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What Factors Affect Households' Decision to Be a New "International Migrant Household" in Rural Bangladesh? Evidence from a Unique Panel Data

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Abstract

We explore the role of households' economic status and migration network on the probability of becoming a new international migrant household while controlling for other conventional parameters. We use the Bangladesh Integrated Household Survey data, a nationally representative panel for rural Bangladesh covering three periods – 2012, 2015, and 2018. Based on a dynamic panel probit model, we find that being from the top four income deciles in the base year (2012) leads to a statistically significant higher probability of being a migrant household in a later period. We also observe a strong impact of the migration network. Having a family member abroad in the baseline increases the probability of having a new migrant in the later periods significantly. In addition, being in the migrant-prone area increases the probability of sending a new member abroad. However, the village migration network is a weaker predictor of future migration than the family network.

Keywords: migration, migration decisions, new migrants, migration and household's economic status.

JEL Classification: F22, O15.

1. Introduction

International migration has long been a strategy for diversifying household income and earning sources. From here on, by migration we refer to international migration, and by remittance, we refer to international remittances, unless mentioned otherwise. More formally, remittance refers to the non-commercial transmission of funds carried out by an expatriate labourer, an individual from a diaspora group, or a citizen connected to relatives residing abroad. Bangladesh has experienced a substantial increase in international migrants over the years. Between 1976 and 2023,

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Bangladesh sent over 15 million workers abroad, per BMET (n.d.), data updated until August 2023. This figure only includes migrations through formal official channels. A sizeable proportion of international migrants migrate using informal channels, which is not captured in the official figures. Particularly in rural areas, where more than two-thirds of the population resides, migration has emerged as a significant livelihood strategy, offering opportunities for economic and social advancement. However, not every household becomes an international migrant. Jones (1998), Stark and Bloom (1985) argue that who gets to migrate overseas depends on the stages of migration. In the earlier stages of migration, richer households have the social network and abilities to migrate, which eases over time for households from lower income quantiles. We test this hypothesis in the Bangladesh context based on the BIHS database, a panel data covering 6500 households in each 2012, 2015 and 2018 round.

This paper examines the relationship between a household's economic status and the probability of becoming a new international migrant household. We show that households located in migrant-prone regions and households from upper-income deciles are more likely to become new migrants.

We analyse Bangladesh's existing foreign migration procedure, develop a theoretical framework for foreign migration, and estimate a model to show the likelihood of becoming a new migrant household depending on several individual, household, and social factors. Our results show that the economic condition of a household is one of the strongest predictors of migration decisions. We establish that the households from the lowest income quantiles have the least probability of migrating abroad. In other words, it is the richer households who migrate more in the initial period. However, the process disseminates more within the region once a stronger migration network develops within the region, which is strongly visible in the time dummy we introduce in the model.

Our paper is different from the earlier literature in several aspects. This is the first study in the Bangladesh context that uses nationally representative panel data to understand the impact of household characteristics, a pre-existing migration network, and the household conditions from the previous rounds on becoming a new international migrant household. The panel data allow us to explore the dynamic nature of the data and utilise a more robust estimate than a conventional approach.

2. Literature Review

International migration is a broad theme, and the research questions could link to anything from peace and conflict, and forced migration, to human capital accumulation, and economic migrations. Given the objective of this paper, we only confine to the economic theories of international migration.

In one of the first neoclassical theories of international migrations, Sjaastad (1962) formalised that a worker decides whether to migrate abroad or not depending on the net present value of lifetime earnings abroad and the net present value of the lifetime cost of living abroad in addition to the migration cost. Later models also considered migration as a human capital investment (Becker, 1964), arguing that

migration happens when people are willing to add skills and training to attain higher human capital.

Compared to the classical models of international migration, the New Economics of Labour Migration (NELM) differs significantly. One of the stark differences between NELM and classical models is that NELM considers migration a household decision rather than an individual utility maximisation problem. Stark (1978, 1991) pioneered the concept that the decision-making unit is the household, and the household not only maximises income, but also minimises and diversifies risks (Stark & Levhari, 1982; Stark & Bloom, 1985). Such a risk minimisation strategy helps explain cases where migration occurs without wage differentials. The NELM also assumes an imperfect credit market that is often only accessible to elites in society. Migration is considered to break the credit constraints of households. Another difference between the neo-classical migration model and the NELM is that the former does not consider remittances in the migration decision. In contrast, the latter perceive it as an essential catalyst (De Haas, 2010).

Moreover, it is also argued that there is selection bias in who migrates and who does not. In other words, migration decisions are not random (Arouri & Nguyen, 2018). For example, households with better networking and higher income opportunities may have higher migration tendencies than those with lower education or income profiles. As such, the migrant families might have had a better outcome even in the absence of migration. Arouri and Nguyen (2018) argue that this issue can be adequately controlled with an appropriate IV. Fixed effects can also contain such biases in the absence of an IV by removing the time-invariant variables.

Chort and Senne (2015) frame a theoretical model accounting for household-based migration decisions and their implications on selecting migrants and their destinations at the household level. Based on an extension of the Roy-Dahl model of mobility and earnings, the paper shows that expected remittances, earnings differentials between home and host countries etc., are essential factors for intra-household migration decisions. After controlling for the earning differentials between home and migration destination country, the paper finds that the households select migrant workers with the highest remittance potentials. In addition, they considered variables such as two "eldest dummies" to capture the socioeconomic context of Senegal, where the eldest son is expected to assume responsibility.

In the context of Bangladesh, Kikkawa and Otsuka (2016) investigate the relationship between migration networks, social capital, and the likelihood of international migration, emphasising how the significance of these forms of capital evolves over time. The research uses a panel data collected from households in three time periods: 2000, 2008, and 2014. However, one of the short-comings of the paper is that it does not control for the initial value problem. As Woolridge (2000) and Woolridge (2005) show, with a short T and large N, pooled probits, or probit fixed effects, can lead to potentially biased estimates because of unobserved time-invariant individual effect being correlated with lagged explanatory variables. Moreover, the study data is not nationally representative, and it primarily focuses on the migration network as the key explanatory variable for international migration.

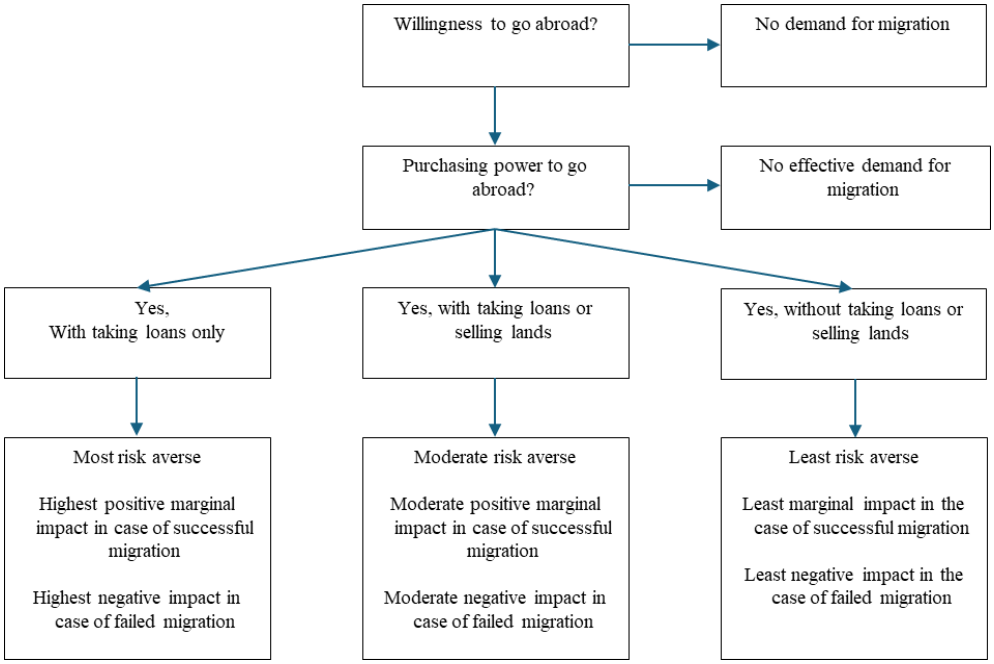
Our paper is different from the earlier literature in several aspects. First, this is the first study in the Bangladesh context that uses nationally representative panel data to understand the impact of household characteristics, a pre-existing migration network, and household conditions from the previous rounds on the international migration dynamics. This paper is also the first one to attempt a theoretical understanding of why the poor are less involved in the migration process than others in the context of Bangladesh. Moreover, empirically, we apply a dynamic panel probit estimator – which provides us with a more robust estimate of the migration dynamics in the Bangladesh context.

