



Incentives to Learn

Michael Kremer, Edward Miguel,
Rebecca Thornton

December 2004

Narmin Bashirzade
Rashad Mehbaliyev

CEU
Program Evaluation
Spring 2010

© [http://www.povertyactionlab.org/sites/default/files/publications/
/14_Kremer_Incentives_to_Learn.pdf](http://www.povertyactionlab.org/sites/default/files/publications/14_Kremer_Incentives_to_Learn.pdf)



The Program

- Background:
 - primary school and secondary schools (8+4)
- The problem:
 - high dropouts rates, especially for girls.
- The Girls Scholarship Program:
 - in 2001-2002 in Busia and Teso (Kenyan districts);
 - 64 out of 127 primary schools;
 - Top 15% of grade 6 girls awarded by Dutch NGO ICS Africa: (1) 1000 KSh (US\$12.80) for winner and her family; (2) 500 KSh (US\$6.40) for school fees; (3) Public recognition at an award ceremony.
- Main goals:
 - improvements in girls' attendance and academic results and cover the costs of high-achieving girls;
 - improvements in teachers' attendance.



Data

- Test score data:
 - Obtained from District Education Offices (DEO);
 - Normalized in each district: $\sim N(0,1)$;
- Surveys and announced checks.
- 2 cohorts of grade 6 girls:
 - registered for grade 6 in January 2001 in treatment schools (competing in 2001);
 - registered for grade 5 in January 2001 (competing in 2002);
- Samples:
 - Baseline sample (BS): 11,728 students registered;
 - Intention to treat sample (ITTS) – baseline students taking 2001 exam ($\approx 65\%$ of baseline sample);
 - Restricted sample (RS) – after attrition in ITTS;
 - Longitudinal sample (LS) – cohort 1 students in RS.



Methodology

- Randomization:
 - 64 treatment and 63 control groups;
 - stratified schools by (1) district and administrative divisions within district; (2) by participation in a past program launched before.
- Downward bias caused by attrition. Used:
 - Lee's trimming method and Nonparametric Fan locally weighted regressions

Table 1: Summary Sample Sizes

	----- Busia District -----				----- Teso District -----			
	Program Schools		Comparison Schools		Program Schools		Comparison Schools	
Panel A: <u>Number of schools</u>	34		35		30		28	
	Cohort 1		Cohort 2		Cohort 1		Cohort 2	
Panel B: Baseline sample	Program	Comparison	Program	Comparison	Program	Comparison	Program	Comparison
Number of girls	744	767	898	889	571	523	672	572
Number of boys	803	845	945	1024	602	503	739	631
Panel C: Intention to treat (ITT) sample								
Number of girls	614	599	463	430	356	397	399	344
Number of boys	652	648	492	539	385	389	508	415
Panel D: Restricted sample								
Number of girls	588	597	449	427	304	342	380	333
Number of boys	607	648	470	531	328	334	484	436
Panel E: Longitudinal sample								
Number of girls	360	408	--	--	182	203	--	--
Number of boys	398	453	--	--	205	219	--	--

Notes: The baseline sample refers to all students that were registered in grade 6 (cohort 1) or grade 5 (cohort 2) in January 2001. The ITT sample consists of all baseline sample students with either 2001 (cohort 1) or 2002 (cohort 2) test scores. The restricted sample consists of ITT sample students in schools that did not pull out of the program, with average school test scores in 2000. The longitudinal sample contains those cohort 1 restricted sample students who took the 2000 test. A dash (-) indicates that the data are unavailable (for instance, cohort 2 is not included in the longitudinal sample).

Table 3: Demographic and Socio-Economic Characteristics Across Program and Comparison Schools Cohort 1 and Cohort 2, Busia and Teso Districts

