NGOS, HUMAN CAPITAL, AND WOMEN'S EMPOWERMENT: EVIDENCE FROM BANGLADESH

by

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Abstract

This thesis studies the effects of non-governmental organizations (NGOs) on human capital investment and women's empowerment in Bangladesh.

Chapter Two studies how the entry of NGOs in primary education has affected educational outcomes of girls and examines the mechanisms which account for the relative performance of NGO versus state schools in improving female educational outcomes. The results show that the entry of NGO schools has significantly increased girls' enrollment as compared to boys. The two most prominent characteristics of NGO schools that encourage girls' enrollment are the high percentage of female teachers and having Parent-Teacher Associations. NGO schools show strong effects in improving children's test scores.

Chapter Three analyzes the factors which affect teacher presence, student attendance, and community participation in primary schools in Bangladesh. The results show that, after controlling for other factors, NGO school teachers are more likely to be present in school, NGO schools are associated with higher student attendance rates, and guardians of NGO school students, in particular mothers, are more likely to participate in school meetings. Motivation appears the most important factor explaining teacher presence among NGO school teachers. Teacher attendance rate and other factors relating to curriculum and school facility explain student attendance in NGO schools.

Chapter Four investigates the effects of having the Grameen Bank in the village of

residence on fertility decisions and women's empowerment. The results suggest that the Grameen Bank affects fertility decisions in the direction towards lower fertility. The changes include a reduction in women's ideal number of children and the number of births in the year prior to the survey, and an increase in husband's approval rate, and actual use, of family planning methods. Having the Grameen Bank in the village shows positive relationship with women's empowerment as measured by contribution to family support and mobility.

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Chapter 1

Introduction

This thesis studies the effects of non-governmental organizations (NGOs) on human capital investment and women's empowerment in Bangladesh. The thesis focuses on the impacts of NGOs on educational outcomes and fertility decisions, with an emphasis on how NGOs affect women's empowerment in these areas. It consists of two main parts. The first part (Chapters Two and Three) analyzes the impacts of NGO schools, while the second part (Chapter Four) studies the effects of micro-credit.

Specifically, Chapter Two studies how the entry of NGO schools affects the educational outcomes of girls, while Chapter Three analyzes how motivation and school inputs affect teacher absenteeism and other educational outcomes in NGO schools as well as other types of schools. Chapter Four investigates the effects of having the Grameen Bank in the village of residence on fertility decisions and women's empowerment, as measured by contribution to family support, mobility, and discussion with husband regarding family planning.

Non-governmental organizations have become important providers of public goods in many developing countries today. Understanding how NGOs perform, and the impacts they have on welfare is therefore an important issue. This thesis aims

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to contribute to the economic understanding of the effects of NGOs on educational outcomes and fertility decisions, both of which are key determinants of welfare.

The term "non-governmental organization" was used first at the founding of the United Nations. NGOs are defined by the United Nations Interagency Committee on Integrated Rural Development for Asia and the Pacific (1992) as having six key characteristics: they are voluntary, non-profit, service and development oriented, autonomous, have a high degree of motivation and commitment, and some form of formal registration (Besley and Ghatak, 1999). NGOs range from a small local NGO consisting of just a few people working towards one objective, to large international NGOs with a worldwide operation. NGOs work in many areas, including the provision of aid and relief, the delivery of social service, and the implementation of development projects. The number and roles of NGOs around the world have increased significantly in recent years.[1]

With the increasing roles of NGOs in service delivery, studies have documented their strengths and weaknesses. The most notable strength of NGOs lies in their comparative advantage in grassroots and community level activities compared to public agencies. This is mainly due to the NGO institutional and incentive structures. NGOs in general use participatory methodologies and tools, which allow them to reach poor people and voice their concerns and needs. Also, NGOs have comparative advantage in cost effectiveness and the ability to innovate and adapt (e.g. Sobham (1997) and the World Bank (1998)). The weaknesses of NGOs that are often quoted are limited financial and management expertise, high degree of reliance on external resources, and lack of understanding of the broader social context.

Bangladesh is documented as having one of the most active NGOs in the world. This makes the country an ideal place to study the impacts of NGOs. The number of

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[1]Between 1990 and 2000 the number of international NGOs has grown by almost 20% to 37,281 (Human Development Report, 2000). Domestic NGOs have increased even faster, for example, in Russia, where almost none existed before the fall of communism, at present the number is at least 65,000 (The Economist, 2000).

NGOs in Bangladesh has significantly increased from when NGOs started to emerge in 1971. At present, there are about 20,000 NGOs operating in Bangladesh's 86,000 villages providing education, health, small loans, and agricultural extension services. NGOs in Bangladesh influence people's lives in many ways. As one observer comments: *"In some villages, you can send your child to an NGO school, receive medicine from an NGO health center, sell your milk to an NGO diary, talk on an NGO phone, and borrow money from an NGO bank."*

Prior to Bangladesh's war of independence in 1971, social welfare activities were mainly undertaken by the Christian missionaries. NGOs as a sector started to emerge after the war of independence in 1971, in response to the need for massive relief and rehabilitation activities (Ahmad, 1999). At that time, most of the NGOs were aid and relief agencies. However, as it became clear that Bangladesh's problems needed more than simple relief, NGOs started to re-orient their work to have a stronger and more long-term development focus (Sobham, 1997). Soon after they began their development projects, however, many NGOs found that the projects benefited relatively well-off rural farmers instead of the very poor because of the structure of the rural power. This led to the adoption of an empowerment model of development by many NGOs. An emphasis was put on social mobilization and conscientisation through education and training. However, by the 1980s those NGOs learned that group cohesion was difficult when members were economically marginalized. NGOs began to experiment with the provision of micro-credit and income generating activities in addition to the provision of health and education services. This came to be known today as the integrated rural development model.

NGOs in Bangladesh range from small local NGOs to large and internationally well-known NGOs. Two of the largest and most well-known NGOs in Bangladesh are the Bangladesh Rural Advancement Committee (BRAC) and the Grameen Bank. Chapters Two and Three of the thesis focus on NGO schools, the majority of which

follow the BRAC model. Chapter Four studies the impacts of the Grameen Bank, which initiated group lending programs for the poor.

In Chapter Two, I study how the entry of NGOs in primary education has affected educational outcomes of girls and examine the mechanisms which account for the relative performance of NGO versus state schools in improving female educational outcomes. Bangladesh has seen a rapid increase in the enrollment rate of girls in recent years, such that the country became the first in South Asia to have achieved gender equity in primary enrollment. In particular, girls from rural areas and poorer households have a higher enrollment rate compared to boys. It is possible that NGOs have played a role in this, as NGOs provide non-formal primary education to poor children. Currently 1.4 million children, or 8% of children enrolled in primary schools are in NGO schools.

NGO schools aim to provide basic education to the poorest children who did not have a chance to attend formal schools. NGO schools have many characteristics that differ from formal schools in order to suit the needs of poor children in remote areas. For example, a school is usually built in the village nearby to children's homes, because one of the reasons parents do not send their children, especially girls, to school is the long distance from home to school (Jalaluddin and Chowdhury, 1996). A school is usually a one-room construction easily built, with one teacher (mostly female) and no more than 33 children. The community helps select the location of the schools, and often helps build the schools. Parents and the teacher decide together on the timing of the lessons and vacation schedules. The flexible schedule allows the children to work outside of the school time, and has contributed to the high attendance rate. The teaching is child-centered and participatory, and activities include field trips, singing, dancing, and role-playing.

The largest NGO in the field of education in Bangladesh is the Bangladesh Rural

Advancement Committee (BRAC).[2] 1.2 out of 1.4 million children in NGO schools are in BRAC schools. BRAC innovated non-formal education in 1985, after recognizing that cost-effective supplements to the formal school system were needed in order for the poorest children to receive some education. After 2 years BRAC developed a model of primary education programme that has today become highly successful, and most other NGOs in primary education follow the BRAC model. The success is believed to come from the fact that BRAC schools target girls, and are relevant to the needs of the rural poor.

Chapter Two uses large, nationally representative data from the Education Watch Project in Bangladesh to study the impacts of NGO schools on girls' educational outcomes. The data has information on the households, schools, and test scores. First I study how the entry of NGO schools affects girls' enrollment and class passed as compared to boys. I then analyze the characteristics of NGO and state schools which affect girls' enrollment. Finally, I investigate the learning outcomes of students attending NGO and state schools.

To find out whether NGO schools increase enrollment for girls as compared to boys, I use data for children aged 11 to 20 years old. I construct cohorts from cross-sectional data using year of birth and year of NGO school establishment and show that cohorts which were exposed to NGO schools have higher probability of enrollment, and the effect operates mainly through girls. Next I analyze data for primary school aged children, i.e. children aged 6 to 10, and find that living in a village with at least one NGO school, or a village with higher NGO school involvement, is associated with higher probability of enrollment for girls as compared to boys, controlling for other factors. When rural and urban areas are studied separately, the effects of NGO schools in increasing girls' enrollment are found mainly in the rural areas. Moreover,

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[2]BRAC started in 1972, after Bangladesh's liberation war, as a relief and development agency and later on evolved into a multi-faceted NGO with several programmes aimed at poverty alleviation and empowerment of the poor.

the effects of NGO schools in increasing girls' enrollment are stronger for BRAC target households[3] compared to non-target households, suggesting that NGO schools increase girls' enrollment more for poorer households as BRAC target households are the poorest group of the population.

Overall, the results in Chapter Two show that the entry of NGO schools has significantly increased girls' enrollment as compared to boys. I find that the two most prominent characteristics of NGO schools that encourage girls' enrollment are the high percentage of female teachers and having Parent-Teacher Associations (PTAs). Moreover, I investigate how the students are learning as a result of attending NGO schools and find that being enrolled in an NGO school has positive and strongly significant effects on children's test scores, as measured by Assessment of Basic Competencies (ABC) test.

As NGO schools enrol children from the poorest households who were non-enrolled or have dropped out of school, it is surprising that NGO school students have higher attendance rates compared to government school students. Moreover, NGO school students have high test scores as measured by the ABC test. One reason believed to have contributed to NGO schools' performance is the school characteristics which are designed to suit the needs of the rural poor. For example, the fact that the schools are built nearby to children's homes and the timing of the lessons is decided by the teacher and the parents is likely to contribute to the high attendance rate of NGO school students. Also, another important factor believed to have contributed to NGO schools' performance is the motivation and incentives of the parties involved. This includes teachers' motivation and parents' interest in their children's schooling.

Chapter Three analyzes the factors which affect teacher absenteeism, student attendance, and parents' participation in school meetings in NGO schools and other types of schools. Statistics from the Education Watch data show that NGO school

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[3]BRAC target households are defined as households with less than 0.5 acre of land and at least 1 person engaged in manual labor for at least 100 days a year (Nath, 1999).

teachers have much higher attendance rates compared to teachers in other types of schools. This is in spite of the fact that NGO school teachers are paid much less compared to teachers in government or private schools.[4] Students in NGO schools also have much higher attendance rates compared to students in government or private schools, although NGO school students are from the more disadvantaged households. Moreover, parents of NGO school students participate more often in school meetings although they are poorer and have less education compared to parents of students attending government or private schools.

Teacher absenteeism is a major problem in the delivery of education in many developing countries. Survey statistics from several countries show that teacher absence rates can be very high, and prevalent among many schools in different geographical areas in a country. For example, teacher absence rates are found to be as high as 25% and 27% in India and Uganda, respectively (Chaudhury et al., 2005). Studies by Chaudhury et al. (2005) and Kremer et al. (2005) find that working conditions and administrative monitoring are correlated with absence.

Chapter Three uses school level data from the Education Watch project to examine the effects of school types and school characteristics on teacher presence and student attendance in primary schools in Bangladesh. I focus on three types of schools: government schools, private schools, and NGO schools. I also find out whether there are school characteristics which affect teacher presence and student attendance differently for NGO schools compared to other types of schools. Moreover, I focus only on NGO school teachers and explore the factors correlated with NGO teacher presence. Using household level data, I then analyze the determinants of parents' participation in school meetings, controlling for the type of school that the child was attending together with other household characteristics.

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[4]NGO school teachers receive a monthly salary of approximately 12 US dollars per month. This is much lower than average monthly salary of teachers in government and private schools, which is around 4 times higher. However, most NGO school teachers are housewives who consider their work as a part-time job bringing in extra income to the family.

The results in Chapter Three show that, after controlling for other factors, NGO school teachers are more likely to be present in school, NGO schools are associated with higher student attendance rates, and guardians of children attending NGO schools are more likely to participate in school meetings. When compared to other types of schools, teacher motivation, monitoring, and school facility appear to play a role in the high teacher attendance in NGO schools. Among NGO school teachers, motivation appears the most important factor explaining teacher presence. Motivation is captured by whether the school has only one teacher, whether the teacher received training from the NGO, and the number of refreshers' courses that the teacher attended during the past year. When the school has only one teacher, if the teacher does not come to school there would be no schooling on that day. Therefore the sense of responsibility is a possible explanation of why teachers are more likely to show up when they are in one-teacher schools. One possible source, or signal, of professional motivation is whether the teacher has received teacher training. Refreshers' course could also increase intrinsic motivation.

High student attendance rate in NGO schools could be explained by high teacher attendance rate, as well as other factors relating to curriculum and school facility. Guardians of NGO school students appear to attend school meetings regardless of their education. For NGO school students, their mothers are much more likely to attend school meetings compared to students in other types of schools. This is likely because NGOs work mainly with women, and encourage women's participation in development projects such as micro-credit and income generating activities. These NGO activities possibly have an impact on women's mobility and other areas of empowerment. I further explore this possibility in Chapter Four of the thesis.

Besides the provision of non-formal primary education, NGOs in Bangladesh undertake a wide range of development activities such as health, income-generating activities, and micro-credit. Micro-credit, initiated by the Grameen Bank, has become

a development phenomenon in recent years. The Grameen Bank's model of group-lending has been duplicated in over 40 countries around the world. In Bangladesh, micro-credit has become one of the most important activities of NGOs. Besides the Grameen Bank, BRAC, the Association for Social Advancement (ASA), and other smaller NGOs also provide micro-credit.

Chapter Four of the thesis investigates the effects of having the Grameen Bank in the village of residence on fertility decisions and women's empowerment. Micro-credit may affect fertility decisions in many ways. For example, by increasing income micro-credit might increase the demand for children. Moreover, having micro-credit programs in the village of residence may affect people's perception regarding family size and family planning, as well as their knowledge of family planning methods. Another channel through which micro-credit programs may affect fertility decisions is through increasing women's empowerment. In the case of the Grameen Bank, over 95% of its members are women. By having access to credit and joining weekly group meetings, it is possible that being members of the Grameen Bank affects women's empowerment. As women's empowerment and fertility have been found to be negatively correlated, it is possible that by affecting women's empowerment micro-credit programs have an impact on fertility decisions.

Micro-credit was initiated by the Grameen Bank in 1976. Muhammad Yunus, an economics professor who founded the Grameen Bank, felt that lack of capital was the main obstacle to productive self-employment among the poor. He started by lending some villagers his own money, and the Grameen Bank formally began functioning as a specialized bank in 1983. The Grameen Bank provides credit to members who form self-selected groups of five. Collateral is replaced with peer monitoring, as all members in the group become ineligible for further loans if any member defaults. The groups meet weekly to make repayments on their loans as well as mandatory contributions to savings and insurance funds. The Grameen Bank's weekly meetings

may affect women's perception regarding family size and family planning. At the meetings members jointly recite the "sixteen decisions", which include the following: "We will keep our families small."

The Grameen Bank may also affect women's empowerment in some areas. Empowerment has been defined as the process by which the powerless gain greater control over the circumstances of their lives (Baltiwala, 1994). Variables used to proxy for women's empowerment include decision-making authority, mobility, freedom from threat, and access to economic resources (Jejeebhoy, 2000). By providing access to credit, the Grameen Bank is likely to improve women's access to economic resources. Moreover, the weekly meetings mean that women have to travel from their homes to the meeting place, which possibly increases their mobility. Furthermore, by having the Grameen Bank in the village, social norms regarding women's roles may change, in which case the Grameen Bank may have an effect on women who are non-members as well.

Chapter Four uses nationally representative data from the Bangladesh Demographic and Health Survey (BDHS) to study the changes in fertility decisions and women's empowerment between 1993 and 1996. I divide the villages into four groups; those with the Grameen Bank both in 1993 and 1996, those with the Grameen Bank only in 1993 (the Grameen Bank left between 1993 and 1996), those with the Grameen Bank only in 1996 (the Grameen Bank entered between 1993 and 1996), and those where the Grameen Bank never entered. To address the non-random program placement of the Grameen Bank, I use pooled cross-sectional analysis and study the changes over time in different groups of villages. This is possible because the 1993 and 1996 rounds of the BDHS surveyed the same villages. Because of the possibility of self-selection of Grameen Bank members, where more active women might self-select themselves into joining the program, I study all individuals in the village rather than focusing on members of the Grameen Bank. Therefore any effect found

includes both the direct effect of the Grameen Bank on its members and the spill-over effect of social norms.

Results in Chapter Four suggest the role of the Grameen Bank in affecting people's perception regarding family size and family planning. In villages where the Grameen Bank is well established, between 1993 and 1996 there has been a reduction in women's ideal number of children and the number of births in the year prior to the survey, and an increase in the use of family planning methods. In villages where the Grameen Bank entered between 1993 and 1996 there has been an increase in husbands' approval of family planning methods. Moreover, having the Grameen Bank in the village is associated with an increase in women's empowerment in terms of contribution to family support and mobility. There is evidence that women with a high level of mobility are likely to want fewer children, and women aged 10 to 29 who contribute to family support or have a high level of mobility are less likely to have given birth in the year prior to the survey.

Overall, the findings in Chapters Two, Three, and Four point to the role of non-governmental organizations in improving human capital and women's empowerment in Bangladesh. Chapter Two provides evidence that NGO schools contribute to an increase in the education of girls. Education is considered an important determinant of female empowerment. Chapter Three shows that motivation is an integral part in the performance of NGO schools, which have extremely low teacher absence rates compared to other types of schools. Findings in Chapter Four suggest that the Grameen Bank affects fertility decisions in the direction towards lower fertility. Moreover, the Grameen Bank is associated with an increase in women's empowerment in terms of mobility and contribution to family support.

Both NGO schools and micro-credit programs are the innovations of NGOs. These innovations originated from actually observing the needs of the poor and designing the programs to suit the needs. The aim of this thesis is to provide an economic

understanding of such innovations, and the impacts that they have on overall welfare.

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Chapter 2

The Entry of NGO Schools and Girls' Educational Outcomes in Bangladesh

Abstract

This chapter uses household, school, and test score data from Bangladesh to compare and contrast the effectiveness of NGO-run and state-run schools in the provision of primary education. I study how the entry of NGOs in primary education has affected educational outcomes of girls and examine the mechanisms which account for the relative performance of NGO versus state schools in improving female educational outcomes. The results show that the entry of NGO schools has significantly increased girls' enrollment as compared to boys. Constructing cohorts from cross-sectional data using year of birth and year of NGO school establishment, I show that cohorts which were exposed to NGO schools have higher probability of enrollment and the effect operates mainly through girls. The two most prominent characteristics of NGO schools that encourage girls' enrollment are the high percentage of female teachers and having Parent-Teacher Associations (PTAs). NGO schools show strong effects in improving children's test scores.

2.1 Introduction

There has been a significant increase in the number and roles of non-governmental organizations (NGOs) around the world in the last few decades.[1] In developing countries NGOs have become heavily involved in the provision of public goods and services including health care, education, and rural credit.[2] As NGOs are rapidly becoming important providers of public goods in developing countries, a key issue is to understand how they perform relative to the state.

The objective of this chapter is to examine how NGO expansion affects educational attainment. Education is one area which has typically been preserved for the state but has seen an increasing role for NGOs, where NGO involvement is often intended to overcome state failure in the delivery of education. Whether and how NGO involvement affects educational outcomes is an important issue which has attracted the interests of several researchers. For example, Miguel and Kremer (2003) find that an NGO program of school-based mass treatment with deworming drugs in Kenya is effective in reducing school absenteeism. Banerjee et al. (2003) find an NGO remedial education program in India, where young women from the community are hired to teach children who lag behind in class, to be effective in improving children's test scores. A school meals program implemented by an NGO is found to increase school participation in Kenya (Vermeersch, 2002).

One of the key problems with studying NGOs and evaluating their effects relative to the state is the fact that they are highly heterogeneous group. This motivated the study's focus on Bangladesh, where there is one large NGO in primary education. With a large NGO operating under a single model, I can make clear comparisons

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[1] In the U.S. there are approximately 2 million NGOs, most of which were formed in the past 30 years, while in Russia, where almost none existed before the fall of communism, at present the number is at least 65,000 (The Economist, 2000). Between 1990 and 2000 the number of international NGOs has grown by almost 20% to 37,281 (Human Development Report, 2002).

[2] Besley and Ghatak (2001) analyze how ownership matters in public good provision, with applications to NGOs.

between NGO-run and state-run schools and identify the characteristics of each type of school that affect educational outcomes.

Using a large, nationally representative data from the Education Watch Project in Bangladesh, the chapter studies the effects of NGO schools on the educational outcomes of girls. Bangladesh is an important case study because the country is home to a large number of active NGOs[3], and NGOs play an important role in the provision of primary education. Moreover, there has been a rapid increase in the enrollment rate of girls in recent years such that Bangladesh has become the first country in South Asia to have achieved gender equity in primary enrollment.[4] Eliminating gender disparity in primary education is a key part of the United Nations Millennium Development Goals.[5] The education of girls is recognized as crucial to development, leading to higher economic productivity, lower infant and maternal mortality, and improved health. Understanding what factors led to gender parity in primary education and identifying the role that NGOs played in this process is a key challenge. Bangladesh's experience can provide useful policy lessons for other countries aiming to achieve gender equity in primary enrollment.

NGOs in Bangladesh initiated non-formal primary education in the middle of 1980s as it was perceived that primary education provided by the government could not reach the poorest children in remote areas. Non-formal education has many characteristics that differ from formal education. For example, parents and the teacher decide together on the timing of the lessons and vacation schedules. The schools usually have one classroom and one teacher. In most cases teachers are female, which

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[3]NGOs in Bangladesh are documented as being one of the most active in the world. There are about 20,000 NGOs operating in Bangladesh's 86,000 villages providing education, health, small loans, and agricultural extension services (The Economist, 1998).

[4]In 1980, net primary enrollment rates for boys and girls were 62% and 47%; in 2000 the corresponding rates were 79.8% and 79.9%, respectively.

[5]Goal 3, namely "Promote gender equality and empower women", has the specific target to "Eliminate gender disparity in primary and secondary education, preferably by 2005, and to all levels of education no later than 2015." Details of the Millennium Development Goals can be found at www.un.org/millenniumgoals/ and www.developmentgoals.org.

is believed to encourage the enrollment of girls. At present, around 1.4 million children or 8% of the children enrolled in primary schools are in NGOs' non-formal schools (henceforth NGO schools). Figure 2.1 shows the expansion of NGO schools in Bangladesh. The largest NGO in the field of education is the Bangladesh Rural Advancement Committee (BRAC), which provides non-formal education to 1.2 out of 1.4 million children receiving non-formal education. Even schools which are run by NGOs other than BRAC tend to follow the BRAC model. I therefore have the advantage of comparing a largely homogenous group of NGO schools with state-run schools.

Nationally representative data from the Education Watch Project show that, in 1998, gender gap in primary enrollment in favor of boys existed only in the case of urban households which reported their economic status as 'surplus'. As Figures 2.2A, 2.2B, and 2.2C show, girls from rural areas, and girls from poorer households appear to do better than boys in terms of net primary enrollment. In particular, girls from rural BRAC target households, which are the poorest households in Bangladesh, and girls from households which reported their economic status as 'always in deficit' have notably higher enrollment rate compared to boys. In many other developing countries, the opposite is true. For example, in India and Nepal, gender gap in favor of boys is greatest in rural areas and for poorer households, as Figures 2.3A and 2.3B show. Why do girls from rural areas and poorer households in Bangladesh have such high enrollment rates relative to boys? One possible explanation could be the works of NGOs such as BRAC, as NGO schools in Bangladesh target poorer households.

To investigate these issues I use household, school, and test score data from the Education Watch Project to analyze the effects of NGO schools on the educational outcomes of girls in Bangladesh. Combining household and school data, I first study how the entry of NGO schools affects girls' enrollment as compared to boys. I then analyze the characteristics of NGO and state schools which affect girls' enrollment.

Finally, I investigate the learning outcomes of students attending NGO and state schools using test score data.

Constructing cohorts from cross-sectional data using year of birth and year of NGO school establishment, I show that cohorts which were exposed to NGO schools have higher probability of enrollment, and the effect operates mainly through girls. Moreover, for primary school aged children, living in a village with at least one NGO school, or a village with higher NGO school involvement, is associated with higher probability of enrollment for girls as compared to boys, controlling for other factors. When rural and urban areas are studied separately, the effects of NGO schools in increasing girls' enrollment are found mainly in the rural areas. Moreover, the effects of NGO schools in increasing girls' enrollment are stronger for BRAC target households[6] compared to non-target households, suggesting that NGO schools increase girls' enrollment more for poorer households as BRAC target households are the poorest group of the population. The two most prominent characteristics of NGO schools that encourage girls' enrollment are the high percentage of female teachers and having Parent-Teacher Associations (PTAs). Being enrolled in an NGO school has positive and strongly significant effects on children's test scores, as measured by Assessment of Basic Competencies (ABC) test.

The chapter is organized as follows. The next section presents a theoretical framework showing how NGO school entry might affect girls' educational outcomes. Section 2.3 discusses the institutional background and the data. Section 2.4 describes the methodology and presents the results. Section 2.5 concludes.

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[6]BRAC target households are defined as households with less than 0.5 acre of land and at least 1 person engaged in manual labor for at least 100 days a year (Nath, 1999).

2.2 Theoretical Framework

The simple model in this section attempts to capture how NGO schools might affect the enrollment of girls as compared to boys. The main assumption is that there exists a disutility associated with sending a child to school, which differs by gender and by school type.[7]

Given household characteristics and characteristics of schools available, household i chooses expenditure on the education of child i to maximize the following household utility function:

$$B(x_s) - p_{skj} + U(Y - c_{kj} - x_s) \tag{2.1}$$

where $B(\cdot)$ and $U(\cdot)$ are household i's perceived benefits of education and utility from current consumption, respectively.[8] $B(\cdot)$ and $U(\cdot)$ are assumed to be increasing and concave. x_s is expenditure on the education of a child of sex s, s = male (m) and female (f). p_{skj} is the disutility associated with sending a child of sex s to school type k in village of residence j. Here k = government school (g) and NGO school (n). Y is household i's income, and c_{kj} is the opportunity cost of time of a child when enrolled in school type k in village j.

The main assumption of the model is that, for each village j, $p_{fgj} > p_{mgj} = p_{mnj} = p_{fnj}$. The disutility of sending a child to a government school is higher for girls compared to boys. In the context of Bangladesh, this could be thought of as the worry of having the child far away from home, which is usually greater in the case of girls, or the disutility of having a girl taught by male teachers. The average distance between a government school and children's homes is 3.2 kilometers, and over 60%

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[7]Possible reasons for gender differences in human capital investments include different expected returns by gender, different costs of investment, and tastes, which may reflect social and cultural norms (Strauss and Thomas, 1995). For example, Alderman and King (1998) assume different rates of returns and different expected transfers to explain differences in school enrollment. Garg and Morduch (1998a and 1998b) assume higher rates of return for males.

[8]Subscript i is omitted for simplicity.

of teachers in government schools are male (Jalaluddin and Chowdhury, 1996). The disutility of sending a child to an NGO school is assumed to be the same for boys and girls, and is equal to the disutility of sending a boy to a government school. NGO schools have some characteristics that should be associated with lower disutility for girls compared to government schools. For example, NGO schools are usually built in the village nearby to children's homes, and over 90% of NGO school teachers are female.

The benefit function, $B(\cdot)$, is assumed to be the same for boys and girls, and the same for government schools and NGO schools. The opportunity cost of time is assumed to be the same for boys and girls[9], and higher in the case of government schools compared to NGO schools. This is because NGO schools are located nearby to children's homes and have class times decided by parents and the teacher to allow children to work outside of school time.

Let $x_s^*(Y)$ be the solution to the maximization problem (1), and let $V(Y)$ be the maximum value function, given p_{skj} and c_{kj}. If household i decides not to enrol the child, the household utility is $U(Y)$. The condition for household i to enrol the child is therefore:

$$V(Y) - U(Y) > 0 \tag{2.2}$$

It is straightforward to show that initial enrollment is non-decreasing with respect to Y, and non-increasing with respect to p_{skj} and c_{kj}.[10] This is intuitive, since high income makes it more 'affordable' to enrol a child, while high disutility associated with sending a child to school and high opportunity cost make it more 'expensive' to enrol a child.

Let Y_{skj}^* be the threshold level of income above which a household will enrol a

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[9]Girls may help with child care and household chores while boys may work in the farm, thus in general it is inconclusive whether the opportunity cost of time is higher for girls or boys (Strauss and Thomas, 1995).

[10]Applying the envelope theorem, the derivative of the left-hand side of (2) is $\frac{\partial V}{\partial Y} - \frac{\partial U}{\partial Y} = \frac{\partial U(Y - c_{kj} - x_s)}{\partial Y} - \frac{\partial U(Y)}{\partial Y} > 0$ since $U(\cdot)$ is concave. Moreover, $\frac{\partial V}{\partial p_{skj}} = -1 < 0$ and $\frac{\partial V}{\partial c_{kj}} = -\frac{\partial U}{\partial Y} < 0$.

child of sex s in school type k in village j, i.e., $V(Y^*_{skj}) - U(Y^*_{skj}) = 0$. Since $p_{fnj} = p_{mnj} = p_{mgj} < p_{fgj}$ and $c_{nj} < c_{gj}$, it follows that:

$$Y^*_{fnj} = Y^*_{mnj} < Y^*_{mgj} < Y^*_{fgj} \qquad (2.3)$$

Result 2.1: NGO schools contribute to an increase in the enrollment rates of boys and girls, with stronger effects for girls.

Let us further assume that NGOs target poor households with income less than Y^{tg}. Suppose Y^{tg} is such that (i) $Y^*_{mn} = Y^*_{fn} < Y^*_{mg} < Y^{tg} < Y^*_{fg}$, or (ii) $Y^*_{mn} = Y^*_{fn} < Y^{tg} < Y^*_{mg} < Y^*_{fg}$.

Result 2.2: The effects of NGO schools in increasing girls' enrollment relative to boys will be stronger for NGOs' target households. Moreover, gender gap in enrollment disappears for target households, but exists for non-target households.

