



International migration and the religious schooling of children in the home country: evidence from Bangladesh

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Abstract

This paper investigates whether international migration increases the religious schooling of children in the home country. I find that migration by a household member from Bangladesh to a Muslim-majority country increases the likelihood that a male child in the household is sent to an Islamic school (*madrasa*). There is no significant impact on the likelihood of a male child's *madrasa* enrollment if the household sends a member to a non-Muslim-majority country. Sending a household member abroad does not affect the likelihood of the household sending children to school at all; it only leads to reallocation toward Islamic schooling. The results are inconsistent with financial remittances underlying the effect of migration on religious schooling. Learning about the potential benefits of *madrasa* education may explain the results, but there are several weaknesses in the arguments in favor of this mechanism. A third potential mechanism is an increase in religiosity through migrants transferring religious preferences, but I cannot establish a causal relationship between international migration and migrant-sending households' religiosity.

Keywords International migration · Impact of migration · Religious schooling · Bangladesh

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1 Introduction

International migrants sent US \$529 billion as foreign remittances to low- and middle-income countries in 2018—an amount that exceeded total foreign direct investment inflows to these countries (World Bank 2019).¹ International migrants can also transfer *social remittances*—that is, ideas, behaviors, identities, and social capital—from the host country (the migrant’s destination) to the home country (the migrant’s origin).² Through financial or social remittances, international migration can affect the behavior of members of migrant-sending households who remain in the home country. Ignoring such changes in the behavior of migrant-sending households can bias estimates of the socio-economic returns to international migration for the home country.

This paper addresses the question of whether international migration affects the preferences for religious schooling in the home country using data from Bangladesh. I use the 2010 round of the Bangladesh Household Income and Expenditure Survey (HIES) to estimate the causal impact of a household that sends a migrant abroad on its likelihood of sending a child to an Islamic school (*madrassa*). Madrasas are a separate stream of schools in Bangladesh that specialize in Islamic education.³ Madrasas have grown faster than any other institution in the education sector of Bangladesh (Asadullah and Chaudhury 2008). Bangladesh is a major migrant-sending country that received foreign remittances in 2018 equivalent to 5.4% of the country’s gross domestic product (GDP) (World Bank 2019).⁴ These conditions make Bangladesh an ideal setting for this study.

I find that sending a migrant to a Muslim-majority country increases the likelihood of sending a male child to a madrasa, and reduces enrollment in non-madrasa schools. Sending a migrant to a non-Muslim-majority country does not have a statistically significant effect on madrasa enrollment. In addition, sending a migrant abroad does not affect whether children go to school at all, only which kind of school they attend.

I use the leave-one-out fraction of migrant-sending households in the primary sampling units (PSUs)—that is, the concentration of migrant-sending households among neighbors—as an instrumental variable. I follow Fruehwirth et al. (2019) in constructing the instrumental variable.⁵ Essentially, I am leveraging on

¹ Foreign direct investment inflows are higher than foreign remittance receipts if China is included in the calculation.

² See Levitt (1998) for details on the origin of the term “social remittances.”

³ A detailed description of madrasa education is presented in Section 2.

⁴ Roughly eight million Bangladeshis (5% of the total population) live outside of the country (McAuliffe et al. 2019). Although 88% of Bangladeshis are Muslims, 95% of the migrants are followers of Islam (author’s own calculation). Bangladesh is a relatively young country as every three out of five Bangladeshis are 30 years old or younger. Though Bangladeshi households on average have just over four members—thanks to the reduction in fertility rate—two-thirds of Bangladeshis are of working age. While 83% of working-age males participate in the labor market, only 11% of working-age females are in the labor market.

⁵ Fruehwirth et al. (2019) used average peer religiosity as an instrument to estimate the causal impact of religiosity on depression.

migrant networks, which previous studies have used as instrument for migration (Lokshin and Glinskaya 2009; McKenzie and Rapoport 2007, 2011). As there are two endogenous migration variables, I use two instrumental variables: the PSU-level leave-one-out fraction of households with a migrant in a Muslim-majority country and the PSU-level leave-one-out fraction of households with a migrant in a non-Muslim-majority country.

The identification assumption is that although the within-sub-district variation of the concentration of migrant-sending households among neighbors across PSUs is a strong predictor of a household's likelihood of sending a migrant abroad, it does not directly influence a household's choice of school for its children. I exploit the within-sub-district variation of the instrumental variables to causally identify the effect of a household sending an international migrant on the likelihood of that household sending a child to a madrasa.

Following the strategy of Fruehwirth et al. (2019), I decompose the exclusion restriction into three parts—an individual-specific component, a household-specific component, and a PSU-specific component—and show that the violation of the exclusion restriction through any of these components is unlikely. The violation of the exclusion restriction through the individual-specific component can occur only if there is a violation of the exclusion restriction through the household-specific component, since both migration and madrasa schooling are a household-level choice. The household-specific component might cause a violation of the exclusion restriction if a household makes a strategic change of location to facilitate external migration. Since it is costly to migrate and credit constraint limits the migration of households in Bangladesh (Bryan et al. 2014; Mendola 2008), such a strategic movement, and therefore, a violation of the exclusion restriction through household-specific component, is implausible. Finally, I use robustness tests to argue that a violation of the exclusion restriction through the PSU-specific component of the error term is unlikely. The PSU-specific component might compromise the identification assumption if PSU-level unobservables that vary within the sub-district are correlated with the instruments and outcomes. I find that the causal estimates are robust to the inclusion of the PSU-level leave-one-out average of the outcome and control variables, which suggests that PSU-level confounding variables are unlikely to compromise the validity of the exclusion restriction.

Since the exclusion restriction can be violated through other potential channels, I show that the findings are also robust to allowing for a minor relaxation of the strict exogeneity assumption following Conley et al. (2012). That is, my findings continue to hold if there is a very small correlation between the instruments and the error term in the second stage.

The increase in madrasa schooling as a result of migration intensifies over time. Using the 2016 round of the HIES, I find that migration increases the likelihood of madrasa schooling for female children, while the effect size for male children is larger than that of 2010. A rise in the school enrollment can partly explain why the madrasa education of female children increased (see also Asadullah and Chaudhury 2013). However, there is no change in the overall school enrollment of male children.

I next consider financial remittances, learning about potential benefits of madrasa education, and an increase in religiosity through migrants transferring religious preferences as potential mechanisms through which the effects of migration on religious schooling may operate. The results are inconsistent with the financial remittances mechanism. The effects of financial remittances can be separated into income effects and overcoming credit constraints. I rule out an income effect as the demand for madrasas has a lower income elasticity than that for non-madrasa schools. Credit constraints are unlikely because madrasas are cheaper than other schools (Al-Samarrai 2007; Asadullah and Chaudhury 2016; Asadullah et al. 2019). Moreover, households with migrants in non-Muslim-majority countries do not send their children to madrasas more, corroborating the inconsistency of financial remittances as the mechanism.

Another potential mechanism is a learning channel: migrants may learn that madrasa schooling improves migration opportunities. In particular, madrasas could be beneficial because they teach students Arabic language skills or impart other useful skills for work in the Persian Gulf. However, there are two weaknesses in the arguments in favor of this mechanism. First, the quality of education at madrasas in Bangladesh does not enable students to learn Arabic properly (Antara 2019; Bhuiyan 2018). Second, madrasa schooling is not a binding constraint to migrate to and work in the Persian Gulf, as manifested by migrants from non-Muslim countries like India, the Philippines, and Sri Lanka having a significant presence and earning potential in the region (Naufal 2011; World Bank 2019).

I provide suggestive evidence that one likely mechanism of international migration increasing madrasa schooling is a transfer of religious preferences by migrants, leading to an increase in the religiosity of migrant-sending households. However, I am unable to ascertain the existence of a causal link between international migration and migrant-sending households' religiosity. Given the unique feature of madrasas of Bangladesh in focusing primarily on the teaching of Islamic theology, sending a child to a madrasa is a good indicator of a religious motivation. Only migrating to a Muslim-majority country causes an increase in madrasa schooling, indicating that a transfer of religious preferences from migrants to those countries may play a role in such increase. In addition, only migrant-sending households above the median income become more likely to send their male children to madrasas. Since the labor-market returns to madrasa schooling appear to be lower (Asadullah 2006, 2009; Berman and Stepanyan 2004; World Bank 2010), sending children to madrasas entails forgoing potential future income gains. Higher-income households can better afford this loss in future income, so the finding that they are the ones who send their sons to madrasas is consistent with the increase in religiosity mechanism. That an increase in household religiosity can potentially alter a household's school choice is also consistent with existing evidence that a household's religiosity affects its choice to send a child to religious schools (Cohen-Zada and Sander 2008; Sander 2005) and that people may choose religiosity over income-generating activity (Berman 2000).

There are two caveats to the arguments in favor of the transfer of religious preferences as a mechanism for the increase in madrasa schooling. First, an increased preference for madrasa education is not a direct measure of an increase in religiosity. Although choosing religious education can suggest increased religiosity, the latter

includes other dimensions such as praying and fasting. I am not able to measure these other dimensions because of data limitations. Hence, I am not able to show an impact on these direct measures, which would provide stronger evidence that an increase in religiosity is a mechanism for my results. Second, changing religiosity is not easy and can take a long time.⁶ The HIES is a cross-sectional dataset and there is no time dimension of the measurement of migration or the measurement of school choice. This dataset only allows me to measure any migration that has happened in the 5 years preceding the survey, which is not a very long time for religiosity to change. In addition, the HIES only allows me to construct a binary measure of school choice (madrasa or non-madrasa), and it is possible that households switch schools over time (Asadullah and Chaudhury 2013). Since I cannot measure an impact of migration on school choice over time, I can only show that migration affects the utilization of religious schools and cannot conclude that there is a causal impact on change in religiosity over time.

This paper makes major contributions to two different literatures. First, it contributes to the literature that examines the impact of international migration. International migration has direct effects on poverty reduction (Bertoli and Marchetta 2014), education (Antman 2011, 2012; Theoharides 2018), human capital formation (Dinkelman and Mariotti 2016), labor market outcomes (Binzel and Assaad 2011; Nguyen and Winters 2011), technology transfer (Kerr 2008), and political change Karadja and Prawitz 2019.⁷ International migration increases migrants' income (Clemens 2013; McKenzie et al. 2010), leading in turn to increased financial remittances to the home country (Yang 2008). Remittance income reduces poverty (Adams and Page 2005; Adams and Cuecuecha 2013) and child labor (Cuadros-Menaca and Gaduh 2019), and increases human capital formation (Ambler et al. 2015; Yang 2008) in the home country. This paper shows that with more migration, a home country's choices of school types can be affected even when total enrollment is unchanged. If there is a substantial variation in the quality of different types of school, an emigration-induced change in preferences for a particular type of school can have implications for human capital production and future labor market outcomes.

Second, this paper contributes to the literature that studies changes in preferences, norms, and institutions in the home country through international migration. This paper establishes that international migrants affect the preferences for religious schools in the home country, a phenomenon that has received little attention in previous research. The existing literature shows that international migration facilitates the transfer of political institutions (Batista and Vicente 2011; Batista et al. 2019; Chauvet and Mercier 2014; Chauvet et al. 2016; Docquier et al. 2016; Spilimbergo 2009; Pfütze 2012; Mercier 2016; Tuccio et al. 2019), conservative gender

⁶ It is likely that there is a time lag between when an agent experiences an increase in the supply of religious activity and when that agent's demand adjusts to the increased supply (Hagevi 2017).