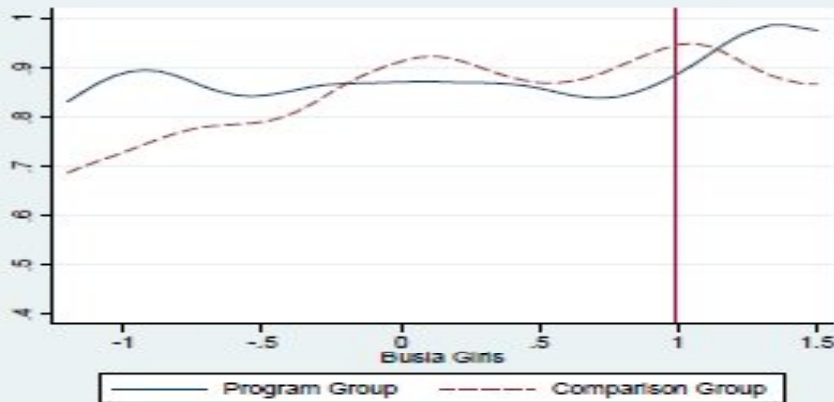
	-----Girls-----			-----Boys-----		
	Program	Comparison	Difference (s.e.)	Program	Comparison	Difference (s.e.)
Panel A: Busia District						
Age in 2001	13.5	13.4	0.0 (0.1)	13.9	13.7	0.2 (0.2)
Father's education (years)	10.8	10.4	0.4 (0.4)	10.2	9.9	0.3 (0.3)
Mother's education (years)	9.2	8.8	0.4 (0.3)	8.3	8.1	0.2 (0.4)
Proportion ethnic Teso	0.07	0.06	0.01 (0.03)	0.07	0.07	0.01 (0.03)
Iron roof ownership	0.77	0.77	0.00 (0.03)	0.72	0.75	-0.03 (0.03)
Test score 2000–baseline sample (cohort 1 only)	-0.05	-0.12	0.07 (0.18)	0.04	0.10	-0.07 (0.19)
Test score 2000–main sample (cohort 1 only)	0.07	0.03	0.04 (0.19)	0.15	0.28	-0.13 (0.19)
Panel B: Teso District						
Age in 2001	14.0	13.8	0.20 (0.18)	14.1	14.1	-0.05 (0.18)
Father's education (years)	11.0	10.8	0.2 (0.4)	10.0	10.0	0.0 (0.4)
Mother's education (years)	8.5	8.4	0.1 (0.5)	7.5	8.2	-0.7 (0.5)
Proportion ethnic Teso	0.84	0.80	0.05 (0.05)	0.85	0.80	0.05 (0.04)
Iron roof ownership	0.58	0.67	-0.09** (0.04)	0.49	0.59	-0.09** (0.04)
Test scores 2000–baseline sample (cohort 1 only)	0.04	-0.11	0.15 (0.18)	0.19	0.10	0.09 (0.17)
Test scores 2000–main sample (cohort 1 only)	0.06	0.06	0.01 (0.19)	0.20	0.25	-0.05 (0.17)

Notes: Standard errors in parentheses. Significantly different than zero at 90% (*), 95% (**), 99% (***) confidence. Sample includes all baseline sample students with the relevant data. Data is from 2002 Student Questionnaire, and from Busia District and Teso District Education Office records. The sample size is 7,401 questionnaires, 65% of the baseline sample in Busia and 60% in Teso (the remainder either had left school by the 2002 survey or were not present in school on the survey day).

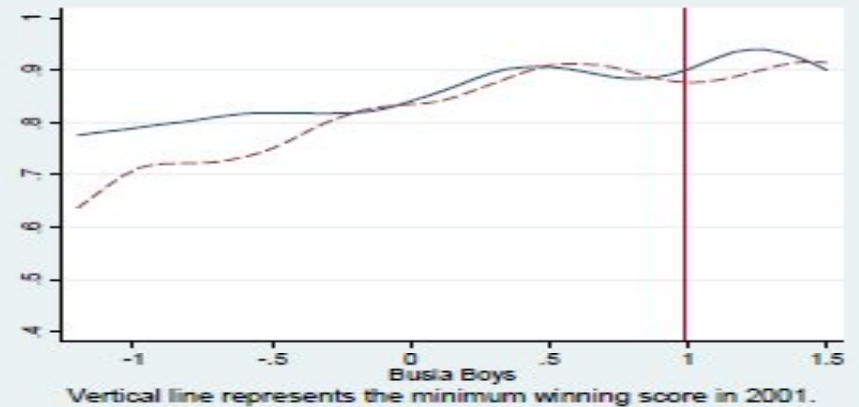
Downward bias

Figure 1: Proportion of Baseline Students with 2001 Test Scores by Baseline (2000) Test Score Cohort 1 (non-parametric Fan locally weighted regressions)