3. Conceptual Framework: Migration Procedure in Bangladesh

An aspirant migrant household does not make the decision in isolation, nor does it make the decision abruptly. Economic migration is a rational decision that the household makes after considering risks, relative risks, and costs, including forgone/opportunity costs. One of our underlying assumptions is that households make migration decisions in steps.

The first step to deciding whether to migrate depends on the first basic problem: whether the household has enough resources to pass through the borrowing constraint. In other words, whether the household has an effective demand for migration (Figure 1).

Figure 1. Household decision-making in steps

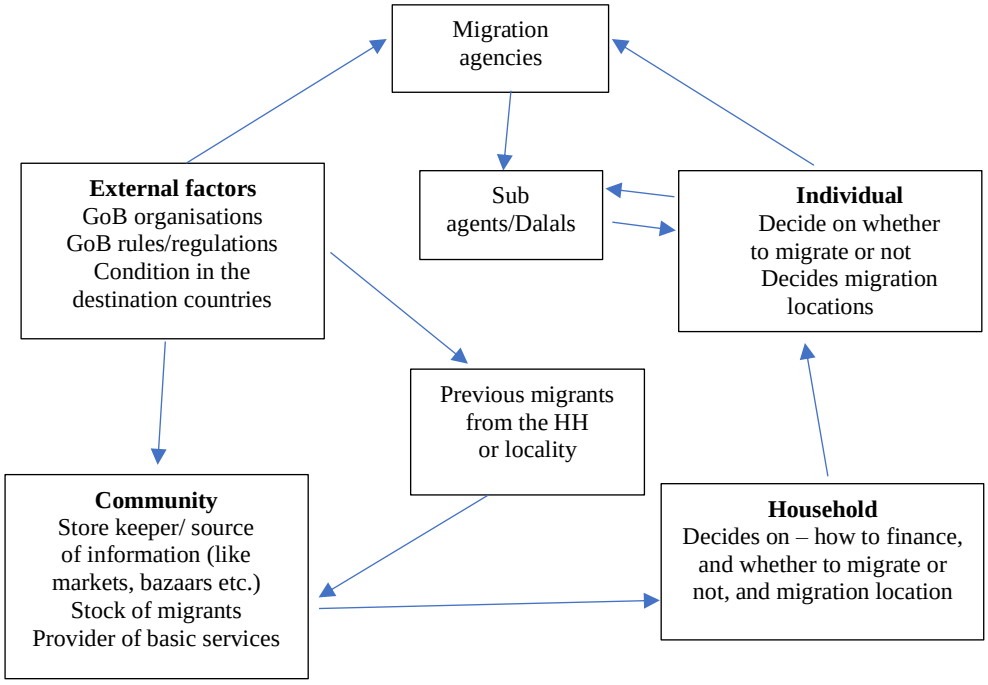


Source: author's conceptualisation.

It must be noted that the impact of foreign migration would largely depend on the pre-existing household conditions controlling for individual attributes. For instance, one of these determinants would be how the household meets the borrowing constraints for overseas migration. As per the Knowledge Network on Migration and Development (KNOMAD) of the World Bank, the cost of international migration is the highest in Bangladesh (The World Bank, 2017). Such a higher cost of migration makes overseas migration more difficult and also creates problems such as debt bondage and exploitation at the destination country that the workers find difficult to overcome (Razzaque et al., 2018).

Once the household is sure about the credit constraints and other factors, it reaches the second step of its decision-making. The second stage of the migration process involves getting into the migration network, making choices regarding destinations, weighing risks, and completing the migration procedure (Figure 2).

Figure 2. Second stage of migration: migration network and how does it work in Bangladesh



Source: author's conceptualisation is based on a secondary literature review. For more details on the process of overseas migration in Bangladesh, see Razzaque et al. (2018, pp. 45-52), Barkat et al. (2014).

This second stage of migration, or the migration process, takes place through one of the three channels, (i) migration through labour recruiters, (ii) migration through intermediaries, social network or family, and (iii) migration through government

agencies (Razzaque et al., 2018). Among the three, the last has the least share in sending overseas workers. Migration through overseas recruiters involves recruitment agencies in Bangladesh which are registered with the government. However, most of these recruiting agencies are located in the capital and do not have branches across the country. Therefore, aspirant migrants often do not have the opportunity to engage with the recruiting agencies directly. Rather, in most of the cases, they are contacted by a middleman or intermediaries (often referred to as 'Dalals' in Bengali) (ibid.). The intermediaries work as deal breakers among the recruiting agencies and the aspirant migrants. IOM (2010) notes that almost 45 percent of overseas migrant workers relied on intermediaries for overseas migration. To what extent a potential migrant would depend on the intermediaries depends on the level of education, migrant network in the village, etc. IOM (2021) points out the lack of information on the aspirant migrants as one of the major obstacles.

Where the potential migrants are illiterate or come from households with lower education or lower social migrant networks, the information asymmetry between the migrant worker and the intermediary increases, leading to a potential moral hazard problem. It increases the cost of migration and risks for migration fraud, as noted by Barkat et al. (2014) and Ahmed et al. (2015). The type of migration fraud includes sending the migrant worker abroad with a nonworker visa (such as a tourist), creating false overseas employment contracts, involving workers in illegal occupation (such as forced sex) etc. (Razzaque et al., 2018). According to a survey on the returning migrants workers by the ILO in 2015, only 17 percent of the sampled workers had a valid work permit when they migrated abroad (Ahmed et al., 2015).

This leads to our hypothesis that poorer aspirant migrant workers are more prone to risky migration process than richer quartile aspirant migrant workers. This is because aspirant migrants with higher education, or where their family members are highly educated, would have more access to better information, either through better access to a safer migration network, the ability to verify information online or read and understand the contract papers, etc.

Unlike migration through intermediaries, migration through friends or families is much safer. According to IOM (2010), around 35 percent of migrant workers collected information on overseas migration through friends or families.

Based on the above discussion, we presume that, in the second stage, a household in Bangladesh decides on migration depending on multiple factors, including (i) the individual, (ii) the households, (iii) the community, and (iv) external factors.

Individual factors include the age, education level, gender, marital status, etc., of the potential migrant. Household factors include the age, sex, and education of the household head, household's income status, household asset (such as total land holding), number of dependents in the household, number of working age population within the household, previous migrants (current or returnee) within the household etc. Community factors include migration network at the community level (such as the proportion of households with a migrant worker), local economic condition (such as mean per capita income/consumption expenditure), environmental

condition (such as propensity to flooding or any other natural disasters) etc. The external factors would include government policies (at home and abroad), conditions and opportunities at the destination countries etc. It also includes recruiting agencies and intermediaries (such as 'Dalals').

