Illusion of Gender Parity in Education: Intrahousehold Resource Allocation in Bangladesh

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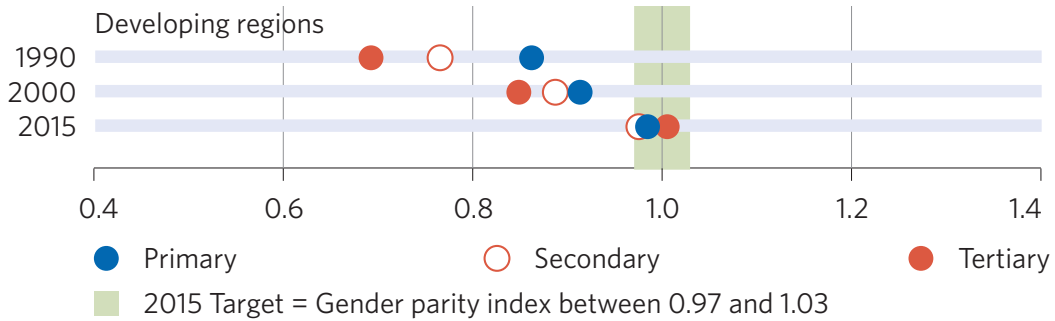
Introduction



* The gender parity index is defined as the ratio of the female gross enrolment ratio to the male gross enrolment ratio for each level of education.

- **Millennium Development Goal 3**: Gender parity in education.
- Globally, in 1990 for every 100 boys enrolled in the primary schools there were only 70 girls, which became 98 girls in 2015.

Gender Parity in Education (1)

- The 20th century witnessed a significant improvement in women's social status throughout the world, particularly in the West
  - Women's suffrage established in a majority of countries
  - Women's parliamentary representation significantly increased
  - More women working in traditionally male-dominated occupations
- This overall trend is also pronounced in education
  - Around the world, boys historically tended to have higher education than girls
  - But this completely changed with the achievement of Millennium Development Goal 3–elimination of gender disparity in all levels of education by 2015
  - e.g., 70 [98] girls per 100 boys in primary school in 1990 [2015]
  - Unlike some other MDGs that were deemed to be attained, this was achieved through the improvement in *all* regions of the world

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Gender Parity in Education (2)

- In a traditionally patriarchal society like Bangladesh, households tended prioritize sons' education over daughters
  - In Bangladesh, only 27% of secondary school students are girls in 1981
- However, this pattern changed dramatically over the last several decades
  - The female ratio in secondary school increased over time and exceeded 50 percent by 1998 in Bangladesh
  - In 2015, the net enrollment rate for girls has reached 61%, far higher than 54% for boys
- These achievements are surely commendable
- Nevertheless, is it enough to have gender parity only in enrollment?

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Introduction

- Girls consistently under-perform than boys.
  - Higher rates of dropout
  - Higher Grade repetition.
  - Low performance in Secondary School Certificate (SSC).
  - Gender gap in the higher secondary school enrollment
  - Gender gap in tertiary education (the share of female in tertiary education is only 38%).