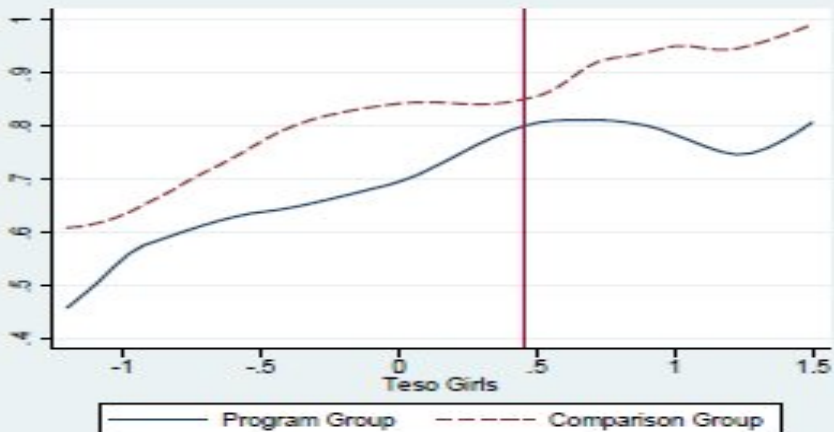
Panel (A) – Busia Girls



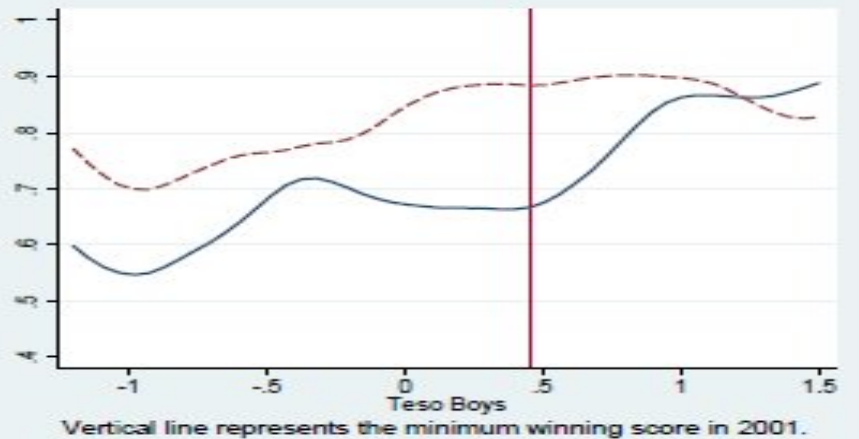
Panel (B) – Busia Boys



Panel (C) – Teso Girls



Panel (D) – Teso Boys





Estimation strategy

The impact of program on normalized test score outcome:

$$\text{TEST}_{ist} = \alpha + \beta_1 \text{TREAT}_s + X'_{ist} \gamma_1 + \mu_s + \varepsilon_{ist}$$

TEST_{ist} – normalized test score for student i in school s in the year of competition;


TREAT_s – program school indicator (dummy);

β_1 – the average program impact on the population targeted for program incentives;

X'_{ist} – vector including the average school baseline (2000) test score (for restricted sample) and individual baseline score (for longitudinal sample), as well as other controls;

μ_s – common school-level error component;

ε_{ist} – unobserved student ability.



Results - test score

- ITT sample:

	Busia and Teso	Busia	Teso
Effect	0.19*	0.27*	0.19

- Restricted sample:

	Busia and Teso		Busia	Teso
Effect	0.18	0.15***	0.25***	0.01

- Longitudinal sample:

	Busia and Teso		Busia	Teso
Effect	0.19	0.12	0.19	-0.01



Results – teacher attendance

- ITT sample:

	Busia and Teso	Busia	Teso
Effect	0.048***	0.070***	0.016

- Restricted sample:

	Busia and Teso	Busia	Teso
Effect	0.006	0.032*	-0.029

- Longitudinal sample:

	Busia and Teso	Busia	Teso
Effect	-0.009	0.006	-0.030



Robustness check

- Similar estimates if controlled for the individual characteristics (i. e. student age, parent education, household asset ownership).
- No statistical significance of interactions of the program indicator with individual characteristics.
 - Implication: No significant increase on average for students from higher-socioeconomic-status households.
- No statistical significance of interactions of the program indicator with measures of baseline school quality.
 - Implication: The same average effects across schools at various academic quality levels.



Conclusions

- Increase in test scores and teacher attendance;
- Evidence on positive externalities for girls with low baseline test scores and poorly educated parents, even for boys.
- No statistically significant effect on dropping out of school.
- No statistically significant effects in Teso. Possible reasons:
 - Different sample attrition across Teso program and comparison schools;
 - Lower value placed on winning the merit award;
 - Lack of local political support among some parents and community opinion leaders.
- No statistically significant effect on education habits, inputs and attitudes



Evaluation of study

- Credible results? Yes: successful randomization.
- Relevant data? Yes: pre-program, program and post-program data collected.
- Cheating? No: the gains persisted one full year after the competition and long-term results.
- Cramming? No evidence that extra test preparation coaching increased in the program schools for either girls or boys.
- Externalities? Yes: reasons explained.
- Bias? Yes: different sample attrition across Teso program and comparison schools, not solved even by Lee trimming method in the paper.
- Cost-effectiveness? Yes: the most cost-effective program ever launched in Kenya.
- Concern (!!!): effect of gifts from winners' parents.

A black and white photograph of a classroom. In the foreground, several students are seen from behind, with their arms raised high, indicating they want to ask a question or answer. The background is a chalkboard filled with mathematical equations and diagrams. The text "Any questions?" is overlaid in the center of the image in a large, bold, serif font.

Any questions?