Education II: Schooling Decisions

14.740x: Foundations of Development Policy

Professor Esther Duflo

What explains education decision

Even when correcting for omitted variable, returns to education are positive, even at the primary level. Generally, there appears to be benefits of being educated at every level, both monetary and non-monetary.
So education is in part an investment: parents invest in their children today, and they get the returns later. How do the cost and the (actual and perceived) returns influence parental decision to send their kids to school?

A simple model of educational choice

Parents make schooling decisions for their child. Their utility function as a function of schooling (S) and earnings of the child when he grows up (y) is:

$$U(y, S) = m * ln(y) - h(S), \tag{1}$$

where:
-S is :
- $h(S)$ is :
-$ln(y)$ is :
-m is:
-What is the interpretation of this equation?

-What does this equation miss?

Returns to education

The earnings of the child when he grows will be:

$$ln(y) = a + b * S \tag{2}$$

This formulation (which is very general in economics) is saying that for each new year of education, the future wage will go up by $b\%$. b is called the *economic returns to education*.
The formulation assumes that it is the same for each year, i.e that returns to education are *linear* (in log term). Is it a reasonable assumption? How does it relate to the capacity curve debate?

Costs of education

Finally, we need to specify what the cost of education function looks like. Is it likely to be convex or concave? Is it likely that each year of education costs more or less than the next?

$$h'(S) = r + \phi(S) \tag{3}$$

With convex costs, ϕ is positive.

Solving the problem

We are now ready to solve the maximization problem of the parents:
replace equation (2) and (3) in equation (1), and take the derivative.

$$S^* = \frac{mb - r}{\phi} \tag{4}$$

Comment on this equation?
We are now in a position to think about what motivates parents in, or prevents them from sending their children to school: we have to think about what determines m, b, r, and ϕ.

What if the perception of the returns is different?

Although the real returns appear to have more or less this log-linear shape, people have a different view: they seem to think the returns to primary education are very low, and then that they are may be higher for higher levels. For example, in Madagascar, parents believed that each year of primary education would increase a child's income by 6 percent, each year of junior high education by 12 percent, and each year of senior secondary education by 20 percent.

To simplify assume that the perception of return is: $ln(y) = a$ if $S < \underline{S}$ and $ln(y) = a + dS$ if $S \geq \underline{S}$, with $d > b$

How does this modify the parent's problem?

The optimal level of education is now:
$S^* = \frac{md-r}{\phi}$ if $S^* \geq \underline{S}$
but it is S^{**}=0 if $S^* < \underline{S}$
What is the difference between the effect of an increase in the cost of education r or ϕ in this model, compared to the previous model?

Adding Credit Constraint

Now assume that parents cannot afford more than $h(S) = \overline{H}$

1. Linear case
   - Under the first model, if $h(S^*)$ is greater than $\overline{H}$, what will parents do?
   - If they have two children, and can only afford a maximum of $2 * \overline{H}$ for their education, and $2h(S^*)$ is greater than $2 * \overline{H}$, how will they decide to educate their children?
2. Non linear case
   - Under the second model, assuming that S^* is greater than $\underline{S}$ but $h(S^*)$ is greater than $\overline{H}$, what are the possible cases:
     -
     -
   - With two children, assuming that S^* is greater than $\underline{S}$ but $2h(S^*)$ is greater than $2\overline{H}$, what are the possible cases now? Can we see inequality emerging between children who are otherwise completely equal?
     Now suppose that one child has a slightly higher return d than the other. Which child will be selected?

Some empirical observations which are consistent with this model

Parents are sensitive to the perceived returns to education: Madagascar

Trang Nguyen: Experiment in Madagascar. Provided parents with simple report cards on the benefits of education (that were discussed by teachers) in randomly selected schools. (Control school=a school meeting but no information on the returns to education)

Parents who initially overestimated returns invest less: higher absence and lower test scores at the end of the year.

Parents who initially understimated returns invest more: lower absence and higher test scores at the end of the year.

The returns to education are affected by the perception that there are jobs for graduates

Robert Jensen: Experiment in India. Recruiters for Back office processing operations were sent to villages in North India, for three years. (control villages=no recruitment). He found that in treatment villages, girls got more education (specifically english language education) and had better BMI.

