# Do remittances reduce school dropout in Bangladesh? The role of government's administrative and structural support

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## Abstract

In the development literature, the impact of remittances on educational outcomes is a contentious topic and remains at the heart of policy discussions on enhancing quality education in developing countries. Bangladesh being one of the world's top remittance recipients, it's crucial to understand the influence of remittances on educational outcomes and school dropout rates. In this study, we examine the impact of internal remittances (from inside Bangladesh) and international remittances (from outside Bangladesh) on school dropout at the household level using a unique, national, and two most recent datasets covering migration and remittance-related information from the Bangladesh Household Income and Expenditure Survey (HIES). Considering the methodological issues such as endogeneity sources and self-selection, we used the Instrumental Variable Cox Proportional Hazard model and included asset scores in the models as a proxy measure of households' wealth index. Furthermore, all the outcomes using the econometric approaches were segregated into three groups: i) those who received no remittances, ii) those who received internal remittances, and iii) those who received international remittances for both HIES 2010 and HIES 2016. This analysis provides a critical picture of the influence of remittances on school dropouts in Bangladesh by giving us a significant positive outcome of the remittances as a whole on education. With the increase in remittance inflows in Bangladesh, the risk of children aged 6-18 dropping out of education are more likely to fall. Aside from the positive impact, this study suggests that government should take the

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initiative of reducing the costs of sending remittances to Bangladesh. Moreover, the government should provide procedural and structural support to migrants.

## 1. Introduction

Policies that reduce the number of children that drop out of school are critical for achieving Sustainable Development Goal 4 (SDG 4). There has been a significant increase in children starting primary school than ever; dropout rates remain significantly higher and low completion of primary and secondary school countries (Sabates et al., 2010). In Bangladesh, the school dropout rate has been alarming, driven by poor socioeconomic status. The question that motivates this study is, "*Can remittances serve as a policy instrument for reducing the school dropout rate in Bangladesh*?".

Migration and remittances are two themes that have received much attention among policymakers and researchers in recent years. Generally, remittances are regarded as monetary or non-monetary payments made by migrants to friends and family in their places of origin, which are predominantly sent to underdeveloped nations (Cooray, 2012). Globally, South Asia is the largest region in the world to receive remittances (World Bank, 2022). South Asia contains 29% of people living below the extreme poverty line worldwide. India (175.7 million people living in extreme poverty), Bangladesh (24.4 million people living in extreme poverty), and Pakistan (9.9 million people living in extreme poverty) are some of the poorest countries in South Asia; however, many countries in south Asia have recently been able to combat poverty and remove a significant portion of their populations from the extreme poverty line (SARMD, 2019). The remittance inflow to these South Asian countries has also been increasing, notably in Bangladesh. Remittance flows to Bangladesh increased from US$ 1.9 billion in 2000 to US$ 21.7 billion in 2020 (Cooray, 2012; Islam, 2021).

There is a well-established connection between remittance and socioeconomic development. Extant literature has shown that remittance significantly enhances economic growth and human development (Acheampong et al., 2021; Annen et al., 2016; Khraiche & Boudreau, 2020; Imai, Gaiha, Ali, Kaicker, 2014a, 2014b). Specifically, the existing empirical studies have focused primarily on the role of remittances and migration in eradicating poverty and promoting income equity (Acosta et al., 2007; Adams Jr & Page, 2005; Adams et al., 2008; Córdova, 2006; Imai, Gaiha, Ali, Kaicker, 2014a, 2014b; Taylor, 1992). In addition to poverty eradication and income equity, migration and remittances have been shown to have a substantial effect on children's educational outcomes (Acosta et al., 2007; Amuedo-Dorantes et al., 2010; Calero et al., 2009; Edwards & Ureta, 2003; Hanson & Woodruff, 2003; McKenzie & Rapoport, 2011). In Bangladesh, there is extensive research on the impact of remittances on poverty, income inequality, and economic growth (De Bruyn & Kuddus, 2005; Murshid et al., 2000; Siddiqui & Abrar, 2003; Siddiqui, 2001; Uddin & Sjö, 2013). However, none of these studies have investigated the contribution of remittance on school dropout in Bangladesh.

Against this backdrop, this research investigates the effect of remittances on school dropouts in Bangladesh. To the best of the authors' knowledge, no literature has ever attempted to

observe the impact of remittances on school dropouts in Bangladesh using survival analysis. We, therefore, contribute to the literature on remittances and economic development literature by unraveling the impact of remittance on school dropouts in Bangladesh using a robust econometric technique. In this study, we use two most recent datasets from the Bangladesh Household Income and Expenditure Survey (HIES) to help understand the implication of remittance for school dropouts at the microeconomic scale. From a methodological perspective, this study deploys the Instrumental Variable Cox Proportional Hazard model to address a number of econometric issues, such as sources of endogeneity and self-selection. This study also differentiated internal remittances' contribution to school dropout from international remittances. Finally, the findings from this study will inform policymakers in their attempt to address school dropout to achieve SDG 4 in Bangladesh.

The structure of the paper is as follows: Section 2 provides a literature overview of past empirical investigations, Section 3 describes the data and technique, Section 4 analyses the empirical findings, while Section 5 provides the conclusion with some policy-oriented recommendations.

