Many Children Left Behind? Textbooks and Test Scores in Kenya*

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*http://www.povertyactionlab.org/evaluation/textbooks-and-test-scores-kenya

The Program

- School Assistance Program (SAP)
  - Funded by International Christelijk Steunfonds (ICS)
- Location:
  - Busia and Teso districts, Western Kenya
- Sample:
  - 100 of the 333 primary schools
- Timeline:
  - 1995 - 2000 years
- Policy Goals:
  - Education Quality Improvement
  - Decrease Absenteeism
- Data:
  - Textbooks Provision and Test Scores

The Program Design

- Randomization
- Difference-in-difference
  - Simple diff-in-diff
  - Subject based diff-in-diff
- Intent to treat effect
  - Impact of being offered the treatment

	Distribution of Textbooks
Group 1	Math books provided to grades 3, 4, 5, 6 and 7 English provided to 3, 5 and 7 Science and Agriculture provided to grade 8
Group 2	Grant equal to US$2.65 per student, 43% of which was spent on textbooks
Group 3	Similar grant in 1998 school year
Group 4	Similar grant in 2000 school year

Randomized Experiment

- 100 SAP schools were randomly divided into four groups
- Books were given less then one-to-one ratio (Heyneman et al., 1984) and one copy of associated teacher's guide

	Group 1 25 schools	Group 2 25 schools	Group 3 25 schools	Group 4 25 schools
1996	treated	comparison	comparison	comparison
1997	treated	treated	comparison	comparison
1998	treated	treated	treated	comparison
1999	treated	treated	treated	comparison

❖ Group 4 was assisted in 2000

Evaluation of Randomization

Table 1: Differences in Normalized Pre-Test Scores between Textbook Schools and 25-School Comparison Group

Subject	English		Math		Science		All subjects combined	
Grade	Grades with texts (3-7)	All grades (3-8)	Grades with texts (3, 5, 7)	All grades (3-8)	Grades with texts (8)	All grades (3-8)	Grades with texts	All grades
Difference between textbook schools and comparison schools	0.046 *(0.105)*	0.033 *(0.101)*	0.056 *(0.090)*	0.054 *(0.085)*	0.173 *(0.105)*	-0.017 *(0.088)*	0.061 *(0.091)*	0.023 *(0.087)*
Observations	8,516	9,332	5,069	9,302	816	9,276	14,401	27,910

Econometric Specification

$$t_{ijks} = \alpha_{jk} + \beta_{jk} p_s + u_{jks} + e_{ijks} \quad j = 3, 4, \ldots 8 \quad k = \text{English, Math, Science.}$$

where student i in grade j, subject k, and schools s with test score t_{ijks}

p_s dummy indicates whether school s received textbooks

- Random assignment of textbooks to schools ensures:

$$E[p_s u_{jks}] = E[p_s e_{ijks}] = 0$$

- Generalized Least Squares

Further Econometric Specification

- Final estimates combine all grades and subjects

$$t_{ijks} = \alpha_{3E}D_{3Ei} + \alpha_{3M}D_{3Mi} + \alpha_{3S}D_{3Si} + \ldots + \alpha_{8E}D_{8Ei} + \alpha_{8M}D_{8Mi} + \alpha_{8S}D_{8Si} + \beta p_s + u_s + w_{js} + v_{jks} + e_{ijks}.$$

- $D_{grade/subject}$ – dummy, allows for different intercepts
- w_{js} – teacher specific effect (assumes same teacher for all subjects)
- v_{jks} – subject specific effect (conditional on having that teacher)
- u_s – school specific effect
- Selection and Attrition Bias

Impact on Average Test Scores

Table 4:Impact of Textbook Program on Normalized Test Scores

Dependent Variable	Normalized test score [a b]	Normalized test score [b]	Normalized test score minus pretest score [c]	Normalized test score minus pretest score [c]	Relative normalized test score [d]
	(1)	(2)	(3)	(4)	(5)
Textbook school	0.022 (0.086)	0.023 (0.105)	0.019 (0.053)	-0.039 (0.070)	0.036 (0.083)
Received a textbook					-0.009 (0.040)
Region and sex dummies	YES	YES	YES	YES	YES
Years exposed to textbooks	1	2	1	2	1
Grades	3-8	4-7	3-8	4-7	3-8
Observations	24,132	12,487	11,321	7,377	47,116

Notes: * significant at 10%, ** significant at 5%, *** significant at 1%. Standard errors in parentheses.