Parents miss-perceive the "ability" of their children

Rebecca Dizon-Ross designed a very clever experiment and data collection method to show that parents have distorted beliefs about their children's ability (or even how well they are doing in school: a less fundamental measure of ability), and that this affects their investment decisions.

The experiment takes place in Malawi.

Basic experimental design: Select 3,464 households with at least 2 school age children, and select 2 school age children per family. Select half of those families randomly (the treatment group), and provide to the treatment group information about their children's achievement: the school report card, explained in detail.

Data collection: How to elicit beliefs and investments?

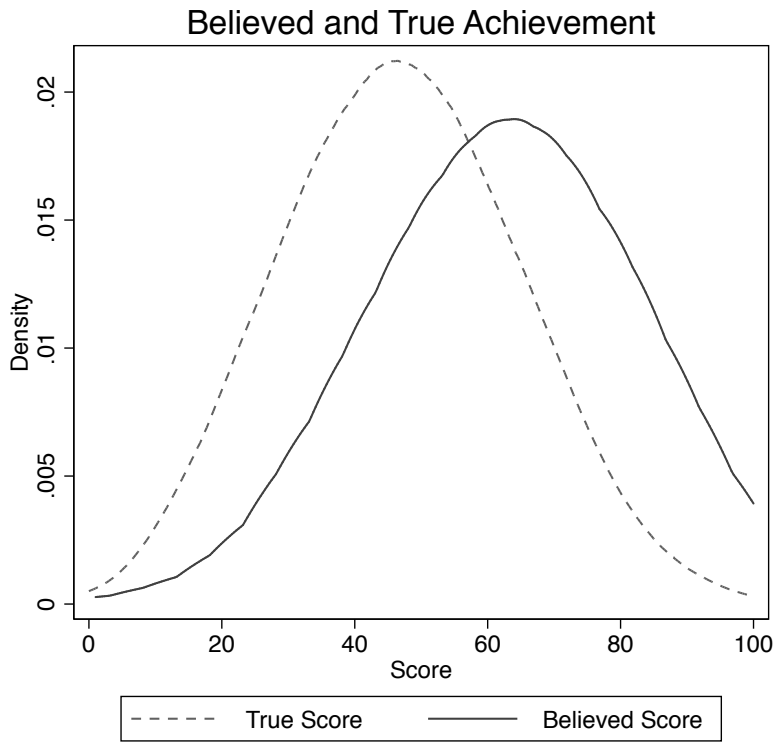
1. Ask them .... However, there may be a problems with that. Parents may not remember their investment or may want to please the surveyor ("Social desirability bias").
2. "Put your money where your mouth is": little "lab in the field" experiments to force parents to make choices which have some consequences.
   - Willingness to pay for a remedial textbook in English and Math, using Becker-DeGroot-Marshak method.
   - Each child is given two workbooks: one in math, and one in english.Parents must chose among 3 levels (easy, medium, hard).
   - Secondary school lottery: one in every 100 child in the sample will get secondary school fees paid. Each parent is given 9 tickets and must allocate them between the two children
3. Administrative data on school participation and end-of-year grades
4. Actual investment decisions one year later.