⁷ Karadja and Prawitz (2019) argue that the contributing mechanism behind emigration causing political changes in Sweden was the availability of an outside option—that is, migrating to the USA.

norms (Tuccio and Wahba 2018),⁸ and fertility norms (Beine et al. 2013; Bertoli and Marchetta 2015), and leads to the reduction of widespread social practices such as female genital mutilation (Diabate & Mesplé-Somps 2019). Having friends and family abroad is also positively associated with pro-social behavior (Nikolova et al. 2017). Lastly, this paper relates to the broader literature of migration-induced social remittances that includes studies that investigate migrants importing norms to the host country (Alesina et al. 2013; Fisman and Miguel 2007; Fernández 2011; Forrester et al. 2019).⁹

The remainder of the paper is organized as follows. Section 2 provides a detailed background of Bangladesh's madrasa education. Section 3 discusses the data and the descriptive statistics. Section 4 covers the empirical strategy and identification. The results and robustness checks are presented and discussed in Section 5. Section 6 concludes the paper.

2 Madrasa education in Bangladesh

Bangladesh has made major progress in universally enrolling students in primary education, although retention remains a significant challenge for the country (Sabates et al. 2010). One unique feature of primary and secondary education in Bangladesh is that there are three major streams. First, there are Bengali-medium schools that follow the national curriculum. The public schools and a large number of private schools fall under this category. Second, there are some English-medium schools that largely follow a British curriculum. These are private schools and more expensive than any other type of school. And third, there are madrasas which are Islamic schools. Madrasas are not merely schools where a general curriculum is taught and is administered by religious authorities; rather these are religious schools where the core curriculum is the religion of Islam and the primary focus is on the teaching of the Quran, hadith, and other religious lessons. Essentially, madrasas operate as full-time schools to provide students education on faith and the primary learning outcome of these schools is to learn about Islamic theology. While the state has control over the curriculum of some madrasas, there are many on which the state does not have any control.

There are two kinds of madrasas in Bangladesh that provide primary education or above—Qawmi and Alia. Alia madrasas operate under the supervision of the state's madrasa education board and follow the national curriculum set by the board.¹⁰ The first Alia madrasa, known as the Calcutta Madrasa, was established in Bengal by the British colonial rulers to provide a model institution for Muslims that would

⁸ Conservative norms might also increase in an importing country through international trade (see Autor et al. 2016).

⁹ It should be noted that often a transfer from the home country to the host country is assumed to be of negative consequences. Given the dearth of empirical evidence, Clemens and Pritchett (2019) suggest that such assumption is a conjecture.

¹⁰ Bangladesh is similar to Indonesia and Egypt where a parallel Islamic education system has evolved over the years with state patronization (Asadullah and Chaudhury 2016).

teach both religious and secular subjects. Though the Calcutta Madrasa moved from Kolkata to Dhaka after the partition of India, it was not until the early 1980s that Alia madrasas began to spread in Bangladesh (World Bank 2010). The curriculum of Alia madrasas includes religious subjects (Quran, Islamic jurisprudence, and the Arabic language¹¹) and secular subjects (the Bengali and English languages, math, science).

Qawmi madrasas, on the other hand, are mostly community based and operated by non-governmental entities. They depend on their own assets and charities for funding and follow their own curriculum. Qawmi madrasas began operating in South Asia during the Mughal period¹² (World Bank 2010). After the British colonized the sub-continent in the 18th century, these madrasas stopped receiving state support, turned away from teaching secular subjects, and focused only on the teaching of religion. They still exist in Bangladesh and often have an influence in politics and policy due to their organization and obedience to hierarchy. A Qawmi madrasa might offer non-religious teaching at its own discretion, which also depends on its ability to hire teachers. Degrees offered by Qawmi madrasas were not recognized by the state until 2017.¹³

The share of madrasa enrollment is consistently higher at the secondary level (22%) than at the primary level (14%), suggesting either that households switch schools for their children to madrasas after primary education (Asadullah and Chaudhury 2013) or that the dropout rate at the secondary level is higher at non-religious schools. Between the years 1998 and 2014, enrollment in the registered secondary madrasas grew by 45% (Asadullah and Chaudhury 2016). Though a lack of supply of secular public schooling may have caused the spread of madrasas, there is no evidence to suggest that madrasas are currently more concentrated in regions where secular public schools are in low supply. There is a positive correlation between the number of Alia madrasas and the number of nonreligious public schools (World Bank 2010).

The pattern of enrollment in madrasas and the location of madrasas suggest that the decision to send a child to a madrasa in Bangladesh is unlikely to be due to supply-side factors. Instead, it is more likely to be influenced by demand-side factors such as poverty, cost, or preference. The majority of the madrasa-enrolled students comes from poor households (World Bank 2010). Most of the madrasa enrollment is at Alia madrasas (Asadullah and Chaudhury 2016). Madrasas are also cheaper than the non-madrasa alternatives (Asadullah et al. 2015). Qawmi madrasas are always cheaper than Alia madrasas. While the share of private cost for schools run by non-governmental organizations or the government can be less for primary education, Alia madrasas are cheaper than non-religious schools at the secondary level (Al-Samarrai 2007; Asadullah and Chaudhury 2016).

¹¹ While the Arabic language is not a religious subject, it is generally viewed as one in the social context of Bangladesh.

¹² The Mughals ruled South Asia between between the 16th and 18th centuries.

¹³ While there are co-educational secular schools and Alia madrasas, Qawmi madrasas are primarily boys' schools (Asadullah et al. 2019).

Madrassa students face at least two structural issues that adversely affect their labor market potential and put them in a disadvantaged position compared to their peers in non-madrassa schools. First, the madrassa curriculum limits a student's opportunity to advance to university education. The Alia madrassa curriculum did not meet the prerequisites for admission in many secular disciplines at the university level until 2013 (Farhin 2017). The Qawmi madrassa curriculum does not allow its students to sit for many accredited university admission tests.

Second, the poor learning outcomes of madrassa students inhibit their university admission and labor market opportunities. Madrassa education has a negative correlation with labor market outcomes such as wage earning (Asadullah 2006, 2009). Though students can learn secular subjects at Alia madrassas, the learning outcomes of these students are worse than those of their counterparts at secular schools (World Bank 2010). The majority of Qawmi madrassas do not offer math at the secondary level, only three-fifths of Qawmi madrassas offer Bengali—the national language—and about 80% of the secular subject teachers are untrained. Lack of prerequisites and preparedness deprives madrassa students of the opportunity of studying more lucrative disciplines in universities and, consequently, they have poorer expected labor market outcomes. A large portion of graduates from Qawmi madrassas take the low-paying jobs of *imams* or *maulavis* in mosques and madrassas (Asadullah et al. 2019).

Madrassa graduates have a significantly higher fertility rate (Berman and Stepanyan 2004). Madrassa schooling is also negatively associated with positive attitudes towards income-earning women, lower and fixed desired fertility, and higher education for female children (Asadullah and Chaudhury 2010). Such perceptions may not necessarily help countries such as Bangladesh to alleviate poverty, to increase female empowerment, or even to curtail the threat of religious extremism.

It should be noted that madrassa students also face a lot of stereotypes that are not true. In Pakistan, madrassa students are more trusting towards non-madrassa students, while their trustworthiness is often under-estimated by those without a madrassa education (Delavande and Zafar 2015). It is possible that stereotype and stigma against madrassa students might influence their adverse labor market outcomes.

3 Data and descriptive statistics

For my primary analysis, I use the 2010 round of the HIES—a nationally representative survey of the population of Bangladesh to measure their living standards that the Bangladesh Bureau of Statistics conducts every 5 years. To test whether my findings persist over time, I use the 2016 round of the HIES and estimate the same set of equations.

In total, 55,580 individuals from 12,240 households were interviewed for the 2010 round of the HIES, while 168,089 individuals from 46,075 households were surveyed in the 2016 round. Both of these rounds used a two-stage stratified random sampling strategy to select PSUs from the list of the population census enumeration

areas. Twenty households were selected for interviews from each PSU, and all members of a household were interviewed.¹⁴

The key independent variable of interest is whether the household has sent a migrant in a Muslim-majority country. In the migration module of the the HIES, each household is asked the following question: “Has any member of your household migrated, either within the country or abroad, during the last five years?”

If a household has sent at least one member to a Muslim-majority country in the previous 5 years, I consider that household to have a migrant in a Muslim-majority country. I refer to these households as M^1 households. I use membership in the Organisation of Islamic Cooperation and having a majority Muslim population as criteria for a country being a Muslim-majority one (Organisation of Islamic Cooperation 2019). The Muslim-majority countries that the households in my sample have sent migrants to are Brunei, Iran, Iraq, Kuwait, Libya, Malaysia, Oman, Qatar, Saudi Arabia, and the United Arab Emirates.

I can group migration to all Muslim-majority countries together without loss of generality. In all these countries, Islam is used in state affairs—the legal system either is entirely guided by the sharia (e.g., Saudi Arabia) or co-exists with the common law but Muslims must abide by sharia law (e.g., Malaysia). In addition, these countries are also similar in that in none of these countries does a separate religious education stream exist as in Bangladesh. Though my analysis would be much stronger if I could show results for each Muslim-majority country separately when migration to all Muslim-majority countries is considered separately, the sample sizes of migrant-sending households for each country become very small, which will cause a lack of statistical power. Therefore, to do a meaningful analysis, I group together all migration to a Muslim-majority country.

Similarly, I consider a household to have a migrant in a non-Muslim-majority country if that household has sent a migrant to a non-Muslim-majority country, and I refer to those households as M^2 households.¹⁵ The non-Muslim-majority countries that the households in my sample have sent migrants to are: Australia, Canada, Italy, Japan, Russia, Singapore, South Africa, South Korea, the UK, and the USA.

Table 1 reports the destination countries of migrants from Bangladesh. A majority (83%) of Bangladeshi migrants go to Muslim-majority countries. Saudi Arabia, United Arab Emirates, and Malaysia are the top three destinations of Bangladeshi migrants.

There are three key limitations to this approach to measuring migration. First, the HIES does not include the frequency of a household member’s migration. As a result, I cannot know if the reported migration was the first time that individual had migrated or whether that person had migrated before as well. Second, although the questionnaire asks whether any currently residing household member has returned from abroad within the last 5 years after living there for at least 6 months, it does

¹⁴ See Bangladesh Bureau of Statistics (2011) and Ahmed et al. (2017) for a detailed description of the sampling strategies of the 2010 and 2016 rounds of the HIES, respectively.

¹⁵ Households who have sent at least one member to both a Muslim-majority country and a non-Muslim majority country are both M^1 and M^2 households.

not include information on when the migrant has returned. Neither does it collect information about the destination or length of the migration of that returning member. This prevents me from analyzing the effects of return migration. Third, I do not know whether an individual has switched countries since migrating. I have to rely on the last reported country of migration to construct the type of country (i.e., Muslim-majority/non-Muslim-majority) variables. Because of these limitations, I can only identify the total effect of any migration—first time or repeat—that has happened in the previous 5 years, irrespective of whether the migrant has returned home or not.¹⁶

As the primary outcome of interest in this paper is the likelihood that a household sends a child to a madrasa for schooling, I restrict my analysis to children aged 5 to 18 years. I also focus on the likelihood of a household sending at least one child to a madrasa in order to understand the household-level effects. I consider a household to be a madrasa-sending household if at least one child of the household goes to a madrasa. For the household-level analysis, I restrict my sample to households that have at least one child. These restrictions reduce my sample to 9178 households and 18,063 children in the 2010 round, and to 56,439 children in 32,204 households in the 2016 round of the HIES. In the 2010 HIES, there are 1578 children from 758 M^1 households and 357 children from 178 M^2 households, while there are 3707 children from 2114 M^1 households and 863 children from 469 M^2 households in the 2016 HIES.