It must be noted that the internal migration mechanism is entirely different than how the external migration would work, at least in the context of Bangladesh (Table 1).

Table 1. Two major differences between internal and international migrations

Area	Internal migration	International migration
Cost of migration	As low as $1 to a maximum $5 to travel to any part of the country in Bangladesh	Depends on the destination. However, the most popular destinations, such as Malaysia or Saudi Arabia, would cost around $3000 to $5000 (Blanchet & Bishwas, 2021). A larger amount is paid to the recruitment agent. The accrued cost is often 300-500% higher than government-set fees (ibid.). There is a huge political economy of the recruitment agency in Bangladesh.
Barriers to migration	There is no barrier to migrating internally except three CHT (Chittagong Hill Tracts Area) – Bandarban, Rangamati, and Khagrachari – where you would need separate permission to settle. No permission is needed to work.	Needs the appropriate visa to migrate to the country. Many Bangladeshi workers are still working as undocumented migrants as they do not have proper visa. In many cases, there are language and cultural barriers. Bangladesh has one of the lowest ranking passport acceptability globally. According to the Henley passport index 2022, it ranks 104 among 110 countries.

Source: author's analysis based on literature.

4. Theoretical Model

One of the cornerstones of migration theory, more precisely the human capital model of migration, has been first coined by Sjaastad (1962), who argues that migration is nothing but acts of positioning one's skills in the market that pays the highest. In his model, Sjaastad (1962) considers the differential in wages for the source and destination countries, the cost of living differential in the source and destination countries, the present value of net gain to migration, the distance between origin and destination, as well as a vector of determinants of migration costs. He argues that, a potential migrant worker only moves abroad if the net return is positive.

However, the model has several limitations (Bodvarrson, 2015). As such, the model only considers migration as a single-period decision and does not consider the migrant worker's age, the career point at which the migrant worker is at, how

much the migrant worker values leisure over income, etc. Moreover, the model also considers migration as a problem of individual decision making. However, as the NELM literature suggests, the migration decision is taken at the household level. For example, whether there is already a migrant member in the family, where the migrant lives, how much the family earns, sex composition in the family (such as whether there are no boys in the family, the age of the eldest son in the family etc.) can have a significant influence on the household migration decision.

The model also assumes no asymmetry of information for the migrant workers. The uncertainty and asymmetry of information could be higher for migrants travelling cross-border. Also, risks and uncertainty could be higher for persons with pay in piece than persons with permanent tenure employment opportunities. Nonetheless, the costs of migration, in terms of risks and uncertainty would lower down as there are increasing past migrations in the destination country.

Later models on international migration extend on Sjastad and show that kinship networks and migrant networks would reduce employment search costs, increase security, lower risks, lower language barrier, and lower costs of accommodation, amongst others (Massey & Garcia, 1987; Taylor, 1986, etc.). However, as the later literature shows, beginning with Stark and Levhari (1982), Stark (1984, 1991), and Katz and Stark (1986), the migration decision is not made by the individual but rather by the household.

In our model, we argue that, even though the household is the decision maker on migration, it does not decide in isolation. Rather, the migration decision is taken jointly by the migrant worker and the household. At the individual level, the aspirant migrant compares the option available, like the destinations, the difference in earnings at the source and destination countries, as well as the opportunity cost of migrating abroad. However, when it comes to the cost, the role of the household comes in. This is because the cost, as we argue in the context of Bangladesh, can be a borrowing constraint at the household level, which is resolved at the household level.

In our model, we assume that a migrant worker maximises his expected revenue from migrating abroad rather than absolute revenue. This is because there are always some uncertainties related to international migration, at least in the context of rural Bangladesh. We assume that there is a probability p that his migration will be successful; that is, there is (1-p) probability that it may fail.

At the individual level, the individual would be willing to migrate abroad if the expected revenue from cumulative migration within a span of t years exceeds the expected costs within the same period of time. In our context, the expected revenue is:

$$\text{Expected revenue} = p\left(wage_1 + \frac{wage_2}{(1+\delta)} + \frac{wage_3}{(1+\delta)^2} + \cdots + \frac{wage_{t+1}}{(1+\delta)^t}\right) - (1-p)mig\_cost \quad (1)$$

where,

$wage_i$ = wage in period i, i = 1, 2, …, t

δ = discounting factor (including inflation and social adjustment costs)

p= the probability that it would be a successful migration. Therefore, (1-p) stands for the probability of an unsuccessful migration.

mig_cost= the total cost of migration. It does not include living expenses during the migration years. In the case of a failed migration, the migrant will have zero cumulative wages, and still, he will have to bear the costs (such as the payments made to the intermediaries, fees or travel costs paid, etc). In this particular case, the expected revenue would be negative.

Now, the expected cost from the migration, where it is successful, would be = $p(mig\_cost)$.

Where mig_cost is the cost of migration incurred initially. However, it must be kept in mind that individuals can consider this migration cost and divide it into periods. For example, if the total migration cost is C, he may divide it into periods.

Let's assume he would gain a return of interest (i) for each period of this money had he invested in some banks or bought some assets. Alternatively, had he taken the cost C as a borrowing, it can be considered as the interest rates paid off each period.

However, the migrant will not consider this amount as a one of payment. Rather than a split payment over a period of T (his total length of migration).

Therefore, the true cost incurred, which is split across time would be:

$$mig\_cost = \sum_{t=1}^{t=T} \frac{C(1+i)^{t-1}}{T} * \frac{1}{(1+\delta)^{t-1}} = \sum_{t=1}^{t=T} \frac{C}{T} \frac{(1+i)}{(1+\delta)}^{t-1} \quad (2)$$

For simplicity, let's assume, the interest rate, i is equal to the social discounting rate/inflation rate (δ). Therefore, equation (2) would become:

$$mig\_cost = \sum_{t=1}^{t=T} \frac{C}{T} = \text{C}$$

However, for this basic model, we assume that, along with this migration cost, there will be the cost of living in the destination country. Let's assume, living cost in each period of time is L_t. We also assume that the inflation rate at the home and the destination country are the same. Therefore, a migrant would assume that his cost of living in the destination would increase exactly at the same rate as his discounting factor $(1 + \delta)$. We also assume that there is a fixed exchange rate between the home country and the destination. This assumption of a fixed exchange rate is particularly valid in the context of Bangladesh. The central bank of Bangladesh manages the exchange rate and follows a dirty float to keep it fixed.

Therefore, his total living cost would be:

$= L_1 + L_2(1 + \delta) + L_3(1 + \delta)^2 + \cdots + L_t(1 + \delta)^{t-1}$

Therefore, his expected profit (Π) from going abroad would be:

$$\Pi = p\left(wage_1 + \frac{wage_2}{(1+\delta)} + \frac{wage_3}{(1+\delta)^2} + \cdots + \frac{wage_{t+1}}{(1+\delta)^t}\right) - (1-p)(\sum_{t=1}^{t=T} \frac{C(1+i)^{t-1}}{T} * \frac{1}{(1+\delta)^{t-1}} - p(\sum_{t=1}^{t=T} \frac{C(1+i)^{t-1}}{T} * \frac{1}{(1+\delta)^{t-1}} + L_1 + L_2(1+\delta) + L_3(1+\delta)^2 + \cdots + L_t(1+\delta)^{t-1}) \quad (3)$$

Equation (3) can be written in simple terms as:

$$\Pi = pW - (1 - p)\, C - p(C + L) \tag{4}$$

where,

Π = net return from overseas migration

$W =$ total wage accrued between period 1 and t in present value

$C =$ total migration cost in present value, which only occurs in the current period

L = total living cost (between period 1 and t) abroad in present value

Some basic rearrangements of equation (4) would give us:

$$\Pi = pW - \ C - pL \tag{5}$$

A person, at the individual level, would decide on migrating abroad if:

$$\Pi = pW - \ C - pL \ \geq \theta \tag{6}$$

where, θ is some reservation wage, or the minimum wage that a person would earn even at her village without migrating abroad (between period 1 and t).