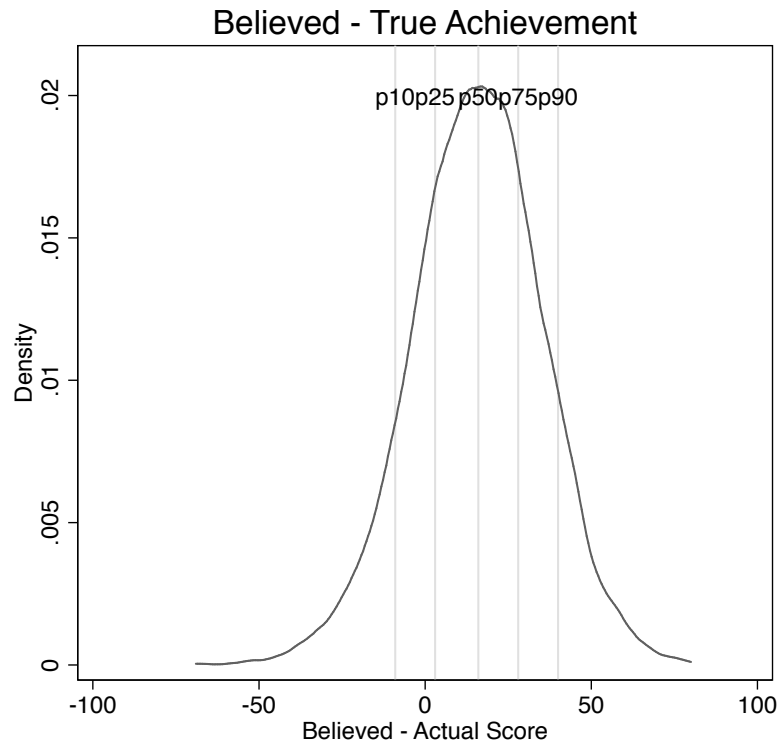
Becker-DeGroot-Marshak

Surveyor: For each row, say: "At the end of the interview, if the randomly selected textbook is the **math** book for [*NAME*] and the randomly selected price is [*PRICE*] MWK, will you purchase the book?"					
a)	**1900**MWK	☐ 1. YES	*or*	☐ 2. NO	
b)	**1700**MWK	☐ 1. YES	*or*	☐ 2. NO	
c)	**1500**MWK	☐ 1. YES	*or*	☐ 2. NO	
d)	**1300** MWK	☐ 1. YES	*or*	☐ 2. NO	
e)	**1100** MWK	☐ 1. YES	*or*	☐ 2. NO	
f)	**900**MWK	☐ 1. YES	*or*	☐ 2. NO	
g)	**700**MWK	☐ 1. YES	*or*	☐ 2. NO	
h)	**500**MWK	☐ 1. YES	*or*	☐ 2. NO	
i)	**300**MWK	☐ 1. YES	*or*	☐ 2. NO	

Source: Dizon-Ross (2014) "Parents' Perceptions and Children's Education: Experimental Evidence from Malawi"

