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Abstract

Private, market-based initiatives have been tried as policy solutions for the perceived failure of public education systems around the world for the past three decades. Over these years a large amount of literature has emerged that attempts to measure the effectiveness of market-based reform in education in improving educational outcomes. The findings of this literature are mixed. This fact has been used by policy advocates on both sides of the argument to argue for greater or lesser market-based initiatives. However, these analyses are plagued with methodological concerns.

This paper attempts at reviewing private-public school comparisons in low-income countries in an attempt to analyze the methodological issues that limit the research and therefore limit the inferences that can be made. For this purpose it reviews 18 studies conducted in 13 countries in Africa, Asia and Latin America. It explores the methodologies used in these private-public comparisons based on a five-aspect analytical framework, which covers: study design, choice of treatment variable, dependent variable(s), control variable(s) and statistical methods.

This study highlights that the literature suffers from three main methodological limitations. First is a lack of panel data which limits the possibility of analyzing the effectiveness of private solutions over time. Second is the choice of dependent variables in the studies which are increasingly using test scores as a proxy for educational achievement. This is at the expense of other educational outcomes of concern such as equality, diversity, etc. Finally, each study analyzed here uses a binary treatment variable for enrolment in primary or public schools. This is based on the assumption that there something inherently different between private and public schools. This is an assumption that is not based on any detailed analysis.

Introduction

Private, market-oriented initiatives have been promoted as viable solutions for the perceived failure of public school systems by policy advocates with increasing success over the past three decades. In wealthy economies – within the context of near-universal enrollment in largely public elementary education systems – this failure is represented by the systems' inability to un-couple the educational attainment of students from their socio-economic background as well as a perceived failure to keep pace with the educational attainment of students from other growing economies. Therefore, a tension between the needs for equity within the system and competitiveness without it exists.

On the other hand, in most low-income countries the impetus for private basic (or elementary) education comes from the inability of the public system to meet increasing demand for education or (as is the case in many low-income economies) the disintegration of the public system. While the picture presented above is a broad generalization of trends which may not be present everywhere, the perception of the public education system's failure is quite common amongst politicians, policy makers, the media as well as the general public in most countries.

A number of private solutions have been proposed and implemented within education systems over the last few decades. These tend to vary greatly by the size of the program, the relationship with the public system and the intended objective of the program (Levin, 2001). These can take the form of voucher programs, charter schools, public-private partnerships, private contractors for various aspects of the education system (e.g. supplemental educational service providers), etc. The simplest manifestation is that of a school that is owned, financed and run privately. As the number of private programs and their scope has increased a large amount of

research has been conducted on the subject of their effectiveness in delivering educational goals relative to the effectiveness of public schools.

The research that attempts to accurately identify the effects of private educational initiatives on educational goals as compared to public ones faces a number of methodological limitations (Goldhaber & Eide, 2003; Vandenberghe & Robin, 2004). In fact research conducted on the effects of market based reform on educational outcomes presents a very mixed picture. In light of the above there is a need for further exploration of market-based reform. Specifically, there may be a need to re-examine the methodological issues at hand.

The objective of this paper is to conduct a review of the literature which analyzes effectiveness of private schools compared to public schools in low-income countries. It concentrates on the methodologies used to conduct such research in an attempt to generate a picture of the 'state of the field'. Therefore, this paper focuses on methodological aspects of the studies included in the review.

The next section creates an analytical framework for the analysis. The following section presents the methodology for this survey of literature. This is followed by the final section that analyzes the literature and provides recommendations.

Framework of Analysis

This study follows the pattern of three previous studies: Jimenez, Lockheed & Paqueo (1991), Lockheed & Jimenez (1994) and Somer, McEwan & Willms (2004). These studies provide a meta-analysis of some recent studies on private/public comparisons of schools conducted in low-income countries. However, unlike these studies this paper will concentrate on methodological issues only.

