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Children in left-behind migrant households: education and gender equality

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Abstract

This paper analyses the effect of migration of men from rural areas in Pakistan on children in households "left behind" by the migrants. Left-behind households' expenditure on children's education and the gendered distribution of these expenditures are two outcomes of main interest. First, it is tested if left-behind households have higher overall expenditures on children's education. Second, it is tested if migration of men from households reduces gender inequality in households' expenditures on children's education. This gendered distribution is analyzed by estimating the effect of migration on the share of households' education expenditures spent on girls. Migration can affect these expenditures and its gendered distribution through various channels. Men's migration may lead to women taking over household decisions regarding education expenditures. Migration may also transfer norms and alter peoples' preferences such as those regarding children's schooling. To differentiate between the channels two types of migration, permanent migration of men for employment creating "left-behind" households and temporary migration whereby male members migrate for employment for short periods during the year, have been considered. Transfer of norms is expected to operate through temporary migration episodes as well as via permanent migration, while the changes in women's decision making is expected to operate via permanent migration when the men are absent. The effect of remittances has been further separated from the effect of migration. The paper uses longitudinal data from rural households in Pakistan with additional data collected from a sub-sample of the panel by the author. Fixed effects fixed effects model (FEM) is used to estimate these relationships, reducing endogeneity of migration. The results suggest that migrant and non-migrant households in the sample do not have significantly different expenditures on children's schooling and education. This is true for both types of migration. Households that receive remittances have higher expenditures on children's education. A noteworthy result is that left-behind households have girls' shares that are higher as much as 18 percent than the average. This is not the case for households with temporary migrants, suggesting that women's decision participation decreases gender inequality in households' education expenditures. Heckman Selection Model has additionally been estimated to estimate the effect of the migration on households' expenditure on girls' education, considering the selection of households into sending girls to school. Heckman Selection model also suggests that left-behind households have higher per girl expenditures. The results of the selection model suggest that being a left-behind household is significantly positively associated with households' expenditures on girls' education.

JEL classification: O15, D15, J16, F22

Keywords: migration, women's empowerment, intra-household resource allocation

1. Introduction

Left-behind households are households from where one or more members migrate leaving the others in the area of origin creating spatially divided households. Migration and absence of members of the household can affect left-behind children's education through various channels. First, this type of migration is characterised by economic ties of the left-behind household with the migrant(s), manifesting, predominantly, in receipt of remittances by left-behind household. Households' investment in children's education may increase due to the receipt of remittances that, by increasing incomes, allows households to invest in children's education.

Migration of household members can also affect education of children through other channels. Perceptions of household decision makers towards education may change due to migration; migration exposes households to norms different from their own and thus changing their perceptions towards children's education (Fargues, 2006; Giannelli, & Mangiavacchi, 2010). Migration experiences of family members may also affect children's own education aspirations (Kandel & Kao, 2000). Children's education can also be affected through a change in household decision makers (Antman, 2011; Antman, 2015). Migration of the head of the household may leave household decisions regarding children's education and education expenditures with the left-behind members of the household. The new decision-makers of the household may have different preferences regarding education thereby affecting education investment, education outcomes or both. This means that migration can affect children's education in the absence of remittances as well as due to the receipt of remittances. Left-behind households that previously did not send their children to school may start sending children to school or those that sent their children to school may increase expenditures on children's schooling in the absence of a migrant member.

Migration prospects have also been noted to change incentives to educate children in migrant sending households. If migration is a way to achieve improved socio-economic status and higher skills are positively associated with the likelihood to migrate, households are encouraged to invest in children's education. On the other hand, if higher skills are not associated with likelihood to migrate, then households' incentives to educate their children are not changed (Boucher et al., 2009). Depending on the perceived relationship between

migration and education, households may be encouraged to send their children to school if they previously did not. This mechanism also implies that migration can affect households' expenditure on the education of their children even in the absence of remittances.

Migration of a household member also causes loss of household labour. While the migrant is away, left-behind members, including children may take up tasks to compensate for this loss of labour by engaging in domestic or waged work (Jingzhong & Lu, 2011; Chang et al., 2011). Children in left-behind households may also be forced to engage in waged work, if households do not receive any remittances but experience a loss of household income due to the absence of a member who was employed prior to migrating (Mendola, 2012). An increased burden of work on children could mean that migration is followed by children dropping out from school.