Setting it to equality gives us the following:

$$\Pi = pW - \ C - pL = \ \theta + \ \kappa \tag{7}$$

$$=> \ pW = \ C + pL + \ \theta + \kappa \tag{8}$$

where, κ =Non-negative premiums are earned by the migrant member overseas.

Equation 7 tells us that an individual will be willing to migrate abroad only if he profits as much as he would have been had he been engaged in the rural labour market.

A person will only be willing to migrate if his expected wage abroad is as high as the total migration cost, total living expenses, and reservation wage (equation 8). It must be noted here that C is a binding borrowing constraint. A higher value of C would mean a more stringent borrowing constraint for the individual and the household.

And it is through C and Π that the individual decision to migrate influences the household's decision whether to send the migrant member abroad or keep him in the region, where he can earn a wage of θ with certainty. Given that the rural unemployment rate in Bangladesh is less than 1 percent, we assume that the individual has certainty about earning from the village a value of θ. However, it can take any value. During the lean season, it can be 0. However, as in all cases here, we assume all our values at the annual average level summing for a period of t.

Now, at the household level, the household knows about equation 7. They know about the cost of migration and the potential returns.

We hypothesise that the cost of migration puts a borrowing constraint on the household. Here, the cost of migration, C is defined as:

$$C = f(T_c, L_c, w(I)) \tag{9}$$

where, T_c is the transport cost for the aspirant migrant. It could be bus fares, airfares, or any mode of transport that the worker takes. We assume that the mode of transport is homogeneous, and the cost for all migrants for a given destination is the same for a given year.

L_c = Legal costs of migrations. It would include any costs, such as documentation in the source country, visa costs, etc. We assume this would be homogeneous for all migrants for the same destinations for a given year.

ω = Premium paid to the intermediaries, which is a function of I, the degree of asymmetry of information.

We assume that the higher the proportions of migrant households from a region, the lower the asymmetry of information in a particular region. The higher the migration network, the lower the degree of asymmetry in information. [Here, N = Migrant network in the community. One measure could be the proportion of households in the community with at least one international migrant]. We also assume that the level of education of the migrant and the aspirant migrants is important as it would enable them to read what is written on the visa application and other documents and help them to make more informed decisions. In other words, the higher the level of education or parental education, the lower the degrees of asymmetric information. In other words, we assume:

$$I \propto \frac{1}{N}, \frac{1}{E}, \frac{1}{PE} \tag{10}$$

where I is the degree of asymmetric information. Equation 10 says that the degrees of asymmetric information are inversely proportional to the migrant network in a particular community, the aspirant migrant's education, and the parental education of the aspirant migrant.

However, the level of kinship or relationship among the villagers/ residents of a particular community can vary from region to region. For instance, for some regions, this kinship could be more potent than for some other regions. This is also true for the quality of education in a locality. Some regions may have better education qualities than others. Therefore, the degree of information asymmetry is related to the region-specific qualities like strength of kinship, quality of education, etc., in the specific locality. In other words, equation (10) will equate as follows:

$$I = k * [\frac{1}{N} + \frac{1}{E} + \frac{1}{PE}] \tag{11}$$

where k is an idiosyncratic variable for each region or a region-specific fixed effect.

Given the relationship between I and N, the premium charged by an intermediary would be:

$$\omega = I + \epsilon$$
$$\Rightarrow \quad \omega = k * [\frac{1}{N} + \frac{1}{E} + \frac{1}{PE}] + \epsilon \tag{12}$$

where, ϵ is the fee that he would charge anyone regardless of the asymmetry of information. That is, in the case that the migrant worker has perfect information, the value of I would be 0, and the only premium that he would be paying is ϵ or the fees of the intermediary. According to 11 and 12, the least cost of information would be incurred by a household that has a very strong migration network, higher years of education as well as higher parental education.

Therefore, for a typical migrant worker, the total cost of migration would be:

$$C = T_c + L_c + \omega \tag{13}$$

Equation 13 says that the total migration cost has a direct relationship with travel costs, legal costs, and the cost of intermediaries. Following equation 12, equation 13 can be rewritten as:

$$C = T_c + L_c + k * [\frac{1}{N} + \frac{1}{E} + \frac{1}{PE}] + \epsilon \tag{14}$$

Here, C is a borrowing constraint for a household if

$$C > L_f + A + S + cY \tag{15}$$

In other words, if the cost of migration is greater than the total amount the household can borrow (L_f) from informal (friends, relatives, etc.) or formal (banks, NGOs, etc.) channels, total asset holdings (A) (such as total land values), total savings (S), and proportion of income after consumption expenditure (cY). Here, c is the marginal propensity to consume for a typical household.

For migrant or aspirant migrant households, equation 15 must be:

$$C \leq L_f + A + S + cY \tag{16}$$

At the corner solution, equation 16 would solve with equality:

$$C = L_f + A + S + cY \tag{17}$$

Given this, a household's decision to have an international migrant would be a function of:

I_M= f($L_f, A, S, cI, T_c, L_c, N, E, PE, k$).

Where, I_M= 1 if the household has a new international migrant, and 0 otherwise. Whether to migrate or not, i.e. the value I_M takes would depend on household's utility.

From equation (7) we get,

$$\Pi = pW - C - pL - \theta = \kappa \tag{18}$$

Π enters the utility of the household utility function. The households optimise their utility. The utility depends on household consumption expenditure (Y), as well as the earning from international migration (Π). If there is no migration, the migration benefit would be 0, and therefore, the utility would be entirely dependent on the amount of consumption expenditure. We also assume that, for the households who want to be a migrant, their risk aversion depends on their total wealth or total asset (A). The richer the households, the less risk-averse the households when it comes to the migration net benefits. A wealthy household would be more risk taker for a given value of Π compared to a less wealthy household.

Therefore, the household maximises its utility function:

$$U = f(Y, A, \Pi) \tag{19}$$

where, Y is the level of consumption of the household.

To capture the degree of risk aversion of the household, let us introduce a parameter γ which is a function of A. Therefore, our utility function becomes:

$$U = f(Y, A, \gamma, \Pi) \tag{20}$$

Now, assuming a decreasing relative risk aversion (DARA), that is, the degree of risk aversion decreases as the household's wealth or asset level increases with regard to the net benefits of foreign migration, our utility function becomes:

$$U = Y^{\alpha} + \frac{\Pi}{\gamma(A)} \tag{21}$$

where, α is the elasticity of consumption (Y)

In the case that the household does not decide to migrate, the value of Π is 0. In other cases, the higher the net benefits from migration (Π), the higher the utility of the household. However, the utility also depends on household wealth (A) that follows a function $\gamma(A)$. $\gamma(A)$ decreases as wealth increases. In other words, households become less risk-averse as their wealth or asset level increases. Therefore, utility (U) from migration is higher for higher-income households. Richer households are less risk-averse for a given level of net benefit from migration than poorer households.

The functional form of $\gamma(A)$ is as follows:

$$\gamma(A) = \frac{\eta}{A^{\rho}} = \eta A^{-\rho} \tag{22}$$

Here, η and ρ determines the shape of the DARA function. η represents the overall level of risk aversion. It determines the degree of risk aversion for the household with respect to net benefits of migration, with a higher value indicating higher risk aversion. The reciprocal of η, 1/η, can be interpreted as the coefficient of absolute risk aversion (CARA), which measures the sensitivity of the household's utility to changes in risk. A higher value of η indicates a higher degree of risk aversion, meaning the household is more sensitive to changes in risk and tends to be more conservative in their decision making and vice versa. In the case of ρ, it determines the rate at which risk aversion decreases with increasing wealth. A higher value of ρ would mean faster decrease in risk aversion as the household becomes wealthier and vice versa.