One limitation of my measurement of the outcome variable is that I cannot identify whether a child has switched from a madrasa school at the primary level to a non-madrasa school at the secondary level (or vice versa). The HIES does not collect information on education history. In Bangladesh, a considerable fraction of children switch from non-madrasa schools to madrasa schools after the completion of primary school (Asadullah and Chaudhury 2013). I cannot investigate such dynamics and have to rely on the binary construct of being currently enrolled at a madrasa or at a non-madrasa school.

Table 2 reports the descriptive statistics of the key outcome variables in the 2010 HIES.¹⁷ About 60% of the school-aged children attend school.¹⁸ About 5% of the children from M^1 households attend madrasas, compared to four percent of children from non-migrant-sending households. In addition, M^1 households are more likely to send at least one of their children to a madrasa than are non-migrant-sending households. Eight percent of M^1 households send at least one child to a madrasa, while 6% of households without a migrant in a foreign country send a child to a madrasa. There is no difference between the likelihood of a child from an M^2 household going to a madrasa (4%) and the likelihood of a child from a non-migrant-sending household going to a madrasa (4%). The likelihood of an M^2 household sending at least

¹⁶ While the HIES collects the timing of migrating in the last 5 years, in absence of more information on the number of migration or repeat migration, data on duration is not that useful. Hence, I can only measure the extensive margin of migration.

¹⁷ The descriptive statistics of these variables in the 2016 HIES are available on request.

¹⁸ These out-of-school children are either in the labor market or not in education, employment, or training.

Table 1 Destination of Bangladeshi migrants

Country	Per- cent of migrants
<i>Muslim-majority countries</i>	
Saudi Arabia	36.00
United Arab Emirates	19.90
Malaysia	10.51
Kuwait	7.18
Oman	4.01
Qatar	3.66
Libya	0.94
Iraq	0.39
Brunei	0.25
Iran	0.05
<i>Non-Muslim-majority countries</i>	
Singapore	2.43
UK	1.65
Italy	1.59
USA	0.61
South Africa	0.55
Other European Countries	0.36
South Korea	0.25
Australia	0.23
Canada	0.17
Russia	0.16
Japan	0.03
Other	9.08

Source: Author's calculations based on the HIES 2010

one child to a madrasa (5%) is slightly lower than that of a non-migrant-sending household doing so (6%).

Table 3 reports the descriptive statistics for several individual- and household-level variables.¹⁹ In the estimation sample, 52% of the children are male and the average age is 11.26 years. About two-thirds of the households (64%) live in rural areas. The majority of the households (88%) are headed by a Muslim, likewise the majority (87%) are headed by a male. More than half of the household heads (52%) do not have any formal education. Very few households (2%) have an adult over 23 years of age who went to a madrasa. This alludes to the fact that the increase in madrasa education is a recent phenomenon, correlated with the rise in school

¹⁹ The descriptive statistics of these variables in the 2016 HIES are available on request.

Table 2 Descriptive statistics of individual- and household-level outcome variables

	Household has			All households
	A migrant in a Muslim-majority country	A migrant in a non-Muslim-majority country	No migrant abroad	
Individual level				
<i>Goes to madrasa</i>				
A child	0.05	0.04	0.04	0.04
A male child	0.05	0.04	0.04	0.04
A female child	0.04	0.03	0.04	0.04
<i>Goes to non-madrasa school</i>				
A child	0.61	0.63	0.56	0.56
A male child	0.61	0.62	0.54	0.55
A female child	0.61	0.65	0.58	0.58
<i>Does not go to school</i>				
A child	0.35	0.33	0.40	0.40
A male child	0.34	0.34	0.42	0.41
A female child	0.35	0.32	0.38	0.38
Total number of children	1578	357	16,169	18,063
Household level				
<i>Goes to madrasa</i>				
At least one child	0.08	0.05	0.06	0.06
At least one male child	0.04	0.04	0.04	0.04
At least one female child	0.04	0.03	0.03	0.03
<i>Goes to non-madrasa school</i>				
At least one child	0.77	0.74	0.69	0.70
At least one male child	0.51	0.46	0.44	0.44
At least one female child	0.48	0.49	0.43	0.44
<i>Does not go to school</i>				
Any child	0.20	0.23	0.28	0.27
Any male child	0.46	0.52	0.54	0.53
Any female child	0.49	0.48	0.55	0.54
Total number of households	758	178	8260	9178

Table showing the means of the individual- and household-level outcome variables by migration status of a household and for the total estimation sample of the 2010 round of the HIES. The individual-level sample is restricted to children ages 5 to 18 years, and the household-level sample is restricted to households who have at least one child. Source: Author's calculations based on the 2010 HIES

Table 3 Descriptive statistics of other individual- and household-level variables

	Household has			All households
	A migrant in a Muslim-majority country	A migrant in a non-Muslim-majority country	No migrant abroad	
Individual level				
Sex of the child (male=1)	0.52	0.47	0.52	0.52
<i>Average age (in years)</i>				
All children	11.52	11.94	11.22	11.26
All male children	11.44	11.73	11.30	11.32
All female children	11.61	12.13	11.13	11.20
Total number of children	1578	357	16,169	18,063
Household level				
<i>Household head is</i>				
Male	0.46	0.58	0.91	0.87
Muslim	0.96	0.94	0.88	0.88
<i>Household location</i>				
Metropolitan	0.06	0.02	0.09	0.09
Urban	0.24	0.31	0.27	0.27
Rural	0.70	0.67	0.64	0.64
<i>Household has</i>				
An adult (>23 years old) who went to a madrasa	0.02	0.03	0.02	0.02
A member who returned from abroad in the previous 5 years	0.04	0.04	0.01	0.01
<i>Education of the household head</i>				
No formal education	0.47	0.39	0.53	0.52
Primary or below	0.19	0.17	0.15	0.16
Secondary	0.30	0.34	0.22	0.23
Post secondary	0.04	0.10	0.10	0.10
Total number of households	758	178	8,260	9,178

Table showing the means of the individual- and household-level characteristics by migration status of a household and for the total estimation sample of the 2010 round of the HIES. The individual-level sample is restricted to children ages 5 to 18 years, and the household-level sample is restricted to households who have at least one child. Source: Author's calculations based on the 2010 HIES

enrollment in Bangladesh. Roughly 1% of the households have a member who had returned from abroad in the last 5 years after living there for at least 6 months.²⁰

4 Empirical strategy

4.1 Estimation method

Let i indicate a child, h denote household, p refer to PSU, and s indicate sub-district. Then the key equation of interest is:

$$Y_{ihps} = \alpha_s + \alpha_1 M_{hps}^1 + \alpha_2 M_{hps}^2 + \alpha_3 X_{ihps} + \alpha_4 H_{hps} + \xi_{ihps} \quad (1)$$

In Eq. 1, $Y_{ihps} = 1$ if child i of household h in PSU p of sub-district s goes to a madrasa, and 0 otherwise. M_{hps}^1 is an indicator for whether household h in PSU p of sub-district s has a member who migrated to a Muslim-majority country in the last 5 years, where $M_{hps}^1 \in \{0, 1\}$. Similarly, M_{hps}^2 is an indicator variable of whether household h in PSU p of sub-district s has a member who migrated to a non-Muslim-majority country in the last 5 years, where $M_{hps}^2 \in \{0, 1\}$. X_{ihps} denotes individual-level control variables, and H_{hps} refers to household-level control variables. The error term is denoted by ξ_{ihps} , and α_s represents sub-district-level fixed effects. The key parameters of interest are α_1 and α_2 . Households sending no migrants abroad (i.e., $M_{hps}^1 = 0$ and $M_{hps}^2 = 0$) form the comparison group.²¹

In order to examine whether the individual-level effects reflect a change in preferences for households who would not send any child to a madrasa otherwise, I also perform a household-level analysis. The outcome variable for the household-level analysis is constructed as follows: $Y_{hps} = 1$ if household h in PSU p of sub-district s sends at least one child to a madrasa, and 0 otherwise. Hence, the equation of interest for the household-level analysis becomes:

$$Y_{hps} = \theta_s + \theta_1 M_{hps}^1 + \theta_2 M_{hps}^2 + \theta_3 H_{hps} + \zeta_{hps} \quad (2)$$

A major concern in estimating these equations is that international migration is not a random phenomenon, that is, $cov(M_{hps}^j, \xi_{ihps}) \neq 0$ or $cov(M_{hps}^j, \zeta_{hps}) \neq 0$, where $j \in \{1, 2\}$. The household-level decision of sending a migrant abroad may depend on a number of confounding observable and unobservable factors. For example, a household's decision to migrate to a Muslim-majority country might be influenced by that household's preference to send a child to a madrasa, thus creating a reverse causality problem.

²⁰ Note that there is no information on when these members migrated abroad and to which countries they migrated. In relation to their timing of return, the only thing that can be ascertained is that they returned home within the last 5 years.

²¹ For households who have sent migrants to both a Muslim-majority country and a non-Muslim-majority country, both $M_{hps}^1 = 1$ and $M_{hps}^2 = 1$.

Moreover, ordinary least squares (OLS) will produce biased estimates due to omitted variables bias. The wealth of the household cannot be included in the estimation, while its exclusion can create further endogeneity issues. The wealth of a household can have a simultaneous relationship with the school that a child of that household attends. A potential change in the wealth of the household can influence the attainment of education. With an increase in wealth from migration, households might decide to send their children to school (that is, the extensive margin of schooling). Wealthier households might also choose to send their children to more expensive schools. On the other hand, the returns to education of a child would affect household wealth. Hence, there is a simultaneous relationship between schooling and household wealth. In addition, while a household's decision to send a migrant abroad may depend on the wealth of that household (McKenzie and Rapoport 2007), migration itself can improve the wealth of the household. Therefore, wealth cannot be included in the equation. But exclusion of wealth also introduces omitted variable bias into the estimation strategy. In addition to wealth, the level of education of the migrant and intra-household power dynamics can act as confounding factors for migration and school choice.

To overcome the endogeneity of migration and schooling, I use an instrumental variables method. I use the leave-one-out fraction of migrant-sending households in a PSU as the instrumental variable. For household h , a leave-one-out fraction of migrant-sending households in PSU p is calculated by dividing the sum of the total number of migrant-sending households in that PSU except household h by the total number of households in that PSU except for household h . As there are two endogenous variables here, I need to use two instrumental variables. The instrumental variable for each type of migrant-sending household is a leave-one-out fraction of that type of migrant-sending household in the PSU. Formally, for a household h of migration type M^j in a PSU p of sub-district s , the instrumental variable is defined as:

$$z_{p(h)s}^j = \frac{\sum_{k,k \neq h}^N M_{kps}^j}{N_{ps} - 1} \quad \forall j \in \{1, 2\}$$

Here, N_{ps} is the total number of households in the PSU. The subscript $p(h)$ refers to the PSU-level average without household h .

The fraction of migrant-sending households in a PSU represents the transnational network of external migrants in the neighborhood. Such a network of external migrants from the neighborhood can help potential migrants in the source country to migrate (Lokshin and Glinskaya 2009; Munshi 2003; McKenzie and Rapoport 2007). A network of migrants increases access to information and can reduce uncertainty regarding migration. Therefore, the existence of such a network would facilitate external migration.

