

Annotated Bibliography for BREAD-IGC lectures on education¹

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I. Introduction

We study the economics of education in areas with *significant school choice*. Many children in low-income countries live in such environments. This is partly because of the rise of private schools, which now account for close to one-fourth of all primary enrollment in low-income countries. But this is also partly because there may be many *public* schools within the same geographical area. Villages in the Learning and Educational Achievement in Pakistan Schools or LEAPS project, which is one of the largest educational ecosystem studies in the world, have 8 schools each on average—and 70% of the province of Punjab, Pakistan, which has the 12th largest schooling system in the world—live in such villages. We will call the educational ecosystem in such regions/villages “education markets”. A key feature of education markets is that schools ought to respond both to what parents want and to what other schools are offering in terms of their education services and their prices.

Lecture 1 describes such education markets and establishes why looking at education through the lens of markets is important for policy. Lecture 2 then shows how the functioning of such markets can be improved by systematically addressing market failures, or the constraints that schools and households face in their interactions with each other. In both lectures we highlight two analytical approaches. First, the importance of generating rich descriptive data to understand the actors in the market, their preferences, resources constraints and exchange frictions. Second, drawing on equilibrium analysis that recognizes that any policy intervention will likely affect all actors in this system, directly or indirectly, and therefore the final outcomes.

We expect that coming into the course you know how to (a) compute simple derivatives (Math); (b) understand equilibrium in markets and a basic understanding of market failures (Economics) and; (c) in econometrics, understand the problem of selection in estimating causal impacts.

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Through these lectures, you will:

1. Understand what an educational landscape looks like in low-income countries and how to analyze/describe this new environment.
2. Understand why policy in education markets has to account for school-level reactions—even policies designed for the public sector must account for potential reactions in other schools and among parents.
3. Understand that even if all the actors in this system are trying to do the best for themselves, constraints like poor information and/or lack of finances may constrain performance. Alleviating these constraints at the market level can improve educational outcomes.

Below we summarize the two lectures and then provide a reading list.

II. Lecture 1

Lecture 1 demonstrates that:

1. Educational markets are characterized by significant variation in quality, price and enrollment. Over time, schools that are higher quality gain more market share in the LEAPS villages and private (but not public) schools that are low quality are also more likely to close.
 - a. A key empirical challenge when estimating school quality is that we observe test scores, but test scores depend both on the quality of the school and the ability of the child. We will discuss how to overcome this challenge to emerge at measures of school quality that are not confounded with the ability of the children in that school.
2. We can use this variation in quality and price (as well as other school features) to understand what school characteristics parents care about—and this in turn can help us understand what policies may work to improve educational performance.

We then use #1 and #2 to show that:

1. Variation Matters: One focus of research and policy is to understand whether private schools provide better quality than public schools. But when there are many schools of varying quality, there is no 'single' public-private difference. If we compare a high performing public to a low performing private school, the private school effect may be negative—but if we compare a low performing public to a high performing private school, the effect may be positive. Realizing that empirically there is a wide range of private school effects is important for a range of policies, from

supporting specific schools through instruments like vouchers to policy towards school entries and exits.

2. Demand Matters: A second focus of policy is the use of educational *vouchers*, or public payments to private schools based on enrollment. Such vouchers are used in multiple countries, including Colombia, Chile, Pakistan and India. Whether such educational vouchers improve outcomes depends on (a) the extent to which such vouchers change school choice and (b) the extent to which this change leads to a selection of higher quality schools. We will show, using evidence from LEAPS, that vouchers do not lead to large increases in private schooling because for many parents, *private school fees are not the main barrier to private schooling*.
3. Supply matters: A third focus of policy is how to improve public schools. In an education market, any policy may have repercussions throughout the system. We discuss two policies that (a) provided grants to public schools (in Pakistan) and (b) increased public school capacity in Dominican Republic. We show that both policies had massive effects on the *private* sector, and ignoring these reactions would lead to incorrect valuations of these policies.

Lecture 1 concludes with how to think of market policies for market education. We introduce the idea that resolving *market failures* can improve outcomes in both public and private schools, while also potentially decreasing the quality-adjusted cost of schooling. The research in Lecture 2 seeks to address the fundamental failure of education policy to date—costs have risen while quality has not, leading to dramatic declines in productivity—and asks to what extent a market approach can address this decline.

