

THE SOCIOECONOMIC AND DEMOGRAPHIC ASPECTS OF EDUCATION IN THE PHILIPPINES

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ABSTRACT

This paper seeks to analyze the determinants of school attainment of a sample of 12-year old children included in the Household and School Matching Survey (HSMS). A conceptual framework is drawn to show how the number of years of schooling completed by a child is affected by the characteristics of the child himself, those of his household, the school and the community.

Two measures of child characteristics were used in the regression model -- the child's sex and his mother's rating of his IQ. The latter proved to be a significant determinant of school attainment. The household's borrowing capacity and the value of household assets, both indicators of the household's socioeconomic status, did not bear significantly on school attainment. Of the six community-level indicators included in the analysis, only child's wage rate and rate of return to elementary education were found to be statistically significant. Finally, school expenditure on personnel per student was also found to have a statistically significant and negative effect on the level of schooling.

INTRODUCTION

The economic and social development of a country depends critically on how it prepares its citizens for participation in national life. At first blush, the Philippines seems to be doing well as far as formal education and training is concerned. It enjoys one of the highest literacy rates in the world¹ and possesses a broad-based system of education at all levels. However, its educational system has also been criticized for producing a large pool of educated, unemployed workers and for being of low quality in some respects.

The proper approach to the gross mismatch created by the educational system has been studied by various researchers. This study will concentrate on some aspects of the quality of education by looking at the progress of educational services at the elementary levels of education.

The effectiveness of the school system in meeting the needs of our society cannot be effectively measured without considering the influence exerted by factors beyond its control. Among these factors are household and community characteristics. For example, while the efficiency and recruitment efforts of the school is important in the family's decision to send a child to first grade, the household's own characteristics - its income, composition, aspirations and other factors - may likewise be crucial.

The effects of household and community factors are also of interest because conclusions from such a study may indicate with greater clarity the role that can be realistically played by educational policies. We may obtain insights into how non-educational policies ostensibly affect educational outcomes. In the design of educational policy, it is helpful to know up to what point educational inputs can be relied upon to deliver improvements in outcomes and in which areas it may be profitable to rely on indirect policies.

It is customary to discuss educational outcomes in the context of household, community and school characteristics. Thus, the investigation delves into the manner by which the educational system copes with the increasing burden by studying the related influences of household and community factors.

The major question addressed in this paper is: what are the factors that determine schooling achievement and attainment. Two measures are utilized: number of years of schooling achieved by those who were old enough to be in the last elementary year (12-year olds) and the score achieved by students in selected subjects and in a general achievement test.

DATA AND METHODOLOGY

The data used in this study come from the Household and School Matching Survey (HSMS) a nationwide sample survey of barangay (village)

and households which was conducted by the Project Development and Implementation Management Office (PDIMO) of the Ministry of Education, Culture and Sports in 1982.

The HSMS was part of a set of baseline surveys of communities, households, children and schools intended to provide data for empirical and analytical studies that might contribute to the understanding of educational differentials and the development of appropriate policy direction and program effectiveness.

A two-stage sampling design was used to select the sample respondents with the barangays and the households as the primary and secondary sampling units, respectively. The primary sampling frame is a complete list of barangays with information on: (1) the number of households, and (b) classification as to location, that is, whether urban or rural and whether "affected" or not. For purposes of the HSMS, barangays were categorized as "affected" if they fall below the national cut-off in the following indicators: achievement scores, school participation, and survival rate. A total sample of 260 barangays was randomly drawn with probability proportional to size, (that is, the number of households in the community).

The second-stage samples consisted of households selected within the sampled barangays. The sampling frame was a listing of all households in the sample barangay with at least one person less than 25 years of age. The estimated household sample size was 5,796. The actual size, however, was only 4,990 for a 90 per cent response rate. Some 226 households did not respond to interview calls, while 580, which were actually interviewed, were invalidated for not meeting the age criterion set for the household respondent.

Information on the community level variables were gathered using a questionnaire that the barangay captain filled out. For the sample households, another questionnaire was administered through interviews with the wife of the household head as respondent.

Table 1 shows the school participation rate of the children included in the sample according to their ages.