Most studies of private educational programs have sought to measure the effect on some measure of education (educational inputs and/or educational outputs) of various kinds of private program interventions and compare that effect to that of the public alternative. Five methodological aspects of these studies are used to provide an analytical framework for the subsequent analysis of the literature (Table 1 on pg 10). These are: (a) study design, (b) measure of treatment variable, (c) choice of dependent variable, (d) choice of other input variables (control variables) and (e) statistical methods employed for correcting biases. It is important to note that this review concentrates on quantitative comparisons of private and public educational alternatives.

*Study design*

The ideal study for this purpose would be to conduct an experimental design. Such a study would entail random sampling of students. This would be followed by a 'pre-test' on the variable of concern (the dependent variable); random assignment of students to private or public schools (or to the private program and to a control group); a 'post-test' on the same variable of interest and then running statistical comparisons between their output data while controlling for the various explanatory variables. Such a study design would allow the capture of educational gains (as opposed to static levels) that could be directly attributed to the treatment: enrollment in a private school.

However, in most education settings such experimental design studies are not possible. In such circumstances alternative study designs – quasi-experimental designs – can be used that attempt to mimic the attributes of an experimental design. Quasi-experimental designs are attempts at creating a control group for comparison to the treatment group that would allow for

the assumption that students were assigned to private and public alternatives randomly. An

example of such a technique is propensity score matching (Vandenberghe & Robin, 2004).

In many circumstances this is not possible either and many researchers simply run

regressions based on pre-existing data and use various statistical techniques to control for the

methodological complications that arise from using non-experimental data (Goldhaber & Eide,

2003).

*Treatment variable*

The main issue at hand in this analysis is the whether enrollment in private schools leads

to improved educational outcomes. Levin (2001) highlights that the private nature of schools can

be defined by a number of dimensions. These include financing, sponsorship, operation, benefits

and the for-profit (or not) nature of the school. A school may be public or private in one or more

of these dimensions. For example a school may be government sponsored, but charge fees and/or

be operated by a private contractor, but not earn any profits. Thus the school would be public

along the second and fourth dimensions and private along the first and third dimensions stated

above, respectively. This highlights the complex nature of the analysis at hand.

In their analysis of data on schools from the OECD for example, Vandenberghe & Robin

(2004) define a school as public if it is both government owned and operated. All other schools

included in the analysis are considered as private schools. Defining private or public schools in

this way has the advantage of being simple. However a certain amount of information may be

lost in such an analysis.

Most studies on the subject define the treatment variable as enrollment (participation) in

the public or private school (or program). The treatment is represented by a binary variable that

takes the value 1 if the student is enrolled in the private program and 0 if the student is enrolled in the public alternative. However, depending upon the nature of the private alternative being studied this binary operationalization of the treatment variable can have varying effects on a study's findings. This is so because the underlying assumption here is that private schools are inherently different from public schools. Depending on the local context this may or may not be true.

*Dependent variable*

The choice of dependent variables has an important effect on the nature of the analysis. These can fall into four broad categories: economic outcomes, school & teacher quality indicators (educational inputs), educational outcomes and equality outcomes.

Economic outcomes of the type of education (in this case private or public) received can include employment and income. Therefore, a study may be interested in examining the effect of enrolling in private school on future wages or likelihood of employment as compared to enrolling in public school. One of the papers included in this study (Bedi & Garg, 2000) attempts exactly this kind of comparison by using wages as an output variable.

A second category of dependent variables that can be used to determine the effectiveness of private schools as compared to public schools is that of school quality and teacher quality. Some studies merge the latter into the former while others distinguish between them. Broadly these represent school inputs (or process variables) being used as output variables for the study. The underlying assumption here is that better school quality or better teacher quality will lead to better education for the student. Studies operationalize these constructs by using such proxy variables as per pupil expenditure, class size, student-teacher ratios, etc. (school quality) and

teacher qualifications, teacher experience, teacher absenteeism, content knowledge, college attended, etc. (teacher quality). These kinds of studies have become less common in high-income economies as there is an increased emphasis on educational outcomes. In many low-income country contexts, however, a lack of comparable test score data forces many researchers to use such educational input data to determine the effect of private education.

