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Evidence-based policy making

How do adult returns to schooling affect children's enrollment?

Raising future expected monetary gains to schooling and poor families' current incomes promotes school enrollment in developing countries

Keywords: school enrollment, returns to schooling, income effects, poverty

ELEVATOR PITCH

Universal completion of secondary education by 2030 is among the targets set by the United Nations' Sustainable Development Goals. Higher expected adult wages traced to schooling may play a major role in reaching this target as they are predicted to induce increased school enrollment for children whose families wish to optimally invest in their children's future. However, low incomes and the obligation to meet immediate needs may forestall such investment. Studies suggest that school enrollment in developing countries is positively correlated with higher expected future wages, but poor families continue to under-enroll their children.

Higher returns to schooling are linked to higher enrollment in South Africa, ca. 1994
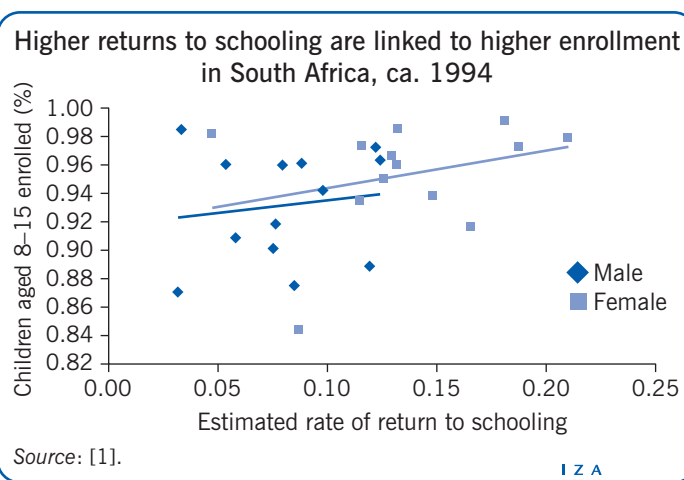
Source: [1].

KEY FINDINGS

Pros

⊕ Higher wages currently associated with higher levels of schooling appear to shape expectations about future wages and are linked to higher rates of school enrollment among children.

⊕ Income supplements to poor households increase children's school enrollment, in part because they relax day-to-day liquidity and income constraints.

⊕ The relevance of schooling to the type of work the children may expect to do as adults likely affects the relationship between returns to schooling and school enrollment.

Cons

⊖ The complete labor market payoff to schooling is still debatable: it may include higher wages, better employment prospects, and/or access to formal-sector employment.

⊖ Income supplements tied to school enrollment appear to have a larger effect on enrollment than unconditional supplements; however, conditional supplements may encourage schooling at the expense of other spending options that have higher payoffs in terms of a child's overall well-being.

⊖ There is little consensus about what inputs into schooling yield improved educational outcomes, which would in turn lead to higher expected adult returns to schooling.

AUTHOR'S MAIN MESSAGE

Increasing and fulfilling expectations about the future earnings of educated workers and helping poor families meet their immediate financial needs encourages higher rates of school enrollment. A clear message from the literature is that cash transfers to poor families help ease current-day constraints that often prevent their children from enrolling in school. Less clear is how to raise and meet expectations about future earnings prospects. In this respect, appropriate policy will be specific to local contexts and will likely be identified only through careful thought and rigorous evaluation relevant to that context.

MOTIVATION

An economic view of education considers it an investment through which a child's time is devoted to schooling today in order to develop a stock of capital ("human capital") that pays returns in the future. These returns come in the form of higher wages earned over the course of the educated adult's participation in the labor market. Like any investment, expected higher returns (wages) should incentivize further investment; that is, more children enrolling in and attending school, and for a longer duration.

However, funds and time are required to pursue this investment. Because poor households in developing countries often face a daily struggle to survive, they may not be able to devote their or their children's time to taking optimal advantage of the available primary- and secondary-school enrollment opportunities. That is, the imperative to satisfy today's needs may constrain the ability of households to invest in their children's future—even when returns to that investment are high.

DISCUSSION OF PROS AND CONS

What type of assessment can be made?

The issue at hand is whether wage returns to schooling that an individual expects to enjoy as an adult determine school enrollment and the amount of schooling pursued when the individual is young. As it is impossible to see into the future, empirical assessment of the wage return-enrollment relationship must be at least somewhat indirect, and a wide variety of study types exist on the topic.