Substituting $\gamma(A)$ in 21 and after some manipulations we get:

$$U(Y, A, \Pi) = Y^{\alpha} + \frac{\Pi A^{\rho}}{\eta} \tag{23}$$

$$\Rightarrow \quad U(Y, A, \Pi) = Y^{\alpha} + \frac{\kappa \,.\, A^{\rho}}{\eta} \tag{24}$$

$$\Rightarrow \quad U(Y, A, \Pi) = Y^{\alpha} + [pW - C - pL - \theta]\frac{A^{\rho}}{\eta} \tag{25}$$

Replacing the value of C in equation 25 we get:

$$U(Y, A, \Pi) = Y^{\alpha} + [pW - (T_c + L_c + k * [\frac{1}{N} + \frac{1}{E} + \frac{1}{PE}] + \epsilon) - pL - \theta]\frac{A^{\rho}}{\eta}$$

$$\Rightarrow \quad U(Y, A, \Pi) = Y^{\alpha} + (pW - T_c - L_c - k * \left[\frac{1}{N} + \frac{1}{E} + \frac{1}{PE}\right] - \epsilon - pL - \theta)\frac{A^{\rho}}{\eta} \tag{26}$$

Equation 26 states that the utility of the household increases with increasing consumption, however, at a decreasing rate. Moreover, whether to migrate or not, the household decides that based on the latter part of the equation in 24. As long as κ>0 (in equation 24), households' utility from migrating abroad would be greater than the decision on non-migration. From equation (26), it can be asserted that, for a given value of ρ, η , p, and A, the utility of a household will increase:

- with an increase in overseas lifetime income (W) or an increase in the rates of successful migration (p) or both (pW);
- decrease in transport cost (T_c);
- decrease in legal costs to migrate abroad (L_c);
- increase with higher social network, individual education, or parental education – as these will reduce the asymmetry of information between the aspirant migrant and the intermediary (N, E, or PE);
- decrease in the premium charged by the intermediary (ϵ);
- decrease in the lifetime cost of living abroad (pL);
- and, decrease in the local wage (θ).

In a nutshell, our theoretical model underpins three important dynamics influencing migration decisions at the household level.

First, one of the primary determinants for household migration decision is whether the household has adequate resources to migrate abroad. In other words, whether the household can meet the binding resource constraint. Our theoretical model shows that it is the richer households who are more likely to migrate than others as they can meet this binding resource constraint.

Second, the relationship between household assets and the migration decision is not linear. Households with higher resources would be less risk averse and, therefore, with the same level of migration benefits would be willing to migrate more.

And lastly, a decrease in information asymmetry would enable a higher level of migrations.

5. Hypotheses:

We hypothesise that households from the lower income quantiles have least probability to migrate. We also hypothesise that households with better migration networks would have higher probability to migrate compared to others.

6. Data and Methodology

6.1 Data

We use Bangladesh Integrated Household Survey (BIHS) data. It is the only nationally representative panel survey for rural Bangladesh covering detailed data on agriculture production, dietary intake of household members, anthropometric measurements of all household members (including heights and weights), data on measuring women's empowerment, information on household income and expenditures, as well as detailed information on shocks (economic or natural disasters), migration, and remittances of the household members etc. The survey data cover 6,500 households from 325 primary sampling units (PSUs). The surveys are conducted in 2011-12, 2015-16, and 2018-19.

A trade-off for using these data is that they only cover rural Bangladesh. However, since this is nationally representative of rural Bangladesh for all administrative districts of the country, it enables a deeper analysis of the rural Bangladesh context. Moreover, more than two-thirds of the total population still lives in rural areas, and most of the employment comes from the rural farm and nonfarm sectors. Moreso, international migration is more of a rural phenomenon than urban in Bangladesh. Moreover, the panel dimension of the dataset enables us to explore the impact of migration and remittances using more robust econometric models than otherwise.

All the prices and income in the data are in constant 2012 prices (such as monthly household expenditure etc.) based on a constructed regional consumer price index (See Annex 1 for further details).

6.2 Empirical Models

Dynamic Panel Probit Model

Based on the conceptual and theoretical underpinning, and the panel dimension of our data, a naïve regression model would look as follows:

$$m_{it} = \alpha_0 + x_{it}'\alpha + z_{it-1}'\gamma + m_{i0}\beta + c_i + \mu_{it} \quad (27)$$

where,

m_{it}= 1 if the household has any new international migrant member in period t, 0 otherwise

m_{i0}= 1 if the household had any international migrant in the baseline period, 0 otherwise

x_{it} is a vector of variables such as the education of the household head, and education squared, age of the household head, and $z_{it-1}$is a vector of variables showing migrant members in one period lag: internal migrant network in one period lag at the district level (measured as the proportion of households with at least one internal migrant); international migrant network in one period lag at the district level (measured as the proportion of households with at least one international migrant); household income decile in one period lag; proportions of working age male population in the household etc.; the proportion of adult males in the household in lag 1; the amount of loan or savings in the households in one period lag (in log); etc. $\mu_{it}$is the error term.

More specifically, we can denote our pooled probit model as follows:

$$m_{it}^* = \alpha_0 + x_{it}'\alpha + z_{it-1}'\gamma + c_i + \mu_{it} \quad (28)$$

where,

$$m_{it} = \begin{cases} 1, & \forall m_{it}^* > 0 \\ 0, & Otherwise \end{cases} \quad (29)$$

We observe whether household *i* has a new migrant member in period t or not. If household *i* has a new migrant member in period t, it takes 1, and 0 otherwise. In essence, m_{it}^* shows the ability of a household to have a new migrant worker in a particular period.

However, running a pooled probit estimate would lead us to a biased estimate as the assumption that c_i is independent of z_{it-1} is impossible (Woolridge, 2005). One approach is to control for c_i as a parameter estimate for each i. This is often referred to as controlling for household fixed effects. However, with fixed T and $N \to \infty$, this would result in inconsistend estimators (Wooldridge, 2000), precisely our case.

Wooldridge (2000) suggests, first, to model the distribution of $c|z_t, x_t)$ and then to construct the density of explanatory variables given $(z_{t,}\, m_{0,})$. Furthermore, Woolridge (2005) provides a simple solution to the initial conditions problems as is in our case.

Moreover, in the presence of attrition, following Wooldridge (2005) has several advantages. Wooldridge (2005) approach allows attrition to arbitrarily depend on $m_{i0,}$ the initial condition. In the present case, $m_{i0,}$ shows the household's migrant status in the initial period. An MLE estimation following Wooldridge (2005) would allow attrition probabilities to differ across the initial condition. In contrast to this approach, traditionally, it would have required us to explicitly model attrition as a function of the initial condition following appropriate Heckman analysis (Wooldridge, 2005).

Whether the household has a new migrant in period t, could depend on whether the household had a migrant in period t-1, or in the initial year. Also, one of our key hypotheses is that households from the poorest income quantiles are the least likely to migrate given the higher borrowing constraint. Therefore, we are interested in observing the impact of the household's income status from the previous round affects the new migrant status in the current round. Wooldridge (2005) shows that, if not properly controlled for, such initial value problems can lead to potential biased estimates. In other words, unobserved individual heterogeneity affecting m_{1it} can be correlated with unobserved individual heterogeneity affecting m_{2it}. Moreover, idiosyncratic shocks that affect m_{1it} can be strongly correlated with idiosyncratic shocks affecting m_{2it}. Therefore, Wooldridge (2005) suggests a simple solution by applying dynamic panel probit model.