The effect on children's education in left-behind migrant households is influenced by several factors. These effects are expected to differ for left-behind households and for households with a temporary migrant[1]. Transfer of norms and incentive effects may operate through all types of migration. However, effect of migration due to changes in household decision makers can be expected to be more pronounced when the migrant is away.

The effects can also be different for boys and girls. In contexts where high disparity of education of boys and girls exists, the differential effects of migration on education of boys and girls assumes salience. If migration positively selects on levels of education and level of education of boys is higher than that of girls, boys will be more likely to migrate. Higher probability of migration of boys will incentivise migrant sending households to invest in the education of boys exacerbating education disparity between boys and girls. Boucher et al (2009) have found evidence that villages in Mexico where migration prospects are higher, have an overall higher level of education among the population that they attribute to the incentive effect of migration. On the other hand, migration from areas of educational disparity between girls and boys to areas with low disparity can also lead to a diffusion of

[1] In this paper, a household is considered a left-behind household if a male member of the household had migrated for employment and was away from the household at the time of the survey. A household is considered having a temporary migrant if a male member had migrated for employment during the year preceding the survey but had returned to the household at the time of the survey. These definitions and the categorization of households as "left-behind" household and as household with temporary migrant are detailed in the subsequent sections.

norms of the host areas into the sending areas (Fargues, 2006; 2011). This can lead households to invest in education of girls. The overall effect could be a reduction of disparities between education of boys and girls or an exacerbation of this disparity[2].

Empirical research on the effect of migration and remittances on education of children in the left behind households and within migrant sending communities provides mixed results (Nguyen et al., 2006; Adams, 2011; Ye et al., 2013; Antman, 2018). Studies note that the effect of migration on education of children in left-behind households and within migrant sending communities are different for boys and girls (Mansuri, 2006) and are context specific. Existing empirical work has also not taken into account the impact of migration on gender inequality. So, this paper attempts to fill this gap.

This paper assesses the effects of migration on households' expenditure on education of boys and girls in rural areas of Pakistan. The paper also estimates the effect that the migration has on the gendered distribution of households' expenditure on the education of children by estimating the effect of migration on households' share of expenditure on girls' education (henceforth called Girls' share). An increase in girls' share is assumed to reduce inequality of expenditures between boys and girls. Additionally, the effect of migration on households' expenditure girls' schooling is estimated after tackling selection of households into sending girls to school using the Heckman Selection Model. To summarize, this paper estimates the effect of migration on:

1. Households' expenditure on children's education
2. Households' share of education expenditure spent on education of girls (girls' share)

Household's expenditures on children's schooling have been analysed for two main reasons. Household's expenditures on education can reflect households' attitudes towards children's education net of household incomes. Also, changes in expenditures can be observed in the immediate time-period after migration. Children's schooling outcomes may be affected by factors other than household attitudes and take longer time to change after

[2] It may be noted that not sending girls to school or limiting girls' schooling to primary level are part of gender norms of some societies including that of rural areas of some parts of Pakistan.

migration. Moreover, an interest of this paper is also to observe inequality between boys and girls within households. A change in households' shares spent on the education of boys and girls can point out if migration reduces gender inequality within households. Specifically, by separating the effects on gender equality within households with permanent migrant (left behind households) from the effects for households with a temporary migrant, it can be deciphered if changes in household decision makers in the absence of men from the household can reduce gender inequality in households. Households' share of expenditures spent on the education and clothing of children have been analysed by Antman (2011). The study reports that left behind households spend a higher share of expenditures on girls when there is a migrant away from the household. The study only finds significant effects on clothing expenditures. The author attributes these changes to changes in the decision-making roles of men and women during and after migration.

These effects are estimated for households that have a migrant member who is away (left-behind) and for households who have had a migrant member who has returned to the household. In this way, the various mechanisms through which children are affected by migration of household members are delineated. As noted earlier, incentive effects and changes in perceptions can be expected to operate through both kinds of migration experiences. However, the effects due to changes in household decision makers and due to absence are expected to be more pronounced for left-behind households. For ease of differentiation, these two categories are called households with a permanent migrant (or left-behind household) and households with a temporary migrant. In the context of the dataset, individual migration for employment is predominately undertaken by men, therefore the analysis has explored the effect of men's migration. Although the various channels through which migration can affect children's education are described above, all these potential mechanisms are not explored. For example, if the prospect of migration changes households' incentives to educate their children cannot be deciphered from the analysis. Other channels, for example, absence of a member, changes in decision makers within the household and remittance receipts are explored in detail in this paper.