III. **Lecture 2**

Lecture 2 shows how policies that alleviate *market failures* can improve educational outcomes. We focus on two policies: alleviating market failures arising from lack of information on school quality, and alleviating market failures arising from lack of school finance. Empirically, we introduce the idea of `market level randomizations to demonstrate the importance of alleviating market failures.

1. Market failures from lack of information arises because schools may know their own quality, but parents observe only a noisy measure of quality. The theory of *adverse selection* shows that in these situations, prices serve two functions: They equilibrate supply and demand (like in standard economic models) but they also signal school quality. Because a single instrument (price) cannot solve two problems (allocation and quality signaling) without inducing some inefficiency, any model of adverse selection will result in inefficient outcomes.

Specifically, if the information is 'not too bad', the market separates with higher quality schools charging higher prices and lower quality schools charging lower prices. However, the price charged by higher quality schools will be even higher than in markets with perfect information—it is this informational rent that constitutes the inefficiency in the market. As the information environment worsens, the informational rent required for separation increases, and in this sense, price becomes a substitute for information. At some level, the price required for separation may be too high for the market to bear. At this point, the market collapses; in the resulting 'pooling' equilibrium, every school produces the same quality and charges the same price.

In order to assess the validity of this theory for education markets, we experimentally alter the information environment in some villages and leave it untouched in others in a market-level randomization. There are three components to this experimentally induced variation:

- a. First, we work in 112 villages that are closed educational markets. That is, children in the village attend schools in the village, and schools in the village draw their enrollment from the children in the village. This means that changes in the *local* environment should change the equilibrium.
- b. Second, in a randomly selected half of the villages we provide information on school quality. The other half remains as control villages.
- c. Third, we return 1 and 2 years later to understand how the information changed school fees (prices) in private schools as well as test scores and enrollment in both public and private schools.

The first part of the lecture will discuss this experiment and whether the results were consistent with the theory of adverse selection. We will conclude this first part of the lecture with a discussion of the results 8 years after the experiment, which as we will see, is sufficient time for considerable school exit and entry in the LEAPS villages.

2. Market failures from lack of finance arise because schools are not able to borrow the funds that can lead to school improvements—even if parents are willing to eventually cover the cost of those improvements. One question is the following: What happens in an education market if you alleviate funds for schools *selectively* (say, only for one school) versus for *all schools* irrespective of their performance. This is important for policy as virtually all grant facilities for (private) schools

tend to choose the schools that receive these funds; almost no grant facility provides funding equally to all schools in a market. Interestingly, the policy of selecting specific schools is not only a very costly undertaking, but under certain conditions it may not be socially beneficial either.

The main intuition of this result is the following: Suppose two schools are competing with each other, but do not have the cash on hand to increase their capacity. When one school receives funds, it can increase its capacity *knowing* that the other school cannot do so. However, when both schools receive funds, if they both try to increase their capacity at the same time, they may end up competing for the same pool of students. This intense competition will then decrease their profits. A way around this is to spend *some* of the money on increasing capacity, but then spend *some* of the money on increasing quality. Increasing capacity increases revenues only by bringing in new students, but increasing quality allows schools to earn more revenue from existing students as well.

We assess this theory again in the context of a market-level randomization where we divide villages into three groups: (a) a control group; (b) a set of villages where we give grants to only one school and; (c) a set of villages where we give grants to all schools in the village. The lecture will discuss the results from this experiment.

Lecture 2 concludes with a discussion of how similar approaches can help address the productivity challenges in education markets.

IV. Reading list

In our reading list below, starred readings directly related to the material in the lectures. It may be useful to read these both before and after the lectures. We also include our own two-line summaries of the papers.

Lecture 1:

1. *** Andrabi, Tahir, Jishnu Das, Asim Ijaz Khwaja, Tara Vishwanath, and Tristan Zajonc. "Learning and Educational Achievements in Punjab Schools (LEAPS): Insights to inform the education policy debate." *World Bank, Washington, DC* (2007).

A description of education markets in terms of schools, teachers and household.

2. *** Carneiro, Pedro Manuel, Jishnu Das, and Hugo Reis. "The value of private schools: Evidence from Pakistan." (2016).

Structural estimates of household demand in the LEAPS villages show that households choice of schools is surprisingly insensitive to price (particularly for boys) and very sensitive to distance. The price sensitivity results are consistent with results from an experiment.

3. *** Andrabi, Tahir, Natalie Bau, Jishnu Das, and Asim Khwaja. "Private Schooling, learning, and civic values in a low-income country." *Unpublished manuscript* (2020).