## 2. Literature review

Many studies have examined, using a variety of methodologies, the influence of migration and remittances on various aspects of migrant households' economic well-being (Alam et al., 2011; Borjas, 1999; Clark & Drinkwater, 2007; Grogger & Hanson, 2011; Ortega & Peri, 2013; Jadotte, 2009; Ratha et al., 2011). Alam et al. (2011) found that international migration enhanced remittance-receiving households' health, economic, and educational status. However, many perspectives exist on the impact of migration and remittances on education. According to the ideas, migration negatively affects educational outcomes in general, whereas remittances positively affect educational performance (Bredl, 2011). McKenzie and Rapoport (2011) supported this twofold impact, while Hanson and Woodruff (2003) demonstrated the detrimental effect of migration on schooling. The authors stated that due to the migration of household members, the responsibilities of children might increase as they may be required to perform family-related chores; this work ultimately hinders education as children cannot focus on education alone; in economic terms, the opportunity cost of education for this child rises. In addition, this potential cost increases when the likelihood of a child migrating to a developed foreign nation rises. Therefore, the child may not choose to study hard to obtain a better career in the country of origin; due to migration tendencies, he may opt to study less and move abroad, where he does not require the educational background to obtain a higher-paying job compared to the country of origin.

This is also because, in the host (developed) countries, the education qualifications acquired from developing countries are not valued; regardless of the academic qualifications a migrant may have obtained in their country of origin, the migrant must earn an additional degree in the host country to obtain a qualified job there (Psacharopoulos & Patrinos, 2004). This phenomenon has been confirmed by Bratsberg and Terrell (2002); in their study, the authors compared the return on the education of migrants from poor and developed countries who came to the United States in search of a living and found that migrants from developed countries had a significantly higher educational return than migrants from developing countries. Thus, immigrants from wealthier nations are more likely to obtain skilled employment in the United States. Moreover, Chiswick and Miller (2009) have shown empirically that the educational level of migrants in the United States has a negligible effect on the occupations they hold. For a

specific set of immigrants, the authors discovered a positive link between over-education and modal schooling level and a negative correlation between under-education and modal schooling level.

In contrast, McKenzie and Rapoport (2011) hypothesized a favorable relationship between remittances and educational outcomes. It is because remittances give sufficient revenue for families to send their children to school. Without remittance income, the household may not be able to send its children to school, as school fees frequently exceed the family's income. Moreover, the opportunity cost of schooling is higher, as a child may choose to work instead of attending school, contributing to the household's income.

Both internal and international migration contribute to eradicating poverty and achieving sustainable development objectives. A substantial amount of remittances provided by migrants is spent on their children's education (Al Masud & Hamzah, 2018; Siddiqui & Mahmood, 2015), and it also has a favorable effect on educational attainment (Arif et al., 2019).

Further research demonstrates the connection between remittances and migration and educational outcomes (Cameron, 2012; Kuhn, 2006; Kumar, 2019; Tiza et al., 2019). Askarov and Doucouliagos (2020) showed through meta-regression analysis that the incidence of foreign remittances affected the growth of educational expenditures in nearly 35% of the thirty nations studied. Furthermore, internal migration remittances have an effect, but it is negligible compared to foreign migration. Tiza et al. (2019) and Cooray (2012) also demonstrate a similar favorable association.

In the context of Bangladesh, it is notable that the return on education in urban areas of Bangladesh is more significant than in rural areas (Asadullah, 2006). Therefore, many prefer urban areas to rural ones for their children's adequate education and means of subsistence (Chowdhury et al., 2012; Martin et al., 2017). In the case of internal migrants (within the country), there was a substantial disparity between the educational outcomes of migrant children and those of city-dwelling children. Cameron (2012) introduced the finding for the case of Bangladesh and Vietnam focusing on the poor population; it indicates that migrant children are receiving lower grades than their peers due to the lower socioeconomic position of migrant families in the society; that is, living in a relatively less privileged area, not having good public schools nearby, and low educational level of their parents and peers. However, if only the father or brother migrates without the rest of the family, the children of the migrant family have a better chance of obtaining an education in a rural location with the assistance of remittances (Kuhn, 2006).

In Bangladesh, remittances play a crucial role in children's educational attainment; an empirical study with a purposive sample of 100 migrant families in Tangail revealed that without remittances, children's educational attainment would be impossible and that remittances help to improve children's grades (Tiza et al., 2019). Using micro-level data, Kumar (2019) examined the influence of international remittances on education and health in Bangladesh and concluded that international remittances have significant negative and positive effects on education. Almost no research on Bangladesh has attempted to add the dichotomous variable 'school dropout' to compare its change to the change in remittances. This study is innovative in this context since it fills this gap.

## 3. Data and methodology

### 3.1. Data

The data for this empirical study was taken from the Bangladesh Bureau of Statistics (BBS), including the Household Income and Expenditure Survey (HIES) 2010 and 2016. BBS gathered the demographic and socioeconomic characteristics for each member of 46,076 households in 2016 and 12,240 in 2010. Nonetheless, the HIES survey is a comprehensive, nationally representative survey designed to provide high-quality data on household information roster, education, health, economic activity, wage employment, agricultural and non-agricultural enterprises, housing, other asset and income, and all types of consumption details, including food and non-food consumption.

This study focuses on fitting a survival analysis model that addresses the endogeneity problem of remittance based on a comprehensive examination of the current literature. Consequently, this study determines the outcome of education in Bangladesh in terms of completed school years and current enrolment status. Literature suggests both internal and international remittance-receiving households can influence economic behavior in Bangladesh and that a significant proportion of remittances spent on education can affect school retention or dropout rates.

