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What determines religious school choice? Theory and evidence from rural Bangladesh

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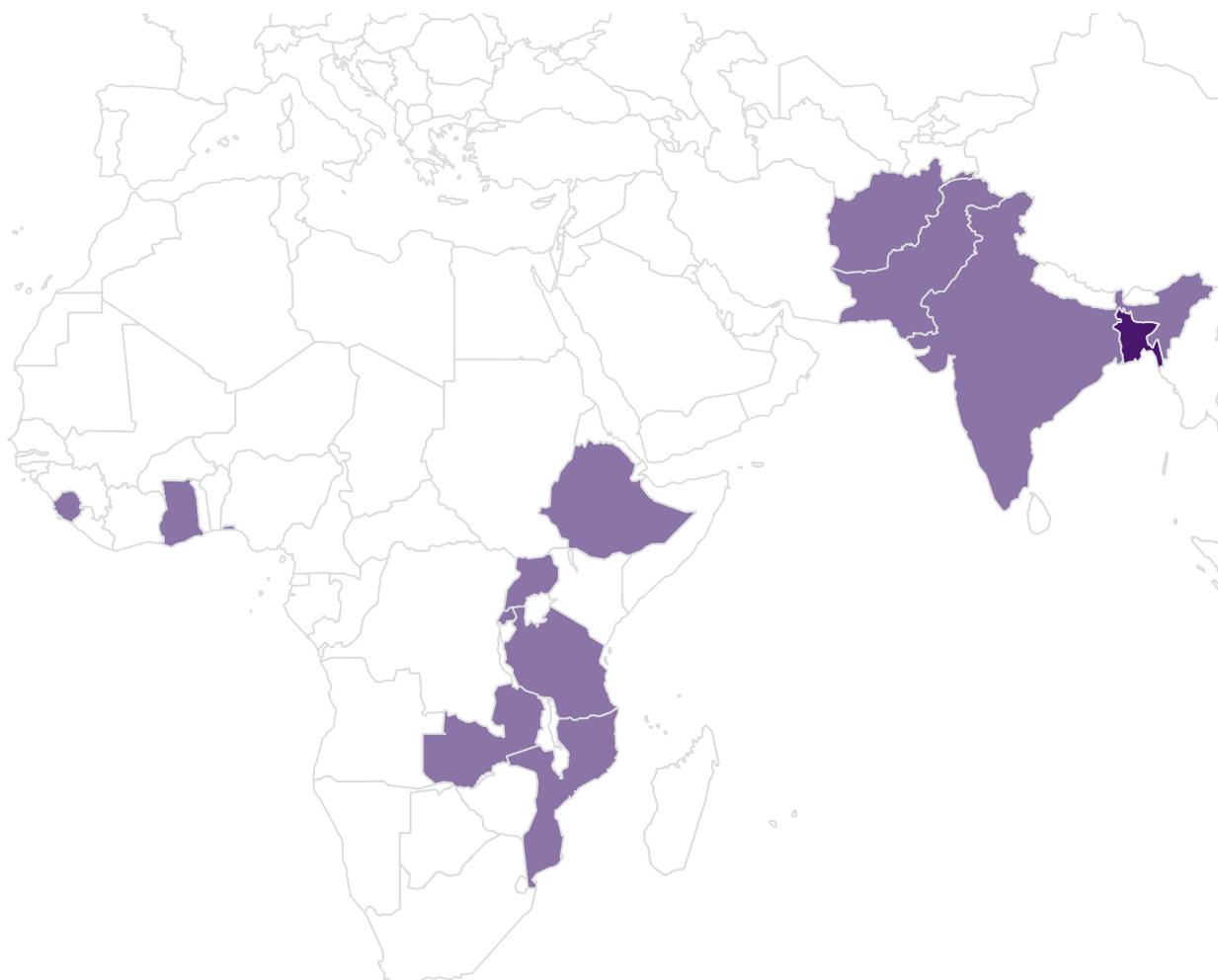
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What determines religious school choice?
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Abstract

This paper looks at the determinants of school selection in rural Bangladesh, focusing on the choice between registered madrasahs (Islamic faith schools) and non-religious schools. We consider a two period framework where children are a source of old age transfers. The amount of transfers is determined both by their labour market outcome and their religious values, which in turn are influenced by their parents' religiosity as well as their schooling. Parents also derive utility from educating a proportion of their children in madrasahs in a way that reflects their own religious values. We investigate how household income, religious preferences, schooling costs, and school quality affect the proportion of children sent to each school type. Using a unique dataset on secondary school age children from rural Bangladesh, we estimate regression models to investigate some of the theoretical determinants of madrasah enrolment. Our main findings indicate that madrasah enrolment falls as household income increases. At the same time, more religious households, and those that live further away from a non-religious school are more likely to send their children to madrasahs. The paper has important policy implications for improving both the accessibility and quality of non-religious secondary schools in rural areas.

JEL classification: D04, I21, O15
Key Words: School choice; madrasah education; Bangladesh.

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1. Introduction

For geo-political and international security related reasons, there is growing global interest in Islamic faith schools or madrasahs. In Bangladesh and other South Asian countries such as India and Pakistan, these schools allegedly cater to a large number of students and thrive in poor and isolated communities. Enrolment in madrasahs, it is argued, is on the rise. Madrasahs may promote extreme political and religious views and gender norms and arguably do not impart significant marketable skills (Asadullah and Chaudhury, 2010; World Bank, 2010). Therefore it begs the question why Muslim households choose to send their children to these schools.

In a country with nearly 40% of the population living below the poverty line, household choice of religious schooling in Bangladesh is popularly perceived in terms of poverty and an inadequacy of mainstream schools (Evans, 2008). The weight of the evidence from existing research indicates that non-religious[1] (government owned and financed) schools are of better quality (Asadullah, Chaudhury and Dar, 2007) so that children are likely to enrol in madrasahs only in areas where there is insufficient provision of non-religious schools. Nonetheless, enrolment decisions can favour madrasahs owing to economic considerations even in better provided areas. Although many madrasahs are fee-charging, they present a cheaper alternative to non-religious schools (World Bank, 2010) and are hence likely to appeal to relatively poorer households. The quality of non-religious schools in rural locations may not be sufficiently high to attenuate the overall demand for madrasahs. However, these hypotheses remain untested given limited research on parental choice of schools in Muslim countries[2].

Religious school choice is however a relatively well researched topic for developed countries. Several European countries such as Ireland, Netherlands, and the United Kingdom have a large number of state-financed religious schools, whilst the United States has a significant number of private schools that operate under a religious orientation. The extant literature on faith school choice in these countries is suggestive of a variety of reasons for demand for religious education (Sander, 2005; Cohen-Zada and Justman, 2005; Cohen-Zada, 2006; Cohen-Zada and Sander, 2008). Cohen-Zada (2006) models the decision of religious parents to send their children to private religious schools in terms of parental desire to protect their children from external influences and thus preserve their religious identity. Using data on Catholic private school enrolment in the US, he finds that when the share of the religious minority in the local population grows, and outside influences become less threatening, the demand for separate religious schooling among the members of the religious group decreases. Sander (2005) finds that the probability of children attending Catholic schools is explained by Catholic parents' religiosity (proxied by church attendance). In a more recent study, Cohen-Zada and Sander (2008) quantify the religious factor in private education in the US by estimating a random utility model of school-choice in which households choose among public, private/non-sectarian, Catholic and Protestant schools. They find that both religion and religiosity have important effects on the demand for Catholic schools[3].

