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The Relative Efficiency of Public Schools in Developing Countries

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Private schools are a cost-effective option for expanding secondary education in some developing countries. They may also provide some lessons for improving the efficiency of public schools.

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Education and Employment

In many developing countries, the national commitment to universal education conflicts with the necessity for fiscal restraint. One option for expanding education is to charge fees for public schooling.

But recent World Bank studies of secondary level data in Thailand, Colombia, Tanzania, and the Philippines point to a second, more cost-effective option: rely on private schools to handle the growing demand for education.

Private school students generally outperform public school students on standardized math and language tests. This finding holds, even after studies account for the fact that, on average, private school students in these countries come from slightly more advantaged backgrounds than their public school counterparts. In addition, school expenditure data show that unit costs for private schools are dramatically lower than those of public schools.

The comparative advantage of private

schools has important policy implications for public schools. Some efficiency gains can come from replicating the input mix (teacher/student ratios, teacher qualifications) of private schools. The data show that private schools, among other practices, make more efficient use of teachers and have better teaching processes (more tests, more homework, orderly classrooms).

Also effective would be to mimic the organizational incentive structures of private schools. Their administrators have considerable economic and bureaucratic autonomy, and are motivated to encourage better teaching practices — using staff more effectively and cheaply — because they must compete for students and remain accountable to parents who pay the bills.

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1. Introduction

Education in most developing countries is publicly provided, enrolling on average approximately 90% of primary and 70% of secondary students (Unesco, 1987). Most public schools are free, or almost free, to students. However, tightening fiscal constraints have limited the ability of the public sector in many countries to expand provision of free public education, creating a particularly serious problem for the poorest countries, where demand for schooling is projected to increase dramatically over the next decades. Changes will be necessary if ambitious educational targets are going to be met in the near future. One option is to charge fees in public schools, and many countries have introduced some form of tuition fee in both primary and secondary schools. But another option is to rely on private schools to handle expansion. Economists reason that such schools should be both more effective in generating resources for education and more efficient, since private schools compete for students and are accountable to parents who pay the bill. As a result, their administrators are motivated to adopt teaching practices and use staff and educational materials effectively but cheaply.

Although this argument is logically persuasive, empirical support for it has only recently begun to emerge. In the United States, the debate was sparked by the Coleman, Hoffer and Kilgore (1982) report which concluded that private (Catholic) schools are more effective than public schools in imparting cognitive achievement. For developing countries, the evidence is even more recent. This paper summarizes several studies, sponsored by the World Bank, that contribute to the literature by analyzing secondary level data from several educationally

diverse countries: Colombia and Tanzania (Cox and Jimenez 1987, Psacharopoulos 1987), the Philippines (Jimenez, Paqueo and de Vera 1987), and Thailand (Jimenez, Lockheed and Wattanwaha 1988).

The next section (2) summarizes the data and the common methodology employed in the analysis. Such a discussion is important since it is difficult to attribute differences between the cognitive abilities of students in public versus private schools to school inputs alone. Unless non-school factors are controlled appropriately, estimates of school effects will be contaminated by what has become known as "selectivity bias." (see Murnane, Newstead and Olsen, 1985, for an assessment of the results of Coleman et al. and their critics).

The main results of the papers are presented in sections 3 and 4. In section 3, the paper addresses the issue of the differential characteristics of those who go to public and private schools. While necessary for the selection correction, these results are of interest in their own right. Section 4 presents results on the relative effectiveness of public and private schools in enhancing achievement. Some of the papers reviewed go beyond this comparison. The work on Thailand, for example, inquires about the nature of public/private differences: what school characteristics are most responsible. All the papers also compare the per-student cost of public and private schools.

The paper concludes with sections (5 & 6) on policy implications of the present findings and directions for future research.

2. Methodology and Data

The papers address the following question: would a high school student, randomly selected from the general student population, do better in a public or private school? In the absence of experimental data, a reliable answer can be obtained from a cross-section comparison

of public and private school students' performance in standardized tests --when student background, motivation and innate ability are controlled through statistical analysis.