This study captures the typical scenario of education outcomes due to remittances by combining the various plausible characteristics of household members aged 6–18. The age range of 6–18 years was chosen due to the duration of typical education (before higher studies) and includes ten (10) years of compulsory education and two (2) years of higher secondary education. In Bangladesh, children are expected to begin formal education at the age of five and complete their education at age 24 with a post-graduate degree; however, higher education groups are more likely to drop out in this country. In accordance with these findings, the study involves members aged 6–18 years and at least a three-year gap in age and years of education for the validity of data (Bredl, 2011). The factors for this investigation were compiled from prior research. However, final datasets covering the individual and household characteristics of 61,377 subjects/members (aged 6–18 years) for HIES-2016 and 11,249 subjects for HIES-2010 have been assembled.

Based on a review of the current literature, this study extracts several individual and household-level characteristics from the HIES-2016 and HIES-2010 as the variable of interest. Some variables were estimated further using existing data, and this study examined the influence of remittance for both HIES-2016 and HIES-2010. Table 1 shows a description of all variables and their codes and labels.

### 3.2. Variables descriptive statistics

Descriptive statistics are presented to understand the nature of the variables. For categorical study variables, the estimation of summary statistics, such as total count and household type frequencies. In addition, the mean and standard deviation are calculated for the continuous study variables according to household types, such as non-migrants, internal migrants, and international migrants.

The gender distribution of respondents aged 6–18 is slightly higher among no remittance-receiving households for 2016; after that comes internal remittance-receiving households at 50.28 (2016) and international remittance-receiving households in 2010. Overall, it is observed

**Table 1**

Operational definition and concrete description of the study variables.

| Variables and literature source | Unit or value labels | Description |
|---|---|---|
| Year of schooling (Hanson & Woodruff, 2003; Edwards & Ureta, 2003) | Number of complete years | Completed years in education after enrolment. It presents the time at risk for getting an event to occur, in summary, this variable represents survival time. |
| Status (Edwards & Ureta, 2003) | 1. Censoring (Currently enrolled) 2. Event (dropped-out) | Currently, the participants are considered as censored if they did not get an event *i.e.*, dropout during their observed time at risk. |
| Gender (Feng, 2012; Bredl, 2011; Edwards & Ureta, 2003) | 0. No 1. Yes | Gender of the individual in dummy coded form. Gender is assigned a value of one for male, and reference coding reflects a female individual. |
| Direct descendant (Bredl, 2011) | 0. No 1. Yes | Direct descendant status of the individual with the household head, with a value of one, when members have descendant status and a value of zero otherwise, representing the reference category |
| Quality of education (Bredl, 2011) | 0. Non-private 1. Private | Individuals choose institutions based on the quality of their education, and private institutions (coded 1) offer a higher quality of education than public institutions (reference). |
| Age of household head & Age square of head (Acosta, 2011) | In complete years | Age of the household head residing with school-aged children. |
| Earning the status of head (Amuedo-dorantes et al., 2010) | 0. No 1. Yes | Earning the status of the household's head, which has a value of 1 when the household's head is employed and a value of 0 otherwise, and is therefore considered a reference category. |
| Migrant status of head | 0. No 1. Yes | This variable has a value of 1 if the head of the household has migrated and a value of 0 otherwise |
| Younger generation (Bredl, 2011; Amuedo-dorantes et al., 2010) | Ratio of the number of people in the school-going generation to the total number of household members. | This variable also takes the value 0 when no family members are aged 6–18 and the value 1 when all family members are aged 6–18. |
| Older generation (Bredl, 2011; Amuedo-dorantes et al., 2010) | Ratio of senior household members to total household members | Older generation refers to the number of elderly family members. This variable also takes the value 0 when no family member is older than 18 years and the value 1 when all family members are older than 18 years. |
| Asset index (Bredl, 2011; Booysen et al., 2008) | A composite score calculated by multiple correspondence analysis | As a proxy for household wealth, a composite score is derived from the ownership of household assets using multiple correspondence analysis. |
| Remittance amount (Feng, 2012; Edwards & Ureta, 2003) | Dollar per month | This variable represents a household's remittance revenue. |

**Table 1** (*continued*)

| Variables and literature source | Unit or value labels | Description |
|---|---|---|
| Share of remittance on education | Expenditures on education as a proportion of the total amount of remittances received. | This variable indicates the contribution of remittances to educational expenses. It also takes 0 when no amount of the remittance is expensed for education and 1 when the entire amount is expensed for education. However, the HIES 2010 survey does not include this variable. |

that compared to 2010, in 2016, the gender distribution is higher for no-remittance and internal remittance-receiving households; and lower for international remittance-receiving households (table 2). Furthermore, we can observe that more than 90% of non-migrant and internal migrant respondents are direct descendants of the household head. The proportion was just below 90% among international migrant households in 2016. Compared with 2010, in 2016, overall enrolment in a government institution is lower among no-remittance and international remittance-receiving households and nearly similar among internal remittance-receiving households. In 2016, a modest number of household heads migrated both within and across national borders compared to 2010, and this variable may influence the educational outcomes of children aged 6–18 years. In addition, the proportion of earners being the head is higher in 2016 than that of 2010, while the proportion is remarkably higher among no remittance-receiving households, followed by internal and international remittance-receiving households, respectively.