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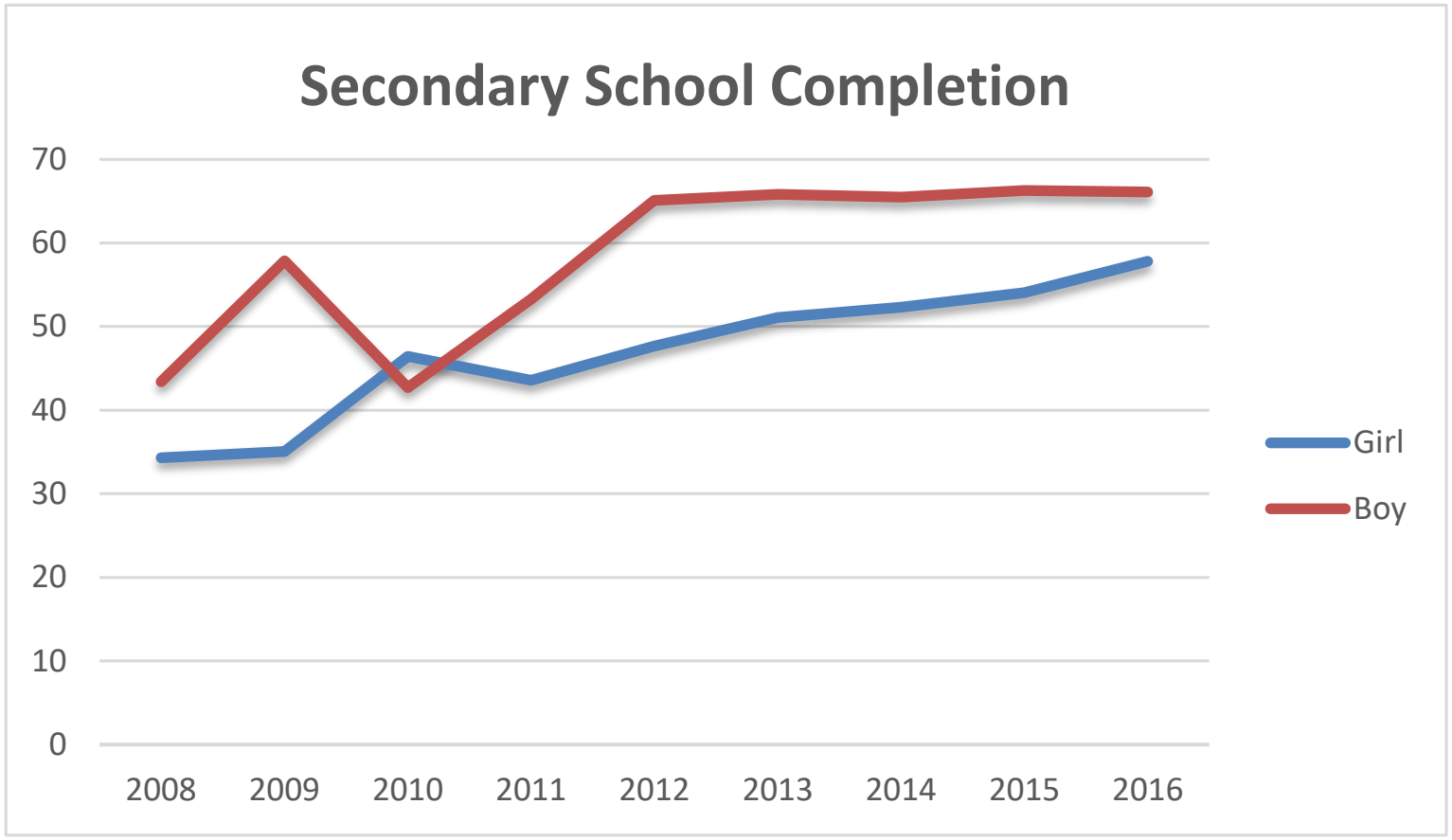