2.3 The Program

With over 20,000 NGOs working in areas such as health, education, micro-credit and agricultural services, Bangladesh is documented as having one of the most active NGOs in the world. NGOs in Bangladesh started to emerge after the War of Independence in 1971, when the country was in a state of upheaval and many refugees were returning home. At that time, most NGOs were aid and relief agencies. As the needs of society changed, many NGOs evolved into development agencies. The number of NGOs has also increased significantly. NGOs in Bangladesh range from small local NGOs to large and internationally well-known NGOs such as the Bangladesh Rural Advancement Committee (BRAC) and the Grameen Bank. In the area of education, NGOs in Bangladesh play a vital role in the provision of non-formal primary

education.

Primary education in Bangladesh was initially the responsibility of the state. After independence, under an Act of Parliament all primary schools in Bangladesh were nationalized in 1973 (Jalaluddin and Chowdhury, 1996). From the second half of 1980s, however, the state has allowed NGOs to experiment with a variety of delivery mechanisms to cater for basic education needs of the disadvantaged households. The objective of NGOs' non-formal schools is to provide education to the poorest children who did not attend or have dropped out of formal schools.

Primary education in Bangladesh is 5 years in length, starting at age 6. There are 11 types of primary schools.[11] Currently, around 1.4 million children, or 8 percent of children enrolled in primary schools, are in NGO-run schools. Around two-thirds are enrolled in government schools, and another 20 percent in registered privately managed schools. For other types of schools, the percentage of children attending each type is 2% or smaller. As Figure 2.1 shows, NGO schools are relatively new. The majority of NGO schools in the rural areas were set up after 1992. For the urban areas, most NGO schools were established after 1995. In the case of government schools, most were established before 1990, with only 2 out of 354 schools under the survey established after 1990.

The Bangladesh Rural Advancement Committee (BRAC) is the single largest NGO in non-formal primary education with over 30,000 non-formal primary schools. BRAC started the Non-Formal Primary Education (NFPE) in 1985 in response to demands from parents whose children did not have a chance to go to school. After 2 years BRAC developed a model of non-formal schools which has become highly successful.[12]

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[11]These are: government schools, registered privately managed schools, unregistered privately managed schools, primary schools attached to high schools, PTI's experimental schools, independent religious schools, religious schools attached to high madrassas, kindergarten, satellite schools, community schools, and NGO schools (World Bank, 2000).

[12]When BRAC started non-formal schools, the objective was to provide basic education to children, and continuation into the fourth grade in the formal system was not expected. However,

This unique characteristic of having one large NGO in education makes it possible to compare how NGO and state schools function, which is usually not possible since NGOs in education are heterogeneous in most other countries.[13] Using nationally representative data from the 1998 Education Watch Project, this paper examines how the expansion of NGO schools affects the educational outcomes of girls, and which characteristics of NGO and state schools matter for those outcomes.

Table 2.1 gives means and standard deviations of the main variables.[14] Panel A shows individual level means of boys and girls aged 6 to 10 years old for all Bangladesh, and separately for rural and urban areas. The enrollment rate of girls has surpassed that of boys for all Bangladesh and the rural areas. Girls' enrollment rate has increased significantly in recent years.[15] The table also shows differences between rural and urban areas in certain family characteristics, such as parental education and household economic status. Despite having parents who have less education, girls in rural areas are more likely to be enrolled overall than urban girls and more likely to be enrolled than rural boys.

The expansion of NGO schools into a village is captured by 'the involvement of NGO schools in a village', defined as the percentage of children aged 6 to 10 years old enrolled in NGO schools among children aged 6 to 10 years old enrolled in school in each village. 'The involvement of government schools' is similarly defined. Panel B gives village level means of 'the involvement of NGO schools' and 'the involvement of government schools'.

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out of over 1.67 million students who have graduated from BRAC schools, 90% have gone on to government schools. Nath et al. (1999) find that graduates of BRAC schools have a high level of basic competency compared to other types of schools.

[13]See, for example, Miguel and Kremer (2003).

[14]Details on the Education Watch data are contained in the Data Appendix.

[15]The increase in girls' enrollment rate is believed to have been brought about by a number of 'positive discriminatory' actions taken by the state and NGOs in favor of girls and poor children in the rural areas. Among these are: (i) non-formal primary education; (ii) Female Stipend program, where the state provides stipends to girls in secondary school and does not charge any tuition; and (iii) Food for Education program, where the state provides a food ration to children from rural poorer families for attending school (Chowdhury et al., 2001).

In general NGOs target villages with low enrollment rates. NGO schools are usually built in villages where there is demand for the school, i.e. villages with many dropout and non-enrolled children. For BRAC, in villages where BRAC has its development activities, a survey is conducted to find out the number of children who are non-enrolled or have dropped out of school, and one school is open for 33 children.

Panel C gives the school level means of the characteristics of NGO schools and government schools. The differences between the two types of schools can be seen in many areas. For class size, NGO schools have much smaller class size, on average around 30 students in one class[16], while government schools' average class size is 55. Teacher absenteeism appears higher in the case of government schools; the percentage of teachers present on the day of school visit is 97% for NGO schools and 86% for government schools. The percentage of female teachers is much higher for NGO schools, 92% compared to 35% in the case of government schools. Teachers' education is on average lower in the case of NGO schools. Government school teachers have on average almost 12 years of education, compared to 10 years for NGO school teachers.[17] NGO school teachers also have much fewer years of experience, on average 2.65 years compared to almost 20 years for government school teachers.

2.4 Empirical Analysis

To answer the question of how the entry of NGO schools affects girls' educational outcomes, I start by analyzing how NGO schools affect girls' enrollment. For children aged 11 to 20 years old, I find out how exposure to NGO schools affects the probability of having been enrolled, and whether the effect differs between boys and girls. I also study whether, for primary school aged children, being in a village with at least one NGO school, or a village with higher NGO school involvement, affects girls' enrollment

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[16]For BRAC schools, class size is set at 33 children for each school, which is usually a one-room construction with one teacher.

[17]BRAC has a policy of hiring female teachers who have completed 9 or more years of school.

as compared to boys. Next I find out the characteristics of NGO and state schools which affect female participation in education. Finally, I investigate the quality of NGO schools by analyzing the learning outcomes of boys and girls attending NGO and state schools.

Table 2.2 gives an overview of how the entry of NGO schools affects girls' enrollment. I show the percentage of children with no schooling in villages with at least one NGO school and villages with no NGO school. I focus on two age groups, 17 to 20 and 11 to 14, as most 17 to 20 year olds were not exposed to NGO schools while children in the 11 - 14 year range were.[18] Comparing columns (1) and (4), it appears that NGO schools entered villages with a higher percentage of children with no schooling. This is in line with the targeting policy of NGOs, where more schools are built in villages with demand for the schools, i.e. villages with many dropout or non-enrolled children. Columns (2) and (5) show that, for 11 to 14 years old children, girls in villages with at least one NGO school do better than girls in villages with no NGO school. For boys, however, the opposite is true. Columns (3) and (6) show that the reduction in the percentage of children with no schooling has been fastest for girls in villages with at least one NGO school. In fact, from being the worst-off group before NGO schools entered, they became the group with the highest percentage of children having been enrolled. This issue is further explored in the following analysis.

As Table 2.2 shows, NGOs appear to enter villages with low initial enrollment. Table 2.3 confirms NGOs' targeting policy. NGO school involvement is greater in villages where adults have lower average schooling, as defined by (i) average class passed for adults 21 years and above, and (ii) percentage of adults 21 years and above with no schooling.[19] As NGO school placement is a function of the initial level

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[18] As Figure 2.1 shows, most NGO schools started on or after 1992. Children aged 17 to 20 in 1998 were 11 or older in 1992, thus most of them were not exposed to NGO schools as NGO schools usually enrol children aged 8 to 10 years old.

[19] In Table 2.3, the dependent variable is the involvement of NGO schools in a village, and

of education in the village, there is a possible endogeneity problem where the results found are due to the targeting policy of NGOs and not the activities of NGO schools. To deal with this possible endogeneity problem, I control for village fixed effects when analyzing children aged 11 to 20 years old. This is possible because for each village I can divide the children into those who were exposed to NGO schools and those who were not, using year of birth and year of NGO school establishment. In interpreting the results, the identification assumption is that there is no omitted time-varying and region specific effects correlated with the placement of NGO schools. When analyzing children aged 6 to 10 years old, I control for several village characteristics.[20] Results showing similar patterns emerge from analyzing 11 to 20 years old and 6 to 10 years old, suggesting that under the assumption that there is no time-varying component the results found are not driven by NGO school placement.

2.4.1 Entry of NGO Schools and Girls' Enrollment

A. Basic Results

First I explore the key question of this paper - does the entry of NGO schools contribute to the increase in girls' enrollment as compared to boys?

To find out whether being exposed to NGO schools has different effects on the enrollment status of girls as compared to boys, I estimate the following equation:

$$\Pr(S_{ij} = 1) = \alpha_0 + \alpha_1 EXP_{ij} + \alpha_2 Girl * EXP_{ij} + \alpha_3 C_{ij} + \alpha_4 Girl * C_{ij}$$

$$+\alpha_5 Girl + \alpha_6 V_j + \text{error term} \tag{2.4}$$

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explanatory variables are village characteristics as listed. The education of adults 21 years and above is not affected by whether there is an NGO school in the village, as those 21 years and above in 1998 would be 11 years or older in 1988, and in 1988 there were hardly any NGO schools at all (as shown in Figure 2.1).

[20] As all children aged 6 to 10 years old are exposed to NGO schools, it is not possible to control for village fixed effects.

where S_{ij} is equal to 1 if individual i in village j has been enrolled in school, and 0 otherwise. Here I focus on the age range of 11 to 20, as this age range includes children who were exposed to NGO schools as well as those who were not. EXP_{ij} is equal to 1 if individual i in village j has been exposed to an NGO school in the village, and 0 otherwise. An individual is considered exposed to an NGO school if he/she was 10 years old or younger when the first NGO school in the village was established, as most NGO schools enrol 8 to 10 years old children.[21] *Girl* is the dummy variable for being a girl. I control for a number of individual and family characteristics, represented by vector C_{ij}, and village fixed effects, V_j. Equation (2.4) is estimated by maximum likelihood logit. In this specification, and all others that follow, standard errors are clustered at the village level.[22]

I control for the following child and family characteristics to account for unobserved heterogeneity that might drive enrollment: age of the child, number of adults in the household, number of siblings, percentage of boys among all siblings, whether the household is a female headed household, father's education, mother's education, household's self-perceived economic status, whether mother has access to NGO credit, whether mother is engaged in income-generating activities, whether there is at least one member of the household who sells labor more than 100 days/year, and religion.

Columns (1) to (4) of Table 2.4 show that being exposed to NGO schools increases the probability of having been enrolled for girls as compared to boys. Interaction terms with Girl are not included in column (1), and are included in column (2). Column (1) shows that, compared to those who were not exposed to NGO schools, being exposed to NGO schools increases the probability of having been enrolled for all children. In column (2), the interaction term 'Girl*Exposed to NGO school'

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[21] I constructed this variable using the age of an individual and the year when the first NGO school was established in the village of residence.

[22] See Deaton (1997).

is positive and strongly significant, while the level term 'Exposed to NGO school' becomes insignificant. This suggests that compared to children who were not exposed to NGO schools in the village, being exposed to NGO schools increases the probability of having been enrolled for girls as compared to boys. The marginal effect suggests that being exposed to NGO schools increases girls' probability of having been enrolled by 3% compared to boys.

Columns (3) and (4) look at children who were exposed to NGO schools and those who were not. I split the sample in this way to allow for child and family characteristics to have different effects on children who were exposed to NGO schools and whose who were not.[23] For the group of children who were exposed to NGO schools, girls are more likely to be enrolled compared to boys, controlling for other factors. The coefficient of 'Girl' is positive and strongly significant in column (3). On the other hand, for children who were not exposed to NGO schools, the coefficient of 'Girl' is marginal and insignificant.

Taken together, the results suggest that being exposed to NGO schools in the village significantly increases the probability of having been enrolled for girls as compared to boys.

Next I investigate whether the exposure to NGO schools leads to an increase in class passed, defined as the last class which a child has completed, and whether the effects are stronger for girls as compared to boys. Columns (5) and (6) of Table 2.4 show the results from estimating equation (2.4) using the last class passed as the dependent variable. The results are similar to those in the case of enrollment: being exposed to NGO schools increases class passed for all children, and the effect operates mainly through girls. The marginal effect suggests that being exposed to NGO schools increases class passed for girls by 0.23 year as compared to boys.

Columns (7) and (8) report the results from splitting the sample into those who

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[23]It is possible that for children who were exposed to NGO schools, parents may become more sensitive towards girls' needs for education due to NGO activities in the village of residence.

were exposed to NGO schools and those who were not. For the group of children who were exposed to NGO schools, girls appear to have significantly higher class passed compared to boys. The coefficient of 'Girl' is positive and significant at the 1% level. For children who were not exposed to NGO schools, the coefficient of 'Girl' is much smaller in magnitude and less strongly significant[24] compared to the case of children who were exposed to NGO schools.

Taken together, the results suggest that the entry of NGO schools increases girls' enrollment and class passed compared to boys.

Table 2.5 shows the results from using a different identification strategy, where I analyze how the intensity of NGO schools in the village affects enrollment and class passed of children born in different years.[25] The year of birth and the village of birth jointly determine an individual's exposure to NGO schools. As Figure 2.1 shows, over 95% of NGO schools were established in or after 1992. Since NGO schools usually enrol children aged 8 to 10 years old, those who were 11 or older in 1992 were not exposed to NGO schools. At the time of the survey in 1998, children who were 17 years or older form the cohort who were too old to benefit from NGO schools. I compare the effects of the intensity of NGO schools in the village of residence on children who were young enough to be exposed to the schools versus those who were too old to benefit from them. If exposure to NGO schools increases class passed rates for children, we would expect to find no effect for those 17 years or older, and increasing effects for younger children.[26]

I estimate the following equation:

$$Y_{ijk} = \alpha_0 + \alpha_1 NP_j * T_{ik} + \alpha_2 T_{ik} + \alpha_3 C_{ijk} + \alpha_4 V_j + \text{error term} \qquad (2.5)$$

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[24]For children who were not exposed to NGO schools, the coefficient of 'Girl' is significant at 10% level.

[25]The intensity of NGO schools in a village is measured by the number of NGO schools in the village per 100 children aged 11 to 20 years old.

[26]This is the same identification strategy as in Duflo (2001).

where Y_{ijk} is (i) whether individual i in village j who is of age k has ever been enrolled[27], and (ii) the last class passed for individual i in village j who is of age k, where $11 \leq k \leq 20$. NP_j is the number of NGO schools in village j per 100 children aged 11 to 20 years old. T_{ik} is the treatment dummy indicating the age of individual i. C_{ijk} denotes child and family characteristics of individual i in village j who is of age k.

Columns (1) and (2) of Table 2.5 show that exposure to NGO schools has positive effects on the probability of having been enrolled for girls. The coefficients of 'Number NGO schools*age k' are positive and significant for girls aged 12 to 15, and positive though insignificant at the 10% level for boys of the same age range. For both boys and girls, there appears to be little or no effect on those aged 17 and above. Here age 20 is the omitted category. The results show that NGO schools increase the probability of having been enrolled for children who were exposed to the schools, with stronger effects in the case of girls. Results regarding class passed, as shown in columns (3) and (4) of Table 2.5, are similar to those regarding enrollment. The coefficients of 'Number NGO schools*age k' are positive and significant for girls aged 15 and below, and positive though mostly insignificant at the 10% level for boys of the same age range.

Overall, the results in Table 2.5 point to the same direction as those in Table 2.4: NGO schools appear to increase girls' enrollment and class passed as compared to boys.

Next I look at whether being in a village with an NGO school increases the probability of being enrolled for children aged 6 to 10 years old. While studying the enrollment history of children 11 to 20 years old has the advantage of comparing between those who were exposed to NGO schools versus those who were not, focusing

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[27]The variable is equal to 1 if the individual has ever been enrolled and 0 otherwise.

on 6 to 10 years old, the primary school age in Bangladesh, allows for the analysis of the current primary enrollment situation in Bangladesh.

I estimate the following equation:

$$\Pr(S_{ij} = 1) = \alpha_0 + \alpha_1 N_{ij} + \alpha_2 Girl * N_{ij} + \alpha_3 G_{ij} + \alpha_4 Girl * G_{ij} + \alpha_5 C_{ij}$$
$$+ \alpha_6 Girl * C_{ij} + \alpha_7 Girl + \alpha_8 A_j + \alpha_9 Vc_j + \text{error term} \qquad (2.6)$$

where N_{ij} represents two different measures of supply of NGO schools in village j. One is whether there is at least 1 NGO school in village j, and the other is the involvement of NGO schools in village j. 'The involvement of NGO schools in a village' is defined as the percentage of children aged 6 to 10 years old enrolled in NGO schools among children aged 6 to 10 years old enrolled in school in each village, excluding the child from the sample. This variable shows the relative importance of NGO schools in a village. G_{ij} is similarly defined for government schools.[28] A_j represents the stratum in which village j is located, and Vc_j is a vector of village-level characteristics. Village characteristics included are percentage of adults with no schooling, whether there is an NGO micro-credit in the village, average economic status, percentage of landless households, percentage of households with members who sell labor more than 100 days/year, percentage of female headed households, and percentage of Muslims in the village. All other variables are as defined above.

Columns (1) to (4) of Table 2.6 show the main findings. In column (2), the interaction term 'Girl*At least 1 NGO school' is positive and significant at the 1% level, indicating that being in villages with at least 1 NGO school is associated with higher probability of being enrolled for girls as compared to boys. The marginal effect suggests that the magnitude of this effect is 3%, which is similar to the case of 11 to 20 years old. The interaction term 'Girl*Fraction NGO' in column (4) is also

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[28] As there are 11 types of primary schools in Bangladesh, the involvement of NGO schools and the involvement of government schools in a village do not add up to one.

positive and significant at the 10% level. Both results point to the same direction that NGO schools increase girls' enrollment as compared to boys. On the other hand, having at least 1 government school in the village or having more government school involvement does not show different effects on the probability of being enrolled for girls as compared to boys. This suggests that it is exposure to NGO schools and not government schools that drives up girls' enrollment relative to boys.

Column (3) shows that NGO school involvement is associated with lower probability of being enrolled for all children. As Tables 2.2 and 2.3 suggest, NGOs appear to target villages with low enrollment rates.

To conclude, the results in Tables 2.4, 2.5, and 2.6 point to the role of NGO schools in increasing girls' enrollment. Being exposed to NGO schools significantly increases enrollment and class passed for girls as compared to boys. Moreover, living in a village with at least one NGO school, or a village with higher NGO school involvement, is associated with higher enrollment for girls as compared to boys.[29]

B. Extensions

Results in the previous subsection lead to the conclusion that NGO schools have contributed to the increase in female enrollment in Bangladesh. However, given the characteristics of NGO schools which aim to suit the needs of the poorest children, it is possible that NGO schools may increase female enrollment for some groups (e.g. rural versus urban, BRAC target versus non-target households) and not others. Also, to draw out policy implications it is useful to find out how NGO schools affect female enrollment for different groups of the population.

Here I analyze whether the effects of NGO schools in increasing girls' enrollment

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[29] Appendix 2, Table 2.12 shows the effects of child and family characteristics on the probability of being enrolled for boys and girls. Most of the child and family characteristics have the expected sign, although there are some exceptions. In line with Figure 2C, being from a household which reports their economic status as 'surplus' has a negative and significant relationship with the probability of being enrolled for girls in the urban areas.

vary between rural and urban areas, and between BRAC target and non-target households. The rural and urban areas in Bangladesh differ in many aspects which possibly impact how NGO schools affect female enrollment. For example, in the urban areas schools are more likely to be closer and there are more infrastructures such as roads.

In the case of BRAC target and non-target households, when BRAC started its NGO schools the main objective was to provide education to children from BRAC target households, defined as households with less than 0.5 acre of land and at least one person engaged in manual labor for at least 100 days a year (Nath, 1999). However, as there were many children from non-target households who did not have an education, BRAC schools also enrol children from non-target households. BRAC target households are the poorest group of the population, and whether NGO schools affect target and non-target groups differently should provide insights into how NGO schools affect female enrollment.

Panel A in Table 2.7 shows the results from estimating equation (2.4) separately for rural and urban areas, while Panels B and C show the results from estimating equation (2.6) for rural and urban areas. Columns (1) and (2) show that, for children aged 11 to 20 years old, the effect of being exposed to NGO schools on relative female enrollment can be found in both rural and urban areas, with the effect being stronger for the rural areas. Panels B and C show that the effects of NGO schools in increasing girls' enrollment as compared to boys are found mainly in the rural areas. For Panel B, the coefficient of 'Girl*At least 1 NGO school' is positive and significant only for the rural areas. For Panel C, the coefficient of 'Girl*Fraction NGO' is positive and significant for the rural areas, and insignificant for the urban areas.

One possible reason NGO schools seem to increase relative female enrollment mainly in the rural areas is that in rural villages government schools and other types of schools are likely to be far away, therefore having an NGO school in the village would encourage parents to send the girls to school. As the theory suggested, the

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disutility associated with sending a girl to school could be reduced by having NGO schools nearby to children's homes. Moreover, in many cases the poorest children in urban areas who attend NGO schools are children of construction workers who often have to move from site to site, making it difficult for the children to continue in school.[30]

Table 2.8 shows the results from estimating equation (2.6) separately for BRAC target and non-target households. The results show that NGO schools have stronger effects in increasing relative female enrollment for BRAC target households as compared to non-target households.[31] The coefficients of 'Girl*At least 1 NGO school' and 'Girl*Fraction NGO' are positive and significant in the case of target households. The effects on non-target households are positive though not statistically significant at the 10% level. The results suggest that the effects of NGO schools in increasing relative female enrollment is stronger for BRAC target households, although there is evidence of some effects in the case of non-target households as well. This is in line with the fact that NGO schools also enrol children from non-target households.

In summary, it appears that NGO schools increase relative female enrollment mainly in the rural areas. Moreover, the effects of NGO schools in increasing relative female enrollment are stronger for BRAC target households compared to non-target households.[32] These results make us more confident that the increase in female versus male primary school enrollment is being driven by exposure of poor rural households (and in particular BRAC target households) to NGO schools.

C. Robustness Checks

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[30] I thank BRAC personnel who suggested this possibility.

[31] As the criteria of land-owning is relevant only for the rural areas, the analysis focuses on BRAC target and non-target households in the rural areas.

[32] As the condition of having 'at least 1 person engaged in manual labor for at least 100 days a year' may change each year, I also looked at the criterial of land-owning only. The results show that the effects of NGO schools in increasing relative female enrollment are positive and significant for households owning less than 0.5 acre of land and insignificant for households owning more than 0.5 acre of land.

Restricting to BRAC schools

The largest NGO in non-formal primary education is the Bangladesh Rural Advancement Committee (BRAC). The school data from the Education Watch Project shows that 73% of NGO schools are BRAC schools. Many smaller NGOs also follow the BRAC model in setting up and managing their schools.[33] For a robustness check of whether the previous findings are driven by BRAC schools, here I restrict the analysis to BRAC schools only.

Table 2.9 shows that the main results regarding BRAC schools are very similar to those in the case of all NGO schools. Columns (1) to (6) show that, for children 6 to 10 years old, BRAC school involvement is significantly associated with higher probability of being enrolled for girls as compared to boys, moreover, the effect is found mainly in the rural areas and the effects are stronger for BRAC target households compared to non-target households.[34] These results are very similar to those found in the case of all NGO schools, and suggest that BRAC schools play an important role in increasing girls' enrollment in Bangladesh and that the BRAC model of non-formal primary education contains certain characteristics which encourage girls' enrollment.

2.4.2 What School Characteristics Determine Female Participation in Education?

The previous section has shown that NGO schools contribute to an increase in female enrollment. The objective of this section is to uncover the mechanisms through which NGO schools affect female participation in education.

To find out the characteristics of NGO and government schools in the village of

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[33]BRAC's Education Support Programme provides support in the areas of technical, conceptual and human skills to 303 NGOs for 2,505 schools.

[34]Similar results are found using 'whether there is at least 1 BRAC school' instead of 'BRAC school involvement'.

residence which affect enrollment, I estimate the equation:

$$\Pr(S_{ij} = 1) = \alpha_0 + \alpha_1 Nc_j + \alpha_2 Gc_j + \alpha_3 C_{ij} + \alpha_4 A_j + \alpha_5 Vc_j + \text{error term} \qquad (2.7)$$

where Nc_j is a vector of aggregate village-level characteristics of NGO schools in village j, and Gc_j is a vector of aggregate village-level characteristics of government schools in village j. All other variables are as defined above. Here the analysis is restricted to villages with at least one NGO school, therefore the sample size is smaller compared to the previous section.

Interaction terms with *Girl* are included in the next equation to find out the different effects that village-level school characteristics have on the probability of being enrolled for girls as compared to boys.

$$\Pr(S_{ij} = 1) = \alpha_0 + \alpha_1 Nc_j + \alpha_2 Girl * Nc_j + \alpha_3 Gc_j + \alpha_4 Girl * Gc_j + \alpha_5 C_{ij}$$
$$+ \alpha_6 Girl * C_{ij} + \alpha_7 Girl + \alpha_8 A_j + \alpha_9 Vc_j + \text{error term} \qquad (2.8)$$

The results are reported in Table 2.10. Column (1) shows that the most prominent NGO school characteristic which appears to encourage enrollment for all children is the high percentage of female teachers. The percentage of female teachers in NGO schools also appears to increase girls' enrollment as compared to boys, the coefficient of 'percentage of female teachers in NGO schools*Girl' is positive and significant at the 5% level. For NGO schools, having Parent-Teacher Associations (PTAs) also seems to encourage enrollment for all children.

For government schools, larger class size appears to discourage enrollment, and the effects appear similar for boys and girls. Having government school teachers with more experience seems to encourage girls' enrollment, although there is no significant effect in the case of boys. Having School Management Committees (SMCs), on the

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other hand, appears to encourage boys' enrollment with no effect in the case of girls.

Overall, the results suggest that high percentage of female teachers and having PTAs are important NGO school characteristics which encourage enrollment for both boys and girls. In particular, high percentage of female teachers appears to be the most prominent NGO school characteristic which encourages girls' enrollment.[35]

2.4.3 How do NGO Schools Affect Learning Outcomes?

The impact of NGO schools on welfare depends not only on enrollment, but also on how the students are learning as a result of attending NGO schools. In this section I further investigate the quality of NGO schools using test score data. NGO schools use a different model of teaching compared to state schools, and there is no obvious reason why NGO school students should perform better or worse compared to those attending state schools.

Under the Assessment of Basic Competencies (ABC) survey, in each village 7 boys and 7 girls aged 11-12 years old were randomly selected to take the ABC test.[36] Using this sample, I estimate the following equation:

$$Y_{ij} = \alpha_0 + \alpha_1 T_{ij} + \alpha_2 Girl * T_{ij} + \alpha_3 C_{ij} + \alpha_4 Girl * C_{ij} + \alpha_5 V_j$$

$$+ \text{ error term} \tag{2.9}$$

where Y_{ij} represents (i) whether a child passed the ABC test or not, and (ii) test scores of life-skills, reading, writing, and numeracy sections. T_{ij} is the dummy variable for

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[35] As shown in Table 2.1, attendance rate is much higher in NGO schools compared to government schools (85% versus 55%). OLS regressions with attendance rate as dependent variable and school characteristics and school type dummies as explanatory variables show that the determinants of attendance are similar for boys and girls (results not shown). The single most important determinant of attendance is the percentage of teachers present on the day of school visit. Teacher absenteeism therefore appears to discourage attendance of both boys and girls. Teacher absenteeism is also quite common and is a major concern in other developing countries such as India (The PROBE team, 1999).

[36] The Data Appendix contains detail on the ABC test.

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the type of school that the child was attending at the time of survey. I control for children who have dropped out of school, and the omitted category is the group who have never been enrolled. Other variables are as defined above.

A child is considered to have 'basic education', i.e. to pass the ABC test, if he/she satisfied the following criteria: (i) answering correctly at least 7 out of 10 life skills questions; (ii) answering correctly at least 3 of the 4 questions from the reading comprehension passage; (iii) correctly communicating a given message through a letter; and (iv) answering correctly at least 3 of the 4 mental arithmetic questions (Chowdhury et al., 1999).

Table 2.11 shows that, for both boys and girls, attending an NGO school has positive and significant effects on the probability of passing the ABC test, and all test scores. Attending an NGO school also significantly increases the probability of passing the ABC test for girls as compared to boys. For each section's test scores, however, the effects do not differ between boys and girls.

Attending a government school appears to significantly increase the probability of passing the ABC test for girls, although there seems to be no effect for boys. For all children, attending a government school significantly increases reading and writing scores. The effect on numeracy section is positive though not significant, and there appears to be no effect on life skills section.[37] For each section, the effect of attending a government school do not differ between boys and girls.

The effects of attending an NGO school on test scores are larger than the effects of attending a government school. For reading skills[38], compared to children who have never been enrolled, attending an NGO school increases the scores of reading skills by 21% for boys and 22% for girls. For government schools, the corresponding effects are

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[37]The different effects of NGO schools and government schools on life skills section could be due to the curriculum. NGO schools emphasize more on matters such as health and personal hygiene, which are tested in the life skills section.

[38]There are 4 questions for reading skills section.

9% and 8% respectively. For writing skills[39], attending an NGO school increases the scores by 26% for boys and 31% for girls, while the corresponding effects are 10% for both boys and girls in the case of government schools. Attending a government school does not show significant effects in improving scores for the life skills and numeracy skills sections.

The strongest determinant of test scores for all sections is the last class passed. Listening to the radio, watching television, and reading newspaper are positively associated with the scores of life skills section. Listening to the radio and reading newspaper also significantly increase the probability of passing the ABC test. Most factors related to household economic status do not significantly affect children's test scores. Most of the determinants of test scores appear similar for boys and girls.[40]

Results from Table 2.11 suggest that, controlling for other factors, attending an NGO school shows stronger effects in improving children's test scores compared to attending a government school. For children who took the ABC test, those in NGO schools would have been in school for a shorter period of time compared to their peers in government schools, since NGO schools enrol children 8-10 years old while government schools enrol children 6 years or above. Moreover, NGO school students are mainly those from the poorest families who were non-enrolled or have dropped out of school. As NGO schools use a different model of teaching, including a child-centered approach, simple textbooks which are relevant to rural life, continuous evaluation instead of exams, and flexible class times, the strong effect of NGO schools on test scores is very likely the result of the NGO model of teaching.

Overall, the results indicate that NGO schools significantly improve children's competencies in all areas tested by the ABC test. Moreover, attending an NGO

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[39] The full score for writing skills section is 9.