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[1] The term "non-religious" indicates that the school admits students from all faith groups.
[2] There are three recent studies on faith schools in developing countries -- Wodon and Ying (2009) and Backiny-Yetna and Wodon (2009a, 2009b). But none of these focuses on the question of school choice – they only present evidence on the relative performance of different school types.
[3] However, in a companion paper, Cohen-Zada and Sander (2008b) relax the assumption that religiosity (attendance at religious services) is an exogenous determinant of religious school choice.

Some of the above results can help shed some light on religious school choice in rural Bangladesh. Religious preferences may be important in explaining madrasah enrolment, but at the same time, household choices can be driven by economic costs and benefits. In this latter respect, the household decision for a family in rural Bangladesh is not dissimilar to that of a family in a developed country. Irrespective of their mode of finance and management, faith schools (Catholic and/or Church affiliated) in the UK and the US are considered to be superior to public schools in terms of quality (for example see Neal, 1997). In the US, these faith schools are overwhelmingly under private management and charge high fees which limit participation of children from poorer socio-economic backgrounds. Public school enrolment is thus inversely correlated with household income. In Bangladesh, it is the religious schools which offer a cheaper, but lower quality alternative to non-religious schools. In this sense, parents in both settings face a trade-off between school cost and school quality[4].

For historical reasons, Bangladesh was endowed with a relatively large government-registered madrasah system (Asadullah and Chaudhury, 2009a; World Bank, 2010)[5]. These madrasahs are recognised by the state and follow a standardized curriculum which also includes subjects such as mathematics, languages and science, in addition to Islamic studies. This distinguishes Bangladesh from other countries in South Asia (where madrasahs are typically unrecognised by the state and focus almost exclusively on religious instruction), and presents an ideal context in which to study household choice between registered madrasahs and non-religious schools. So far, this question has not been addressed empirically owing to the lack of household survey based information on enrolment in Islamic religious schools.

In this paper, we use data from a purposefully designed rural household survey - QSSMEB (Quality of Secondary School Madrasa Education in Bangladesh), which examines the incidence of madrasah education in Bangladesh, and households' decisions to educate children in madrasahs. The QSSMEB survey was designed to present definitive statements regarding the choice of madrasahs among households as a schooling choice. Therefore, we go beyond simple tabulations and present regression estimates of determinants of madrasah enrolment. The regression specification is motivated by predictions from a two-period model of school choice.

One of the interesting features of school enrolment in rural Bangladesh is that a household may educate some of its children in a madrasah while the others attend a non-religious school. We thus develop a simple two period framework to explain how a household chooses the proportion of children to send to each school type. The model treats children as a source of old age transfers where the amount of transfers is determined by the labour

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[4] Research on household school choice in developing countries also confirms the relative importance of quality. For instance, Alderman, Orazem and Paterno (2001) report that the poorest households in Pakistan send children to fee-charging private schools (and that utilization increases with income) when public schools are of poor quality.

[5] The first registered madrasah, initially known as the Calcutta Madrasah, was established in 1781 in Calcutta. The madrasah taught both religious and secular subjects, and was supposed to be a model for madrasah reform for the rest of India. After the India-Pakistan partition in 1947, it was transferred to Dhaka. This encouraged significant growth in the number of registered madrasahs throughout East Pakistan. In the early 1980s there was a further proliferation of Aliyah madrasas in response to a series of reform measures initiated by the government.

market outcome of the children as well as their religious values[6]. The latter is in turn influenced by their parents' religiosity as well as their schooling. Parents also derive satisfaction from sending a proportion of their children to madrasahs in a way that reflects their own religious values. Keeping in mind that children who are madrasah graduates are likely to earn less as adults, parents need to balance the economic motives of educating children with the non-economic motives of school choice which are driven by their personal beliefs. The model then examines how factors such as household income, religious preferences, schooling costs and school quality affect the proportion of household children educated in each school type.

By way of combining economic theory with field-based evidence, our paper makes a unique contribution to the current international literature on madrasah education. It builds on two closely related studies on the issue, namely, Newhouse and Beegle (2006) and Andrabi, Das, Khwaja, and Zajonc (2006). Newhouse and Beegle present a model to explain household choice of a school type based on their wealth and preference for academic achievement. Whilst their analysis is a useful starting point, they do not explicitly focus on religious school choice. Instead, they focus on the decision to send children to private (religious or non-religious) or public schools in Indonesia.

On the other hand, Andrabi, Das, Khwaja, and Zajonc (2006) focus on the question of religious school enrolment and present descriptive evidence on the issue for Pakistan. The authors find that school choice by households in their data appears to be driven neither solely by poverty, nor by the religious mindedness of households. On the basis of household censuses and surveys, it is shown that one household could send one of its children to a madrasah, another to a public school, and a third to one of the increasingly common private schools. Nonetheless, the households that choose madrasahs account for a very small proportion in the study sample which limits the scope for a formal statistical analysis of the issue. Another study of school choice in Pakistan is carried out by Alderman, Orazem and Paterno (2001); however, they do not address the issue of religious school choice per se. In their study, the focus is on household choice between private schools, public schools, and not sending children to school at all.

Research on school choice in Muslim communities can be complicated by the fact that the institution of madrasah varies widely in terms of what is taught, how it is taught, and what view of religion is imparted to students. In addition to the large number of registered madrasahs that operates with complete oversight of the government, there is an unknown number of madrasahs in Bangladesh which are not recognised by the state. This latter group primarily specializes in religious education and does not teach marketable skills. Therefore, unrecognised madrasahs do not serve as a substitute for formal schools in the labour market. Moreover, the enrolment share of these madrasahs in rural Bangladesh is very small (Asadullah and Chaudhury 2011, World Bank, 2010). For these two reasons, this study does not explore the question of unrecognised madrasah attendance.

The rest of the paper is organized as follows. Section 2 presents background information on madrasahs and the mainstream education system in Bangladesh. Section 3 presents a

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[6] There is experimental evidence from South Asia which suggests a link between religiosity and pro-social behaviour. For instance, in a field study conducted in India, Ahmed (2009) finds that madrasah students are significantly more cooperative in the public goods game and significantly more generous in the dictator game than other students.

simple theoretical model of school choice. Section 4 discusses the dataset whilst empirical results are presented in Section 5. Section 6 concludes.

2. Background

Islamic religious schools in Bangladesh are almost entirely in the non-state sector, operating at both primary and secondary levels. Moreover, the majority of the state-recognised schools also benefit fiscally from the state under the Private-Public Partnership (PPP) model. Little systematic information is available on those religious schools that remain outside the state sector and are unrecognised by the state. There is a perceived difference among various madrasahs in terms of in-school conduct and curriculum content. Indeed, madrasahs operating at primary or secondary levels in Bangladesh are classified in two broad categories: Aliyah madrasahs and Quomi madrasahs. Outside the primary/secondary sector[7], there is a large number of pre-primary Islamic education institutions which are of two types, Maktab (or Nourani madrasah) and Furqania/Hafizia madrasahs[8]. In this study, we focus on secondary education choices and outcomes only.

The establishment of Aliyah madrasahs and their activities follow government regulations as prescribed by the Madrasah Education Board. The Board approves curriculum for all registered madrasahs from secondary to post-graduate level. For a madrasah operating at any level, there are clearly prescribed requirements for state recognition and support. In terms of curriculum content, Aliyah madrasahs offer a hybrid education where students are taught both religious subjects and modern general education.

