

# Madrasas and NGOs: Complements or Substitutes?

## Non-State Providers and Growth in Female Education in Bangladesh

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## Abstract

There has been a proliferation of non-state providers of education services in the developing world. In Bangladesh, for instance, Bangladesh Rural Advancement Committee runs more than 40,000 non-formal schools that cater to school-drop outs from poor families or operate in villages where there's little provision for formal schools. This paper presents a rationale for supporting these schools on the basis of their spillover effects on female enrollment in secondary (registered) madrasa schools (Islamic faith schools). Most madrasa high schools in Bangladesh are financed by the state and include a modern curriculum alongside traditional religious subjects. Using an establishment-level dataset on student enrollment in secondary schools and madrasas, the authors demonstrate that the presence

of madrasas is positively associated with secondary female enrollment growth. Such feminization of madrasas is therefore unique and merits careful analysis. The authors test the effects of the Bangladesh Rural Advancement Committee primary schools on growth in female enrollment in madrasas. The analysis deals with potential endogeneity by using data on number of the number of school branches and female members in the sub-district. The findings show that madrasas that are located in regions with a greater number of Bangladesh Rural Advancement Committee schools have higher growth in female enrollment. This relationship is further strengthened by the finding that there is, however, no effect of these schools on female enrollment growth in secular schools.

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Non-State Providers and Growth in Female Education in Bangladesh**

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## 1. Introduction

Despite the need to provide public services in hard to reach poor areas, governments in many part of the developing world are stymied by fiscal and institutional constraints (World Bank 2003). Even if it is possible to find the public funds to hire and post public sector teachers and doctors in poor rural villages and urban slums, the efficacy of such public provision is often severely compromised. For example, absenteeism of service providers is a major problem in many rural areas (Chaudhury et al 2006). Even if the providers bother to show up, the quality of their services in terms of impact on schooling and health outcomes is often weak. One possible way of circumventing bureaucratic inertia and government capacity constraints is by contracting-out services to NGOs and private providers (Chaudhury and Devarajan 2006). Cambodia has had some success with this approach. For example, despite considerable international donor funding in Cambodia to resurrect the public health care system in the aftermath of the reign of the Khmer Rouge, delivery of health services by the public system continued to suffer from severe institutional failures (e.g., high levels of doctor absenteeism, widespread pilfering of medicines). Recognizing that these structural problems would be difficult to address within the bureaucratic confines of the public sector, the Health Ministry took a pragmatic decision to hand over health system management in several districts to NGOs backed by public financing. Rigorous evaluation has shown that districts managed by the NGOs are much more successful in improving health services (and health outcomes) than districts run by the government.

In Bangladesh, domestic NGOs have taken the lead in providing services in underserved sectors. Bangladesh has some of the largest and most dynamic education and health NGOs in the developing world. Some have evolved to multi-service entities, such as the Bangladesh Rural Advancement Committee (BRAC), which successfully runs specialized schools for formerly out-of-school children, has an extensive system of health clinics, and provides micro-credit to the poor (besides running chicken cooperatives, handicraft boutiques, commercial lending operations, etc). BRAC is now the largest provider of education services after the government in Bangladesh. BRAC runs over 40,000 non-formal schools which cater to school-drop outs from poor families or operate in villages where there's little provision for formal schools. The board-base support for NGO activities in Bangladesh is because of their pro-poor service delivery. NGOs like BRAC not only perform the traditional role of providing the rural poor access to credit, they are heavily involved in the provision of various public goods such as health and education. While the government has not contracted-out the services of these major NGOs, they have allowed them to operate without too much interference--as long as they refrain from explicit political activity (for example, one NGO, Proshika, was sanctioned by the government for being too closely associated with the opposition party). In fact, the major NGOs have resisted any explicit contractual arrangements with the government. They are to some extent contracted-out by the international donor community (particularly bilateral donors) which provides considerable funding directly to major NGOs. Some of these NGOs might not be able to function at full capacity if there is a significant reduction in donor funding.

There are very few studies comparing the performance of NGO schools and other educational providers<sup>1</sup>. A notable exception is Sukontamarn (2005) who uses data on BRAC schools from Bangladesh and examine the impact of the entry of NGOs in primary education on female enrollment<sup>2</sup>. Sukontamarn finds that the entry of BRAC schools significantly increases girls' enrollment as compared to boys. Cohorts which are exposed to BRAC schools have higher probability of enrollment and the effect operates mainly through female students. However, besides this, we are not aware of any other study on the relative performance of NGO schools in Bangladesh. Most importantly, there is no study which has examined the potential spillover effects of NGO schools on other outcomes such as female participation in secondary schools. Bangladesh has recently achieved the remarkable fit of gender parity in secondary enrollment. Therefore, understanding the determinants of growth in female enrollment is extremely important for other countries who are trying to fulfill the MDG target of closing gender gap in secondary education.

Bangladesh provides a unique setting to study the impact of primary, NGO-run schools on female enrollment in secondary schools for another reason. There are a large number of Islamic faith schools or madrasas for whom, like NGO schools, altruistic motivations are the principal determinants of location decisions. On one hand, both serve children from socially underprivileged families. On the other hand, they have conflicting ideologies and are known to target different gender groups. In other words, madrasas oppose NGO activities and have historically educated boys. For instance, registered madrasas in Bangladesh during the 1980s were predominantly boys-only with only 7% of the total enrolled students being female. However, this has changed in over just one decade. By the year 2000, 46% of the students in registered secondary madrasas in the country were girls.

Such dramatic feminization of registered secondary madrasas has been attributed to introduction of a conditional cash transfer scheme which target female students in secondary schools and madrasas. Female enrollment has increased more than five-fold since 1994 when the conditional cash transfer scheme was introduced. However, the last two decades has also seen a rise in NGO schools at the primary level and given the current controversy over madrasa reform, knowledge of any externalities arising from NGO schools is extremely important from policy point of view. In this study, by way of documenting the process of feminization of madrasas, we examine the impact of BRAC schools in the context of the recent rise in female enrollment in government recognized secondary madrasas.