Following Wooldridge (2005), we have two key underlying assumptions on the conditional distribution. First, the dynamics in our model is correctly specified. "*This means that at most one lag of m_{it} appears in the distribution given outcomes back to the initial time period" (ibid.)* which can be written as:

$$D(m_{it}|z_{it}, m_{i,t-1}, c_i) = D(m_{it}|z_{it}, m_{i,t-1}, \dots\dots, m_{i0}, c_i) \tag{30}$$

We assume that our this 'structural density function' is correctly specified.

Our second assumption is $z_i = \{z_{i1}, \dots z_{it}\}$ is appropriately strictly exogenous, conditional on c_i.

Here, z_i is the row vector of all explanatory variables from all time periods and it can take lag or leads of any exogenous variables.

Let us assume our dynamic probit model with unobserved effect as follows:

$$P\left(m_{it} = 1 \middle| m_{i,t-1}, \dots\dots, m_{i0}, z_i, c_i\right) = \Phi\left(z_{it}\gamma + \rho m_{i,t-1} + c_i\right) \tag{31}$$

In addition to equation 31, we also assume that c_i is distributed as follows,

$$c_i|m_{i0}, z_i \sim N(\alpha_0 + \alpha_1 m_{i0} + z_i\alpha_2, \sigma_a^2) \tag{32}$$

Given equation (31) we can write:

$$f(m_1, m_2, m_3, \dots . m_T|\, z, c, \beta) = \prod_{t=1}^{T}\{\Phi(z_t\gamma + \rho m_{\,t-1} + c)^{m_t} \times [1 - \Phi(z_t\gamma + \rho m_{\,t-1} + c)]^{1-m_t} \tag{33}$$

where,

$\beta = (\gamma', \rho)'$. Integrating (33) with respect to the normal distribution in (32) will give us the density function $D(m_{i1}, \ldots . m_{iT} | m_{i0}, z_i)$.

Now, from (32), we can write

$$c_i = \alpha_0 + \alpha_1 m_{i0} + z_i \alpha_2 + a_i \tag{34}$$

Here, a_i follows a normal distribution with mean 0 and variance σ_a^2. That is,

$$a_i | (m_{i0}, z_i) \sim N(0, \sigma_a^2)$$

It follows that $(m_{it} | z_{it}, m_{i,t-1}, \ldots \ldots, m_{i0}, c_i)$ would follow a probit model with response probability

$$\Phi(z_{it}\gamma + \rho m_{i,t-1} + c_i) \tag{35}$$

Substituting the value of c_i from (34) to (35) we get:

$$\Phi(z_{it}\gamma + \rho m_{i,t-1} + \alpha_0 + \alpha_1 m_{i0} + z_i \alpha_2 + a_i) \tag{36}$$

From (36), we can finally write the latent variable version of our model as:

$$m_{it}^* = z_{it}\gamma + \rho m_{i,t-1} + \alpha_0 + \alpha_1 m_{i0} + z_i \alpha_2 + a_i + u_{it} \tag{37}$$

where, $u_{it} | Z(z_{it}, m_{i,t-1}, \ldots \ldots, m_{i0}, a_i) \sim N(0,1)$ (38)

Now, the density function stated in (33) becomes:

$$\prod_{t=1}^{T} \{\phi(z_t\gamma + \rho m_{t-1} + \alpha_1 m_0 + z\alpha_2 + a)^{m_t} \times [1 - \phi(z_t\gamma + \rho m_{t-1} + \alpha_1 m_0 + z\alpha_2 + a)]^{1-m_t} \tag{39}$$

After Integrating (38) for the normal density function ($N(0, \sigma_a^2)$), one would obtain the same structure as the standard random effects probit model (for further details, see Woolridge (2005). However, the only difference from the random effect probit (as written in equation 28) is that the explanatory variables in the time period t would include the lag of the dependent variable ($m_{i,t-1}$), and the initial values (m_{i0}). Here, we add m_{i0} and z_i in each time period as additional explanatory variables and use of standard random effect probit software would give us unbiased estimates of the parameters.

Therefore, our modified empirical migration model from equation 28 can be written as follows:

$$m_{it}^* = \alpha_0 + \alpha_1 m_{i0} + z_i \alpha_2 + x_{it}\alpha_3 + z_{it-1}\delta + \rho m_{i,t-1} + a_i + u_{it} \tag{40}$$

where,

m_{it}= 1 if the household has any new international migrant member in period t, 0 otherwise

m_{it-1}= 1 if the household has any new migrant member in period t-1, 0 otherwise

m_{i0} = 1 if the household has any new migrant member in the initial period, 0 otherwise

x_{it} are the other covariates such as, education of the household head, age of the household head, regions, dependts in the households, proportion of adult males in the household, mean years of schooling of the household members, proportion of working age adults in the households etc.

z_i is the row vector of all explanatory variables from all time periods and it can take lag or leads of any exogenous variables.

w_{it-1} are the variables such as household income quantile in period t-1, domestic migration network in one period lag, international migration network in one period lag etc.

6.3 Summary Statistics of the Selected Variables

Among all households, only 5% of the households have a new international migrant worker (Annex Table 1). 66% of the new households of international migrant workers had at least one international migrant in the initial period (2012). In contrast, for households without any new migrant workers, this rate was only 7%. It shows the strong role of the family network in new international migration.

The mean years of education for the head of the new migrant households is slightly higher (4.1 years) than the nonmigrant households (3.5 years). What is more interesting is, in the one period lag, the highest years of schooling is much higher for the new migrant households (7 years) compared to non-migrant households (4.75 years). Moreover, the proportion of working-age male members in the new migrant households in one period lag is 1.35 times higher than the nonmigrant households.

The descriptive statistics also show that the new migrant households come from stronger migrant-prone areas. As such, the new migrant households are coming from areas where on average 25% of the households have at least one international migrant. In the case of nonmigrant households, the proportion of households with at least one international migrant at the village level is only 11%.

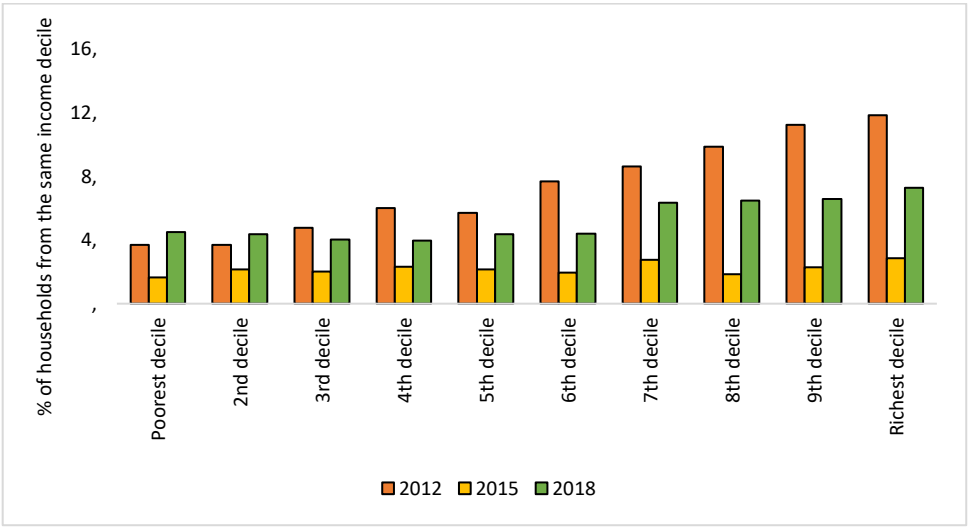
Moreover, we note that the internal migration network is slightly stronger in the regions of nonmigrant households. For non-migrant households, the mean value of the "proportion of households with at least one internal migrant member at the village level" is 23% compared to 20.7% in the case of new international migrant households.