Table 1. Frequency of Enrolment by Age Group, HSMS Sample Survey

Age	Number of Children in the Sample		
	Total	Enrolled	Per Cent Enrolled
7	401	400	99.8
8	706	703	99.6
9	824	811	98.4
10	777	748	96.3
11	825	790	95.8
12	836	783	93.7
13	747	657	88.0
14	714	575	80.5
15	711	510	71.7
16	652	455	69.8
Total	7,193	6,437	89.0

For purposes of this study, it would have been preferable to use 13-year olds (those old enough to have graduated) as basis for the analysis of school attainment. However, the participation rate for 13-year olds drops to 88 per cent from the 94 per cent rate for 12-year olds. Since the use of school characteristics was important for the analysis, a higher percentage of the 13-year old sample would have had to be dropped. To avoid possible statistical problems in the analysis, the 12-year old cut-off was used.

DETERMINANTS OF YEARS OF SCHOOLING: A GENERAL FRAMEWORK

The number of years of schooling completed by the child is the result of the household's demand for education coupled with the available schooling services provided by the school. The actual attainment is also affected by the basic characteristics of the child and community conditions that determine the relative efficiency of his study efforts. The community exerts additional influence by determining the norms that the household is expected to satisfy. All of these influence the number of years of schooling that is finally attained by the child.

These variables can be classified into four groups: child characteristics, household characteristics,

school characteristics, and community variables. The interactions of these variables can be visualized as acting through the two sides, supply and demand, of the schooling market. A rough characterization would divide the variables into those that influence the supply side and those that influence the demand side.

The household may be seen as primarily affecting the demand for educating the child. Its demand in turn is affected by community norms that the household may try to fulfill. Thus, household and community characteristics act primarily by increasing or decreasing the demand for schooling.

The school on the other hand, is seen as the main instrument for translating demand into actual school completion and achievement. School factors determine the efficiency with which demand is transformed into realized output. The school is visualized as the supplier of schooling services and its characteristics can be seen as increasing or decreasing the supply of schooling output.

The child is the raw material which is transformed into the finished product. This influences the modeling of child variables. For example, a brighter child increases the efficiency of "producing" schooling, thereby increasing the supply of school completion and achievement. In conjunction with some household characteristics he also increases the material and psychic returns for the household from investments in the child. These are expected to increase the demand for schooling.

Household Characteristics

Household characteristics have various effects. In some cases, as in the amount of parent's education, the effect will be to increase the taste for education, and thus increase the demand for education. This leads to an increase in the expected years of schooling. Thus, other things being equal, we would expect more educated parents to be more interested in giving education to their children. Higher parent's education may also have an indirect effect through higher household income.

Higher household income has two effects. First, it increases the household's ability to finance a child's studies. Richer parents can more easily afford to send their children to school. Thus, it is

expected to increase the demand for education. Second, higher income also enables the household to purchase more commodities for its members. Since education can also be thought of as one other commodity that a household may want for its members, higher income will also result in higher demand for schooling. We expect richer households to buy more clothes for their children. We can also expect them to buy more schooling. Higher income thus directly increases the demand for education.

Extending this reasoning, higher parent education, by increasing income, also has an indirect increase in demand for schooling. Mother's wage rate, for example, increases household income, thereby increasing the demand for education. At the same time, it raises the opportunity cost of staying at home to assist in ancillary activities to children's education like homework preparation, and thus decreases the demand for education. The final result in the empirical study would depend on which effect is stronger.

Community Variables

Community variables influence the years of schooling by providing norms and conditions that influence the household's demand for education. They also indicate the level of modernization and technology as well as levels of wages and living costs, all of which influence the education provision and the supply curve. The presence of electricity in the community, for example, increases the ease of learning. It also increases the potential study period for the child and the work period for the mother enabling her to substitute for the children in minor housework. All of these increase the demand for education and increase the expected completed years of schooling.

Other community variables may also move supply and demand in different directions and the needs to be discussed in context. For example, the family's perception of whether the community looks down on illiterate individuals is expected to increase its demand for schooling. The influence of differences in media exposure also incorporates complicated mixtures of perceptions and social processes which have to be disentangled.

