If You Clothe Them, They Will Come: The Provision of School Uniforms and Educational Outcomes

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CIES Conference

March 2015

Gender Inequality in Education in Developing Countries

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- 24% of girls do not complete primary school, compared with 15% of boys (UNICEF 2004)

Various attempts to increase female participation in schooling

- Millennium Development Goals (MDGs): achieving universal primary education, promotion of gender equality

School Uniforms Required to Attend School in India

Mandatory Component of School Attendance

- Introduced by British in India to instill humility, discipline
- In USA, not compulsory but thought to remove visible difference in socioeconomic status, increase self-esteem

However, negative consequences of uniforms

- Schooling supposed to be "free," but uniform requirement increased effective cost of schooling, adding barrier to entry

Initiatives to provide uniforms

- Governments, NGOs implemented uniform-distribution programs for groups of children more likely to drop out
- Idea: reduce schooling cost, therefore increase likelihood that families enroll their children in school

Research Questions and Initial Results

Did the provision of free school uniforms in Indian schools affect student enrollment?

- School participation, measured by enrollment
- Differential impacts by student sex and caste

Estimating Education Impacts of Free Uniforms

- Many resources directed toward the distribution of school uniforms
  - Differences-in-differences empirical methodology
    - Compare schools that offer uniforms to similar schools
    - Verify robustness via sensitivity analysis

Initial Results: Presence of a uniform-distribution program substantially impacts educational outcomes

- Increased school enrollment of girls and lower-caste children
- Decreased enrollment of general-caste children

Outline

- Background on Uniform Distribution Program
- Data from Census of Indian Schools
- Methodology
- Main Results
- Summary, Next Steps

National Programme for Education of Girls at Elementary Level (NPEGEL)

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- Increasing community involvement, developing model schools, introducing "gender-sensitivity" into schools, providing early childcare facilities (task force launched September 2003)

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Tangible outcome: school-uniform distribution (AY 2005-06)

- Families may focus resources on most "productive" leaving behind vulnerable family members (Behrman 1997). Thus, reducing cost of schooling may remove enrollment barrier.
- Sometimes included "historically-disadvantaged" castes

Target groups: Girls in "educationally-backward" blocks (EBBs)

- Female literacy rate below the national average
- Gender gap in literacy above the national average