parents have inaccurate perceptions about their children's achievement

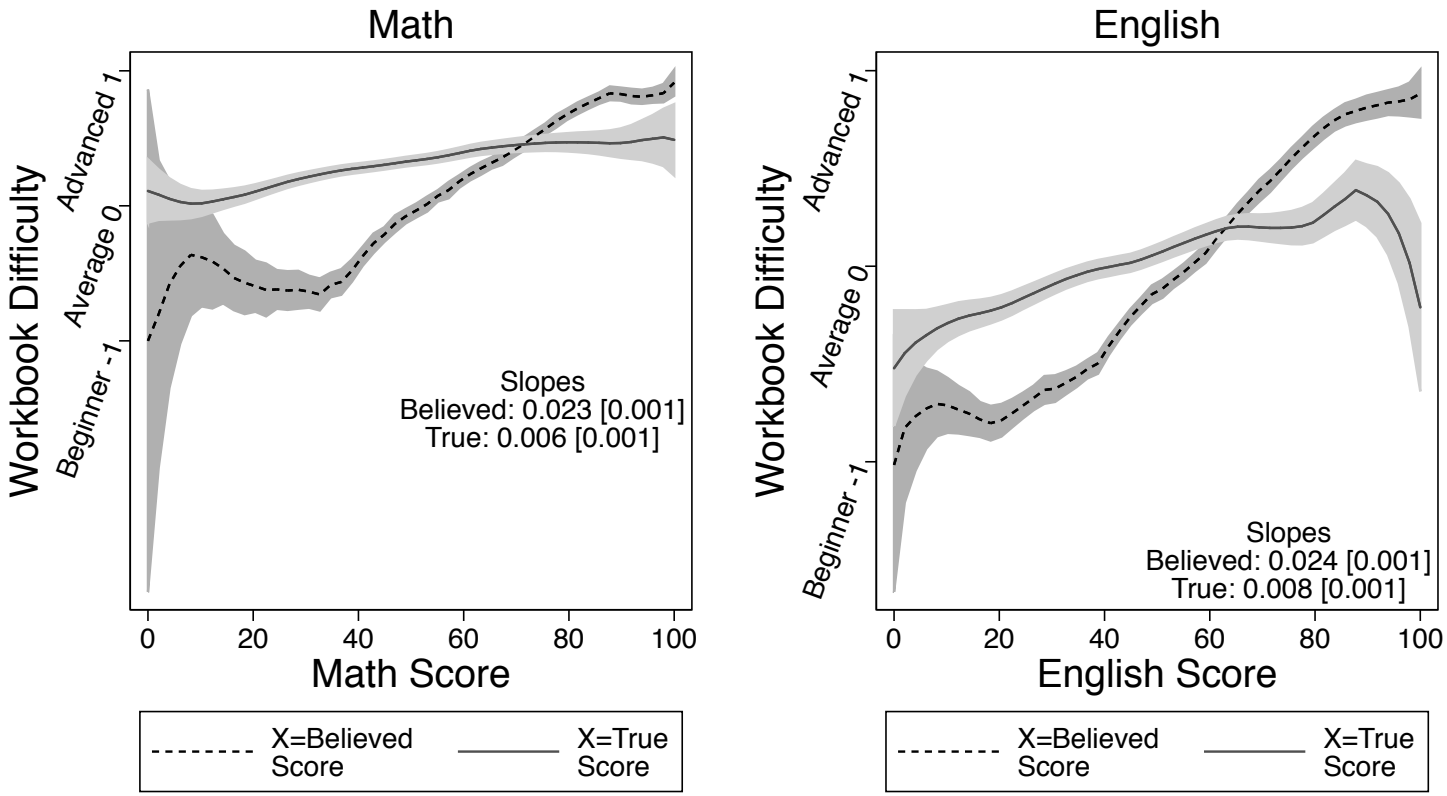




Source: Dizon-Ross (2014) "Parents' Perceptions and Children's Education: Experimental Evidence from Malawi"

As a result they pick the wrong workbooks, for their own preferences

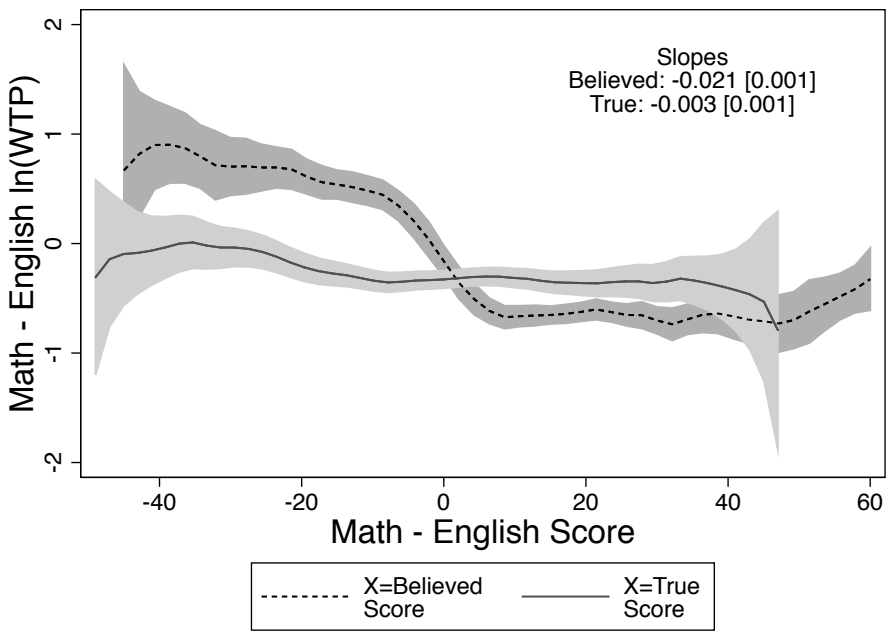
(a) **Workbooks (Complements)**



Source: Dizon-Ross (2014) "Parents' Perceptions and Children's Education: Experimental Evidence from Malawi"