School Factors

In contrast to the previous groups of variables, school factors mainly influence the supply side of schooling achievement. The level of technology and competence in the schools strongly affects the provision of schooling services. Thus, school variables mainly affect completed years of schooling through the resulting shifts in the supply curve.

For example, with all other factors unchanged, improvements in teacher quality will increase the expected years of schooling of a child by raising his studying efficiency. This would be manifested in our model by an increase in the supply of schooling services and an increase in the expected completed years of schooling.

All of the material aids for learning like the number of desks available for student use, number of textbooks per student (general and reference), physical condition of the buildings (primarily as an indicator of other physical aids that would be available) and the number of science kits are all expected to ease the learning process for the child. These increase the supply of schooling services and may be hypothesized to increase educational completion and achievement.

Child Variables

Child characteristics are influential because they determine the expected utility of education to the household and the efficiency of service supplied by the school. As discussed earlier, a brighter child would imply an increased usefulness of schooling for the household because more of what is taught would be retained by the child. This translates in a higher level of income expected. At the same time, it would have the equivalent effect of increasing the supply of school services by increasing the efficiency of schooling production. Thus, variables that increase a child's absorptive ability would increase both the supply and demand for schooling, leading to an increase in realized schooling.

Higher drive and interest in schooling by a child may translate to an increase in the demand for education by the child and is expected to increase the expected years of schooling completed and achieved.

AN EXPLORATION OF SCHOOL QUALITY AND DIFFERENCES BETWEEN PUBLIC AND PRIVATE SCHOOLS

For a meaningful analysis of the results on the determinants of the years of schooling, it was deemed necessary to carry out a study of the factors affecting the quality of schools. The results are discussed here to guide us in identifying later those school variables influential in determining the educational attainment of children and in interpreting the results.

An obvious finding of this analysis is the marked difference between public and private schools in the sample. This is evident in the difference in the quality of the two types of schools as shown by indicators of school achievement. These indicators are the average scores of a random sample of 20 grade-four children in tests in Mathematics, English and Pilipino (Table 2).

Table 2. Average Scores of Public and Private School Students in Selected Subjects

Subjects	Schools	
	Public	Private
Math	41.1	52.5
English	42.3	60.2
Pilipino	48.2	61.3
Average of Above	43.9	57.5
No. of Schools in the sample	477	90

To test for statistical significance and at the same time show the difference between the overall scores (average of the three subjects) of students, a simple regression was run. This regression tried to explain variations in the dependent variable, the average score of the twenty sample students in three subjects, in terms of differences in the explanatory variable. The explanatory factor used as binary variable had a value equal to one if the school is public; otherwise, the variable's value is zero.

The result of this regression is shown in Table 3. The intercept is 57.2. This is the average overall score if the value of the independent variable is 0 (i.e., if the school is private). This agrees with the

Table 3. School Quality Difference Between Public and Private Schools

Variable Label	DF	Parameter Estimate	T for H_0 Parameter = 0	Prob > T
INTERCEPT	1	57.163082	60.267	0.0001
WHETHER SCHOOL IS PUBLIC	1	-13.208045	-12.773	0.0001

Source	DF	Sum of Squares	Mean Squares	F Value	Prob > F
MODEL	1	13649.268	13649.268	163.139	0.0001
ERROR	584	48861.266	83.666551		
C TOTAL	585	62510.534			
RDOT MSE		9.146942	R-SQUARE	.2184	
DEP MEAN		46.051195	ADJ. R - SQ	0.2170	
C.V.		19.86255			

average score for private schools in Table 2. If the value of the explanatory variable is 1 (i.e., if the school is public), we deduct the value of the estimated coefficient, -13.2. This would make the average public school's score equal to 44, which is virtually the same as in Table 2. Our simple regression shows this difference to be statistically significant at the .0001 level. (That is, the chances are .0001 that this difference was accidental).

Given this difference, the data were examined for systematic differences between public and private schools in those factors that school administrators and researchers think determine school quality. Data were available on educational aids, financial information and physical arrangements in schools.