The empirical framework

The i th private school student's achievement score (A) is a function of a vector of observed background variables (X) and unobserved variables (e)¹

$$(1a) \quad A_{ip} = b_p X_{ip} + e_{ip},$$

where each component of b measures the marginal effect of a characteristic on achievement. The " j th" public (or government) school student's score can be similarly expressed by replacing the subscript " p " with " g :"

$$(1b) \quad A_{jg} = b_g X_{jg} + e_{jg}.$$

If the effects due to unobserved variables, e , are randomly and normally distributed, ordinary least squares regression techniques can then be used to estimate the parameters of equations (1a) and (1b). Private/public comparisons can then be made using this information. For a student with the characteristic of the average public school student, the difference in achievement score if he/she were to attend a private school would be²:

¹Alternatively, equations (1a) and (1b) can be estimated as one equation, with a dummy variable for private and public types of schools. However, statistical (F -) tests led us to reject the hypothesis that the coefficients of all the other variables are equivalent in both types of schools.

²This can be easily shown. Subtract the estimated equation (1b) from (1a). Then, add and subtract $b_p X_g$ on the right hand side of the resulting equation. The resulting difference can be expressed as:

$$\text{Difference} = b_p (X_p - X_g) + (b_p - b_g) X_g,$$

where the first term is interpreted as the endowment effect (i.e., the difference in scores due to differences in characteristics) and the second term is the school effect shown in equation (2) above.

$$(2) \quad \text{Effect} = (b_p - b_g) X_g.$$

Thus, on-school factors affect achievement too, such as socio-economic background, innate ability and individual motivation. Moreover, these non-school factors also affect school choices made by families. This causes the selection bias problem. For example, if children from privileged backgrounds only attended private schools, it would be difficult to infer how they would do in public schools. Statistically, this means that the error terms e are no longer normally distributed and OLS should not be used to estimate the above equations.

To correct for sample selection, the papers use statistical corrections based on Heckman's (1979) two-step technique. First, a probit model is employed to estimate the determinants of choice of school type. Second, the results of the first step are used to hold constant for the probability of school choice in estimating achievement (equations 1a and 1b). The results are promising.

The greatest difficulty in this technique is identification: at least one variable should be included in the first stage that is not in the second stage. This variable is called the exclusion restriction. In the Philippines case, the relative distance to each type of school is used as such a restriction. Otherwise, the results hinge on specification to identify the parameters and the coefficients could be unstable. In such a case, the models should be subjected to sensitivity analysis by including different subsets of variables in each stage of the analysis.

Another major innovation is the use of panel data to mitigate the effects of selection in the Thailand case study. As far as we know, only one other study (an independently and simultaneously conducted research effort by James Coleman at the University of Chicago) uses

panel data in comparing public and private school achievement. Ours is the first to do so for developing countries.

Data

Each of the papers relies on data that were already collected for other purposes. The Colombia and Tanzania data were generated from a World Bank study of diversified education (Psacharopoulos and Loxley 1985). The Philippine data were collected by the Ministry of Education as part of its Household and School Matching Survey. The Thai data were obtained from Second International Mathematics Study conducted by the International Association for the Evaluation of Education Achievement (IEA).

Despite their varied origins, the data sets contained similar core information. The main components are: household and student characteristics and achievement test scores on standardized tests of verbal skills and/or mathematics. In Colombia, Tanzania and the Philippines, this was supplemented by data on mental ability. For Thailand, extensive data were available on school and teacher characteristics and teaching practices. Table 1 summarizes their salient features.

Table 1: Summary of Studies

Country	Year Data Collected	Students	Sample Schools	Grade	Achievement Indicator	Data Base
Colombia (Cox & Jimenez, 1987)	1981	1004	129	11	Average scores on math and verbal tests tests	DISCUS study (non-INEM)
Philippines (Jimenez, Paqueo & de Vera, 1988)	1983	446 ^a	-	7-10	Mathematics test English test Pilipino test	National household survey
Tanzania (Cox & Jimenez, 1987)	1981	1124	57	11	Average scores on math and verbal tests	DISCUS study
Thailand (Jimenez, Lockheed & Wattanawaha, 1986)	1981/2	4030	99	8	Mathematics test	National school survey

^a Sample based on national household survey; number of schools unknown.