The paper is organized as follows. Section 2 briefly reviews studies that have estimated the effects of migration and remittances on children's education. Section 3 describes the data

used in the analysis of this paper. Section 4 introduces the proposed estimation strategy; Section 5 presents the results of the empirical analysis and Section 6 discusses these results.

2. Literature Review

Empirical research that has analysed the effect of migration on education of children in the left-behind households and communities has observed different impacts of migration on girls and boys. Kuhn (2006) and Lu (2012) find a positive association of migration of a family member (father or brother) on children's schooling in the context of Bangladesh and Rural China, respectively. Giannelli, & Mangiavacchi (2010), for households in Albania, find that migration of fathers negatively affects left-behind children's schooling and this effect is more pronounced for girls. They suggest that migration of a father leaves household decision making with a male relative in the family who is likely to have conservative attitudes towards girls' education that may be the reason for the strong negative effect on girls.

Negative effect of migration on children's education are also noted by Meyerhoefer & Chen (2011) and Zhou et al. (2014) for China and McKenzie & Rapoport (2011) for Mexico. Cortes (2013) in a study of left-behind children in the Philippines also reports negative effects of migration on children's schooling but these effects have been noted to depend on migration of the father or the mother of the children. Zhou et al (2014) compare health and educational outcomes of left-behind children in migrant households with those in non-migrant households in China and find no difference in the health, nutritional status, and education of these different groups of children.

Estimating the effects of migration on children's outcomes are complicated by endogeneity of migration. This endogeneity arises due to self-selection of migrants and simultaneity of migration decisions with other household decisions. Self-selection of migrants means that migrants and non-migrants as well as migrant and non-migrant households differ in terms of their observed and unobserved characteristics, therefore, a comparison of outcomes of interest for migrant households and non-migrant households leads to biased estimates of the impact of migration. Simultaneity of migration and households' other decisions implies that households decide to send a member away at the same time as taking another decision, for example, sending children to school or increasing investment in children's education and hence a change in the outcome of interest cannot be said to have occurred due to migration. Empirical studies, therefore, are wary of cross-sectional comparisons of migrant and non-migrant households. In the absence of longitudinal data,

studies rely on instrumental variable (IVs) or Propensity Score Matching (PSM) to identify the effects of migration. A few of the above-mentioned studies have tackled endogeneity of migration; Zhou et al (2014) use propensity score matching (PSM), McKenzie & Rapoport (2011) and Cortes (2013) employ IVs and IVs interacted with fixed effects, respectively, and Lu (2012) has used longitudinal data with fixed effects.

Studies have also analysed the impact of remittances on children in remittance recipient households. Calero et al. (2009) find that in Ecuador remittances increase school enrolment among children aged 10-17, and this effect is larger for girls. Acosta (2011) reports that remittances do not significantly affect children's schooling. Alcaraz et al. (2012) report that a reduction in remittances in recipient households, decreases school attendance in Mexico. López-Córdova et al, (2005) finds that remittances reduce child illiteracy and increase schooling for five-year olds but negatively affect enrolment of 7- to 14-year-olds in Mexico. Calero et al. (2009) use Instrumental Variables (IVs) to tackle endogeneity. Acosta (2011) uses Propensity Score Matching and IVs and Alcaraz et al. (2012) employ difference in difference technique along with IVs to tackle endogeneity. Other studies, including Edwards and Ureta (2003), Hanson and Woodruff (2003), Brown et al. (2006), Vogel & Korinek (2012) and Pickbourn (2015), have estimated the effect of remittances on children's education but these studies have not tackled endogeneity of remittances (Adams, 2011; Brown & Jimenez Soto, 2015).

Impact of remittances on education of children in areas of migrant origin has been studied both at the macro level (country level) and at the micro level (household level)[3]. Macro level studies have analysed the effect of remittances on countries' human capital levels[4]. Azizi (2018) finds that tertiary enrolment and private school enrolment are positively affected by remittances. The study suggests that girls receive a larger proportion of households' investments in education in response to the receipt of remittances as girls' enrolment and completion rates are affected more by remittances pointing to the potential of remittances in reducing inequality of education between boys and girls.

[3] Boucher at al. (2009) analyse the effect of migration at the community level that can be considered a meso level analysis.

[4] Given the analysis of this paper is at the micro (household) level, previous macro level studies are not extensively reviewed, only a few latest and methodologically sound studies are mentioned.