The secondary level of the Aliyah stream is known as Dakhil which spans grades 6 to 10. As in the mainstream education system, at the end of Dakhil education students appear in a public examination which is organized by the Bangladesh Madrasah Education Board. The Dakhil certificate is equivalent to the Secondary School Certificate (SSC) obtained after successful completion of secondary education from non-religious schools. There are four Dakhil madrasah curriculum groupings: (a) General group, where the focus is on languages, mathematics, religious studies, and social studies; (b) Science group, where in addition to languages, mathematics, and religious studies, students are examined in computer science, physics, chemistry, and biology; (c) Muzabbid group, where students are taught in additional religious subjects such as Quran, hadith, and fiqh; (d) Hifzul Quran group, where students specialize in memorizing the Quran.

Similarly, students in non-religious secondary schools can opt for different group specializations such as science, arts and commerce. However, they cannot specialise in religious studies; at most 10% of the curriculum comprises of Islamic education[9]. Therefore, in comparison to mainstream non-religious schools, Aliyah secondary madrasahs give students the option to specialise in general, non-religious stream as well as Islamic theology.

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[7] As in other South Asian countries, the Bangladeshi education system consists of four main levels: primary school (five years of study), secondary school (five years), and higher secondary education (two years) and tertiary (graduate and post-graduate) education.

[8] Abdalla, Raisuddin and Hussein (2004) provide an excellent discussion of the curriculum and structure of primary and pre-primary religious and non-religious schools within the state regulated sector.

[9] Non-Muslim students study their own religion or are allowed to opt out of religious education.

The international discourse uses the word "madrasah" as a catchall term. However, depending on level of education and/or government recognition, madrasahs differ in types. First, a madrasah can mean something as simple as a pre-school institution, where children learn the Quran alongside a few religious practices. Second, it can mean a primary or secondary school that serves as a substitute for mainstream non-religious education. Third, it can also mean a seminary established to train proper clerics in classical Islamic religious knowledge. We, therefore, define madrasah enrolment by types.

Asadullah and Chaudhury (2011) present the market share of different types of madrasahs in rural Bangladesh using the QSSMEB survey data which was collected in 2008. According to the QSSMEB Census, there are 32,372 children between the ages of 6 and 18 of which 17.52% (i.e. 5763 children) report the last school attended as a madrasah. However, many students may have first enrolled in a madrasah but have subsequently moved to a school. When accounting for this fact, 19.78% (6404 children) have enrolled at least once in madrasahs in the past. Lastly, when restricted to the population of 24,440 children who are currently enrolled, the share of madrasahs rises to 18.79%. These numbers are consistent with household survey based estimates of the market share of madrasahs.

Table 1 below summarizes data on the market share of madrasahs by levels of education. The share is found to be much higher in secondary education. These figures are close to estimates available from other sources. For instance, according to the large scale nation-wide household survey of CAMPE (Campaign for Popular Education), madrasahs account for 16% of total enrolment in the primary sector whilst our estimates range between 13.8 to 15.7%. Unfortunately, apart from CAMPE, there is no other source of comparable data on madrasah enrolment.

Table 1: Madrasah enrolment in rural Bangladesh

	Overall share	Breakdown by school type
QSSMEB 2008 census		
% share of primary enrolment madrasah	13.8%	8.14% is in Aliyah, 1.9% is in Quomi, and 4.35% is in "Other" category that includes Nurania/ Quiratia/Furkania madrasah
% share of secondary enrolment madrasah	22.1%	18.65% is in Aliyah, 2.32% is in Quomi, and 1.34% is in "Other" category that includes Nurania/ Quiratia/Furkania madrasah
QSSMEB 2008 survey		
% share of primary enrolment madrasah	15.7%	9.48% is in Aliyah, 2.3% is in Quomi, and 4.37% is in Other madrasah that includes Nurania/ Quiratia/Furkania madrasah
% share of secondary enrolment madrasah	24.5%	20.53% is in Aliyah, 2.56% is in Quomi, and 1.76% is in Other madrasah that includes Nurania/ Quiratia/Furkania madrasah

Finally, differences in curriculum aside, registered schools and madrasahs differ significantly in terms of costs and physical inputs. Table 2 reports the average profile of non-religious secondary schools and registered madrasahs in rural Bangladesh. On average, schools have a bigger land area, are better inspected by the government and have a larger proportion of trained teachers. They also charge higher fees and pay a higher salary to their teachers. Looking at average test scores in mathematics and English, we find that non-religious schools perform slightly better, while as expected, madrasahs have a clear advantage when it comes to religious studies. However, it is worth noting that while non-religious schools tend to achieve somewhat higher scores, the average performance is rather poor for both types of schools.

Table 2: Profile of an average non-religious secondary school and madrasah

	Non-religious school	Registered Madrasah
School land area (in logs)	4.91	4.77
School inspected (1 if yes)	0.82	0.69
Student fees (in logs)	4.95	4.20
% of female teachers	18	9
% of trained teachers	69	25
Teacher salary (in logs)	8.63	8.29
Grade 8 student score in maths (% of answers correct)	35.57	33.14
Grade 8 student score in English (% of answers correct)	36.88	26.69
Grade 8 student score in Islam (% of answers correct)	69.94	81.54
N	206	123

Source: Based on World Bank (2010) and QSSMEB survey 2008.

3. A theoretical model of household demand for madrasah education

As pointed out earlier, religious school choice has not been studied extensively in developing, and in particular, Islamic countries. However, one example is Newhouse and Beegle (2006) who address the issue for Indonesia where households have the option of sending their children to private or public (religious or non-religious) schools. To formalize the problem of school choice, they set up a two-period model where parents select a school in Period 1, whilst the child transfers an amount of income determined by the quality of their education, which is consumed by the parent in the second period. Parents' utility is a positive function of their consumption in the two periods, their taste for school quality (or valuation of academic achievement) as well as non-academic characteristics of the school such as safety, religious affiliation, convenience and discipline.

The Newhouse and Beegle model makes two predictions. First, a parent that places a higher value on education is more likely to send their child to public schools, which are assumed to be of higher average quality. Second, holding other factors constant, wealthier households are more likely to send their children to private school.

In Bangladesh, most of the non-religious schools are either state managed or aided. The share of the unrecognised madrasahs in secondary education is insignificant. Therefore, the real choice lies between state-recognised secondary schools and madrasahs, rather than between public and private faith schools. Using the framework of Newhouse and Beegle as a starting point, we develop a theoretical model to explain the household choice of madrasahs over non-religious schools in rural areas. Unlike in the Newhouse and Beegle model where religious affiliation of the school is considered a part of "other" factors, we specifically model both the impact of the religiousness of the school curriculum as well as parental religiosity on the level of transfers. Parents also derive direct satisfaction from their school choice decision relative to their religiosity. Our model also specifically addresses the observed fact that a proportion of children in a given household might attend madrasahs while the rest attend non-religious schools.

We consider a simple, two-period model, where individuals work when young, earn an exogenous income, y, and send their children to school[10]. Schools are of two types, non-religious secondary schools, which are denoted by s and state recognised Aliyah madrasahs, denoted by m.

Schooling costs, denoted by P_s and P_m respectively, include both tuition and travel cost[11]. Empirical evidence suggests that tuition for registered Aliyah madrasahs is typically less than that of non-religious schools, and they are also more likely to be geographically more accessible than secondary schools; thus $P_s > P_m$. We further assume that both P_s and P_m are strictly less than y, and that $y - P_m > \underline{y}$, where $\underline{y}$ is a subsistence level of income. The

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[10] For the purposes of this model, we only focus on households that send their children to school. We are thus abstracting away from the issue of child labour, whereby some parents might decide not to send their children to school at all. In our sample, 72% of secondary school age children attend a secondary school of some type.