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<sup>1</sup> In general, evaluation of the performance of national NGOs is rare. As pointed out by Barr and Fafchamps (2005), there have been very few quantitative evaluations of entire countries' NGO sectors so that little is known about the motivations and performance of NGOs in general. Existing published research on Bangladeshi NGOs (e.g. Gauri and Galef, 2005; Fruttero and Gauri, 2005) is largely descriptive; they do not test relative performance of NGOs with other service providers.

<sup>2</sup> Additional evidence on quality of BRAC schools is also provided by Asadullah, Chaudhury and Dar (2007). Studies on the relative performance NGO schools for other countries include Arif and Saqib (2003) and Khan and Kiefer (2007). Both studies utilize sample survey data from Pakistan.

To test for the presence of such externalities, we study the impact of NGO schools on secondary female enrollment growth in unions, an administrative unit bigger than village but smaller than sub-district<sup>3</sup>. First, we show in the context of regional growth in secondary (grades 6-10) female enrollment that the number of madrasas in a union is positively associated with growth rate even after controlling for sub-district fixed effects, initial enrollment level and various characteristics of registered secondary educational institutions. Next, we test how female enrollment growth in secondary madrasa is affected by the presence of BRAC schools. We find that madrasas located in unions with greater the number of BRAC schools have higher enrollment growth, once we correct for endogeneity of the number of BRAC schools in the union.

Our findings point towards a new explanation for the recent boom in female enrollment in the madrasa sector. More importantly, they yield a new policy measure to reform madrasas in Muslim-majority countries. Traditional religious primary schools in a community may become redundant with the opening of NGO schools. But the positive effect of BRAC schools on female enrollment growth, we argue, represents a form of vertical externality: Bangladeshi regions with higher stock of BRAC schools have higher number of girls who are future entrants to secondary schools. This, combined with the introduction of a female secondary stipend (FSP) scheme, may have stimulated secondary school madrasas to open their gates to female students.

The rest of the paper is organized as follows. Section 2 provides a comparison between the current government system of education and the system used by BRAC. Section 3 discusses the data and methodology. Section 4 presents the main results and section 5 concludes.

## 2. Background

The Bangladeshi education sector is characterized by presence of different types of schools which vary significantly across primary and secondary level. At the primary level, there are 11 types of schools. There are currently 37,000 government primary schools and 6000 registered madrasas in Bangladesh. Government schools are concentrated mostly in urban centers, resulting in a lack of educational access to the majority of children in the country who live in rural areas. This has motivated NGOs to set up schools so that children living in under-provided areas can acquire education. Today, there are over 400 NGOs in Bangladesh today involved with providing basic education. The number of NGO schools has increased four times since the early 1990s and now comprised 8.5% of the educational system in Bangladesh; most of these NGO schools are widely considered to be more effective than government schools.

BRAC is the largest NGOs in the country working on primary education and account for 76% of all NGO primary schools. The Non-Formal Primary Education Program of

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<sup>3</sup> Administratively the nation is divided into 6 divisions, 64 districts, 400+ sub-districts (*upazilas*), 4000+ unions and cluster of household (*mouzas*). A union on average comprises of 15 villages. A mouza may or may not be greater than a village but is always smaller than a union.

BRAC started in 1984 with only 22 pilot schools. BRAC's education program began in rural areas where there were no alternative education options<sup>4</sup>. Today there are more than 40,000 BRAC schools covering 50,000 out of 84,000 Bangladeshi villages.

BRAC schools have a number of hallmarks. First, they cater to children who have never attended school as well as those who have dropped out of government or other schools. Similar to madrasas, BRAC (instead of the child's family) bears most of the educational expenses<sup>5</sup>. A majority of the students in BRAC primary schools are from the poorest 20% of the population. Second, 70 percent of children attending BRAC schools are female. Third, 97% of teachers in BRAC schools are married women and come from the same village where the school is located.

Today, BRAC schools are regarded by many as a success story. First, BRAC students are found to have higher test scores when compared to students from government primary schools (Sukontamarn, 2005). Second, 90% of students who complete their primary schooling through BRAC continue into secondary education. Third, BRAC schools have been instrumental in retaining female students from poorer families in school (Sukontamarn, 2005).

At the secondary level, on the other hand, there is no NGO school. Rather, education is provided by government schools, aided schools and madrasas. According to government census records for the year 2003, there are 8,406 institutions at post-primary level against 17,389 secondary schools constituting approximately 26% of all post-primary education and 32.5% of all secondary educational institutions respectively. Madrasa enrollment accounts for 15% of total PPE enrollment<sup>6</sup>. Most madrasa education takes place in rural locations and rural learners account for 90.9% of madrasa enrollment, compared with around 77% in mainstream education.

There is an important stylized fact about the secondary madrasa sector in Bangladesh. More than 90% of the registered secondary madrasas in Bangladesh today admit girls and half of the students enrolled in these schools are girls (Asadullah and Chaudhury, 2007). This 'feminization' of the secondary madrasa system in Bangladesh is a recent phenomenon. Female enrollment boom in religious schools has been driven by the conversion of formerly all-male, un/registered madrasas into registered centers for co-education. This reflects the confluence of two hybrid (supply and demand side) conditional cash incentive schemes. First, the government took over responsibility over teacher pay in madrasas conditional upon formal registration and introduced of modern subjects (math, science, etc). Then the government introduced the FSP project which allowed rural females to go to any registered school (public, private, religious) of their choice (payment was conditional upon enrolling in secondary school). Furthermore any

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<sup>4</sup> However, since 1992 BRAC additionally began constructing schools in urban slums.

<sup>5</sup> Whilst BRAC bears majority of the expenses, the cost of maintaining the classrooms are the responsibility of the community. Communities are involved in deciding locations and schedules of schools as well as providing labor and materials to build schools.