Further, this table documented that approximately 15%, 19%, and 40% of students dropped out of school in 2016 from no remittance-receiving households, internal remittance-receiving households, and international remittance-receiving households, respectively. In 2010, about 20% of students from households that did not receive remittances, 23% of students from households that get internal remittances, and 18% of students from households that get international remittances dropped out of school.

The average age of respondents in 2016 varies a little depending on the status of the household, and we found lower age in 2016 than that in 2010 (Table 3). Practically for all variables, the standard deviation was reported to be nearly similar or slightly different among

**Table 2**

Summary statistics (percentage) of the dummy study variables, HIES-2010 and HIES-2016, Bangladesh.

| Variables | No remittance | | Internal remittance | | International remittance | |
|---|---|---|---|---|---|---|
| | 2016 | 2010 | 2016 | 2010 | 2016 | 2010 |
| | *N*= 41366 | *N*= 9216 | *N*= 1613 | *N*= 549 | *N*= 3464 | *N*= 1484 |
| Male student | 51.10 | 50.22 | 50.28 | 44.99 | 48.99 | 50.27 |
| Direct descendant | 93.31 | 92.75 | 90.27 | 91.26 | 89.20 | 90.57 |
| Govt. institution | 40.20 | 45.18 | 45.26 | 45.17 | 47.17 | 56.00 |
| Head's migrant status | 1.98 | 0.94 | 2.11 | 0.55 | 5.51 | 0.67 |
| Head's earning status | 91.56 | 91.15 | 65.22 | 56.10 | 59.50 | 44.34 |
| Dropout rate | 14.59 | 19.29 | 19.16 | 22.59 | 39.75 | 17.92 |

**Table 3**

Descriptive statistics (mean and standard deviation) of the continuous study variables, HIES-2010 and HIES-2016, Bangladesh.

| Variables | No remittance | | Internal remittance | | International remittance | |
|---|---|---|---|---|---|---|
| | 2016 | 2010 | 2016 | 2010 | 2016 | 2010 |
| | *N*= 41366 | *N*= 9216 | *N*= 1613 | *N*= 549 | *N*= 3464 | *N*= 1484 |
| Year of schooling | 4.88 | 5.39 | 5.33 | 6.09 | 5.24 | 13.29 |
| | (3.22) | (3.02) | (3.20) | (2.88) | (3.22) | (3.28) |
| Head's age | 44.37 | 46.54 | 50.71 | 52.00 | 45.02 | 5.89 |
| | (10.65) | (10.36) | (13.82) | (12.81) | (14.17) | (2.98) |
| Head absent | 0.89 | 0.89 | 0.90 | 0.91 | 0.85 | 49.00 |
| | (0.14) | (0.13) | (0.15) | (0.11) | (0.16) | (14.36) |
| Younger generation | 0.48 | 0.50 | 0.51 | 0.53 | 0.52 | 0.89 |
| | (0.14) | (0.14) | (0.15) | (0.15) | (0.16) | (0.13) |
| Older generation | 0.45 | 0.43 | 0.43 | 0.41 | 0.40 | 0.54 |
| | (0.12) | (0.12) | (0.13) | (0.15) | (0.14) | (0.15) |
| Asset scores | -0.45 | 0.46 | -0.37 | 0.29 | -0.20 | 0.38 |
| | (0.59) | (0.79) | (0.52) | (0.49) | (0.39) | (0.14) |
| Received remittance | - | - | 38.28 | 37.66 | 134.84 | 0.32 |
| | | | (43.42) | (111.91) | (160.22) | (0.43) |

no-remittance, internal, and international remittance-receiving households. In migrant (internal and international) households, the average number of years of schooling is greater than 5 years, whereas it was fewer than 5 years in only non-migrant households in 2016. The average age of household heads is slightly higher among internal remittance-receiving households (50.71 years) compared to the international remittance and no remittance-receiving households. The ratio of a younger generation (educational attainment age) to the school-going generation is near 0.5 for all household categories except for the international migration category in 2010. Moreover, the ratio of the older generation spans around 0.40–0.45, except for the international migration category in 2010, when it was observed to be 0.54.

The predicted average asset scores among research participants were negative in 2016 and positive in 2010; however, as Booysen et al. (2008) observed, assets change slowly and discretely. Thus, it's possible that the indicator doesn't adequately reflect increases in well-being. Additionally, the index's weak capacity to discriminate at the low end of the scale makes it an inadequate instrument for researching extreme poverty; overall, it might not be a decent predictor for understanding the change in school dropout. On average, Bangladeshi households received a larger amount of remittances in 2016 compared with 2010. However, there is a remarkable difference in the received amount of remittance in 2010 and 2016 for international remittance-receiving households. It is estimated that a household in 2016 earned about 38 dollars per month in internal remittances and 134.84 dollars per month in overseas remittances.