Large increase in free school uniforms distributed

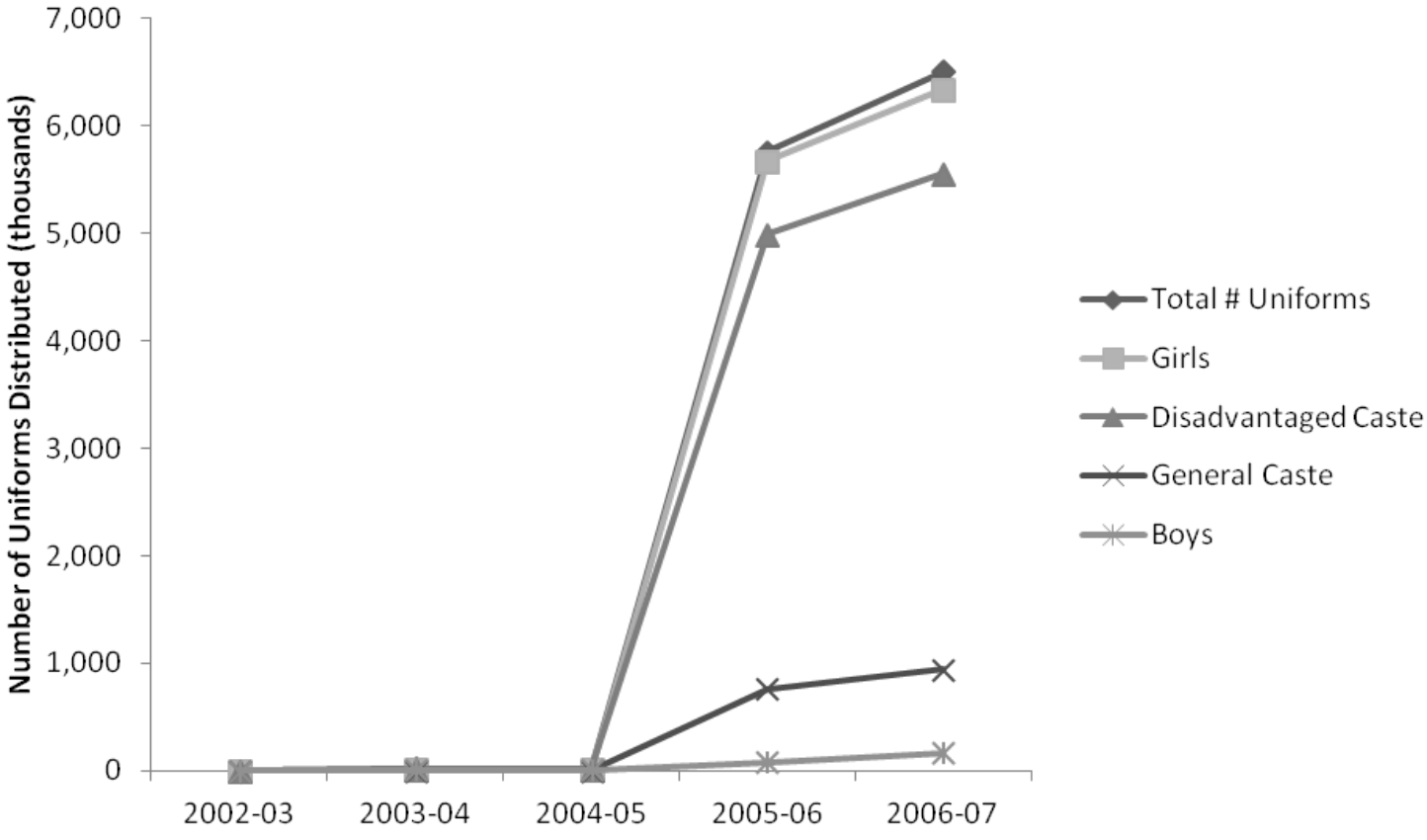

Figure : Number of Uniforms Distributed in Uttar Pradesh Over Time

Source: DISE Data

Evidence on the impact of providing school uniforms

Similar initiatives in other countries with mixed findings

Positive impacts on attendance (Evans *et al.* 2009):

- Decrease in dropout and absenteeism, increase in attainment
- Randomized trial within 12 schools in Kenya
- Uniforms distributed as part of selection for an international sponsorship program

Negative impacts on attendance (Hidalgo *et al.* 2010):

- Decrease in attendance
- Randomized trial across 101 schools in Ecuador
- Introduction to government program, implemented 1 year after announcement

Data: Census of Indian Schools

Annual census of Indian primary and upper-primary schools registered with the government

- District Information System for Education (DISE)
- Includes all government and some private schools

Main Variables Collected in DISE:

- School-level outcome by student caste and sex
  - Enrollment, measured 3-4 months into the academic year
- Presence of uniform program
  - Number distributed, by student sex and caste
    - Caste divided into two categories: "general" and "disadvantaged" (SC, ST, OBC)
- School-level characteristics (infrastructure, etc.)