[40] The most notable exception is that being from economically well-off families has a positive and significant relationship with the reading and writing scores for girls compared to boys. In fact, being from well-off families appears to have a negative effect on reading and writing scores for boys, a rather surprising result.

school significantly increases the probability of passing the ABC test for girls as compared to boys. The effects, however, do not appear to differ between boys and girls for each section's test scores.

2.5 Conclusion

Bangladesh has achieved gender parity in primary enrollment in spite of being one of the poorest countries in the world. More surprisingly, it is among the poorest households in the rural areas where net enrollment rate of girls is most notably higher than that of boys. This is contrary to the situation in other low income countries. For Bangladesh, the entry of NGOs in primary education appears to be an important part of the success story. NGOs in Bangladesh are heavily involved in the provision of primary education, in particular to the poorest children.

Understanding what factors led to gender parity in primary enrollment is a key issue which has important policy implications. In this paper I identify the effects of NGO schools on girls' enrollment and examine the characteristics which account for the relative performance of NGO versus state schools in improving girls' educational outcomes.

The results show that the entry of NGO schools has significantly increased girls' enrollment as compared to boys. For children aged 11 to 20 years old, being exposed to NGO schools significantly increases the probability of having been enrolled for girls as compared to boys. Moreover, for children aged 6 to 10 years old, living in a village with at least one NGO school or a village with higher NGO school involvement is associated with higher enrollment for girls as compared to boys. When divided into rural and urban areas, the effects of NGO schools in increasing girls' enrollment are found mainly in the rural areas, where circumstances are likely to allow NGO schools to function well. Moreover, the effects of NGO schools in increasing girls' enrollment

are stronger for BRAC target households, the original target group of NGO schools, compared to non-target households. The two most prominent characteristics of NGO schools that encourage girls' enrollment are the high percentage of female teachers and having Parent-Teacher Associations (PTAs). NGO schools also show strong effects in improving children's test scores.

The innovative ways of NGO schools and the resulting increase in girls' enrollment show what can be achieved when policies are designed to suit the needs of the poor. In this paper I have identified some characteristics of NGO schools which affect educational outcomes. However, certain characteristics that are believed to have contributed to the success of NGO schools are those related to pedagogy practices and motivation. Such characteristics are difficult to capture in quantitative data. How dancing and singing are part of the curriculum and how NGO school teachers actually visited houses to convince parents to send their children to school are only some examples. There are other aspects of NGO schools that are beyond the scope of this paper.

2.6 Appendix 1: Data Appendix

The data used in this study came from the Education Watch Project. The Education Watch project was initiated in 1998 by the Campaign for Popular Education (CAMPE), a coalition of more than 400 NGOs involved in non-formal primary education, together with concerned individuals and organizations. The project aims to create more transparency in the education system in Bangladesh by collecting and providing accurate information relating to education, particularly primary education. CAMPE provided the secretariat for the project, while the Research and Evaluation Division of BRAC carried out the actual management and execution of the study. Three rounds of data have been collected; the first round in 1998, and the second and

third rounds in 2000. Each round of data contains information on certain aspects of education in Bangladesh. This paper uses the first round of data, which focuses on the internal efficiency[41] of primary education system in Bangladesh.

The survey was conducted during October and November 1998, and data from 42,584 households and 885 schools in 240 clusters covering all 64 districts in Bangladesh was collected. Out of 240 villages under the survey, 81 villages have at least 1 NGO school.

Three survey instruments were used to collect the data:

(1.) Household Survey Questionnaire (42,584 households from 312 villages in all 64 districts with 31,092 children). This questionnaire has 4 sections: profile of each household member, schooling of the members aged 4-20 years, parental information, and household level information.

(2.) Assessment of Basic Competencies (ABC) Questionnaire (3,360 children: 7 boys and 7 girls from each of the 240 clusters). This part of the survey is intended to provide information on the level of basic competencies of the children as an indicator of achievement. There are four sections: life skills/knowledge, reading, writing, and numeracy.

A child is considered to have 'basic education' if he/she satisfied the following criteria: (i) answering correctly at least seven of the ten life skills questions; (ii) answering correctly at least three of the four questions from the reading comprehension passage; (iii) correctly communicating a given message through a letter; and (iv) answering correctly at least three of the four mental arithmetic questions.

(3.) School Observation Checklist (885 schools). There are seven sections in the checklist: general information about the school, classroom information, teachers' profile, community participation, retention and dropout, school visit by the supervisors,

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[41]In education literature two types of efficiencies are identified: external and internal. External efficiency refers to broader social goals such as better health and productive person-power for the labour market, while internal efficiency refers to objectives which are internal to the education system such as enrollment and achievement (Chowdhury et al., 1999).

and losses due to the flood of 1998.

The sampling procedure was designed in such a way that the data is nationally representative. Because of variations in educational attainment in different geographical regions in Bangladesh, eight different surveys were carried out in each strata. The strata considered were six rural divisions, the metropolitan cities and the non-metropolitan urban areas.[42] For each stratum the same sample size and similar sampling strategy were followed. Employing a multi-stage sampling procedure, at the first stage, for each stratum 30 thanas (pourashava for non-metropolitan urban areas) were selected through systematic random sampling technique with probability proportional to size (PPS). At the second stage, one union (or ward for the urban strata) for each selected thana/pourashava was selected randomly. At the third stage, one village (mahalla for the urban strata) was selected, again randomly, for each selected union/ward. In other words, 30 villages/mahalla were selected for each stratum, totalling 240 for the whole of Bangladesh. It came out that all 64 districts of the country were represented in the sample.

For each village/mahalla, the number of households interviewed varied between 125 and 200, depending on the size of the village/mahalla. The interviewers started in the north-west corner of the village/mahalla, and surveyed the first household of the corner, and then moved anti-clockwise for the next household, and continued doing so. If the village/mahalla was small, and the number of households did not reach 125, then the interviewers moved to the closest village/mahalla and completed the interview. If there were more than 200 households in the village/mahalla, then the survey stopped at reaching the 200th household. For each village/mahalla, 14 children (7 boys and 7 girls) aged 11-12 years, chosen randomly from the surveyed households, were interviewed for the ABC survey. For the school survey, all schools

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[42]The six rural divisions are rural Dhaka, rural Chittagong, rural Rajshahi, rural Khulna, rural Barisal, and rural Sylhet, while the metropolitan cities and the non-metropolitan urban areas are located throughout the country.

located in the selected village/mahalla and its adjacent village/mahalla were surveyed through the School Observation Checklist.

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TABLE 2.1
SUMMARY OF MAIN VARIABLES

Panel A: Individual Level Means*	All Bangladesh		Rural		Urban	
	Boys	Girls	Boys	Girls	Boys	Girls
Enrollment rate	.766	.791	.760	.793	.793	.784
	(.42)	(.41)	(.43)	(.41)	(.41)	(.41)
Number of adults in household	2.59	2.59	2.57	2.57	2.67	2.66
	(1.37)	(1.36)	(1.31)	(1.34)	(1.56)	(1.45)
Number of siblings	3.83	3.90	3.92	4.00	3.51	3.50
	(1.72)	(1.69)	(1.72)	(1.70)	(1.68)	(1.58)
Proportion of boys among siblings	.67	.36	.66	.37	.68	.32
	(.23)	(.23)	(.23)	(.22)	(.24)	(.24)
Proportion of female headed households	.030	.030	.032	.032	.024	.026
	(.17)	(.17)	(.18)	(.18)	(.15)	(.16)
Father's education (class passed)	3.13	3.18	2.64	2.70	5.04	4.95
	(4.22)	(4.25)	(3.77)	(3.82)	(5.19)	(5.17)
Mother's education (class passed)	1.99	2.00	1.58	1.62	3.57	3.41
	(3.19)	(3.17)	(2.68)	(2.72)	(4.31)	(4.17)
Proportion of households 'always in deficit'	.33	.32	.35	.34	.24	.23
	(.47)	(.47)	(.48)	(.48)	(.43)	(.42)
Proportion of households 'sometimes in deficit'	.33	.34	.35	.36	.29	.29
	(.47)	(.48)	(.48)	(.48)	(.45)	(.45)
Proportion of households economically 'balance'	.24	.24	.22	.22	.33	.32
	(.43)	(.43)	(.41)	(.41)	(.47)	(.47)
Proportion of households economically 'surplus'	.09	.10	.08	.08	.15	.16
	(.29)	(.30)	(.27)	(.27)	(.36)	(.37)
Proportion of households: mother access to NGO credit	.18	.18	.19	.19	.12	.13
	(.38)	(.38)	(.39)	(.39)	(.33)	(.33)
Proportion of household: mother involved in income generating activities	.25	.25	.27	.26	.19	.21
	(.43)	(.43)	(.44)	(.44)	(.39)	(.41)
Proportion of households: member sells labor at least 100 days/year	.48	.48	.51	.52	.37	.35
	(.50)	(.50)	(.50)	(.50)	(.48)	(.48)
Number of observations	15846	15187	12568	11965	3278	3222

Panel B: Village Level Means	All Bangladesh	Rural	Urban
Involvement of NGO schools	.07	.066	.084
	(.13)	(.13)	(.15)
Involvement of government schools	.61	.65	.49
	(.29)	(.30)	(.24)
Number of observations	240	180	60

Panel C: School Level Means	NGO schools	Gov. schools
Class size	29.8	55.3
	(5.1)	(30.7)
Proportion of teachers present on day of visit	.97	.86
	(.15)	(.18)
Proportion of female teachers	.92	.35
	(.26)	(.33)
Teachers' education (years)	10.1	11.8
	(1.3)	(1.0)
Teachers' experience (years)	2.65	19.5
	(2.4)	(5.7)
Proportion of schools with PTAs	.34	.70
	(.47)	(.46)
Proportion of schools with SMCs	.77	.99
	(.42)	(.09)
Attendance rate	.85	.55
	(.16)	(.15)
Number of observations	215	353

* Individual Level Means are those of individuals aged 6-10 years old.
Standard deviations are in parentheses. See the Data Appendix for detail on the 1998 Education Watch Data.

TABLE 2.2
PERCENTAGE OF CHILDREN WITH NO SCHOOLING
BY COHORT AND VILLAGE OF RESIDENCE

	NGO school availability in village of residence					
	At least 1 NGO school			No NGO school		
	Aged 17-20	Aged 11-14	% Change	Aged 17-20	Aged 11-14	% Change
	(1)	(2)	(3)	(4)	(5)	(6)
Girls:	.273	.126	-53.8	.244	.149	-38.9
	(.44)	(.33)		(.43)	(.36)	
Boys:	.234	.180	-23.1	.207	.165	-20.3
	(.43)	(.39)		(.41)	(.37)	

Standard deviations are in parentheses.

TABLE 2.3
DETERMINANTS OF NGO SCHOOL LOCATION

| | Dependent variable: The involvement of NGO schools in a village | | | | | |
| | All Bangladesh | | Rural | | Urban | |
	(1)	(2)	(3)	(4)	(5)	(6)
Village characteristics:						
Average class passed (adults 21 +)	-.025		-.025		-.022	
	(3.3)***		(2.3)**		(1.8)*	
% adults (21+) with no schooling		.259		.213		.399
		(3.5)***		(2.5)**		(2.5)**
NGO micro-credit in village	.039	.053	.063	.066	-.025	-.012
	(1.6)	(2.1)**	(1.9)*	(2.0)**	(.56)	(.28)
Average economic status	.023	.007	.038	.031	.011	.022
	(.59)	(.21)	(.82)	(.67)	(.16)	(.34)
% landless households	-.003	-.006	-.034	-.045	.108	.105
	(.05)	(.09)	(.48)	(.63)	(.81)	(.81)
% hh w/ members who sell labor	.050	.045	.031	.033	.108	.051
100 days/year +	(.74)	(.67)	(.38)	(.41)	(.87)	(.41)
% female- headed households	-.024	.007	-.003	.009	-.432	-.379
	(.13)	(.04)	(.02)	(.04)	(1.0)	(.91)
% Muslims	-.005	-.013	-.035	-.041	.125	.109
	(.13)	(.35)	(.80)	(.92)	(1.5)	(1.3)
Stratum effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	240	240	180	180	60	60
Adjusted R-squared	.14	.14	.10	.10	.25	.29

Absolute t-statistics are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively.

TABLE 2.4
ENTRY OF NGO SCHOOLS AND GIRLS' ENROLLMENT AND CLASS PASSED:
BOYS AND GIRLS AGED 11 TO 20

	Dependent variable: Ever enrolled = 1				Dependent variable: Last class passed			
	All children		Exposed	Non-exposed	All children		Exposed	Non-exposed
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Exposed to NGO school	.182	.004			.207	.089		
	(2.0)**	(.03)			(1.7)*	(.69)		
Girl*Exposed to NGO school		.385				.231		
		(2.9)***				(2.8)***		
Girl	.065	-1.53	.308	.036	.102	-1.88	.290	.079
	(1.3)	(6.4)***	(2.7)***	(.70)	(2.6)**	(7.1)***	(3.1)***	(1.9)*
Control for child and family characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Village effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	43738	43738	4369	39264	43677	43677	4468	39209
Pseudo R2 / Adjusted R2	.254	.258	.253	.257	.449	.449	.408	.449

For columns (1) – (4), absolute z-statistics are in parentheses. For columns (5) – (8), absolute t-statistics are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively. Standard errors are corrected for clustering at the village level. Child and family characteristics include: age of the child, number of adults in the household, number of siblings, percentage of boys among all siblings, whether the household is a female headed household, father's education, mother's education, household's self-perceived economic status, whether mother has access to NGO credit, whether mother is engaged in income-generating activities, whether there is at least one member of the household who sells labor more than 100 days/year, and religion. A child is considered 'exposed to an NGO school' if he/she was 10 years old or younger when the first NGO school in the village was established.

TABLE 2.5
ENTRY OF NGO SCHOOLS, ENROLLMENT, AND CLASS PASSED:
BOYS AND GIRLS AGED 11 TO 20

		Dep Var: Ever enrolled = 1		Dep var: Last class passed	
		Boys	Girls	Boys	Girls
		(1)	(2)	(3)	(4)
Number NGO schools*age 11		.003	.093	.231	.261
		(.03)	(1.0)	(1.6)	(1.9)*
	12	.130	.162	.229	.269
		(1.4)	(2.1)**	(1.8)*	(2.1)**
	13	.007	.177	.206	.245
		(.08)	(2.3)**	(1.5)	(1.7)*
	14	.049	.161	.138	.294
		(.38)	(2.2)**	(.93)	(2.1)**
	15	.102	.196	.194	.266
		(1.1)	(2.5)**	(1.4)	(2.1)**
	16	.012	.099	.088	.171
		(.14)	(1.5)	(.68)	(1.4)
	17	-.020	.116	.030	.138
		(.25)	(1.5)	(.24)	(1.1)
	18	.030	.099	.010	.109
		(.36)	(1.3)	(.07)	(.93)
	19	-.042	.023	-.080	-.034
		(.41)	(.20)	(.46)	(.19)
Control for child and family characteristics		Yes	Yes	Yes	Yes
Village effects		Yes	Yes	Yes	Yes
Number of observations		22081	21657	22052	21629
Pseudo R2 / Adjusted R2		.238	.304	.448	.459

For columns (1) and (2), absolute z-statistics are in parentheses. For columns (3) and (4), absolute t-statistics are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively. Standard errors are corrected for clustering at the village level. Child and family characteristics include: age of the child, number of adults in the household, number of siblings, percentage of boys among all siblings, whether the household is a female headed household, father's education, mother's education, household's self-perceived economic status, whether mother has access to NGO credit, whether mother is engaged in income-generating activities, whether there is at least one member of the household who sells labor more than 100 days/year, and religion. A child is considered 'exposed to an NGO school' if he/she was 10 years old or younger when the first NGO school in the village was established.

TABLE 2.6
SCHOOL ENROLLMENT: BOYS AND GIRLS AGED 6 TO 10

Dependent variable: Currently enrolled in school = 1				
	(1)	(2)	(3)	(4)
At least 1 NGO school	.013	-.114		
	(.15)	(1.2)		
Girl*At least 1 NGO school		.220		
		(2.6)***		
At least 1 government school	.107	.089		
	(.71)	(.54)		
Girl*At least 1 government school		.045		
		(.36)		
NGO school involvement			-.656	-.917
			(1.7)*	(2.2)**
Girl*NGO school involvement				.543
				(1.8)*
Government school involvement			.075	-.006
			(.47)	(.04)
Girl*Gov. school involvement				.168
				(1.3)
Girl	.114	-.748	.114	-.680
	(2.6)***	(2.6)***	(2.7)***	(2.3)**
Control for child and family characteristics	Yes	Yes	Yes	Yes
Control for village characteristics	Yes	Yes	Yes	Yes
Stratum effects	Yes	Yes	Yes	Yes
Number of observations	31033	31033	31033	31033
Pseudo R2	.143	.146	.143	.146

Absolute z-statistics are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively. Standard errors are corrected for clustering at the village level. Child and family characteristics include: age of the child, number of adults in the household, number of siblings, percentage of boys among all siblings, whether the household is a female headed household, father's education, mother's education, household's self-perceived economic status, whether mother has access to NGO credit, whether mother is engaged in income-generating activities, whether there is at least one member of the household who sells labor more than 100 days/year, and religion. Village characteristics include percentage of adults with no schooling, whether there is an NGO micro-credit in the village. average economic status. percentage of landless households, percentage of households with members who sell labor more than 100 days/year, percentage of female headed households, and percentage of Muslims in the village.

TABLE 2.7

SCHOOL ENROLLMENT: RURAL VERSUS URBAN AREAS

	Rural versus urban			
	Dep var: Ever enrolled = 1		Dep var: Currently enrolled = 1	
	Rural (1)	Urban (2)	Rural (3)	Urban (4)
PANEL A: 11-20 years old				
Exposed to NGO school	.010	-.104		
	(.08)	(.58)		
Girl*Exposed to NGO school	.315	.594		
	(2.2)**	(1.9)*		
Girl	-1.37	-2.23		
	(4.4)***	(4.1)***		
PANEL B: 6-10 years old				
Measure of supply of NGO schools (1)				
At least 1 NGO school			-.149	-.103
			(1.4)	(.51)
Girl*At least 1 NGO school			.195	.211
			(2.0)**	(1.5)
At least 1 gov. school			.015	.157
			(.07)	(.77)
Girl*At least 1 gov. school			-.022	.020
			(.13)	(.14)
Girl			-.639	-.407
			(2.0)**	(.87)
PANEL C: 6-10 years old				
Measure of supply of NGO schools (2)				
Fraction: NGO schools			-1.02	-1.88
			(1.9)*	(2.5)**
Girl*Fraction NGO			.796	-.086
			(2.2)**	(.22)
Fraction: Gov. schools			-.198	-.025
			(1.1)	(.06)
Girl*Fraction Gov.			.116	.015
			(.85)	(.06)
Girl			-.591	-.305
			(1.8)*	(.60)
Control for child and family characteristics	Yes	Yes	Yes	Yes
Control for village characteristics	No	No	Yes	Yes
Stratum effects	No	No	Yes	Yes
Village effects	Yes	Yes	No	No

Absolute z-statistics are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively. Standard errors are corrected for clustering at the village level. Child and family characteristics include: age of the child, number of adults in the household, number of siblings, percentage of boys among all siblings, whether the household is a female headed household, father's education, mother's education, household's self-perceived economic status, whether mother has access to NGO credit, whether mother is engaged in income-generating activities, whether there is at least one member of the household who sells labor more than 100 days/year, and religion. Village characteristics include percentage of adults with no schooling, whether there is an NGO micro-credit in the village, average economic status, percentage of landless households, percentage of households with members who sell labor more than 100 days/year, percentage of female headed households, and percentage of Muslims in the village.

TABLE 2.8
SCHOOL ENROLLMENT: BRAC TARGET VERSUS NON-TARGET HOUSEHOLDS
BOYS AND GIRLS AGED 6 TO 10

Dependent variable: Currently enrolled in school = 1				
	BRAC target versus non-target households			
	Target	Non-target	Target	Non-target
	(1)	(2)	(3)	(4)
At least 1 NGO school	-.138	-.181		
	(1.0)	(1.7)*		
Girl*At least 1 NGO school	.214	.169		
	(1.7)*	(1.5)		
At least 1 government school	.187	-.299		
	(.88)	(1.2)		
Girl*At least 1 government school	-.259	.352		
	(1.4)	(1.4)		
NGO school involvement			-.737	-1.39
			(1.1)	(3.4)**
Girl*NGO school involvement			.872	.648
			(2.0)**	(1.6)
Government school involvement			-.029	-.364
			(.14)	(1.8)
Girl*Gov. school involvement			.198	-.026
			(1.1)	(.14)
Girl	-.403	-.608	-.684	-.216
	(1.0)	(1.6)	(1.6)	(.66)
Control for child and family characteristics	Yes	Yes	Yes	Yes
Control for village characteristics	Yes	Yes	Yes	Yes
Stratum effects	Yes	Yes	Yes	Yes
Number of observations	10331	14202	10331	14202
Pseudo R2	.107	.142	.107	.142

Absolute z-statistics are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively. Standard errors are corrected for clustering at the village level. Child and family characteristics include: age of the child, number of adults in the household, number of siblings, percentage of boys among all siblings, whether the household is a female headed household, father's education, mother's education, household's self-perceived economic status, whether mother has access to NGO credit, whether mother is engaged in income-generating activities, whether there is at least one member of the household who sells labor more than 100 days/year, and religion. Village characteristics include percentage of adults with no schooling, whether there is an NGO micro-credit in the village, average economic status, percentage of landless households, percentage of households with members who sell labor more than 100 days/year, percentage of female headed households, and percentage of Muslims in the village.

TABLE 2.9
BRAC SCHOOLS AND ENROLLMENT:
BOYS AND GIRLS AGED 6 TO 10

	Dependent variable: Currently enrolled = 1					
	All Bangladesh		Rural	Urban	Target	Non-target
	(1)	(2)	(3)	(4)	(5)	(6)
Fraction: BRAC schools	-1.42	-1.91	-1.80	3.34	-2.00	-1.63
	(3.4)***	(5.1)***	(4.4)***	(4.2)***	(4.1)***	(3.7)***
Girl*Fraction BRAC		1.05	1.27	-.144	1.61	.836
		(2.3)**	(3.1)***	(.26)	(3.1)***	(1.8)*
Fraction: Gov. schools	.044	.037	-.234	.319	-.094	-.352
	(.28)	(.23)	(1.3)	(.85)	(.47)	(1.8)*
Girl*Fraction Gov.		.169	.126	-.031	.211	-.021
		(1.4)	(.91)	(.12)	(1.2)	(.12)
Girl	.116	-.680	-.606	-.169	-.716	-.226
	(2.7)***	(2.3)**	(1.9)*	(.32)	(1.7)*	(.69)
Control for child and family characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Control for village characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Stratum effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	31033	31033	24533	6500	10331	14202
Pseudo R2	.146	.148	.151	.190	.109	.142

Absolute z-statistics are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively. Standard errors are corrected for clustering at the village level. Child and family characteristics include: age of the child, number of adults in the household, number of siblings, percentage of boys among all siblings, whether the household is a female headed household, father's education, mother's education, household's self-perceived economic status, whether mother has access to NGO credit, whether mother is engaged in income-generating activities, whether there is at least one member of the household who sells labor more than 100 days/year, and religion. Village characteristics include percentage of adults with no schooling, whether there is an NGO micro-credit in the village, average economic status, percentage of landless households, percentage of households with members who sell labor more than 100 days/year, percentage of female headed households, and percentage of Muslims in the village.

| | Pooled | Interacted | |
| | | Level | *Girl |
	(1)	(2)	(3)
Class size (NGO)	.012	.004	.016
	(.67)	(.19)	(.78)
Class size (Gov.)	-.008	-.007	-.001
	(2.5)**	(2.2)**	(.18)
% teachers present (NGO)	-.577	-.304	-.811
	(.22)	(.11)	(0.38)
% teachers present (Gov.)	-.254	-.096	-.497
	(.48)	(.17)	(1.1)
% female teachers (NGO)	1.41	.927	1.04
	(4.3)***	(2.7)***	(2.3)**
% female teachers (Gov.)	.165	.007	.276
	(.30)	(.01)	(.67)
Teachers' education (NGO)	-.026	.002	-.056
	(.31)	(.02)	(.89)
Teachers' education (Gov.)	.056	.003	.133
	(.39)	(.02)	(1.2)
Teachers' experience (NGO)	-.013	-.027	.019
	(.44)	(.67)	(.47)
Teachers' experience (Gov.)	.034	.006	.065
	(1.3)	(.23)	(2.7)***
% of schools with PTAs (NGO)	.367	.364	-.005
	(1.8)*	(1.7)*	(.03)
% of schools with PTAs (Gov.)	-.047	-.025	-.078
	(.28)	(.15)	(.50)
% of schools with SMCs (NGO)	.316	.474	-.331
	(1.4)	(2.0)**	(1.7)*
% of schools with SMCs (Gov.)	1.84	2.72	-1.97
	(1.5)	(1.9)*	(1.5)
Control for child and family characteristics	Yes	Yes	
Control for village characteristics	Yes	Yes	
Stratum effects	Yes	Yes	
Number of observations	8611	8611	
Pseudo R2	.158	.168	

Dependent variable: Currently enrolled in school = 1

Absolute z-statistics are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively. Standard errors are clustered at the village level. Child and family characteristics include: age of the child, number of adults in the household, number of siblings, percentage of boys among all siblings, whether the household is a female headed household, father's education, mother's education, household's self-perceived economic status, whether mother has access to NGO credit, whether mother is engaged in income-generating activities, whether there is at least one member of the household who sells labor more than 100 days/year, and religion. Village characteristics include percentage of adults with no schooling, whether there is an NGO micro-credit in the village, average economic status, percentage of landless households, percentage of households with members who sell labor more than 100 days/year, percentage of female headed households, and percentage of Muslims in the village.

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TABLE 2.11
TEST SCORES: BOYS AND GIRLS AGED 11 TO 12

	ABC		Life skills		Reading		Writing		Numeracy	
	Level	*Girl	Level	*Girl	Level	*Girl	Level	*Girl	Level	*Girl
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Currently attending	.902	2.02	.708	.498	.838	.053	2.35	.468	.384	.105
NGO school	(1.6)	(2.5)**	(2.6)***	(1.4)	(4.6)***	(.20)	(5.6)***	(.79)	(2.3)**	(.45)
Currently attending	-.046	1.51	-.132	.269	.361	-.030	0.89	.015	.212	-.068
government school	(.10)	(1.9)*	(.56)	(.88)	(2.6)**	(.16)	(3.1)***	(.04)	(1.4)	(.30)
Indicator: Girl	-1.48		-.850		.604		.383		-.943	
	(1.1)		(1.5)		(1.9)*		(.73)		(4.0)***	
Class passed	.761	-.062	.399	-.049	.525	-.005	1.08	.025	.226	.102
	(8.6)***	(.53)	(9.3)***	(.87)	(17.4)***	(.12)	(17.5)***	(.31)	(9.0)***	(2.7)***
Listen to the radio	.526	-.494	.226	.029	.136	-.026	.200	-.201	-.014	.074
	(3.1)***	(2.0)**	(2.5)**	(.23)	(2.1)**	(.28)	(1.6)	(1.0)	(.26)	(.94)
Watch television	-.058	.140	.208	-.061	.041	-.110	-.013	-.061	.039	-.144
	(.32)	(.62)	(2.0)**	(.46)	(.55)	(1.1)	(.10)	(.33)	(.71)	(1.7)*
Read newspaper	.973	.078	.366	.048	-.090	.427	-.030	.686	-.023	.218
	(2.9)***	(.18)	(2.6)**	(.20)	(.90)	(2.9)***	(.15)	(2.0)**	(.38)	(1.9)*
Father's education	.035	.005	.016	.001	.019	.002	.051	.004	-.002	-.000
	(1.4)	(.14)	(1.1)	(.03)	(1.8)*	(.15)	(2.7)***	(.14)	(.22)	(.02)
Mother's education	.054	-.028	.011	.024	-.018	.013	-.003	.019	.010	-.003
	(1.5)	(.58)	(.56)	(.96)	(1.4)	(.75)	(.11)	(.55)	(1.1)	(.18)
Always in deficit	-.206	.341	.096	.017	-.073	.013	-.159	.047	.034	.059
	(.83)	(1.0)	(.71)	(.10)	(.81)	(.11)	(.89)	(.19)	(.43)	(.53)
Sometimes in deficit	-.252	.331	-.078	.006	-.066	.086	-.256	.180	-.010	.106
	(1.3)	(1.1)	(.63)	(.04)	(.83)	(.71)	(1.7)	(.78)	(.15)	(1.2)
Surplus	-.540	.708	-.153	.022	-.237	.343	-.614	.683	-.072	.181
	(1.9)*	(1.9)*	(.99)	(.11)	(2.0)**	(2.1)**	(2.7)***	(2.2)**	(.92)	(1.5)
Mother: access to NGO credit	-.037	.294	.156	-.026	-.070	.146	-.164	.089	.035	.028
	(.16)	(.95)	(1.4)	(.16)	(.70)	(1.2)	(.86)	(.38)	(.53)	(.29)
Mother: involve in income	.010	-.125	-.067	.115	-.051	-.031	-.122	-.138	.030	-.030
generating activities	(.05)	(.48)	(.62)	(.78)	(.64)	(.29)	(.78)	(.69)	(.50)	(.33)
At least 1 member of hh	.215	-.179	.026	-.170	.037	-.153	.052	-.197	.029	.060
sells labor 100 days/year +	(1.1)	(.65)	(.26)	(1.2)	(.52)	(1.6)	(.35)	(1.0)	(.53)	(.70)

	ABC	Life skills	Reading	Writing	Numeracy
Control for other family charac. and other school types	Yes	Yes	Yes	Yes	Yes
Village effects	Yes	Yes	Yes	Yes	Yes
Number of observations	3061	3324	3324	3324	3324
Pseudo R2 / Adjusted R2	.339	.363	.518	.577	.295

For columns (1) and (2), absolute z-statistics are in parentheses. For columns (3) to (10), absolute t-statistics are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively. Standard errors are clustered at the village level. Child and family characteristics include: age of the child, number of adults in the household, number of siblings, percentage of boys among all siblings, whether the household is a female headed household, father's education, mother's education, household's self-perceived economic status, whether mother has access to NGO credit, whether mother is engaged in income-generating activities, whether there is at least one member of the household who sells labor more than 100 days/year, and religion.