One group of studies examines the relationship between school enrollment and the wage returns to schooling in the labor market by analyzing whether the wage returns enjoyed by the adults who reside near a group of children affect the likelihood that those children are enrolled in school. Data from South Africa near the end of apartheid show that the likelihood of children's enrollment in school was positively associated with the wage returns to schooling that adults earned in the children's region of residence. Because apartheid limited interregional mobility, these adult returns were likely informative of how the children could reasonably expect to fare when they grew up. A couple of additional interesting insights are found in the data on these children. One is that enrollment rates for boys—particularly for boys older than 11—were more responsive to higher wage returns than enrollment rates for girls or younger boys. It is likely that in South Africa, at that time, older boys had more and higher paying alternative uses for their time, so that the rate of return was much more important to their decisions about how to spend their time than it was for either girls or younger boys. For the latter two groups, schooling was likely one of the few activities they had available, and may have just been something to do, as opposed to being a conscious investment choice among many options. Perhaps for those reasons, enrollment of girls and younger boys was less dependent on the economic calculation about current time usage versus future payoff and was rather more related to immediately available alternatives [1].

Somewhat similar results have been found in other studies that directly examine the association between "local" adult returns to education and children's schooling. A study in Malaysia estimated rates of returns for mothers and fathers at the province level; it found a significant and positive relationship between higher wage returns for mothers and provincial rates of school enrollment. There was no significant relationship with fathers'

returns, and the relationship for mothers' returns became insignificant when boys and girls were considered separately [2].

In a study of India, rates of return to schooling were estimated at the village level. Differences in the rates of return between villages were found to be more important for explaining village-level variation in school enrollment when there was greater variation in schooling levels within a village's adult population. In villages with wide variation, the variation in schooling among adults and the associated (large) differences in their earnings may have enabled families to more clearly understand that a variation in payoff to different accumulations of years enrolled in school existed. Although payoff to schooling also existed in villages with narrower variation, the narrowness may have kept families from noticing the payoff [3].

An issue with this body of evidence is the presumption that the only expected future return considered in enrollment is the earnings- or wage-measured rate of return to education. But, better-educated workers tend to have other advantages in the labor market, in addition to higher wages. In developing countries in particular, this includes access to formal sector jobs, which are both more secure and more likely to convey access to social protection schemes in the event of leaving a job, including for reasons of disability or retirement. The studies discussed above do not assess the relative importance of these channels compared to the wage channel. Another issue with this body of evidence is that the rates of return enjoyed by the next generation of adults in a local area may rise or fall for subsequent generations as the general economic fortunes of the locality rise and fall. Finally, children may not end up working as adults in the same place where they went to school.

With respect to the last criticism, patterns of rural-to-urban migration have been used to infer that higher wage returns to education tend to incentivize higher school enrollment. One study hypothesizes that schooling decisions of rural Indian households are affected not only by returns to schooling in their region of residence, but also in places that their adult children may migrate to. It then shows that rural children receive more schooling if the differential in wages between better-educated and less-educated workers in a nearby urban area is higher [4]. In a similar vein, patterns of rural-to-urban migration in Latin America and Kenya have been interpreted as linking school enrollment to higher wages for better-educated workers [5].

Other evidence that school enrollment responds to the rate of return is found in studies that link increased schooling to the relevance of education in the labor market. Particularly interesting are studies of India that analyze where, how, and why the green revolution had an effect on schooling outcomes. The technological advancements from the green revolution increased school enrollment in rural areas that adapted the technology most extensively and rapidly, but only the enrollment of children from land-owning households increased. The authors argue that since only land-owning households possessed the means to implement the new technology, the technology was relevant only to them, and thereby provided returns only to their investments in physical and human capital. As only their children enjoyed new returns to schooling, only those children subsequently pursued more schooling [6], [7]. The policy takeaway from this setting is that education needs to be relevant to the work that children will eventually perform as adults. For many policymakers, the challenge will therefore be to find a way to apply this insight to a more inclusive group of children.

Household finances impact enrollment

In a number of countries, including Brazil, Cambodia, Colombia, Honduras, Mexico, Malawi, and Nepal, evaluation evidence from carefully constructed experiments suggests that cash payments given to families that are conditioned on school enrollment or attendance increase enrollment [8], [9]. By explicitly subsidizing schooling, these cash conditional transfer (CCT) programs reduce the costs incurred by families, and therefore may implicitly raise the returns their children enjoy from schooling (because the rate of return is a measure of the extent to which benefits exceed costs). Therefore, an interpretation of cash-for-schooling programs is that they raise the returns to schooling and, through that channel, raise enrollment.