I exploit the within-sub-district variation of the leave-one-out fraction of migrant-sending households among the neighbors (in this case, PSUs) to identify the causal effect of migration on sending a child to a madrasa. Since migration is a binary variable, there are only two values for each of the instrumental variables within each PSU—one value if the household is a migrant-sending household, and another if

not. Hence, most of the variation in the instrumental variables comes from between PSU variation. Table A1 in Appendix A reports the descriptive statistics of the instrumental variables.

In this instrumental variable framework, there are two first-stage regressions:

$$M_{hps}^1 = \lambda_s + \lambda_1 Z_{p(h)s}^1 + \lambda_2 Z_{p(h)s}^2 + \lambda_3 X_{ihps} + \lambda_4 H_{hps} + \eta_{ihps} \quad (3)$$

$$M_{hps}^2 = \gamma_s + \gamma_1 Z_{p(h)s}^1 + \gamma_2 Z_{p(h)s}^2 + \gamma_3 X_{ihps} + \gamma_4 H_{hps} + \psi_{ihps} \quad (4)$$

The second stage is:

$$Y_{ihps} = \beta_s + \beta_1 \widehat{M}_{hps}^1 + \beta_2 \widehat{M}_{hps}^2 + \beta_3 X_{ihps} + \beta_4 H_{hps} + \epsilon_{ihps} \quad (5)$$

Here, \widehat{M}_{hps}^1 and \widehat{M}_{hps}^2 are the predicted values from the first-stage estimation.²² Thus, β_1 and β_2 from a two-staged least squares (2SLS) estimation are consistent estimates of the parameters of interest.²³ As the sampling strategy involved picking PSUs randomly and then interview randomly chosen households, I cluster standard errors at the PSU level—following Abadie et al. (2017).

The estimates of β_1 and β_2 are local average treatment effects (LATE)—the treatment effect of the compliers (Imbens and Angrist 1994). That is, I identify the treatment effect of the households that would not otherwise send migrants abroad but do so when the fraction of migrant-sending households in the neighborhood increases.

In this individual-level estimation, I include the following control variables: age (in years) and age squared, whether any adult above 23 years of age went to a madrasa, whether the household head is a Muslim, whether the household has any member who returned from abroad within the last 5 years after living there for at least 6 months, the level of education of the household head, and sub-district-level fixed effects. I include all but the individual-level controls (age in years and age squared) as control variables for the household-level analysis.

4.2 Identification

I exploit the variation in the concentration of migrant-sending households across PSUs within the same sub-district to isolate exogenous variation in a household's decision to send a migrant abroad. The underlying assumption is as follows: while within sub-district variation in the concentration of migrant-sending households across PSUs is a strong predictor of the likelihood of household h being a migrant-sending household, it does not directly affect the household's schooling decision for a child. Formally, my identification relies on the following assumptions:

²² These first-stage estimates suffer from problems elucidated in Manski (1993). However, following Fruehwirth et al. (2019), I argue that these problems do not threaten my identification since I am interested in the correlation in the first stage, not causation.

²³ The first- and second-stage equations for the household-level estimates are presented in Appendix B.

Table 4 First-stage estimates

	Dependent variable: Household has a migrant in a Muslim-majority country		Dependent variable: Household has a migrant in a non-Muslim-majority country	
	(1)	(2)	(3)	(4)
<i>Second-stage estimation sample universe:</i>				
	Individual		Household	
	Male children	Female children	All households	Individual
	(1)	(2)	(3)	Male children (4)
				Female children (5)
				All households (6)
<i>PSU-level leave-one-out fraction of households with a migrant in a</i>				
Muslim-majority country	0.677*** (0.045)	0.622*** (0.043)	0.683*** (0.036)	0.049*** (0.016)
Non-Muslim-majority country	0.204*** (0.072)	0.057 (0.087)	0.197*** (0.062)	0.320*** (0.080)
R-squared	0.12	0.11	0.12	0.04
Olea-Pfueger F-statistic	183.13	142.78	286.64	18.38
Critical value for 5% of worst case bias	19.81	14.98	18.91	26.43
Critical value for 10% of worst case bias	12.79	9.93	12.25	16.67
N	9322	8741	9178	9322
				8741
				9178

All regressions include the following control variables: whether the household has an adult aged 23 years or older who went to a madrasa, whether the household head is a Muslim, whether the household has any member who returned from abroad within the last 5 years after living there for at least 6 months, dummy variables for the level of education of the household head, and sub-district fixed effects. Columns 1, 2, 4, and 5 also include the age of the child and its square. Columns 3 and 6 are restricted to households that have at least one child. The Olea-Pfueger F-statistics and the critical values of the worst case bias are obtained from the weak instrument test of Olea and Pfueger (2013). Standard errors, clustered on PSU, in parentheses. Source: Author's calculations based on the 2010 HIES. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

$$\lambda_1 \neq 0 \text{ and } \gamma_2 \neq 0 \quad (\text{A1})$$

$$\text{Cov}(Z_{p_{(h)s}}^j, \epsilon_{ihps}) = 0 \quad \forall j \in \{1, 2\} \quad (\text{A2})$$

Having many migrant-sending households in a neighborhood establishes a network for aspiring migrant-sending households. A network of migrant-sending households would make information more available and accessible. As information is a key constraint for international migration (Beam 2016; McKenzie et al. 2013), access to information should increase the probability of migration from the neighborhood.

Consequently, the likelihood of a household sending a migrant to a Muslim-majority country should increase in $Z_{p_{(h)s}}^1$. This hypothesis is tested by obtaining a statistically significant $\hat{\lambda}_1$ from Eq. 3. Similarly, whether the likelihood of migration to a non-Muslim-majority country is increasing in $Z_{p_{(h)s}}^2$ can be tested by obtaining a significant $\hat{\gamma}_2$ from Eq. 4.

Table 4 reports the results of the estimation of the first stage. A household's own probability of sending a migrant to a Muslim-majority country increases by 6.8 percentage points when the proportion of households in the neighborhood with a migrant in a Muslim-majority country increases by 0.1. When there is a similar increase in the proportion of households with a migrant in a non-Muslim-majority country, the probability of a household to send a migrant in those countries increases by 4.1 percentage points. The strong and statistically significant estimates of the instrumental variables for both types of migrant-sending households imply that the instrumental variables satisfy the relevance condition (assumption A1).²⁴

Using the weak instrument test of Olea and Pflueger (2013), I find that the Olev-Pflueger F-statistics for $Z_{p_{(h)s}}^1$ and $Z_{p_{(h)s}}^2$ are higher than the critical values for 5% and 10%, respectively, of the worst-case bias from a weak instrumental variable. Therefore, I can rule out that the instrumental variables are weak.

One major threat to identification is the violation of assumption A2—that is, the exclusion restriction—as the validity of the causal estimates relies on satisfying these assumptions. It is likely that the concentration of migrants in the neighborhood directly affects a household's likelihood to send at least one child to a madrasa, rendering estimates inconsistent. To tackle this, I exploit the plausibly random within sub-district variation in of concentration of migrants across PSUs. I assume that after controlling for pre-determined household- and individual-level characteristics, within-sub-district variation in the concentration of migrant-sending households across PSUs does not correlate with the household's unobservable type. However, unlike the relevance condition, there is no direct statistical method to test this assumption.

²⁴ There is some variation in $\hat{\lambda}_2$ and $\hat{\gamma}_1$. For instance, $\hat{\lambda}_2$ is statistically insignificant when the estimation sample is restricted to female children but significant when restricted to male children. While this is likely due to sampling variation, it should be noted that to test the relevance condition, I am interested in λ_1 and γ_2 . Since $\hat{\lambda}_1 > \hat{\lambda}_2$ and $\hat{\gamma}_1 < \hat{\gamma}_2$, it is clear that each instrumental variable is a strong predictor for the corresponding endogenous variable.

To address the concern that the within-sub-district variation of migrants across PSUs may violate the exclusion restriction, I divide the residuals from the second stage into three parts following the strategy of Fruehwirth et al. (2019): individual-specific components (u_{ihps}), household-specific components ($v_{h(i)ps}$), and PSU-specific components ($v_{p(h)s}$) that include PSU-level direct effects on school choice or other PSU-level unobservables. As a result, the error term can be written as $\epsilon_{ips} = u_{hps} + v_{h(i)ps} + v_{p(h)s}$. Assumption A2 can be written as follows:

$$\begin{aligned} Cov\left(Z_{p(h)s}^j, u_{hps} + v_{h(i)ps} + v_{p(h)s}\right) &= Cov\left(Z_{p(h)s}^j, u_{ihps}\right) + \\ Cov\left(Z_{p(h)s}^j, v_{h(i)ps}\right) &+ Cov\left(Z_{p(h)s}^j, v_{p(h)s}\right) = 0 \end{aligned}$$

For the estimates to be consistent, the following conditions need to be true:

$$Cov\left(Z_{p(h)s}^j, u_{ihps}\right) = 0 \quad (6)$$

$$Cov\left(Z_{p(h)s}^j, v_{h(i)ps}\right) = 0 \quad (7)$$

$$Cov\left(Z_{p(h)s}^j, v_{p(h)s}\right) = 0 \quad (8)$$

Condition (6) or (7) is violated when an individual or a household can select into PSUs based on unobservables which are related with both madrasa education and migration. Such selection will not be addressed by sub-district-level fixed effects. Since a systematic change of PSU by a child is not a practical reality, we can assume that such violation would occur only through a systematic change of PSU by households. Moreover, both the key independent variable—whether a household sends a migrant abroad—and the key outcome variable—the decision of sending any child to a madrasa—are household-level decisions. Therefore, for all the intents and purposes, I can argue that condition (6) will not be violated if (7) is not violated.

For a violation of $Cov\left(Z_{p(h)s}^j, v_{h(i)ps}\right) = 0$, a household would have to systematically change PSU based on the fraction of migrants there are or based on anything that is correlated with the fraction of migrants and choice of school type. In other words, to migrate internationally, a household can make the strategic decision to migrate internally to PSUs with more migrant-sending households. Learning about migration opportunities certainly induces households to make strategic choices (Shrestha 2017).

However, such strategic movement is unlikely in this setting because of the cost of migration. Both internal and international migration are expensive endeavors. Credit constraints restrict the ability of households to send migrants abroad (Mendola 2008). Internal migration also is often undertaken by households with access to more income (Munshi & Rosenzweig 2016). In addition, internal migration in Bangladesh is principally constrained by a lack of credit rather than by a lack of information (Bryan et al. 2014). International migration being much more expensive than

internal migration, it does not seem plausible that Bangladeshi households would strategically move into different PSUs that would facilitate international migration rather than migrating to areas with higher wage jobs. Hence, I do not consider that such a violation of condition (7) to be a likely threat.

Condition (8) can be violated if there are PSU-level variables that correlate with both the outcome variable and the instrumental variables. This is a concern if there are PSU-level observables or unobservables that affect sending a child to a madrasa and also correlate with the fraction of migrants in the PSU. One way to alleviate this concern is to show that the causal estimates do not change when PSU-level leave-one-out average of outcome variables and control variables are included in the main specification. In Section 5.2, I show that the estimates do not change when PSU-level observables are controlled for. If the estimates were driven by unobservable PSU-specific factors, then the inclusion of these additional controls would significantly change my results. Thus, I argue that a violation of condition (8) is not highly likely either and, therefore, the validity of my identification is not threatened by the exclusion restriction not being satisfied.