Data Construction

DISE data publicly-available for years after 2005

- Initiated as a pilot in 1995
- Systematic data-collection established in 2001

Constructed large, continuous 5-year panel for 2002 - 2007

- Limit sample to Uttar Pradesh: 71 districts, 951 blocks
- 71,888 schools in sample
- 13% schools privately-managed
  - Most in C group. Only 22 private schools in T group.
- Server error in 2004 lost most infrastructure data

DISE reflects careful multi-state data-collection process

- Independent post-enumeration surveys conducted annually

Research Design: Differences-in-Differences

Treatment schools first offer uniform program in AY 2005-06

Comparison schools do not offer uniforms between 2002 - 2007

Basic differences-in-differences research design:

- Comparing post-treatment outcomes of the treatment group to pre-treatment outcomes of the treatment group, adjusting for changes in the comparison group that may have taken place in the treatment group in the absence of a uniform program

Basic identification assumption:

- Treatment schools and comparison schools would have changed similarly, on average, if not for the uniform program offered in treatment schools

Average Baseline Characteristics: Enrollment

	Treatment (Pgm in 2005) (1)	Comparison (No program) (2)	Alt. Treatment Group (Pgm in 2006) (3)
# of Schools	50,212	21,676	11,726
Total Enrollment	187.677	188.100	176.219
Girls' Enrollment	91.353	81.784	85.484
Boys' Enrollment	96.324	106.316	90.735
Disadvantaged Caste	144.378	118.633	129.032
General Caste	43.299	69.467	47.187
General Caste, Girls	21.386	30.682	23.049
General Caste, Boys	21.913	38.785	24.138
Disadvantaged, Girls	69.967	51.102	62.435
Disadvantaged, Boys	74.411	67.531	66.597

Notes: The Comparison group in column 2 includes schools that did not offer a uniform program between AY 2002-03 and AY 2006-07. The Alternative Treatment Group in column 3 compares Comparison schools in column 2 to schools that began to offer a uniform program for AY 2006-07. Sample is limited to 951 blocks in Uttar Pradesh.

Average Baseline Characteristics: Infrastructure

	Treatment (Pgm in 2005) (1)	Comparison (No program) (2)	Alt. Treatment Group (Pgm in 2006) (3)
# of Schools	50,212	21,676	11,726
Blackboard	0.965	0.926	0.958
Computer	0.018	0.037	0.018
Electricity	0.015	0.239	0.025
Library	0.729	0.578	0.689
Medical Checkup	0.536	0.440	0.475
Playground	0.597	0.704	0.610
Ramps	0.032	0.030	0.026
Latrine (any)	0.559	0.634	0.546
Tap Water	0.002	0.049	0.006

Notes: The Comparison group in column 2 includes schools that did not offer a uniform program between AY 2002-03 and AY 2006-07. The Alternative Treatment Group in column 3 compares Comparison schools in column 2 to schools that began to offer a uniform program for AY 2006-07. Sample is limited to 951 blocks in Uttar Pradesh.

Empirical Strategy

Initial regression:

$$Y_{sdt} = \beta U_{st} + \alpha_s + \lambda_{dt} + \gamma_t X_s + \epsilon_{sdt}.$$

- Outcome Y : Log(Enrollment + 1), Level enrollment
- School s, District d, Year t
- Presence of a uniform program U_{st}
- Control for baseline school characteristics, interacted with year

Identification assumption: schools offering a uniform program would have changed similarly to schools not offering uniforms, within the same district and with similar initial characteristics

β reports the average effect of a school offering a uniform program on outcomes across all student sexes and castes

Empirical Strategy: by Student Sex

Student sex-specific regression equation:

$$Y_{gsdt} = \beta_g U_{st} + \alpha_{gs} + \lambda_{gdt} + \gamma_{gt} X_s + \epsilon_{gsdt}$$

- School s, Student sex g, District d, Year t

Identification assumption: for each student sex, schools would have changed similarly within districts and within similar initial characteristics

Compare effect on girls and boys

- β_f and β_m report the average effect of a school offering uniforms on outcomes for female and male students.
- Can be compared to test whether effect is higher among girls

Empirical Strategy: by Student Caste

Student caste-specific regression equation:

$$Y_{isdt} = \beta_i U_{st} + \alpha_{is} + \lambda_{idt} + \gamma_{it} X_s + \epsilon_{isdt}$$

- School s, Student caste i, District d, Year t

Identification assumption: for each student caste, schools would have changed similarly within districts and within similar initial characteristics

Compare effect on students from different castes

- β_g and β_d report the average effect of a school offering uniforms on outcomes for students from "general" and "disadvantaged" castes.
- Can be compared to test whether effect is higher among "disadvantaged-caste" students.