...they don't want to pay for the right textbook

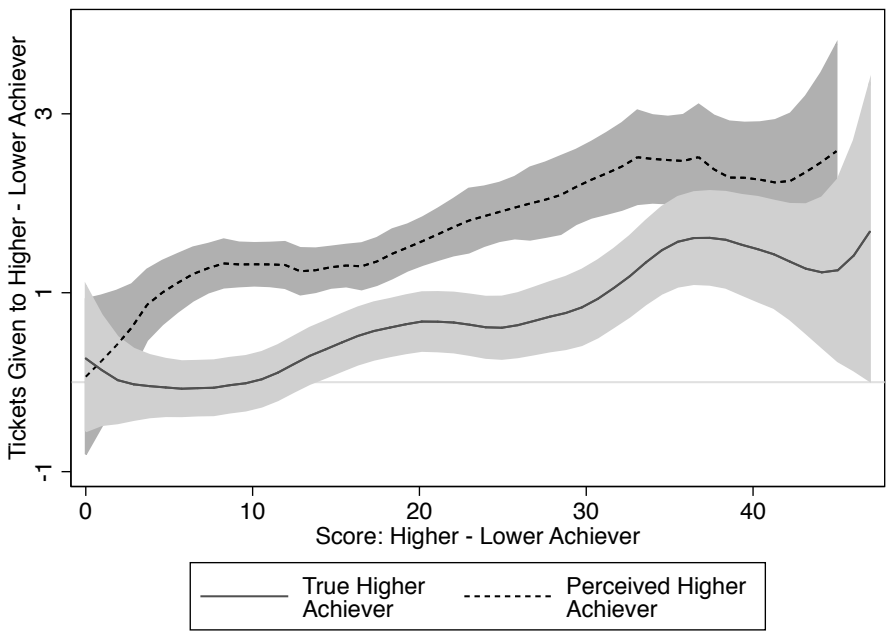
(b) **Textbook WTP (Substitute)**



Source: Dizon-Ross (2014) "Parents' Perceptions and Children's Education: Experimental Evidence from Malawi"

...they give more ticket to the "wrong" child

(c) **Secondary School Lottery**



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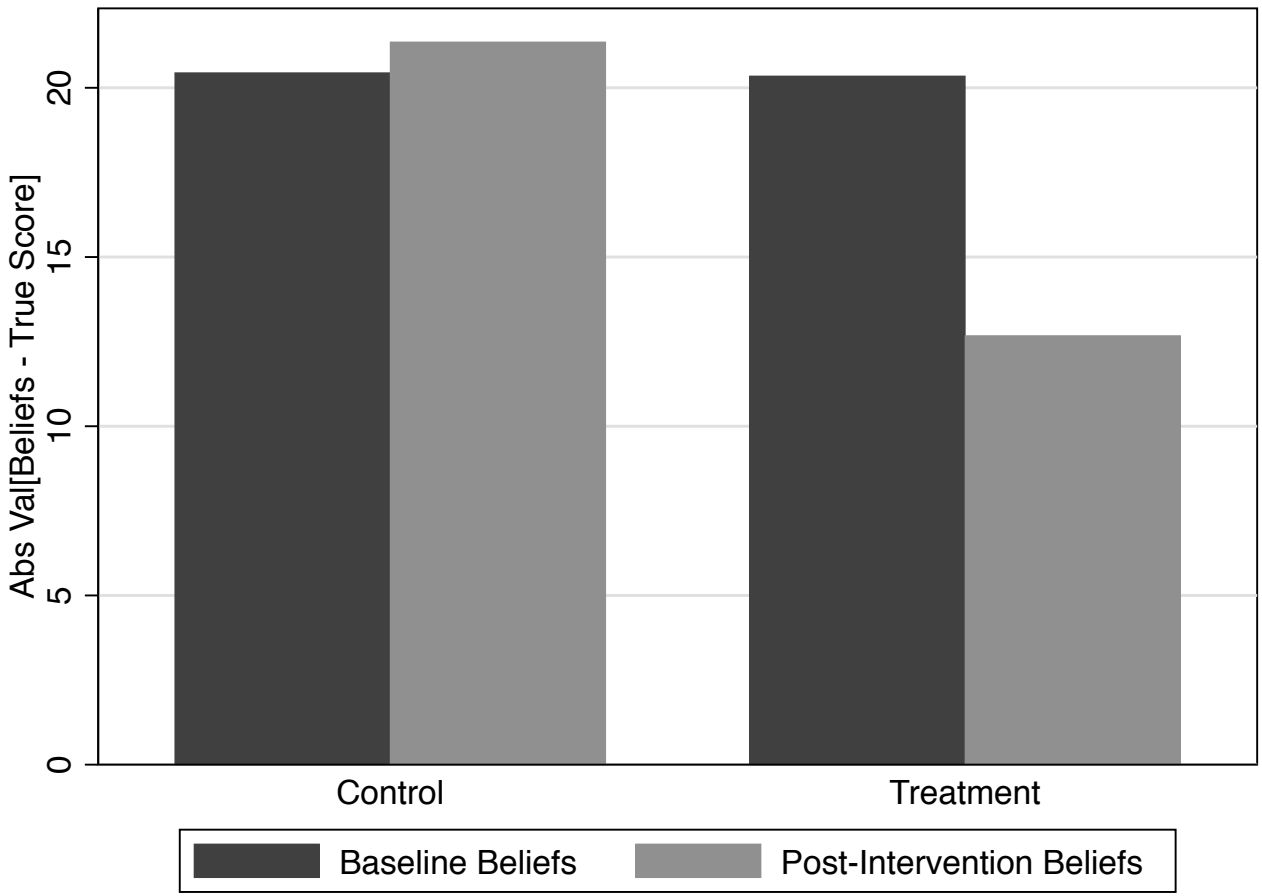
The information treatment affect beliefs