<sup>6</sup> In contrast, Madrasas in Pakistan account for less than 1% of total school enrollment (Andrabi et al., 2006).

type of school participating in this project received government funding depending upon the number of females enrolled in the school. This additional incentive induced many formally all-male madrasas to open their gates to female students.

The modernization scheme originally initiated in the early 1980s has succeeded in converting a large pool of orthodox, all-male madrasas which previously operated with own funds and eschewed teaching of modern subjects. Secondary madrasas therefore grew in numbers in Bangladesh in two distinct phases. The modernization scheme of 1980s saw a surge in numbers between 1980 and 1994. In post-1994 years, growth was driven mostly via enrollment of female students and allegedly by transforming formerly all-boy madrasas into centers for co-education. This feminization of modernised madrasas in Bangladesh dispels the common view that the rise of the religious education sector is explained away only by a lack of public provision<sup>7</sup>.

These features of the religious education system in Bangladesh provide important policy leverage in harmonizing schooling outcomes among students from diverse educational backgrounds. This scenario is at stark contrast with other countries in South Asia with large Muslim populations (and elsewhere), where most religious seminaries are of traditional orthodox types, predominantly single-sex (boys only), and still untouched by any significant changes in curriculum. Therefore, understanding the nature and process of female enrollment growth in madrasas is important to correctly inform the current debate over madrasa reform in other South Asian countries such as India and Pakistan.

Although the importance of the FSP scheme in feminizing the madrasa sector is well-acknowledged, relatively less is understood about the nature of growth of female enrollment in madrasas. Given that these secondary madrasas mostly rely on primary schools and primary madrasas for the supply of new students, it is of policy interest to examine whether female enrollee of madrasas come from secular education sector, in particular NGO schools which promote secular values, cater to children from poorer households and has an explicit agenda to empower rural women. Table 1 presents data on the type of primary school attended by grade 8 students in a sample of 221 secondary schools and 94 madrasas drawn from rural Bangladesh<sup>8</sup>. 9% of the female secondary students attended NGO schools for primary education which is consistent with the fact that BRAC schools predominantly educate girls. More importantly, madrasa and school girls are equally likely to have attended NGO schools for primary education.

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<sup>7</sup> The relevance of this hypothesis for Pakistan is also questioned by some researchers (e.g. see Andrabi et al., 2006).

<sup>8</sup> The survey was conducted in the year 2005 in 60 rural unions. For a detailed description, see Asadullah et al. (2007).



Table 1: Raw probability of enrollment in secondary school/madrassa by gender and primary school type

Primary school attended	Female		Male		Female, madrassa		Female, school		Male, madrassa		Male, school	
	Mean	sd	Mean	sd	Mean	sd	Mean	sd	Mean	sd	Mean	sd
<b>Government</b>	0.65	0.48	0.66	0.47	0.49	0.50	0.68	0.46	0.42	0.49	0.73	0.45
<b>Private/aided</b>	0.19	0.39	0.19	0.39	0.13	0.33	0.20	0.40	0.12	0.33	0.21	0.41
<b>Madrassa</b>	0.04	0.19	0.06	0.24	0.17	0.38	0.01	0.07	0.26	0.44	0.01	0.10
<b>NGO</b>	<b>0.09</b>	<b>0.28</b>	<b>0.04</b>	<b>0.19</b>	<b>0.09</b>	<b>0.28</b>	<b>0.09</b>	<b>0.28</b>	<b>0.03</b>	<b>0.18</b>	<b>0.04</b>	<b>0.19</b>
<b>Secondary school</b>	0.03	0.18	0.04	0.19	0.11	0.32	0.01	0.11	0.14	0.35	0.01	0.08
N	5273		3202		1057		4216		696		2506	

Source: Author's calculation based on sample survey data.

The finding that NGO school graduates make up for a significant fraction of secondary school students today is an important finding: it suggests that a good number of female students who studied in NGO-run primary schools continue into secondary education. But the fact that NGO school graduates today penetrate madrasas and schools *pari passu* is important considering the fact that madrassa and NGO schools pursue conflicting ideologies and just a decade ago secondary madrasas were seldom open to female students. As a matter of fact, greater NGO school activities could have created pressure on nearby secondary madrasas in the community which have historically catered to boys only to open up and absorb female students. Prospect for such vertical externality is high because NGOs and Islamic faith schools both serve marginalized communities where provision for state aided education is relatively scarce. Despite similar motives, NGOs and Islamic schools in Bangladesh operate in different levels of the education system. NGO schools are exclusively concentrated in the primary sector whereas the registered madrasas operate in both primary and secondary sectors<sup>9</sup>. Therefore, while BRAC run schools compete with primary madrasas for students, their presence in the community can create significant externalities for secondary madrasas. Moreover, given that BRAC schools primarily cater to female students, any potential spillover effects on religious schools will have to operate through enrollment of female students in madrasas. If so, evidence of such externalities has important policy implications as promoting female education and closing gender gap in secondary enrollment is a key MDG target.

To formally, test this proposition, we need data on enrollment in madrasas across villages with and without NGO schools along with information on when the NGO school was set up. In the absence of such data, we test this proposition by looking at female enrollment data (aggregated at school level) and see how this correlates with the presence of BRAC schools in the community. This is discussed in the next section.

<sup>9</sup> There are about 6000 primary registered madrasas as opposed to 8404 secondary madrasas in Bangladesh.

### 3. Data and methodology

The existing census (cross-sectional) dataset on schools and madrasas contains annual enrollment figures spanning the period 1999-2003<sup>10</sup>. The dataset includes information on all secondary educational institutions (25,795 in total) in the 64 districts of Bangladesh. We use the 2003 round of the Census dataset, which provides information on all registered religious and secular post-primary educational institutions. Having sex and grade-specific data on enrollment in each secondary school for the years 1999-2003, it is possible to study the supply-side determinants of growth in total number of girls enrolled at the regional as well as school/madrasa level. We further merge these data to two unique datasets which provide union-level information on the number of BRAC schools and thana-level information on the number of BRAC branches and female members. Both of the latter datasets provide information on all BRAC schools and branches in the country.