Although experiments around CCTs do a good job of establishing cause and effect between the cash payments and higher school enrollment, they may not provide evidence of the connection between higher expected returns to education and higher school enrollment. They may instead be addressing a basic issue of affordability faced by poor families. Indeed, many of these experiments show greater responsiveness of enrollment to the CCT among poorer families, where sacrifices made to send children to school are most acute. This suggests that the CCT's effect could come purely from having more income, and is thus not a response to the explicit enrollment requirement to receive the transfer.

There are a number of theoretical models suggesting that (the expectation of) permanently low income may lead families to make sub-optimal investments in education for their children [1], [5]. These models posit that if families could borrow against the future returns to education, they could have the resources to cover the out-of-pocket and opportunity costs of sending their children to school today and therefore fully exploit the opportunity to invest in education. In this conception, there is a liquidity problem where the investment being made in the child is effectively not liquid for many years; there is also an "agency problem," in that the person who eventually collects the investment returns (the educated child, many years later) is typically not the same person who takes on the borrowing obligation (the parent). As a result, the poor parent places significant importance on today's pressing household needs when considering how he/she wants to provide for the child's future. In higher-income families, this particular calculus is not likely to affect the number of years enrolled in school because these families do not suffer from the day-to-day lack of resources that creates the need to borrow in order to invest in their children's education. These latter families can pursue education investment opportunities without constraint.

For the poorer parent who wants to borrow, but cannot, an increase in the rate of return to schooling can have an interesting effect if the increase is related to *any* additional increase in time spent in school. That parent may then reason that a higher return per unit of time spent in school may mean that less total time needs to be spent to provide as well for their child's future well-being (compared to the longer time they may have planned to enroll their child when the return was lower). It is thus theoretically possible that higher rates of return lead to *lower* rates of enrollment among poor children. As this calculus is made only by parents who are constrained from taking full advantage of the better investment opportunity (i.e. poor parents), this suggests that for a group of children who face the same rates of return to schooling, the poorer children are less likely to enroll in school than the wealthier ones; moreover, raising poorer children's household income may increase their likelihood of enrollment, by easing the constraint that had kept poor parents from taking fuller advantage of the opportunity to invest in their children's education.

Studies that attempt to better isolate the pure income effect on enrollment include the following: regression studies based on observational data that incorporate some measure of family or household income; studies that attempt to assess an income effect by examining how households react to unanticipated shocks to their income; and, studies that examine how anticipated increases in income matter, which include non-conditional cash transfer programs. The results based on regression analyses have been least helpful. One reason is that they typically find little significant effect of income on enrollment, which is difficult to believe. The other reason is that methodological flaws endemic to the approach make interpretation of the results—significant or not—suspect. This is because household income is correlated with so many other measures that might affect income and family decision making about school enrollment, including the rate of return to education, and it is difficult to ensure that regression analysis can appropriately net out the effect of income from these other effects [10].

Studies based on unanticipated shocks to income do not suffer from the same methodological problems because truly unanticipated shocks cannot, by definition, be correlated with the income that families anticipate when they make enrollment decisions. The interesting big-picture take away from these studies is that unanticipated decreases in family income interrupt children's schooling, but do not tend to decrease eventual total years of enrollment. This suggests little systematic effect on enrollment rates per se, but does point to a concern about the efficacy of schooling when there are gaps in its progression [5], [10]. However, studies based on unanticipated interruption of income still suffer from a methodological flaw: they cannot measure a key variable, namely the effect of permanently lower incomes. This is either because shocks are temporary, or because the data in which the shocks are observed do not include a long enough period to determine whether the income effects are more than temporary.

Returning to studies based on anticipated increases in income: some cash transfer programs can be relatively long lived and do not condition transfer receipt on expectations of certain behavior. State-supported old-age-pension guarantees (which could matter to schooling decisions in households with grandparents and grandchildren) and needs-tested poverty supplements (so long as the supplement does not feasibly affect actions to escape poverty) are just two examples. From a measurement standpoint, unconditional cash transfer (UCT) from such programs may usefully identify a pure income effect on school enrollment.