## 3.3. Estimation strategy and empirical model

Theoretically, the study of remittances on education produces a simultaneous equation system because of the endogeneity problem. In short, many methodological problems, such as biases, arises from endogeneity or reverse causality; moreover, selectivity and omitted variables are more obvious in the developing world. One best way is using randomized experiments to

eliminate the problems by comparing a randomly-selected treatment group (remittance receiver) with a control group (remittance non-receiver), but such experiments are quite rare in developing countries (Adams, 2011). Another way to deal with these problems is using "natural experiment," exogenous shock from 'nature.' In addition, large, heterogeneous, and panel data on remittance receivers and non-receiver are essential to identify the shock on migrants, but the panel data on migration and remittances are veiled in developing countries (Yang, 2008; Yang & Martinez, 2006). Generally, the two-stage least square (2SLS), two-stage Heckman model, three-stage least square (3SLS), full information maximum likelihood, and instrumental variable (IV) method are more suitable tools for analyzing the impact of remittance in developing countries (Adams and Page, 2005; Adams & Cuecuecha, 2013; Lokshin et al., 2010; McKenzie and Rapoport, 2006, 2007; Lopez-Cordova, 2005). Most studies used relevant and exogenous instrumental variables approach for analyzing the impact of remittance on poverty, income inequality, health, education, labor force, and economic growth (Adams and Page, 2005; McKenzie and Rapoport, 2007; Lopez-Cordoba, 2005; Woodruff & Zenteno, 2007). Based on these issues, either instrumental variable analysis or the two-stage Heckman model is essential to identify the impact of remittance on the education outcome of school-going children in Bangladesh. Identification of suitable instrumental variables is a significant and crucial concern because of large inconsistencies among IV estimates. To identify good IV, McKenzie and Sasin (2007) and Adams (2011) experienced different instrumental variables, such as the distance between the host and destination country or region of migration.

Similar to this study's aim, applying the Cox-proportional hazard model to identify the impact of remittance on education is frequent in literature (Edwards & Ureta, 2003; Bredl, 2011). The education outcome for this study contains the year of schooling who are currently enrolled or dropped out (Hanson & Woodruff, 2003; Mansour et al., 2011). In this context, there exists censoring observation to proceed, and numerous scholars employed Cox's proportional hazard model to investigate the determinants in circumstances where the outcome variable has censored observation. The advantage of this model is that it simultaneously takes into account the occurrence of an event and survival time or the time at risk. To be dropped out an individual, the year of schooling that individual is defined as the time at risk or survival times, and it would be censored case when the individual is currently enrolled in education, and that's why this study turns to the survival analysis (Boualaphet & Goto, 2020). The application of survival models in migration-related literature is very recent and has not been researched extensively.

Considering methodological problems for dealing with remittance and time-to-event cases, the study employed the instrumental variable Cox PH model to identify the impact of remittance on children's dropout status in Bangladesh.

Using the proportional hazard model, the effect of the determinants on the likelihood of dropping out of school is analyzed. In the study of the hazard model, survival time is considered a dependent variable, while concurrent factors are handled as independent variables. This model can contain both complete (uncensored) and incomplete (censored) data, and in the study of the educational outcome, incomplete data are occasionally a significant concern for underdeveloped as well as developing countries.

In brief, the proportional hazard model, as suggested by Cox (1972), is given by,

$$h(t, x) = h_0(t, x)e^{\beta^i X}, \qquad\qquad (1)$$

Where, t is the survival time, $X = (x_1, x_2,., x_p)$ is a vector of covariates values, $\beta' = \beta_1 + \beta_2 + \cdots + \beta_n$ are unknown parameters, and $h_0 (t, x)$ is the baseline hazard when the

covariates effects are kept at their mean values. One of the main assumptions of this model is the assumption of time invariance of all covariates over the observation period, which means the schooling career of the individuals.

Before proceeding to the Cox PH model, this research applied a multiple regression model of exogenous and instrumental variables on the amount of remittance to find out the predicted value of remittance to omit the endogeneity bias in the later model. Furthermore, the parameter estimates are obtained from Cox-PH and Instrumental Variable Cox-PH (IV Cox-PH) models to differentiate the study's findings. However, the hazard ratio value is used to determine the impact of remittance, along with other individual and household level factors, on the educational outcome of Bangladeshi children. The impact of migration is identified using separate models of no remittance-receiving, internal and international remittance-receiving households for both HIES-2010 and HIES-2016 in Bangladesh.

## 4. Results

Table 4 represents the hazard ratios and robust standard error from both Cox-PH and IV Cox-PH models for the remittance-receiving households. Hazard ratios are the exponentiated coefficients of the model, which identifies the hazard of children dropping out from education among migrant households in 2016 and 2010 in Bangladesh. There exists slight variation among the estimates found in the Cox-PH model and IV Cox-PH model. In addition, the consequences of the endogeneity problem are minimized using the instrumental variable through the OLS model in the first stage and the Cox-PH model in the second stage.

The coefficient of the gender of the individuals is significant in both the years 2010 and 2016. The results indicate that male students are 31.3% more likely (HR = 1.313) to drop out in 2016 and 24.4% more likely (HR = 1.244) to drop out in 2010 as compared to the female students, which resonates with the findings of Edwards & Ureta (2003) (table 4). They find that, compared to females, males are 27% more likely to drop out of school. This is because males have greater opportunities in the labor market to get a job; thus, the opportunity cost rises. Descendant history is also a statistically significant ($p < 0.01$) predictor of children drop out status from education in both 2016 and 2010, and it found that direct descendant students are 74.4% less likely (HR = 0.256) to drop out from education in 2016 and 71.1% less likely (HR = 0.299) in 2010. This study further explores that the risk of dropout significantly ($p < 0.01$) decreases (HR < 1.0) for children having education in government institutions compared with private institutions in 2016 and 2010. The characteristics of household heads are also significant risk factors for dropping out of education in Bangladesh. This study finds that the risk of dropout increased by 8.4% (HR = 1.084) in 2016 and 15.3% (HR = 1.153) in 2010 with the increase in one-year age of the household head. Moreover, the coefficient of the head's earning status is significantly ($p < 0.05$) different from one in 2010 only, which means in that year when household heads are employed, it is more likely for the students to drop out; mentionable that this variable is significant for both categories of HIES-2010, and 2016 in non-IV Cox-PH model. Further, the coefficient of the household composition is a negative and significant impact on children drop out status in 2016 and illustrates that the risk of dropout significantly decreases with the increase of the after-schooling members or older generation (age more than 18 years).