FIGURE 2.1: EXPANSION OF NGO SCHOOLS IN BANGLADESH

Notes: All variables refer to the cumulative number of NGO schools. The variables are constructed using information from the 1998 Education Watch data.
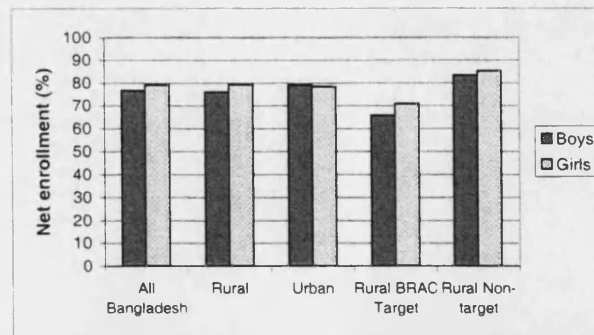
FIGURE 2.2A: NET ENROLLMENT IN BANGLADESH
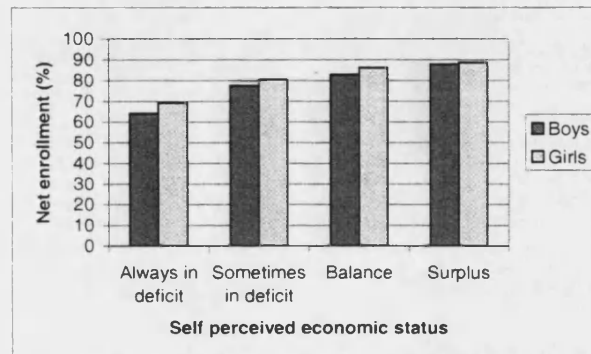
FIGURE 2.2B: NET ENROLLMENT AND SELF PERCEIVED ECONOMIC
STATUS IN RURAL BANGLADESH
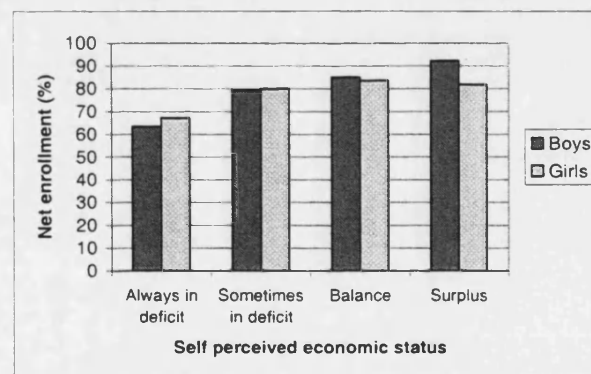
FIGURE 2.2C: NET ENROLLMENT AND SELF PERCEIVED ECONOMIC
STATUS IN URBAN BANGLADESH

Notes: The variables are constructed using information from the 1998 Education
Watch data. The Data Appendix provides a full description of the data. BRAC
target households are defined as households with less than 0.5 acre of land and at
least 1 person engaged in manual labor for at least 100 days a year (Nath, 1999).
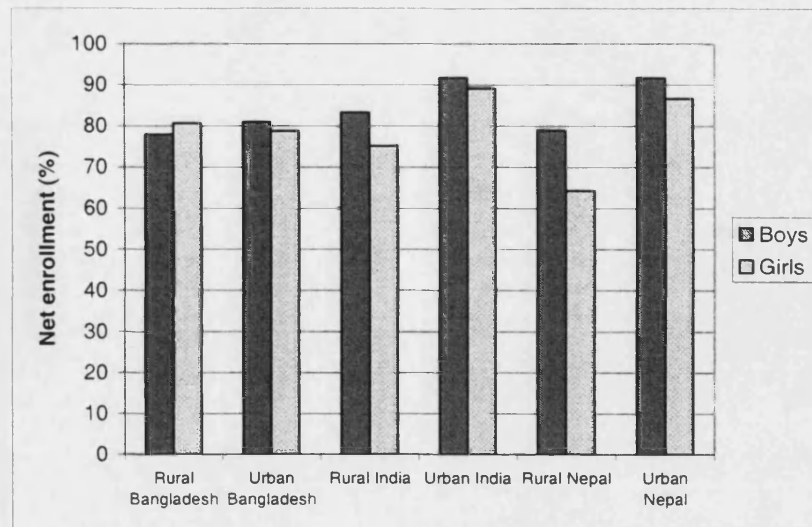
FIGURE 2.3A: NET ENROLLMENT IN BANGLADESH, INDIA, AND NEPAL:
BY AREA
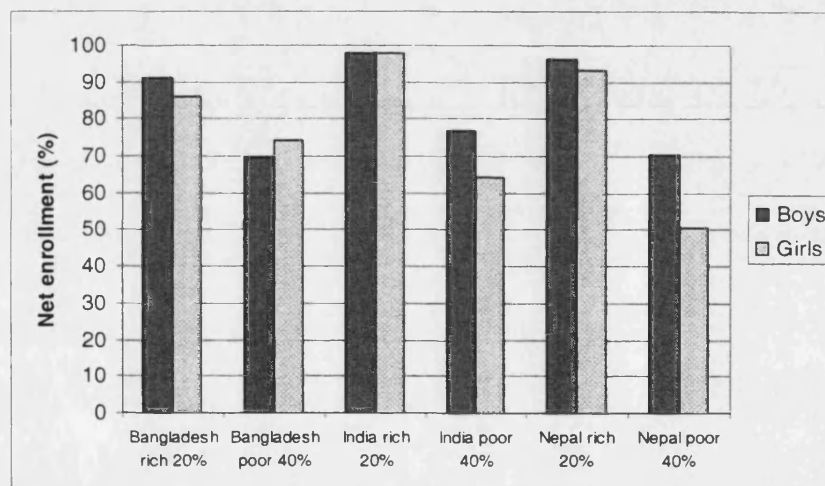
FIGURE 2.3B: NET ENROLLMENT IN BANGLADESH, INDIA, AND NEPAL:
BY ECONOMIC STATUS

Notes: The variables are constructed using information from the Demographic and

Health Survey (Bangladesh 1999, India 1998/99, and Nepal 2001), as reported in

the data sheet in support of Filmer (2003).

2.7 Appendix 2

TABLE 2.12
DETERMINANTS OF SCHOOL ENROLLMENT: BOYS AND GIRLS AGED 6 TO 10

	Dependent variable: Currently enrolled in school = 1					
	All Bangladesh		Rural		Urban	
	Boys	Girls	Boys	Girls	Boys	Girls
	(1)	(2)	(3)	(4)	(5)	(6)
NGO school involvement	-.862	-.444	-.870	-.403	-1.73	-2.10
	(2.2)**	(-1.0)	(1.7)*	(.77)	(2.3)**	(2.0)**
Government school involvement	.039	.130	-.140	-.142	.045	-.063
	(.24)	(.71)	(.75)	(.73)	(.10)	(.10)
Number adults	.080	.080	.094	.111	.019	-.018
	(3.9)***	(4.1)***	(4.2)***	(5.0)***	(.40)	(.49)
Number siblings	-.036	-.058	-.057	-.074	.059	-.004
	(2.3)**	(3.5)***	(3.5)***	(4.1)***	(1.7)*	(.10)
Percentage of boys	-.447	.174	-.463	.168	-.382	.197
	(5.0)***	(1.5)	(4.5)***	(1.3)	(2.1)**	(.82)
Female head of household	-.213	-.052	-.257	-.082	.070	.129
	(1.9)*	(.38)	(2.1)**	(.53)	(.21)	(.39)
Father's education	.078	.107	.093	.116	.042	.090
	(8.6)***	(10.4)***	(8.9)***	(10.7)***	(2.2)**	(4.1)***
Mother's education	.139	.140	.128	.126	.193	.188
	(10.5)***	(9.2)***	(8.3)***	(6.7)***	(7.1)***	(6.6)***
Always in deficit	-.530	-.536	-.512	-.571	-.642	-.311
	(7.6)***	(7.1)***	(6.7)***	(6.8)***	(4.2)***	(2.0)**
Sometimes in deficit	-.106	-.100	-.143	-.184	.005	.199
	(1.7)**	(1.3)	(2.1)**	(2.2)**	(.04)	(1.3)
Surplus	.168	-.432	.120	-.111	.315	-.731
	(1.6)	(3.1)***	(.94)	(.75)	(1.7)*	(3.3)***
Mother: access to NGO credit	.257	.285	.172	.189	.667	.637
	(3.3)***	(3.6)***	(2.1)**	(2.3)**	(4.1)***	(3.4)***
Mother: income generating activities	-.009	-.132	.054	-.108	-.391	-.333
	(.16)	(1.9)**	(.84)	(1.3)	(3.6)***	(2.7)***
At lease 1 household member sells labour 100 days/year +	-.490	-.357	-.537	-.364	-.308	-.394
	(9.7)***	(6.2)***	(9.6)***	(5.7)***	(2.9)***	(3.3)***
Stratum effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	15846	15187	12568	11965	3278	3222
Pseudo R2	.143	.153	.140	.162	.191	.185

Absolute z-statistics are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively. Standard errors are corrected for clustering at the village level. Child and family characteristics include: age of the child, number of adults in the household, number of siblings, percentage of boys among all siblings, whether the household is a female headed household, father's education, mother's education, household's self-perceived economic status, whether mother has access to NGO credit, whether mother is engaged in income-generating activities, whether there is at least one member of the household who sells labor more than 100 days/year, and religion. Village characteristics include percentage of adults with no schooling, whether there is an NGO micro-credit in the village, average economic status, percentage of landless households, percentage of households with members who sell labor more than 100 days/year, percentage of female headed households, and percentage of Muslims in the village. Percentage of adults with no schooling has a negative and significant relationship with the probability of being enrolled for both boys and girls. Percentage of households with members who sell labor more than 100 days/year has a positive and significant relationship with the probability of being enrolled for boys. All other village characteristics are insignificant.

Chapter 3

Motivation, School Inputs, and Educational Outcomes: Evidence from NGO Schools in Bangladesh

Abstract

This chapter uses nationally representative data to study teacher absenteeism, student attendance, and community participation in primary schools in Bangladesh. The study focuses on government, private, and NGO schools. The results show that, after controlling for other factors, NGO school teachers are more likely to be present in school, NGO schools are associated with higher student attendance rates, and guardians of NGO school students, in particular mothers, are more likely to participate in school meetings. Motivation appears the most important factor explaining teacher presence among NGO school teachers. Teacher attendance rate and other factors relating to curriculum and school facility explain student attendance in NGO schools. There is evidence that guardians' participation in school meetings is positively correlated with test scores.

3.1 Introduction

Although the importance of education is universally accepted[1], there are still major problems in the delivery of education in many developing countries. One of the key problems is teacher absenteeism. The 1999 Public Report on Basic Education in India (The PROBE team, 1999) brought to attention the severe state of teacher absenteeism in North Indian states. Nationally representative data show that teacher absence rates are as high as 25% and 27% in India and Uganda, respectively (Chaudhury et al., 2005). Teachers in Kenya were absent from school 20% of the time and absent from their classrooms even more frequently (Glewwe, Ilias, and Kremer, 2004).

The prevalence of teacher absenteeism has led several researchers to address this problem. Chaudhury et al. (2005) analyze nationally representative data on primary school teacher absence in six countries[2], and find that working conditions and administrative monitoring are correlated with absence. On the other hand, proxies for intrinsic motivation, community monitoring, and salary levels do not explain absence. Kremer et al. (2005)[3] find that teacher absence in India is correlated with daily incentives to attend work such as school inspection and infrastructure, while compensation does not appear to affect absence.[4] Banerjee and Duflo (2005) provide evidence from a number of randomized experiments designed to address the problem of absence of teachers and health providers in developing countries. The evidence suggests that teachers do respond to incentives, however, the constraint seems to be in getting the incentives implemented.

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[1]Theoretical growth models, such as Lucas (1988) and Becker, Murphy, and Tamura (1990), emphasize the role of human capital in the form of educational attainment. Several cross-country studies, for example Barro and Lee (1994) and Krueger and Lindahl (2001), confirm the positive correlation between education and growth. Micro evidence of the return to education include Duflo (2001) and a survey in Card (1999).

[2]The six countries are Bangladesh, Ecuador, India, Indonesia, Peru, and Uganda.

[3]Kremer et al. (2005) use the data for India which come from the same data base as Chaudhury et al. (2005).

[4]One way of interpreting the results is that overall teacher compensation has little effect on absence because teachers cannot be fired and attendance rates do not affect compensation.

Together with teacher absenteeism, low student attendance is another pressing concern in many developing countries. While teacher absence is likely to discourage student attendance, student absence may also be caused by several other factors including poor health, families' need for child labor, and school quality. Miguel and Kremer (2003) find that a program of school-based mass treatment with deworming drugs in Kenya is effective in reducing school absenteeism. Providing cash grants to mothers conditional on children's school attendance is found to increase school participation in Mexico (Schultz, 2001).

Moreover, guardians' interests in their children's education can also play an important role in improving educational outcomes. For example, Jimenez and Sawada (1999) find that guardians' participation in school meetings and monitoring improves learning outcomes and student attendance.

In this chapter I analyze the factors which are correlated with teacher absenteeism, student attendance, and guardians' participation in school meetings. Using nationally representative data from the Education Watch project in Bangladesh, I examine the effects of school types and school characteristics on teacher presence and student attendance. I focus on three types of schools: government schools, registered non-government schools (henceforth private schools), and NGOs' non-formal schools (henceforth NGO schools). Although there are 11 types of primary schools in Bangladesh, the above three types together enrol more than 90% of the students in primary schools.

NGO schools in Bangladesh employ a different model of education delivery compared to government and private schools. NGO schools were initiated in the middle of the 1980s with the objective of providing basic education to the poorest children who were non-enrolled or have dropped out of school. NGO school characteristics are designed to suit the needs of the poor. For example, parents and the teacher decide together on the timing of the lessons. The community is usually involved in

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the management and supervision of the schools. A school is usually a one-room construction built inside the village with one teacher and up to 33 children. Over 90% of NGO school teachers are female, and the curriculum is child-centered and includes dancing and singing. At present, around 1.4 million children are in NGO schools.[5] The single largest NGO in education is the Bangladesh Rural Advancement Committee (BRAC), which provides non-formal education to 1.2 million children.

Data from the Education Watch project show that teacher absence rates vary greatly among different types of schools. For government schools and private schools, teacher absence rates are 14% and 21%, respectively. For NGO schools, teacher absence rate is only at 3%. Moreover, the student attendance rate is much higher in NGO schools compared to government and private schools (84% versus 55% and 49%, respectively).

Although the main response to poorly functioning or inadequate formal schools has been non-formal schools run by NGOs or the community, it is not always the case that non-formal schools perform better than state schools with regards to teacher absence. For example, Kremer et al. (2005) find that locally controlled non-formal schools in India have higher absence rates than schools run by the state government. Using data from a survey of 60 non-formal education centers run by an NGO in Udaipur, Duflo and Hanna (2005) find that the average absence rates for teachers in these education centers was 36%.

Why do NGO schools in Bangladesh have such high teacher presence and student attendance rates? To investigate this issue, I analyze how school characteristics affect teacher presence differently for NGO schools compared to other types of schools. Moreover, I focus on NGO school teachers and test several hypotheses regarding factors which might affect teacher presence. Using school-level data on student attendance rates, I find out how school characteristics affect student atten-

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[5]This is approximately 8% of the children enrolled in primary schools.

dance differently for NGO schools compared to other types of schools. As community participation is an important characteristic of NGO schools which possibly affect educational outcomes, I also analyze the factors which affect guardians' participation in school meetings, and whether the factors are similar or different among students attending government, private, and NGO schools. Finally, I investigate the relationship between guardians' participation in school meetings and test scores.

The empirical analysis shows that, after controlling for other factors, NGO school teachers are more likely to be present in school, NGO schools are associated with higher student attendance rates, and guardians of children attending NGO schools are more likely to participate in school meetings. Teacher motivation, monitoring, and school facility appear to play a role in the high teacher attendance in NGO schools when compared to other types of schools. Motivation appears the most important factor explaining teacher presence among NGO school teachers. High student attendance rate in NGO schools could be explained by high teacher attendance rate, as well as other factors relating to curriculum and school facility. Guardians' participation in school meetings appears positively correlated with certain sections' test scores.

The chapter is organized as follows. Section 3.2 provides an overview of primary education in Bangladesh with an emphasis on NGO schools. Section 3.3 discusses the data and section 3.4 contains the empirical analysis. Section 3.5 concludes.

3.2 Background

Primary education in Bangladesh is 5 years in length, starting at age 6. There are 11 types of primary schools.[6] Presently about two-thirds of students are enrolled in government schools, around 20% are in private schools, and 8% are in NGO schools.

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[6]The 11 types of primary schools are: government, non-government registered, non-government unregistered, primary schools attached to high schools, PTI's experimental schools, Ebtedayee Madrassas (independent), Ebtedayee attached to high madrassas, kindergarten, satellite schools, community schools, and non-formal schools run by NGOs.

In Bangladesh, NGOs play an important role in the provision of non-formal education. From the second half of 1980s, the state has allowed NGOs to experiment with a variety of delivery mechanisms to cater for basic education needs of the disadvantaged households, and non-formal education has been accepted as a complementary approach to formal education.

The largest NGO working in the field of education in Bangladesh is the Bangladesh Rural Advancement Committee (BRAC), which has over 30,000 non-formal primary schools and more than 1.2 million students. BRAC initiated the Non-Formal Primary Education program (NFPE) in 1985 in response to demands from the parents who took part in BRAC's adult functional literacy class, and whose children did not have a chance to attend formal schools.

In 1985 BRAC set up 22 experimental village schools, with the help of a staff of educators and a consultant from Dhaka University School of Education. After the first two years, BRAC developed a model of primary education program that has today become highly successful.[7] The success is believed to come from the fact that BRAC's schools target girls, and are relevant to the needs of the rural poor. Studies such as Nath et al. (1999) and Chowdhury et al. (1999) find that graduates of BRAC schools have a high level of basic competency compared to other types of schools.

Using nationally representative data from the Education Watch project[8], Table 3.1 gives means and standard deviations of several characteristics of government primary schools, private schools, and NGO schools. The differences between NGO schools and government and private schools can be seen in the following areas:

Teacher presence and student attendance: The percentage of teachers present on the day of school visit is much higher in the case of NGO schools compared to

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[7]When BRAC started non-formal primary education in 1985, the main objective was to provide basic education to the children who did not have an opportunity to attend formal schools. Continuation into the fourth grade in the formal system was not expected. However, out of over 1.67 million students who have graduated from BRAC schools, 90% have gone on to government schools.

[8]Details of the data are discussed in the next section.

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government schools and private schools. NGO schools also have much higher student attendance rate compared to government and private schools.[9]

School visit: The percentage of schools with at least one school visit during the last month before the survey is much higher in the case of NGO schools. 60% of NGO schools had at least one school visit during the last month before the survey, compared to 36% and 25% in the case of government and private schools, respectively. BRAC schools are visited by program organizers and program assistants. Government schools and private schools are visited by Thana Education Officers (TEOs) and Assistant Thana Education Officers (ATEOs).

Community participation: A smaller percentage of NGO schools have Parent-Teacher Associations compared to government schools and private schools, however, the percentage of members who attended the last PTA meeting is highest in the case of NGO schools. For School Management Committee (SMC), almost all government schools and private schools have SMC, whereas 77% of NGO schools do. Similar to the case of PTA, however, the percentage of members who were present at the last SMC meeting is highest for NGO schools, showing a stronger community involvement in the case of NGO schools.[10]

Teacher characteristics: For government and private schools, there are on average 4-5 teachers per school. On the other hand, the average number of teachers in NGO schools is 1.1. BRAC schools usually have one teacher who remains with the student until graduation. Around one in three teachers in government schools and private schools are female. On the other hand, the percentage of female teachers

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[9]The average student attendance rate in NGO schools is 84%, compared to 55% and 49% in government schools and private schools, respectively.

[10]For BRAC schools, the community is usually involved in the planning, management, and supervision of BRAC schools. They help select the location of the school, the students, and the teacher. For government schools, as noted in Jalaluddin and Chowdhury (1996), there is a general feeling in the rural areas that SMCs and PTAs are "committees on paper".

in NGO school is 92%.[11] Teachers in NGO schools on average have fewer years of education compared to government and private schools. Moreover, as NGO schools are relatively new, NGO school teachers' experience is only 2.6 years on average compared to almost 20 years in the case of government schools and 10 years in the case of private schools. The average number of refreshers' courses attended in the past year is highest in the case of NGO school teachers. For NGO school teachers, refreshers' courses are organized by NGOs. Government and private school teachers attend refreshers' courses provided by government institutes.

BRAC school teachers are given 12 days of initial teacher training in basic concepts of Learning Theory, English, Mathematics, Science and Social Studies. Once they start teaching, they have to attend a one-day refresher course each month, and a six-day refresher course at the end of the first year.

The government has large training facilities. There are 53 Primary Training Institutes (PTIs) which offer a one-year Certificate-in-Education course for primary school teachers. The National Academy for Primary Education (NAPE) also provides training. A scheme of continuous training has been introduced, where all teachers of a sub-cluster attend a one-day training session every two months with their respective Assistant Thana Education Officers.

Classroom conditions and school facilities: Class size is much smaller in the case of NGO schools.[12] Average class size in NGO schools is 30, while government and private schools have average class size of 54 and 47, respectively. Moreover, the level of classroom crowdedness, as measured by 'the number of students registered in the class' divided by 'the number of students that can sit with ease' as observed by the interviewer, is highest for private schools and lowest for NGO schools. BRAC schools

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[11] For BRAC schools, female teachers are employed whenever possible. Teachers must be married residents of the village (to avoid losing personnel due to spousal transfers) who have completed nine or more years of school.

[12] For BRAC schools, in general there are 33 students in each BRAC school.

are usually a one-room construction, with an earthen floor, bamboo or mud-walled, and a thatched or tin roof with students sitting on the floor on bamboo mats in a U-shape around the room. On the other hand, government and private schools are generally permanent structures, mostly brick-built and consist of 3-5 classrooms.[13]

Compared to government and private schools, a much smaller percentage of NGO schools have toilet and drinking water facilities. Only one-third of NGO schools have toilet facilities, and only one in ten have drinking water facilities. The majority of government schools and private schools have toilet facilities, and 60% of government schools and 43% of private schools have drinking water facilities.

Table 3.2 presents individual level means of children aged 6 to 10 years old attending government, private, and NGO schools. Parents' level of education is lowest in the case of NGO school students and highest in the case of government school students. For self-perceived economic status, NGO school students appear to be from the poorest group of households, while students in government and private schools appear to be from similar economic backgrounds.

Guardians' participation in school meetings is highest among NGO school students. 61% of NGO school students had at least one person from the household who attended a school meeting during the past year, compared to 29% in the case of government and private school students. The main difference comes from mothers' attendance in school meetings. While 39% of NGO school students reported that their mothers had attended a school meeting, only 5% of government school students and 4% of private school students did.

3.3   Data

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[13]BRAC schools are usually built in the village, and the distance from children's homes to a school ranges from less than 1 km to 2.5 km. For government schools, the average distance from children's homes to a school is 3.2 km (Jalaluddin and Chowdhury, 1996).

This study uses nationally representative data from the Education Watch project.[14] The data used is the first round collected under the project, and the focus of this data is on the internal efficiency of primary education system in Bangladesh.[15]

The survey was conducted during October and November 1998, and data from 42,584 households and 885 schools in 240 clusters covering all 64 districts in Bangladesh was collected. Three survey instruments were used to collect the data:

(1.) Household Survey Questionnaire (42,584 households from 312 villages in all 64 districts with 31,092 children). There are four sections: (i) profile of each household member, which includes age, sex, and education; (ii) schooling of individuals aged 4-20 years, including enrollment status, type of school, and participation of the guardians in school meetings; (iii) parental information; and (iv) household information such as self-perceived economic status.

(2.) Assessment of Basic Competencies (ABC) questionnaire (3,360 children aged 11-12 years old, 7 boys and 7 girls from each of the 240 clusters). This questionnaire is intended to provide information regarding the level of basic competencies of the children as an indicator of achievement.[16] There are four sections in the questionnaire: (i) Life skills/knowledge, which includes questions on health, population, and knowledge about the outside world; (ii) Reading skills; (iii) Writing skills; and (iv) Numeracy skills.

(3.) School Observation Checklist (885 schools). This questionnaire aims to collect information about the schools and other school related matters. There are

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[14]The Education Watch project was initiated in 1998 by the Campaign for Popular Education (CAMPE), a coalition of more than 400 NGOs involved in non-formal primary education, together with concerned individuals and organizations. The project aims to create more transparency in the education system in Bangladesh by collecting and providing accurate information relating to education.

[15]In the education literature two types of efficiencies are identified: external and internal. External efficiency refers to broader social goals such as better health and productive person-power for the labour market, while internal efficiency refers to objectives which are internal to the education system such as enrollment and achievement (Chowdhury et al., 1999).

[16]The ABC questionnaire was developed in 1992-1993 to assess basic educational level of the children of Bangladesh (Chowdhury et al., 1994).

seven sections: general information, classroom information, teachers' profile, retention and dropout, community participation, school visit, and loss due to the floods of 1998. In particular, the teachers' profile contains information on whether a teacher was physically present at the school on the day of school visit.

The multi-stage sampling procedure was designed such that the data is nationally representative. The geographical areas in Bangladesh were divided into eight different strata[17], and for each strata the same sample size and similar sampling strategy were followed.[18] At the first stage, for each stratum 30 thanas (pourashava for non-metropolitan urban areas) were selected through systematic random sampling technique with probability proportional to size (PPS). At the second stage, one union (or ward for the urban strata) for each selected thana/pourashava was selected randomly. At the third stage, one village (mahalla for the urban strata) was selected randomly for each selected union/ward. In summary, 30 villages/mahalla were selected for each stratum, totalling 240 for the whole of Bangladesh.

For each village/mahalla, the number of households interviewed varied between 125 and 200, depending on the size of the village/mahalla. If the village/mahalla was small, and the number of households did not reach 125, then the interviewers moved to the closest village/mahalla and completed the interview. If there were more than 200 households in the village/mahalla, then the survey stopped at reaching the 200th household. For each village/mahalla, 14 children (7 boys and 7 girls) aged 11-12 years, chosen randomly from the surveyed households, were interviewed for the ABC survey. For the school survey, all schools located in the selected village/mahalla and its adjacent village/mahalla were surveyed through the School Observation Checklist.

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[17]This is because of variations in educational attainment in different geographical regions.

[18]The strata considered were six rural divisions (Dhaka, Chittagong, Rajshahi, Khulna, Barisal, and Sylhet), the metropolitan cities and the non-metropolitan urban areas. The metropolitan cities and the non-metropolitan urban areas are located throughout the country.

3.4 Empirical Analysis

3.4.1 Teacher Presence

First I explore the factors which affect teacher presence. Here, a teacher is considered present if he/she was physically present in school at the time of the unannounced school visit. Specifically, I analyze whether teacher presence is correlated with types of schools, school characteristics, and individual characteristics.

I estimate the following equation:

$$\Pr(S_{ijk} = 1) = \alpha_0 + \alpha_1 T_k + \alpha_2 Z_{ijk} + \alpha_3 C_{ijk} + \alpha_4 V_j + \text{error term} \qquad (3.1)$$

where S_{ijk} is equal to 1 if teacher i in village j in school type k was present on the day of the unannounced school visit, and 0 otherwise. T_k is the type of school. I focus on three main types of schools: government schools, private schools, and NGO schools.[19] Z_{ijk} represents a vector of school characteristics, and C_{ijk} represents a vector of individual characteristics of the teacher. I control for village fixed effects, V_j. Equation (3.1) is estimated by maximum likelihood logit. In this specification, and all others that follow, standard errors are clustered at the village level.[20]

The results are shown in Table 3.3. Columns (1) to (3) show that NGO schools are significantly associated with higher teacher presence when school and individual characteristics are not controlled for. Column (1) does not include any other control, while column (2) controls for other types of schools, village characteristics, and stratum fixed effects. Column (3) controls for other types of schools and village fixed effects.

Columns (4) and (5) include several school characteristics. NGO schools remain significantly associated with higher teacher presence. Most of the school character-

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[19] I also control for the following types of schools: religious schools, kindergarten, and other types of non-formal schools which are not run by NGOs.

[20] See Deaton (1997).

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istics are not statistically significant. In column (5), where village fixed effects are controlled for, having Parent-Teacher Association (PTA) appears positively correlated with teacher present and the effect is significant at the 10% level.

Columns (6) and (7) include individual characteristics as well as school characteristics. In both columns, NGO schools remain significantly associated with higher teacher attendance. Many individual characteristics are statistically significant. For both columns (6) and (7), being a male teacher, having received training from Primary Training Institute (PTI) and having a Bachelor of Education (BED) are associated with a higher probability of being present. On the other hand, being a head teacher is associated with a lower probability of being present. This might be because of official duties which require the head teacher to be absent from school. Another possible reason is that there is no other person to monitor the head teacher.[21] Column (6) shows that higher education is associated with lower probability of being present, however, the effect becomes insignificant once village fixed effects are controlled for.[22]

Overall, the results suggest that NGO schools are significantly associated with higher teacher attendance, and that several individual characteristics are important determinants of teacher attendance.

Next, I further investigate whether there are school characteristics which affect teacher presence differently in the case of NGO schools compared to other types of schools.

I estimate the following equation which includes interaction terms between the dummy variable 'NGO school' and school characteristics:

$$\Pr(S_{ijk} = 1) = \alpha_0 + \alpha_1 T_k + \alpha_2 Z_{ijk} + \alpha_3 NGO * Z_{ijk} + \alpha_4 V_j + \text{error term} \qquad (3.2)$$

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[21] Similar results are found in other countries. Chaudhury et al. (2005) find that head teachers are more likely to be absent in India and Peru.

[22] It is possible that teachers with higher education choose to locate in areas where there are other opportunities for income generating activities, and thus are absent from school more often.

where *NGO* is the dummy variable indicating an NGO school, and other variables are as defined above. The interaction terms between *NGO* and school characteristics show how the school characteristics affect teacher presence differently in the case of NGO schools compared to other types of schools.

Table 3.4 shows the results from estimating equation (3.2). Column (1) controls for village characteristics, while column (2) controls for village fixed effects. For both columns, conditioned on being an NGO school, the number of teachers in the school is negatively correlated with the probability of being present. As 207 out of 216 NGO schools have only one teacher, the results suggest that a teacher in an NGO school is more likely to be present if he/she is the only teacher in the school. When a teacher is the only teacher in the school, if he/she is absent then there will be no school on that day. Therefore the sense of responsibility, or motivation, is one possible explanation why NGO school teachers are more likely to attend school if he/she is the only teacher in the school.

In column (2), 'NGO*School visit' is positive and almost significant (p-value = 0.125). This suggests that monitoring might be one explanation for high teacher presence in NGO schools. On the other hand, having a PTA does not seem to increase teacher presence for NGO schools. School facilities, in the case of toilet facility, appear to increase teacher attendance for NGO schools compared to other types of schools.