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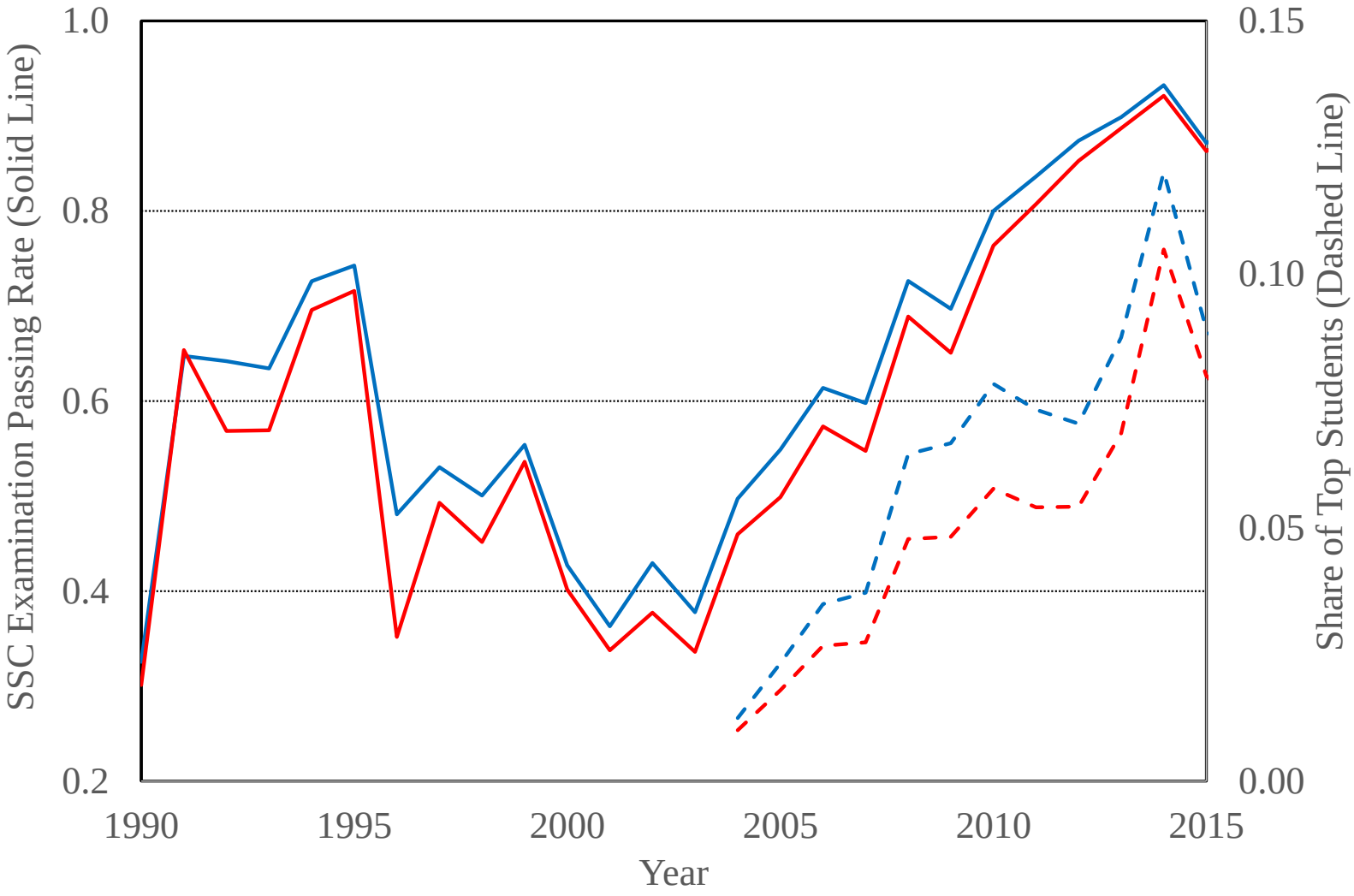
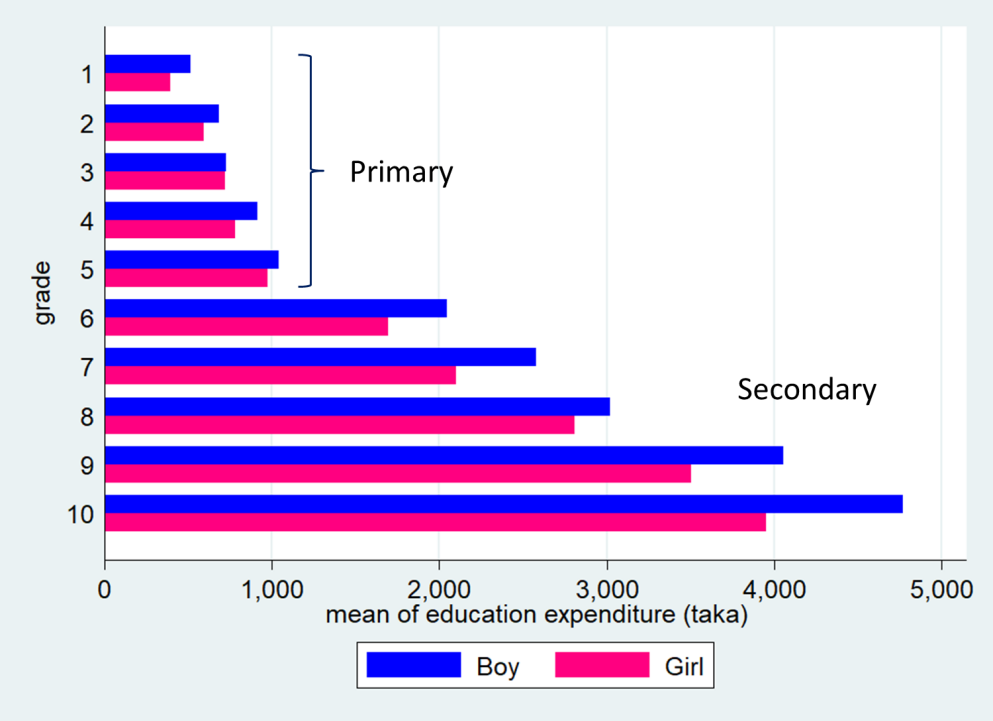