The first estimates of School Value-Added (a test-score based measure of school quality) from low-income countries shows tremendous variation in quality within the same village and within public and private schools.

4. *** Bau, Natalie. "Estimating an equilibrium model of horizontal competition in education." (2019). Forthcoming, *Journal of Political Economy*.

Private schools have to choose their instructional levels to match the level of the marginal, not the average child in their school. When a new school enters the village, existing private schools increase their instructional level to retain the high performing children, who are also those most likely to switch. This leads to significant welfare losses.

5. Muralidharan, Karthik, and Venkatesh Sundararaman. "The aggregate effect of school choice: Evidence from a two-stage experiment in India." *The Quarterly Journal of Economics* 130, no. 3 (2015): 1011-1066.

If we were interested in estimating an 'average' private school effect, we would still have to address selection into schooling. A two-stage experiment evaluates average private-school effectiveness in the light of potential quality changes in public schools as children exit the sector.

6. Neilson, Christopher. "Targeted vouchers, competition among schools, and the academic achievement of poor students." *Documento de trabajo*. Yale University. Recuperado de http://economics.sas.upenn.edu/system/files/event_papers/Neilson_2013_JMP_current.pdf (2013).

In poor areas in Chile, people don't want to travel far to go to schools. This allows schools that are in these areas to 'markdown' quality. A voucher redesign that changes the amount paid to schools depending on family income has beneficial effects due to school entry.

7. Ainsworth, Robert, Rajeev Dehejia, Cristian Pop-Eleches, and Miguel Urquiola. *Information, preferences, and household demand for school value added*. No. w28267. National Bureau of Economic Research, 2020.

In Romania, like in Pakistan, there is substantial variation in test-score based measures of school quality within the same communities. An experimental evaluation shows that lack of information is not the driving force behind the continuing use of low-quality schools.

Lecture 2:

1. *** Andrabi, Tahir, Jishnu Das, and Asim Ijaz Khwaja. "Report cards: The impact of providing school and child test scores on educational markets." *American Economic Review* 107, no. 6 (2017): 1535-63.

Giving school report cards increases test scores in public and private schools and decreases prices in private schools in this market-level randomization. Consistent with the theory of adverse selection, price declines are greater in better performing schools.

2. *** Andrabi, Tahir, Jishnu Das, Asim I. Khwaja, Selcuk Ozyurt, and Niharika Singh. "Upping the ante: The equilibrium effects of unconditional grants to private schools." *American Economic Review* 110, no. 10 (2020): 3315-49.

Private schools, and the children enrolled in them, benefit when the schools are given additional funds. The effects differ depending on whether one or all school receive funds. When one school receives funds, it increases enrollment but not quality or fees. However, when all schools receive funding, beneficiary schools raise quality and fees, in addition to enrollment.

3. Andrabi, Tahir, Natalie Bau, Jishnu Das, Naureen Karachiwalla, and Asim Khwaja. "Crowding in Private Quality: The Equilibrium Effects of Public Spending in Education." (2021).

In the LEAPS villages, a market-level randomization shows that grants to public schools increase test scores in public schools—and in private schools. Failure to account for spillovers would underestimate the cost-effectiveness of the program by half.

4. Dinerstein, Michael, and Troy D. Smith. "Quantifying the supply response of private schools to public policies." *American Economic Review* 111, no. 10 (2021): 3376-3417.

Grants to public schools in New York led to greater public and lower private enrollments. This reallocation of children from private to public schools undid the positive effects of the grant on public school quality.

5. Neilson, Christopher, Michael Dinerstein, and Sebastián Otero. *The Equilibrium Effects of Public Provision in Education Markets: Evidence from a Public School Expansion Policy*. Princeton University, Department of Economics, Industrial Relations Section., 2020.

In the Dominican Republic, the government undertook a massive expansion of public school capacity. As a result, private schools closed down and those that survived, lowered prices and increased quality.

6. Das, Jishnu, Stefan Dercon, James Habyarimana, Pramila Krishnan, Karthik Muralidharan, and Venkatesh Sundararaman. "School inputs, household substitution, and test scores." *American Economic Journal: Applied Economics* 5, no. 2 (2013): 29-57.

In Zambia and in India, every \$ of school grants reduces private expenditures by 80 cents. Small grants, such as those studied here, do not increase test scores—not because school grants have a zero effect in the production function, but because of the substantial reduction in private spending.