Compared to analyses of CCT programs, there have been far fewer attempts to assess the impact of UCT programs. However, a recent systematic assessment of that small body of work suggests that UCTs can significantly increase the odds of school enrollment [11]. In terms of the household decision making problems discussed above (e.g. day-to-day liquidity issues), this may imply that lower income families receiving the transfer tend to "satisfice" when determining schooling for their children (i.e. they make decisions aimed at reaching the minimum satisfactory goals for their children's future). That is, when returns to schooling are high, they decide that a little less of it can be pursued to still achieve an adequate payoff for their children when they grow up. The transfers seem to move families closer to the optimal duration of school enrollment, from an investment perspective.

Of particular interest is the fact that the same assessment also allows for a comparison of the effects on school enrollment from CCTs relative to UCTs, and suggests that the odds of a CCT increasing enrollment is about 15% higher than a similarly sized UCT [11].

Unfortunately, this estimate is not statistically significant, most likely because of the small number of UCT studies available and other measurement issues. However, the difference is significant to the discussion in this paper in the sense that it does provide some evidence for the argument that a CCT combines two effects: a pure income effect and an effect of implicitly raising returns to schooling (keeping in mind that returns to schooling in this case refers to the difference between the overall costs and benefits of attending school).

However, just because a CCT tends to increase school enrollment more than a UCT does not mean that a CCT is necessarily a better tool for promoting the optimal amount of schooling for children. If the UCT addresses the income or liquidity constraints that would otherwise have kept poor children from attending school, and this is the only barrier to optimal investment, then the absence of conditions in the UCT may allow poor families to optimally invest in schooling and also to invest more in items that are also critical to children's future well-being, such as health care, nutrition, and housing. A CCT of similar generosity forestalls use of the transfer for investing in other things because families must satisfy the condition to receive the transfer (e.g. school enrollment). As a result, the CCT may lead to over-investment (too much time spent) in schooling. This suggests the importance of thinking carefully about whether and why conditionality is necessary or desirable.

Beyond the scope of this paper is a literature that would suggest assessing whether or not to pursue conditionality based on who makes decisions about spending in the household (the agency problem). That literature suggests the importance of asking whether the key decision maker(s) demonstrate that their objective is truly the well-being of everyone in the household, or whether they clearly prioritize themselves or some members first, at the expense of the children. In the latter cases, conditionality may serve to more effectively ensure that transfers improve the children's well-being.

Can targeting school inputs increase returns to schooling?

Having established that there is reasonable evidence for expecting that higher wage returns to schooling lead to more schooling for children, a natural next question is whether something can be done about schooling itself to ensure higher future returns. From an economic perspective, this amounts to asking whether schooling outcomes are better if more of something, e.g. more teachers, is devoted to generating them; or if a higher quality of something, e.g. better trained teachers, is needed; or both. These types of quantity and quality considerations are henceforth discussed together using the word "inputs" to capture both dimensions of the resources devoted to schooling. Indeed, there is a vast literature on schooling inputs, motivated by the notion that more, better, or better use of certain inputs should improve schooling outcomes.

There is no direct empirical assessment of the relationship between school inputs and the rate of return to education, but there are many studies on school inputs and other schooling outcomes. A snapshot of that evidence is sufficient to illustrate the complexity and low likelihood of a generalizable relationship between school inputs and the rate of return to schooling.

Consider Figure 1, which is based on a recent extensive literature review covering the relationship between school inputs and student test scores [12]. Higher test scores may indicate students who are likely to be more productive workers in the future, and therefore

Figure 1. Presence of input variables in the literature and expected impact on test scores