Estimation Notes

Regression details

- Balanced panel of schools
- Cluster standard errors at school level

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Robustness checks

- Functional form of outcome variable (log(x + 1), log, levels)
- Restrict sample to villages with only one school
- Control for changes in school infrastructure after 2002
- Control for school-latrine construction in 2003

Substantial Impact on Enrollment

	Log(Enrollment + 1) (1)	Level Enrollment (2)
Panel A: Overall Impact		
Offered uniforms	0.045** (0.004)	8.807** (0.887)
R^2 statistic	0.116	0.080
Number of observations	359,440	359,440
Number of schools	71,888	71,888

Notes: Regressions in Panel A control for year-district fixed effects, school fixed effects, and initial school characteristics interacted with year. Robust standard errors are reported in parentheses with "**" denoting statistical significance at the 1% level. Sample limited to schools in 70 districts (951 blocks) in Uttar Pradesh, India.

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Number of observations	359,440	359,440
Panel B: By Student Sex		
Offered uniforms * Females	0.099** (0.005)	6.773** (0.441)
Offered uniforms * Males	0.023** (0.005)	1.934** (0.496)
R^2 statistic	0.106	0.086
Number of observations	718,880	718,880
Number of schools	71,888	71,888

Notes: Regressions in Panel B control for year-district-student sex fixed effects, school-student sex fixed effects, and initial school characteristics interacted with year and student sex. Robust standard errors clustered at the school level are reported in parentheses with "**" denoting statistical significance at the 1% level. Sample limited to schools in 70 districts (951 blocks) in Uttar Pradesh, India.

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Panel C: By Student Caste		
Offered uniforms * Disadvantaged caste	0.080**	12.410**
	(0.010)	(0.770)
Offered uniforms * General caste	-0.229**	-4.254**
	(0.012)	(0.639)
R^2 statistic	0.186	0.127
Number of observations	718,880	718,880
Number of schools	71,888	71,888

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Subgroup Analysis

	Log(Enrollment + 1) (1)	Level Enrollment (2)
Offered uniforms * Males	-0.233**	-2.377**
* General caste	(0.011)	(0.349)
Offered uniforms * Males	0.047**	3.429**
* Disadvantaged caste	(0.009)	(0.435)
Offered uniforms * Females	-0.167**	-1.961**
* General caste	(0.010)	(0.308)
Offered uniforms * Females	0.150**	9.010**
* Disadvantaged caste	(0.009)	(0.375)
R^2 statistic	0.179	0.128
Number of observations	1,437,760	1,437,760
Number of schools	71,888	71,888

Notes: Regressions control for year-district-student caste-student sex fixed effects, school-student caste-student sex fixed effects, and initial school characteristics interacted with year, student sex, and student caste. Robust standard errors clustered at the school level are reported in parentheses with "**" denoting statistical significance at the 1% level. Sample limited to schools in 70 districts (951 blocks) in Uttar Pradesh, India.

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	Log(Enrollment + 1) (1)	Level Enrollment (2)
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Sensitivity Checks

	Alt. Treat. Group: Offered uniforms in 2006 (1)	Villages with only one school (2)	Built school latrine in 2003 (3)	Log(Enroll) (4)
Uniform Program	0.022**	0.046**	0.045**	0.045**
	(0.006)	(0.006)	(0.004)	(0.004)
R^2 statistic	0.115	0.129	0.116	0.117
# of observations	167,010	207,825	359,440	359,440
# of schools	33,402	41,565	71,888	71,888

Notes: Dependent variable in columns 1-4 is the natural logarithm of enrollment plus one. The dependent variable in column 4 is the natural logarithm of enrollment. Robust standard errors are reported in parentheses with "**" denoting statistical significance at the 1% level.