[11] This is done for simplicity. We could split up total schooling cost into $P_j = Q_j + D_j$, where Q_j represents tuition, while D_j represents distance or travel cost. Although tuition in secular schools is higher, we can allow for the travel cost to the madrasah to be higher or lower than travel cost to a non-religious school, depending on the location of schools in a particular village.

number of children is normalized to 1. Parents send a proportion a of their children to madrasahs, and a proportion $1 - a$ to non-religious schools.

In the second period, parents get old age transfers from their children. For simplicity, we assume that there is no other income in period 2; however, adding this will not make a significant difference to the analysis. Transfers (T) are a proportion of the wage (w) earned by the child as an adult. This proportion is determined by their religiosity as an adult. Let Z_j be an index of adult religiosity for a child who was educated in school type j. Thus,

$$T_j = Z_j w_j, \text{ where } j = s, m \tag{1}$$

A child's adult wage is determined by the type of school its parents chose in period 1. Aliyah madrasahs teach fewer marketable skills, therefore, $w_s > w_m$[12]. We can also think of these wages as a proxy for school quality, although it is worth keeping in mind that in some rural areas, school quality may be low across the board (as seen in Table 2).

The religiosity of a child in adulthood, Z_j, is an increasing function of both the religious aspect of their school curriculum, as well as their parent's religiosity: Thus,

$$Z_j = Z_j(z_j, Z_P) \tag{2}$$

where z_j represents the religious aspect of the curriculum in school type j, and Z_P is the parent's religiosity, which is taken as given in this two period model[13]. Since madrasahs have a more religious curriculum, $z_m > z_s$.

Finally, the total amount of transfers received by the parent in period 2 is a weighted average of transfers from madrasah-educated and non-religious school-educated children, and is given by

$$T = aT_m + (1 - a)T_s \tag{3}$$

Apart from consumption in the first and second period (c_1 and c_2, respectively), parents also derive utility from sending a certain proportion of their children to madrasahs in a way that reflects their religious values. The lifetime utility of the representative parent is given by

$$U = \ln c_1 + \beta \ln c_2 + \gamma v\left(\frac{a}{Z_P}\right) \tag{4}$$

where $v' > 0$ if $(a/Z_P) < 1$
$\quad v' = 0$ if $(a/Z_P) = 1$
$\quad v' < 0$ if $(a/Z_P) > 1$, and
$\quad v'' < 0$ for all (a/Z_P).
$\quad 0 < \beta < 1$, and
$\quad \gamma > 0$

We further assume that $v(0) = 0$, and that there is a lower bound on parental religiosity, $\underline{Z_P}$, such that $v\left(\frac{a}{\underline{Z_P}}\right) = 0$. This is graphically illustrated in Appendix 1.

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[12] See Asadullah (2009) for evidence on the negative correlation between wages and madrasah attendance.
[13] In general, Z_s and Z_m can have different forms.

The last term in the utility function can be thought of as a "school choice" term, whereas the first two terms of the utility function are the standard consumption terms. This school choice term in Equation (4) says that sending a certain proportion of children to madrasahs yields the highest utility when this proportion best matches the religious values of the parent, i.e. when $(a/Z_P) = 1$. On the other hand, a parent who is not very religious, but still sends a large proportion of children to a madrasah (because it is the cheaper or more accessible alternative), gains lower utility from the school choice term, since in their case, $(a/Z_P) > 1$. Similarly, for a parent who is very religious, but does not send a large enough proportion of children to a madrasah, the additional benefit from the school choice term is not very high.

The problem for the representative parent is to choose a, the proportion of children to send to madrasah, in order to maximise lifetime utility.

$$\max_{a \in [0,1]} \ln c_1 + \beta \ln c_2 + \gamma v \left(\frac{a}{Z_P} \right)$$

subject to,

$$c_1 = y - aP_m - (1-a)P_s$$
$$c_2 = aT_m + (1-a)T_s$$

It can be readily verified that the first order condition for this problem is:

$$\frac{P_s - P_m}{c_1} - \beta \frac{(T_s - T_m)}{c_2} + \gamma v' \left(\frac{a}{Z_P} \right) \left(\frac{1}{Z_P} \right) = 0$$

(5)

We can now substitute equations (1) and (2) into equation (5) to express the first order condition in terms of the different parameters of the model. In particular, we can express the first order condition as:

$$F(a, y, P_s, P_m, w_s, w_m, z_s, z_m, Z_P) = 0$$

(6)

Using the implicit function theorem[14], we can now see how the optimal proportion of children educated in madrasahs, varies with changes in school costs, school quality (as proxied by future wages), the religiousness of the school curriculum, and parental religiosity.

Comparative statics

From equation (6), it can be shown that as parental income y increases, the proportion of children enrolled in madrasahs decreases. This is because an increase in y means that parents can afford the more expensive non-religious schools and thus they educate a smaller proportion of their children in madrasahs[15]. As madrasahs become more

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[14] The effect of each parameter on a, the proportion of children enrolled in madrasahs, can be calculated as follows; using the parameter y as an example, we know that $\partial a / \partial y = -(F_y / F_a)$.

[15] It can be shown that if parents earn income in both periods, then a depends negatively on first period income, as shown here, and positively on second period income. This is not surprising since parents who have a larger second period income do not need to rely as much on transfers, and hence can afford to educate a larger proportion of their children in madrasahs.

expensive, i.e. as the cost of madrasahs P_m increases, madrasah enrolment falls. Similarly, if non-religious secondary schools become more expensive, then madrasah enrolment rises.

From equation (6), it can also be shown that if either w_s or z_s increases, then madrasah enrolment decreases. This is because in both cases, the parameters have a positive impact on the amount of transfers (T_s) that parents can expect in their old age from their non-religious school educated children. Similarly, if either w_m or z_m rises, then madrasah-educated children become more valuable as a source of transfers and thus madrasah enrolment also rises.

Finally, we look at the impact of parental religiosity, Z_P. What happens to madrasah enrolment as parental religiosity changes now depends on how the child's religiosity as an adult, Z_j, responds to parental religiosity, Z_P. It will be useful to define the "elasticity" of children's religiosity with respect to their parent's religiosity as:

$$\varepsilon_j = \frac{\partial Z_j / \partial Z_P}{Z_j / Z_P}$$

(7)

Using the implicit function theorem, we know that

$$\frac{\partial a}{\partial Z_P} = -\frac{F_{Z_P}}{F_a}$$

From equation (6), it can be easily verified that $F_a < 0$. Thus, the sign of $\frac{\partial a}{\partial Z_P}$ is determined by the sign of F_{Z_P}, which is given by the following equation:

$$F_{Z_P} = \frac{\beta w_m w_s Z_m Z_s}{Z_P c_2^2} (\varepsilon_m - \varepsilon_s) - \gamma v'' \left(\frac{a}{Z_P}\right)\left(\frac{a}{Z_P^2}\right)\frac{1}{Z_P} - \gamma v' \left(\frac{a}{Z_P}\right)\frac{1}{Z_P^2}$$

(8)

Assuming that $(\varepsilon_m - \varepsilon_s) \geq 0$[16] and given that $v'' < 0$, we can see that the first two terms in equation (8) are positive. For values of $(a/Z_P) > 1$, we know that $v' < 0$, which implies that the last term in equation (8) is also positive. Furthermore, when $(a/Z_P) = 1$, we know that $v' = 0$. Thus the sign of F_{Z_P} is positive for the region where $(a/Z_P) \geq 1$.