5 Estimation and discussion

5.1 Discussion of the main results

The primary equation that I estimate is Eq. 5:

$$Y_{ihps} = \beta_s + \beta_1 \widehat{M}^1_{hps} + \beta_2 \widehat{M}^2_{hps} + \beta_3 X_{ihps} + \beta_4 H_{ihps} + \epsilon_{ihps}$$

Results from estimation of this equation—presented in Table 5—show that a child from a household with a migrant in a Muslim-majority country (M^1) is six percentage points more likely to go to a madrasa. This result is statistically significant at the 10% level. A six percentage points increase is equivalent of a 150% increase in the probability compared to the sample mean. The effect on the probability that a child from a household with a migrant in a non-Muslim-majority country (M^2) goes to a madrasa is negative in magnitude, but not statistically significant.

Omitted variables of the naive OLS estimates—such as household wealth, aspiration of earning a higher income, and skill and ability of the migrant—would positively correlate with the likelihood of migration, but are likely to have a negative correlation with the preference for a school that has a relatively lower returns (Asadullah 2006, 2009; World Bank 2010). Thus, the naive estimates would likely suffer from a downward bias. Indeed, the naive OLS estimates are small in magnitude and insignificant, while generally, the 2SLS estimates are larger than OLS estimates and statistically significant for male children. The larger magnitude of the 2SLS estimates than OLS verifies that the naive estimates are biased downward—consistent with the expected direction of bias.

This result is driven by the causal impact of a household sending a member to a Muslim-majority country on the probability of that household sending a male child to a madrasa. A male child from an M^1 household is 10.8 percentage points more

likely to be sent to a madrasa. This is statistically significant at the 5% level. In other words, if a member migrates to a Muslim-majority country, it increases the household's probability to send a male child to madrasa by 2.5 times of that of the sample mean. As with the estimates for a child of any sex, the magnitude of the impact of having a migrant in a non-Muslim-majority country on the likelihood of male child being sent to madrasa is negative and statistically insignificant. The estimates of the effects of being an M^1 or M^2 household on the likelihood of sending a female child to a madrasa are very small (0.003 and 0.008, respectively) and statistically insignificant.

M^1 households send some of their children to madrasas whom they would have otherwise sent to non-madrasa schools had there been no migration. The results presented in Table 6 show that having a migrant abroad does not have a significant impact on increasing enrollment to school. In addition, the direction of the effect of having a migrant in a Muslim-majority country on the likelihood of sending a male child to a non-madrasa school is negative (-0.136)—though, due to relatively large standard errors (0.096), the effect is not significant even at the 10% level of significance. However, this result suggests that the increase in the likelihood of madrasa schooling for male children is due to households switching from non-madrasa schools to madrasas, not because of a general increase in school enrollment.²⁵

Having a migrant in a Muslim-majority country also affects whether the household sends at least one child to a madrasa (10.2 percentage points increase), and, similarly to individual-level effects, this is driven by the increased likelihood of the household sending at least one male child to a madrasa (12.9 percentage points increase). Panel A of Table 7 reports the results for this estimation. The household-level analysis was conducted only on households with children. The sex-specific household-level results are similarly estimated using only households that have at least one child of that particular sex.

Since the dependent variable here is whether the household sends at least one child to a madrasa, the household-level effects indicate that sending a migrant abroad can also increase madrasa schooling at the extensive margin. That is, migration of a member of the household to a Muslim-majority country causes a household to send at least one child to a madrasa, while that household would not have sent any child to a madrasa in absence of sending a member abroad. As there is no increase in schooling as a whole, this increase at the extensive margin further corroborates that the effect I find is a switching effect.

Though households are switching some of their children to madrasas from non-madrasa schools because of migration, they are not doing this for all of their children. The results presented in Panel B of Table 7 show that having a migrant abroad does not have a statistically significant effect on the likelihood of sending at least one

²⁵ To further verify that the effect is driven by switching away from non-madrasa schools to madrasa schools, I estimate how migration affects choice of schooling conditional on enrollment in school. The results presented in Appendix Table A2 show that migration of a household member to a Muslim-majority country causes an increase in the likelihood of that household sending a male child to a madrasa by 16.7 percentage points.

Table 5 Individual-level effects of a household having a migrant abroad on the likelihood of sending a child to a madrasa

Dependent variable: Goes to a madrasa						
	A child		A male child		A female child	
	OLS	2SLS	OLS	2SLS	OLS	2SLS
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Household has a migrant in a</i>						
Muslim-majority country	0.003 (0.007)	0.060* (0.034)	0.005 (0.009)	0.108** (0.044)	0.002 (0.008)	0.003 (0.040)
Non-Muslim-majority country	-0.006 (0.013)	-0.060 (0.106)	-0.005 (0.016)	-0.161 (0.174)	-0.006 (0.015)	0.008 (0.109)
Sample mean	0.04	0.04	0.04	0.04	0.04	0.04
<i>N</i>	18,063	18,063	9322	9322	8741	8741

All regressions include the following control variables: age of the child and square of age, whether the household has an adult aged 23 years or older who went to a madrasa, whether the household head is a Muslim, whether the household has any member who returned from abroad within the last 5 years after living there for at least 6 months, dummy variables for the level of education of the household head, and sub-district fixed effects. Standard errors, clustered on PSU, in parentheses. Source: Author's calculations based on the 2010 HIES. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

child to a non-madrasa school. The effect of having a migrant in a Muslim-majority country on the likelihood of sending at least one male child to a non-madrasa school has a sizable but imprecise negative estimate. Similarly, having a migrant in a non-Muslim-majority country has a statistically insignificant but sizable positive estimate for the effect on sending at least one male child to a non-madrasa school. There is no impact when I look at the likelihood of sending at least one female child to a non-madrasa school.²⁶

These results establish that households that have migrants in Muslim-majority countries switch schools from non-madrasa schools to madrasas for some of their male children but not for all of them.²⁷ As indicated above, the existing literature suggests that madrasa students have worse learning outcomes (World Bank 2010) and lower returns to education Berman and Stepanyan 2004 than non-madrasa students. There is also a negative relationship between madrasa education and wage income (Asadullah 2006, 2009). This is also corroborated by the fact that madrasa-educated students cannot apply for good university degrees and, therefore, cannot get good jobs.

²⁶ To observe the joint effect of M^1 and M^2 , I re-estimate the equations of interest including the interaction of M^1 and M^2 . The results are reported in Appendix Table A3. The interaction terms are not statistically significant for any of the specifications.

²⁷ I also estimate results for each Muslim-majority country. As expected, the estimates are statistically insignificant due to the lack of statistical power. These results are available on request.

Table 6 Individual-level effect of household having a migrant abroad on the schooling decision of a child of the household

	Panel A			Panel B			Panel C		
	Dependent variable: Goes to a madrasa			Dependent variable: Goes to any school			Dependent variable: Goes to a non-madrasa school		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<i>Household has a migrant in a</i>									
Muslim-majority country	0.060* (0.034)	0.108** (0.044)	0.003 (0.040)	0.023 (0.081)	-0.027 (0.090)	0.062 (0.098)	-0.037 (0.085)	-0.136 (0.096)	0.059 (0.104)
Non-Muslim-majority country	-0.060 (0.106)	-0.161 (0.174)	0.008 (0.109)	-0.061 (0.304)	0.126 (0.407)	-0.192 (0.313)	-0.001 (0.332)	0.287 (0.420)	-0.201 (0.360)
Sample mean	0.04	0.04	0.04	0.60	0.59	0.62	0.56	0.55	0.58
N	18,063	9322	8741	18,063	9322	8741	18,063	9322	8741

All coefficients are 2SLS estimates. Each regression includes the following control variables: age of the child and square of age, whether the household has an adult aged 23 years or older who went to a madrasa, whether the household head is a Muslim, whether the household has any member who returned from abroad within the last 5 years after living there for at least 6 months, dummy variables for the level of education of the household head, and sub-district fixed effects. Standard errors, clustered on PSU, in parentheses. Source: Author's calculations based on the 2010 HIES.* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 7 Household-level effects of a household having a migrant abroad on the schooling decision of its children

	At least one child		At least one male child		At least one female child	
	OLS	2SLS	OLS	2SLS	OLS	2SLS
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Panel A</i>						
Dependent variable: Household sends to a madrasa						
<i>Household has a migrant in a</i>						
Muslim-majority country	0.010 (0.011)	0.102** (0.048)	0.002 (0.012)	0.129** (0.057)	0.007 (0.010)	0.032 (0.050)
Non-Muslim-majority country	-0.014 (0.015)	0.036 (0.164)	-0.002 (0.021)	-0.124 (0.206)	-0.004 (0.018)	0.039 (0.153)
Sample mean	0.06	0.06	0.05	0.05	0.04	0.04
<i>N</i>	9178	9178	6492	6492	6183	6183
<i>Panel B</i>						
Dependent variable: Household sends to a non-madrasa school						
<i>Household has a migrant in a</i>						
Muslim-majority country	0.068*** (0.016)	0.114 (0.091)	0.082*** (0.023)	-0.142 (0.111)	0.035 (0.021)	0.201 (0.125)
Non-Muslim-majority country	0.019 (0.033)	-0.085 (0.401)	0.058 (0.044)	0.806 (0.541)	0.016 (0.043)	-0.274 (0.367)
Sample mean	0.70	0.70	0.63	0.63	0.65	0.65
<i>N</i>	9178	9178	6492	6492	6183	6183

All regressions include the following control variables: whether the household has an adult above 23 years of age who went to a madrasa, whether the household head is a Muslim, whether the household has any member who returned from abroad within the last 5 years after living there for at least 6 months, dummy variables for the level of education of the household head, and sub-district fixed effects. Columns 1 and 2 are restricted to households that have at least one child of any sex. Columns 3–6 are restricted to households who have at least one child of the sex that the dependent variable is referencing to. Standard errors, clustered on PSU, in parentheses. Source: Author's calculations based on the 2010 HIES. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

I estimate the relationship between madrasa education and labor market outcomes for the working-age population—that is, for all persons aged 15 to 64 years. I explore the relationship between madrasa education and two key outcome variables—labor force participation and current employment. Table 8 reports the results of the estimation. I find that madrasa education has a significant negative relationship with these labor market outcomes of the male working-age population. The likelihood of labor market participation by males decreases by 3.5–4 percentage points, depending on the specification. The employment rate also declines by about 3.5–4.2 percentage points. The reduction of labor force participation and current employment indicates that madrasa educated males are relatively worse off than the non-madrasa-educated males in terms of their labor market outcomes.

Table 8 Relationship between madrasa education and labor market outcomes for population of ages 15–64 years

	Labor force participation=1			Currently employed=1		
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Labor market outcomes of males						
Madrasa=1	−0.040** (0.017)	−0.038** (0.017)	−0.035** (0.016)	−0.042** (0.018)	−0.040** (0.018)	−0.035** (0.017)
Fixed effects		Sub-district	PSU		Sub-district	PSU
Comparison group mean	0.83	0.83	0.83	0.83	0.83	0.83
<i>N</i>	16,165	16,165	16,165	16,165	16,165	16,165
Panel B: Labor market outcomes of females						
Madrasa=1	−0.005 (0.015)	−0.006 (0.015)	0.003 (0.016)	−0.006 (0.015)	−0.007 (0.015)	0.004 (0.016)
Fixed effect		Sub-district	PSU		Sub-district	PSU
Comparison group mean	0.11	0.11	0.11	0.10	0.10	0.10
<i>N</i>	17,236	17,236	17,236	17,236	17,236	17,236

All the regressions include the following control variables: age of the individual in years, square of the age, whether the individual is still attending school, dummy variables for marital status of the individual, dummy variables for the religion of the individual, whether the household has sent a migrant in a Muslim-majority country in the last 5 years, and whether the household has sent a migrant in a non-Muslim-majority country in the last 5 years. Standard errors, clustered on PSU, in parentheses. Source: Author's calculations based on the 2010 HIES. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The net welfare effects of this increase in madrasa education are ambiguous. As the primary focus of madrasas is the study of religion, having a madrasa education could also increase children's religiosity. Religiosity has significant socio-economic effects. For instance, religiosity positively affects both income (Bryan et al. 2020) and educational attainment (Gruber 2005). Religiosity can also have adverse effects on labor supply (Berman 2000), and increases an individual's tendency to discriminate (Lavy et al. 2018). The negative relationship between madrasa education and learning outcomes and labor market outcomes suggests that a systematic increase of madrasa education might adversely influence the human capital development of Bangladesh.²⁸ External migration is extremely important due to the large welfare gains it can generate (Clemens 2011). If the migration-induced increase in madrasa schooling leads to an unaccounted for social costs, then the calculated returns of external migration would be overestimated. Conversely, if madrasa schooling leads to unmeasured benefits, then the returns to migration would be understated. In either scenario, it is likely that estimates that focus solely on the effects on earnings for migrants are mis-calibrated.