Taken together, the results suggest that, compared to other types of schools, higher teacher presence in NGO schools is likely due to teacher motivation, teacher monitoring, and school facilities in the case of toilet facility.

Next I explore the factors correlated with teacher presence among NGO school teachers. Based on Table 3.4 results, my hypothesis is that NGO school teacher presence is likely to be correlated with teacher motivation, teacher monitoring, and

school facility.

By focusing on NGO school teachers, the number of observations drops to 233. Moreover, because 97% of NGO school teachers were present on the day of school visit, it is not possible to include the full set of controls as specified in equation (3.1). Instead I focus on certain explanatory variables to test my hypothesis.

Columns (1) to (4) of Table 3.5 test the hypothesis that motivation increases NGO school teacher attendance. Factors which are likely to explain motivation are (i) whether the school has one teacher, (ii) whether the teacher receives training from the NGO, and (iii) the number of refresher's courses taken within the past one year. A sense of responsibility, or motivation, is a likely explanation for higher teacher presence in the case of one-teacher school, as discussed above. As stated in Chaudhury et al. (2004), one possible source (or signal) of professional motivation is whether the teacher has received teacher training. This is captured by 'training from NGO' as 77 % of NGO school teachers received training from the NGO.[23] Moreover, a factor that could increase intrinsic motivation is in-service training (Chaudhury et al., 2004). Here in-service training is captured by the number of refresher's courses taken within the past one year.

Columns (1) to (4) show that all three factors reflecting motivation are positive and significant, either when entered separately or together. Moreover, they remain statistically significant when several other explanatory variables are included, as shown in column (11). These results suggest that motivation plays an important role in determining teacher presence in the case of NGO schools.

Columns (5) to (8) explore factors related to monitoring. These are captured by (i) whether there was a school visit within the past one month, (ii) whether the school has a Parent-Teacher Association (PTA), (iii) whether the school has a School Management Committee (SMC), and (iv) whether the teacher is a head teacher. School

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[23] Only 4 NGO school teachers received training from Primary Teaching Institute.

visits are a form of administrative monitoring by the NGO which runs the school. PTA and SMC possibly reflect informal monitoring by the community (Chaudhury et al., 2004). More powerful teachers, as captured here by whether the teacher is a head teacher, are less likely to be monitored.

The only factor relating to monitoring that appears statistically significant is whether there was a school visit within the past one month, as shown in column (5). This variable becomes significant at the 10% level in column (9), when entered together with other factors relating to monitoring. Moreover, in column (11), when several other variables are included the variable becomes insignificant. All other factors relating to monitoring are statistically insignificant. The results suggest that monitoring is not an important factor in explaining high teacher presence in NGO schools.

Columns (10) and (11) show that school facilities, proxied by whether the school has a toilet facility, is not statistically significant either when entered separately or together with other explanatory variables. This suggests that, among NGO school teachers, whether the school has toilet facility does not significantly affect teacher attendance.

Overall, the results in Table 3.5 suggest that motivation is the most important factor explaining high teacher attendance in NGO schools. As Besley and Ghatak (2005) suggest in their theoretical analysis, workers in the mission-oriented sector[24] are typically motivated agents, i.e. agents who pursue goals because they perceive intrinsic benefits from doing so. The analysis in this section suggests that high teacher attendance in NGO schools derives mainly from teacher motivation, thus NGO school teachers are likely to be motivated agents.

To conclude, the results in Tables 3.3, 3.4, and 3.5 point to the role of teacher motivation in explaining high teacher presence in NGO schools. Controlling for all

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[24]Organizations for the provision of collective goods cohere around a mission, thus production of collective goods can be viewed as mission-oriented (Besley and Ghatak, 2005).

other factors, NGO schools are associated with higher teacher attendance compared to other types of schools. Teacher motivation, monitoring, and school facility appear to play a role in the high teacher attendance in NGO schools when compared to other types of schools. Among NGO school teachers, the most important factor explaining teacher presence is teacher motivation.

3.4.2 Student Attendance

The previous section has shown that NGO schools are associated with higher teacher attendance compared to other types of schools. In this section I analyze the determinants of student attendance, in particular how NGO schools and teacher presence affect student attendance.

Using school-level data on student attendance rate, I estimate the following equation:

$$Y_{csjk} = \alpha_0 + \alpha_1 T_k + \alpha_2 Z_{csjk} + \alpha_3 V_j + \text{error term} \qquad (3.3)$$

where Y_{csjk} is the attendance rate of class c in school s which is of school type k in village j. Z_{csjk} is a vector of the characteristics of class c in school s together with the characteristics of school s. All other variables are as defined above. I also estimate equation (3.3) separately for the attendance rates of boys and girls.

Columns (1) to (3) of Table 3.6 show the results from estimating equation (3.3) without including classroom and school characteristics. In column (1), no other control is included except the dummy variables for the three types of schools as shown. Controls for other school types, village characteristics, and stratum fixed effects are included in column (2), while column (3) includes controls for other school types and village fixed effects. For all three columns, the dummy variable 'NGO school' is positive and statistically significant, suggesting that NGO schools are associated with higher student attendance compared to other types of schools.

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Columns (4) and (5) include controls for several classroom and school character-istics. Village characteristics and stratum fixed effects are included in column (4), while village fixed effects are controlled for in column (5). The dummy variable 'NGO school' remains positive and significant in both columns. The percentage of teachers present on the day of school visit is positive and statistically significant, suggesting a strong positive correlation between teacher presence and student atten-dance. The number of teachers in the school and drinking water facility are also positively and significantly associated with student attendance.[25] The percentage of members who attended the last School Management Committee meeting is posi-tively correlated with student attendance when village fixed effects are controlled for. An active School Management Committee possibly reflects community interest in the school, which might be one explanation for why an active SMC is positively correlated with student attendance. On the other hand, the level of classroom crowdedness[26] is negatively correlated with student attendance, suggesting that school facilities in terms of adequate space in the classroom might affect student attendance.

Columns (6) and (7) show the results from estimating equation (3.3) separately for boys and girls. The dummy variable 'NGO school' remains positive and statistically significant in both columns. Most correlates of student attendance appear similar for boys and girls. One main difference is that the percentage of female teachers in the school appears to increase the attendance rate of girls with no effect on the attendance rate of boys.

Together the results suggest that NGO schools are associated with higher student attendance rate, even after controlling for classroom and school characteristics. The percentage of teacher present appears an important determinant of student atten-

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[25] One possible reason student attendance is positively associated with the number of teachers in the school is that schools with more teachers are larger schools which often have more facilities and/or are located in areas that are easily accesible.

[26] The level of classroom crowdedness is measured by 'the number of students registered in the class' divided by 'the number of students that can sit with ease' as observed by the interviewer.

dance. For girls, the percentage of female teachers also appears to increase atten-
dance.

Next I further explore whether there are school characteristics which affect student
attendance differently for NGO schools compared to other types of schools. I estimate
the following equation:

$$Y_{csjk} = \alpha_0 + \alpha_1 T_k + \alpha_2 Z_{csjk} + \alpha_3 NGO * Z_{csjk} + \alpha_4 V_j + \text{error term} \tag{3.4}$$

where the variables are as defined above. I also estimate the equation separately for
boys and girls.

Table 3.7 shows the results from estimating equation (3.4). Column (1) shows the
results for all students, while columns (2) and (3) show the results for boys and girls,
respectively. As in Table 3.6, percentage of teachers present on the day of school visit
is positive and statistically significant for all columns. Moreover, 'NGO*% teacher
present' is positive for all columns, and statistically significant in column (2). This
suggests that, conditioned on being an NGO school, teacher presence has an effect on
boys' attendance over and above the effect found in all types of schools. For girls,
the effect of teacher presence on student attendance appears similar in the case of
NGO schools and other types of schools.

'NGO*Class size' is positive and significant across all columns. The results suggest
that, conditioned on being an NGO school, larger class size is significantly associated
with higher attendance for both boys and girls.[27] The variable 'NGO*Sing national
anthem' is also positive and significant across all columns. One characteristic of
NGO schools is that singing and dancing is included in the curriculum and that
children appear to enjoy the activity. Whether or not students in NGO schools sing
the national anthem could be correlated with whether the school include singing as

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[27]One possible reason is that larger class size could be due to high community demand for NGO
school, which might be because the particular teacher is good at teaching or because people in the
community value education. Either of this would lead to higher attendance rate.

a school activity. This interaction term possibly suggests that, for NGO schools, including singing as part of the curriculum leads to higher student attendance.

Conditioned on being an NGO school, the level of classroom crowdedness appears to discourage attendance rate of girls, with an effect over and above that found in all schools. Higher teacher education in NGO schools is correlated with lower attendance for boys, and the effect is significant at the 10% level. Conditioned on being an NGO school, teacher experience is positively correlated with the attendance of girls.

While the percentage of members who attended the School Management Committee meeting is positively correlated with attendance rate for all types of schools, this does not appear to be the case for NGO schools. While the level term is positive and significant, the interaction term 'NGO*% attended SMC' is negative and significant in the case of all students and girls. Therefore it appears that, for NGO schools, active SMC is not correlated with student attendance.

Overall, the results in Table 3.7 suggest that high student attendance rate in NGO schools could be explained by high teacher attendance rate, as well as other factors relating to curriculum and school facility.

3.4.3 Parents' Participation in School Meetings

Results from the previous sections show that NGO schools are associated with high teacher presence and high student attendance rates. Besides teachers and students, in many cases parents also play an important role in determining their children's educational outcomes.[28] As NGO school personnel work closely with the community, especially the parents, it is possible that through their work they help to increase parents' awareness of the importance of education.

In this section I analyze parents' interest in their children's schooling as proxied

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[28]For example, whether a child is enrolled in primary school or not is often the decision of the parents. Parents who are aware of the importance of education would encourage a child to spend time revising lessons at home and provide an environment conductive to a child's learning.

by whether they participated in school meetings during the past year.

Using data from the Household Survey Questionnaire, I estimate the following equation:

$$\Pr(S_{ijk} = 1) = \alpha_0 + \alpha_1 T_k + \alpha_2 C_{ijk} + \alpha_3 V_j + \text{error term} \tag{3.5}$$

where S_{ijk} represents whether the following person in the household of child i in village j who is enrolled in school type k attended at least one school meeting during the past year: (i) at least one person from the household, (ii) the father, (iii) the mother, and (iv) other member of the household. S_{ijk} is equal to 1 if the person attended at least one school meeting, and 0 otherwise. C_{ijk} is the individual characteristics of child i in village j in school type k. Other variables are as defined above.

Columns (1) to (4) of Table 3.8 show the results from estimating equation (3.5) without including child characteristics. Compared to other types of schools, being enrolled in an NGO school significantly increases the probability that the child's mother attended at least one school meeting during the past year. Being enrolled in an NGO school also increases the probability of another member of the household attending school meeting, the effect is significant at the 10% level. On the other hand, compared to being enrolled in other types of schools, children enrolled in a government school or a private school are less likely to have either their fathers or mothers attend school meeting, when child characteristics are not controlled for.

When child and family characteristics are controlled for in columns (5) to (8), the dummy variable 'Child attends NGO school' is positive and significant across all columns, with the effect strongest in column (7), in the case of mother's participation. The results suggest that when a child is enrolled in an NGO school, the father, the mother, and another member of the household are all more likely to attend a school meeting. For children attending a government school, both the father and the mother are less likely to attend a school meeting, while for children attending a private school the mother is less likely to attend a school meeting compared to children attending

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other types of schools.

Several child and family characteristics appear strong determinants of whether the father, the mother, or another member of the household attend a school meeting. Education and economic status seem to play an important role. The level of education of the father increases the probability that he attends a school meeting, and likewise for the mother. When a parent has more education, it is likely that they are interested in their children's education and participate in school meetings. A household's economic status is captured by whether a household is economically surplus, balance, sometimes in deficit, or always in deficit. Being economically surplus increases the probability that the father attends a school meeting, while being in deficit decreases the probability that the father and the mother attend a school meeting.

Household components also appear to play an important role. Children from households with more adults are more likely to have another member of the household attend a school meeting. Having more siblings increases the probability that the father attends a school meeting. A child with a higher percentage of boys in the family is less likely to have the mother attend a school meeting.[29] A child from a female-headed household is more likely to have the mother or another member of the household attend a school meeting, and less likely to have the father attend a school meeting, as expected. When the mother has access to NGO credit, or when she is involved in income-generating activities, she is more likely to attend a school meeting.[30]

The results in Table 3.8 point to the role of NGO schools in increasing parents' participation in school meeting. The effect appears strongest in the case of mother's

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[29] One possible reason is that daughters can often help with household chores and taking care of younger siblings, thus allowing the mother to attend a school meeting.

[30] This could be either because (i) having access to NGO credit or being involved in income-generating activities increases the mother's mobility and confidence in interacting with other people which makes her more likely to attend a school meeting, or (ii) more active and confident mother is more likely to join an NGO credit or become involved in income generating activities and at the same time more likely to attend a child's school meeting.

participation.

I further investigate whether the factors affecting the probability of a parent's participation in school meeting differ between children attending different types of schools. I estimate equation (3.5) separately for children attending government, private, and NGO schools. The results are shown in Table 3.9.

The main results are that the level of education appears to play a much less important role in explaining parents' participation in school meeting when a child attends an NGO school. For government and private schools, the father's education is significantly associated with whether he participated in school meeting. However, this relationship does not hold in the case of NGO schools. Mother's education plays an important role in explaining whether at least one person attended a school meeting in the case of government school students. For NGO school students, the relationship is sigfinicant at the 10% level.

As students in NGO schools are mainly children from poor households who did not have a chance to attend a formal school, in many cases their parents are poor and have little or no education. The results in Table 3.9 suggest that NGO schools have been able to encourage parents of the students to attend school meetings regardless of their education.

Together the results in Tables 3.8 and 3.9 show that parents, in particular the mother, and other members of the household are more likely to attend a school meeting when a child is enrolled in NGO school. For parents of NGO school students, the level of education does not appear to be an important determinant of their participation in school meetings.

As parents' interest in their children's education possibly affects the children's learning outcomes, I further investigate whether parents' participation in school meetings has any effect on children's test scores, as measured by the Assessment of Basic Competencies (ABC) test.

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Using the sample of 11-12 year-old children who took the Assessment of Basic Competencies test, I estimate the following equation:

$$Y_{ijk} = \alpha_0 + \alpha_1 T_k + \alpha_2 C_{ijk} + \alpha_3 V_j + \text{error term} \tag{3.6}$$

where Y_{ijk} represents (i) whether a child passed the ABC test or not[31], and (ii) test scores of life-skills, reading, writing, and numeracy sections. T_k is the dummy variable for the type of school that the child was attending at the time of survey. I control for children who have dropped out of school, and the omitted category is the group who have never been enrolled. C_{ijk} is a vector of individual characteristics of child i in school type k in village j, which includes variables representing whether the child's father, mother, or other member of the household attended any school meeting in the past year.

Table 3.10 shows that being enrolled in an NGO school has positive and significant effects on the probability of passing the ABC test, and all test scores. Being enrolled in a government school or a private school has positive and significant effects on the test scores of reading, writing, and numeracy skills sections.[32]

Father's participation in school meeting shows a positive and significant association with the probability of passing the ABC test. Also, as shown in column (6), the effect is positive and significant at the 10% level for the scores of reading skills section when village fixed effects are controlled for. Mother's participation is positively and significantly associated with the scores of writing skills section when village fixed effects are not included, although the effect becomes insignificant once village fixed

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[31]A child is considered to have 'basic education', i.e. to pass the ABC test, if he/she satisfied the following criteria: (i) answering correctly at least 7 out of 10 life skills questions; (ii) answering correctly at least 3 of the 4 questions from the reading comprehension passage; (iii) correctly communicating a given message through a letter; and (iv) answering correctly at least 3 of the 4 mental arithmetic questions (Chowdhury et al., 1999).

[32]For life skills section, the different effects of NGO schools and both government and private schools could be due to the difference in the curriculum. NGO schools emphasize more on matters such as health care which are tested in the life skills section.

effects are controlled for. Other member of the household's participation in school meeting is positively and significantly associated with the scores of life skills section.

Several other child and family characteristics are significantly correlated with test scores. The last class passed is the strongest determinant of test scores for all sections. Girls tend to do worse than boys in all sections, especially numeracy skills. Father's education is positively and significantly associated with the probability of passing the ABC test, and reading and writing scores.

Together the results in Table 3.10 show that parents' participation in school meeting is positively correlated with certain sections' test scores. As parents' participation in school meeting possibly reflects parents' motivation and interest in their children's education, the results suggest that of parents' motivation improves children's educational outcomes.

Overall, the results in Tables 3.8, 3.9, and 3.10 point to the role of NGO schools in encouraging parents' participation in school meeting, in particular mother's. Unlike the case of government and private schools, the level of education does not appear an important determinant of whether parents of NGO school students attend a school meeting or not. Parents' participation in school meeting is positively correlated with certain sections' test scores.

3.5 Conclusion

NGO schools in Bangladesh are an innovation aimed to reach the poorest children who did not have a chance to attend formal school. Although NGO school teachers are paid much less compared to formal school teachers, their attendance rate is much higher. NGO school students come from poor households and were non-enrolled or have dropped out of school, however, they have much higher attendance rate compared to students in government and private schools. Moreover, parents of NGO school

students are poorer and have less education compared to parents of government or private school students, yet they participate more in school meetings.

In this chapter I identify the factors which are correlated with teacher presence, student attendance, and guardians' participation in school meetings. Using nationally representative data, I first study the correlates for all types of schools in Bangladesh, and then focus on the case of NGO schools. The results show that, after controlling for other factors, NGO school teachers are more likely to be present in school, NGO schools are associated with higher student attendance rates, and guardians of NGO school students, in particular mothers, are more likely to participate in school meetings. Motivation appears the most important factor explaining teacher presence among NGO school teachers. Teacher attendance rate and other factors relating to curriculum and school facility explain student attendance in NGO schools. Education appears to play a much smaller role in explaining guardians' participation in school meetings for NGO school students compared to students in other types of schools. There is evidence that guardians' participation in school meetings is positively correlated with test scores.

Overall, it appears that the high teacher attendance rate in NGO schools comes from the motivation of the teachers rather than monitoring or school facilities. The motivation may either have come from the process of self-selection, where more motivated persons choose to join NGO schools (as suggested in Besley and Ghatak, 2005), or NGOs might have motivated their teachers through NGO training and refreshers' courses. It is not possible to identify the process of self-selection with the present data. However, evidence suggests that the latter must have played a role, as NGO school teacher presence is correlated with having received NGO training and refreshers' courses. As noted in Khan (2001), in the case of BRAC schools, motivational work is done by local staff before they open schools in the villages and *"a sense of re-*

sponsibility in teaching poor children is developed."[33] This motivational work appears to have played a role in the high teacher presence in NGO schools.

These results contrast with earlier findings which suggest that monitoring and school facilities are correlated with teacher presence in formal schools, while motivation does not appear correlated (Chaudhury et al., 2005 and Kremer et al., 2005). In the case of formal schools, motivation may not play a role, however, the results in this chapter suggest that motivation is an underlying factor explaining the high teacher attendance rate in NGO schools.

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[33]Khan (2001), page 13.

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TABLE 3.1
SUMMARY OF SCHOOL CHARACTERISTICS

School Level Means	Government	Private	NGO
% teachers present on day of visit	.86	.79	.97
	(.18)	(.22)	(.15)
Student attendance rate	.55	.49	.84
	(.16)	(.21)	(.18)
% schools with school visit within one month	.36	.26	.59
	(.49)	(.44)	(.49)
% schools with PTA	.70	.41	.34
	(.46)	(.49)	(.47)
% members attended last PTA meeting	.55	.74	.79
	(.21)	(.17)	(.21)
% schools with SMC	.99	.99	.77
	(.09)	(.09)	(.42)
% members attended last SMC meeting	.70	.72	.89
	(.17)	(.16)	(.16)
Number of teachers	4.4	4.0	1.1
	(2.3)	(1.6)	(.43)
% female teachers	.35	.31	.92
	(.33)	(.28)	(.26)
Teachers' education (years)	11.8	11.4	10.1
	(1.0)	(1.0)	(1.3)
Teachers' experience (years)	19.5	9.8	2.6
	(5.7)	(5.0)	(2.4)
Teachers' number of refreshers' courses	5.3	4.3	9.0
	(2.6)	(3.2)	(4.4)
Class size	53.8	46.4	30.4
	(30.6)	(26.2)	(4.7)
Level of classroom crowdedness	1.67	1.9	1.01
	(1.0)	(1.0)	(.23)
% schools with toilet facility	.83	.72	.33
	(.38)	(.45)	(.47)
% schools with drinking water facility	.60	.43	.10
	(.49)	(.50)	(.30)
Number of observations	353	116	215

Standard deviations are in parentheses. The numbers of observations for "Percentage of members attended last PTA meeting" and "Percentage of members attended last SMC meeting" are 196 and 340 for government schools, 31 and 104 for private schools, and 58 and 139 for NGO schools, respectively. The numbers of observations for "Student dropout rate" are 331, 98, and 94 for government, private, and NGO schools, respectively.

TABLE 3.2
SUMMARY OF INDIVIDUAL CHARACTERISTICS

Individual Level Means*	Government	Private	NGO
Number of adults in household	2.6	2.6	2.5
	(1.5)	(1.3)	(1.2)
Number of siblings	3.9	3.8	3.5
	(1.7)	(1.7)	(1.5)
% boys among siblings	.51	.51	.49
	(.27)	(.27)	(.28)
% female headed households	.03	.03	.03
	(.16)	(.17)	(.18)
Father's education (class passed)	3.5	2.9	2.1
	(4.2)	(3.9)	(3.3)
Mother's education (class passed)	2.2	1.9	1.1
	(3.1)	(3.0)	(2.3)
% from households 'always in deficit'	.30	.26	.32
	(.46)	(.44)	(.46)
% from households 'sometimes in deficit'	.35	.38	.38
	(.48)	(.49)	(.48)
% from households 'economically balance'	.25	.26	.25
	(.43)	(.44)	(.43)
% from households 'economically surplus'	.10	.10	.06
	(.30)	(.30)	(.24)
% from households: mother has access to	.19	.20	.27
NGO credit	(.39)	(.40)	(.44)
% from households: mother is involved in	.25	.29	.29
income generating activities	(.43)	(.45)	(.45)
% from households: member sells labor	.44	.48	.52
at least 100 days/year	(.50)	(.50)	(.50)
% at least one person from household	.29	.29	.61
attended school meeting this year	(.46)	(.45)	(.49)
% father attended school meeting this year	.20	.22	.25
	(.40)	(.41)	(.43)
% mother attended school meeting this year	.05	.04	.39
	(.21)	(.19)	(.49)
% another person from household attended	.07	.05	.10
school meeting this year	(.25)	(.22)	(.30)
Number of observations	15288	3097	1542

* Individual level means are those of individual aged 6 to 10 years old attending the respective types of schools.
Standard deviations are in parentheses.

TABLE 3.3
TEACHER PRESENCE: PRIMARY SCHOOLS IN BANGLADESH

	Dependent variable: Whether the teacher was present or not						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Government school	-0.214	0.021	0.186	0.272	0.360	-0.131	-0.289
	(1.57)	(0.11)	(0.60)	(1.16)	(0.97)	(0.45)	(0.66)
Private school	-0.784	-0.487	-0.586	-0.035	-0.178	-0.140	-0.432
	(4.55)***	(2.09)**	(1.74)*	(0.14)	(0.47)	(0.51)	(1.07)
NGO school	1.604	1.828	2.042	2.479	2.421	2.912	2.524
	(3.10)***	(3.42)***	(3.34)***	(4.22)***	(3.60)***	(3.88)***	(3.29)***
Number of teachers				0.024	0.028	0.019	0.016
				(1.77)*	(1.39)	(1.37)	(0.80)
Class size				0.003	0.001	0.002	0.000
				(1.52)	(0.44)	(0.92)	(0.07)
% female teachers				-0.126	-0.154	0.256	0.253
				(0.65)	(0.52)	(1.00)	(0.68)
School visit within 1 month				0.028	0.040	-0.022	-0.098
				(0.22)	(0.23)	(0.16)	(0.53)
Has PTA				0.279	0.501	0.237	0.466
				(1.56)	(1.93)*	(1.22)	(1.69)*
% attended PTA				-0.189	-0.428	-0.254	-0.588
				(0.75)	(1.26)	(0.91)	(1.58)
Has SMC				-0.221	-0.758	-0.070	-0.629
				(0.59)	(1.61)	(0.18)	(1.29)
% attended SMC				0.278	0.313	0.204	0.201
				(1.20)	(1.00)	(0.85)	(0.65)
Has toilet				0.151	0.160	0.143	0.237
				(1.05)	(0.83)	(1.00)	(1.21)
Has drinking water				0.094	-0.063	0.152	-0.040
				(0.79)	(0.39)	(1.22)	(0.23)
Male						0.400	0.412
						(2.35)**	(2.26)**
Head teacher						-0.466	-0.554
						(3.04)***	(3.14)***
Training: Primary Training Institute (PTI)						0.649	0.817
						(3.26)***	(3.47)***
Training: Bachelor of Education (BED)						0.399	0.543
						(2.11)**	(2.46)**
Training: NGO						0.434	0.740
						(0.91)	(1.84)*
Education (years)						-0.073	-0.065
						(2.13)**	(1.57)
Experience (years)						0.006	0.007
						(0.69)	(0.71)
Number of refresher courses						-0.021	0.022
						(1.07)	(0.69)
Control for other school types	No	Yes	Yes	Yes	Yes	Yes	Yes
Village characteristic	No	Yes	No	Yes	No	Yes	No
Stratum fixed effects	No	Yes	No	Yes	No	Yes	No
Village fixed effects	No	No	Yes	No	Yes	No	Yes
Observations	4237	4237	3635	4142	3564	4027	3410
Pseudo R2	0.019	0.043	0.096	0.056	0.107	0.075	0.131

Absolute z-statistics are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively. Standard errors are clustered at the village level. Other school types include three types of religious schools, kindergarten, and non-formal schools which are not run by NGOs. Village characteristics include percentage of adults 21 years and above with no schooling, whether there is an NGO micro-credit in the village , average economic status, percentage of landless households, percentage of households with members who sell labor more than 100 days/year, percentage of female headed households, and percentage of Muslims in the village.

Dependent variable: Whether the teacher was present or not		
	(1)	(2)
Government school	0.278	0.369
	(1.19)	(1.00)
Private school	-0.030	-0.181
	(0.12)	(0.47)
NGO school	5.676	3.237
	(2.13)**	(1.18)
Number of teachers	0.025	0.028
	(1.79)*	(1.42)
NGO*Number of teachers	-4.107	-4.452
	(3.99)***	(3.73)***
Class size	0.003	0.002
	(1.50)	(0.48)
NGO*Class size	0.072	0.115
	(0.88)	(1.26)
% female teachers	-0.129	-0.160
	(0.65)	(0.52)
School visit within 1 month	0.027	0.025
	(0.21)	(0.14)
NGO*School visit	2.140	2.821
	(1.39)	(1.53)
Has PTA	0.295	0.549
	(1.62)	(2.03)**
NGO*Has PTA	-2.329	-2.103
	(2.07)**	(1.16)
Has SMC	-0.230	-0.781
	(0.59)	(1.60)
NGO*Has SMC	-2.896	-1.840
	(1.82)*	(1.01)
% attended SMC	0.279	0.298
	(1.21)	(0.94)
NGO*% attended SMC	-0.503	0.154
	(0.40)	(0.12)
Has toilet	0.142	0.138
	(0.97)	(0.69)
NGO*Has toilet	3.568	3.719
	(3.54)***	(2.93)***
Control for other school charac.	Yes	Yes
Village characteristics	Yes	No
Stratum fixed effects	Yes	No
Village fixed effects	No	Yes
Observations	4068	3499
Pseudo R2	0.055	0.107

Absolute z-statistics are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively. Standard errors are clustered at the village level. Other school types include three types of religious schools, kindergarten, and non-formal schools which are not run by NGOs. Village characteristics include percentage of adults 21 years and above with no schooling, whether there is an NGO micro-credit in the village , average economic status, percentage of landless households, percentage of households with members who sell labor more than 100 days/year, percentage of female headed households, and percentage of Muslims in the village.

TABLE 3.5
TEACHER PRESENCE: THE CASE OF NGO SCHOOL TEACHERS

	Dependent variable: Whether the teacher was present or not										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Motivation:											
One teacher school	1.756			1.743							6.509
	(2.24)**			(1.71)*							(2.68)***
Training NGO		1.762		1.790							2.012
		(2.47)**		(4.52)***							(1.90)*
Number refresher's			0.255	0.139							0.289
course			(4.74)***	(2.15)**							(4.63)***
Monitoring:											
School visit within					1.630				1.605		0.787
one month					(3.04)***				(1.70)*		(1.34)
Has PTA						-0.184			-0.224		-1.911
						(0.21)			(0.21)		(1.30)
Has SMC							0.661		0.078		-2.541
							(0.80)		(0.05)		(1.84)*
Head teacher								0.074	-0.029		-1.039
								(0.09)	(0.03)		(0.45)
Facility:											
toilet										-0.023	2.057
										(0.03)	(1.41)
Village characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Stratum fixed effects	No	No	No	No	No	No	No	No	No	No	No
Village fixed effects	No	No	No	No	No	No	No	No	No	No	No
Observations	233	233	230	230	233	233	232	233	232	233	229
Pseudo R2	0.260	0.259	0.379	0.441	0.265	0.215	0.222	0.214	0.266	0.214	0.502

Absolute z-statistics are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively. Standard errors are clustered at the village level. Village characteristics include percentage of adults 21 years and above with no schooling, whether there is an NGO micro-credit in the village , average economic status, percentage of landless households, percentage of households with members who sell labor more than 100 days/year, percentage of female headed households, and percentage of Muslims in the village.