In other words, $\frac{\partial a}{\partial Z_P} > 0$ for the region where $(a/Z_P) \geq 1$; thus madrasah enrolment increases with an increase in parental religiosity.

For the region where $(a/Z_P) < 1$, the sign of $\frac{\partial a}{\partial Z_P}$ remains positive until a point $\left(\frac{a}{Z_P}\right)_{low}$ below which v' has a sufficiently large positive value so as to outweigh the effect of the first two terms in equation (8). In this case, we find that $\frac{\partial a}{\partial Z_P} < 0$.

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[16] Generally speaking, ε_m can be greater than or less than ε_s. However, it is quite plausible that the religiosity of madrasah-educated children is more responsive to parental religiosity. Madrasahs, with their greater emphasis on religious instruction, are more likely to impart traditional values than non-religious schools, and this includes being more sensitive to one's parent's religiosity. Consequently, we henceforth assume that $(\varepsilon_m - \varepsilon_s) \geq 0$.

Thus, in general, parental religiosity has a positive effect on madrasah enrolment. However, there is a very small range of values of (a/Z_P), for which this effect might be reversed. This occurs where (a/Z_P) is close to zero. For people who are very religious and for whom Z_P is very large relative to a, the utility from the school choice term in equation (4) is very small, and it is the consumption effect that dominates. Thus if they were to become even more religious, they would need to compensate for their reduction in second period consumption by increasing the proportion sent to non-religious schools (keeping in mind that non-religious school graduates will earn a higher wage, and thus give higher transfers than their madrasah educated counterparts). Table 3 below summarises how a responds to changes in various parameters of the model.

Table 3: Summary of comparative statics

Parameter	*Effect on the fraction of children sent to madrasahs*
Parental income (y)	-
Cost of madrasah (P_m)	-
Cost of non-religious schools (P_s)	+
Adult wage of secondary-educated child or non-religious school quality (w_s)	-
Adult wage of madrasah-educated child or madrasah quality (w_m)	+
Religiousness of non-religious curriculum (z_s)	-
Religiousness of madrasah curriculum (z_m)	+
Parental religiosity (Z_P)	+ / -

4. Data

The empirical analysis presented in this paper is based on a unique survey of households carried out by the authors in 2008, as part of a project on religious school choice in rural Bangladesh. The survey was conducted in 96 villages. The village sample frame comprised of all households where there is at least 1 child aged between 11 and 18 years. The census, on the other hand, covers all households in the sample villages in 12 districts, spread across 6 divisions in Bangladesh. Consequently, it yields a much bigger sample on madrasah enrolment which allows for examining correlations with household attributes in a meaningful manner.

In addition to directly asking the question: "Is the child enrolled in an Islamic education school?", the QSSMEB survey questionnaire also enquired about any madrasah/school the child may have attended previously. The survey questionnaire also has a detailed module on past school choice for all children of school age. Lastly, schooling information is collected not only for resident children, but also for children of the head of household who currently do not live in the household. This is an important issue, since many madrasahs in South Asia are boarding schools, so that ignoring non-resident children would lead to an under-estimate of the true enrolment share of madrasahs.

For the above reasons, we are able to define madrasah enrolment in broad terms – we go beyond current enrolment by using data on "ever enrolment" and use information on resident as well as non-resident children of school age. Another peculiarity of Bangladesh

is a sizeable non-Muslim population. However, since madrasahs cater exclusively to the Muslim population, we discard all non-Muslim households in our empirical analysis.

Lastly, although completion rates still remain poor, secondary school participation rate in Bangladesh has increased considerably in recent years. As a proportion of all secondary school-age (i.e. 11-18 years old) children, 72% children in our data were enrolled in secondary education. Since we are interested in explaining the proportion of secondary school going children sent to registered madrasahs, we discard data on the small fraction of households where none of the children have ever attended secondary school. Incorporating this small sub-group of households in our analysis requires joint modelling of schooling and child labour decisions. Since our primary objective is to explain household's choice of school type with a focus on religious schooling, we have abstracted away from the problem of how to decide whether to send the child to secondary school or not in the first place.

5. Findings

We begin by describing the variation in madrasah enrolment at the level of the household in the QSSMEB data. We follow Andrabi et al. and analyse enrolment choices at the household level. First, for households that have a child enrolled in a madrasah, we examine what type(s) of schools the other children in the household attend. Focusing on households that had at least two enrolled children we classify them as (*i*) "all madrasah: Quomi," if all the children attend a Quomi madrasah; (*ii*) "all madrasah: Aliyah," if all children attend Aliyah madrasah; and (*iii*) "mixed madrasah," if the households had children in each type of madrasahs (i.e. Aliyah and Quomi) simultaneously and (iv) "madrasah/school," if at least one child goes to the madrasah and one to a school. Similarly, we repeated this exercise in households with at least one child going to a non-religious school.

The results are summarized in Table 4. Among households with at least one child enrolled in a school (i.e. "school households"), almost 68% of households choosing schools for at least one of their children select non-religious schools for all of their school-age children, while 19% of households sending a child to a madrasah (i.e. "madrasah households") send all of their children to madrasahs. In other words, the majority of "madrasah households" use both madrasahs and public/aided schools whilst the pattern is the opposite in case of "school households". Among households with at least two children enrolled in secondary education, 7% can be classified as "all madrasah" households. Therefore, a small but significant part of the variation in madrasah enrolment is between households and lends support to the hypothesis that the choice of a madrasah in Bangladesh provides some information about the ideology of the household.

Table 4: Household enrolment choices

	Households with at least 1 madrasah enrolled child	Households with at least 1 school enrolled child	All households
% Children in Quomi madrasah only	5	-	2
% Children in Aliyah madrasah only	12	-	4
% Children in (Quomi and Aliyah) madrasah only	3	-	1
% Children in non-religious school only	-	68	31
% Children in school and (Aliyah/Quomi) madrasah only	80	32	62

Source: Asadullah and Chaudhury (2011).

The fact that a significant part of the variation in madrasah enrolment is between households highlights the role of household-specific factors in predicting madrasah enrolment of children. Motivated by religious convictions, households may only have to "sacrifice" one child for religious education. Indeed, analysis of household responses to direct question on reasons for madrasah attendance does provide support for some of these theories. The most commonly cited reason is religious preference of the household (45.79%), followed by perceived high quality of madrasah education (22.18%), concerns for after-life (8.22%) and distance to school (6.88%).

The significance of the variation in madrasah enrolment at the household level is also confirmed by the descriptive statistics presented in Appendix Table 1. Further insights into the underlying reasons for madrasah attendance can also be obtained by looking at the figures presented in Appendix Table 1. The first column in the Table reports mean values of key household and community-level variables. The second and third columns report the mean values of the variables at the child level separately for school and madrasah enrolled children respectively. In our sample, there are a total of 1566 children enrolled in registered secondary school/madrasah of which 19% are reported to be attending religious schools.

A number of observations can be made here. First, households whose children are enrolled in non-religious schools have higher income and better access to electricity. Second, madrasah attending children belong to more religious households. Third, madrasah enrolled children live in less developed (measured in terms of average educational attainment of the villagers and road conditions) and more religious (proxied by the number of mosques) villages. Finally, the demand for madrasah schooling appears to be inversely related to the quality of non-religious schools in the area (measured in terms of test scores) – households with at least one madrasah enrolled child report living in areas with higher average madrasah test score (mathematics as well as English). The opposite pattern is noted for households with at least one non-religious school child. We now further explore these issues in a regression framework.