Education Expenditure



- Education expenditure by gender and grade in 2000 conditional on enrollment.

Main Research Questions and Preview of Main Results

- Is there a gender bias in the allocation of resources for the education of children within the household in Bangladesh?
  - Yes.
- Did this bias change over time?
  - Contra-directional bias: pro-female in enrollment but other indicators are still pro-male.
  - Illusion of gender parity.
- The role of CCT?
  - CCT conditionality pushed gender parity in enrollment, however, could not mitigate the gender gap in other dimensions.

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Data

- Household Expenditure Survey (HES) 1995
- Household Income and Expenditure Survey (HIES) 2000, 2005 and 2010
- Detailed education expenditure for each child in the household is available.

Three-Part Model

1. Enrollment decision (d).

$$d = \mathbf{1}(x_d'\beta_d + \epsilon_d > 0) \tag{1}$$

2. Expenditure decision (y) conditional on $d = 1$.

$$\log(y) = x_y'\beta_y + \epsilon_y \tag{2}$$

3. Core component share decision (s) conditional on $d = 1$.

$$s = \begin{cases} 0 & s^* \leq 0 \\ s^* & 0 < s^* < 1 \\ 1 & s^* \geq 1 \end{cases} \tag{3}$$

where $s^* = x_s'\beta_s + \epsilon_s$ is the latent variable for s.

- Estimation: MLE with the assumption that $(\epsilon_d, \epsilon_y, \epsilon_s)^T$ has a trivariate normal distribution, particularly interdependence allowed.