There is a statistically significant ($p < 0.01$) impact of remittances on the children's school dropout status in 2016 but no significant impact in 2010. It is observed in previous studies that remittance plays a significant role in removing household budget constraints, which eventually enables the children to study, and reduces the tendency for dropout (Bredl, 2011; Hanson &

**Table 4**

Estimated hazard ratios of Cox-PH and instrumental variable Cox-PH model for the migrant households, HIES-2016 and HIES-2010, Bangladesh.

| Variables | Remittance receiving households | | | |
| --- | --- | --- | --- | --- |
| | Hazard ratios of Cox-PH Model | | Hazard ratio of IV Cox-PH Model | |
| | HIES-2016 | HIES-2010 | HIES-2016 | HIES-2010 |
| Male gender | 1.297 *** | 1.235 * | 1.313 *** | 1.244 ** |
| | (0.082) | (0.108) | (0.081) | (0.108) |
| Direct descendant | 0.278 *** | 0.305 *** | 0.256 *** | 0.299 *** |
| | (0.089) | (0.114) | (0.087) | (0.130) |
| Govt. institution | 0.371 *** | 0.568 *** | 0.388 *** | 0.566 *** |
| | (0.074) | (0.104) | (0.073) | (0.104) |
| Head's age | 1.076 *** | 1.157 *** | 1.084 *** | 1.153 *** |
| | (0.018) | (0.033) | (0.018) | (0.033) |
| Head's age squared | 0.999 *** | 0.999 *** | 0.999 *** | 0.999 *** |
| | ($< 0.001$) | ($< 0.001$) | ($< 0.001$) | ($< 0.001$) |
| Head's Migrant status | 0.557 ** | 1.306 | 0.698 | 1.419 |
| | (0.238) | (0.364) | (0.230) | (0.510) |
| Head's earning status | 1.456 *** | 1.304 ** | 1.109 | 1.294 ** |
| | (0.085) | (0.111) | (0.117) | (0.115) |
| Younger generation | 0.777 | 1.571 | 0.846 | 1.578 |
| | (0.385) | (0.572) | (0.389) | (0.582) |
| Older generation | 0.134 *** | 0.672 | 0.147 *** | 0.683 |
| | (0.434) | (0.574) | (0.438) | (0.594) |
| Asset scores | 0.969 | 0.968 | 1.084 | 0.962 |
| | (0.083) | (0.142) | (0.085) | (0.144) |
| Received remittance* | 0.997 ** | 0.995 | 0.993 *** | 0.999 |
| | (0.001) | ($< 0.001$) | (0.002) | (0.002) |
| Share of education | 0.517 ** | - | 0.467 *** | - |
| | (0.215) | | (0.213) | |

*Note:* *, **, *** indicates that the model coefficients are significant at 10%, 5%, and 1% level, respectively; The robust standard error of estimates are represented within parentheses; *Predicted amount of remittance is obtained from a classical regression model on the truly exogenous variables and the instrumental variable. The share of remittance on education (education share) is missing in the HIES 2010 survey and hence do not include in the model of HIES 2010.

Woodruff, 2003). The hazard ratio lower than one indicates that the hazard of dropout significantly decreases with the increase in the amount of remittance in 2016, consistent with the findings of Edwards and Ureta (2003), who indicated that remittances have a substantial impact on student's decisions to stay in school. More specifically, the increase in one-dollar remittance per month significantly decreased the dropout risk by 0.7% in 2016 (HR=0.993). In addition, the share of remittance on education expenditure directly impacts children's educational status in 2016. It specifies that the risk of dropout decreases by 53.3% (HR=0.467) with an increase in share of remittances on education in Bangladesh. The effect of this variable was unable to be determined due to it being missing in the HIES 2010 survey.

Table 5 represents the hazard ratios and robust standard error from the instrumental variable Cox-PH model for no remittance-receiving, internal remittance-receiving, and international remittance-receiving households of Bangladesh in 2016 and 2010. The impact of remittance and individual and household level factors on educational outcomes are analyzed for the three tiers of households to compare the estimated coefficient.