TABLE 3.6
STUDENT ATTENDANCE: PRIMARY SCHOOLS IN BANGLADESH

	Dependent variable: Attendance rate of students in each class						
	All students					Boys	Girls
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Government school	-0.035	-0.045	0.004	0.020	0.024	0.018	0.010
	(1.10)	(1.17)	(0.14)	(0.59)	(0.63)	(0.46)	(0.23)
Private school	-0.085	-0.090	-0.065	0.010	-0.015	-0.010	-0.034
	(2.52)**	(2.17)**	(1.80)*	(0.33)	(0.43)	(0.27)	(0.91)
NGO school	0.226	0.222	0.275	0.318	0.302	0.316	0.281
	(6.23)***	(4.94)***	(6.07)***	(6.57)***	(5.43)***	(5.62)***	(4.56)***
% teachers present				0.098	0.108	0.099	0.124
				(2.64)***	(2.33)**	(2.02)**	(2.52)**
Number of teachers				0.004	0.005	0.004	0.006
				(3.33)***	(2.52)**	(2.19)**	(2.64)***
Class size				0.000	0.000	0.000	0.000
				(1.55)	(1.05)	(0.95)	(1.01)
Level of classroom crowdedness				-0.042	-0.034	-0.033	-0.035
				(7.37)***	(6.84)***	(5.89)***	(6.24)***
% female teachers				-0.002	0.054	0.045	0.073
				(0.09)	(1.67)*	(1.35)	(2.12)**
Teachers' education				0.002	-0.009	-0.003	-0.012
				(0.37)	(1.22)	(0.38)	(1.55)
Teachers' experience				0.002	0.002	0.002	0.002
				(1.13)	(1.08)	(1.08)	(1.14)
School visit within 1 month				-0.003	-0.010	-0.010	-0.010
				(0.27)	(0.58)	(0.54)	(0.51)
Has PTA				-0.022	0.001	0.009	0.012
				(1.24)	(0.03)	(0.36)	(0.52)
% attended PTA				0.001	-0.005	-0.019	0.004
				(0.05)	(0.19)	(0.55)	(0.13)
Has SMC				-0.020	-0.071	-0.090	-0.032
				(0.59)	(1.82)*	(2.04)**	(0.80)
% attended SMC				0.030	0.078	0.101	0.056
				(1.12)	(2.25)**	(2.78)***	(1.61)
Has toilet				-0.005	0.012	0.019	0.013
				(0.31)	(0.69)	(0.93)	(0.71)
Has drinking water				0.038	0.029	0.025	0.027
				(3.06)***	(1.83)*	(1.44)	(1.67)*
Has flag				-0.001	-0.005	0.010	-0.016
				(0.05)	(0.18)	(0.37)	(0.60)
Sing national anthem				0.036	0.022	0.027	0.014
				(2.69)***	(1.47)	(1.69)*	(0.87)
Control for other school types	No	Yes	Yes	Yes	Yes	Yes	Yes
Village characteristics	No	Yes	No	Yes	No	No	No
Stratum fixed effects	No	Yes	No	Yes	No	No	No
Village fixed effects	No	No	Yes	No	Yes	Yes	Yes
Observations	3553	3553	3553	3381	3381	3267	3241
R-squared	0.09	0.16	0.39	0.26	0.46	0.39	0.41

Absolute z-statistics are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively. Standard errors are clustered at the village level. Other school types include three types of religious schools, kindergarten, and non-formal schools which are not run by NGOs. Village characteristics include percentage of adults 21 years and above with no schooling, whether there is an NGO micro-credit in the village , average economic status, percentage of landless households, percentage of households with members who sell labor more than 100 days/year, percentage of female headed households, and percentage of Muslims in the village.

TABLE 3.7
STUDENT ATTENDANCE:
DIFFERENCES BETWEEN NGO AND OTHER TYPES OF SCHOOLS

Dependent variable: Attendance rate of students in each class		
	All	Boys	Girls
	(1)	(2)	(3)
Government school	0.033	0.028	0.016
	(0.87)	(0.68)	(0.41)
Private school	-0.003	0.006	-0.026
	(0.10)	(0.15)	(0.75)
NGO school	0.145	0.077	0.132
	(0.40)	(0.21)	(0.35)
% teachers present	0.098	0.089	0.113
	(2.16)**	(1.85)*	(2.33)**
NGO*% teachers present	0.191	0.280	0.186
	(1.29)	(3.17)***	(0.92)
Number of teachers	0.005	0.004	0.005
	(2.42)**	(1.95)*	(2.59)**
NGO*Number of teachers	0.041	0.057	0.034
	(0.88)	(1.14)	(0.75)
Class size	0.000	0.000	0.000
	(0.74)	(0.66)	(0.67)
NGO*Class size	0.011	0.012	0.013
	(2.90)***	(2.52)**	(3.71)***
Level of classroom Crowdedness	-0.034	-0.033	-0.034
	(6.62)***	(5.68)***	(6.00)***
NGO*Level of classroom Crowdedness	-0.116	-0.113	-0.166
	(2.06)**	(1.57)	(2.77)***
% female teachers	0.035	0.031	0.051
	(1.06)	(0.88)	(1.45)
NGO*% female teachers	-0.026	-0.038	-0.041
	(0.42)	(0.63)	(0.61)
Teachers' education	-0.003	0.005	-0.008
	(0.43)	(0.54)	(0.98)
NGO*Teachers' education	-0.028	-0.033	-0.020
	(1.72)*	(1.86)*	(1.13)
Teachers' experience	0.002	0.002	0.002
	(1.08)	(1.30)	(0.99)
NGO*Teachers' experience	0.006	-0.005	0.013
	(1.12)	(0.82)	(2.20)**
School visit within 1 month	-0.020	-0.028	-0.016
	(1.06)	(1.50)	(0.78)
NGO*School visit	0.007	0.060	-0.019
	(0.21)	(1.61)	(0.56)
Has PTA	0.000	0.005	0.015
	(0.01)	(0.20)	(0.65)
NGO*PTA	-0.065	-0.043	-0.105
	(1.22)	(0.80)	(1.75)*
% attended PTA	0.008	-0.001	0.014
	(0.25)	(0.04)	(0.42)
NGO*% attended PTA	-0.021	-0.029	0.001
	(0.35)	(0.37)	(0.01)
Has SMC	-0.061	-0.063	-0.013
	(1.16)	(1.08)	(0.24)
NGO*Has SMC	0.016	-0.028	-0.002
	(0.20)	(0.30)	(0.03)

TABLE 3.7
STUDENT ATTENDANCE:
DIFFERENCES BETWEEN NGO AND OTHER TYPES OF SCHOOLS
(CONTINUED)

Dependent variable: Attendance rate of students in each class			
	All	Boys	Girls
	(1)	(2)	(3)
% attended SMC	0.080	0.091	0.067
	(1.97)*	(2.10)**	(1.63)
NGO*% attended SMC	-0.097	-0.043	-0.125
	(1.89)*	(0.69)	(2.45)**
Has toilet	0.004	0.009	0.006
	(0.20)	(0.42)	(0.30)
NGO*Has toilet	0.029	0.026	0.024
	(0.66)	(0.55)	(0.54)
Has drinking water	0.033	0.028	0.032
	(2.03)**	(1.55)	(1.94)*
NGO*Has drinking water	-0.094	-0.079	-0.116
	(1.68)*	(1.50)	(1.68)*
School has flag	0.003	0.019	-0.008
	(0.09)	(0.67)	(0.26)
NGO*Flag	-0.022	-0.037	-0.016
	(0.37)	(0.60)	(0.25)
Sing national anthem	0.017	0.022	0.006
	(1.02)	(1.32)	(0.37)
NGO*Sing national anthem	0.086	0.097	0.086
	(2.33)**	(2.28)**	(2.21)**
Control for other school types	Yes	Yes	Yes
Village characteristics	No	No	No
Stratum fixed effects	No	No	No
Village fixed effects	Yes	Yes	Yes
Observations	3381	3267	3241
R-squared	0.47	0.41	0.42

Absolute z-statistics are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively. Standard errors are clustered at the village level. Other school types include three types of religious schools, kindergarten, and non-formal schools which are not run by NGOs. Village characteristics include percentage of adults 21 years and above with no schooling, whether there is an NGO micro-credit in the village , average economic status, percentage of landless households, percentage of households with members who sell labor more than 100 days/year, percentage of female headed households, and percentage of Muslims in the village.

TABLE 3.8
PARENTS' PARTICIPATION IN SCHOOL MEETINGS:
PRIMARY SCHOOLS IN BANGLADESH

	At least one	Father	Mother	Other member	At least one	Father	Mother	Other member
Dependent variable: Whether the following person attended school meeting this year								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Child attends gov. school	-0.304 (3.49)***	-0.273 (3.34)***	-0.515 (3.62)***	-0.013 (0.12)	-0.134 (1.67)*	-0.156 (2.06)**	-0.276 (2.07)**	0.073 (0.66)
Child attends private school	-0.344 (2.54)**	-0.283 (2.02)**	-0.667 (2.89)***	-0.001 (0.00)	-0.197 (1.51)	-0.175 (1.28)	-0.505 (2.26)**	0.117 (0.60)
Child attends NGO school	1.229 (5.82)***	0.125 (0.77)	1.836 (7.55)***	0.388 (1.94)*	1.648 (7.80)***	0.461 (2.83)***	2.219 (9.34)***	0.606 (3.05)***
Girl					0.023 (0.62)	0.027 (0.67)	0.019 (0.28)	0.000 (0.00)
Age 7					0.109 (2.29)**	0.032 (0.57)	0.084 (0.84)	0.208 (2.43)**
Age 8					0.126 (2.45)**	0.077 (1.37)	0.090 (0.98)	0.139 (1.60)
Age 9					0.226 (4.56)***	0.212 (3.76)***	0.205 (1.83)*	0.115 (1.16)
Age 10					0.195 (4.06)***	0.199 (3.62)***	0.049 (0.49)	0.144 (1.69)*
Number adults					0.046 (2.50)**	-0.016 (0.76)	-0.048 (1.75)*	0.205 (8.39)***
Number siblings					0.035 (2.24)**	0.057 (3.11)***	-0.040 (1.65)*	-0.020 (0.78)
Percentage of boys					-0.083 (1.04)	0.016 (0.18)	-0.264 (2.15)**	0.128 (0.91)
Female head of household					-0.312 (2.23)**	-3.301 (6.89)***	0.615 (3.20)***	1.091 (6.72)***
Father's education					0.072 (9.61)***	0.092 (11.12)***	-0.013 (1.13)	0.022 (1.78)*
Mother's education					0.050 (5.83)***	0.013 (1.26)	0.156 (11.3)***	0.021 (1.64)
Always in deficit					-0.250 (3.21)***	-0.201 (2.27)**	-0.184 (1.65)*	-0.206 (1.79)*
Sometimes in deficit					-0.058 (1.05)	0.025 (0.42)	-0.222 (2.38)**	-0.066 (0.76)
Surplus					0.191 (2.36)**	0.196 (2.18)**	-0.058 (0.50)	0.307 (2.37)**
Mother: access to NGO credit					0.068 (1.13)	-0.055 (0.77)	0.389 (4.51)***	-0.040 (0.38)
Mother: income Generating activities					0.154 (2.44)**	0.120 (1.74)*	0.330 (3.41)***	-0.030 (0.33)
At least 1 household Member sells labour					-0.220 (3.38)***	-0.335 (4.94)***	0.328 (3.28)***	-0.105 (1.21)
Village fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	23905	23905	19150	21882	23866	23866	19124	21843
Pseudo R2	0.130	-0.273	0.220	0.089	0.169	0.158	0.254	0.117

Absolute z-statistics are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively. Standard errors are clustered at the village level. 1 also control for whether the religion of the child is Islam or Hindu.

	Government schools		Private schools		NGO schools	
Dependent variable: Whether the following person attended school meeting this year						
	One person	Father	One person	Father	One person	Father
	(1)	(2)	(3)	(4)	(5)	(6)
Girl	0.027	0.058	0.068	0.103	-0.281	-0.410
	(0.59)	(1.16)	(0.58)	(0.87)	(1.53)	(2.10)**
Age 7	0.169	0.107	-0.082	-0.257	0.076	-0.238
	(2.56)**	(1.39)	(0.56)	(1.61)	(0.29)	(1.05)
Age 8	0.156	0.135	0.022	-0.157	0.313	-0.090
	(2.35)**	(1.83)*	(0.15)	(1.04)	(1.01)	(0.32)
Age 9	0.247	0.252	0.059	-0.077	0.436	0.144
	(4.03)***	(3.55)***	(0.37)	(0.46)	(1.60)	(0.49)
Age 10	0.254	0.279	0.073	-0.066	0.071	-0.040
	(4.09)***	(4.01)***	(0.61)	(0.50)	(0.24)	(0.13)
Number adults	0.046	-0.012	0.030	-0.045	0.029	-0.032
	(1.91)*	(0.46)	(0.66)	(1.07)	(0.39)	(0.30)
Number siblings	0.051	0.060	-0.067	-0.013	0.006	0.089
	(2.57)**	(2.62)***	(1.95)*	(0.37)	(0.10)	(1.16)
Percentage of boys	-0.041	0.024	-0.176	-0.021	-0.453	-0.446
	(0.38)	(0.21)	(0.83)	(0.09)	(1.43)	(1.35)
Female head of	-0.313	-3.416	-0.932	-3.396	-0.070	-2.207
household	(1.77)*	(4.83)***	(2.44)**	(3.07)***	(0.13)	(2.77)***
Father's education	0.066	0.091	0.116	0.117	0.017	0.059
	(7.42)***	(9.14)***	(4.89)***	(5.04)***	(0.49)	(1.52)
Mother's education	0.050	0.006	0.039	-0.005	0.082	0.006
	(4.55)***	(0.51)	(1.48)	(0.19)	(1.89)*	(0.15)
Always in deficit	-0.236	-0.153	0.075	0.035	-0.398	-0.508
	(2.39)**	(1.38)	(0.34)	(0.15)	(1.71)*	(1.90)*
Sometimes in deficit	-0.005	0.059	0.056	0.145	-0.273	0.170
	(0.07)	(0.76)	(0.36)	(0.89)	(1.25)	(1.06)
Surplus	0.205	0.180	0.507	0.441	-0.596	-0.236
	(2.02)**	(1.59)	(1.67)*	(1.33)	(1.48)	(0.64)
Mother: access to	-0.047	-0.112	0.290	0.151	0.307	-0.402
NGO credit	(0.64)	(1.27)	(1.91)*	(0.84)	(1.47)	(1.92)*
Mother: income	0.226	0.157	0.099	0.065	0.387	0.238
Generating activities	(3.00)***	(1.98)*	(0.60)	(0.34)	(1.62)	(1.22)
At least 1 household	-0.278	-0.355	-0.314	-0.404	-0.138	-0.552
Member sells labour	(3.54)***	(4.17)**	(1.78)*	(2.43)**	(0.65)	(3.21)**
Village fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	15155	14898	2877	2821	1390	1323
Pseudo R2	0.163	0.165	0.186	0.172	0.294	0.183

Absolute z-statistics are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively. Standard errors are clustered at the village level. I also control for whether the religion of the child is Islam or Hindu.

TABLE 3.10
TEST SCORES AND PARENTS' PARTICIPATION IN SCHOOL MEETINGS

| | Dependent variable: Test scores of | | | | | | | | | |
| | ABC | | Life skills | | Reading | | Writing | | Numeracy | |
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Government	0.339	0.606	0.014	-0.021	0.269	0.333	0.774	0.902	0.244	0.177
	(1.14)	(1.59)	(0.09)	(0.13)	(2.72)***	(3.17)***	(3.91)***	(4.31)***	(2.15)**	(1.48)
Private	0.605	0.894	0.205	0.165	0.288	0.394	0.926	0.970	0.303	0.271
	(1.79)*	(1.91)*	(1.09)	(0.80)	(2.30)**	(2.96)***	(3.33)***	(3.17)***	(2.64)***	(2.09)**
NGO	1.689	1.840	1.158	0.940	0.946	0.849	2.958	2.610	0.539	0.431
	(4.48)***	(3.87)***	(5.59)***	(4.29)***	(6.85)***	(5.81)***	(9.45)***	(7.85)***	(4.20)***	(3.05)***
Father:	0.255	0.280	0.109	0.033	0.091	0.113	0.060	0.136	0.006	0.002
School meeting	(2.15)**	(1.97)**	(1.24)	(0.37)	(1.55)	(1.86)*	(0.52)	(1.11)	(0.13)	(0.04)
Mother:	0.140	-0.046	0.150	0.064	0.153	0.063	0.393	0.186	0.090	0.049
School meeting	(0.71)	(0.19)	(1.21)	(0.48)	(1.57)	(0.64)	(2.00)**	(1.02)	(1.47)	(0.78)
Other member:	0.052	-0.063	0.409	0.261	0.004	-0.015	-0.138	-0.189	0.055	0.039
School meeting	(0.32)	(0.31)	(3.26)***	(2.05)**	(0.05)	(0.17)	(0.89)	(1.21)	(0.86)	(0.56)
Girl	-0.314	-0.414	-0.126	-0.135	-0.130	-0.126	-0.315	-0.294	-0.477	-0.472
	(2.84)***	(3.20)***	(1.61)	(1.69)*	(2.65)***	(2.47)**	(3.06)***	(2.79)***	(9.63)***	(9.12)***
Class passed	0.619	0.717	0.356	0.376	0.524	0.518	1.100	1.083	0.264	0.272
	(11.8)***	(11.5)***	(12.0)***	(12.7)***	(24.5)***	(22.6)***	(24.3)***	(22.1)***	(15.9)***	(14.9)***
Father's	0.034	0.039	0.017	0.017	0.018	0.020	0.052	0.053	-0.001	-0.002
education	(2.58)***	(2.29)**	(1.88)*	(1.70)*	(2.56)**	(2.68)***	(3.84)***	(3.76)***	(0.15)	(0.40)
Mother's	0.017	0.037	0.015	0.024	-0.015	-0.012	-0.002	0.004	0.000	0.009
education	(0.96)	(1.59)	(1.11)	(1.75)*	(1.80)*	(1.33)	(0.10)	(0.26)	(0.03)	(1.15)
Other child charac.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Village charac.	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Stratum effects	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Village effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Observations	3311	3065	3324	3324	3324	3324	3324	3324	3324	3324
Pseudo R2/ R2	0.258	0.332	0.31	0.42	0.48	0.56	0.54	0.61	0.25	0.35

Absolute z-statistics are in parentheses. *, **, and *** denote significance at the 10%, 5% and 1% level, respectively. Standard errors are clustered at the village level. Other child characteristics include: whether the child listens to the radio/ watches television/ reads newspaper, number of adults in the household, number of siblings, percentage of boys among all siblings, whether the household is a female headed household, household's self-perceived economic status, whether mother has access to NGO credit, whether mother is engaged in income-generating activities, whether there is at least one member of the household who sells labor more than 100 days/year, and religion. Village characteristics include percentage of adults 21 years and above with no schooling, whether there is an NGO micro-credit in the village , average economic status, percentage of landless households, percentage of households with members who sell labor more than 100 days/year, percentage of female headed households, and percentage of Muslims in the village.

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Chapter 4

Micro-credit, Fertility Decisions, and Women's Empowerment in Bangladesh

Abstract

This chapter investigates how micro-credit provided by the Grameen Bank affects fertility decisions and women's empowerment. In particular, the results point to the direction that women's empowerment is one of the main channels through which the Grameen Bank may affect fertility decisions. In villages where the Grameen Bank is well established, between 1993 and 1996 there has been a reduction in women's ideal number of children and the number of births in the year prior to the survey, and an increase in the use of family planning methods. In villages where the Grameen Bank entered between 1993 and 1996 there has been an increase in husbands' approval of family planning methods. Having the Grameen Bank in the village shows positive relationship with women's empowerment as measured by contribution to family support and mobility. Women who contribute to family support or have a high level of mobility are less likely to have given birth in the year prior to the survey.

4.1 Introduction

Bangladesh has experienced a sharp decline in fertility from a total fertility rate[1] of 6.3 in 1971-75 to 3.3 in 1994-96 despite the absence of conditions believed to be necessary for such changes, such as economic growth. Researchers argue that something must have occurred during the period that changed people's perception regarding family size and family planning (Cleland et al., 1994). The basis for this argument is that in the 1960s family planning programs were considered a failure, however, since the 1970s family planning programs have been highly successful. Pakistan, on the other hand, had a very slow fertility decline, although both Pakistan and Bangladesh started with a similar level of total fertility rate in 1970s and had a similar level of real GDP growth per year between 1980 and 1996 (Morduch, 2001).

One of the major changes in Bangladesh in the 1970s is the emergence of non-governmental organizations (NGOs) after the war of independence in 1971. At that time, the country was in a state of turmoil and many NGOs sprung up to help resettle the refugees who were returning home. Many NGOs later evolved into development agencies providing services in many areas including micro-credit, education, health, and agriculture. Micro-credit has become one of the main activities of NGOs in Bangladesh, and the 1980s and early 1990s saw rapid expansion of micro-credit programs by the Grameen Bank and replication by other NGOs.

The Grameen Bank initiated group lending programs for the poor in 1976. Muhammad Yunus, the founder of the Grameen Bank, felt that most villagers were unable to obtain credit at reasonable rates and that lack of credit hindered productive self-employment (Morduch, 1999). One special characteristic of micro-credit is that collateral is replaced with peer monitoring. Micro-credit members form groups and

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[1] Total Fertility Rate (TFR) is defined as "the average number of children that would be born alive to a woman (or a group of women) during her lifetime if she were to pass through her childbearing years conforming to the age-specific fertility rates of a given year." This rate is sometimes stated as the number of children women are having today.

all members of the group become ineligible for further loans if any member defaults. 95% of the Grameen Bank members are women. Group members meet weekly to repay loans, and during these meetings social issues such as education and family planning are raised.

Micro-credit programs may affect fertility decisions in many ways. Having micro-credit programs in the village of residence affects people's perception regarding family size and family planning, their knowledge of family planning methods, and economic opportunities that they face. Moreover, as the majority of micro-credit recipients are women, it is possible that micro-credit programs have an impact on women's empowerment.[2] Mahmud (2003) and Hashime et al. (1996), among others, document the positive impact of micro-credit program membership on women's empowerment in Bangladesh. Research findings have confirmed the negative impact of women's empowerment and education on fertility.[3]

Evidence regarding the relationship between micro-credit and fertility in Bangladesh has been mixed. Studies including Amin et al. (1994) and Hashemi et al. (1997) show positive associations of micro-credit participation and the probability of using family planning methods. However, the studies employ cross-sectional data and do not explicitly address the possibility of self-selection into programs.

On the other hand, two recent studies have found positive associations between micro-credit and fertility. Pitt et al. (1999) use 1991 cross-sectional data to estimate the impact of micro-credit participation on reproductive behavior, controlling for choice-based sampling, self-selection into programs, and non-random program placement. The findings suggest that female participation in credit programs has

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[2] "Empowerment" has been defined as the process by which the powerless gain greater control over the circumstances of their lives. It includes both control over resources (physical, human, intellectual, financial) and over ideology (beliefs, values, and attitudes) (Baltiwala, 1994). Variables used to proxy for women's empowerment include economic decision-making authority, child-related decision-making authority, mobility, freedom from threat, and access to economic resources (Jejeebhoy, 2000).

[3] For example, see Jejeebhoy (1995), Dyson and Moore (1983), Abadian (1996), G. Sen (1993), and Presser and Sen (2000).

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a positive effect on fertility relative to non-participant, although the effect is not always significant. The paper suggests that the income effect of access to micro-credit dominates the substitution effect.[4] Morduch (2001) uses a longitudinal data set with information on almost 1200 women during the years 1981 to 1991 to investigate the links between access to micro-credit and reproductive behaviors. The study measures the impact of eligibility rather than participation, using program rules that bar households owning over half an acre of land from participating.[5] The results show surprising positive associations of micro-credit access and fertility rates, confirming the findings in Pitt et al. (1999).

In this chapter I investigate the effects of having the Grameen Bank in the village of residence on fertility decisions and women's empowerment. Unlike Pitt et al. (1999) and Morduch (2001), I do not analyze the impact of micro-credit on actual participation or eligibility. Instead, I focus on the presence of the Grameen Bank in the village of residence, and the timing of the Grameen Bank's entrance into the village. I study how fertility decisions change over time in different groups of villages.

Using nationally representative data from the Bangladesh Demographic and Health Survey (BDHS), I study the changes in fertility decisions and women's empowerment between 1993 and 1996 in villages with and without the Grameen Bank. Due to non-random program placement of the Grameen Bank, I employ pooled cross-sectional analysis and focus on the changes over time in different groups of villages. This is possible since the 1993 and 1996 rounds of the BDHS surveyed the same villages. I can therefore control for village fixed effects. Due to the possibility of self-selection of

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[4]The Neoclassical model presented in the paper suggests that higher income from access to credit raises the demand for children while the higher opportunity cost of time in raising children lowers the demand. However, the employment generated by micro-credit is usually based at home, therefore the opportunity cost of child rearing is likely to be small.

[5]However, the author notes that the rule was followed laxly in the program villages, where 20-30% of participants were over the line and thus were excluded from the analysis. The procedure of choosing households in the controlled villages followed the rule strictly.

Grameen Bank members[6] and the likely spill-over effects of social norms[7], instead of focusing on the difference between members and non-members, I study all individuals in different groups of villages.

Findings suggest the role of the Grameen Bank in affecting people's perception regarding family size and family planning. In villages where the Grameen Bank is well established, between 1993 and 1996 there has been a reduction in women's ideal number of children and the number of births in the year prior to the survey, and an increase in the use of family planning methods. In villages where the Grameen Bank entered between 1993 and 1996 there has been an increase in husbands' approval of family planning methods. Moreover, having the Grameen Bank in the village is associated with an increase in women's empowerment in terms of contribution to family support and mobility. In line with earlier studies, there is evidence that women's empowerment is negatively correlated with fertility.

This chapter is organized as follows. The next section discusses the change in fertility in Bangladesh and the Grameen Bank's micro-credit program. Section 4.3 describes the data while section 4.4 presents the empirical analysis. Section 4.5 concludes.

4.2 Background

Bangladesh has undergone a considerable decline in fertility in the last few decades although the country's economic circumstances appeared unfavorable. Bangladesh is in fact the only country among the world's twenty poorest countries where such a change has occurred (Khuda and Hossain, 1996). The rapid decline in fertility in Bangladesh has challenged conventional demographic transition theory, which as-

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[6]It is possible that more active and outgoing women self-select themselves into joining the Grameen Bank.

[7]The knowledge of family planning methods and the perception regarding family size are some changes that can easily spill-over to non-members in the village.

sociates fertility decline with economic development, and researchers have tried to understand the factors that have contributed to this change in Bangladesh.

A World Bank study (Cleland et al., 1994) attributes the decline in fertility to the activities of national family planning program, as, according to the study, the decline occurred in spite of social, economic, and institutional circumstances that are unfavorable to reproductive change. Living standards hardly improved, very few women were engaged in cash-generating activities, and the Bangladeshi society has remained conservative, traditional, and agrarian. Children, particularly sons[8], are seen as an insurance against risks for women in the case that they divorce. This is because women are usually unable to seek employment and would therefore rely on their sons for support. The study states that the crucial change that has taken place concerns acceptability of and access to birth control and not economic growth that has driven down the demand for children. The Bangladesh government intensified family planning program efforts from about 1973, and achieved considerable momentum by 1975. Because the family planning program of the 1960s was considered a failure, it is believed that a change in the outlook of the people, perhaps encompassing demand factors, was a prerequisite for the success of the family planning program in the late 1970s and 1980s.

Caldwell et al. (1999), on the other hand, do not agree with Cleland et al. (1994) that little change occurred to the Bangladeshi society during the two decades between 1970s and 1990s. Their qualitative research, based on their fieldwork in Chittagong Division, found that the main reason given for using family planning methods is to allow for children's education and other family needs. Limited amounts of land means that more employment has to be found outside of farming, and education is recognized as the main route to such employment. Therefore, the reduction in fertility is likely to have resulted from the change in society to one which parents

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[8]Bangladesh is a society where there is a preference for sons over daughters, most vividly demonstrated by the excess mortality of daughters in childhood (Cleland et al., 1994).

need to carefully plan for their children's education and employment.

Female education is found to be the most important variable affecting both contraceptive use and fertility regulation in Bangladesh (Khuda and Hossain, 1996). There is also evidence that improvement in women's status in terms of employment, mobility, and decision-making power has contributed to increased contraceptive use and consequent fertility decline.

NGOs in Bangladesh are likely to have affected the Bangladeshi society in many ways, including female education and women's empowerment in areas such as employment, mobility, and decision-making. The number of NGOs has increased significantly from when NGOs started to emerge after the war of independence in 1971. In 1998 there were about 20,000 NGOs operating in Bangladesh's 86,000 villages (The Economist, 1998). In 2000, 83% of the women interviewed by the Bangladesh Demographic and Health Survey lived in villages where NGOs are operating (BDHS, 2000). NGOs in Bangladesh are involved in many areas of public service and are documented as being one of the most active in the world (Sharafuddin, 1998). NGOs provide services in many areas including education, health, and micro-credit. In many cases, NGOs focus on the poorest people and women. For example, micro-credit programs are aimed at women and NGOs' non-formal schools target girls.

The Grameen Bank is probably the most well-known NGO providing micro-credit. The Grameen Bank initiated group lending programs for the poor, and its model for group lending has been used for delivering credit in over 40 countries (Pitt et al., 1999). The Grameen Bank was founded in 1976 by Muhammad Yunus, a professor in economics, based on an idea that lack of capital was the main obstacle to productive self-employment among the poor. The Grameen Bank formally began functioning as a specialized bank in 1983, providing finance for nonagricultural self-employment activities. Common loan uses include rice processing, livestock raising, and traditional crafts (Morduch, 1999). The Grameen Bank provides credit to members who

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form self-selected groups of five. Collateral is replaced with peer monitoring, as all members in the group become ineligible for further loans if any member defaults.[9] The groups meet weekly to make repayments on their loans as well as mandatory contributions to savings and insurance funds.

The Grameen Bank personnel supervise the utilization of loans and guide borrowers through their use of loan resources. Members of each group are of the same sex, and 95 percent of the borrowers are women. The Grameen bank lends at the same rate of interest as commercial banks, and the repayment rate is over 90 percent. Strict rules of weekly repayment and peer pressure are believed to account for the high repayment rates.

The Grameen Bank also promotes an idea of low fertility and an alteration of the attitude towards women. At each weekly meeting, members jointly recite the "sixteen decisions", which include the following: "We will keep our families small," "We shall not take any dowry in our sons' wedding, neither shall we give any dowry in our daughters' wedding," and "We shall not practice child marriage."

From the day Muhammad Yunus lent his own money to some poor villagers, the Grameen Bank has grown significantly in size and coverage. As of July 2004, the Grameen Bank has 3.7 million borrowers, 1267 branches, and provides services in 46,000 villages, covering more than 68 percent of the total villages in Bangladesh (www.grameen-info.org).

In this chapter I investigate how the Grameen Bank affects fertility decisions and women's empowerment. I study how fertility decisions and women's empowerment have changed between 1993 and 1996 in villages with and without the Grameen Bank, using data from the Bangladesh Demographic and Health Survey (BDHS), as described in the next section.

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[9] The enforcement mechanisms rely on informal insurance relationships and threats, ranging from social isolation to physical retribution.