A third category of output variables used in comparisons of private and public schools are educational outcomes. These can include achievement variables such as test scores, school completion and drop-out rates. In most developed countries the debate in the field currently is the relative efficacy of using test-scores levels (a one-time static snapshot of student achievement) or so-called growth or value-added measure (usually operationalized as change in test-scores over time). A number of the studies reviewed here also use educational achievement as the output measure.

The final category of dependent variables is a measure of equality. Researchers can be concerned about the effect of private education on dimensions of equality (gender, race, linguistic groups, religious minorities, etc.) that are of concern. Some studies measure this by reviewing the effect of private education reform on access (e.g. the research on racial diversity effects of choice programs here in the US). Others review effects on educational achievement separated by race, gender, etc.

*Control variables*

Specifying a production function for the relationship between educational outputs and inputs requires controlling for a number of variables that may also have an effect on those outputs. Some of the variables that may affect student outcomes like achievement, other than the

private or public nature of school are socio-economic background, gender, first child status and age. These can have significant effects on a child's educational attainment. Studies tend to vary greatly when it comes to the control variables they include. This variation is informed partly due to the choice of the dependent variable (therefore some of the control variables used in a model specification may vary based on whether the dependent variable used is test scores or drop-out rates) and data availability considerations.

*Statistical methodologies to correct for model biases*

One of the biggest problems in statistical examinations of the effect of an educational reform or alternative (e.g. enrollment in a private school instead of public school) on the output variable of interest (achievement, school quality, teacher quality, etc.) is to establish causality. As highlighted earlier the ideal way to achieve this goal is to use a random experimental design. However, in most studies on the subject of effects of private education as compared to public education the data are being collected 'post-treatment'. This means that the participants that choose to enroll in private schools and those that choose public schools were not assigned to those schools randomly. This violates a central assumption of the experimental design. Therefore it is possible that there is a common characteristic among all those students that choose private schools that also affects their achievement. To the extent that this is the case the study will suffer from *selection bias*. This is the most important drawback of many private-public comparison studies (Goldhaber & Eide, 2003). Therefore most researchers use statistical techniques to counter this bias. Two of the most common methods of correcting for selection bias in such studies are instrumental-variables (IV) estimation & the Heckman 2-stage correction model (Goldhaber& Eide, 2003; Vandenberghe & Robin, 2004).

Table 1 below summarizes the five aspects of the analytical framework discusses thus far.

Table 1

*Framework of Analysis*

| Five aspects | Type | Example |
| --- | --- | --- |
| Study design | Experimental design | |
| | Quasi-experimental design | Matching, propensity score matching |
| | Descriptive statistics | |
| Treatment variable | Private/public enrollment | Binary variable |
| | *Alternate: separate models for separate private and public groups* | |
| Dependent variable | Economic | Employment (rate, type), income |
| | Educational inputs | School quality: spending, class size, etc. |
| | | Teacher quality: salary, qualifications, experience, etc. |
| | Educational outcomes | Test scores (level, growth), drop-out/completion, etc. |
| | Equality outcomes | Integration (exposure), access, etc. |
| Control variables | Student background | Socio-economic status, parent's education, family income, etc. |
| | School quality | Spending, class size, average scores, etc. |
| | Teacher quality | Salary, qualifications, experience, etc. |
| | Peer effects | Racial diversity, average scores, SES |
| Statistical methods | IV estimation | |
| | Heckman 2-stage model | |
| | Difference of difference estimation | |

## Methodology

The objective of this study is to review comparisons of private schools with public

schools in developing countries within the context of the analytic framework described above.

Therefore, to determine which papers to include in this review a search was conducted on the

George Washington University's Gelman Library online search system using a combination of

keywords including 'education', 'schools', 'schooling', 'private', 'public', 'effects',

'effectiveness', 'achievement', 'comparison', 'developing countries and 'low-income countries'.