The contradictory effects of migration on education of children in the left-behind households found in empirical research perhaps arise, because of the several channels through which children's education can be affected. The net effect depends on the relative strength of these effects. These effects are also dependent on the research context (Ballard, 2005). For example, if remittances ease households' liquidity constraints allowing households to invest in children's education, then this effect will only manifest, if the area in which households receive remittances have access to educational institutions. In regions where households do not have access to schools or institutions of higher education, the relaxation of budget constraints through remittances may not be enough to improve children's education levels. Or, if migration positively selects skilled individuals, migration may encourage education in migrant sending areas (Beine et al., 2011; Di Maria & Lazarova, 2012; Brown & Jimenez-Soto, 2015). However, if skilled individuals are not positively selected into migration, higher education may be discouraged (Boucher et al, 2009).

Continuing this work, this paper estimates the effect of migration of household members and the receipt of remittances on households' expenditures on schooling and education of children. The effect of migration on gendered distribution of household expenditure on children's education is also estimated. This aspect remains underexplored in existing studies particularly in the context of rural areas of Pakistan. This is the main contribution of this paper. Since the paper uses longitudinal data allowing for the inclusion of unit level fixed effects and reducing for endogeneity of migrant selection, the estimates are reliable. Furthermore, the inclusion of year fixed effects controls for unobserved shocks/events that may have caused the change in observed outcomes. Moreover, to delineate the channels through which any observed changes take place, households with a permanent migrant (left-behind households), with a temporary migrant and remittances recipient households have been differentiated.

3. Data and Methodology

The study uses three rounds of the Pakistan Rural Household Panel Survey (IFPRI & IDS, 2012; 2014) to estimate the effect of migration on household education expenditures and girls' share. Additional data from a sub-sample of the PRHSP was collected by the author in the year 2017. This data has been appended to the original panel (henceforth called round 4) [5]. To estimate the effect of migration on household education expenditures and girls' share fixed effect model (FEM) with household and year fixed effects are used. Additionally, the effect of migration on households' expenditure on schooling per girl is also estimated after tackling selection of households into sending girls to school using the Heckman Selection Model.

The PRHPS contains data from 2090 rural households from the provinces of Punjab, Sindh, and Khyber Pakhtunkhwa[6]. The dataset has a wide coverage, even though it is not nationally representative. The total number of rural households in the country is 20 million (GOP, 2017), PRHPS covers 15 million households[7]. Round 4 was limited to households in the PRHPS in Khyber Pakhtunkhwa province and from Attock district of province of Punjab[8] and consists of 300 households. In the three provinces that were surveyed in the PRHPS, Khyber Pakhtunkhwa as chosen for its accessibility and higher rates of migration of men. Secondly, since overall gender inequality in the rural areas of Khyber Pakhtunkhwa[9] is more pronounced than in Punjab, it is worthwhile to assess the potential of migration in the reduction of gender inequality[10].

From each household, a male and a female questionnaire were filled out for all rounds of the PRHSP. A man respondent (the head of the household in most cases) was interviewed

[5] However, it makes the panel unbalanced due to the smaller number of households surveyed in round 4. Therefore, sampling weights from the first round of the survey are used in all estimations. Reliability of estimates is checked by restricting the sample to households included in round 4 wherever possible contingent on the number of useful observations available in the smaller sample.

[6] Province of Baluchistan and some areas in the province of Khyber Pakhtunkhwa were not surveyed due to adverse security situation. The sampling universe of the dataset also excludes the Federally Administered Tribal Areas (FATA).

[7] Data collection methodology can be found in Nazli & Haider (2012).

[8] These districts are Districts Nowshera and Mansehra in Khyber Pakhtunkhwa province and District Attock in Punjab province.

[9] Gender inequality in terms of children's enrolment rates is one aspect of the overall inequality.

[10] These areas were also more accessible to the author as compared to rural areas in Sindh.

for the male questionnaire and a woman respondent was interviewed for the female questionnaire. The woman respondent was the wife of the head of the household in most cases. Information on all members of the household regarding age, marital status, employment, education, migration status etc. were collected.