Table 4 shows that there are systematic differences between public and private schools. Among other things, differences between these two types of schools are evident in the total expenditure per student by various types of cost, in the number per student of various educational aids, in the location of schools (as measured by distance from homes of students) and the type and length of training of the teachers. There was, however, a surprising similarity in the size of the average public and private schools.

Instead of testing the difference in means between public and private schools for each variable reported by the data, a multiple linear regression was used to analyze whether the selected set of variables could be used to discriminate between the two types of schools. This is essentially an analogue for the more precise, but more expensive, probit or logit methods which discriminate between groups by using an empirically estimated formula based on a set of factors.²

The method consists of estimating a function that is then used to predict whether a particular school is public or private based on selected characteristics. If the formulation is successful, the empirically estimated function will predict well. Turning the argument around, if the function predicts well, then we conclude that a systematic difference exists between the two types of schools as far as the selected characteristics are concerned.

The results of the multiple regression are shown in Table 5. The results give quantitative support to the commonly held beliefs about differences between public and private schools. The intercept in this case has no independent meaning. It merely provides a starting point to which estimated coefficients associated with selected characteristics are added or subtracted in order to arrive at a prediction (or guess) whether a school is public or private.

Table 4. Means of Selected SQ VARS (with missing values)

Variable No.	Label	Schools			
		Private		Public	
		N	Mean	N	Mean
SQVAR4	NO. OF STUDENTS: AVERAGE	82	843.310976	487	842.292341
SQVAR22	AVERAGE AGE OF TEACHERS	85	31.023529	480	39.147917
SQVAR23	PERCENT OF TEACHER WITH MS PHD UNITS	0		464	0.416311
SQVAR24	AVERAGE LENGTH OF TEACHING EXPERIENCE	85	8.658824	479	15.185804
SQVAR25	FREQ OF PTA MEETINGS	79	4.405064	482	5.298755
SQVAR36	TOTAL FLOOR AREA PER STUDENT	79	2.505967	484	2.163086
SQVAR37	NO. OF TEXTBOOKS PER STUDENT	63	4.560641	457	3.433516
SQVAR38	NO. OF REF BOOKS PER STUDENT	71	3.851331	484	0.512644
SQVAR39	EXPENDITURES ON PER SNL PER STUDENT	63	588.320773	395	455.861531
SQVAR40	MOE LESS TEXT EXPENSES PER STUDENT	63	148.223560	303	35.454560
SQVAR41	MOE PER STUDENT	64	177.708644	304	42.583858
SQVAR42	TOTAL EXPTR E LESS TEXT PER STUDENT	65	713.881430	425	448.960086
SQVAR43	NO. OF DESKS PER CLASSROOM	78	63.907622	472	17.761391
SQVAR45	NO. OF STUDENTS PER CLASS	81	42.146572	485	36.374282
SQVAR46	IF SCHOOL IS IN RURAL BARANGAY	92	0.163043	492	0.502033
SQVAR47	DAILY WAGE RATE OF UNSKLD ADULT	92	16.97286	459	14.017429
SQVAR48	IF BRGY SCHOOL IS LOCATED HAS ELE	92	0.956522	492	0.743902
SQVAR50	ALL OR MOST TEACHERS HAD TRAG	93	0.838710	493	0.813387
TQDOSF		78	54.853320	479	52.501314
HINCOME		88	7744.590909	473	5867.410148

If the estimated value of the function is 0 or close to it, the particular school is probably private. If it is closer to 1, the school is probably public. Because the method being used is just an approximation the estimated value can be below 0 in which case it is set equal to 0, or it can be above 1 in which case it is set to 1.

The characteristics used to discriminate between public and private schools may be classified into four broad groups; indicators of the level of material inputs into the educational process; indicators of the quality of teaching and school administration; location of the school; and, other variables. Some variables on material inputs are direct measurements such as the number of desks and the number of textbooks per student. Another indicator used was the total cost less textbook

expenses per student to indicate the level of support for day-to-day items. The major portion of this cost is personnel salaries.

Differences between public and private schools start with the level of material inputs. Public schools typically spend less money per student on all components of school costs, and have fewer desks, textbooks and reference books per student (Table 4).