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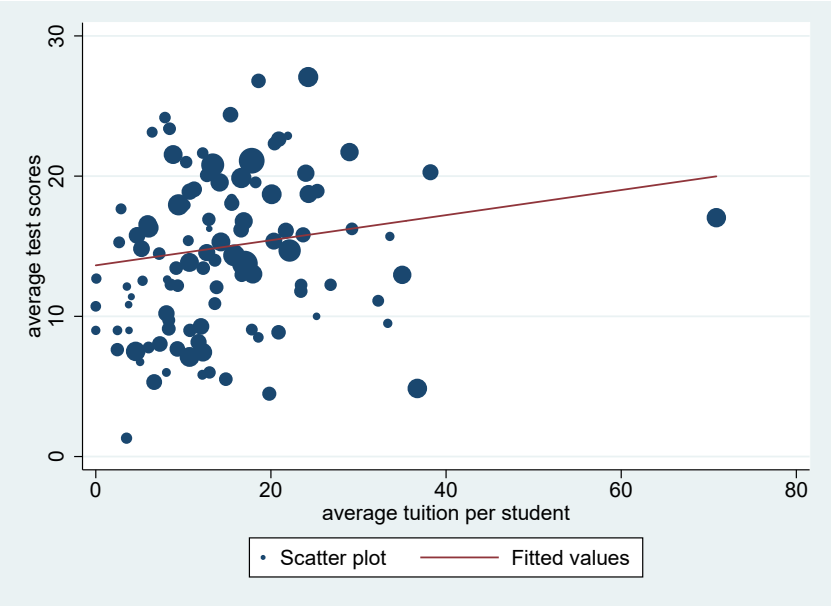
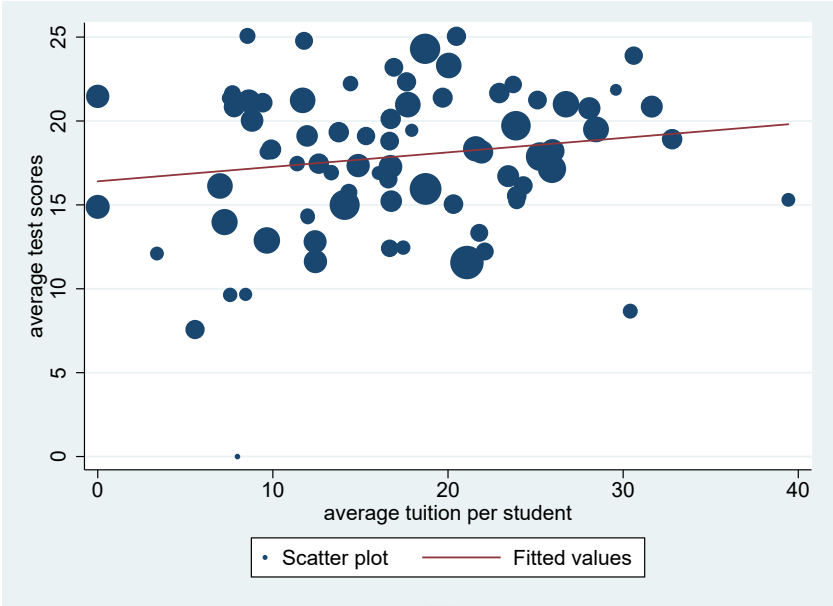
Core Component

- Core: tuition, home tutor, material
- Criterion: directly related to quality of education
- Importance of home tutor is reasonably well documented.
  - Especially for compulsory subjects: Mathematics and English.
  - Raising trend: 1995, about 55% to 74% in 2010.
- Tuition reflects the quality of education.
  - Competitive force would create a positive relationship
  - Some evidence at the primary level.





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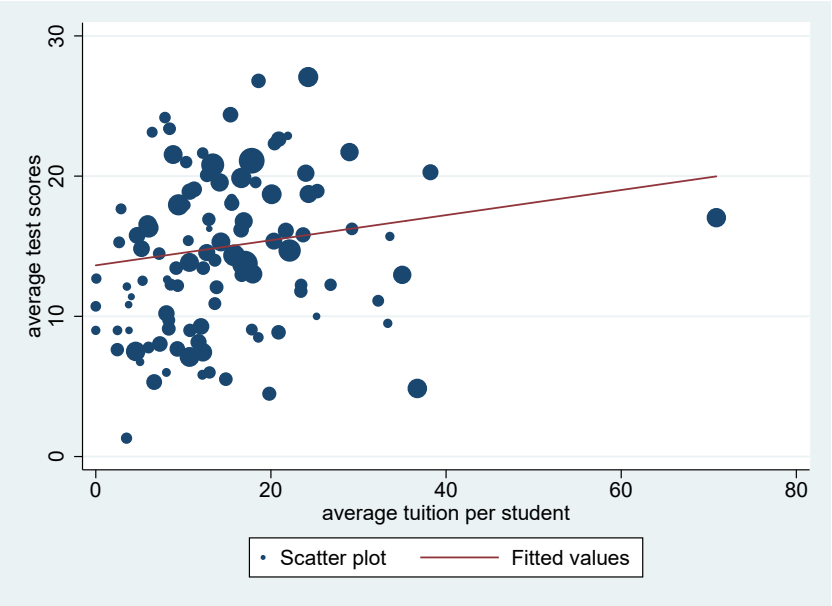

