586	0.0504	-3.15	0.00
own household, not married	0.3452	0.1585	2.18	0.03
married	-0.8882	0.0444	-20.02	0.00
Individual characteristics				
sex (=male)	0.1210	0.0298	4.06	0.00
age	-0.0341	0.0180	-1.89	0.06
Wood roof (atap kayu)	-0.2595	0.0429	-6.05	0.00
Bamboo roof (atap bambu)	-0.6266	0.0372	-16.85	0.00
Regional Characteristics				
Estimated Wages:				
service	-0.0141	0.0097	-1.46	0.15
agriculture	0.0828	0.0513	1.62	0.11
industry	-0.0223	0.0248	-0.90	0.37
transport & communications	0.0236	0.0127	1.86	0.06
Availability of SMP	0.1481	0.0152	9.77	0.00
Interaction between availability of SMP and urban areas	-0.1263	0.0170	-7.42	0.00
Provincial Indicators (DKI ommitted category)				
West Java	-0.2215	0.0926	-2.39	0.02
Central Java	0.0014	0.0930	0.02	0.99
Yogyakarta	0.3529	0.1303	2.71	0.01
East Java	0.2361	0.0883	2.68	0.01
Bali	-0.0669	0.1263	-0.53	0.60
Urban/Rural (1=Urban)	0.8346	0.1291	6.47	0.00
Constant	0.1522	0.2862	0.53	0.60

Table 6.
Maximum Likelihood Estimates for Sequential Probit: SMA equation

SMA	Coef.	Std. Err.	z	P|z|
Parental characteristics				
ln(income)	0.5916	0.0731	8.09	0.00
father's education	0.1185	0.0215	5.51	0.00
mother's education	0.1061	0.0272	3.90	0.00
Family Structure Indicators				
mother missing	-0.1091	0.1413	-0.77	0.44
father missing	0.0442	0.0758	0.58	0.56
own household, not married	0.4666	0.1992	2.34	0.02
married	-0.2242	0.0994	-2.26	0.02
Individual characteristics				
sex (=male)	0.0686	0.0451	1.52	0.13
age	-0.0981	0.0292	-3.36	0.00
Wood roof (atap kayu)	-0.0975	0.0702	-1.39	0.17
Bamboo roof (atap bambu)	-0.2152	0.0899	-2.39	0.02
Regional Characteristics				
Estimated Wages:				
service	0.0287	0.0143	2.01	0.05
agriculture	-0.0020	0.0788	-0.03	0.98
industry	-0.1050	0.0378	-2.78	0.01
transport & communications	-0.0422	0.0192	-2.19	0.03
Availability of SMP	0.1245	0.0412	3.02	0.00
Interaction between availability of SMP and urban areas	-0.0781	0.0410	-1.90	0.06
Provincial Indicators (DKI ommitted category)				
West Java	-0.0328	0.1110	-0.30	0.77
Central Java	0.0616	0.1298	0.47	0.64
Yogyakarta	0.2874	0.1900	1.51	0.13
East Java	0.0424	0.1218	0.35	0.73
Bali	0.0670	0.1865	0.36	0.72
Urban/Rural (1=Urban)	0.2973	0.1762	1.69	0.09
Constant	2.2982	0.5335	4.31	0.00
RHO (correlation)	Coef.	Std. Err.	z	P|z|
Constant	-0.4410	0.1610	-2.75	0.01

availability indicates that most of the increase occurs in rural areas. i.e., for rural areas the predicted increase in school participation is .1481, while for urban areas it is .1481-.1263=.0118. Thus, the advantage of living in an urban area (the dummy variable for urban/rural), .8346, may be eliminated if the density of schools reaches a certain level. While the same effect is visible for the SMA equation, it is not as significant. This suggests that conditional upon SMP graduation, students will travel father distances to enroll in high school. The availability of junior high schools undoubtedly also effects the price and the quality of the schools because of competition for students. Table 8 illustrates the predicted effect on high school enrollment of increasing the density of both SMPs and SMAs on urban and rural rates of participation, holding all other variables to their mean levels for their respective (urban/rural) area.

The effect of labor opportunities is modeled by the Kabupaten-specific wage terms. None of these terms is significant at the 5% level for the SMP equation. However, for the SMA equation we see a significant negative impact for industrial wages. This suggests that opportunities in the industrial labor force is a significant inducement for SMP graduates not to enroll in high school, everything else being equal. It is important to note that any of the geographic variables may also be picking up regional differences which are not specified in the model. However, the fact that the wage terms are not significant for the first equation, and the industry wage is quite significant for the second equation,