**Table 5**

Estimated hazard ratios of instrumental variable Cox-PH model for the non-migrant, internal migrant, and international migrant households, HIES-2016 and HIES-2010, Bangladesh.

| Variables | No remittance | | Internal remittance | | International remittance | |
|---|---|---|---|---|---|---|
| | 2016 | 2010 | 2016 | 2010 | 2016 | 2010 |
| Male gender | 1.738 *** | 1.384 *** | 1.416 *** | 0.932 | 0.982 | 1.558 |
| | (0.028) | (0.049) | (0.123) | (0.220) | (0.202) | (0.366) |
| Direct descendant | 0.236 *** | 0.333 *** | 0.350 *** | 0.306 *** | 0.578 *** | 0.155 |
| | (0.036) | (0.061) | (0.127) | (0.228) | (0.999) | (2.106) |
| Govt. institution | 0.338 *** | 0.381 *** | 0.451 *** | 0.474 *** | 0.499 *** | 0.511 |
| | (0.025) | (0.045) | (0.302) | (0.192) | (0.196) | (0.415) |
| Head's age | 1.031 *** | 1.009 | 1.022 | 1.027 | 1.354 ** | 1.174 *** |
| | (0.006) | (0.011) | (0.047) | (0.086) | (0.152) | (0.039) |
| Head's age squared | 0.999 ** | 1.000 | 0.999 * | 0.999 | 0.997 * | 0.998 *** |
| | (< 0.001) | (< 0.001) | (< 0.001) | (0.001) | (0.002) | (< 0.001) |
| Head's Migrant status | 0.749 *** | 0.757 | 0.548 * | 1.752 * | 2.182 | 18.661 |
| | (0.105) | (0.381) | (0.337) | (0.328) | (0.994) | (9.158) |
| Head's earning status | 0.775 *** | 0.812 *** | 0.564 | 2.286 *** | 0.017 | 0.853 |
| | (0.041) | (0.076) | (0.994) | (0.241) | (3.081) | (0.935) |
| Younger generation | 0.874 | 1.166 | 0.434 | 1.268 | 3.511 | 1.945 |
| | (0.136) | (0.264) | (0.899) | (1.142) | (1.191) | (0.706) |
| Older generation | 0.111 *** | 0.119 *** | 0.028 *** | 0.751 | 1.326 | 0.593 |
| | (0.158) | (0.307) | (1.187) | (1.167) | (1.365) | (0.794) |
| Asset scores | 1.001 | 1.056 *** | 1.103 | 0.907 | 2.561 | 0.964 |
| | (0.022) | (0.020) | (0.165) | (0.227) | (0.632) | (0.308) |
| Received remittance* | - | - | 0.941 | 1.003 | 0.906 | 0.989 |
| | | | (0.069) | (0.013) | (0.067) | (0.035) |
| Share education | - | - | 0.528 | - | 0.003 ** | - |
| | | | (0.490) | | (2.557) | |

*Note:* * , **, *** indicates that the model coefficients are significant at 10%, 5%, and 1% level, respectively; The robust standard error of estimates are represented within parentheses; *Predicted amount of remittance is obtained from a classical regression model on the truly exogenous variables and the instrumental variable.

The estimated hazard ratio indicates that male students are more likely to drop out in 2016 (HR=1.738) and 2010 (HR=1.384) among no remittance-receiving households as well as internal remittance-receiving households in 2016 (HR=1.416) (table 5). In addition, direct descendant students are less likely to drop out of education among no-remittance, internal remittance, and international remittance-receiving households (2016 only) than non-descendant students. It is estimated that the dropout risk is lower for the individuals enrolled in a government institution than that of a private institution in 2016 and 2010 among no-remittance, internal remittance-receiving households in both 2016 and 2010, whereas for international remittance-receiving households, it was true only in 2016. The characteristics of the household's head imply that head age, earning status, and migrant status significantly impact ($p < 0.1$) children's dropout status in Bangladesh. The dropout risk increased by 3.54% (HR=1.354) and 1.74% (HR=1.174) among international remittance-receiving households with the increased one-year age of household head age in 2016 and 2010, respectively. Head's migrant status is indifferent from unity ($p > 0.1$) among international remittance-receiving households whereas significantly ($p < 0.1$) different from one among no remittance-receiving households and internal remittance-receiving households. It implies that the risk of dropout is 25.1% (HR=0.749) lower among no-remittance-receiving households whose head was migrated than that of the

non-migrated head in 2016. Whereas, for internal migrants, the dropout tendency decreases by around 45.2% (HR=0.548) in case the household head migrated in 2016; however, for 2010, an opposite tendency (HR=1.752) is observed. This study also finds that children dropping out of education are less likely among no-remittance-receiving households whose head earns money than non-earner in both 2016 (HR=0.775) and 2010 (HR=0.812). Further, the estimated coefficient regarding household composition indicates that the risk of dropout decreases (HR less than one) with the increase of older generation (age more than 18 years) among no remittance-receiving households in both years, as well for an internal remittance-receiving household for 2016.

This study extracts an interesting finding regarding the impact of remittance on educational outcomes in Bangladesh. The impact of remittance is found significant for remittance receiver households combining both types of migration, such as internal and international (table 04) but found no significant impact of internal remittance and international remittance separately (table 05). In addition, the impact of the share of remittance on education expenditure had a significant (p < 0.01) impact among foreign remittance receiver households in 2016 (table 05), such that for the increase in the share of remittance on education, the dropout tendency decreases by 99.7% (HR=0.003).

## 4.1. Discussion and Policy Implications

Overall, our findings suggest that male students are more prone to school dropout than females. It could be because male students have a more significant opportunity cost of education as they have easier access to the labor market (Edwards & Ureta, 2003). Further, we find that students who are enrolled in government schools are more likely to survive in education, which resonates with the fact that the majority population who are poor or near poor can have access to government institutions compared to private institutions despite the low quality of education, as they can study there with little or no substantial fees.