Information on schooling and education of all children of the household is available. The first dependent variable is households' education expenditures. The following four variants are used: households' annual education expenditure, annual per child education expenditure, girls' share and annual per girl education expenditure. Education expenditures include 1. School fee 2. Expenditures on School books and stationery and 3. Expenditure on School Uniform. Total annual education expenditures incurred by the household are calculated by adding expenditures in the above-mentioned categories for all children of the school age in the household. All children between the ages of 5 and 17 are considered of the school going age. Children of the school age who were not attending school at the time of the survey are considered as having zero expenditures. Total expenditure is divided by the number of children of the school age (5-17) in the household for annual per child education expenditure. Households have reported financial aid received by children for education. The amount of aid received by each child is subtracted from the expenditure incurred by the household on that child to compare households' own expenditures on children's education.

To calculate girls' share, first, expenditures on schooling of all girls aged 5-17 in the household are added. It is then divided by the number of girls aged 5-17 to arrive at household per girl schooling expenditure. The per girl expenditure is divided by the per child expenditure to arrive at the share of education that households spend on girls (girls' share). In this way, girls' share is adjusted for the number of boys and girls in the household. Girls' share and households' education expenditures per child, in both migrant and non-migrant households are shown in Table 1.

Table 1 shows average per child, per girl and per boy education expenditures on households without migrants, households with permanent migrants (left-behind), households with temporary migrants and households that reported receiving remittances during the year preceding the survey. The comparisons shown in the table are restricted to households with both girls and boys of the school age present in the household.

Table 1 Share of Households' Expenditure per Child spent on Girls and Expenditures per Child

	Non-Migrant Household[1]	Migrant Household (P[2])	Migrant Household (T[3])	Remittance Recipient HHs[4]
Average education expenditures per Child	2522*	3332*	3387	3402*
	(1774)	(81)	(22)	(127)
Average per girl expenditure	2734	3257	2905	3367
	(1261)	(61)	(16)	(98)
Average per boy expenditure	3421**	4842**	4441	4417*
	(1639)	(76)	(20)	(119)
Share in Education Expenditures				
Girls share	0.70	0.70	0.81	0.79
	(1728)	(81)	(21)	(127)
Boys share	1.35	1.32	1.16	1.24
	(1728)	(81)	(21)	(127)

1. Households that did not have any permanent or temporary migrants during the year preceding the survey.
2,3. P refers to households with Permanent Migrant (left behind households) and T refers to households with temporary migrant.
4. Households that had permanent or temporary migrants are excluded from this category for analysis, that is only those remittance receiving households are included in this category for comparison that did not have migrants from the two defined categories.
*** p<0.01, ** p<0.05, * p<0.1

The first row of Table 1 shows the average per child education expenditures of households. Households with a permanent migrant (left-behind households) and households that reported receiving remittances have significantly higher average per child education expenditures than households without migrants. There appears to be no statistically significant differences in the average per child expenditures of households with temporary migrants. Table 1 also shows average per girl and per boy expenditures of households. These averages show that girls receive lower expenditures on their education than boys. This is true for non-migrant and migrant households of both types. However, the average per girl expenditures of migrant households (both types) and households that received remittances are higher than the per girl expenditures of non-migrant households (statistically insignificant). The per boy expenditures of households with a permanent migrant and those who received remittances are significantly higher than the per boy expenditures of non-migrant households.

Table 1 also suggests that girls' shares are smaller than boys' share in all types of households. As these shares are calculated by dividing households per girl (boy) education expenditure by the per child expenditure, in a situation of equality, girls' and boys' shares

should be 1. That is, household's expenditure per girl should be equal to household's expenditure per child. That would mean that the girl chid receives what the average child receives, however, the average share for girls is less than 1 and the average share for boys is greater than 1. This shows that on average, households spend less on their girls' education as compared to boys. This girls' share is higher for households with temporary migrants, and households that received remittances, but these differences are not statistically significant.

The number of observations from households with both boys and girls of the school age is 2703. Out of these observations, 636 have missing data on school expenditures because, either all children were out of school or there were zero expenditures on children's schooling. We are left with 2067[11] observations to compare migrant and non-migrant households. The number of observations in second row of Table 1 is different from the number of observations in the first row, as average expenditures are calculated by keeping the observations on children who were out of school as missing. So, the number of observations 1436 (sum of four columns of second row) corresponds to households that had girl children at the time of the survey who were attending school and had positive educational expenditures incurred on their education by the household. The number of observations is different from 1854 (sum of the four columns of the third row) because out of the 2703 observations corresponding to positive number of girls and boys of the school age, a larger number (1436 for girls, 1854 for boys) have positive expenditures on schooling of boys than on girls.