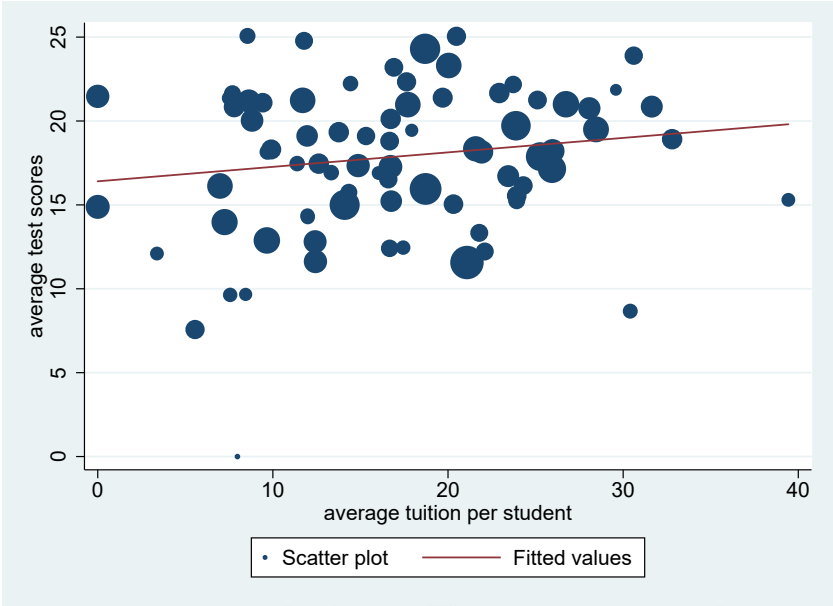

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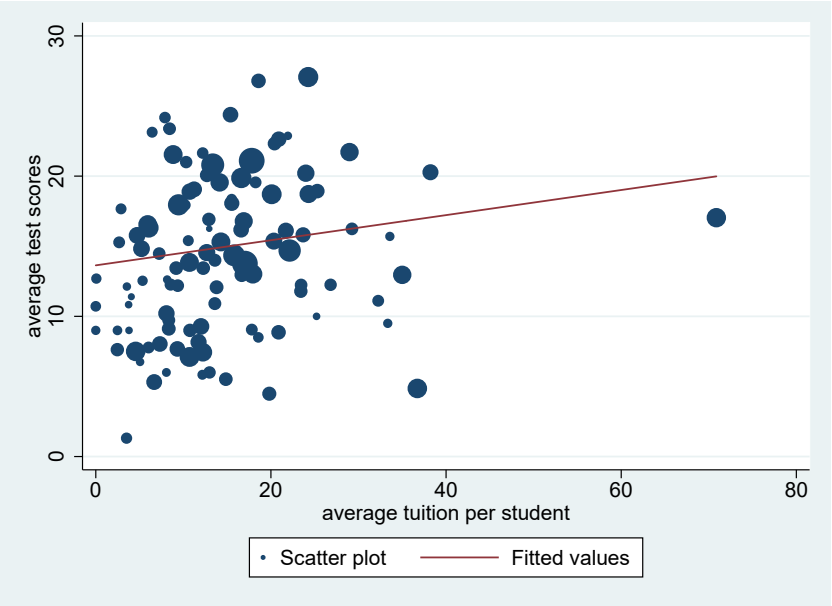