We do not see much difference between the new international migrant households and the nonmigrant households with regard to other variables such as the under 15 dummy, elderly dummy, log of total loan in one period lag, or the log of total savings in one period lag etc.

6.4 Descriptive Statistics

The proportion of households with at least one new international migrant is higher in the higher-income deciles. For instance, in 2012, only 3.7 per cent of the poorest-income households had at least one international migrant member (Figure 3). In 2018, this rate has increased to 4.3%. In contrast, in 2012, among the households in the richest income decile, 11.8% of the households had at least one new international migrant member. However, we notice that the proportion of new international migrant workers is almost flat across all income deciles. One possible explanation for this could be that international migration is costly. We observe the same set of households across three periods. Therefore, a time lag could influence the lower proportion of new migrants in 2015.

Figure 3. New migrant households by income deciles and year



Source: author's estimation.

The same trend is observed in the migrant workers by income deciles. For example, among all the new migrants in 2012, 56.8% of them belonged to the top four income deciles. The bottom four deciles, the share of new international migrants in 2012 was 24.8%. In 2018, the share of new international migrants among the bottom four deciles increased to 34.8%. However, 49% of the all new international migrants still come from the top four income deciles.

Therefore, it can be argued that the proportion of new migrant households in the poorer income decibels has increased significantly over the years. As such, in 2012, the richest 40% of the households had a 2.29 times higher propensity to have new international migrant households than the bottom 40% of the households (Table 2). This propensity decreased to 1.43 in 2018, meaning that the top 40% of the households had at least 1.43 times more new international migrants than the bottom 40% of the households.

Table 2. Migrant share index

Indicator	2012	2015	2018	Total
Share of the bottom 40% of households in total new migrations (%)	24.8	38.6	34.1	29.9
Share of top 40% of households in total new migrations (%)	56.8	42.9	49.	52.2
The ratio of the top and bottom 40%	2.29	1.11	1.43	1.74

Source: author's estimation.

7. Regression Results

Following the empirical model discussed above, we estimate our model by following different model specifications as a robustness check. In all the model specifications, our main objective variables, such as whether the household has any new migrant in one period lag, whether the household had any migrant at the baseline, household head education, household's income deciles, migration networks (both internal and international) etc. are kept the same. In alternative specifications, we add variables such as whether the household had any under-15 dependents at home (in lag), whether there were any elderly in the family (in lag), the proportion of the working age males in the household (in lag), log of total loan in the household (in lag), log of total savings in the household (in lag) etc. The results of the marginal effects are presented in Annex Table 2. For the brevity of the paper, we do not incorporate the results from the main probit regression. However, this is available from the author upon request.

The results of the regressions show that having a new migrant in the immediate past lag lowers the probability that the household sends another migrant member in the present period. As such, households with new migrant members in the immediate past lag would have a 34 per cent lower probability of sending another member abroad. However, we observe a strong relationship between the migration status of a household in the initial period and the probability of sending a new migrant member. Households with international migrant members in the initial period have a 33 percentage points more probability to have an international migrant member in the following periods compared to nonmigrant households. We also observe a strong role of migration networks at the village level. A 10 per cent increase in the proportion of international migrants at the village level can increase the probability of having a new international migrant household in the locality by more than two percentage points. However, we did not observe any significant relationship between the internal migration network and the probability of new international migration at the household level.

In all the specifications, we observe a strong relationship between household expenditure deciles and the probability of new migration in the following period for the households from the upper income deciles. As such, for households belonging to the bottom five deciles, no relationship can be observed between the decile status and the new international migration status compared to the base category (poorest expenditure decile). However, households from the sixth income

decile have 51 percentage points higher probability of having a new migrant member in the following period compared to the poorest decile households. This relationship becomes more prominent as we move up in the expenditure decile. As such, the richest income decile households have an 81 percentage points higher probability of becoming a new migrant household in the next period compared to the poorest income decile households.

We observe a weak relationship between the years of education of the household head and the probability of having a new migrant member. However, this relationship is quadratic in nature and it increases at a decreasing rate. One reason behind this result could be that households educated beyond certain threshold points might have more high-yielding local opportunities than other households. We also observe a positive and significant relationship with the highest years of male education in the household: higher educated households, higher probability to have a new migrant in the following period. However, we do not see any significant relationship between the female highest education in the household and the probability of new migration.

8. Conclusion

Bangladesh is one of the main migrant host countries in the world. Migration and remittances have played important roles in the development dynamics of Bangladesh. However, as the stages of migration theory suggest, due to the cost and risks associated with international migration, not all households have opportunities to become international migrant households. In this paper, we explore the international migration process in Bangladesh, devise a theoretical framework, and test our key hypothesis using the Bangladesh Integrated Household Survey data from 2012, 2015 and 2018.

Our theoretical model predicts that households with higher education, better migration networks, and higher wealth endowments will have higher tendencies to international migration. Our empirical findings support this hypothesis. Based on a dynamic panel probit model, we see that households with international migrant members in the initial period have a higher probability of sending another new migrant member in the later periods. In other words, the family migration network is highly significant in household migration decisions. We also observe a significant relationship between the migration network at the village level and the probability of new migration. However, the magnitude of this network is much lower than that of the family network. Our result also suggests that households from the richer income deciles have a significantly higher probability of being new migrants compared to the households from the poorer income deciles. We also observe that the education of the household members plays an important role. As explained in the theoretical model, higher education can reduce the risk of international migration and, thereby, can reduce the expected cost of international migration. Our evidence supports this hypothesis.

Several conclusions can be drawn from the results. First, unequal access to international migration can have a further inequality abating impact on the source

community. Therefore, the migration process needs to be much easier and less costly so that poorer households can participate. Furthermore, as found in the paper, education can play an important role in this process. Therefore, extra attention should be provided to the regions where international migration is low and explore whether lower education in those regions explains such outcomes. As we show in this paper, increasing a household's education endowment will increase the chances of international migration by lowering the risk associated with it.