4.3 Data

Data used in this paper come from the 1993/94 and 1996/97 rounds of the Bangladesh Demographic and Health Survey (BDHS). Both the 1993/94 and 1996/97 BDHS employed a nationally-representative, two-stage sample.[10]

For the first stage, selection was made from the Integrated Multi-Purpose Master Sample (IMPS), created by the Bangladesh Bureau of Statistics. The primary sampling units in the IMPS were selected with probability proportional to size from the 1991 census frame. In rural areas the primary sampling unit was the *mauza*, and in urban areas it was the *mahalla*. Bangladesh is divided into five administrative divisions, 64 districts, and 489 thanas. In rural areas, thanas are divided into unions and then *mauzas*, an administrative land unit. Urban areas are divided into wards and then *mahallas*. The 1993/94 BDHS covered 301 sample points. The 1996/97 BDHS covered the same sample points (though not necessarily the same households) as the 1993/94 BDHS, together with 12 additional sample points in the new division of Sylhet. A total of 313 points were covered.

For the second stage, after the selection of the BDHS sample points a systematic sample of households was selected from a prepared household list, with an average of 25 households in urban clusters and 37 households in rural clusters. For the BDHS 1993/94, a total of 9174 households (9640 women and 3284 men) were interviewed. For the BDHS 1996/97, 8682 households (9127 women and 3346 men) were interviewed.

There are four types of questionnaires:

(i) Household Questionnaire. All the usual members and visitors were listed, and some basic information was collected, including age, sex, education, and relationship to the head of the household.

(ii) Women's Questionnaire. Ever-married women aged 10-49 were interviewed. The topics covered include background characteristics (such as age, education, and

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[10]Details of the sampling technique are discussed in the Data Appendix.

religion), reproductive history, knowledge and use of family planning methods, ante-natal and delivery care, vaccinations and health of children under age three, marriage, fertility preferences, husband's background, and respondent's work.

(iii) Husband's Questionnaire. The questions are the same as in Women's Questionnaire, except that questions regarding birth history, maternal care, breast-feeding and child health are omitted.

(iv) Service Availability Questionnaire. This part of the survey contains information on the family planning and health services available in and near the sampled areas.

Table 4.1 shows how the Grameen Bank entered and left rural villages between 1993 and 1996. The analysis in this paper focuses on rural villages, as the Grameen Bank works almost exclusively with the rural poor.[11] Out of 202 rural villages with information on the Grameen Bank for both 1993 and 1996, 60 villages have the Grameen Bank for both years. There are 42 villages where the Grameen Bank left sometime during 1993 and 1996, and 10 villages where the Grameen Bank entered between 1993 and 1996.

For the purpose of the analysis, I construct the indexes of women's empowerment in the following areas:

(i) Discussion of family planning. This index is constructed from the question "Do you discuss family planning with your partner?" A score of 0 is assigned if the answer is 'never', 3 if the answer is 'once or twice', and 6 if the answer is 'more often.'

(ii) Contribution to family support. I use the following three questions: "Are you currently working?", "Do you earn cash for work?", and "Is the employment all year or seasonal?". A score of 2 is assigned if the respondent was currently working, and 0 otherwise. An addition score of 2 is given if the respondent earns cash for work. And, for the last question, a score of 2 is given if the respondent works all year, 1

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[11] Only 10 cities/towns covered in the data has had the Grameen Bank at some point in time, while the corresponding figure is 118 for rural villages.

if the work is seasonal, and 0 if the work is occasional. The index for contribution ranges from 0 to 6.

(iii) Mobility. The index for mobility is constructed from the following two questions: "Are you allowed to go out of town alone or with young children?", and "How often do you go shopping?". A score of 3 is assigned if the respondent said she could go out of town alone, or with children or husband, and 0 if the respondent said she could not go out of town. For the frequency of shopping, a score of 3 is assigned if the answer is "once a month or more", 2 if "several times per year", 1 if "once a year or less", and 0 if "never". The index for mobility ranges from 0 to 6.

An overall index of empowerment is an average of the three indexes above. The overall index of empowerment ranges from 0 to 6.

Table 4.2 gives means and standard deviations of the main variables. The rural villages are divided into four groups: (i) those without Grameen for both 1993 and 1996, (ii) those with Grameen for both 1993 and 1996, (iii) those with Grameen only for 1993, and (iv) those with Grameen only for 1996.

Panel A shows individual level means of women aged 10 to 49 surveyed in the four different groups of villages in 1993 and 1996. For all villages associated with the Grameen Bank at some point in time, the ideal number of children has decreased between 1993 and 1996. On the other hand, in villages where the Grameen Bank never entered, there is a slight increase in the ideal number of children. The number of children born in the past year also appears highest in the group of villages where the Grameen Bank never entered, although we have to take into account the non-random program placement of the Grameen Bank.[12] Villages with the Grameen Bank for both 1993 and 1996 are those with the highest proportion of women using family planning method, and the highest proportion of husbands who approve of family planning methods. Differences in other areas regarding fertility decisions and

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[12]For example, it is possible that the Grameen Bank did not enter some villages for reasons such as difficulty to access, and those villages are the ones with higher fertility rates.

women's empowerment can be seen among the four groups of villages.

Panel B gives the village level means of the characteristics of the four groups of villages using data from 1993. It appears that the Grameen Bank has programs in more easily accessible villages. Villages where the Grameen Bank never entered are on average further away from the Thana Headquarter compared to villages associated with the Grameen Bank at some point in time. Moreover, villages where the Grameen Bank never entered have a smaller proportion of households with electricity, and lower average education of adults. The summary statistics suggest non-random program placement of the Grameen Bank, which will be taken into account when the data are analyzed in the next section.

4.4 Empirical Analysis

This chapter investigates how micro-credit provided by the Grameen Bank affects fertility decisions and women's empowerment. First I find out how having the Grameen Bank in the village of residence affects fertility decisions as shown by the ideal number of children, the number of children born in the past year, and family planning related decisions. The second part of the analysis studies how having the Grameen Bank in the village affects women's empowerment, as proxied by mobility, contribution to family support, and discussion with their husbands regarding family planning. I further analyze the relationship between women's empowerment and fertility decisions.

When analyzing the impacts of a non-random program, such as micro-credit in this case, we need to take into account non-random program placement and selection bias. For non-random program placement, programs may be implemented in areas with certain characteristics, therefore a cross-sectional analysis which finds a relationship between the implementation of a program and an outcome of interest may not report the true effect of the program. The relationship found could be biased due to the

characteristics of the areas where the program is implemented. To deal with non-random program placement, I use pooled cross-sectional analysis and focus on the changes through time in different groups of villages.[13] I use two specifications, one which I control for village characteristics and the other village fixed effects. In interpreting the results, the identification assumption is that there is no omitted time-varying and region specific effects correlated with the placement of the Grameen Bank.

Regarding selection bias, it is possible that members of a program self-select themselves into joining the program. It has been argued that relatively more empowered women self-select themselves into programs such as micro-credit (Mahmud, 2003). Therefore, the difference in the outcomes between members and non-members could partly be due to the pre-program characteristics of members and non-members. Due to the possibility of selection bias, I study how the presence of the Grameen Bank in the village affects all individuals, including both members and non-members. Any effect found includes both direct and spill-over effects.

4.4.1 Micro-credit and Fertility Decisions

First I explore how having the Grameen Bank in the village of residence affects fertility decisions.

I estimate the following equation:

$$Y_{ij} = \alpha_0 + \alpha_1 G_j + \alpha_2 Y96 * G_j + \alpha_3 Y96 + \alpha_4 C_{ij} + \alpha_5 V c_j + \alpha_6 A_j$$

$$+\text{error term} \tag{4.1}$$

where Y_{ij} represents

(i) the ideal number of children as reported by individual i in village j,

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[13]Pooled cross-sectional analysis is employed because the same villages, but possibly different households, were surveyed for each round of the 1993 and 1996 BDHS.

(ii) the number of children born in the past year, and

(iii) family planning related decisions (i.e. whether the respondent was using a family planning method at the time of the survey, and whether her husband approves of family planning).

The villages are divided into four groups: (i) those without Grameen for both 1993 and 1996, (ii) those with Grameen for both 1993 and 1996, (iii) those with Grameen only for 1993, and (iv) those with Grameen only for 1996. I create a dummy variable for each group of villages, using those without Grameen for both 1993 and 1996 as the baseline comparison group.

G_j is a vector of dummy variables indicating whether (i) the village has Grameen for both years (Grameen Both), (ii) the village has Grameen only in 1993 (Grameen Exit), or (iii) the village has Grameen only in 1996 (Grameen New). $Y96$ is a dummy variable indicating data from the 1996 round. C_{ij} is a vector of individual and family characteristics, Vc_j is a vector of village characteristics, and A_j is a dummy variable for the stratum in which village j is located. Separate regressions are estimated for each round of the data, where the interaction terms are excluded. In this specification, and all others that follow, standard errors are clustered at the village level.

I also estimate the following equation which includes village fixed effects:

$$Y_{ij} = \alpha_0 + \alpha_1 Y96 * G_j + \alpha_2 Y96 + \alpha_3 C_{ij} + \alpha_4 V_j + \text{error term} \qquad (4.2)$$

where V_j represents village fixed effects. All other variables are as defined above.

The results are reported in Tables 4.3, 4.4, and 4.5. Table 4.3 shows the results regarding fertility preference. Columns (1) to (4) show the analysis for all women aged 10 to 49. Columns (5) to (8) limit the analysis to those aged 10 to 29, while columns (9) to (12) limit the analysis to those aged 30 to 49. It is possible that microcredit has different effects on women in different age groups, as they face different

circumstances such as how many children they already have.

Column (2) shows that, in 1996, being in villages with the Grameen Bank in both 1993 and 1996 is significantly correlated with a lower ideal number of children for all women. In column (3) the coefficient of 'Year 96*Grameen Both' is negative and statistically significant, suggesting that, in villages with Grameen for both years, women's ideal number of children has decreased between 1993 and 1996. Column (4), where village fixed effects are included, confirms this result.

Columns (5) to (12) suggest that it is among women aged 30 to 49 years old that the change in fertility preference occurred. As shown in columns (7) and (8), for women aged 10 to 29, the coefficient of 'Year 96*Grameen Both' is negative though not statistically significant. On the other hand, columns (11) and (12) show that there has been a significant decrease in the ideal number of children between 1993 and 1996 for women aged 30 to 49 in villages where the Grameen Bank is well established, i.e., villages with the Grameen Bank for both years.

For women aged 30 to 49, column (9) suggests that, in 1993, villages with the Grameen Bank (Grameen Both and Grameen Exit) are associated with higher ideal number of children compared to villages where the Grameen Bank has never entered. However, in 1996, as column (10) shows, villages where the Grameen Bank is well established is associated with lower ideal number of children.

Most individual characteristics have the expected signs. Older women are likely to report a higher ideal number of children. This appears to be the case for women aged 30 to 49, but not for those aged 10 to 29. Higher education is associated with lower ideal number of children, for women of all age groups. In most specifications, husband's education is also associated with lower ideal number of children. Women who married when older are more likely to want fewer children.[14]

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[14] Age when married is often used as one of the proxies for women's empowerment. Thus the results point to the direction that women's empowerment is associated with lower ideal number of children.

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Taken together, the results suggest that, in villages where the Grameen Bank is well established, women's ideal number of children has significantly decreased between 1993 and 1996. Moreover, it is among women aged 30 to 49 years old that the change in fertility preference occurred.

Table 4.4 shows the effects of having the Grameen Bank in the village of residence on the number of children born in the past year. The results appear similar to the case of fertility preference. As columns (3) and (4) show, the number of births in the year prior to the survey appears to have decreased between 1993 and 1996 in villages where the Grameen Bank is well established. The coefficient of 'Year 96*Grameen Both' is negative and almost statistically significant in column (3), when village characteristics and stratum effects are controlled for. In column (4), when village fixed effects are controlled for, the coefficient of 'Year 96*Grameen Both' is negative and statistically significant at the 5% level. Moreover, it is among women aged 30 to 49 that the change has taken place, as columns (11) and (12) show.

For women aged 10 to 29, age is positively correlated with the number of children born in the past year. On the other hand, for women aged 30 to 49, age is negatively correlated with the number of children born in the past year.[15] This shows the fertility pattern, where women in their 20s and 30s are more likely to have given birth in the past year compared to younger or older women.

Education appears negatively correlated with the number of births in the past year for year 1996 and pooled regressions. Husband's education is not statistically correlated with the number of births in the past year. For most specifications, age when married is not statistically correlated with the number of births in the past year.[16]

Overall, the results suggest that between 1993 and 1996 there has been a significant

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[15] Age square is included in the regressions, though not shown in the table.

[16] The exception is column (1), when age when married is positively correlated with the number of births for women aged 10 to 49 in 1993.

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reduction in the number of births in the past year in villages where the Grameen Bank is well established, and it is mainly among women aged 30 to 49 that the change has taken place.

Next, I turn to family planning related decisions. Table 4.5 shows how having the Grameen Bank in the village affects the use of a family planning method and husbands' approval of family planning methods.

As columns (1) and (2) show, between 1993 and 1996, in villages where the Grameen Bank is well established there has been a significant increase in the probability of a respondent using a family planning method at the time of the survey. The coefficients of 'Year 96*Grameen Both' are positive and significant at the 5% level for both columns (1) and (2). The effect appears to have come from women aged 10 to 29, as columns (5) and (6) show.[17]

Villages where the Grameen Bank is well established is associated with a higher probability of husbands' approval of family planning methods, as shown in column (3). The coefficient of 'Grameen Both' is positive and significant at the 5% level. It is among women aged 30 to 49 that this relationship holds, as shown in column (11). However, there does not seem to be a significant change during the period between 1993 and 1996 in these villages, either for all women or for women aged 30 to 49.

On the other hand, in villages where the Grameen Bank entered sometime between 1993 and 1996, there has been a significant increase in husband's approval of family planning methods among respondents aged 30 to 49, as shown in columns (11) and (12). The coefficients of 'Year 96*Grameen New' are positive and significant at the 5% level. Thus it appears that an immediate impact of the presence of the Grameen Bank in the village on fertility decisions is that husbands are more likely to approve of family planning methods.

Together, the results suggest that, between 1993 and 1996, there has been a sig-

[17]Although the coefficients of 'Year 96*Grameen Both' are less strong in columns (5) and (6) compared to columns (1) and (2), they are statistically significant at the 10% level.

nificant increase in the use of family planning method in villages where the Grameen Bank is well established. In villages where the Grameen Bank entered between 1993 and 1996, there has been a significant increase in husbands' approval of family planning methods.

To conclude, the results in Tables 4.3, 4.4, and 4.5 point to the role of the Grameen Bank in affecting fertility decisions in rural villages in Bangladesh. In villages where the Grameen Bank is well established, between 1993 and 1996 there has been a reduction in women's ideal number of children and the number of births in the year prior to the survey, and an increase in the use of family planning methods. In villages where the Grameen Bank entered between 1993 and 1996 there has been an increase in husbands' approval of family planning methods.

4.4.2 Micro-credit, Women's Empowerment, and Fertility

The previous section has shown how the Grameen Bank affects fertility decisions. The objective of this section is to analyze how the Grameen Bank affects women's empowerment, and how women's empowerment and fertility decisions are related.

To find out how having the Grameen Bank in the village of residence affects women's empowerment, I estimate equations (4.1) and (4.2) above, with Y_{ij} representing the indexes of different areas of women's empowerment. The four indexes I consider are: (i) discussion of family planning with husband, (ii) contribution to family support, (iii) mobility, and (iv) overall index of empowerment. The construction of these indexes are as discussed in section three.

Columns (2) and (3) of Table 4.6 show that being in a village where the Grameen Bank is well established is significantly associated with higher levels of contribution to family support and mobility for women aged 10 to 49. As shown in column (4), being in a village where the Grameen Bank is well established is also associated with a higher level of the overall index of women's empowerment. These associations

appear similar in the case of women aged 10 to 29 and those aged 30 to 49, as shown in columns (6) to (8) and (10) to (12).

For villages where the Grameen Bank is well established, there appears to be little or no change through time for most of the indexes of women's empowerment. One exception is column (9), where the coefficient of 'Year 96*Grameen Both' is positive and significant at the 10% level in the case of whether a woman in the age range of 30 to 49 discusses family planning with her husband. Thus in villages where the Grameen Bank is well established there appears to be an increase in the proportion of women aged 30 to 49 who discuss family planning with their husbands.

The coefficients of 'Grameen Exit' are also positive and significant at the 10% level for columns (2) to (4), (6), (7), and (12). These results suggest that, in 1993, when these villages had the Grameen Bank, women's levels of contribution to family support and mobility were higher than villages where the Grameen Bank did not enter. In column (7), the coefficient of 'Year 96*Grameen Exit' is negative and almost significant at the 10% level for mobility, suggesting that during 1993 and 1996, the period when the Grameen Bank left the villages, the level of mobility has decreased in these villages for women aged 10 to 29. The results suggest that having the Grameen Bank in the village of residence is associated with a higher level of women's empowerment, particularly as measured by contribution to family support and mobility.

The coefficients of 'Grameen New' and 'Year 96*Grameen New' are statistically insignificant across all columns. One possible explanation is that it takes time before the Grameen Bank has a visible impact on women's empowerment in a village.[18] In column (7), however, the coefficient of 'Year 96*Grameen New' is positive with the t-value of 1.53, suggesting an increase in the level of women's mobility, although the

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[18] For villages in the 'Grameen New' group, the Grameen Bank entered the villages at some point between 1993 and 1996, therefore when the data was collected in 1996 the Grameen Bank might have been there for only a short period of time.

effect is not statistically significant.

For individual characteristics, age appears positively correlated with the indexes of empowerment. Education is positively correlated with whether the respondent discusses family planning matters with the husband, and mobility. However, education does not appear to be significantly correlated with the level of contribution to family support. Husband's education is positively correlated with whether the couple discusses family planning matters, and negatively correlated with the level of the wife's contribution to family support. Husband's education appears positively correlated with the wife's mobility for women aged 10 to 29, though not for women aged 30 to 49.

Overall, the results suggest that having the Grameen Bank in the village is associated with an increase in women's empowerment in terms of contribution to family support and mobility.

Next, I analyze the relationship between women's empowerment and fertility decisions. I estimate the following equation:

$$Y_{ij} = a + bE_{ij} + cY96 + dC_{ij} + eV_j + \text{error term} \tag{4.3}$$

where Y_{ij} represents (i) the ideal number of children as reported by individual i in village j, and (ii) the number of children born in the past year. Here E_{ij} represents (i) the indexes of women's empowerment, as discussed above, and (ii) the overall index of empowerment. All other variables are as defined above.

Columns (1), (3), and (5) of Table 4.7 show that women who discussed family planning with their husbands are likely to want fewer children, controlling for other factors. However, the causal relationship may be either because more empowered women who discuss family planning tend to want fewer children, or because women who want fewer children are more likely to discuss family planning with their hus-

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bands. To find the direction of the causality, further investigation is needed. The coefficients of 'mobility' are negative and strongly significant for all columns, suggesting that women who have a higher level of mobility are likely to want fewer children, controlling for other factors.

Columns (2), (4), and (6) show that the overall index of empowerment has a negative and strongly significant relationship with the ideal number of children, and the relationship holds for women of all age groups.

Two other indicators often used to proxy for women's empowerment are level of education and age when married. Across all columns, the coefficients of 'education' and 'age when married' are negative and statistically significant, confirming previous research findings that women's empowerment has a negative impact on fertility.

Together, the results suggest that a women's level of mobility is negatively correlated with her ideal number of children. Moreover, women who discuss family planning with their husbands are likely to want fewer children, controlling for other factors.

Table 4.8 explores the relationships between women's empowerment and the number of children born during the year prior to the survey. Columns (1), (3), and (5) show that women with a higher level of contribution to family support are less likely to have given birth in the past year. The relationship is statistically significant for women aged 10 to 29, though not for those aged 30 to 49. Women in the age group of 10 to 29 who have a higher level of mobility are also less likely to have given birth in the previous year. On the other hand, women in the age group of 30 to 49 who discuss family planning with their husbands are more likely to have given birth in the past year.[19]

Columns (2), (4), and (6) show that the coefficients of the overall index of em-

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[19]This suggests that the causality between discussion of family planning with husbands and the number of births in the previous year might be that those who have given birth in the past year are likely to want to use a family planning method.

powerment are negative though not statistically significant for all women and women aged 10 to 29. The relationship is marginal for women aged 30 to 49.

For individual characteristics, age is positively associated with the number of children born in the past year for women aged 10 to 29. On the other hand, age is negatively associated with the number of children born in the past year for women aged 30 to 49, similar to the results in Table 4.4. The coefficients of 'education' are negative and statistically significant across all columns. The coefficients of 'husband's education' and 'age when married' are marginal and insignificant across all columns.

Overall, the results suggest that contribution to family support and mobility are negatively correlated with the number of children born the year prior to the survey for women aged 10 to 29.

To conclude, the results suggest that having the Grameen Bank in the village is associated with an increase in women's empowerment in terms of contribution to family support and mobility. Moreover, women with a higher level of mobility tend to want fewer children, and women aged 10 to 29 who contribute to family support or have a high level of mobility are less likely to have given birth in the year prior to the survey.

4.5 Conclusion

The Grameen Bank's micro-credit program may affect fertility in many ways. By generating employment and raising income, micro-credit possibly increases the demand for children through the effect of higher income or reduces the demand through higher opportunity cost of time. The Grameen Bank's weekly meetings and the recitation of the "sixteen decisions" which include "We will keep our families small." possibly affects members' perception regarding family size. These meetings and other educational programs could be a place where the knowledge of contraceptive methods

is promoted and new perspectives are introduced. Moreover, the Grameen Bank's micro-credit program targets women. It is possible that the program contributes to women's empowerment and thus lowers fertility, as one factor that is generally believed to have contributed to lower fertility is the empowerment of women.

This chapter investigates the effects of having the Grameen Bank in the village of residence on fertility decisions and women's empowerment. The results point to the role of the Grameen Bank in affecting fertility decisions in rural villages in Bangladesh. In villages where the Grameen Bank is well established, between 1993 and 1996, there has been a reduction in women's ideal number of children and the number of births in the year prior to the survey, and an increase in the use of family planning methods. In villages where the Grameen Bank entered between 1993 and 1996 there has been an increase in husbands' approval of family planning methods. Having the Grameen Bank in the village shows positive relationship with women's empowerment as measured by contribution to family support and mobility. Moreover, women with a higher level of mobility tend to want fewer children, and women aged 10 to 29 who contribute to family support or have a high level of mobility are less likely to have given birth in the year prior to the survey.

The results in this chapter suggest that the Grameen Bank plays a role in empowering women and affecting their fertility decisions in addition to providing funds for income generating activities. As Mohammad Yunus, founder of the Grameen Bank, declares, "Credit is a powerful weapon, and anyone possessing this weapon is certainly better equipped to maneuver the forces around him to his advantage", the Grameen Bank has clearly empowered many poor women in Bangladesh.

4.6 Appendix 1: Data Appendix

The 1993/94 and 1996/97 rounds of the BDHS were conducted under the authority of the National Institute of Population Research and Training of the Ministry of Health and Family Welfare. The survey was implemented by Mitra and Associates, a private research firm located in Dhaka. Both the 1993/94 and 1996/97 BDHS employed a nationally-representative, two-stage sample. For the first stage, selection was made from the Integrated Multi-Purpose Master Sample (IMPS), created by the Bangladesh Bureau of Statistics. The primary sampling units (the *mauza* for the rural areas and the *mahalla* for the urban areas) in the IMPS were selected with probability proportional to size from the 1991 census frame. The units for the BDHS were subselected from the IMPS with equal probability to make the BDHS selection equivalent to selection with probability proportional to size. For the 1993/94 BDHS, a total of 304 primary sampling units were selected, out of the 372 in the IMPS. Fieldwork in three sample points was not possible so a total of 301 points were covered. The 1996/97 BDHS covered the same sample points as the 1993-94 BDHS, together with 12 additional sample points in the new division of Sylhet. A total of 313 points were covered. For the second stage, after the selection of the BDHS sample points a systematic sample of households was selected from a prepared household list, with an average of 25 households in urban clusters and 37 households in rural clusters. Every second household was identified as selected for the husband's survey, i.e., in addition to interviewing all ever-married women aged 10-49, interviewers also interviewed the husband of any woman who was successfully interviewed. The contents of the questionnaires were based on the DHS Model A Questionnaire, which is designed for use in countries with relatively high levels of contraceptive use.

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TABLE 4.1
HOW THE GRAMEEN BANK ENTERED AND LEFT VILLAGES

Number of villages with:	1993	1996	Both
Grameen Bank	102 (50.5%)	70 (34.7%)	60 (29.7%)
Grameen Bank only in 1993 (Grameen left)	42 (20.8%)		
Grameen Bank only in 1996 (Grameen entered)		10 (4.9%)	

The total number of rural villages with information on the Grameen Bank for both 1993 and 1996 is 202.

TABLE 4.2
SUMMARY OF MAIN VARIABLES

Panel A: Individual Level Means*	Grameen Both		Grameen Exit		Grameen New		No Grameen	
	93	96	93	96	93	96	93	96
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ideal number of children	2.45	2.37	2.54	2.49	2.45	2.41	2.51	2.55
	(.78)	(.72)	(.89)	(.83)	(.83)	(.75)	(.85)	(.85)
Number of children born in	.14	.13	.14	.15	.13	.13	.16	.16
the past year	(.36)	(.33)	(.35)	(.35)	(.33)	(.34)	(.37)	(.37)
Proportion: currently using	.47	.52	.44	.46	.40	.46	.41	.43
family planning method	(.50)	(.50)	(.50)	(.50)	(.49)	(.50)	(.49)	(.50)
Proportion: husband approves	.86	.90	.83	.85	.80	.87	.79	.81
of family planning method	(.34)	(.30)	(.37)	(.35)	(.40)	(.33)	(.40)	(.40)
Index: discussion family	3.2	2.4	3.0	2.1	2.9	1.9	2.9	1.9
planning with husband	(2.3)	(2.3)	(2.4)	(2.2)	(2.2)	(2.3)	(2.4)	(2.2)
Index: contribution to family	1.1	2.0	1.0	1.8	1.2	2.1	.74	1.8
support	(2.3)	(2.5)	(2.2)	(2.5)	(2.3)	(2.5)	(1.9)	(2.5)
Index: mobility	2.8	2.7	2.7	2.6	2.4	2.6	2.5	2.5
	(1.3)	(1.5)	(1.4)	(1.6)	(1.6)	(1.5)	(1.5)	(1.6)
Index: empowerment	2.3	2.3	2.2	2.1	2.1	2.2	2.0	2.0
	(1.2)	(1.3)	(1.2)	(1.3)	(1.3)	(1.4)	(1.2)	(1.3)
Age	28.9	28.7	29.1	29.4	28.8	29.4	28.8	29.0
	(8.9)	(9.2)	(8.8)	(9.2)	(9.5)	(9.2)	(8.9)	(9.2)
Education (years)	2.2	2.5	1.8	2.5	1.9	1.9	1.8	2.0
	(3.1)	(3.2)	(2.9)	(3.4)	(3.1)	(3.0)	(2.8)	(3.0)
Husband's education (years)	3.8	3.9	3.3	3.7	3.1	2.9	3.2	3.2
	(4.3)	(4.3)	(4.3)	(4.5)	(4.2)	(4.1)	(4.1)	(4.1)
Age when married	14.1	13.8	13.9	13.9	14.2	13.8	14.0	13.7
	(2.8)	(2.6)	(2.8)	(3.0)	(2.8)	(2.9)	(2.7)	(2.7)
Proportion: working	.19	.41	.19	.37	.20	.43	.13	.38
	(.39)	(.49)	(.39)	(.48)	(.40)	(.50)	(.34)	(.49)

Panel B: Village Level Means in 1993	Grameen Both	Grameen Exit	Grameen New	No Grameen
	(1)	(2)	(3)	(4)
Distance from Thana	5.8	5.4	3.9	6.6
Head Quarter (km)	(3.8)	(4.2)	(3.4)	(4.6)
Distance from District	17.2	16.1	22	19.4
Head Quarter (km)	(8.7)	(10.3)	(9.0)	(12.1)
Proportion of households	.12	.11	.14	.08
with electricity	(.20)	(.14)	(.19)	(.20)
Proportion of households	.61	.60	.55	.57
with land	(.17)	(.16)	(.21)	(.17)
Average education (adults)	2.9	2.5	2.5	2.3
	(1.1)	(1.2)	(.89)	(1.1)
Number of observations	60	42	10	90

* Individual level means are those of women aged 10 to 49 living in rural villages who were covered under the Women Questionnaire. Due to several missing data, the number of observations varies for each individual characteristic. The minimum numbers of observations for columns (1) to (8) are as follows: 1955, 1396, 320, 2838, 1572, 1152, 250, and 2400.
Standard deviations are in parentheses.