This difference shows up in the estimated prediction function (Table 5). The number of science kits owned, number of desks, number of textbooks per student and the number of desks per classrooms all have negative coefficients. Negative coefficients tend to lower the estimated value of the prediction function towards 0, indicating that increases in the

Table 5. Probability That a School Is Public or Private

Variable No.	Variable Label	DF	Parameter Estimate	T for H ₀ ; Parameter=0	Prob >T
INTERCEP	INTERCEPT	1	0.857739	11.482	0.0001
SQVAR13	TOTAL EXPENDITURE LESS TEXT	1	4.49068E-08	2.892	0.0040
SQVAR 17	NO. OF TIMES VISITED BY SUPERSRS	1	0.003263037	2.213	0.0273
SQVAR18	AVERAGE CLASSROOM SIZE	1	-0.000313705	-1.007	0.3145
SQVAR23	PERCENT OF TEACHER WITH PHD UNITS	1	0.078649	3.792	0.0002
SQVAR24	AVE LENGTH OF TEACHING EXPERIENCE	1	0.007597198	4.727	0.0001
SQVAR25	FREQ OF PTA MEETINGS	1	0.002087892	0.831	0.4061
SQVAR26	NO. OF SCIENCE KITS OWNED	1	-0.00214699	-4.875	0.0001
SQVAR29	NUMBER OF DESKS	1	-0.000692148	-3.387	0.0008
SQVAR37	NO. OF TEXTBOOKS PER STUDENT	1	-0.00574067	-2.257	0.0244
SQVAR38	NO. OF REF BOOKS PER STUDENT	1	0.0004097884	0.137	0.8910
SQVAR43	NO. OF DESKS PER CLASSROOM	1	-0.000729971	-4.597	0.0001
SQVAR46	IF SCHL IS IN RURAL BRGY	1	0.079604	4.006	0.0001
TQDASF		1	0.000883445	0.849	0.3961
SHQ22	WHAT DEGREE WAS THIS?	1	-0.00153214	0.177	0.8595
SQVAR32	WHETHER SCHL IS MULTILEVEL	1	-0.691170	-19.829	0.0001
SHQ118	PHYSICAL CONDITIONS	1	0.028177	-1.706	0.0885
ADIS	DISTANCE OF MAJORITY OF HOMES	1	-0.26998	-3.332	0.0009

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB F
MODEL	17	51.468010	3.027530	65.809	0.0001
ERROR	566	26.038839	0.046005		
C TOTAL	583	77.506849			
ROOT MSE		0.213388	R-SQUARE	0.6640	
DEP MEAN		0.842466	ADJ R-SQ	0.6540	

values of these variables decrease the probability that a specific school is public. High values of these indicators of material inputs are, therefore, identified with private schools.

Another variable was used to represent the physical condition of the school. This was used as a broad indicator of the condition and quality of the material inputs, as well as the availability of other education aids. Once these variables indicating

direct measurements are controlled for, the estimated coefficient for total expenditures less textbooks per student is positive.³

This indicates that once we have standardized all schools to have equal levels of directly measured material inputs such as science kits and desks, higher educational costs are identified with public schools.

The foregoing variables are all significantly different from 0 as indicated by their t-statistics, the ratios of the estimated coefficients to their own standard errors. The chances that the estimated values are different from 0 merely by accident are less than some acceptable level. In conventional practice, the acceptable level is 10 per cent. The estimated coefficient number of reference books per student was not significantly different from 0. However, this may be because its effect has already been included with that of number of textbooks per student.

The other main input into the education process is the level and quality of teaching and administration. Five indicators are available for this group of inputs: average length of teaching experience, percent of teachers with M.S. or Ph.D. units, frequency of supervisory visits, educational attainment of the school head, and average quality of teachers as indicated by scores achieved in Math, English and Pilipino. Here public schools seem to have the edge. Their teachers have more experience in teaching and a greater proportion of them had earned graduate credits. Supervisory visits were also more frequent in public schools. Teacher quality and frequency of PTA meetings do not seem to be good discriminators between the two types of schools.