The search produced a list of 18 studies (Table 2) once literature reviews were removed

from the study, including studies conducted by the World Bank. Each one of these studies was

analyzed based on the above framework. The analysis is presented in the following section using

a narrative structure.

Table 2

*The Studies*

| Studies | Location | Data years |
|---|---|---|
| 1.  Alderman, Kim & Orazem (2003) | Pakistan | 1994, 95, 96 |
| 2.  Andrabi, Das & Khwaja (2002) | Pakistan | 2000 |
| 3.  Angrist, et al. (2003) | Colombia | 1999 |
| 4.  Bedi & Garg (2000) | Indonesia | 1993 |
| 5.  Cox & Jimenez (1991) | Colombia & Tanzania | 1981 |
| 6.  Glewwe & Jacoby (1994) | Ghana | 1989 |
| 7.  Jimenez, et al. (1991) | Dominican Republic | 1983 |
| 8.  Jimenez & Sawada (1998) | El Salvador | 1996 |
| 9.  Jimenez, Lockheed & Wattanawaha (1988) | Thailand | 1981-82 |
| 10. Jimenez, Paqueo & De Vera (1988) | Philippines | 1983 |
| 11. Kingdon (1996a) | Uttar Pradesh, India | N/A |
| 12. Kingdon (1996b) | India | 1976, 1986 |
| 13. Lockheed & Bruns (1990) | Brazil | 1988 |
| 14. McEwan (2001) | Chile | 1997 |
| 15. McEwan (2002) | Argentina & Chile | 1997 |
| 16. McEwan & Carnoy (2000) | Chile | 1990, 92, 94, 96 |
| 17. Mizala & Romaguera (1996) | Chile | 1996 |
| 18. Psacharopolous (1987) | Colombia | 1981 |

The studies included in this analysis cover private/public education comparisons in different countries across Asia, Africa and Latin America. It is important to note that there is considerable variation in the level of development across these countries at the time the data included in the studies was collected. However, since the concern here is with methodological issues this should not interfere with the analysis.

Analysis

Table 3 provides a snapshot of the eighteen studies included in the analysis based on the 5-aspect analytical framework highlighted above.

*Study design*

Of the eighteen studies surveyed only two (Alderman, Kim & Orazem, 2003; Angrist, et al., 2003) qualify as experimental design studies. A majority of the papers (fourteen) are quasi-experimental designs where data from already existing datasets have been mined to create two comparison groups *ex post*. The studies on Pakistan and India by Andrabi, Das & Khwaja (2002) and Kingdon (1996), respectively, use descriptive statistics to highlight the differences in effectiveness of private and public schools. This trend confirms the earlier assertion that experimental designs are rare in education policy analysis. The presence of descriptive statistical analyses also highlight the data limitations in some developing countries (e.g. in South Asia).

An important finding of the analysis is that a majority of the studies use cross-sectional data, i.e., data is available for only one time period. Alderman, et al (2003) and McEwan & Carnoy (2000) are the only two studies that use panel datasets for more than two data periods. This allows for much more rich analysis providing the authors the opportunity to examine the

effects of the policy intervention over-time. For example, Alderman, et al (2003) highlight that girls enrolment increased considerably in the second year for those districts that introduced the urban private schools program in Balochistan, Pakistan; a significant finding.

The fact that all the other studies discussed here present a snapshot of program effects represents an important shortcoming in the literature. As will be highlighted later, this limits the possibility of the use of value-added or achievement growth-based models to determine the effectiveness of privatization programs.

*Treatment variable*

The treatment variable as highlighted earlier is usually a simple binary variable that takes the value 1 for enrollment in private schools and 0 for public schools. However, there are two different kinds of variation in the literature.