Our objective in this paper is to test whether (i) presence of madrasas in a region (i.e. union) bolsters enrollment of female students and if so, (ii) whether madrasas located in regions with more BRAC schools have seen a higher growth in enrollment of female students<sup>11</sup>. Given the availability of data on annual student enrollment for four years, we do so by analyzing the determinants of enrollment growth across Bangladesh regions or unions (which are on average a cluster of 15 villages) in a simple cross-section regression framework. We follow the empirical income growth literature and specify a regression model of female enrollment growth. To capture convergence effect, we allow growth during 1999-2003 to depend on enrollment at the beginning of the period. Since we also want to know school type effects, our growth equation includes the level of school availability by type in 1999 and changes therein by 2003. This yields the following reduced form model of enrollment growth at the region (i.e. union) level:

$$G_{it} = \beta_0 + \beta_1 E_{t-4} + \beta_2 X_{t-4,i} + \beta_3 \Delta X_{it} + \beta_4 W_{it} + \omega_t + \nu_{it} \quad (1)$$

where,

$G_{it}$  = Regional growth rate of female enrollment during 1999-2003

$E_{t-4}$  = Regional enrollment in 1999

$X_2$  = Mean characteristics of educational institutions of the region in 1999

$\Delta X_{it}$  = change in # of schools and madrasas between 1999 and 2003

$W_{it}$  = Other attributes of the union (e.g. whether an urban region; average age of school/madrasa in the region; presence of a government school in the region)

$\omega_t$  = Sub-districts (*Upazila*) fixed-effects

$\nu_{it}$  = iid random error

t = time index

i = union index

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<sup>10</sup> The Census has been conducted by the Ministry of Education, Government of Bangladesh.

<sup>11</sup> As many as 24% (N=1179) of the unions in Bangladesh do not have a secondary madrasa.

A common problem in equation (1) is that of endogeneity of number of madrasas admitting females. Presence/emergence of co-educational or girls-only madrasas could be driven by cultural factors: regions where there are less cultural restrictions on female mobility are more likely to see emergence/presence of “liberal” religious schools that also encourage education of girls. We address the concern over identification of religious school effect using sub-district fixed-effects. This requires sufficient sub-district level variation in norms and/or a dataset with a large number of sub-districts. In the year 2003, there were 486 sub-districts (upazilas) in Bangladesh and our dataset contained all secondary schools in the country. Within the context of Bangladesh, socio-economic differences are usually across regions and districts - therefore, we can study growth in enrollment at the union level controlling for unobservables in a fixed-effect framework.

For our purpose, we create a dataset aggregated at the union level. Appendix Table 1 provides a summary of key variables. The period of 1999-2003 has seen exceptional growth in total female enrollment in secondary schools. At the union level, the average growth rate is 21%. But looking at enrollment in grade 10, this figure is as high as 31%<sup>12</sup>.

To examine the effect of BRAC schools on female enrollment growth in secondary grades in madrasas, we expand equation (1) by additionally including total number of BRAC schools in the union as a regressor on the RHS and estimate this equation at the madrasa level. The equation, when re-written, appears as follows:

$$G_{it} = \alpha_0 + \alpha_2 X_{t-4,i} + \alpha_3 \Delta X_{it} + \alpha_4 W_{it} + \alpha_5 (\# \text{ of BRAC schools in the union})_i + \delta_t + \varepsilon_{it} \quad (2)$$

where,

$G_{it}$  = growth rate of female enrollment in secondary madrasas during 1999-2003

$\delta_t$  = Districts fixed-effects

$\varepsilon_{it}$  = iid random error

t = time index

i = union index

Equation (2) is estimated using establishment (i.e. madrasa or school) level data. The number of BRAC schools in the union in equation (2) is treated as endogenous. Madrasas that are located in poorer areas are likely to have experienced higher growth in female enrollment because of the FSP intervention. Yet, these regions would have a greater concentration of BRAC schools. Therefore, presence of BRAC schools could merely proxy for local poverty and hence endogenous. We correct for this endogeneity problem in an instrumental variable framework where we use data on the number of BRAC branches and the number of BRAC female members as excluded instruments.

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<sup>12</sup>A similar pattern is observed from gross enrollment statistics. According to BANBEIS, gross female enrollment rate at secondary level in school (total # of females enrolled in secondary school/total # of 11-15 years old in the population) has increased from 42.5% to 48.4% between 1999 and 2003.

## 4. Results

Table 2 reports regression estimates of enrollment growth models using growth rate in total female enrollment (grades 6-10). For each dependent variable, three regression specifications are used. Specification (1) controls for district fixed-effects. Specification (2) controls for sub-district (upazila) level fixed-effects. Specification (3) replaces the variables - total number of schools in 1999 and total number of madrasas in 1999 – by gender-disaggregated versions (e.g. coeducation, boys-only, girls-only).

**Table 2:** Determinants of regional enrollment growth (1999-2003) [Dependent variable: Regional growth rate of total female enrollment, grades 6-10]