The evidence from this study shows that in the remittance-receiving household in the non-IV COX PH Model, the household head's migration status is found to positively affect school retention rates. However, some previous studies have found that the migration of heads negatively influences education. According to the authors, due to household members moving away, children may have more obligations and need help with domestic duties. This scenario eventually interferes with children's education since they can only concentrate on their studies (Hanson & Woodruff, 2003; Bredl, 2011).

More specifically, our study depicts that when internal and international migration is combined, the impact of remittance is shown to be significant for remittance-receiving households, but there is no significant impact for internal and international remittance alone. Such that the chance for dropout significantly decreases when the households receive remittance. Additionally, among those that received remittances from abroad in 2016, the influence of the remittance share on education spending was considerable. The findings related to remittance impact are consistent with previous studies, such that McKenzie and Rapoport (2011) predict a positive correlation between remittances and academic success. Remittances provide enough income for families to afford and send their kids to school. Since school costs frequently surpass the family's finances, thus the household might not be able to send its children to school without extra money, which may come in the form of remittance. Moreover, children's educational achievement in Bangladesh is found to be significantly influenced by remittances; research using a purposive sample of 100 migrant households in Tangail finds that without remittances,

children would not complete their schooling and that remittances also aid in raising children's grades (Tiza et al., 2019). However, the findings can be repudiated by Kumar (2019), who used micro-level data to analyze the impact of overseas remittances on education and health in Bangladesh and came to the conclusion that remittance had favorable benefits on health but considerable negative effects on education.

These findings have significant policy implications for policymakers in Bangladesh in their attempt to improve quality education, which is at the heart of SDG 4. From the evidence, we suggest that the government needs to reduce the cost of sending remittances and help the migrant to develop their skillset. For remittance to have a real effect on school dropout, policymakers can equip non-migrants with entrepreneurial and career development skills that would enable them to channel their received remittance into productive ventures that can sustain their income and contribute to their children's education. Moreover, Bangladesh, a country with a demographic dividend, has more potential to send people abroad; however, the prospective migrant faces various procedural impediments. Policymakers are recommended to prioritize these procedural constraints and implement appropriate strategies to address these constraints to accelerate international migration in the country.

Additionally, as males are more prone to school dropout than females, attention should be given to males to improve their school retention rate. This can be achieved through the provision of scholarship, which provides monthly stipends to needy male students in Bangladesh. Also, given that males have opportunities in the labor market and engage in many activities to earn income to cater to their educational needs, parents should channel remittance into improving their children's education and family needs. Further, parents should recognize that their male children engaging in labor activities to fend for their education and family needs would be detrimental to the child's future well-being. Therefore, there is a need for parents and families to stop seeing male children as their source of income and discourage them from engaging in child labor activities to concentrate on their education. Furthermore, given that majority of Bangladesh's population are in the low-earning bracket and has a high dropout rate in public schools, the government should take steps to incentivize students in public schools to enhance their academic performance and further improve the infrastructure needs of the public schools. Also, curriculum reforms focusing on skills development among students in public schools would increase skilled manpower in the country. A skilled workforce, which is a crucial asset for economic development, may be beneficial not only for the domestic economy but for foreign countries, as skilled migrant workers have a greater potential for securing a job and attracting better earnings, increasing remittance flow to Bangladesh.

## 5. Conclusion

Using two nationally representative survey data, HIES 2010 and HIES 2016, we examine the impact of remittances on the educational outcome and school dropout. The study aims to find the difficulties in educational accomplishments in recent years and help the government and other organizations set up educational policies and use remittances effectively to increase human capital in Bangladesh. From a theoretical viewpoint, poor households should benefit from remittances, and remittances are expected to reduce budget constraints. Budget constraints play an important role in the educational system in Bangladesh. The comparatively greater quality of education in private sector facilities compared to government schools in the Bangladeshi educational system and the high poverty rate is predominant in the country.

In this research, we applied Instrumental Variable Cox Proportional Hazard (IV Cox-PH) model by including asset score in the models as a proxy measure of a household's wealth index. Moreover, all econometric methods were applied for the three groups: i) received no remittances, ii) received internal remittances, and iii) received international remittances; for both HIES 2010 data and HIES 2016 data, which gives us a comprehensive outcome for understanding the impact of remittances on the school dropout in Bangladesh. According to the IV Cox-PH model results, there are few disparities between two consecutive years of surveys, such as HIES 2016 and HIES 2010. However, the critical variable of remittance was found to significantly affect educational outcomes in 2016 when the internal and international remittance-receiving households were considered together. On the other hand, when the impact of remittance on education for internal and international remittance-receiving households is analyzed separately, the remittance variable was not shown to have a significant impact on school dropout tendency in any of the years (2016 and 2010) studied. Our findings generally suggest that dropout tendencies decreased for female students, students studying in government schools, and students whose household head has migrated. More importantly, with the rise of remittance receipts, and the share of remittance on education, school dropout is decreasing significantly.

This study provides an avenue for future research. Our study can be extended by analyzing if COVID-19 could significantly affect the remittance-school dropout relationship. Future research can also investigate whether there is any impact of COVID-19 on the remittances-human capital relationship once the next HIES survey is available. Additionally, research is needed to determine how the channels through which remittances contribute to human capital accumulation in Bangladesh.

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