First, for all the studies using the Heckman (1979) 2-stage correction model the data are split into two groups: students enrolled in public schools and students enrolled in private schools. This allows the researchers to determine the average characteristics of a public school student. This is useful for determining the likelihood (using Probit or Logit estimation) of a student choosing to enroll in public or private school. In these studies one model with a binary private/public treatment variable is not included. This method (of estimating the private/public decision in the first stage) is heavily dependant upon the quality of student and family background data (Goldhaber & Eide, 2003; Vandenberghe & Robin, 2004). To the extent that information about student characteristics is flawed the results of the analysis will be limited by selection bias.

Table 3

*Analysis*

| Study | Design | Data | Treatment | Dependent | Controls | Statistical technique |
|---|---|---|---|---|---|---|
| Alderman, et al. (2003) | Experimental | Longitudinal (3) | Private/Public | Net enrollment (gender) | N/A | Difference-or-differences |
| Andrabi, et al. (2002) | Descriptive | Cross-sectional | N/A | Spending, pupil-teacher ratios; teacher experience, qualifications & absenteeism; gender enrollment ratio | N/A | N/A |
| Angrist, et al. (2003) | Experimental | Cross-sectional | Private/Public | Test-scores | Student characteristics Family background | None |
| Bedi & Garg (2000) | Quasi | Cross-sectional | Private/Public | Income | Family background School characteristics | 2-stage model |
| Cox & Jimenez (1991) | Quasi | Cross-sectional | Private/Public | Test-scores | Family background School characteristics | 2-stage model |
| Glewwe & Jacoby (1994) | Quasi | Cross-sectional | Private/Public | Test-scores | Family background School characteristics | 2-stage model |
| Jimenez, et al. (1991) | Quasi | Cross-sectional | Private/Public | Test-scores | Student characteristics Peer characteristics | 2-stage model |
| Jimenez & Sawada (1998) | Quasi | Cross-sectional | Private/Public | Test-scores Student absenteeism | Student characteristics Family background School characteristics | 2-stage model |
| Jimenez, et al. (1988) | Quasi | Cross-sectional | Private/Public | Test-scores (value added) | Student characteristics Family background School characteristics Peer group | 2-stage model |

Table 3

*Analysis (Continued)*

| Study | Design | Data | Treatment | Dependent | Controls | Statistical technique |
|---|---|---|---|---|---|---|
| Kingdon (1996a) | Quasi | Cross-sectional | Private/Public | Test-scores | Student characteristics<br>Family background | 2-stage model |
| Kingdon (1996b) | Descriptive | Longitudinal (2) | N/A | Enrollment | N/A | N/A |
| Lockheed & Bruns (1990) | Quasi | Cross-sectional | Private/Public | Test-scores | Student characteristics<br>Peer characteristics | HLM |
| McEwan (2001) | Quasi | Cross-sectional | Private/Public | Test-scores | Student characteristics<br>Peer characteristics | 2-stage model |
| McEwan (2002) | Quasi | Cross-sectional | Private/Public | Test-scores | Student characteristics<br>Peer characteristics | N/A |
| McEwan & Carnoy (2000) | Quasi | Longitudinal (4) | Private/Public | Test-scores | Family background | N/A |
| Mizala & Romaguera (1996) | Quasi | Cross-sectional | Private/Public | Test-scores | Family background | N/A |
| Psacharopolous (1987) | Quasi | Cross-sectional | Private/Public | Test-scores | Student characteristics | N/A |

Second, in some developing countries there are more than two types of schools (Kingdon, 1996a; 1996b; McEwan & Carnoy, 2000; McEwan 2001). In these scenarios, where there is a 2-stage estimation, instead of using simple binomial probit/logit model specifications the authors have used polynomial estimations for the private/public choice decision. In this scenario the private/public choice may have become obscure if some types of schools are substantively similar, while differing in official (or the authors') classification.

*Dependent variable*

A majority of the studies (especially the World Bank studies using cross-sectional data and the Heckman 2-stage model) use test-scores as the dependent variable to determine whether private schools are more effective that public schools. Only one of these studies – the Jimenez & Sawada (1998) review of data from El Salvador – uses test-score growth as the main dependent variable. Jimenez & Sawada also study the effect of private school enrolment on student absenteeism, an indicator not used in any other study.