Table 7.
Effect of School Availabibty on SMA enrollment

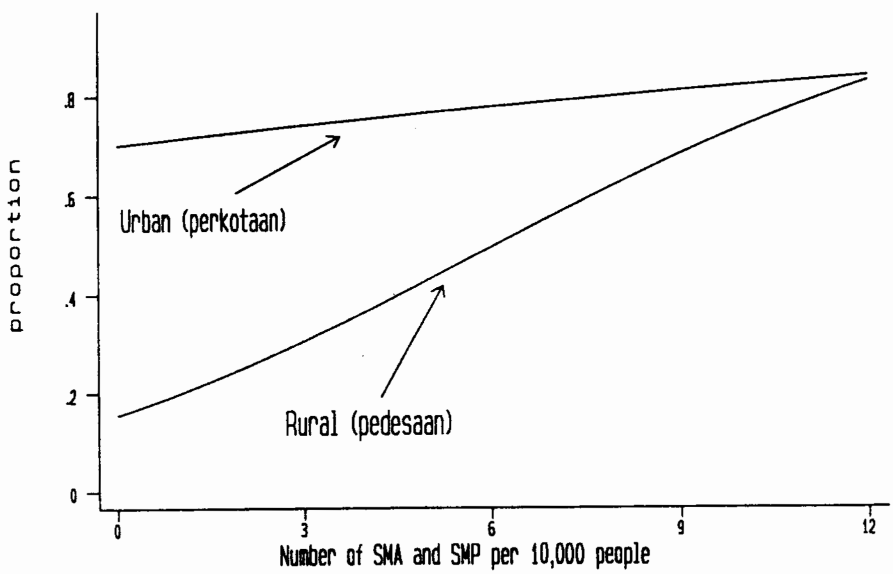
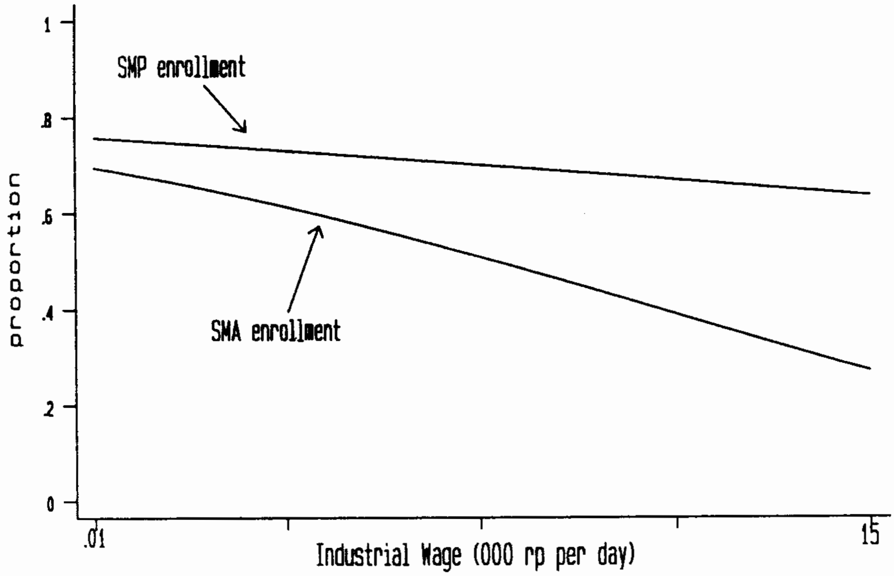


Table 8.
Effect of Industrial Wage on School Enrollment



suggests that it may indeed be reflected the reality of individual decision making. Table 8 illustrates the predicted effect of increases in industrial wages on school participation, holding other variables constant. In this sense, it shows the effects of regional uneven development, where rapid industrialization is not matched by improvement in public facilities and improved social welfare. It does not, however, model the broader long term effects, because presumably higher industrial wages would be a sign of a more general overall prosperity.

The indicator variables for each province drop out of the SMA equation. This indicates that inter-regional differences in SMA participation can be largely explained on the basis of empirical measures. I would point out that a better specified model would include indicator variables for each province by urban and rural area, or dummy variables for each Kabupaten. However, computer limitations restricted the number of variables allowed in the estimation. Nonetheless, it is suggested that much of the regional difference in educational participation is due to factors which are the result of public and private educational policy as well as differences in regional rates of development.

Conclusion

While educational attainments in Java and Bali have been increasing rapidly, significant inequality in secondary education exists on the basis of social status, the geographic distribution of development, and between urban and rural areas. The current popularity of Human Capital theory, which often tends to obscure the role of these social factors in educational attainment, should not prevent us from acknowledging the larger social and cultural systems thet the educational process is embedded in. Subsequently, in modeling the rate of high school participation on Java and Bali, this paper suggests that much of the regional and urban/rural difference can be explained on the basis of empirical factors. Further research would allow a fuller paramaterization of the model and extend the analysis to the rest of Indonesia.

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Descriptive Statistics of Sample Variables

	Obs	Mean	Std. Dev.
Parental characteristics			
ln(income)	19789	12.137	0.625
father's education	17538	2.287	2.017
mother's education	19182	1.640	1.579
Family Structure Indicators			
mother missing	23398	0.026	0.159
father missing	23398	0.096	0.295
own household, not married	23398	0.011	0.102
married	23398	0.144	0.351
Individual characteristics			
sex (=male)	23398	0.513	0.500
age	23398	17.007	0.804
Wood roof (atap kayu)	23398	0.146	0.353
Bamboo roof (atap bambu)	23398	0.205	0.404
Regional Characteristics			
Estimated Wages: (000 rp sehari)			
service	23398	4.418	2.936
agriculture (if rural)	12986	1.731	0.476
industry	23398	2.565	1.321
transport & communications	23398	3.415	1.859
Availability of SMP	23398	4.029	2.308
Availability of SMA	23398	2.888	2.432
Provincial Indicators (DKI ommitted)			
West Java	23398	0.234	0.423
Central Java	23398	0.287	0.452
Yogyakarta	23398	0.035	0.184
East Java	23398	0.294	0.456
Bali	23398	0.058	0.234
Urban/Rural (1=Urban)	23398	0.445	0.497
Outcome variables			
Graduated from SMP, or still enrolled	23398	0.566	0.496
Enrolled in SMA	23398	0.359	0.480
Still enrolled in SMP	23398	0.104	0.301