To calculate the shares, however, expenditures on children who were out of school are considered zero, hence shares are compared for all households that had both boys and girls of the school age present in the household and at least some of these children were attending school. So, for a household with girls of the school going age not attending school but boys of the school going age attending school are said to have 0 share for the education of girls. These comparisons are also limited to 2703 observations on households which had both boys and girls aged 5-17 in the household. This leaves us with 2020[12] data points to

[11] Out of these 2703 observations, 670 have zero education expenditure (either all the children are out of school or there were zero out of pocket expenditures incurred by the household) and 13 have missing data Another 9 observations have other variables that are missing

[12] Another 9 observations have other variables missing

compare the shares of girls' and boys' education expenditures in the total education expenditures of the household[13].

The explanatory variable of interest is migration of a member from the household. The dataset reports migration episodes as well as permanent migration of all individuals of the household. A household is considered a left-behind household of a migrant if a member had left the household for employment sometime during the year preceding the survey and was away from the household at the time of the survey[14]. A binary variable that takes a value 1 if a household has a permanent member is used to identify these households. If a member of the household had migrated for work sometime during the year preceding the survey and had been away for 1-5 months but had returned to the household at the time of the survey, the household is considered as a household with temporary migrant. Another binary variable, that takes value 1 if the household has a temporary migrant is used to identify these households. The other explanatory variable of interest is household's receipt of remittances. Households that had received remittances in the year preceding the survey are identified by a binary variable. Households with a migrant member do not perfectly overlap those that report receiving remittances.

Table 2 below shows the number of observations for migrant and non-migrant households in the panel. The percentage of observations out of the total number of observations are reported in the parentheses. The table shows that eight percent of observations correspond to having either a permanent or temporary migrant in the household at the time of the survey. However, it is worth noting that households that received remittances are a different category as those households from where migrants had moved either permanently or temporarily, fewer among these households reported receiving remittances.

[13] The comparisons also excluded overlapping categories to calculate the average for households with permanent migrants. Permanent migrant households that received remittances are excluded.

[14] The controls in the data analysis to identify permanent migrants are: male members, above the age of 11, left the household during the year preceding the survey for employment, were in an urban area outside their own district and had been away for over 6 months or male members who had left the household for employment. Temporary migrant: male member, left for employment, to an urban area outside the district, sometime during the year preceding the survey, had stayed between 1-5 months away, but had returned to the household at the time of the survey.

Table 2 Migrant and Non-Migrant Households

Number of Observations	6262 (100)
Migrant Households	487 (7.8)
-Permanent Migrant	434 (7.0)
-Temporary Migrant	62 (1.0)
Remittance Recipient Households	587 (9.3)
*-Permanent Migrant * Receives Remittance*	197 (3.1)
*- Temporary Migrant * Receives Remittance*	2 (0.03)

Note: The percentage of categories is calculated from the total number of observations across the four rounds of the panel. These percentages are reported in parentheses.

Table 3 shows demographic characteristics of households with and without migrants. Column (1) shows the summary of households with a permanent migrant (left-behind households), column (2) shows the statistics for households with temporary migrant and column (3) shows the summary characteristic of households that received remittances. Table 3 also shows the annual per person income, the annual per child, per girl and per boy education expenditures of the households and the share of expenditures spent on boys and girls.

The average number of adult women in migrant households is more than the average number of women in non-migrant households. This could be because in the rural areas, men are unable to migrate and leave their wives and children behind unless other adult members of family are present in the household. These households are perhaps extended family households with multiple adult women. Interestingly, Table 3 also shows that the average per child expenditures of permanent migrant households is significantly larger than those of non-migrant households. The per boy annual education expenditures of both types of migrant households is significantly larger but the per girl annual education expenditures of these households is not. Girls' share is slightly higher for permanent migrant households, but this difference is not statistically significant. This share, however, is significantly higher for households that received remittances.

Table 3 Summary Statistics by Migrant and Non-Migrant Status

Variable	(1) Migrant (P)	(2) Migrant (T)	(3) Remittance Recipient HHs	(4) Non-Migrant
Household Size	7.1***	7.4**	6.4	6.4*
Men	1.9	2.1**	1.7	1.7
Women	2.1***	1.9	1.8**	1.7***
Children	3.0	3.3	2.8*	3.0*
Girls	1.1	1.1	1.0	1.0
Boys	1.0**	1.6*	1.0	1.1**
Annual Income per Person	36808	28838	64432***	36334
Annual per Child Education Expenditure[1]	4572***	3348	3778*	3098***
Annual per Girl Education Expenditure	3456*	2782	3362	2924*
Annual per Boy Education Expenditure	5498***	4253	4650*	3714***
Share of Boys in Education Expenditure	1.24	1.12	1.17	1.26
Share of Girls in Education Expenditure	0.76	0.81	0.84*	0.75

*** p<0.01, ** p<0.05, * p<0.1

All expenditures are in Pakistan Rupee (PKR)

Households with either a permanent or a temporary migrant are considered as being migrant households.