3. Findings

The two principal sets of findings concern the relative access to public and private schools and the relative achievement of students once they enter those schools.

Background and the choice of school type

Unless there is excess demand for places, students and parents choose which type of school to attend. They do so by weighing the benefits and costs of each type of school. If school places are rationed, then, the schools' selection criteria affects who, among those who have applied, are given access.

Because the private schools in our sample countries are unsubsidized while the public schools are almost free, the most important factors in the household decision are income (or income-related variables such as parents' education and occupations) and the relative cost of schooling. According to Table 1, average income indicators for students in private schools are about double those for students in public schools in Colombia and the Philippines. Interestingly, in Tanzania, this difference is much lower, which suggests that subsidized public schools are attracting and giving access to students from higher income backgrounds. These findings are corroborated by higher relative indicators for private school students regarding mother's education and

Table 2: Background indicators of private school students as a multiple of public school student indicators

	Colombia	Tanzania	Thailand	Philippines
Income (HH or father's)	1.94	1.20	..	2.07
Coeff. of variation of income	1.24	.83	..	.72
Mother's education (% > primary)	1.87	1.27	1.61	1.23
Father's occupation (% white collar)	1.09	1.50	1.94	..
Per cent male	1.04	1.07	.91	.98

whether the father had a white-collar job (except for Thailand and the Philippines). However, the dispersion of income is only slightly higher for private school students in Colombia and lower in Tanzania and the Philippines, suggesting a substantial overlap in the income categories of the public and private samples. Most of these variables were significant in the school choice equation.

The relative quality-adjusted price of attending the two types of schools is very difficult to measure. Tuition tends to reflect school quality, which itself is a dimension of school choice. Thus, we

did not include this variable, even when available. However, in the Philippine case, we were able to obtain the relative distance of public and private schools from each households and use this as a measure of relative cost. This variable was highly significant in explaining school choice.

Although many of the private schools are sectarian, religion is not included as an explanatory variable because the populations are so homogeneous. Sex of the student can be an important determinant of school choice because the proportion of segregated schools is higher in the private system. Some parents prefer segregated schools. In Colombia and Tanzania, males dominate in private schools, while in Thailand and the Philippines, females dominate.

In summary, private school students come, on average, from slightly more advantaged backgrounds than their public school counterparts. However, the difference is slight and the variance is large.

We have used these findings to make conclusions about selection into different types of schools -- and to correct for possible biases in the achievement equation. In the only study that contained strict cross-country comparisons, Colombia and Tanzania, correcting for sample selection bias revealed that, while Colombian students tended to choose the type of school where they would prosper, Tanzanian students were positively selected into the public system. This finding is important because in Tanzania, student choice is more limited and public schools are viewed as elite.

4. Relative Efficiency of Public and Private Schools

Do private schools provide a better education, and at a lower unit cost, than public schools? The papers provide a consistent empirical basis to the issue of the relative efficiency of public and private schools in a number of developing countries. A principal finding is that, given student background, students in private schools, on average, generally outperform their public school counterparts on standardized mathematics and/or language tests. According to Table 2, this advantage varies considerably across countries, but is consistently positive for all subsamples and achievement tests, with the possible exception of mathematics achievement in the Philippines where the differences are insignificant.

A critical phrase is "given student background." It is generally not valid to infer differences among types of schools based on simple public/private comparisons of achievement in standardized tests because students' background vary so much in each type of school. In the comparisons, equation (2) is used to hold constant for background effects by measuring achievement effects at the average characteristics of public or private school students.