The locational patterns of the two types of schools are also different. The coefficient of variables indicating whether the school is rural is positive while average distance from the majority of students' homes is negative. Both coefficients are statistically significant. Two interpretations are possible. One is that public schools are probably located close to the homes of their target population. The other is that because of higher out-of-pocket costs, the target population of private schools is sparser and they allow for this by locating in urban areas. Consequently, distance from the majority of students' homes is higher than that for public schools.

The overall picture that is presented by the data is of virtually two systems with different characteristics. The implications of these differences in school quality are explored in the next section.

Quality Differences Between Public and Private Schools

The results from the previous section indicate systematic differences between public and private schools in material inputs to the educational process, teacher characteristics and in other aspects. Additionally, the data show a difference in the way that these schools allocate their resources. Private schools concentrate more resources on material inputs like books and desks. Public schools, on the other hand, tend to spend more for personnel salaries and maintenance and overhead expenses after material inputs have been standardized (i.e. conceptually made equal). The raw data indicate that personnel and maintenance costs per student are less in public schools than in private schools. Whether these differences are intentional or unintentional results of policies will be examined at a later phase.

This section tries to examine the influence of these differences between public and private schools on school quality. The indicator of school quality used in this section is the average of the scores of the twenty sample grade-four pupils in Mathematics, English and Pilipino. This is the dependent variable whose variations are explained by a set of factors made up mostly of those characteristics used to discriminate between public and private schools. If successful, the analysis will show which of these characteristics are important determinants of school quality. As a by-product, it will also show which characteristics are responsible for the observed differences in quality between the two types of schools.

In the conceptual framework, it was shown that school achievement and attainment result from a complex interaction of motivations and markets that involves variables belonging to four major groups: community characteristics, family and household characteristics, child variables and school variables. While we are interested in explaining school quality, the indicator used is merely an average of a sample of individual achievements. The analysis should therefore, include family and individual characteristics to the extent that these differ systematically by communities or by groups of children representing particular schools.

At this level of analysis, the unit of observation is the school; individual and family characteristics cannot be included. Our exercise is anchored on the belief that differences in household characteristics cancel out for each observation. For example, suppose that school achievement is strongly influenced by socioeconomic status (SES) and that family income is a good indicator of SES. If average student income varied considerably by schools, then this would be reflected in the average score that we use as an indicator of school quality. However, if each school had roughly the same dispersion in student incomes as the other schools then income differences would cancel out within each observation.

The average achievement score in the grade-four sample would not be affected and including this variable would be unnecessary. This analysis proceeds on the expectation that individual and family characteristics do cancel out this way.

The school variables have been divided into the same broad groups used in the analysis of school differences. Essentially the same variables used there are used here. Average household income for the barangay was included to test whether community incomes affected the dependent variable. Aside from testing whether school quality was dependent on community income, this variable was added to control for socioeconomic status just in case this was representative of average student income of the school found in that barangay. The presence of electricity in the barangay was included because an earlier analysis (Paqueo, 1985) found this to be a very strong influence on school attainment.

Table 6 presents the estimated coefficients of the function used to explain variations in the indicator for school quality, the average score of sample students in Mathematics, English and Pilipino. Based on results of the multiple regression, the F-value for the estimated function is 11.8 indicating that there is only a .0001 probability that variations explained by this function is accidental.

Most of the results are expected. Material inputs such as number of desks, number of reference books per student and maintenance expenses other than textbook have positive estimated coefficients

implying that higher levels of these variables tend to lead to higher school quality. These coefficients are all statistically significant at the 10 per cent level. Expenditures on personnel, number of science kits owned and the number of textbooks per student both have the expected positive sign but are not statistically significant. Thus, in those variables where each type of school has an edge - expenditures per student for public schools and direct inputs for private schools - the implied decisions seem to be correct. They do enhance school quality.

In the quality of teaching and administration, the results are not so straightforward. The quality of teachers as measured by average test scores is highly significant and positively influences school quality. On the other hand, average length of teaching experience and frequency of supervisor visits have negative signs but are insignificant.

A tentative hypothesis which has to be verified, is that teachers who are weak tend to go for further training. So once actual teacher scores are allowed for, graduate units may actually indicate lower teacher quality. The estimated coefficients on the frequency of PTA meetings may also be explained along these lines.