²⁸ The concern of adverse influence in the human capital production is amplified by the likelihood that stereotype and stigma against the madrasa-graduates (Delavande and Zafar 2015) may contribute to the creation of an unfavorable labor market situation for them.

Table 9 Tests on neighbor characteristics influencing madrasa schooling

	Baseline results (1)	Include neighbor household controls (2)	Include neighbor household outcomes (3)	Include neighbor household controls and outcomes (4)	Include PSU-level distance of nearest madrasa and neighbor household controls and outcomes (5)
<i>Panel A</i>					
Dependent variable: A male child goes to a madrasa					
<i>Household has a migrant in a</i>					
Muslim-majority country	0.108** (0.044)	0.114** (0.051)	0.089** (0.040)	0.101** (0.048)	0.100** (0.049)
Non-Muslim-majority country	-0.161 (0.174)	-0.211 (0.185)	-0.149 (0.150)	-0.191 (0.168)	-0.217 (0.183)
N	9,322	9,322	9,322	9,322	9,322
<i>Panel B</i>					
Dependent variable: A female child goes to a madrasa					
<i>Household has a migrant in a</i>					
Muslim-majority country	0.003 (0.040)	-0.019 (0.045)	-0.002 (0.029)	-0.019 (0.038)	-0.017 (0.038)
Non-Muslim-majority country	0.008 (0.109)	-0.039 (0.103)	-0.001 (0.081)	-0.032 (0.087)	-0.033 (0.088)
N	8741	8741	8741	8741	8741

All coefficients are 2SLS estimates. All regressions include the following control variables: age of the child and square of age, whether the household has an adult aged 23 years or older who went to a madrasa, whether the household head is a Muslim, whether the household has any member who returned from abroad within the last 5 years after living there for at least 6 months, dummy variables for the level of education of the household head, and sub-district fixed effects. In addition, column 2 includes the PSU-level leave-one-out average of the following variables—whether the household has an adult above 23 years of age who went to a madrasa, whether the household head is a Muslim, whether the household has any member who returned from abroad within the last 5 years after living there for at least 6 months, and the level of education of the household head. Column 3 includes the PSU-level leave-one-out average of the outcome variable. Column 4 includes all the controls of columns 2 and 3. Column 5 includes all the controls of column 4 and the distance of nearest gender-specific madrasa in the PSU. When the madrasa is situated in the same PSU, distance is coded as 0. Standard errors, clustered on PSU, in parentheses. Source: Author's calculations based on the 2010 HIES.* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

5.2 Robustness checks

5.2.1 Validity of identification

To tackle the concern that $Cov(Z_{p(h)s}^j, v_{p(h)s}) = 0$ can be violated, I plug the PSU-level leave-one-out average of outcome and control variables into the main specification and re-estimate the results. The control variables I select are: whether the household has an adult aged 23 years or older who went to a madrasa, whether the household head was a Muslim, whether the household has a member who returned from abroad, and the level of education of the household head. By including PSU-level leave-one-out average of control variables, I am controlling for other factors that might be associated with neighborhood-level migration and school choice. I also include the leave-one-out mean of the outcome variable, that is the fraction of children in the PSU that attends a madrasa. If households with a migrant in a Muslim-majority country live in a locality that prefers religious schools more to begin with, then this difference in pre-migration preferences of the neighborhood may explain the difference in schooling decisions. In that case, the inclusion of the neighborhood-level leave-one-out average of incidence of madrasa schooling would explain away the causal relationship that I find. Then I estimate the equation with both the pre-determined neighbor characteristics and outcomes. I also include the distance of the nearest gender-specific madrasa from the PSU (when madrasas are situated in the same PSU as the household, the distance is coded as 0) to test whether the supply of madrasas can explain the causal results I find. Table 9 reports the results of the estimation.

I find that an inclusion of the neighbor characteristics does not change the results, though their magnitude increases slightly (11.4 percentage points). When I include only the average of the neighbors' outcome, again, the magnitude is smaller (8.9 percentage points)—but qualitatively, the results remain the same and they remain significant.²⁹ When I include both the neighbor characteristics and the neighbor outcome, the estimates (10.1 percentage points) are almost the same as that of the baseline results (10.8 percentage points). When I include the distance to the nearest gender-specific madrasa, the estimate is again almost the same (10.0 percentage points). As the addition of these additional controls cannot explain away the main results, this reduces the concern of PSU-level confounding variables violating condition $Cov(Z_{p(h)s}^j, v_{p(h)s}) = 0$ and threatening the validity of the identification strategy. Therefore, this further supports that the estimates I find can be considered causal.³⁰

²⁹ The drop in the magnitude is expected given the mechanical negative bias that leave-one-out means create—referred to as “exclusion bias” by Caeyers and Fafchamps (2016). For illustration purposes, consider Appendix Table B1. Due to the exclusion bias, my first-stage estimates are potentially downward biased as well. Again, it does not posit a threat to my identification as I am interested only in the correlation in the first stage, not causation.

³⁰ The stability of results after inclusion of neighbor outcome and characteristics and neighborhood characteristics also suggests that migration status of neighbor household is unlikely to affect own household's outcome—a concern raised by Betz et al. (2018) about spatial instrumental variables.

Table 10 Plausible exogeneity of the instruments

Panel A: Madrasa schooling of male children	
	A male child goes to a madrasa
	2SLS (1)
Household sends at least one male child to a madrasa	2SLS (2)
	0.089*** (0.027)
	-0.012 (0.065)
	-0.115 0.238
	0.011 6492
Panel B: Madrasa schooling of female children	
	A female child goes to a madrasa
	2SLS (1)
Household sends at least one female child to a madrasa	2SLS (2)
	0.020 (0.025)
	0.026 (0.063)

Panel A: Madrasa schooling of male children	
	A male child goes to a madrasa
	2SLS (1)
<i>PSU-level leave-one-out fraction of households with a migrant in a Muslim-majority country</i>	0.067*** (0.020)
Non-Muslim-majority country	-0.026 (0.048)
Bounds of the coefficient for the household having a migrant in a Muslim-majority country	-0.083 0.194
Lower bound	0.194
Upper bound	≈0.012
$\beta_{Z_{i,t}^{migr}}$	9322
N	

Panel B: Madrasa schooling of female children	
	A female child goes to a madrasa
	2SLS (1)
<i>PSU-level leave-one-out fraction of households with a migrant in a Muslim-majority country</i>	0.001 (0.019)
Non-Muslim-majority country	0.008 (0.047)

Table 10 (continued)

Bounds of the coefficient for the household having a migrant in a Muslim-majority country	
Lower bound	-0.097
Upper bound	0.134
$\beta_{Z_{imm}}$	N/A
N	6183

Following Conley et al. (2012), I assume that the instrumental variables enter the reduced form equation with coefficients β_{Z_1} and β_{Z_2} . The bounds of the coefficient for migration variables are computed at a 95% significance level after assuming β_{Z_1} and β_{Z_2} are bounded between 0 and their estimated values reported in the table. β_{Z_1} refers to the maximum value of β_{Z_1} for which the confidence intervals for second-stage estimates of the migration variables will exclude 0. All regressions include the following control variables: age of the child and square of age, whether the household has an adult aged 23 years or older who went to a madrasa, whether the household head is a Muslim, whether the household has any member who returned from abroad within the last 5 years after living there for at least 6 months, dummy variables for the level of education of the household head, and sub-district fixed effects. Column 2 for each panel is restricted to households that have at least one child of the sex that the dependent variable is referring to. Standard errors, clustered on PSU, in parentheses. Source: Author's calculations based on the 2010 HIES. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

It is possible that there are other reasons that violate the exclusion restriction that I have not thought of. Hence, I check whether my results are robust to a relaxation of the strict exogeneity conditions following the methodology laid out by Conley et al. (2012). The methodology of Conley et al. is as follows: relax the assumption of instrument variables being strictly exogenous and assume that the instrumental variables enter the second stage estimation. I relax the assumptions $Cov(Z_{p(i)s}^1, \eta_{ihps}) = 0$ and $Cov(Z_{p(i)s}^2, \psi_{ihps}) = 0$ and assume that Z^1 and Z^2 enter the second stage with coefficients β_{Z^1} and β_{Z^2} , respectively. I compute the bounds of the consistent values of the coefficients of M^1 and M^2 by making assumptions about the values of β_{Z^1} and β_{Z^2} .

I follow Nunn and Wantchekon (2011) and Azar et al. (2020) to implement this methodology. I regress madrasa schooling on the household-level migration variables, the instrumental variables, and the full set of control variables used in the preferred specification. The coefficients of the instrumental variables from this estimation are taken as upper (lower) bound of the values of β_{Z^1} and β_{Z^2} if the coefficient is positive (negative), while 0 is assumed to be lower (upper) bound.

As my primary result is that migration to a Muslim-majority country increases the probability of madrasa schooling, I focus on the effects of M^1 when I assume plausible exogeneity of Z^1 . The coefficient of Z^1 is 0.067 in the reduced form, where the outcome variable is regressed on all the regressors and the instrument variables. Hence, I assume that the upper bound of β_{Z^1} is 0.067 and the lower bound is 0.³¹ The results of this computation are reported in Table 10.

The confidence interval of the coefficient of the primary variable of interest, that is, a household having a migrant in a Muslim-majority country, includes 0 under the assumed bound of β_{Z^1} . The maximum value of β_{Z^1} for which the coefficient for the individual-level effect on the schooling of male children does not include 0 (I refer to it as $\beta_{Z^1}^{max}$) is approximately 0.012, which is roughly 6.3 percent of the upper bound of β_{Z^1} (0.19). This means that my main results are robust for a minor violation of the strict exogeneity assumption.

5.2.2 Intertemporal external validity

To verify whether the results hold over time, I estimate my main results using the 2016 HIES, which was collected based on a new sample. If the results of the 2010 HIES and the 2016 HIES were inconsistent, that would raise doubts about the validity of the findings.³²

Table 11 presents the results of the estimation of my main specification (Eq. 5) using the 2016 round of the HIES. The new estimates show that having a migrant in a Muslim-majority country increases the likelihood of sending a child to a madrasa by 15.4 percentage points, as opposed to six percentage points in 2010. In 2016, the

³¹ Assuming negative values for β_{Z^1} does not threaten my results as, when I assume β_{Z^1} to be negative, the estimates for β_1 are always positive and the confidence intervals do not include 0.