Table 3: Private over Public School Advantage in terms of Z-Differential in Achievement Score -- Secondary Level^a

Country	Achievement Indicator	Advantage (percent)
-----	-----	-----
Colombia	Average math and verbal	11.6
Tanzania	Average math and verbal	17.4
Thailand	Mathematics	163.3
Philippines	Mathematics	-1.0
	English	19.5
	Pilipino (nat'l lang.)	46.6

^aPercentage gain in achievement score if a randomly selected student, with the characteristic of the average public school student, attends private rather than public school, holding constant for that student's background.

It should be noted that the case studies tended to focus on secondary school students and may not hold for other levels, even within the same countries. Moreover, it would not be valid to make any cross-country comparisons regarding the magnitude of the results. The tests are not standardized across countries. Also, because the data sets were designed by different researchers, the student background variables being held constant are only roughly equivalent.

The question may be raised whether the differential between private and public school achievement changes sign as the socioeconomic status (SES) of students falls. The Philippine study, which is the only paper that looked at the sensitivity of private/public differential to SES, found that varying the student's SES within a reasonable range did not produce a reversal in the direction of the private school effect. However, the magnitude of the private school advantage substantially decreases with lower SES. This is consistent with the fact that the more elite private schools in the Philippines tend to emphasize the development of English-language skills and that children with higher SES have greater exposure to environments where English is used often and where they have better access to English-language media. In Pilipino, on the other hand, there is no relationship between SES and the size of the private school effect. And in mathematics the disadvantage of private school students declines slightly with lower SES.

What about efficiency? Preliminary calculations based on school expenditure data indicate that, on average, the unit cost for private schools is dramatically lower than that for public schools (Table 3). Combined with result above, this leads us to conclude that private schools are more efficient than public schools, at least for secondary level schools in the sample countries.

Table 4 Average Costs of Public and Private Schools

	Units	Average Cost		Private Cost/ Public Cost
		Public	Private	
	-----	-----	-----	-----
Colombia	Pesos	18,281	12,674	69
Philippines	Pesos	820	450	55
Tanzania	Shillings	3,539	2,456	69
Thailand	Baht	4,492	1,762	39

This finding should be interpreted with some important caveats. First, although it is agreed that the order of magnitude is generally correct, the cost estimates for Colombia and Tanzania are not precise because of the reluctance of some private schools to provide the necessary information. Second, in the Philippines, the average cost figure we obtained was not for the samples of schools used in the achievement study but a nationwide sample, unlike in Thailand, where we were able to go back and obtain school-by-school cost data for the sample. Also, it does not include family expenditures on children's education and the implicit subsidy provided by the priests and nuns teaching in sectarian schools. Third, there is considerable variability within each school type. Some types of public schools (say, those that are primarily locally funded) have lower unit cost than some types of private schools (say, the elite schools). It would be interesting in subsequent analysis to make use of this variability in the comparisons.

Why is there a public/private differential?

Unlike U.S. studies, the research attempted to inquire into the nature of the private/public difference in Thailand and, to a lesser degree, in Colombia and Tanzania. This is important since the

disadvantaged school type may be able to replicate some of the characteristics of the other and thereby gain in efficiency. There are a number of reasons why a private school advantage exists, including: peer group effects (in Thailand), a more efficient use of teachers through slightly lower qualifications (in Thailand) and pay structures (in Colombia) for private schools and better teaching processes (more tests, orderly classrooms and homework in Thailand). (See Table 4.) These findings are necessarily preliminary because it is very difficult to assign achievement differentials among school inputs whose uses are sometimes complementary to one another. Nevertheless, the results can be used to indicate the direction of further research.