Note: Men are the number of adult men in the household. Women are the number of adult women in the household. Children are number of members below 18 years of age. Girls are the number of female members of the school age (5-17) and Boys are the number of male members of the school age.

Overlapping households have been excluded from the summary statistics, so for households that had a permanent migrant and received remittances, these households are not included in column (1), nor in column (4)

1. The education expenditures per child shown in Table 1 above compared households with children of both sexes of the school age present in the household. Here, the comparison is made for all households that may have children of either sex of the school age.

In the next part of the analysis, the effect of migration on households' expenditure on schooling per girl in the household is estimated. For this analysis, the sample is restricted to households with girl children; all households without girl children of the school age (5-17) are excluded. The dependent variable is the log of households' expenditure per girl child in the household. In this part, the effect of migration on households per girl child expenditure on education is estimated after tackling selection of households into sending girls to school using the Heckman selection model. The selection variable is the household's distance to girls' primary (Grade 1-5) and secondary school (Grade 6-10). In the dataset, households have reported the distance to school that their children attend. For households that did not send their children to school, the average distance to schools in their village is used. As most schools in rural areas are sex segregated, households' distance to girls' primary and secondary schools are used. Distance to school affects households' decision to enrol their children to

school but is not expected to directly affect the expenditures on the above-mentioned categories of expenditures[15].

Table 4 Children out of School

Percentage Out of School Children (Ages 5-17)	Round 1	Round 2	Round 3	Round 4
Girls %	60	53	53	21
	(2207)	(2138)	(1969)	(230)
Boys %	44	35	39	9
	(2331)	(2217)	(2150)	(251)

The percentage of girls (boys) of school age group who were not attending school out of the total number of girls (boys) of the school age group in the sample in that round. This number of observations is in the parentheses.

Table 4 shows percentage of children who were not attending school of the total number of children of that sex who were of the school age at the time of the survey. These numbers suggest that selection models may be used to assess the effect on households schooling expenditures. Table 5 below shows the percentage of households with permanent and temporary migrants and households without migrants who had children out of school. Row one of Table 5 shows the percentage of households in each of these categories that had children of both sexes of the school going age present in the household but one or more of those children were not attending school. That means that in 2478 households without migrants (from pooled data of four rounds), 64 percent had one or more girl between the ages of 5-17 who was not attending school compared to 52 percent of households with a permanent migrant.

Table 5 Migrant and Non-Migrant Households with Children out of School

Households with Children out of school	Migrant (P)	Migrant (T)	Remittance Recipient HHs	Non-Migrant
Girls	52***	54	49***	64***
	(162)	(37)	(220)	(2541)
Boys	35**	35	33***	47**
	(162)	(37)	(220)	(2541)

Households that have children of either sex of the school age (5-17) present in the house but one or more of them does not attend school
Households that have children of both sexes of the school going age (5-17) present in the household and no boy is out of school but one or more girls of the school age groups is out of school.
Households that have children of both sexes of the school going age (5-17) present in the household and no girl is out of school but one or more boys of the school age groups is out of school.

[15] The dataset reports expenditures on travel to school incurred for each child attending school in the household. In the calculation of both expenditure shares and per child (per girl, per boy) expenditures, travel costs have not been included.

4. Estimation and Identification Strategy

The impact of migration on households' education expenditure is estimated using the following equation:

$$LnEduexp_{i,t} = \alpha_1 Permanentmigrant_{i,t} + \alpha_2 TemporaryMigrant_{i,t} + \alpha_3 Remittance_{i,t} + \alpha_4 X_{i,t} + \omega_i + \Phi_t + \epsilon_{i,t} \quad \text{.....Equation (1)}$$