Correlates of madrasah enrolment

In this section, we build on simple tabulations presented earlier and formally explore the correlates of madrasah enrolment in a regression framework. We are interested in learning about the effect of variables such as household poverty, parental education, religious preference, distance to schools and community profile on school choice decisions. The study of school choice is complicated by the presence of two types of religious schools.

Given the institutional differences between recognised and unrecognised madrasahs and very small share of the latter in total secondary school enrolment, we discard the unrecognised ones from the regression analysis. The regression model is estimated using data on all currently enrolled children, leaving non-religious school as the base category type.

The regression sample contains 1229 households where 27% households have more than 1 secondary school enrolled children. Our dependent variable of interest is the proportion of children belonging to the same household who attend madrasahs. Therefore, the dependent variable has values that fall between zero and one. Estimation of the regression model using Ordinary Least Squares (OLS) method with proportions response dependent variable is unproblematic as long as all of the proportions lie well within the unit interval (e.g. between values 0.3 and 0.7). Otherwise, the predicted values are unlikely to fall between zero and one. In other words, in cases where the variable is strictly inside the unit interval, one cannot recover the expected value of the fractional response from a linear model for the log-odds ratio. Indeed, density plots of the dependent variable reveals a significant number of proportions close to 1 and 0 (results not shown). Estimating a logit model for such data is not appropriate either – using the log-odds transformation fails when we observe responses at the corners, zero and one. This will result in missing values, and hence observations would subsequently be dropped from the estimation sample. Amongst other things, a linear functional form for the conditional mean might also miss important nonlinearities. To deal with fractional response data, one needs models for the conditional mean of the fractional response that keep the predicted values in the unit interval. For the above reasons, Papke and Wooldridge (1996) suggest using a Generalized Linear Model[17] (GLM), also known as Fractional logit, which can handle proportions of exactly 0 or 1[18]. However, for the sake of comparability, we also report results from OLS and Probit regressions[19].

The choice of independent variables in our regression analysis is guided by the theoretical model of school choice discussed in Section 3. The regression model has the following controls:

a) household income (proxied by per capita expenditure; household assets; household having electricity; mother's and father's education level and age[20])
b) parental religiosity
c) distance to different types of school from the household (measured in terms of travel time, in minutes)
d) availability of registered madrasahs relative to non-religious secondary schools in the locality (i.e. union)
e) quality of registered madrasahs and non-religious schools in the locality (i.e. union)
f) average age and gender of school-age children in the household

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[17] The GLM generalizes linear regression by allowing the linear model to be related to the response variable via a link function and by allowing the magnitude of the variance of each measurement to be a function of its predicted value.

[18] For a textbook treatment of fractional logit regression model, see Wooldridge (2002, page 661 p).

[19] For empirical studies comparing estimates of OLS and Flogit, see Wagner (2001).

[20] In addition, a positive coefficient on parental age may serve as a crude test of the "after-life consumption" hypothesis. Using data on Taiwan, Chang (2005) finds that (a), religious giving and charitable giving are closely related to after-life consumption and (b) older people are more likely to provide volunteer work and attend more religious activities than younger individuals.

g) village characteristics

This specification is similar to that used by Newhouse and Beegle (2006)[21]. However, our data is rich enough to shed light on the effect of poverty, household's religious preference and supply-side influence.

Results

Table 5 presents the regression results following three different regression models, namely, OLS, probit and fractional logit. Two specifications are presented for each model. The first is a parsimonious specification whilst the second additionally controls for village characteristics. The main results are as follows.

Income effect: Madrasahs charge lower fees and hence may attract children from poorer households. Households may be unable to afford admission fees, textbooks, transport and private tuition required to attend government recognised schools and hence may often find that their only option is a registered madrasah. Indeed in our theoretical model in section 3, the effect of parental income (y) on the fraction of children sent to madrasahs is negative.

To test for this possibility, we included 2 dummies which capture the economic status of the household. For each household, we first compute the total food and non-food expenditure. We then work out per capita monthly household expenditure, and apply adult equivalence correction to account for scale economies arising due to differences in household demographic structure. On the basis of this variable, we calculate expenditure quartiles – the 2 dummies in our empirical specification correspond to the first 2 quartiles leaving the top 2 quartiles as the base category. If household poverty is a valid explanation for madrasah enrolment, we would expect positively signed coefficients on dummies corresponding to lower quartiles. Indeed there is some evidence in favour of the poverty hypothesis. The coefficient on the variable "Household expenditure: 2nd quartile" is always significant in all regressions (see Table 5). This is also true for the variable "Household expenditure: 1st quartile". When other proxies of household poverty are examined, the inverse relationship between household income and madrasah attendance is also confirmed. Madrasah enrolment is also found to be negatively associated with electricity connection to the household's home.

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[21] Their child-level regression model included the following variables: (a) household wealth (proxied by per capita expenditure and floor type of the household); (b) past academic achievement of the child (including elementary school grade repetition); (c) mother's and father's education level and religion; (d) student's sex; (e) whether the student worked in junior high; (f) the general size of the student's village at age 12; (g) the type of elementary school; (h) indicators for languages spoken at home; (i) the average district elementary score; (j) number of schools in the district and (k) the subjective health of the respondent.

Table 5: Household level estimation of the determinants of madrasa enrolment
(Dependent variable: Proportion of enrolled school children who attended madrasa)

	OLS		Probit		Fractional Logit	
	1	2	1	2	1	2
Fraction of children being female	0.012	0.011	0.001	-0.002	0.012	0.012
	(0.49)	(0.44)	(0.03)	(0.08)	(0.52)	(0.51)
Average age of children in the household	-0.001	-0.004	0	-0.003	-0.001	-0.003
	(0.19)	(0.56)	(0.02)	(0.37)	(0.15)	(0.53)
Mother education: primary completed	-0.007	0.004	0.018	0.028	-0.012	-0.006
	(0.15)	(0.07)	(0.32)	(0.48)	(0.28)	(0.14)
Mother education: secondary completed	-0.028	-0.004	-0.035	-0.002	-0.033	-0.005
	(0.42)	(0.05)	(0.45)	(0.03)	(0.45)	(0.08)
Father education: primary completed	0.019	0.055	0.062	0.106	0.012	0.052
	(0.32)	(0.9)	(0.94)	(1.55)	(0.24)	(0.95)
Father education: secondary completed	0.057	0.072	0.093	0.112	0.057	0.077
	(1.06)	(1.31)	(1.56)	(1.82)+	(1.17)	(1.48)
Father's age	0	-0.001	-0.001	-0.002	-0.0003	-0.001
	(0.21)	(0.59)	(0.56)	(1.05)	(0.22)	(0.81)
Mother's age	0.002	0.003	0.001	0.003	0.002	0.004
	(0.75)	(1.27)	(0.43)	(0.99)	(0.65)	(1.29)
Household expenditure: 1st quartile	0.057	0.058	0.062	0.066	0.055	0.057
	(2.00)*	(1.97)*	(1.89)+	(1.96)+	(1.91)+	(1.93)+
Household expenditure: 2nd quartile	0.061	0.063	0.061	0.065	0.065	0.069
	(2.19)*	(2.21)*	(1.93)+	(1.98)*	(2.33)*	(2.41)*
Household has electricity	-0.087	-0.087	-0.1	-0.098	-0.085	-0.083
	(3.45)**	(3.28)**	(3.57)**	(3.31)**	(3.52)**	(3.22)**
Religiosity: Whether parents pray daily	0.083	0.09	0.086	0.094	0.079	0.084
	(3.31)**	(3.48)**	(3.14)**	(3.33)**	(3.23)**	(3.36)**
Religiosity: how frequently parents recite the Quran	0	0.001	0.001	0.002	0.0009	0.001
	(0.04)	(0.36)	(0.25)	(0.51)	(0.25)	(0.4)
Distance of the household from: Sub-district headquarters	0	0	0.001	0	0.0003	0.0001
	(0.65)	(0.17)	(1.44)	(0.65)	(1.03)	(0.35)
Distance of the household from: Secondary school	0.004	0.004	0.004	0.004	0.0037	0.0039
	(4.22)**	(3.80)**	(3.99)**	(3.76)**	(4.02)**	(4.06)**
Distance of the household from: Primary school	-0.001	-0.001	-0.002	-0.002	-0.0014	-0.0016
	(0.97)	(1.02)	(1.26)	(1.18)	(1)	(1.13)
Distance of the household from: Secondary madrasa	-0.002	-0.002	-0.001	-0.002	-0.0015	-0.0022
	(1.58)	(1.96)+	(1)	(1.67)+	-1.44	(2.11)*
Distance of the household from: Primary madrasa	-0.002	-0.001	-0.002	-0.002	-0.0018	-0.0015
	(1.5)	(1.22)	(1.72)+	(1.25)	(1.56)	(1.27)
log of mean Maths score of local madrasas	0.002	-0.033	0.009	-0.023	0.0073	-0.025
	(0.07)	(0.93)	(0.25)	(0.58)	(0.23)	(0.67)
log of mean Maths score of local schools	-0.059	-0.051	-0.056	-0.013	-0.076	-0.05