³² The first-stage estimates using the 2016 round of the HIES are reported in Appendix Table A4. Estimates show that the instrumental variables are relevant. In addition, from the Olea-Pflueger test, I can rule out that there is a weak-instruments problem.

point estimate of the effects on the likelihood of sending a male child to a madrasa is 0.147, as opposed to 0.108 from 2010. Moreover, the probability of sending a female child to a madrasa also increases by 4 times the sample mean in 2016.³³ Migration to a non-Muslim majority country, similar to the results I find using the 2010 HIES, does not have a statistically significant effect on the likelihood of sending any child or a child of a particular gender to a madrasa.

To further verify whether the results are intertemporally consistent, I use the 2016 HIES to estimate the effects of migration on school enrollment and on non-madrasa schooling. The results from Appendix Table A6 show that migration to a Muslim-majority country reduces the probability of a male child going to a non-madrasa school by 13.8 percentage points—a 17% reduction compared to the sample mean. Migration to a non-Muslim-majority country, on the other hand, does not have a statistically significant effect on the likelihood of non-madrasa schooling. Results from the household-level analysis using the 2016 HIES—presented in Appendix Table A7—are qualitatively similar to the results that I find from using the 2010 HIES. The only meaningful difference is that having a migrant in a Muslim-majority country reduces the likelihood of sending at least one male child to a non-madrasa school. This implies that with the passage of time, migrant-sending households become more likely to send all of their male children to madrasas.

The analysis using the 2016 HIES shows that the intensity of the causal impacts has increased over time. The effects on sending male children to madrasas persist and the point estimate becomes larger. In addition, additional effects on sending female children to madrasas appear to manifest over time. A general increase in female education can partially explain the increase in madrasa schooling for female children. However, there is no general increase in the enrollment of male children. Therefore, the increase in madrasa schooling for male children is not due to an increase in overall male enrollment.

5.3 Mechanisms

I explore three potential mechanisms through which international migration could causally increase the demand for religious schooling—financial remittances, learning about the potential benefit of madrasa schooling, and an increase in religiosity through the transfer of religious preferences.³⁴ I show that the results

³³ Appendix Table A5 shows the estimates from pooling the 2010 and 2016 rounds of the HIES. This indicates that the increase in madrasa schooling in 2016 is driven by the increase in madrasa schooling of female children.

³⁴ Other potential mechanisms that would be applicable to both types of migrant-sending households can be readily ruled out as I find that the households who are sending migrants to non-Muslim-majority countries are not more likely to send their children to madrasas. For instance, if madrasa education is less demanding and a male child is sent to madrasa because then he can also help the household, that mechanism would be true for the household that has sent a migrant to a non-Muslim-majority country as well. Similarly, since the supply of madrasas or non-madrasas is not correlated with the community having a large number of a specific type of migrant-sending households, availability of school is not a credible mechanism.

Table 11 Individual-level effects of a household having a migrant abroad on the likelihood of sending a child to a madrasa (Using the 2016 HIES)

	Dependent variable: Goes to a madrasa					
	A child		A male child		A female child	
	OLS (1)	2SLS (2)	OLS (3)	2SLS (4)	OLS (5)	2SLS (6)
<i>Household has a migrant in a</i>						
Muslim-majority country	0.018*** (0.006)	0.154*** (0.040)	0.017** (0.008)	0.147*** (0.048)	0.019*** (0.007)	0.160*** (0.041)
Non-Muslim-majority country	-0.004 (0.009)	0.056 (0.153)	-0.008 (0.013)	0.083 (0.189)	-0.002 (0.012)	0.041 (0.145)
Sample mean	0.05	0.05	0.06	0.06	0.04	0.04
<i>N</i>	56,439	56,439	29,307	29,307	27,132	27,132

All regressions include the following control variables: age of the child and square of age, whether the household has an adult aged 23 years or older who went to a madrasa, whether the household head is a Muslim, whether the household has any member who returned from abroad within the last 5 years after living there for at least 6 months, dummy variables for the level of education of the household head, and sub-district fixed effects. Standard errors, clustered on PSU level, in parentheses. Source: Author's calculations based on the 2016 HIES. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

are inconsistent with the financial remittances mechanism. I explain how the learning channel effect can potentially explain the results, along with the reasons that weaken the case for this mechanism. I find suggestive evidence that the transfer of religious preferences is a potential mechanism for my results, but I cannot provide direct evidence for changes in religiosity.

I can separate the financial remittances effect into two parts—income effect and reduced credit constraint. If the demand for madrasa has high income elasticity, then the additional household income generated from the financial remittances received from migrants might increase madrasa education. Here, the choice of school is discrete—madrasas or non-madrasa schools. Hence, if there is a high relative income elasticity of madrasa education, then madrasa schooling might increase with migration to Muslim-majority countries. However, in the absence of migration, madrasa education has a lower income elasticity than non-madrasa options. In Figs. 1 and 2, I plot the sex-wise probability of a child from a non-migrant-sending household to go to a madrasa for different total household income and asset, respectively. The slope for sending a child to a madrasa is lower than the slope for sending a child to a non-madrasa school. This suggests that given the two choices, madrasa schooling does not have the higher income elasticity. Thus, I can rule out the income effect mechanism.

The mechanism of a reduction of credit constraints would work in the following way: a household, in spite of the willingness to send a child to a madrasa, cannot do so due to not having the means. In the absence of migration the said household would send the child to a non-madrasa school, as otherwise there would have been an increase in school enrollment. If the household's credit

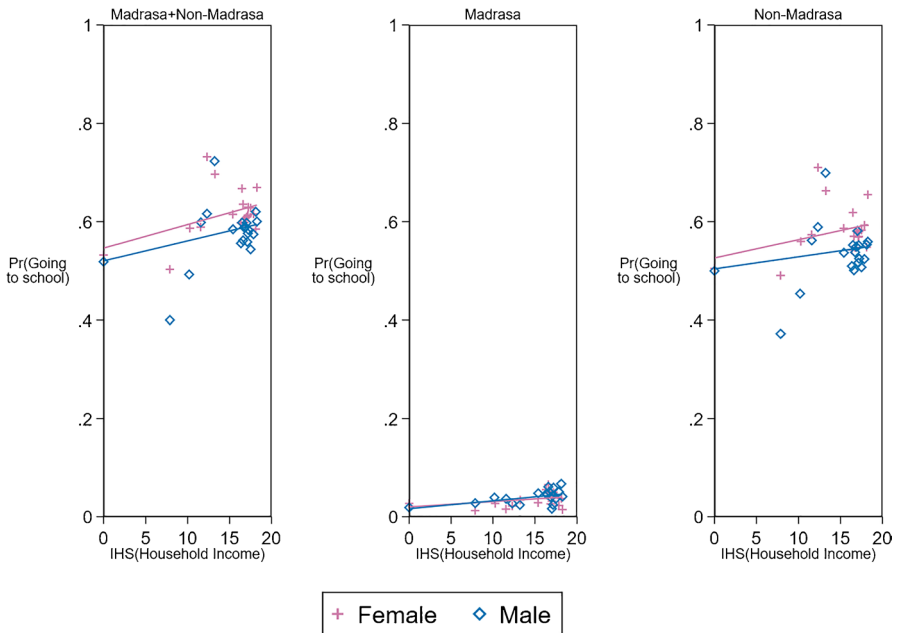


Fig. 1 The probability of a child from a non-migrant-sending household attending school in relation to the household's total income. The figure shows the relative change in the probability of a child from a non-migrant-sending household attending any (a madrasa or a non-madrasa) school with the change in the inverse hyperbolic sine (IHS) transformation of the total income of the household (in Bangladesh Taka). Source: Author's calculations based on the 2010 HIES

constraint is reduced because of financial remittances sent by the migrant, the household decides to send the child to a madrasa.

There are two reasons why this mechanism is inconsistent with the data. First, madrasas in Bangladesh are less expensive than non-madrasas. Qawmi madrasas are less expensive than Alia madrasas, and non-madrasa schools might be much more expensive considering all the outside tutoring fees that a household might have to pay. Admittedly, non-madrasa schools might be a less expensive option than madrasas at the primary level, but at the secondary level madrasas are less expensive than non-madrasa schools (Asadullah and Chaudhury 2016; Al-Samarrai 2007). To test whether the results are driven by primary school students, I estimate the main specification by dividing the sample according to age group. Appendix Table A8 reports the result. Since different children might start primary school at different ages, I split the sample in different ways. It shows that the point estimates are larger and more precise for the age group at which students would go to secondary schools, suggesting that the causal impact is much stronger for madrasa schooling at the secondary level. Hence, the data are inconsistent with the hypothesis that a reduction in credit constraint would increase madrasa enrollment by reducing non-madrasa schooling, the costlier option.

Second, madrasa schools have lower returns than the non-madrasa schools (Berman and Stepanyan 2004). Madrasa schools are associated with adverse learning

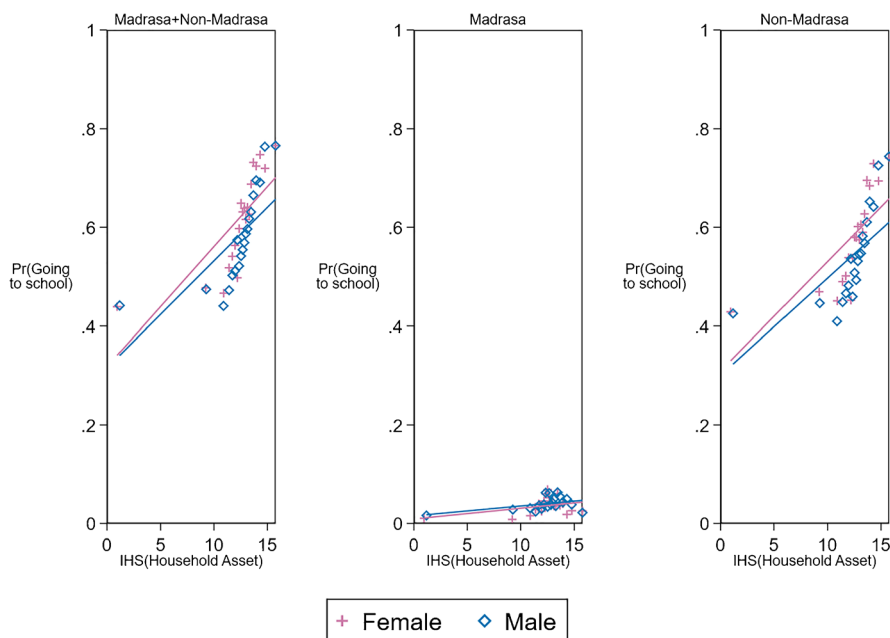


Fig. 2 The probability of a child from a non-migrant-sending household attending school in relation to the household's total assets. The figure shows the relative change in the probability of a child from a non-migrant-sending household attending any (a madrasa or a non-madrasa) school with the change in the inverse hyperbolic sine (IHS) transformation of the total asset of the household (in Bangladesh Taka). Source: Author's calculations based on the 2010 HIES

(World Bank 2010) and labor market outcomes (Asadullah 2006, 2009). Again, it is not plausible that, with the credit constraint relaxed, the migrant-sending households will switch away from the option with higher returns and choose madrasa schools. Hence, the credit constraint reduction mechanism does not explain the results that I find.

I also find that the households who are sending migrants to non-Muslim-majority countries—which are also richer countries, in general—are not sending their children to madrasas. If an income effect or a reduction of credit constraints was the mechanism behind the increase in madrasa schooling, then households who are sending members to non-Muslim-majority countries would have also had an increased likelihood of sending their children to madrasas. The insignificant effects of migration to non-Muslim-majority countries further corroborate that the effects of financial remittances are not driving the results.