Robustness Check

Table 5: Selection and Attrition During Year One

	Textbook	*Comparison*	*Difference*
Drop outs and transfers from year 0 to start of year 1(20 schools)[a]			
Dropouts (%)	5.3	6.0	-0.7
Transfers out (%)	5.2	3.6	1.6
Composition of students, beginning of year 1 (50 schools)[b]			
Repeaters (%)[c]	21.9	26.0	-4.1***
Transfers in (%)	11.2	10.3	0.9
Students present at start of year 1 but not tested at end of year 1 (100 schools)[d]			
Year 1 (%)	26.0	26.3	-0.3
Year 2 (%)	31.0	33.3	-2.3***
Year 3 (%)	38.6	39.9	-1.2
Year 4 (%)	45.2	47.9	-2.7

Notes: * significant at 10%, ** significant at 5%, *** significant at 1%

Interaction between Initial Test Scores and Program Impact

Table 8: Normalized Test Scores as a Function of Treatment and Pre-Test Score

Dependent Variable	Normalized test score (year 1)	Normalized test score (year 2)	Normalized test score (year 1, IV estimates)	Normalized test score minus pre-test scores (year 1)	Relative normalized test score (year 1)
Textbook school	0.060	-0.014	-0.035	0.021	0.065
	(0.061)	*(0.083)*	*(0.066)*	*(0.060)*	*(0.078)*
Received a textbook					-0.006
					(0.047)
Pre-test score	0.429	0.345	0.839	-0.338	0.384
	(0.013)	*(0.016)*	*(0.042)*	*(0.016)*	*(0.007)*
Pre-test*Textbook school	0.057***	0.064***	0.144***	0.042**	
	(0.018)	*(0.022)*	*(0.055)*	*(0.021)*	
Pre-test*Received a textbook					0.070***
					(0.014)
Number of observations	11,342	7393	11,211	11,321	22,130

Notes: * significant at 10%, ** significant at 5%, *** significant at 1%

Other Education Outcomes

Table 10: Promotion, Repetition, and Dropping Out

	Lower Grades (3 – 7)		*Upper Grade (8)*	
	Textbook schools	*Comparison schools*	*Textbook schools*	*Comparison schools*
	(1)	*(2)*	*(3)*	*(4)*
Stayed, promoted	.53	.53		
Finished primary, no secondary			.32***	.41
Entered secondary			.43**	.38
Stayed, repeated	.21	.21	.16	.14
Dropped out	.17	.17	.01	.03
Transferred out	.08	.09	.06	.04
Number of students	5009	4838	447	440

Notes: * difference with comparison group significant at 10%, ** significant at 5%, *** significant at

Results

- NO evidence for program increase of the average student's test scores
- Program does not improve academic performance
- Program has no effect on drop out rates and high absenteeism

- BUT program increases test scores for students with high initial academic achievement
- Increase the probability for the 8th grade student to go on to secondary school

Why Many Children Left Behind?

- Children left behind in societies that combine:
  - A centralized, unified education system
  - The heterogeneity in student preparation associated with rapid expansion of education
  - Disproportionate elite power

Evaluation of the Evaluation Study

- Do we believe the results?
  - Yes → randomization
- Well designed evaluation given adequate data
- Remaining questions:
  - Potential reforms that could broaden access to learning
  - Reorientation of curricula
  - Tracking and vocational education
  - Remedial education

- Questions?
- Comments?

- THANK YOU FOR YOUR ATTENTION