DETERMINANTS OF SCHOOLING ATTAINMENT: FINDINGS

One of the main objectives of Program for Decentralized Education (PRODED) is to increase the level of schooling attained. Consequently, the determinants of school achievement are of intense interest in the HSMS follow-up study. Here variables with a significant influence on the level of schooling attained by 12-year old children, especially those which can be influenced by PRODED inputs, are examined. PRODED-related variables mostly involve the enhancement of school and teacher quality through increases in material inputs in school and by changing the rewards to teachers.

The study aims to capture the effects of the PRODED-related variables while controlling for the influence of other types of measures. PRODED variables are discussed together with

Table 6. Factors Influencing School Quality

Variable No.	DF	Variable Label	Parameter Estimate	For H ₀ : Parameter=0	Prob >T
INTERCEPT	1	INTERCEPT	38.590690	10.697	0.0001
SQVAR17	1	NO. OF TIMES VISITED BY SUPERVSRS	-0.014948	-0.258	0.7862
SQVAR18	1	AVERAGE CLASSROOM SIZE	0.00329658	-0.260	0.7947
SQVAR23	1	PERCENT OF TEACHERS WITH MS PHD UNITS	-1.626217	0.999	0.0461
SQVAR24	1	AVERAGE LENGTH OF TEACHING EXPERIENCE	-0.061016	0.947	0.3439
SQVAR25	1	FREQ OF PTA MEETINGS	-0.174768	-1.750	0.0807
SQVAR26	1	NO. OF SCIENCE KITS OWNED	0.012982	0.763	0.4456
SQVAR29	1	NUMBER OF DESKS	0.003092036	3.955	0.0001
SQVAR37	1	NO. OF TEXTBOOKS PER STUDENT	0.105562	1.010	0.3131
SQVAR38	1	NO. OF REF BOOKS PER STUDENT	0.457962	3.839	0.0001
SQVAR39	1	EXPENDTRS ON PERSONL PER STUDENT	0.0007379488	1.437	0.1513
SQVAR40	1	MOE LESS TEXT EXPENSES PER STUDENT	0.005572602	1.662	0.0971
SQVAR43	1	NO. OF DESKS PER CLASSROOM	0.001351416	0.219	0.8269
SQVAR45	1	NO. OF STUDENTS PER CLASS	0.027893	1.191	0.2340
SQVAR46	1	IF SCHL IS IN RURAL BRGY	-2.603179	-2.803	0.0052
TQOASF	1	TEACHER QUALITY SCORE	0.175899	4.128	0.0001
SHQ22	1	WHAT DEGREE WAS THIS?			
		DEGREE OF SCHOOL HEAD	0.171402	0.482	0.6300
SHQ118	1	PHYSICAL CONDITIONS	0.607415	0.938	0.3489
AD15	1	DISTANCE FR MAJORITY OF HOMES	0.450566	1.387	0.1660
REGION1	1		-3.841523	-2.212	0.0274
REGION2	1		-2.309063	-1.283	0.2001
REGION3	1		-0.244425	-0.144	0.8854
REGION4	1		-0.857881	-0.491	0.6238
REGION5	1		-2.017788	-1.091	0.2757
REGION6	1		-7.518403	-4.412	0.0001
REGION7	1		-7.446036	-4.574	0.0001
REGION8	1		-8.363203	-4.351	0.0001
REGION9	1		-9.593719	-5.477	0.0001
REGION10	1		-5.963486	-3.406	0.0007
REGION11	1		-7.931196	-4.833	0.0001
REGION12	1		-8.112635	-4.253	0.0001
ELECTRIC	1		-0.243046	-0.220	0.8257
HINCOME	1		0.0004074857	0.773	0.4398

these other influences. The discussion follows the format of the previous sections where the other groups are discussed first. The effects of school and teacher quality measures are examined in the light of this background.

The estimated function reported in this table has an F-ratio of 2.927 which is significant at the .0002 level.