The second potential mechanism is learning about the potential benefit of madrasa schooling. After a household member has migrated to a Muslim-majority country, migrant-sending households are likely to learn more about these countries and to have more information about what might help a child to migrate in the future. Households might conclude that having a madrasa education could be beneficial for their children to migrate in the future because they learn Arabic or other skills that are useful in Muslim-majority countries. It is also possible that religious schooling

could have direct benefits for their children's future migration prospects; for example, madrasa education could work as a signaling device. Either of these two factors could cause migrant-sending households to send their children to madrasas.

There are two weaknesses in the arguments in favor of this mechanism. First, the number of teachers who can give proper training in spoken Arabic in Bangladeshi madrasas is very low, and the quality of Arabic learning is also very poor (Bhuiyan 2018; Antara 2019). Hence, the Arabic learned in the madrasas in Bangladesh may not be useful for migrating to Muslim-majority countries. Second, there is no evidence that the religion of migrants determines their employability or wage payment in Muslim-majority countries. Indeed, a significant portion of the migrants in the Persian Gulf comes from countries where Islam is not the dominant religion (e.g., India, the Philippines, and Sri Lanka). Migrants from these countries are also high on the list of top remittance senders from the Gulf countries (Naufal 2011; World Bank 2019).

The third mechanism I consider is an increase in religiosity through the transfer of religious preferences. I find suggestive evidence for this mechanism, but I cannot establish a causal relationship between international migration and religiosity. My results show that migration to a Muslim-majority country increases enrollment in madrasas, while there is no evidence of an effect of migrating to a non-Muslim-majority country. As madrasa education is primarily focused on the teaching of Islam, only finding causal impact for migration to Muslim-majority countries suggests that an increase in madrasa enrollment is likely related to the fact that madrasas offer Islamic religious schooling. If a household sends a child to a school where the teaching of a particular faith is the primary focus, this strongly suggests a religious motive for that choice. Consistent with this theory, previous research on Catholic schools in the USA provides evidence that religiosity influences a household's decision to send a child to a religious school (Sander 2005; Cohen-Zada and Sander 2008). This suggests that an increase in religiosity through the transfer of religious preferences from the destination country is driving the increased madrasa enrollment for children from migrant-sending households.

Since madrasa education appears to be negatively associated with labor market outcomes (Asadullah 2006, 2009; Berman and Stepanyan 2004; World Bank 2010), the increased religiosity mechanism would make economic sense primarily for richer households, who are more likely to be able to afford the loss in income. This in turn implies that the treatment effects should be heterogeneous by household income. I test this implication of the increased religiosity mechanism by estimating treatment effect heterogeneity by income in Table 12. I split the households into two groups based on whether their income is above or below the median. I find that only households with above-median income increases their likelihood of sending a male child to a madrasa in response to having a migrant in a Muslim-majority country.³⁵ This finding suggests that the increase in madrasa schooling likely takes place through an increase in religiosity: if the motivation were primarily financial, then

³⁵ That madrasa enrollment increases only for wealthier households shows that the increase in madrasa schooling is not due to households being stuck in a poverty trap.

Table 12 Heterogeneous effects on madrasa schooling by household income

Panel A: Madrasa schooling of male children		A male child goes to a madrasa		Household sends at least one male child to a madrasa	
	Below median income (1)	Above median income (2)	Below median income (3)	Above median income (4)	
<i>Household has a migrant in a</i>					
Muslim-majority country	0.065 (0.057)	0.197** (0.085)	0.071 (0.067)	0.226** (0.099)	
Non-Muslim-majority country	0.087 (0.175)	-0.734 (0.614)	0.044 (0.185)	-0.456 (0.615)	
Sample mean	0.04	0.04	0.05	0.06	
N	4338	4983	3061	3430	
Panel B: Madrasa schooling of female children		A female child goes to a madrasa		Household sends at least one female child to a madrasa	
	Below median income (1)	Above median income (2)	Below median income (3)	Above median income (4)	
<i>Household has a migrant in a</i>					
Muslim-majority country	-0.016 (0.047)	0.053 (0.075)	0.011 (0.057)	0.091 (0.101)	
Non-Muslim-majority country	0.039 (0.140)	-0.049 (0.285)	0.089 (0.180)	0.004 (0.437)	
Sample mean	0.03	0.04	0.04	0.05	
N	4093	4646	2948	3233	

All coefficients are 2SLS estimates. All regressions include the following control variables: whether the household has an adult aged 23 years or older who went to a madrasa, whether the household head is a Muslim, whether the household has any member who returned from abroad within the last 5 years after living there for at least 6 months, dummy variables for the level of education of the household head, and sub-district fixed effects. Columns 1 and 2 also include age and square of age. Columns 3 and 4 of each panel are restricted to households that have at least one child of the sex that the dependent variable is referring to. Columns 1 and 3 are estimates for households with below-median total income. Columns 2 and 4 are estimates for households with above-median total income. Standard errors, clustered on PSU, in parentheses. Source: Author's calculations based on the 2010 HIES. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 13 Effects of household having a migrant abroad labor market outcome for female members of ages 15–64 years and total number of children

	Female labor force participation 2SLS (1)	Number of children in household 2SLS (2)
<i>Household has a migrant in a</i>		
Muslim-majority country	−0.257*** (0.042)	1.199*** (0.272)
Non-Muslim-majority country	−0.163 (0.173)	0.505 (1.061)
Sample mean	0.11	1.46
<i>N</i>	17,236	12,240

All the regressions include the following control variables: whether the household has an adult above 23 years of age who went to a madrasa, whether the household head is a Muslim, whether the household has any member who returned from abroad within the last 5 years after living there for at least 6 months, dummy variables for the level of education of the household head, and sub-district fixed effects. In addition, column 1 includes the age of the individual in years, square of the age, whether the individual is still attending school, dummy variables for the marital status of the individual, and indicator variables for the level of education completed by the individual. Standard errors, clustered on PSU, in parentheses. Source: Author's calculations based on the 2010 HIES. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

poorer households would also choose to send their children to madrasas, especially since they are cheaper than other schools (Al-Samarrai 2007; Asadullah and Chaudhury 2016; Asadullah et al. 2019).³⁶

An increase in religiosity through the transfer of religious preferences by an international migrant might lead to other changes in the household to comply with Islamic religious norms. For instance, households might reduce female labor market participation because women in many of the Muslim-majority countries face Islam-imposed cultural restrictions to participate in the labor market (Dildar 2015). Households might also increase the total number of children they have, since Muslims tend to demonstrate opposition to fertility control regardless of the position of Islamic scholars and leaders (McQuillan 2004). I estimate the impact of a household having a migrant abroad on these outcomes in Table 13. The results are consistent with increased religiosity—when the household has a migrant in a Muslim-majority country, female labor market participation decreases and the total number of children in the household increases. Moreover, no significant pattern emerges when the household has a member living in a non-Muslim-majority country. These results further strengthen the suggestive evidence that an increase in household religiosity is a potential underlying mechanism.

³⁶ Berman (2000) has also reported evidence of people choosing religious activities over income-generating activities; however, he does not show that this is true only for wealthier households.

The increased religiosity mechanism is consistent with previous research on migration. Migration can cause a person to undergo major transformations of his or her identity. Though several studies document that less religious individuals are more likely to migrate (Myers 2000; Falco and Rotondi 2016), external migrants are likely to become more religious after migrating (Simpson 2003; Williams et al. 2014). Migrants are exposed to the pain of dislocation, and they might revert to their religious identity as a coping mechanism. Muslim migrant laborers from South Asia experience an enhanced sense of religiosity and orthodoxy after their migration (see Kibria 2008). Having migrated to a Muslim-majority country—especially one in the Persian Gulf, where the influence of religion on norms, cultures, and institutions is more overt—a religious Muslim would potentially want to adhere to norms that would reflect the lifestyle of an authentic Muslim. The migrant can then transmit this enhanced sense of religious identity and religiosity to his or her household in the home country. In turn, households would be inclined to imitate norms and behavior that reflect increased adherence to religious practices. Through such practices, they can also gain a higher social status in a society that values religiosity (Kibria 2008). In addition, the increased religiosity of emigrants may dissipate over time when migrating to a non-Muslim-majority country (Aleksynska and Chiswick 2011), which can explain why the migrants do not reunit religious preferences from those destinations.

While the evidence presented thus far supports an increase in religiosity as a mechanism for my results, there are two major weaknesses in the arguments in favor of this mechanism. First, choosing religious education is not a direct measure of changes in religiosity; at best, it is a proxy. There are other direct measures that could better capture any change in religiosity, for instance an increase in offering prayers, or an increase in fasting. However, I am not able to measure these because of data limitations—the HIES does not collect data on these religious activities. Therefore, I cannot show impacts on these direct measures, which would provide stronger evidence of the increase in religiosity mechanism. Second, it is very difficult to change religiosity, and it happens gradually over a long period of time. The HIES is a cross-sectional dataset: it does not collect household information over time. Therefore, I can measure only migration that took place in the preceding 5 years of the survey. Similarly, I can construct only a binary measure of school choice (madrasa or non-madrasa), and cannot capture any switching from non-madrasa to madrasa schooling over time. Thus, I am unable to identify the impact of migration on preference for religious schooling over time. As a consequence, I can only claim to show the causal impact of migration on households choosing religious education, and I cannot identify the causal pathway from migration to religiosity to the preference for religious schooling.

6 Conclusion

I have investigated whether international migration affects the preference for religious schools in the home country. I have found that, in Bangladesh, international migration leads to a strong increase in the likelihood of a migrant-sending household sending a male child to a madrasa. With the passage of time, households also start to send their female children to madrasas. I have found that the increase in

madrassa education is a result of changing schools for those children who would otherwise attend non-madrassa schools. I have also found that although households switch schools for some of the male children, they do not switch schools for all their children. That is, the likelihood of the household continuing to send at least one child to a non-madrassa school is unchanged.

One key limitation of this paper is that the instrumental variables used are unconventional. However, I have demonstrated that the implications of the potential violations of the exclusion restriction do not compromise the results. Nonetheless, it is possible that there are other channels through which the exclusion restriction is violated that I did not consider. To that end, I tested whether my results would survive if the strict exogeneity restriction is violated, and I found that my results are robust to a minor relaxation of the exclusion restriction assumption. Another major limitation is that I could estimate only the local average treatment effects, as I used an instrumental variable approach. Estimating an average treatment effect is recommended for a possible future research agenda.

This paper's findings further imply that it is important to pay attention to the learning outcomes of madrasa students so that they can compete in the labor market with their peers from non-madrassa schools. I find that the same household often sends its children to different types of schools. This clearly demonstrates that there is a demand for madrasa schools.

An increase in madrasa education could impact the society both positively and negatively. As madrasa graduates have low learning outcomes and poor labor market outcomes, a systematic increase in madrasa education may lead to adverse human capital production in Bangladesh. Hence, a migration-induced increase in madrasa education could lead to a reduction in the returns to external migration unless these madrasa graduates are differentially compensated. On the other hand, having a madrasa education could help madrasa graduates to migrate abroad to earn more money. Madrasa education can also have other societal impacts through potentially increasing religiosity. The uncertainty of the net impact of increased madrasa education suggests that economists should pay attention to the life-cycle of madrasa graduates of migrant-sending households, as well as to improving the quality of madrasa education so that the learning and labor market outcomes of madrasa graduates can improve. As international migration is very important to developing economies, economists and policy makers need to understand anything that may influence the returns to migration.

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Declarations

Conflict of interest The author declares no competing interests.

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