TABLE 4.3
MICRO-CREDIT AND WOMEN'S FERTILITY PREFERENCE

	Dependent variable: Ideal number of children											
	Married women aged 10-49				Married women aged 10-29				Married women aged 30-49			
	1993	1996	Pooled 93 and 96		1993	1996	Pooled 93 and 96		1993	1996	Pooled 93 and 96	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Grameen Both	0.023	-0.091	0.018		-0.038	-0.065	-0.028		0.103	-0.124	0.080	
	(0.69)	(2.26)*	(0.53)		(1.05)	(1.61)	(0.78)		(2.08)*	(2.25)*	(1.61)	
Year 96*Grameen Both			-0.104	-0.105			-0.052	-0.057			-0.181	-0.165
			(2.46)*	(2.46)*			(1.11)	(1.23)			(2.72)**	(2.42)*
Grameen Exit	0.051	-0.015	0.048		-0.006	-0.033	-0.001		0.125	0.010	0.114	
	(1.12)	(0.34)	(1.04)		(0.12)	(0.83)	(0.02)		(1.99)*	(0.16)	(1.81)†	
Year 96*Grameen Exit			-0.060	-0.058			-0.039	-0.042			-0.088	-0.067
			(1.44)	(1.39)			(0.82)	(0.93)			(1.27)	(0.95)
Grameen New	0.053	-0.051	0.050		-0.016	-0.028	-0.008		0.139	-0.078	0.128	
	(1.07)	(0.56)	(0.98)		(0.31)	(0.28)	(0.15)		(1.74)†	(0.67)	(1.60)	
Year 96*Grameen New			-0.102	-0.108			-0.033	-0.040			-0.196	-0.170
			(1.35)	(1.42)			(0.40)	(0.46)			(1.82)†	(1.45)
Year 96			0.038	0.036			0.013	0.013			0.071	0.050
			(1.47)	(1.40)			(0.41)	(0.40)			(1.74)†	(1.22)
Age	0.026	0.014	0.020	0.020	0.007	0.045	0.023	0.015	0.080	0.115	0.099	0.083
	(3.61)**	(1.89)†	(3.50)**	(3.54)**	(0.24)	(1.57)	(1.04)	(0.71)	(1.88)†	(2.57)*	(3.17)**	(2.76)**
Education	-0.023	-0.019	-0.021	-0.019	-0.027	-0.018	-0.022	-0.020	-0.018	-0.022	-0.021	-0.017
	(4.79)**	(4.08)**	(6.16)**	(5.77)**	(5.23)**	(3.64)**	(5.97)**	(5.56)**	(1.92)†	(2.54)*	(3.23)**	(2.69)**
Husband's education	-0.003	-0.010	-0.006	-0.007	-0.002	-0.010	-0.005	-0.005	-0.003	-0.011	-0.007	-0.007
	(0.80)	(3.28)**	(2.75)**	(2.86)**	(0.41)	(2.67)**	(2.01)*	(1.89)	(0.55)	(2.05)*	(1.84)†	(1.74)†
Age when married	-0.025	-0.017	-0.021	-0.023	-0.018	-0.012	-0.015	-0.017	-0.032	-0.021	-0.027	-0.029
	(5.54)**	(4.14)**	(6.38)**	(6.82)**	(3.62)**	(2.62)**	(4.08)**	(4.57)**	(4.38)**	(2.97)**	(4.95)**	(5.28)**
Other individual charac.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Village characteristics	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No
Stratum effects	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No
Village effects	No	No	No	Yes	No	No	No	Yes	No	No	No	Yes
Observations	6483	5965	12448	12448	3771	3420	7191	7191	2712	2545	5257	5257
R-squared	0.10	0.12	0.11	0.16	0.07	0.11	0.08	0.15	0.09	0.09	0.08	0.16

Absolute t-statistics are in parentheses. †, *, and ** denote significance at the 10%, 5%, and 1% level, respectively. Standard errors are corrected for clustering at the village level. Other individual characteristics include: age squared, whether the respondent is working, whether the respondent is the head of household, whether the household has land, and religion of the respondent. Village characteristics include: distance from Thana Head Quarter, distance from District Head Quarter, proportion of households with electricity, proportion of households with land, and average education of adults 20 years old and above.

TABLE 4.4
MICRO-CREDIT AND NUMBER OF CHILDREN BORN

	Dependent variable: Number of children born in the past one year											
	Married women aged 10-49				Married women aged 10-29				Married women aged 30-49			
	1993	1996	Pooled 93 and 96		1993	1996	Pooled 93 and 96		1993	1996	Pooled 93 and 96	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Grameen Both	-0.005	-0.024	-0.002		-0.013	-0.019	-0.007		0.001	-0.028	0.000	
	(0.47)	(2.48)*	(0.21)		(0.80)	(1.24)	(0.40)		(0.10)	(2.90)**	(0.03)	
Year 96*Grameen Both			-0.027	-0.028			-0.022	-0.023			-0.028	-0.027
			(1.97)†	(2.08)*			(1.02)	(1.08)			(2.11)*	(1.97)*
Grameen Exit	-0.011	-0.004	-0.008		-0.019	0.000	-0.013		-0.005	-0.011	-0.004	
	(1.08)	(0.35)	(0.77)		(1.14)	(0.01)	(0.83)		(0.46)	(0.95)	(0.41)	
Year 96*Grameen Exit			-0.003	-0.003			0.001	0.003			-0.007	-0.007
			(0.21)	(0.20)			(0.05)	(0.13)			(0.49)	(0.44)
Grameen New	-0.022	-0.007	-0.015		-0.032	-0.018	-0.021		-0.009	0.009	-0.007	
	(1.16)	(0.31)	(0.78)		(1.02)	(0.56)	(0.66)		(0.49)	(0.38)	(0.36)	
Year 96*Grameen New			-0.002	-0.002			-0.013	-0.013			0.012	0.019
			(0.09)	(0.07)			(0.34)	(0.34)			(0.45)	(0.65)
Year 96			0.019	0.019			0.029	0.028			0.006	0.006
			(2.09)*	(2.14)*			(2.01)*	(1.91)†			(0.61)	(0.60)
Age	-0.005	-0.010	-0.007	-0.007	0.081	0.064	0.073	0.072	-0.020	-0.021	-0.020	-0.021
	(1.53)	(2.89)**	(2.94)**	(2.83)**	(5.79)**	(4.20)**	(7.18)**	(6.98)**	(1.82)†	(1.98)*	(2.62)**	(2.65)**
Education	-0.001	-0.007	-0.004	-0.004	-0.001	-0.009	-0.005	-0.005	-0.000	-0.006	-0.003	-0.004
	(0.26)	(3.78)**	(2.66)**	(2.59)*	(0.45)	(3.04)**	(2.44)*	(2.33)*	(0.06)	(3.29)**	(2.05)*	(2.51)*
Husband's education	-0.001	0.002	0.000	0.000	-0.000	0.003	0.001	0.001	-0.001	0.001	-0.000	0.000
	(0.62)	(1.07)	(0.22)	(0.30)	(0.21)	(1.18)	(0.63)	(0.64)	(0.60)	(0.38)	(0.25)	(0.32)
Age when married	0.003	0.001	0.002	0.002	0.004	-0.000	0.002	0.002	-0.000	0.000	-0.000	-0.001
	(2.03)*	(0.74)	(1.80)†	(1.48)	(1.81)†	(0.02)	(1.21)	(1.22)	(0.17)	(0.20)	(0.16)	(0.83)
Other individual charac.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Village characteristics	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No
Stratum effects	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No
Village effects	No	No	No	Yes	No	No	No	Yes	No	No	No	Yes
Observations	7144	6273	13417	13417	4092	3546	7638	7638	3052	2727	5779	5779
R-squared	0.06	0.08	0.06	0.08	0.02	0.03	0.02	0.05	0.04	0.05	0.04	0.08

Absolute t-statistics are in parentheses. †, * and ** denote significance at the 10%, 5%, and 1% level, respectively. Standard errors are corrected for clustering at the village level. Other individual characteristics include: age squared, whether the respondent is working, whether the respondent is the head of household, whether the household has land, and religion of the respondent. Village characteristics include: distance from Thana Head Quarter, distance from District Head Quarter, proportion of households with electricity, proportion of households with land, and average education of adults 20 years old and above.

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TABLE 4.5

MICRO-CREDIT AND FAMILY PLANNING DECISIONS

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	Married women aged 10-49				Married women aged 10-29				Married women aged 30-49			
	Currently using family planning		Husband approves family planning		Currently using family planning		Husband approves family planning		Currently using family planning		Husband approves family planning	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Grameen Both	0.017		0.032		-0.001		0.018		0.045		0.051	
	(0.87)		(1.99)*		(0.03)		(1.01)		(1.70)†		(2.16)*	
Year 96*Grameen Both	0.041	0.041	0.025	0.021	0.041	0.047	0.021	0.019	0.033	0.028	0.032	0.027
	(2.07)*	(2.09)*	(1.28)	(1.05)	(1.68)†	(1.90)†	(0.93)	(0.82)	(1.12)	(0.92)	(1.14)	(0.90)
Grameen Exit	0.017		0.024		-0.003		0.013		0.042		0.036	
	(0.85)		(1.32)		(0.13)		(0.67)		(1.56)		(1.39)	
Year 96*Grameen Exit	-0.007	-0.004	-0.001	-0.003	0.027	0.031	0.014	0.015	-0.055	-0.041	-0.022	-0.021
	(0.31)	(0.17)	(0.04)	(0.11)	(0.95)	(1.04)	(0.50)	(0.54)	(1.54)	(1.16)	(0.63)	(0.60)
Grameen New	-0.031		-0.013		-0.023		0.004		-0.043		-0.042	
	(0.86)		(0.47)		(0.51)		(0.17)		(0.83)		(1.06)	
Year 96*Grameen New	0.032	0.036	0.055	0.054	-0.013	-0.009	0.017	0.015	0.085	0.079	0.111	0.111
	(0.72)	(0.81)	(1.60)	(1.54)	(0.25)	(0.17)	(0.45)	(0.39)	(1.36)	(1.21)	(2.10)*	(2.09)*
Year 96	0.039	0.039	0.010	0.013	0.019	0.020	0.016	0.017	0.066	0.062	0.000	0.007
	(2.84)**	(2.74)**	(0.79)	(0.99)	(1.09)	(1.11)	(1.08)	(1.19)	(3.30)**	(2.95)**	(0.00)	(0.32)
Age	0.081	0.078	0.026	0.025	0.036	0.036	0.052	0.052	0.145	0.146	0.021	0.029
	(24.35)**	(23.07)**	(9.41)**	(9.00)**	(2.77)**	(2.81)**	(4.70)**	(4.89)**	(8.27)**	(8.35)**	(1.33)	(1.81)†
Education	0.011	0.012	0.009	0.010	0.012	0.012	0.012	0.012	0.010	0.014	0.005	0.008
	(5.40)**	(5.72)**	(6.45)**	(6.71)**	(4.89)**	(4.96)**	(6.49)**	(6.49)**	(2.89)**	(3.81)**	(2.04)*	(2.88)**
Husband's education	0.002	0.001	0.001	0.001	0.004	0.004	0.001	0.000	-0.002	-0.003	0.002	0.002
	(1.02)	(0.88)	(1.23)	(0.97)	(2.09)*	(2.04)*	(0.52)	(0.16)	(0.70)	(1.11)	(1.29)	(0.90)
Age when married	-0.012	-0.011	0.002	0.003	-0.016	-0.014	-0.000	0.001	-0.002	-0.001	0.006	0.006
	(6.81)**	(5.93)**	(1.50)	(1.97)	(6.56)**	(5.45)**	(0.14)	(0.39)	(0.80)	(0.35)	(2.49)*	(2.55)*
Other individual charac.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Village characteristics	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Stratum effects	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Village effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Observations	12357	12357	12091	12091	7261	7261	7145	7145	5096	5096	4946	4946
R-squared	0.13	0.17	0.08	0.12	0.12	0.17	0.07	0.12	0.11	0.18	0.08	0.16

Absolute t-statistics are in parentheses. †, *, and ** denote significance at the 10%, 5%, and 1% level, respectively. Standard errors are corrected for clustering at the village level. Other individual characteristics include: age squared, whether the respondent is working, whether the respondent is the head of household, whether the household has land, and religion of the respondent. Village characteristics include: distance from Thana Head Quarter, distance from District Head Quarter, proportion of households with electricity, proportion of households with land, and average education of adults 20 years old and above.

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TABLE 4.6
MICRO-CREDIT AND WOMEN'S EMPOWERMENT

	Married women aged 10-49				Married women aged 10-29				Married women aged 30-49			
	Discuss FP	Contribu-tion	Mobility	Index of empower-ment	Discuss FP	Contribu-tion	Mobility	Index of empower-ment	Discuss FP	Contribu-tion	Mobility	Index of empower-ment
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Grameen Both	0.068	0.317	0.167	0.180	0.024	0.283	0.179	0.158	0.136	0.365	0.144	0.213
	(0.61)	(2.88)**	(2.26)*	(2.88)**	(0.19)	(2.23)*	(1.96)	(2.21)*	(0.98)	(2.94)**	(1.83)†	(2.94)**
Year 96*Grameen Both	0.160	-0.096	-0.112	-0.019	0.056	-0.075	-0.070	-0.028	0.340	-0.110	-0.169	-0.001
	(1.19)	(0.61)	(1.09)	(0.22)	(0.37)	(0.47)	(0.60)	(0.33)	(1.87)†	(0.52)	(1.51)	(0.01)
Grameen Exit	0.013	0.234	0.161	0.136	-0.078	0.243	0.174	0.109	0.155	0.221	0.128	0.175
	(0.11)	(1.92)†	(1.82)†	(1.90)†	(0.53)	(1.87)†	(1.78)†	(1.35)	(1.10)	(1.48)	(1.34)	(2.17)*
Year 96*Grameen Exit	-0.001	-0.273	-0.139	-0.114	0.003	-0.249	-0.250	-0.139	-0.037	-0.293	0.009	-0.090
	(0.00)	(1.45)	(1.10)	(1.10)	(0.02)	(1.37)	(1.71)†	(1.27)	(0.20)	(1.15)	(0.07)	(0.73)
Grameen New	-0.149	0.231	-0.181	-0.036	-0.238	0.281	-0.185	-0.076	-0.041	0.171	-0.185	0.014
	(0.63)	(0.96)	(1.51)	(0.28)	(0.97)	(1.03)	(1.33)	(0.48)	(0.13)	(0.62)	(1.02)	(0.10)
Year 96*Grameen New	-0.071	-0.228	0.218	0.010	-0.001	-0.251	0.313	0.095	-0.201	-0.220	0.084	-0.151
	(0.30)	(1.09)	(1.27)	(0.07)	(0.00)	(1.03)	(1.53)	(0.65)	(0.49)	(0.80)	(0.42)	(0.77)
Year 96	-0.981	1.049	-0.002	0.004	-1.146	0.918	0.038	-0.087	-0.731	1.216	-0.059	0.139
	(11.31)**	(11.14)**	(0.03)	(0.07)	(12.89)**	(9.20)**	(0.47)	(1.51)	(6.19)**	(9.47)**	(0.84)	(1.93)†
Age	0.215	0.225	0.144	0.186	0.293	0.139	0.261	0.226	0.125	0.309	0.088	0.158
	(14.12)**	(17.27)**	(13.78)**	(22.27)**	(4.52)**	(2.55)*	(5.71)**	(6.40)**	(1.49)	(4.06)**	(1.79)†	(3.36)**
Education	0.083	0.011	0.093	0.064	0.090	0.006	0.088	0.065	0.086	0.021	0.104	0.072
	(8.76)**	(1.22)	(11.78)**	(10.71)**	(7.58)**	(0.58)	(9.44)**	(9.39)**	(4.98)**	(1.16)	(8.59)**	(6.22)**
Husband's education	0.029	-0.030	0.014	0.005	0.031	-0.024	0.023	0.009	0.024	-0.038	0.002	-0.003
	(4.32)**	(4.66)**	(2.93)**	(1.17)	(3.77)**	(3.01)**	(3.53)**	(1.88)†	(2.13)*	(3.80)**	(0.35)	(0.46)
Age when married	-0.003	-0.021	-0.011	-0.010	-0.044	-0.043	-0.030	-0.039	0.045	0.001	0.005	0.021
	(0.30)	(2.76)**	(1.90)	(2.12)*	(3.77)**	(3.96)**	(3.67)**	(5.69)**	(3.74)**	(0.13)	(0.66)	(3.06)**
Other individual charac.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Village characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Stratum effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Village effects	No	No	No	No	No	No	No	No	No	No	No	No
Observations	11579	13417	12551	12017	7035	7638	7364	7245	4544	5779	5187	4772
R-squared	0.14	0.10	0.08	0.10	0.10	0.10	0.09	0.10	0.15	0.10	0.06	0.11

Absolute t-statistics are in parentheses. †, *, and ** denote significance at the 10%, 5%, and 1% level, respectively. Standard errors are corrected for clustering at the village level. Other individual characteristics include: age squared, whether the respondent is the head of household, whether the household has land, and religion of the respondent. Village characteristics include: distance from Thana Head Quarter, distance from District Head Quarter, proportion of households with electricity, proportion of households with land, and average education of adults 20 years old and above.

TABLE 4.7
WOMEN'S EMPOWERMENT AND FERTILITY PREFERENCE

	Dependent variable: Ideal number of children					
	Women aged 10-49		Women aged 10-29		Women aged 30-49	
	(1)	(2)	(3)	(4)	(5)	(6)
Discuss FP with husband	-0.016 (4.65)**		-0.018 (4.19)**		-0.011 (1.92)†	
Contribution to family support	-0.003 (0.70)		0.000 (0.04)		-0.005 (0.79)	
Mobility	-0.025 (4.79)**		-0.023 (4.45)**		-0.032 (2.67)**	
Index of empowerment		-0.037 (5.82)**		-0.037 (5.00)**		-0.035 (3.22)**
Year 96	-0.026 (1.44)	-0.012 (0.68)	-0.032 (1.72)†	-0.014 (0.75)	-0.028 (0.89)	-0.017 (0.57)
Age	0.029 (4.80)**	0.028 (4.70)**	0.024 (1.10)	0.021 (0.97)	0.113 (3.18)**	0.112 (3.15)**
Education	-0.017 (5.19)**	-0.018 (5.57)**	-0.019 (5.02)**	-0.021 (5.32)**	-0.014 (1.94)†	-0.016 (2.24)*
Husband's education	-0.005 (2.13)*	-0.006 (2.32)*	-0.003 (1.16)	-0.004 (1.39)	-0.007 (1.64)	-0.007 (1.67)†
Age when married	-0.024 (6.58)**	-0.024 (6.58)**	-0.018 (4.54)**	-0.018 (4.54)**	-0.031 (4.85)**	-0.031 (4.85)**
Other individual characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Village effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	11138	11138	6818	6818	4320	4320
R-squared	0.17	0.17	0.16	0.16	0.18	0.18

Absolute t-statistics are in parentheses. †, *, and ** denote significance at the 10%, 5%, and 1% level, respectively. Standard errors are corrected for clustering at the village level. Other individual characteristics include: age squared, whether the respondent is working, whether the respondent is the head of household, whether the household has land, and religion of the respondent.

TABLE 4.8
WOMEN'S EMPOWERMENT AND NUMBER OF CHLDREN BORN

	Dependent variable: Number of children born in the past one year					
	Women aged 10-49		Women aged 10-29		Women aged 30-49	
	(1)	(2)	(3)	(4)	(5)	(6)
Discuss FP	0.003		0.003		0.004	
with husband	(1.80)†		(1.26)		(2.14)*	
Contribution to	-0.006		-0.008		-0.002	
family support	(4.33)**		(3.72)**		(1.41)	
Mobility	-0.004		-0.006		-0.003	
	(1.67)†		(1.70)†		(0.97)	
Index of		-0.006		-0.010		-0.000
empowerment		(2.06)*		(2.02)*		(0.09)
Year 96	0.020	0.011	0.028	0.017	0.008	0.003
	(2.91)**	(1.73)†	(2.76)**	(1.72)†	(1.02)	(0.39)
Age	-0.003	-0.003	0.077	0.078	-0.021	-0.021
	(1.13)	(1.16)	(7.20)**	(7.19)**	(2.17)*	(2.20)*
Education	-0.005	-0.005	-0.006	-0.006	-0.005	-0.005
	(3.00)**	(2.91)**	(2.56)*	(2.46)*	(2.63)**	(2.64)**
Husband's	0.000	0.000	0.001	0.001	0.000	0.000
education	(0.19)	(0.39)	(0.62)	(0.77)	(0.03)	(0.17)
Age when	0.002	0.002	0.003	0.003	-0.001	-0.001
married	(1.70)†	(1.78)†	(1.27)	(1.30)	(0.59)	(0.51)
Other individual characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Village effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	12017	12017	7245	7245	4772	4772
R-squared	0.08	0.08	0.05	0.05	0.09	0.09

Absolute t-statistics are in parentheses. †, * and ** denote significance at the 10%, 5%, and 1% level, respectively. Standard errors are corrected for clustering at the village level. Other individual characteristics include: age squared, whether the respondent is the head of household, whether the household has land, and religion of the respondent.

Chapter 5

Conclusion

This thesis aims to contribute to the understanding of non-governmental organizations' impacts on human capital and women's empowerment in Bangladesh. The thesis studies the effects of NGOs' innovations in the provision of education and credit.

In the area of education, NGO schools in Bangladesh started as a response to the state's failure to provide primary education to the poorest children in remote areas. For the Bangladesh Rural Advancement Committee (BRAC), their Non-formal Primary Education Programme was innovated in response to demands from the parents who took part in the adult literacy class and whose children did not have a chance to attend formal schools. In 1985, BRAC set up 22 experimental village schools, with the help of a staff of educators and a consultant from Dhaka University School of Education. After the first two years, BRAC developed a model of primary education program which has become highly successful and has been duplicated by other NGOs both in Bangladesh and other countries.

Chapter Two of this thesis studies how the entry of NGO schools has affected educational outcomes of girls and examine the mechanisms which account for the relative performance of NGO versus state schools in improving female educational

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outcomes. The findings suggest that the entry of NGO schools has significantly increased girls' enrollment and class passed as compared to boys. For children aged 11 to 20 years old, being exposed to NGO schools significantly increases the probability of having been enrollment for girls as compared to boys. A child is considered exposed to an NGO school if he/she was 10 years or younger when the first NGO school in the village was established, as most NGO schools enrol 8 to 10 years old children. Similar to the case of enrollment, being exposed to NGO schools also significantly increases the last class passed for girls as compared to boys.

I also analyze the enrollment status of children aged 6 to 10 years old, which is the primary school age in Bangladesh. The results show that being in a village with at least one NGO school is associated with higher probability of being enrolled for girls as compared to boys. On the other hand, being in a village with at least one government school does not show different effects on the probability of being enrolled for girls as compared to boys. Similar results are obtained when I study the effects of being in a village with more NGO school involvement. Here 'the involvement of NGO schools in a village' is defined as the percentage of children aged 6 to 10 years old enrolled in NGO schools among children aged 6 to 10 years old enrolled in school in each village. Together the results point to the role of NGO schools in increasing girls' enrollment as compared to boys.

Further analysis shows that the effects of NGO schools in increasing girls' enrollment are stronger in the case of rural, as compared to urban, areas. One possible reason NGO schools seem to increase female enrollment mainly in the rural areas is that in rural villages government schools and other types of schools are likely to be far away from children's homes. Therefore having an NGO school in the village would encourage parents to send the girls to school. Studies have noted that one reason parents are reluctant to send the girls to school is that they worry about having the girls far away from home. NGO schools are built right in the village, nearby to chil-

dren's homes. This is one example of how NGOs incorporate the needs and concerns of rural villagers to provide an effective program of service delivery.

The results also show that NGO schools have stronger effects in increasing relative female enrollment for BRAC target households compared to non-target households. BRAC target households are defined as households with less than 0.5 acre of land and at least one person engaged in manual labor for at least 100 days a year. BRAC target households are considered the poorest group of the population. When BRAC first started NGO schools, they aim to enrol children from BRAC target households. However, as there were many children from non-target households who were non-enrolled or have dropped out of school, later on they also enrol children from non-target households as well. The results suggest that the effects of NGO schools in increasing relative female enrollment is stronger for BRAC target households, although there is evidence of some effects in the case of non-target households as well.

The statistics from the Education Watch data show that girls from poorer households have higher enrollment rates compared to boys, while the opposite is true for richer households. The findings in this Chapter strongly suggest that the increase in female versus male primary school enrollment in Bangladesh in recent years is at least partly driven by the exposure of poor rural households to NGO schools.

Results from analyzing the school level data suggest that the two most important characteristics of NGO schools which encourage enrollment for both boys and girls are the high percentage of female teachers and having Parent-Teacher Associations. In particular, the high percentage of female teachers appears the most significant characteristic which encourages girls' enrollment. This is in line with the general perception that in Bangladesh many parents do not want to send the girls to school where there are male teachers. Here is another example of how NGOs' understanding of people's concerns has led to the design of schools which encourage girls' enrollment.

As NGO schools differ from government schools in many aspects, an important question is how the students are learning as a result of attending NGO schools. Using test score data from the Education Watch project, I find that attending an NGO school significantly increases test scores in all sections of the Assessment of Basic Competencies (ABC) test.[1] For each section's test scores, the effects of attending an NGO school do not differ between boys and girls. The effects of attending NGO schools are actually stronger than the effects of attending a government school in all sections of the ABC test, controlling for other factors. Statistics from the Education Watch data show that NGO school students actually perform better than government school students in all sections of the test. This is surprising given that NGO schools enrol children from disadvantaged households who did not have a chance to attend formal schools.

Besides the high test scores achieved by the students, NGO schools also have very high teacher attendance rates and student attendance rates compared to other types of school. While the average attendance rate of government school teachers is 86%, the corresponding figure for NGO school teachers is 97%. Student attendance rate is 55% in the case of government schools, and 84% in the case of NGO schools.

Chapter Three investigates the factors which affect teacher presence, student attendance, and parents' participation in school meetings in NGO schools and other types of schools. I focus on three types of schools: government, private, and NGO schools.[2] I also find out whether there are school characteristics which affect teacher presence and student attendance differently for NGO schools compared to other types of schools.

The results show that, after controlling for other factors, NGO schools are associated with higher teacher presence and student attendance rates, and guardians of

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[1] The four sections are life skills, reading, writing, and numeracy.

[2] Although there are 11 types of schools in Bangladesh, these three types of schools enrol over 90% of students in primary schools.

NGO school students are more likely to participate in school meetings compared to guardians of students in other types of schools. Compared to other types of schools, higher teacher presence in NGO schools appears to come from teacher motivation, teacher monitoring, and school facilities in the case of toilet facility. For teacher motivation, NGO school teachers are more likely to be present compared to teachers in other types of school when the number of teachers in the school is smaller. As most NGO school teachers have only one teacher, the results suggest that a teacher in an NGO school is more likely to be present when he/she is the only teacher in the school. When a teacher is the only teacher in the school, there will be no school if he/she is absent. Therefore the sense of responsibility, or motivation, is one possible interpretation of the results.

I also focus only on NGO school teachers, and test several hypothesis regarding the factors which are likely to explain teacher presence. The results suggest that motivation appears the most important factor explaining high teacher attendance in NGO schools. Monitoring and school facilities do not appear to play a significant role. NGO school teachers are more likely to be present when they are the only teacher in the school, when they have received training from the NGO providing the schools, and when they have attended several refresher's courses the past year. Having received training from NGO and having attended refreshers' courses could be either a source of professional motivation, or a signal of intrinsic motivation when more motivated teachers choose to attending training and refreshers' courses. Given the data, it is not possible to distinguish between the two. However, for BRAC schools, before a school is open NGO staff would try to motivate the teacher and develop a sense of responsibility in teaching poor children. This motivational work is likely to play a role in the high teacher presence in NGO schools.[3]

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[3]From a personal experience, I also find BRAC personnel to be highly motivated. During my internship with BRAC in the summer of 2002, I met several BRAC personnel who worked in the area of education, and attended meetings where field staff came to the headquarter to exchange ideas and discuss experiences and problems. The experience impressed on me how motivated and

NGO schools also have much higher student attendance rates compared to other types of schools. The findings suggest that, for all types of schools, the percentage of teacher presence is an important determinant of student attendance. Moreover, the percentage of female teachers appears to increase the attendance of girls.

Several characteristics of NGO schools affect student attendance differently compared to other types of schools. The high rate of teacher presence in NGO schools appears to increase the attendance of boys while the level of classroom crowdedness appears to discourage girls' attendance, with an effect over and above that found in all schools. For NGO schools, larger class size and having the students sing the national anthem appear to encourage attendance for both boys and girls. Whether or not students in NGO schools sing the national anthem could be correlated with whether the school includes singing as a school activity. This possibly suggests that including singing as part of the curriculum might lead to higher student attendance.[4]

The findings suggest that high student attendance rates in NGO schools could be explained by high teacher attendance rates as well as other factors relating to curriculum and school facility.

As community involvement is an important characteristic of NGO schools, it is possible that parents of NGO school students become interested in their children's schooling and attend school meetings. Findings show that parents and other members of the household are more likely to attend a school meeting when a child is enrolled in an NGO school, and the effect is strongest in the case of mothers. For parents of NGO school students, education does not appear to be an important determinant of their participation in school meetings. For parents of students attending government and private schools, on the other hand, education appears to play a role in explaining whether they attend school meetings or not. In fact, parents of NGO

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enthusiastic BRAC personnel were.

[4]It is recognized that students in NGO schools particularly enjoy activities such as singing and dancing, therefore having activities that the children enjoy might lead to higher attendance.

school students are mostly poor villagers who have little or no education. The results suggest that NGOs have succeeded in encouraging guardians, especially the mothers, to attend school meetings regardless of their education. Moreover, there is evidence that guardians' participation in school meetings is positively correlated with certain sections' test scores.

Results in Chapter Three highlight how NGO schools function differently from government and private schools. Teacher motivation appears to play the most important role in explaining teacher presence. Moreover, NGO schools appear to have encouraged guardians of the students, who are mainly poor and uneducated villagers, to attend school meetings.

In Chapter Four I study the impacts of another important NGO innovation, the micro-credit programs. I investigate the effects of having the Grameen Bank in the village of residence on fertility decisions and women's empowerment. Here women's empowerment is proxied by mobility, contribution to family support, and discussion with husband regarding family planning.

The Grameen Bank is an excellent example of an NGO innovation which stems from an accurate understanding of the needs, constraints, and circumstances of the poor. The Grameen Bank's founder, Muhammad Yunus, initiated micro-credit in 1976. It is documented that, after talking with several poor villagers, he was surprised to find out that they only needed a small amount of money to start their own businesses. However, commercial banks would not lend to them, as they do not have collateral. Muhammad Yunus began by lending them his own money. After some experiments, he formed the model of group-lending program which came to be known as micro-credit. Collateral is replaced with peer pressure, as all members of the group become ineligible for further loan if one member defaults.

The results in Chapter Four suggest the role of the Grameen Bank in affecting people's perception regarding family size and family planning. In villages where the

Grameen Bank is well established, between 1993 and 1996 women's ideal number of children has significantly decreased, and it is mainly among women aged 30 to 49 years old that the change in fertility preference occurred. The Grameen Bank supports the idea of having a small family, and the results suggest that this idea has become more widespread among women in villages where the Grameen Bank is well established. Moreover, between 1993 and 1996 there has been a reduction in the number of births in the year prior to the survey, as well as an increase in the use of family planning methods, in villages where the Grameen Bank is well established.

In villages where the Grameen Bank entered between 1993 and 1996 there has been a significant increase in husbands' approval of family planning methods. The results suggest the role of the Grameen Bank in bringing in new ideas and perspectives into the villages. There has been a general change in the perception of husbands regarding the use of family planning methods, which is an important step before a couple actually uses family planning methods.

Moreover, having the Grameen Bank in the village is associated with an increase in women's empowerment in terms of contribution to family support and mobility. The effects found are effects for all women in the village, and not only members of the Grameen Bank. Therefore the effects found include both direct effects on members and spill-over effects on non-members. For members of the Grameen Bank, having access to micro-credit allows women to undertake small businesses, which usually generates income and therefore increases women's contribution to family support. Moreover, being a member of the micro-credit program means that they have to attend weekly meetings. They therefore have to travel outside of the house to attend the meetings. This would likely lead to the acceptance that they could travel to other places as well.

There is evidence that women with a high level of mobility are likely to want fewer children, and women aged 10 to 29 who contribute to family support or have a high