	Expected impact	All 79 studies	43 "high quality" studies	13 RCT studies
School infrastructure variables				
Textbooks/workbooks	+	26/60	3/21	0/4
Desks/tables/chairs	+	8/28	3/7	a
Computers/electronic games	+	7/28	4/22	4/20
Electricity	+	6/15	0/6	a
Blackboard/flipchart	+	7/25	2/6	0/1
Library	+	10/22	4/6*	a
Roof/wall/floor	+	2/6	2/6	a
School infrastructure index	+	13/22*	a	a
Staff characteristic variables				
Teacher education level	+	24/70	2/13	a
Teacher experience	+	17/63	5/28	a
Teacher knowledge (tested)	+	18/33*	13/20*	a
Female teachers	−|+	6/39|12/39[b]	1/8|1/8[b]	a
Teacher job training	+	11/29	3/6*	a
Teacher quality index	+	6/14	a	a
Teaching degree	+	2/6	a	a
Principal education	+	1/6	a	a
Principal experience	+	2/6	a	a
School organization variables				
Pupil–teacher ratio	−|+	59/101*|15/101[b]	14/46|3/46[b]	3/5*|0/5[b]
Teacher absenteeism	−	7/15	4/6*	a
Teacher assigns homework	+	12/16*	a	a
School provides meals	+	6/13	2/3*	0/1
Multi-grade teaching	−|+	4/21|2/21[b]	4/10|1/10[b]	a
Hours of school	+	4/8*	4/4*	a
Tutoring	+	2/5	2/4*	2/2*
Salaried teacher	+	2/6	a	a
Contract teacher	−|+	1/6|4/6*[b]	1/6|4/6*[b]	0/4|4/4*[b]
Expenditure/pupil	−|+	2/3*|1/3[b]	a	a
Cost of attending	−	1/6	a	a
Total school enrollment	−|+	2/6|1/6[b]	a	a
Group work	+	4/13	a	a
Teacher gives examples	+	3/7	a	a
Student attendance	+	8/8*	a	a
Community information campaign	+	1/14	1/14	1/14
Merit-based scholarships	+	1/2*	1/2*	1/2*

Notes: The ratio in each entry in the final three columns gives the number of statistical specifications in which the given input variable was found to be statistically significant over the number of specifications in which the input variable was included. * = statistically significant in 50% or more of all specifications. a = no specification considered this variable. b = first entry applies to negative and significant impacts, second to positive and significant. RCT is randomized control trial study design.

Source: Glewwe, P. W., E. A. Hanushek, S. D. Humpage and R. Ravina. "School resources and education outcomes in developing countries: A review of the literature from 1990 to 2010." In: Glewwe, P. (ed.). *Education Policy in Developing Countries*. Chicago: University of Chicago Press, 2014 [12]; Tables 2.7–2.11.

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to be better paid. This is interesting because if generalizable results about inputs that raise test scores are available then it may be possible to infer a relationship between inputs and wage returns to schooling as well.

The authors of this meta study started with a body of about 9,000 papers from which they systematically identified 79 of sufficient relevance and quality. These 79 studies make up the "sample" the authors assessed in detail, and they collectively cover countries from around the world. Within the 79 studies, the authors further separated out studies that they label "high quality" based on these studies' use of certain statistical techniques that are more likely to reveal causality (rather than simple statistical correlation); and from among these, they also separately assessed random control trial (RCT) studies, which were designed according to the scientific method in an attempt to isolate and identify specific causal relationships (making these "highest" quality). For each input variable (row) and quality type (column), the numerical entries in Figure 1 give the number of statistical specifications in the authors' sample in which the input was found to have a statistically significant effect (numerator) and the total number of specifications in which the input was studied (denominator).

A first point to note from Figure 1 (first column) is the long list of inputs to schooling that have been hypothesized as important. This reflects, to some degree, a lack of consensus among researchers as to what inputs should matter for schooling outcomes. The final three columns appear to justify this lack of consensus. From the column for "All 79 studies" the top five variables in terms of the number of statistical specifications in which they appear are pupil–teacher ratio (101 specifications), teacher education level (70), teacher experience (63), (use of) textbooks/workbooks (60), and female teachers (39). Remarkably, of these variables, only pupil–teacher ratio crosses a threshold for being statistically significant (i.e., having an effect sufficiently likely to be different from no effect) in 50% or more of the specifications in which it was included. At the same time, there is some lack of clarity on whether a higher or lower pupil–teacher ratio produces superior results. While in most studies, a lower ratio produces better test scores, in about 15% of the specifications, a *higher* pupil–teacher ratio is associated with higher test scores. In short, Figure 1 shows that the literature on the relationship between school inputs and test scores has produced little in the way of widely applicable generalizations that can be made with comfort; this is due to the low number of studies that deal with most of the listed inputs, and because little statistically significant or uniform evidence exists in favor of the few inputs that have been studied more extensively.

LIMITATIONS AND GAPS

Three bodies of evidence that provide information on the relationship between returns to schooling in the labor market and children's school enrollment have been discussed. One body of evidence attempts to assess this relationship based on an assumption that what educated adults earn today is indicative of what children will earn in the future as a result of schooling. Another informative body of evidence considers how variations in parent household income affect their children's school enrollment, and what can be inferred from those empirical results about the children's expectations of future returns to schooling. The third body of evidence was considered to see if any general result could be inferred about how to improve inputs to schooling so as to improve future earnings prospects for students.