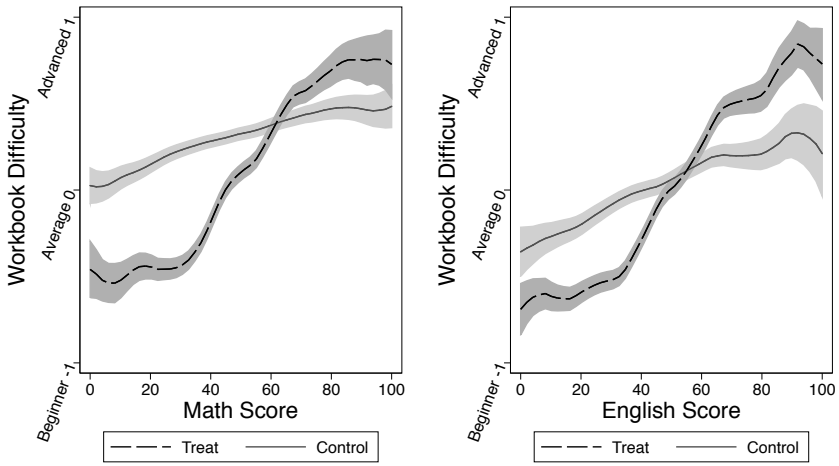
Figure 5: Information shifts parents' beliefs towards their children's true achievement



Source: Dizon-Ross (2014) "Parents' Perceptions and Children's Education: Experimental Evidence from Malawi"

And it makes decisions more sensitive to true achievement

(a) **Workbooks (Complements)**



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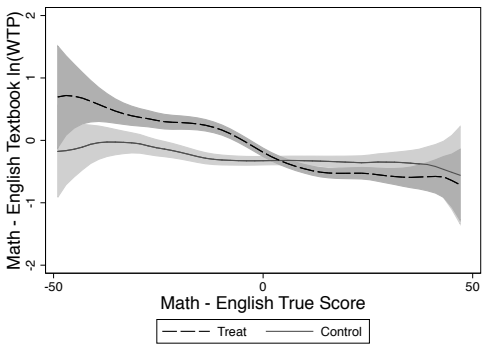
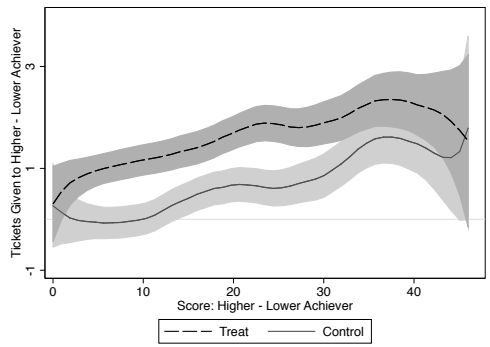


(c) **Secondary School Lottery**



Source: Dizon-Ross (2014) "Parents' Perceptions and Children's Education: Experimental Evidence from Malawi"

And some broader Implications

- Parental demand is for a system that produces an elite: they may not be that interested in remedial education.
- Teachers are given incentives to focus on the curriculum, regardless of whether students learn or not. Private schools have the same incentives.
- Children who are left behind get little from the education system, and they are quick to persuade themselves that education is not for them.
- Teachers also get persuaded that education is not for those children. Once better students or students who get more support leave for private school, teachers remaining in public schools are demotivated.

- Huge waste of talent based on a misunderstanding! But the misunderstanding has little chance to get corrected unless there is a shift: no one ever learns about what the child who got lost in second grade could have done.
- This explains both the huge effect of program that focus on changing pedagogy to focus on what children can learn (and the difficulty to get these programs adopted.
- Also explains interesting effects of private school: they work harder but little causal effect on performance in basic subjects because they spend more time on non basic subjects.