Table 5: Average Characteristics of Private and Public Schools in Thailand, Colombia and Tanzania

Variable Description	Private	Public
<u>Thailand</u>		
School-level characteristics		
Average district per capita income in baht	16,589.0 (4,318.4)	12,602.0 (4,520.0)
School enrollment	747.8 (493.9)	1,576.6 (1,073.2)
Proportion of teachers qualified to teach math in student's school	0.103	0.607
<u>Teacher and class characteristics:</u>		
Teacher's age in years	34.6 (11.0)	29.0 (6.6)
Proportion male	0.261	0.361
Proportion having in-service training	0.231	0.101
Proportion teaching enriched math class	0.308	0.200
Proportion using workbook often	0.263	0.238
Proportion spending > 15 mins/week maintaining order	0.601	0.484
Minutes/week spent on quizzes and tests	44.348 (62.429)	30.514 (24.975)
Number of students in target class	44.1 (6.8)	41.9 (10.7)
<u>Peer group characteristics</u>		
Average of average pre-test scores	10.87	8.84
Average proportion mothers > primary education	.24	.15
Average proportion fathers prof occupation	.19	.15
<u>Colombia</u>		
Mean teacher salary in pesos	10,752.00 (15,667.0)	20,659.00 (15,053.0)
Mean student-teacher ratio	19.9 (5.2)	23.3 (5.7)
<u>Tanzania</u>		
Mean teacher salary in shillings	1,316.00 (2,291.0)	1,143.00 (596.0)
Mean student-teacher ratio	25.4 (11.2)	23.7 (9.2)

Even after all measurable school characteristics are held constant, the private school advantage persists. This advantage can thus be due to unmeasured factors, such as x-efficiency, which is consistent with the hypothesis that there are inherent incentives to be efficient in private schools. This has important policy implications for public schools. Although some efficiency gains can be obtained by "mimicking" the input mix (e.g., teacher/student ratios, teacher qualifications) of private schools, such actions are not likely to equalize the two systems. A

more effective, albeit less transparent, policy measure would be to mimic the incentive structures (including decentralized control) inherent in private systems.

5. Policy Significance

The findings presented here, showing that private schools are comparatively more cost-effective than public schools, are encouraging to those who support reforms in favor of greater private sector participation in the delivery of education. It should be stressed, however, that the relative efficiency of private schools is highly dependent on the institutional regime and structure of incentives under which they are currently operating. Thus, it is possible that reforms in support of private education (particular kinds of government subsidy) may not necessarily lead to greater efficiency in the educational system. These, for example, are reforms that would result in institutional changes that reduce the ability of schools to choose suitable input mixes, accountability and pressure on the private school to be efficient.

What the exact nature of those reforms that lead to improved efficiency and equity is not the concern of the present paper. They might involve the use of education service contracting (as is now being done in the Philippines), or even of some form of voucher system as in Chile. It could mean simply modifying overly restrictive rules and regulations that have been imposed to protect consumers, or legislating tax exemptions for private schools. Surely, all of these will have to be discussed in the larger context of the political economy of specific countries (James 1987). In this regard, it should be emphasized that

the paper is certainly not arguing for the abolition and privatization of public schools.

Yet, the findings should be carefully taken into account in the discussions of the aforementioned issues. For too long now the discussions have been largely speculative and have lacked good empirical data. The usual assumption in considering government policies towards private schools is that the quality of education they provide is not commensurate with what is being paid by the consumers, due to the asymmetry of information between consumers and providers. This assumption is widely held, together with the view that bureaucrats have a better information set regarding the technology of education and that there are no severe incentives incompatibility problems in the public school system. These papers provide contrary evidence that could be useful in judging the importance of the alleged inefficiency of market mechanisms (relative to direct government provision).

6. The Need for Further Analysis

In the public/private comparisons, the rigorous methodology applied made some clear advances in the literature. However, additional work is warranted. First, the data bases were not strictly comparable across countries and it is not possible to make cross-country generalizations. Second, the scope of countries covered is also limited (two Southeast Asian countries provided the strongest data bases). Third, better information, particularly regarding the social and private cost of different school types, needs to be gathered. Finally, the studies covered only secondary schools. In Latin America and East Asia, the critical level for the future is going to be universities, which are the highest-cost components in many educational public budgets. In

Africa and the Indian subcontinent, the issue is also being discussed for the primary level. Thus, we recommend that the methodology applied successfully in the preliminary studies described in this report be extended.

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