	(1)	(2)	(3)
total female enrollment in 1999 in the region, grade 6-10 (in logs)	-0.274 (39.57)**	-0.292 (40.53)**	-0.296 (40.70)**
female enrollment in 1999 in the region, grade 6 (in logs)			
female enrollment in 1999 in the region, grade 10 (in logs)			
# of madrasas in the region, 1999	0.018 (5.55)**	0.025 (7.19)**	
# of schools in the region, 1999	0.054 (20.90)**	0.061 (22.36)**	
$\Delta$ in # of madrasa (1999-2003)	0.057 (2.76)**	0.075 (3.52)**	0.074 (3.49)**
$\Delta$ in # of school (1999-2003)	0.085 (7.09)**	0.093 (7.49)**	0.096 (7.69)**
Mean age of schools	-0.001 (4.39)**	-0.001 (4.12)**	-0.001 (3.38)**
Mean age of madrasas	0.002 (2.80)**	0.001 (2.32)*	0.002 (2.95)**
# of co-educational madrasas in the region, 1999			0.022 (5.25)**
# of girls-only madrasas in the region, 1999			0.045 (5.61)**
# of boys-only madrasas in the region, 1999			-0.015 (0.68)
# of co-educational schools in the region, 1999			0.062 (20.32)**
# of girls-only school in the region, 1999			0.071 (13.28)**
# of boys-only schools in the region, 1999			0.019 (1.69)+
Govt (=1 if a government secondary school present)	0.037 (2.08)*	0.040 (2.28)*	0.058 (3.15)**
Urban	-0.002 (0.13)	-0.016 (1.05)	-0.011 (0.71)
Constant	1.793 (46.31)**	1.873 (46.67)**	1.888 (46.45)**
N	4784	4784	4784
R-squared	0.29	0.32	0.32
Fixed-effects	District	Thana	Thana

Note: (1) Unit of analysis is region (union). (2) Absolute value of t statistics in parentheses. + significant at 10%; \* significant at 5%; \*\* significant at 1%.

A number of results are obtained from Table 2. First, there is clear evidence of convergence: regions with higher initial enrollment (in 1999) experienced slower growth. Second, between 1999 and 2003, regions with more schools had a higher growth rate in enrollment. But more importantly, regions with more madrasas experienced higher

growth although the rate was less than that owing to presence of schools. Third, increase in the number of madrasa in the region during 2000-2003 had a positive and significant effect. Fourth, increase in the mean age of madrasas in the region positively affects enrollment growth. We conjecture that older madrasas, which previously educated only boys and have now become co-educational are driving this result. As a direct test of this hypothesis, we replace the age variable by “fraction of madrasas in the region that are converts (i.e. set up before the reform of 1980)” (see Appendix Table 2). Indeed the variable has a positive, significant impact on enrollment growth. This finding suggests that orthodox madrasas that chose to covert into modern religious schools went beyond curriculum reform by withdrawing restrictions on admission of female students.

It could be argued that our finding of the positive effect of number of madrasas captures union-specific unobservables. Should this be the case, we would even observe a positive correlation between presence of schools that do not admit girls and female enrollment. Disaggregating the stock variables (# of schools and madrasas) by type (coeducation, boys-only, girls-only) yield a consistent pattern, however (see specification 3, Table 2). The number of all-boys schools and madrasas in 1999 never has an impact on female enrollment growth. This serves as a placebo test and implies that the observed effect of presence of madrasas is unlikely to be capturing union-specific variables that are absent in our model<sup>13</sup>.

Another concern over the estimates reported in Table 2 relates to the problem of reverse causality: Many madrasas were newly set up primarily as a response to the stipend scheme immediately after 1994. As a matter of fact, between 1995 and 2003, a total of 3798 secondary educational institutions were set up throughout Bangladesh of which 23.88% (or 907) were madrasas. If there is a correlation between female enrollment and madrasas that existed before introduction of the stipend reform, that can be taken as a cleaner test of the impact of madrasas on female enrollment. To this end, we restricted data to schools/madrasas established before 1994 and repeated our analysis. Results are reported in Appendix Table 3<sup>14</sup>. However, even for this sub-sample, there is a robust relationship between # of madrasas in the region and female enrollment growth.

From the results presented in Table 2 and Appendix Tables 2 and 3, positive impact of madrasas on female enrollment growth is evident. We further examined the impact such feminization had on achieving gender parity across Bangladeshi regions. To this end, we run regressions using specifications similar to those in Appendix Table 2 but used an indicator variable “whether the region achieved gender parity in 2003” instead as the outcome variable. Reassuringly, we find that regions with greater number of madrasas in 1999 are more likely to achieve gender parity by 2003 (results available upon request). In sum, it is evident that reformed madrasas in Bangladesh have gone beyond adopting

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<sup>13</sup> As an alternative placebo test, we repeated the regressions using growth rate in boys enrollment as the dependent variable (results available upon request). Once again, presence of girl’s madrasa in the region had no impact on boy’s enrollment.

<sup>14</sup> Exclusion of pre-reform educational institutions leads to a fall in union level growth in secondary enrollment (19% as opposed to 30%). This implies that newly set up schools/madrasas following the introduction of the stipend scheme contributed more to female enrollment than older educational institutions.

modern curriculum by altering age-old practice of educating predominantly male students and embracing girls.

**Table 3:** 2SLS estimates of determinants of female enrollment in secondary madrasas in 2003 [Dependent variable: Total female enrollment in grades 6-10]