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Appendix

Table 1. Summary of the key variables

Variable	New migrant households					Non-migrant households					All households					Ratio of mean (migrant/non-migrant)
	Obs	Mean	Std. Dev.	Min	Max	Obs	Mean	Std. Dev.	Min	Max	Obs	Mean	Std. Dev.	Min	Max	
New international migrant household dummy	905	1.00	0.00	1.00	1.00	17639	0.00	0.00	0.00	0.00	18544	0.05	0.22	0.00	1.00	
New international migrant dummy in the initial period	872	0.64	0.48	0.00	1.00	16362	0.05	0.21	0.00	1.00	17235	0.08	0.26	0.00	1.00	14.07
Household head years of education	905	4.09	4.02	0.00	18.00	17639	3.55	4.15	0.00	18.00	18544	3.57	4.15	0.00	18.00	1.15
Household head years of education square	905	32.87	46.59	0.00	324.00	17639	29.81	52.72	0.00	324.00	18544	29.96	52.44	0.00	324.00	1.10
Highest years of education of females in the HH	409	5.96	3.75	0.00	18.00	10630	5.17	3.83	0.00	18.00	11040	5.20	3.83	0.00	18.00	1.15
Highest years of education of males in the HH	409	7.02	3.81	0.00	18.00	10630	4.75	4.40	0.00	18.00	11040	4.84	4.40	0.00	18.00	1.48
Proportion of working age members in the HH in L1	409	67.74	20.77	20.00	100.00	10631	60.60	22.21	0.00	100.00	11041	60.86	22.20	0.00	100.00	1.12
Proportion of working age males in the HH in L1	409	35.09	16.66	0.00	80.00	10631	25.98	17.45	0.00	100.00	11041	26.32	17.50	0.00	100.00	1.35
U15 dummy in L1	409	0.75	0.43	0.00	1.00	10628	0.78	0.41	0.00	1.00	11038	0.78	0.41	0.00	1.00	0.96
Number of U15 in L1	409	1.42	1.18	0.00	6.00	10625	1.51	1.15	0.00	7.00	11035	1.50	1.16	0.00	7.00	0.95
Elderly dummy in L1	409	0.23	0.42	0.00	1.00	10628	0.20	0.40	0.00	1.00	11038	0.20	0.40	0.00	1.00	1.15
Number of elderly in L1	409	0.26	0.50	0.00	2.00	10628	0.22	0.47	0.00	3.00	11038	0.22	0.47	0.00	3.00	1.15
Number of members with disability in the HH	409	0.67	0.90	0.00	6.00	10631	0.52	0.77	0.00	6.00	11041	0.53	0.78	0.00	6.00	1.27
ln(total loan, cons 2012 prices)	409	7.13	5.17	0.00	13.87	10630	6.66	4.83	0.00	15.88	11040	6.67	4.84	0.00	15.88	1.07
ln(savings, cons 2012 prices)	409	5.85	4.62	0.00	13.65	10629	5.14	4.45	0.00	14.03	11039	5.17	4.45	0.00	14.03	1.14
Proportion of households with at least one international migrant member	409	24.90	21.03	0.00	90.00	10631	11.23	15.21	0.00	100.00	11041	11.73	15.67	0.00	100.00	2.22
Proportion of households with at least one internal migrant member	409	20.71	14.07	0.00	65.00	10631	23.29	15.54	0.00	100.00	11041	23.20	15.49	0.00	100.00	0.89
HH income decile (monthly exp at lag1, const 2012 prices)	409	6.54	2.65	1.00	10.00	10631	5.36	2.85	1.00	10.00	11041	5.40	2.85	1.00	10.00	1.22

Source: author's estimation based on BIHS datasets (2012, 2015, 2018).

Table 2. Dynamic Probit model: Who becomes a new migrant? Marginal Effects

(Dependent variable: New migrant dummy at the household level)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
New migrant dummy in lag 1	-0.3404**	-0.3736**	-0.3736**	-0.3786**	-0.3824**	-0.3603**	-0.3795**
	(0.1712)	(0.1747)	(0.1747)	(0.1768)	(0.1759)	(0.1754)	(0.1729)
Whether the household had any migrants in 2012, the base year	0.3345***	0.3878***	0.3878***	0.4129***	0.3886***	0.3888***	0.3882***
	(0.1261)	(0.1295)	(0.1295)	(0.1317)	(0.1299)	(0.1296)	(0.1301)
HH years in education	0.0334*	0.0356*	0.0356*	0.0364*	0.0359*	0.0333	0.0351*
	(0.0202)	(0.0207)	(0.0207)	(0.0207)	(0.0209)	(0.0204)	(0.0208)
Square of HH education	-0.0085***	-0.0078***	-0.0078***	-0.0077***	-0.0078***	-0.0077***	-0.0078***
	(0.0017)	(0.0018)	(0.0018)	(0.0017)	(0.0018)	(0.0017)	(0.0018)
Female highest education in lag 1	-0.0093	0.0053	0.0053	0.0086	0.0047	0.0050	0.0048
	(0.0095)	(0.0097)	(0.0097)	(0.0101)	(0.0098)	(0.0097)	(0.0098)
Male highest education in lag 1	0.0893***	0.0619***	0.0619***	0.0540***	0.0615***	0.0625***	0.0621***
	(0.0103)	(0.0109)	(0.0109)	(0.0111)	(0.0110)	(0.0110)	(0.0110)
Total international migrant proportion in lag 1 at village	0.0213***	0.0219***	0.0219***	0.0222***	0.0219***	0.0220***	0.0220***
	(0.0020)	(0.0021)	(0.0021)	(0.0022)	(0.0021)	(0.0021)	(0.0021)
Total internal migrant proportion in lag 1 at village level	-0.0040*	-0.0032	-0.0032	-0.0031	-0.0032	-0.0034	-0.0032
	(0.0022)	(0.0022)	(0.0022)	(0.0023)	(0.0022)	(0.0022)	(0.0022)
2nd Decile (monthly exp) at lag1 at the village	-0.1139	-0.1595	-0.1595	-0.1737	-0.1600	-0.1645	-0.1714
	(0.2618)	(0.2724)	(0.2724)	(0.2769)	(0.2727)	(0.2719)	(0.2741)
3rd Decile (monthly exp) at lag1 at the village	0.1775	0.1558	0.1558	0.1456	0.1582	0.1607	0.1533
	(0.2825)	(0.2908)	(0.2908)	(0.2929)	(0.2910)	(0.2886)	(0.2919)
4th Decile (monthly exp) at lag1 at the village	0.3237	0.2998	0.2998	0.2739	0.3029	0.3062	0.2854
	(0.2600)	(0.2694)	(0.2694)	(0.2729)	(0.2695)	(0.2700)	(0.2703)
5th Decile (monthly exp) at lag1 at the village	0.4306	0.4143	0.4143	0.3926	0.4171	0.4192	0.4015
	(0.2782)	(0.2903)	(0.2903)	(0.2941)	(0.2896)	(0.2908)	(0.2916)
6th Decile (monthly exp) at lag1 at the village	0.5184*	0.4888*	0.4888*	0.4657*	0.4943*	0.4991*	0.4801*
	(0.2664)	(0.2755)	(0.2755)	(0.2789)	(0.2754)	(0.2770)	(0.2765)
7th Decile (monthly exp) at lag1 at the village	0.5151*	0.4933*	0.4933*	0.4615	0.4981*	0.5076*	0.4842*
	(0.2683)	(0.2815)	(0.2815)	(0.2850)	(0.2813)	(0.2811)	(0.2828)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
8th Decile (monthly exp) at lag1 at the village	0.7402***	0.7242***	0.7242***	0.7001**	0.7356***	0.7295***	0.7135**
	(0.2693)	(0.2801)	(0.2801)	(0.2833)	(0.2799)	(0.2804)	(0.2812)
9th Decile (monthly exp) at lag1 at the village	0.6914**	0.6639**	0.6639**	0.6363**	0.6650**	0.6946**	0.6509**
	(0.2740)	(0.2839)	(0.2839)	(0.2864)	(0.2840)	(0.2863)	(0.2854)
10th Decile (monthly exp) at lag1 at the village	0.8143***	0.7915***	0.7915***	0.7601**	0.7947***	0.8098***	0.7768***
	(0.2875)	(0.2997)	(0.2997)	(0.3020)	(0.2996)	(0.3003)	(0.3010)
year_18	0.4906***	0.4856***	0.4856***	0.4871***	0.4867***	0.5052***	0.4789***
	(0.0732)	(0.0745)	(0.0745)	(0.0755)	(0.0747)	(0.0768)	(0.0748)
The proportion of working-age males in the HH lag 1		0.0120***	0.0120***	0.0171***	0.0121***	0.0118***	0.0121***
		(0.0021)	(0.0021)	(0.0028)	(0.0021)	(0.0021)	(0.0021)
Under 15 dummy in lag 1				0.2321**			
				(0.0952)			
Elderly dummy in lag 1				0.2681***			
				(0.0881)			
Number of members with a disability					0.0449		
					(0.0375)		
Ln(total loan in lag 1 in constant 2012 prices)						-0.0203*	
						(0.0122)	
Ln(total savings in lag 1 constant 2012 prices)							0.0155
							(0.0124)
Observations (N)	9208	9208	9208	9206	9208	9208	9202

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Note: the table does not include the dependent variables for each year due to brevity.
Source: author's estimation based on BIHS datasets.