	(0.86)	(0.69)	(0.74)	(0.16)	(1.12)	(0.74)
Number of madrasas as a fraction of all secondary schools	0.256	0.408	0.344	0.493	0.285	0.438
	(1.85)+	(2.64)**	(2.25)*	(2.88)**	(2.04)*	(2.73)**
Number of madrasas as a fraction of all primary schools	-0.102	-0.164	-0.381	-0.395	-0.228	-0.299
	(0.34)	(0.5)	(1.17)	(1.08)	(0.92)	(1.07)
Village has electricity		0.056		0.075		0.043
		(1.03)		(1.28)		(0.78)
Village has pucca road		-0.031		-0.052		-0.03
		(1.07)		(1.58)		(1.11)
Village: number of mosques		-0.009		-0.007		-0.009
		(0.78)		(0.54)		(0.85)
Village has NGO educational activity		-0.076		-0.063		-0.079
		(2.06)*		(1.51)		(2.18)*
Village: mean education of the population		-0.053		-0.053		-0.051
		(3.74)**		(3.38)**		(3.40)**
Village: proportion of the population being non-Muslim		-0.093		-0.19		-0.069
		(0.66)		(1.14)		(0.5)
Constant	-0.001	0.149			-3.296	-2.336
	0	(0.63)			(2.18)*	(1.39)
Observations	1212	1163	1212	1163	1212	1163
Adj. R-squared	0.08	0.09	0.11	0.12	--	--
Log likelihood	--	--	-588.78	-561.7	-549.15	-523.64
chi2	--	--	146.9	158.13	126.35	140.14

Note: (a) + significant at 10%; * significant at 5%; ** significant at 1%. (b) Marginal effects are reported for Probit and Fractional Logit models. (c) Results based on sample of all children aged 11-18 years who attended secondary education. (d) Base-category for parental education is "less than 5 years of schooling".

Religious preference of the household: We include two proxies of parental religiosity[22] – "whether prays daily" and "the frequency of reciting the Quran". In all specifications, daily prayer is positively correlated with the proportion of children enrolled in madrasah. This correlation could be dismissed on the ground that religiosity is simply a proxy for household poverty. However, the regression model already includes detailed control for household economic conditions. Neither can the influence of parental religiosity be attributed to the influence of local poverty[23] since the correlation survives even in specification where detailed control for village characteristics is present.

Access to schools: Madrasah enrolment is positively correlated with distance of the household from non-religious secondary schools. The opposite is true for distance from

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[22] Unlike in the theoretical model where parental religiosity is assumed to be a continuous index, for regression purposes, religiosity is a binary variable (1 if the household head prays daily; 0 otherwise). Given our current dataset, it is not possible to distinguish between different degrees of parental religiosity.

[23] Much of the household preference effect can be conflated by supply-side variables such as availability of formal schools and level of development of the village of development in the village of residence. It is because children from religious households may also live in villages that are underprovided in terms of the supply of various public goods.

secondary madrasahs. This finding is consistent with the positive and statistically significant correlation obtained between madrasah enrolment and relative availability of madrasahs (as a fraction of all the secondary schools in the sample cluster).

School quality: This is measured using data on average test scores of a sample of grade 8 students in all the secondary non-religious schools and madrasahs in sample cluster (namely *union*)[24]. Irrespective of the regression specification used, the correlation between madrasah enrolment and average quality of madrasahs in the *union* is insignificant. The same result is obtained for the average quality of schools in the union. This finding remains unchanged irrespective of whether we use mathematics or English test scores of students to measure quality.

Community (village-specific) influence: The second specification of each regression model in Table 5 included 6 correlates of village level development – village with electricity, average educational attainment of the (adult) villagers, number of mosques in the village, presence of pucca (paved surface) road in the village, proportion of non-Muslim population and village with NGO-run education programs. Of all the above variables, only the average education of the villagers enters the regression function significantly and is positively associated with madrasah enrolment.

Robustness of the results: It should be noted that our conclusions obtained from fractional logit regression estimates presented in Table 5 remain unchanged when we pursue alternative estimation strategy, namely, OLS and probit regressions. Lastly, a significant part of the recent growth in madrasah enrolment reflects the general increase in secondary school participation by girls across Bangladesh. Whilst registered madrasahs were historically a preserve for boys, they started admitting girls following the introduction of the "Female Secondary School Stipend Program" (FSSSP) (Asadullah and Chaudhury 2009b). To this end, we re-estimated the regression model restricting data to the sample of male children (results not reported but available from the authors). However, our results remained unchanged. This result is interesting because it could be argued that old-age transfer, if valid, is more relevant in predicting enrolment decisions for boys. Our analysis therefore suggests that parents' perception of the old-age support from educated daughters in rural Bangladesh may be changing, an issue that needs to be examined in future research.

6. Conclusion and policy implications

In this paper we have examined the choice of registered madrasah education in rural Bangladesh in the context of a two-period school choice model. Our empirical analysis is based on a unique set of data that combines survey information on parents' choices and socio-economic characteristics with survey data on all schools and madrasahs that are de facto available for each family in the study area. We then assessed the choices made in terms of the characteristics of families, schools and communities.

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[24] We use the log of average test scores which was collected from an accompanying survey of all educational institutions in the 48 sample clusters. Given that the quality variable is measured as an aggregate average, this serves as an exogenous proxy for the quality of secondary schools/madrasas in the sample clusters. In the revised draft, we will consider alternative measure of quality based on information on inputs such as teacher salary, teacher training and school fees.