	model 1		model 2		model 3		model 4	
	2SLS	1 stage	2SLS	1 stage	2SLS	1 stage	2SLS	1 stage
<b># of BRAC schools in the union (in 2003)</b>	0.053		0.026		0.071		0.037	
	(2.45)*		(1.73)+		(2.34)*		(2.16)*	
<b>Madrasa is co-ed (base cat: female madrasa)</b>	0.171	-0.462	0.145	-0.234	0.166	-0.244	0.142	-0.179
	(5.57)**	(1.79)+	(5.32)**	-0.88	(5.32)**	-0.99	(5.16)**	-0.7
<b>Age of madrasa</b>	0.003	0.006	0.002	0.007	0.003	0.005	0.003	0.007
	(5.07)**	-1.33	(5.04)**	-1.43	(5.09)**	-1.23	(5.23)**	-1.54
<b>Union has a govt. school</b>	-0.106	0.83	-0.06	0.681	-0.035	0.449	-0.017	0.57
	(1.84)+	(1.67)+	-1.05	-1.23	-0.69	-1.13	-0.34	-1.24
<b>Urban</b>	0	0	0	0	0.349	-2.741	0.22	-1.811
	(.)	(.)	(.)	(.)	(3.87)**	(8.73)**	(4.27)**	(4.76)**
<b># of boys madrasas in the union in 1999</b>			0.034	-0.853			0.038	-0.894
			-0.9	(2.49)*			-0.98	(2.69)**
<b># of girls madrasas in the union in 1999</b>			-0.06	0.921			-0.07	0.937
			(3.32)**	(7.97)**			(3.48)**	(8.29)**
<b># of co-ed madrasas in the union in 1999</b>			-0.01	0.238			-0.014	0.294
			-1.36	(3.76)**			(1.76)+	(4.79)**
<b># of boys schools in the union in 1999</b>			0.009	-0.585			0.021	-0.826
			-0.28	(1.90)+			-0.65	(3.06)**
<b># of girls schools in the union in 1999</b>			-0.02	-0.107			-0.016	-0.116
			(2.08)*	-1.15			-1.56	-1.28
<b># of co-ed schools in the union in 1999</b>			-0.01	0.141			-0.012	0.163
			-1.42	(2.16)*			(1.68)+	(2.60)**
<b># of new madrasas in the union during 1999-2003</b>			0.052	-0.424			0.05	-0.304
			-1.32	-1.11			-1.24	-0.82
<b># of new schools in the union during 1999-2003</b>			-0.045	1.243			-0.054	1.12
			-1.54	(5.47)**			(1.81)+	(5.13)**
<b>Average age of madrasas in the union</b>			0	0.012			0	0.013
			-0.25	(1.98)*			-0.37	(2.28)*
<b>Average age of schools in the union</b>			0	0.008			0	0.007
			(1.89)+	(4.04)**			-1.47	(3.72)**
<b># of BRAC branches in the union (in 2005)</b>		0.305		0.388		0.229		0.35
		(5.22)**		(6.18)**		(4.01)**		(5.73)**
<b># of BRAC female members in the union (in 2005)</b>		-3.003		6.027		-3.565		5.192
		-0.94		(1.73)+		-1.14		-1.54
<b>Constant</b>	-0.261	8.295	-0.061	-3.467	-0.371	8.919	-0.091	-2.691
	(1.86)+	(2.69)**	-0.88	-1.02	(1.96)+	(2.97)**	-1.23	-0.82
<b>N</b>	6271	6271	5266	5266	6664	6664	5520	5520
<b>R-squared</b>		0.01		0.05		0.01		0.05

**Note:** (a) All regressions control for district fixed-effects. (b) All-boys madrasas are excluded from the sample. (c) Models 1 and 2 exclude urban madrasas from the sample.

As argued earlier, feminization of madrasas is a recent phenomenon and from policy point of view, a clear understanding of the association between growth in female secondary enrollment and madrasas is extremely important. In this context, a potentially important explanation could be the rise of NGO schools such as BRAC's non-formal primary schools which increased the number of girls completing primary education in the community. This in turn may create an upward pressure on local madrasas to open up to admitting female students. To test for the presence of such externalities, we report regression estimates of equation (2) at the madrasa level. Results are reported in Table 3. Each regression treats "the number of BRAC schools in the union" as an endogenous variable which is instrumented using data on "the number of BRAC branches" and "the number of BRAC female members". Clearly, presence of BRAC schools in the union has a positive effect on female enrollment growth in madrasas. We also estimated equation (2) using data on secondary schools. However, BRAC schools had no impact on female enrollment growth in secondary schools (see Appendix Table 4). This suggests that the externality effect of BRAC schools is only specific to madrasas. Lastly, the effect of BRAC school remains even when we use an alternative measure where we replace "the number of BRAC schools" by "the number of female students enrolled in BRAC schools" (see Appendix Table 5). Once again, BRAC variable is treated as an endogenous regressor. We find that the number of female students enrolled in BRAC schools positively affects enrollment growth in madrasas.

## **5. Conclusion**

Nongovernmental organizations (NGOs) play an increasingly important role in the delivery of public goods in developing countries. Although this role is well acknowledged in the development literature, relatively less known is the potential externalities that arise from independent NGO interventions in the form of impact on the formal, conventional providers of public services such as state and state-aided private bodies.

We test for the presence of such externalities for Bangladesh where different types of service providers are present in the education sector. Alongside for-profit schools, there exist BRAC schools and madrasas that arguably charge relatively minor fees and serve economically marginalized children and isolated communities. Given that BRAC schools operate exclusively in the primary sector as opposed to madrasas (that have a greater presence in the secondary sector), any effect of BRAC schools on secondary madrasas would be taken as an evidence of a spill-over effect on the latter.

Externality effect of NGO intervention is studied in the context of the recent feminization of the madrasa sector where a previously predominantly all-boys religious education system opened up to girls. First, we find that Bangladeshi regions that had more registered madrasas saw a higher growth in enrollment of girls in secondary grades (holding number of secular secondary schools constant and initial enrollment) during 1999-2003. Regions that had more "converted" madrasas also experienced higher

enrollment growth. This correlation holds even for the sample of older, pre-existing religious schools and hence corroborates the hypothesis that madrasas have encouraged greater female participation in secondary education rather than selectively emerging in regions where households have responded to the stipend scheme by sending daughters to schools. These findings highlight the previously undocumented role played by religious schools in removing gender disparity in rural Bangladesh.

Next, we explored to what extent feminization of secondary madasas is driven by the presence of BRAC schools in the union by using madrasa level enrollment data. We found that madrasas located in regions with larger number of BRAC schools saw a greater growth in female enrollment where presence of BRAC schools in the union is treated as endogenous. The effect of BRAC schools remains even when we use an alternative measure where we replace the number of BRAC schools by the number of female students enrolled in BRAC schools.

Such externality effect on madrasas is unusual but not surprising considering the fact that both BRAC schools and madrasas are inspired by non-profit motives and target relatively poorer regions<sup>15</sup>. Entry of NGO schools, which only operate at the primary level, therefore can put pressure on secondary madrasas in the community which usually cater to boys, compelling them to open up to girls -- greater NGO activities can have unintended consequences in the form of a positive, complementary spill-over effects. Our finding therefore not only provides a new explanation for the rise in female enrollment in religious schools in Bangladesh, it also highlights yet another policy rationale to support and promote the type of targeted services delivered by NGOs in the rural areas.