Among the three bodies of evidence, the most generalizable finding is that money matters to poor households in determining their children's school enrollment and eventual education level. Much of this evidence is based on careful experimentation involving cash transfer programs in developing countries. A limitation to individual experiments of this kind is that they cannot rule out the possibility that something about the location of the experiment may have driven the results; in particular, a factor (or factors) that may not exist elsewhere. But collectively, there have now been a sufficient number of geographically dispersed experiments to confidently support the belief that CCTs increase school enrollment, especially for poor children. UCTs appear effective too, but the limitation here is that not nearly as many UCT evaluations exist. Within the literature on cash transfers, an unanswered question is whether CCTs or UCTs are preferable from the standpoint of promoting overall well-being of the child and the family.

CCT results also suggest that raising the rate of return to schooling increases enrollment. A related branch of literature finds similar results by more directly assessing the relationship between rates of return to education for adults currently working in a locality and current school enrollment in that or a neighboring locality. A key limitation in interpreting both these literatures is whether the channel of influence is the one defined by theory: that higher wages for better-educated workers drive schooling decisions. It could be that better employment prospects, rather than wages, are the key channel. In developing countries, in particular, the fact that the educated appear better able to find and hold on to jobs in the formal sector (defined here to mean jobs that entitle them access to social protection programs such as pensions, unemployment insurance, etc.) is another candidate as a channel of influence.

It would be very useful to have a general set of results on how to improve schooling so as to confer competencies that earn higher payoffs in the labor market. The expectation of these higher returns would in turn encourage higher rates of school enrollment. A great deal of scholarly effort has been devoted to assessing how school inputs affect schooling outcomes. There are however no generalizable results from this body of evidence. It could be that researchers are not looking in the right place; but it could also be that what matters is very location specific, so that broad generalizability in this area may not be possible.

SUMMARY AND POLICY ADVICE

Empirical evidence suggests: (1) that higher returns to schooling in the labor market are associated with higher school enrollment by children; and (2) that money matters, with poorer families less able to invest in their children's education, thereby limiting their ability to receive higher returns when participating in the labor market as adult workers.

In terms of policy, existing evidence most clearly suggests that cash transfers to poor households increase school enrollment among their children. When the transfers are conditioned explicitly on school enrollment or attendance, the effects on enrollment are likely bigger because the transfer provides current income as well as changes the calculus of the lifetime return to education. However, transfers that are unconditional still have the income effect and may be more desirable, particularly if increasing school enrollment is only one of a number of welfare-enhancing outcomes that policymakers seek when providing assistance to poor households. The choice of whether to condition cash transfers on school enrollment or attendance thus depends on whether policymakers

believe that the adults receiving the transfers and making decisions on behalf of their households are sufficiently considering their children's well-being when allocating household resources. If adult decision makers do give appropriate consideration to their children, then conditionality may not be desirable as it may divert resources away from expenditures on items such as health care, nutrition, and housing, which may have greater impacts on children's well-being than additional schooling.

The fact that higher rates of return to schooling in the labor market are associated with higher enrollment and more years of schooling indicates that policy to encourage schooling should consider how the skills and capabilities imparted by that schooling will be harnessed in the labor market. As such, the relevance of schooling to work, and how the adults who make schooling decisions for their children perceive its relevance, should be important considerations in curriculum planning.

While there is a general sense in the literature that more and better inputs into schooling should matter, existing evidence does not identify with any global generality which inputs improve schooling outcomes. It seems very possible that the important inputs vary from place to place, and that locality-specific analysis is needed to determine which inputs to target in which place. Therefore, policymakers wishing to identify inputs that could improve schooling outcomes, including raising the returns to schooling, should ensure that their actions are informed by a sound logic model and backed by as much information as possible about the specific situation facing the population they seek to help. Potential initiatives should first be tested on a small scale, to avoid unintended negative consequences and a potential waste of resources. While all areas of policy making could likely benefit from continuous, rigorous, and locally relevant evaluation, implementation of policies that affect "school input" factors is a task in which rigorous and locally relevant evaluation seems wholly *necessary*, rather than simply useful.

Acknowledgments

Competing interests

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Further reading

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