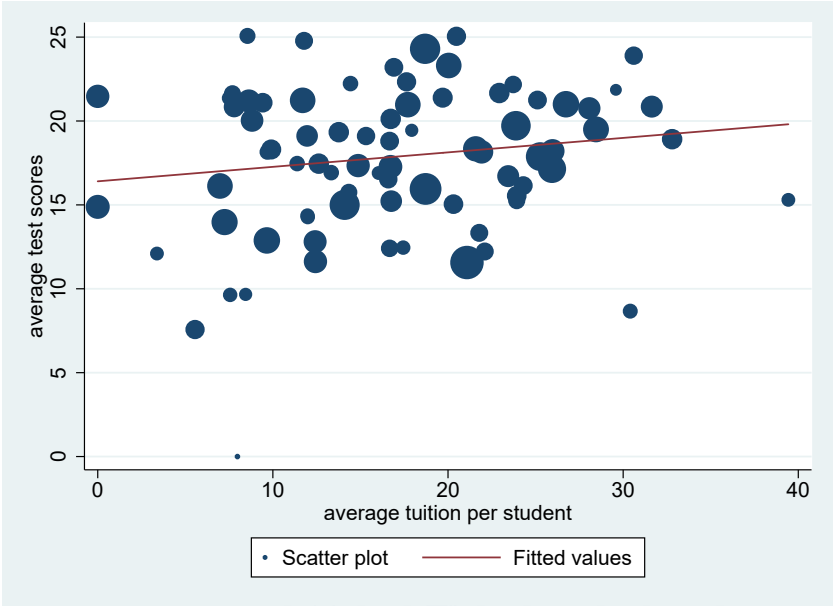

Main Empirical Results

Girl Coef.	d	Cond y	Cond s
1995	-0.001	-0.085***	0.001
2000	0.339***	-0.174***	-0.082***
2005	0.291***	-0.154***	-0.071***
2010	0.289***	-0.131***	-0.067***

***,** ,* denote statistical significance at 1, 5, 10 percent levels. Standard errors clustered at household level are reported in parentheses.

- The three-part model was estimated for each year and for each of primary and secondary age groups.
- Higher conditional enrollment for girls.
- But lower conditional expenditure and lower core share for girls.
- Equation by equation regressions (i.e., under independence assumption) yield similar, but weaker, results.
- Splitting the regressions by urban and rural areas also yield similar results.

Analysis with Pooled Sample across Years

Coef.	d	Cond y	Cond s
Girl	0.029	-0.097***	-0.032***
Year 2000	-0.036	0.224***	-0.017
Year 2005	-0.042	0.400***	-0.037***
Year 2010	-0.161***	0.541***	-0.054***
Girl $\times$ Year 2000	0.317***	-0.059	-0.050***
Girl $\times$ Year 2005	0.259***	-0.072*	-0.034**
Girl $\times$ Year 2010	0.260***	-0.038	-0.032**
Obs.	21732	21732	21732

***,** ,* denote statistical significance at 1, 5, 10 percent levels. Standard errors clustered at household level are reported in parentheses. Year 1995 is the base year for comparison in these regressions.

- The three-part model was estimated simultaneously for all years for each of primary and secondary age groups.
- The pattern that consistently appears is that the enrollment decision has become more pro-female.
- However, at the secondary level, the strong pro-male bias in conditional expenditure and core share did not change much.

Analysis by Education Expenditure Components

Taka	Secondary age group			
expenditure of	1995	2000	2005	2010
Core	-178.7***	-284.1***	-259.8***	-649.9***
Tuition	-228.9***	-488.0***	-694.6***	-669.0***
Home Tutor	-142.7	-199.1*	-100.1	-578.8***
Material	1.7	-5.4	-23.1	-14.9
Peripheral	6.4	31.0	-45.0	59.8
Admission	8.8	-20.5	-15.0	-26.9
Exam	6.9	-2.3	9.6	-1.0
Uniform	70.0***	86.5***	25.3	49.1*
Meal	-310.6	44.9	-52.4	-59.5
Transportation	9.2	-7.8	57.7	723.8***
Obs	1798	1885	2579	3172

Marginal Effects

Year		E(d)	E(y)	E($y|d=1$)	E(ys)	E($ys|d=1$)
1995	Girl	-0.001	-40.5	-181.9***	-7.8	-110.5
2000	Girl	0.126***	152.5***	-224.7***	11.5	-312.7***
2005	Girl	0.114***	145.6***	-416.6***	-0.4	-367.3***
2010	Girl	0.116***	313.0***	-616.8***	3.2	-604.9***

***,** ,* denote statistical significance at 1, 5, 10 percent levels. Standard errors obtained by simulation with 100 replications are reported in parentheses. Conditional expectation is fitted only for subsample of children with positive education expenditure, and unconditional one is fitted for full sample.