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<sup>15</sup> This finding is similar to that of Khwaja et al (2007) who find an externality effect of public schools on the emergence of private schools in rural Pakistan. The authors find that private schools were set up in Pakistani villages that have had government schools because ample local supply of public schools graduates made it feasible for private entrepreneurs to set up low cost private schools.



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**Appendix Table 1: Descriptive statistics**

Variable	Additional description	Std.	
		Mean	Dev.
Growth rate of female enrollment (grades 6-10) in the region	$\ln(\text{enrollment in 2003}) - \ln(\text{enrollment in 1999})$	0.21	0.29
Growth rate of female enrollment (grade 6) in the region	$\ln(\text{enrollment in 2003}) - \ln(\text{enrollment in 1999})$	0.11	0.35
Growth rate of female enrollment (grade 10) in the region	$\ln(\text{enrollment in 2003}) - \ln(\text{enrollment in 1999})$	0.31	0.45
Total female enrollment in 1999 in the region	in natural logs	6.56	0.78
Total female enrollment in grade 6 in 1999 in the region	in natural logs	5.27	0.76
Total female enrollment in grade 10 in 1999 in the region	in natural logs	4.53	0.83
# of co-educational madrasas in the region, 1999		1.73	1.66
# of girls-only madrasas in the region, 1999		3.54	2.17
# of boys-only madrasas in the region, 1999		1.50	1.40
# of co-educational schools in the region, 1999		0.19	0.49
# of girls-only school in the region, 1999		0.03	0.17
# of boys-only schools in the region, 1999		2.74	1.70
$\Delta$ in # of madrasa (1999-2003)	Change in # of madrasas in the region,, 1999-2003	0.70	0.89
$\Delta$ in # of school (1999-2003)	Change in # of schools in the region,, 1999-2003	0.10	0.37
Mean age of schools		0.03	0.17
Mean age of madrasas		0.08	0.31
Fraction of madrasas in the region (in 1999) who are converts	Converts are madrasas established before 1980	0.39	0.41
Urban	Fraction of urban schools	0.13	0.31
Govt	Whether any government school in the region	0.05	0.22
<b>Number of BRAC schools</b>			
<b>Number of BRAC branches</b>			
<b>Number of BRAC female members</b>			
N		4784	

Note: Region refers to “union”, an administrative unit which is smaller than sub-district (Upazila) but bigger than village (usually comprising of 10-15 villages).

**Appendix Table 2:** Determinants of regional enrollment growth (1999-2003) – alternative specification, OLS estimates

total female enrollment in 1999 in the region, grade 6-10 (in logs)	-0.293 (40.54)**
Female enrollment in 1999 in the region, grade 6 (in logs)	--
Female enrollment in 1999 in the region, grade 10 (in logs)	--
# of madrasas in the region, 1999	0.028 (8.81)**
# of schools in the region, 1999	0.060 (22.82)**
$\Delta$ in # of madrasa (1999-2003)	0.075 (3.53)**
$\Delta$ in # of school (1999-2003)	0.092 (7.37)**
Mean age of schools	-0.001 (4.29)**
Fraction of madrasas in the region being “converts” (established pre-1980)	0.024 (2.68)**
Urban	-0.016 (1.03)
Govt (=1 if a government secondary school present)	0.041 (2.32)*
Constant	1.882 (47.01)**
N	4784
R-squared	0.32
Fixed-effects	Thana

Note: Absolute value of t statistics in parentheses. + significant at 10%; \* significant at 5%; \*\* significant at 1%.

**Appendix Table 3:** Determinants of regional enrollment growth (1999-2003) -- Sample of older schools

	(1)	(2)	(3)
total female enrollment in 1999 in the region, grade 6-10 (in logs)	-0.222 (32.11)**	-0.230 (32.14)**	-0.233 (32.16)**
female enrollment in 1999 in the region, grade 6 (in logs)			
female enrollment in 1999 in the region, grade 10 (in logs)			
# of madrasas in the region, 1999	0.017 (4.90)**	0.022 (5.95)**	
# of schools in the region, 1999	0.051 (17.74)**	0.058 (19.31)**	
$\Delta$ in # of madrasa (1999-2003)	-	-	-
$\Delta$ in # of school (1999-2003)	-	-	-
Mean age of schools	-0.000 (0.59)	-0.000 (1.43)	-0.000 (0.82)
Mean age of madrasas	0.002 (4.20)**	0.002 (3.67)**	0.002 (4.08)**
# of co-educational madrasas in the region, 1999			0.020 (4.70)**
# of girls-only madrasas in the region, 1999			0.036 (4.02)**
# of boys-only madrasas in the region, 1999			-0.002 (0.10)
# of co-educational schools in the region, 1999			0.060 (18.13)**
# of girls-only school in the region, 1999			0.064 (10.91)**
# of boys-only schools in the region, 1999			0.019 (1.68)+
Govt (=1 if a government secondary school present)	0.018 (1.06)	0.019 (1.10)	0.038 (2.10)*
Urban	0.015 (1.14)	-0.009 (0.61)	-0.001 (0.07)
Constant	1.381 (35.75)**	1.417 (35.40)**	1.427 (35.01)**
N	4737	4737	4737
R-squared	0.20	0.22	0.22
Fixed-effects	District	Thana	Thana

Note: Absolute value of t statistics in parentheses. + significant at 10%; \* significant at 5%; \*\* significant at 1%.