Child Variables and the Schooling Level

Two measures of child characteristics were used in the final estimating equation: the child's sex and the mother's rating of the child's IQ. Child's sex was not significant. However, mother's rating of IQ was highly significant and positive. This may be the "Pygmalion effect" whereby the mother's expectation of good work induces the desired behavior in the child. Still, the next stage of research disentangling the effect of superior native ability from the Pygmalion effect would be very important for formulating educational methods and policies.

Household Characteristics

Only two household variables were included in the final estimation - the peso amount of household assets and the borrowing capacity of the household. These were mainly indicators of socio-economic status. But other effects may be incorporated in these variables. Measures of mother's and father's level of schooling were included in the early estimators but were consistently insignificant. They were dropped so we could concentrate more on the remaining variables. The number of siblings in the family was dropped for similar reasons.

The borrowing capacity of the household had a positive but statistically insignificant effect on the level of schooling attained. The estimated sign is expected but the effect does not seem to be very precise. Value of household assets had an unexpectedly negative effect but was still statistically insignificant.

Community Characteristics

Community variables in the final estimating function included distance of the community to the nearest public school, job availability for children, urban or rural classification of the barangay, rates of return to both the elementary and college educa-

tion and the child's wage rate in the community. Only the rate of return to elementary education and the child's wage rate were statistically significant.

The rates of return to elementary education and college education tend to raise the household's demand for schooling and are expected to affect the level of schooling positively. The rate of return to college education has the expected sign but it is statistically insignificant. The rate of return to elementary education is statistically significant but has a negative sign. This unexpected result may be due to the way that the indicator was designed.

The measure used is the average rate of return for completing the sixth grade. It was computed by comparing the lifetime expected wage income of a worker with completed elementary education to one who has no education. Suppose that the highest increase in expected wages occurs between the second and third grades (when the child acquires functional reading and writing skills), a child would tend to stop after the third grade. Thus, the probability of stopping after the third grade would be highest where the rate of return to elementary education is also the highest. An indicator that roughly uses the rate of return to completed elementary education would capture this high rate of return to third grade completion. But it would not be able to incorporate the effect of stopping after that grade. It would, therefore, show a negative effect because the probability of attaining grade four or higher decreases as the rate of return to elementary education increases. A more refined measure of the rate of return to elementary education in the succeeding stages of empirical work would be able to examine this issue more closely.

Teacher and School Quality

Half a dozen variables indicating teacher and school quality used in the estimating function included the number of reference books per student, number of students per class, average score of the school's teachers in a diagnostic test, frequency of PTA meetings, number of desks, and expenditures on personnel per student. The first three variables showed a positive influence on the level of schooling attained but were statistically insignificant. The last three showed negative effects but only the variable expenditures on personnel per student was

statistically significant.

The results are best interpreted in the light of the analysis of the determinants of school quality in the previous section. Because school and teacher variables affect school quality in various ways, no general rule as to what directions are expected can be used. The statistically significant variable in this section, expenditures on personnel per student, is interpreted in this light. It emerged as a significant determinant positively affecting school quality. Hence, it is interpreted with the same reference to the estimated results on school quality. But because of the absence of statistical certainty about their results, they are best served for the stage when more precise estimates can be used.

Expenditures on personnel per student has a statistically significant and negative effect on the level of schooling. This result supports the hypothesis that better quality schools tend to have stricter standards. Therefore, the probability that the child will be retained increases with school quality. However, since this finding has significant implications on educational policy, it should be used with caution until more detailed analyses in the later research stages examine all its ramifications. In the meantime, it can perhaps be taken as

indirectly corroborating evidence that PRODED-related measures affect school quality, as concluded in the previous section on the determinants of school quality.

NOTES

¹ 87 per cent of the population 15 years and over in 1980. Ministry of Education, Culture, and Sports. Study of the Literacy Situation in the Philippines: Final Report (1981).

² A separate study on participation is planned.

³ The results of an alternative test using analysis of variance methods are shown in Table 1.

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- Paqueo, Vicente B. 1985. An Econometric Analysis of Educational Attainment Among Elementary School Age Children: Preliminary Results. Transactions of the National Academy of Science and Technology. Bicutan, Taguig, Metro Manila. 7: 359- 380.