Discussion Paper BRIEFS

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Quality or Quantity? The Supply-Side Determinants of Primary Schooling in Rural Mozambique

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The importance of raising educational levels in developing countries is undisputed. The question is how. While the role of school quality in enhancing school outcomes has been widely studied and debated in the United States, focusing on school quality alone may not be the relevant research question in the typical developing country. This is because in the latter there is often a significant portion of the school-age population who are not served by the educational system. For example, in Mozambique, net primary enrollment is only 50 percent. In these settings it is not sufficient to establish that school quality matters. Rather, governments in poor countries must consider the cost-effectiveness of investments that improve school quality relative to investments that expand the school network, especially given the extremely limited resources available.

This paper explicitly considers the trade-offs between quality and quantity in the allocation of school supply resources in rural Mozambique, recognizing that even in an environment with low rates of schooling and poor infra-structure, improving the quality of existing schools might be just as effective at improving educational outcomes as simply opening more schools. Because the benefits of the two different types of investments are likely to differ by schooling outcome, these measures of schooling outcome are examined: the initial decision to send a child to school (enrollment), and two measures of subsequent performance—school efficiency and highest grade attained. In doing so, it is recognized that improving school quality is also likely to have a positive influence on school enrollment; similarly, the analysis allows for the possibility that expanding the number of schools may improve school achievement (for example, by reducing the time spent walking to school).

The data used in this study come from Mozambique's first national household survey, the *Inquérito Nacional aos Agregados Familiares Sobre as Condições de Vida* 1996–97 (IAF), and from regional school supply information provided by the Mozambican Ministry of Education. The sample population is rural children 7 to 11 years old. School quality is measured by the average pupil-teacher ratio (PTR) in the administrative post where the house-hold is located, while school quantity (or access) is measured by whether there is a school within a one-hour's walk.

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Results of Policy Simulations

Regression estimates of the determinants of schooling outcomes show that school access ("quantity") is important for primary school enrollment, while "quality" (measured by the PTR) is an important determinant of schooling efficiency and highest grade attained. Based on these regressions a set of simulations designed to provide quantitative estimates of the benefits of various policy alternatives—and that allow for the "total effect" of each intervention via increased enrollment rates and longer years in school—are performed.

Results of these simulations show that improving school quality by reducing the PTR by 25 percent increases grade attainment and efficiency by approximately 9 percent with no impact on overall enrollment rates. However, an even greater 13 percent increase could be generated by increasing starting enrollment probabilities through the establishment of new schools (increasing school quantity) in all rural villages that currently do not have schools. Moreover, similar rates of increase in school achievement indicators could be attained by building schools in only 56 percent of all villages currently without schools—provided these schools are placed in villages that also do not have access to a school in a nearby village. Hence, well-targeted construction of new primary schools will have the largest combined impact on both total enrollment and grade attainment.

Cost-Effectiveness Analysis

To provide a complete picture of the relative efficiency of the simulated policy interventions, the estimated cost of each simulation is compared to the expected benefit. The cost of expanding the school network includes the cost of constructing and equipping a three-room cement school in rural Mozambique, and the salary of enough primary school teachers over a 20-year period to maintain the existing PTR in the administrative post. The cost of increasing quality is the implied salary cost of hiring more teachers to reduce the existing PTR. For each simulation, the

total estimated cost of the intervention is divided by the expected benefit, which is the predicted percentage increase in enrollment, grade attainment, and schooling efficiency. Results of this cost-effectiveness exercise are presented in the table below, where lower values indicate greater cost-effectiveness.

The first two lines of the table illustrate that improving quality by reducing the PTR is not a cost-effective method of increasing enrollment ($122 million over 20 years per 1 percent increase in net enrollment), but it is an efficient way to increase grade attainment ($14 million). On the other hand, building more schools is an efficient way of increasing overall school enrollment ($15 million), but it is not cost-effective in terms of raising grade attainment. Simulation 3, which involves targeting new schools in villages that do not currently have easy access, is the most cost-effective method of increasing all three schooling outcomes. For this policy intervention, the cost-effectiveness figures are $12, $15, and $13 million for school enrollment, grade attainment, and schooling efficiency, respectively.

Discussion and Conclusion

In developing countries, where a significant part of the school-age population never attends school, policymakers must consider both quality and quantity when deciding how to maximize the impact of scarce investments. Policy simulations using data from rural Mozambique show that improving school quality (through the PTR) increases grade attainment and efficiency by approximately 9 percent with no impact on overall enrollment rates. However, these same—or even better—results could be generated by increasing starting enrollment probabilities through the establishment of new schools in 56 percent of rural villages currently without schools, provided that these schools are placed in villages where there is no other school within a one-hour's walk. The cost-effectiveness analysis confirms that the well-targeted construction of new schools is likely to be the least costly method of improving schooling outcomes at this time.

Keywords: Mozambique, children's education, school quality, cost-effectiveness

Estimated costs per unit of benefit

Policy intervention	Cost of a one percent increase in outcome (over 20 years) (US$million)		
	Probability of ever attending school	Highest class completed	Schooling efficiency
(1) Reduce pupil-teacher ratio by 25 percent	122	14	17
(2) Build a school (EP1) in every village that does not have a school[a]	15	20	17
(3) Build a school (EP1) in every village that does not have a school within one-hour's walking distance	12	15	13
(4) Build a school (EP1) in 56.4 percent of villages that do not have schools[a]	13	17	15
(5) Build a school (EP1) in every village that does not have a school within one-hour's walking distance, and reduce pupil-teacher ratio by 25 percent	23	15	15

[a] This is an untargeted version of policy (3).

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