**Appendix Table 4: 2SLS estimates of determinants of female enrollment in secondary schools in 2003 [Dependent variable: Total female enrollment in grades 6-10]**

	Model 1		Model 2		Model 3		Model 4	
	2SLS	1 stage	2SLS	1 stage	2SLS	1 stage	2SLS	1 stage
# of BRAC schools in the union (in 2003)	0.007		0.013		0.007		0.014	
	(0.6)		(1.14)		(0.62)		(1.28)	
School is co-ed (base cat: female school)			0.084	-0.149			0.086	-0.165
			(8.74)**	-1			(9.10)**	-1.15
Age of school			-0.003	-0.003			-0.003	-0.003
			(16.30)**	-1.17			(16.40)**	-1.02
Union has a govt. school	0.008	0.832	0.021	0.261	0.002	0.437	0.026	0.095
	-0.36	(2.61)**	-1.02	-0.79	-0.13	-1.54	-1.32	-0.32
Urban	0	0	0	0	0.064	-2.671	0.085	-2.565
	(.)	(.)	(.)	(.)	-1.57	(7.52)**	(2.17)*	(7.21)**
# of boys madrasas in the union in 1999			0.028	-0.988			0.023	-0.644
			-1.26	(3.34)**			-1.19	(2.30)*
# of girls madrasas in the union in 1999			-0.021	0.546			-0.02	0.54
			(2.30)*	(5.15)**			(2.22)*	(5.20)**
# of co-ed madrasas in the union in 1999			-0.011	0.09			-0.012	0.11
			(2.64)**	-1.36			(2.72)**	(1.69)+
# of boys schools in the union in 1999			-0.009	-0.316			-0.018	-0.297
			-0.63	-1.52			-1.43	-1.58
# of girls schools in the union in 1999			-0.014	-0.251			-0.012	-0.248
			(2.65)**	(3.67)**			(2.27)*	(3.75)**
# of co-ed schools in the union in 1999			-0.01	0.223			-0.011	0.22
			(2.73)**	(4.83)**			(3.10)**	(5.23)**
# of new madrasas in the union during 1999-2003			-0.006	-0.32			-0.006	-0.302
			-0.35	-1.3			-0.4	-1.25
# of new schools in the union during 1999-2003			-0.017	0.453			-0.017	0.475
			-1.6	(3.06)**			(1.66)+	(3.27)**
Average age of madrasas in the union			0	0.008			0	0.007
			-0.12	(3.95)**			-0.08	(3.82)**
Average age of schools in the union			0	0.008			0	0.007
			(2.56)*	(5.85)**			(2.41)*	(5.37)**
# of BRAC branches in the union (in 2005)		0.205		0.229		0.206		0.233
		(5.01)**		(5.64)**		(5.15)**		(5.89)**
# of BRAC female members in the union (in 2005)		-5.637		-1.349		-5.547		-1.535
		(2.48)*		-0.6		(2.53)*		-0.71
Constant	0.062	10.812	0.087	4.452	0.061	10.654	0.084	4.661
	-0.89	(4.93)**	(1.89)+	(2.03)*	-0.88	(5.03)**	(1.86)+	(2.20)*
N	12744	12744	12744	12744	13196	13196	13196	13196
R-squared		0.00		0.03		0.01		0.04

**Note:** (a) All regressions control for district Fes. (b) All-boys madrasas are excluded from the sample. (c) Models 1 and 2 exclude urban schools from the sample.

**Appendix Table 5:** 2SLS estimates of determinants of female enrollment in secondary madrasas and schools in 2003

	Dependent variable: total female enrollment in grades 6-10 in Madrasa				Dependent variable: total female enrollment in grades 6-10 in school			
# of girls enrolled in BRAC schools in the union (in 2003)	0.002 (2.50)*	0.001 (1.74)+	0.003 (2.45)*	0.002 (2.17)*	0 (0.6)	0.001 (1.1)	0 (0.65)	0.001 (1.26)
Madrasa is co-ed (base cat: female madrasa)	0.168 (5.66)**	0.144 (5.32)**	0.163 (5.46)**	0.141 (5.17)**				
Age of madrasa	0.003 (5.28)**	0.002 (5.09)**	0.003 (5.41)**	0.003 (5.32)**				
School is co-ed (base cat: female school)						0.084 (8.77)**		0.086 (9.13)**
Age of school						-0.003 (16.41)**		-0.003 (16.50)**
Union has a govt. school	-0.103 (1.83)+	-0.061 -1.06	-0.032 -0.66	-0.016 -0.33	0.008 -0.39	0.022 -1.04	0.003 -0.14	0.026 -1.35
Urban			0.325 (4.20)**	0.215 (4.32)**			0.063 (1.65)+	0.081 (2.20)*
# of boys madrasas in the union in 1999		0.033 -0.9		0.038 -0.98		0.027 -1.24		0.022 -1.16
# of girls madrasas in the union in 1999		-0.058 (3.37)**		-0.068 (3.54)**		-0.02 (2.29)*		-0.019 (2.22)*
# of co-ed madrasas in the union in 1999		-0.01 -1.37		-0.014 (1.76)+		-0.011 (2.63)**		-0.012 (2.72)**
# of boys schools in the union in 1999		0.007 -0.22		0.017 -0.56		-0.01 -0.71		-0.019 -1.52
# of girls schools in the union in 1999		-0.02 (2.06)*		-0.015 -1.55		-0.014 (2.77)**		-0.012 (2.35)*
# of co-ed schools in the union in 1999		-0.01 -1.4		-0.012 (1.66)+		-0.01 (2.76)**		-0.011 (3.13)**
# of new madrasas in the union during 1999-2003		0.048 -1.21		0.044 -1.11		-0.006 -0.39		-0.007 -0.43
# of new schools in the union during 1999-2003		-0.04 -1.45		-0.047 (1.69)+		-0.016 -1.55		-0.016 -1.6
Average age of madrasas in the union		0 -0.29		0 -0.31		0 -0.05		0 -0.01
Average age of schools in the union		0 (1.97)*		0 -1.57		0 (2.76)**		0 (2.59)**
Constant	-0.226 (1.83)+	-0.052 -0.8	-0.32 (1.99)*	-0.079 -1.15	0.066 -1.03	0.093 (2.18)*	0.062 -0.99	0.089 (2.14)*
N	6271	5266	6664	5520	12744	12744	13196	13196