- There is pro-female bias in enrollment.
- Unconditionally, total education expenditure is pro-female, if anything.
- Unconditionally no bias but conditionally strong pro-male bias in the core education expenditure.

Taking CCT (FSPs) into Account

- Clean identification is difficult
  - Assignment of FSPs is non-random.
  - Data for pre-FSPs period is limited.
- Use roll-out information of FSP.
- Coverage Intensity: Girl recipient ratio (GRR), the ratio of recipients among eligible girls in the district, as an exogenous source of variation
- Diff-in-diff approach to identify the gender gap before and after the roll-out of FSPs.
- FSPs did not help narrow down the gender gap in conditional expenditure or core share.

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FSPs Impact on Quantity of Education

HIES2010	**Years of Education**		**Enrollment**	
Coef.	(1)	(2)	(3)	(4)
Girl	-2.000***	-1.813***	-0.167***	-0.142***
FSPCover	-0.358	0.144	-0.044	0.003
Girl × FSPs cover	1.876***	1.432***	0.190***	0.159***
Obs	24,912	24,912	162,056	162,056
Mean of depen var.	4.410	4.410	0.335	0.335
HH fixed effects	Y	N	Y	N

***,** ,* denote statistical significance at 1, 5, 10 percent levels. Standard errors clustered at household level are reported in parentheses.

Controlling for the FSPs intensity

Coef.	d	Cond y	Cond s
	(1)	(2)	(3)
2000			
Girl	0.228**	-0.236***	-0.018
FSP	.	0.149***	-0.037**
GRR	0.769**	-1.299***	0.247**
Girl $\times$ GRR	0.378	-0.100	-0.138*
2005			
Girl	0.110	-0.107	-0.007
FSP	.	0.075**	-0.025***
GRR	0.470	-1.004***	0.020
Girl $\times$ GRR	0.656**	-0.308	-0.184**

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Secondary School Graduation on Time: Year-by-Year Regressions

	1991	**1995**	**2000**	**2005**	**2010**	**2005**	**2010**
Coef.	(1)	(2)	(3)	(4)	(5)	(6)	(7)
			Panel A: All individual aged 16-20				
Girl	-0.043***	-0.053***	-0.043***	-0.014	-0.005	0.004	0.065**
L(GRR)	.	.	.	.	.	0.242***	0.699***
Girl × L(GRR)	.	.	.	.	.	-0.064	-0.261***
Obs	3,043	3,752	3,988	5,055	5,316	5,055	5,316
			Panel B: All primary graduates aged 16-20				
Girl	-0.019	-0.081***	-0.063***	-0.022*	-0.024*	0.032	0.088***
L(GRR)	.	.	.	.	.	0.345***	0.835***
Girl × L(GRR)	.	.	.	.	.	-0.201**	-0.425***
Obs	1,223	2,113	2,621	3,716	4,089	3,716	4,089

***,** ,* denote statistical significance at 1, 5, 10 percent levels. Standard errors clustered at household level are reported in parentheses. L(GRR) refers to lagged GRR at division-age level five years before the survey. Coefficients using OLS regression are reported.

Summary

- Contra-directional gender gaps.
  - Pro-female in enrollment.
  - Pro-male in conditional expenditure and quality education component share.
  - Crowding-in in the class room: TSR 1:42 in 2010 (it was 1.30 in 1990).
- Gender gap remains in other dimensions despite FSP.
- Illusion: Narrowly defined gender parity in education is not the right way to go.
- More efforts are called upon.

Thank you!