Our findings indicate that economic considerations such as income and schooling cost dominate in the decision to educate children in registered secondary madrasahs. Poorer households, and those with worse access (and hence higher travel cost) to non-religious schools tend to enrol a larger proportion of their children in madrasahs. Although madrasah enrolment varies positively with household religiosity, we find little evidence to suggest that the average rural Bangladeshi household possesses an innate preference for madrasah education which is insensitive to economic factors.

Our findings have important implications for education policy design. Both the theoretical model and the empirical results suggest that education policies such as increasing the supply of non-religious mainstream schools in rural locations can help raise enrolment in these schools. The theoretical model also supports policies that boost the quality of non-religious schools. However, in contrast to the theory, we find little empirical evidence in support of policies that improve relative quality of non-religious schools. We in fact find that religious school demand does not respond to the average quality of non-religious schools and madrasahs in the locality. This finding can be explained by the fact that education quality remains low across all types of institutions in rural Bangladesh (Asadullah, Chaudhury and Dar, 2007)[25]. The learning premium associated with mainstream non-religious schools may not be sufficiently large so as to make a significant difference for household school choice *at present*. However, it is entirely possible, and indeed likely, that further investment in non-religious school quality (for example through curriculum changes or better teacher training) will favourably alter parents' perception of the premium associated with non-religious schools. Considering the fact that non-religious schools already enjoy a resource advantage over their religious counterparts, this may turn out to be a significant policy challenge.

The cost of schooling has been shown to be an important factor in the household decision making process. Thus financial transfers (such as school vouchers) may be used to make non-religious schools more affordable to certain households. However, this increased enrolment in non-religious schools will have positive implications for human capital accumulation only if there are concurrent policies to further improve the quality of these schools. Finally, since household income is a major determinant of school choice, it is likely that policies aimed at reducing poverty (some of which may already be in place) will have the additional impact of increasing enrolment in non-religious, mainstream schools.

In this study, we have abstracted away from the issue of demand for madrasahs which are not recognised by the state. These madrasahs have a very small market share, and their demand remains less understood considering the fact that they impart little marketable skills. In this regard, non-market explanations can be important. First, in villages where governments and economies function poorly, unrecognised madrasahs can become major suppliers of social services, political action, and coercive force[26]. Unrecognised madrasahs are also a potential proxy for participation in religious organizations which can help offset the negative effects of growing up in a disadvantaged environment[27]. Households secure their membership by sending at least enrolling one child in a

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[25] Other developing country studies that looked into relative quality of faith schools also obtained similar results. For instance, see Backiny-Yetna and Wodon (2009) for the Democratic Republic of Congo.

[26] See Iannaccone and Berman (2006) for a similar argument.

[27] Dehejia, DeLeire, Luttmer and Mitchell (2007) report buffering effects of religious organizations on youth outcomes in the US.

madrasah. Secondly, demand for madrasah education can be also motivated by marriage-related considerations: Madrasah education can reinforce traditional values in girls which may have substantial return in the marriage market.

Therefore, a natural direction for future research on religious school choice in rural Bangladesh is to investigate the demand for these unrecognised madrasahs. From a theoretical perspective, the model in this paper can be extended to incorporate not just religious preferences of the household, but also the influence of social norms and other non-market considerations. It would also be interesting to extend the model to an overlapping generations framework, which would enable us to see how school choice evolves over time, especially in the context of the educational attainment of parents, and changing religious values. We can also further explore parents' decisions regarding exactly which children are picked to attend madrasahs, for example, based on their ability or gender.

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The function $v\left(\frac{a}{Z_P}\right)$ may be generically illustrated as follows:
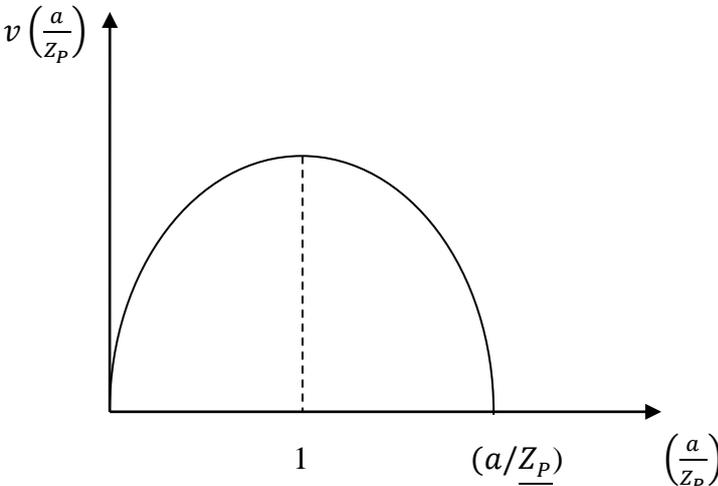
Appendix Table 1: Summary statistics

	Sample of households with at least 1 secondary school enrolled children		Sample of children enrolled in a secondary school		Sample of children enrolled in a secondary madrasah	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Madrasah attendance	0.21	0.39	0	--	1	--
Child being female (mean)	0.59	0.46	0.59	0.49	.59	0.49
Child's age (mean)	15.37	1.57	15.41	1.79	15.37	1.78
Mother's education: primary completed	0.21	0.41	0.21	0.41	0.25	0.44
Mother's education: secondary completed	0.03	0.18	0.03	0.18	0.03	0.16
Father's education: primary completed	0.81	0.39	0.81	0.39	0.77	0.42
Father's education: secondary completed	0.11	0.31	0.11	0.31	0.14	0.35
Father's age	42.29	7.07	42.41	7.04	41.82	7.43
Mother's age	40.11	5.29	40.03	5.52	40.50	4.87
Per capita monthly expenditure in Taka	2317.69	1066.17	2403.17	1143.08	2244.38	936.56
Household expenditure: 1st quartile	0.31	0.46	0.28	0.45	0.32	0.47
Household expenditure: 2nd quartile	0.28	0.45	0.28	0.45	0.31	0.47
Religiosity: Whether parents pray daily	0.57	0.50	0.56	0.50	0.70	0.46
Religiosity: how frequently parents recite the Quran	4.28	3.32	4.41	3.32	4.55	3.44
Distance of the household from: Sub-district headq	44.70	30.02	44.11	29.63	48.95	31.74
Distance of the household from: Secondary school	20.49	13.70	19.84	12.96	22.57	15.76
Distance of the household from: Primary school	11.52	10.28	11.28	9.89	11.12	8.75
Distance of the household from: Secondary madrasa	21.81	14.99	22.06	14.99	19.78	14.45
Distance of the household from: Primary madrasa	18.17	13.59	18.46	13.71	15.57	11.43
Household has electricity	0.59	0.49	0.63	0.48	0.53	0.50
Village has electricity	0.93	0.25	0.93	0.25	0.95	0.20
Village has pucca road	0.63	0.48	0.65	0.48	0.55	0.50
Village: # of mosques	2.37	1.52	2.30	1.50	2.53	1.52
Village has NGO educational activity	0.88	0.33	0.88	0.32	0.85	0.35
Village: mean education of the population	4.71	1.12	4.76	1.13	4.80	1.07
Village: fraction of non-Muslim population	0.06	0.10	0.06	0.11	0.06	0.08
Mean English score of local madrasas (in logs)	1.39	0.90	1.36	0.92	1.57	0.84
Mean English score of local schools (in logs)	4.86	1.41	4.93	1.44	4.66	1.25
Mean Maths score of local madrasas (in logs)	2.14	1.19	2.09	1.21	2.46	1.08
Mean Maths score of local schools (in logs)	5.88	1.62	5.92	1.64	5.88	1.51
N	1229		1264		343	