Three studies look at the effect of private schools on enrolment. These include the two descriptive studies in India (Kingdon, 1996b) and Pakistan (Andrabi, et al, 2002) and the evaluation study in Balochistan (Alderman, et al, 2003). The two studies in Pakistan review enrollment from the gender perspective. This makes sense since marginalization of girls from the Pakistani education system is well documented.

The lack of longitudinal data is clear in the literature as only one study uses value-added as a measure and all others look at test-scores at a certain level. Therefore, it becomes difficult to establish whether private school effects on student outcomes (if any are measured) are

sustainable or disappear in subsequent years. This is a commonly cited limitation of many education reform evaluations.

*Control variables*

A review of table 3 suggests that there is not much variation between the studies on the type of control variables used for the model specification. A majority of the studies use school characteristics and family background (or household characteristics). Some separate SES into family background (income, family education, etc.) and student characteristics ('innate' ability, age, etc.). At least two of the studies include peer group characteristics as well. A review of private-public comparison evaluations in the US would suggest that this is a fairly common practice.

However, the true variation emerges when reviewing the actual indicators used to operationalize these constructs. For example, one study includes a dummy variable for whether a school has a dirt floor or not to represent school infrastructure. Another example of this variation is the fact that some studies use IQ scores to measure student ability, while others use previous test scores. This underscores a major methodological limitation of these studies.

This variation is the result of two different factors. First, specific developing country contexts can vary strongly and need to be dealt accordingly in the research. One of the commonly faced problems in Pakistani schools is lack of sanitation facilities (toilets). Therefore, Andrabi, et al (2002) included the existence of toilets (or not) as a variable.

Second, the choice of control variables can be strongly affected by data limitations. Many of the datasets available in developing countries may not contain rich information about family background and or school characteristics. In such cases researchers have to attempt to use some

unusual controls. Finally, some of the studies here do not clearly highlight the control variables used.

*Statistical methodologies*

As highlighted earlier, three of the commonly used statistical methods for such an analysis are IV estimations, 2-stage models and difference of difference estimation. Alderman, et al (2003), who wished to review the effect of the introduction of private schools on overall enrolments use pre-post experimental design data to conduct a difference-of-differences analysis. All the other studies use 2-stage models (Heckman, 1979; Lee, 1983). Interestingly, none of the studies reviewed here use IV estimations. A commonly proposed instrumental variable in a developing country context that would explain school choice is distance from school (Goldhaber & Eide, 2003). However, due to limited data in many of the national data bases these are only used when actual survey data can be collected from the households.

Conclusions & Recommendations

This paper attempts to present an overview of the state of the field when it comes to evaluating the effectiveness of private schools compared to public schools in developing countries. For this purpose, eighteen studies conducted over the last two decades in Latin America, Africa and Asia were included.

The review highlights that the emphasis placed on test-scores in evaluations of school choice in developed countries is also being replicated in evaluations of private education in developing ones. However, there is need for richer longitudinal data to provide a more accurate assessment of the effects on student outcomes.

Finally the review recommends the following directions for future research. First, it is clear that the use of panel data allowing for more accurate year-to-year growth of achievement data will provide a better picture of private school effects. Are any of the gains highlighted by the literature thus far sustainable? Alternatively, are the gains reported by some of the literature short-lived? Answering these questions requires longitudinal data.

Second, the research should concentrate not only on test-scores but also on other educational outcomes such as access and diversity. This is highlighted in some of the studies reviewed here. However, a large number of the studies reviewing developing country school systems fail to look at issues of diversity (gender, ethno-linguistic and religious). This issue is more important in some countries than in others.

Third, the issue of establishing causality between private school enrollment and improved educational outcomes needs greater clarification. This will require collecting richer data and using better control variables. It would also require moving away from the so-called 'black-box' idea of private schools and showing, empirically, what is it about a private school that is expected to have an effect on student educational outcomes.

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