Where, $LnEduexp_{i,t}$ is the log of household's annual education expenditure or annual per child education expenditure. $PermanentMigrant_{i,t}$ is a binary variable that takes value 1, if, household i, at time period t, had a member who had migrated and was away from the household. $TemporaryMigrant_{i,t}$ is a binary variable that takes value 1, if household i, at time period t had a member who had migrated in time period t but had returned to the household. $Remittance_{i,t}$ is a binary variable that takes value 1 if household i received remittances at time period t. $X_{i,t}$ is a vector of household i's characteristics in time period t, including household size, household income per person[16], the ratio of girls to boys of the school age (5-17), household income quintile in the sample and the share of women's income in total income of the household. ω_i are the household's fixed effects and Φ_t are the year fixed effects. $\epsilon_{i,t}$ is the error term. To estimate the effect of migration on girls' share. The following equation is estimated.

$$GirlsShare_{i,t} = \beta_1 Permanentmigrant_{i,t} + \beta_2 TemporaryMigrant_{i,t} + \beta_3 Remittance_{i,t} + \beta_4 X_{i,t} + \omega_i + \Phi_t + \epsilon_{i,t} \quad \text{.....Equation (2)}$$

Where, $GirlsShare_{i,t}$ is girls' share (share of household i's expenditure on schooling and education of girl children). $PermanentMigrant_{i,t}$ is a binary variable that takes value 1, if, household i, at time period t, had a member who had migrated and was away from the household. $TemporaryMigrant_{i,t}$ is a binary variable that takes value 1, if household i, at time period t had a member who had migrated in time period t but had returned to the household. $Remittance_{i,t}$ is a binary variable that takes value 1 if household i reported receiving

[16] Household income is estimates are used to indicate households' economic status instead of household expenditures as data on household expenditures (except for that on children's schooling) are not available for round 4 of the survey. Incomes of all members, from all reported sources, of the household are added to arrive at the total household income. The total earned income is divided by the number of household members for per person income of the household. Income sources include, primary and secondary employment, income from agriculture (farming and animals), rents, remittances, and social protection programs.

remittances at time period t. $X_{i,t}$ is a vector of household i's characteristics in time period t, including household size, household income per person, the ratio of girls to boys of the school age (5-17), household income quintile in the sample and the share of women's income in total income of the household.

To estimate the effect of migration on households per girl expenditure after tackling of selection of households into sending their girl children to school, the following Heckman Selection Model is estimated.

$$LnGirlsExp*_i = \gamma_0 + \gamma_1 Permanentmigrant_i + \gamma_2 TemporaryMigrant_i + \gamma_3 Remittance_i + \gamma_4 X_i + \omega_i + \Phi_t + \epsilon_i$$ .....Equation (3)

The dependent variable, $LnGirlsExp*_i$, is the log of households' expenditure per girl child in household i. The variables, $Permanentmigrant_i$, $TemporaryMigrant_i$ and $Remittance_i$ are constructed as for equations 1 and 2. X_i is a vector of household i's characteristics at time period t including household size, log of households' per person income and households' income quintile in the sample. The Heckman Selection equation takes the following form:

$$ChildSchool_i = \rho_1 X_i + \rho_3 SchoolDistance_i + \rho_3 Permanentmigrant_i + \rho_3 TemporaryMigrant_i + \rho_3 Remittance_i + \varepsilon_i$$ ..... Equation (4)

$$ChildSchool = \begin{cases} ChildSchool = 1, \ if \ \rho_1 X_i + \rho_3 SchoolDistance_i + \rho_3 Permanentmigrant_i + \rho_3 TemporaryMigrant_i + \rho_3 Remittance_i > 0 \\ ChildSchool = 0, \ if \ \rho_1 X_i + \rho_3 SchoolDistance_i + \rho_3 Permanentmigrant_i + \rho_3 TemporaryMigrant_i + \rho_3 Remittance_i \leq 0 \end{cases}$$

$$LnGirlsExp_i = LnGirlsExp*_i \ if \ ChildSchool_i = 1$$

Where $ChildSchool_i$ is 0 if household i at time period has girl children of the school age but were not attending school. $ChildSchool_i$ takes value 1 if household had girl children of the school age at time period t who were attending school. However, $ChildSchool_{i,}$ is takes value 1 even if some of the girl children in household i were not attending school. The variable takes value 0 only when all girl children in household i were out of school. In this scenario, household i's expenditure on the education of girl children is zero (missing). The Heckman Selection model is estimated using pooled data.

5. Results

Households' Education Expenditures

Table 6 shows the results of estimation of equation 1. The dependent variable is the log of household's annual expenditure per child (Columns 1, 3 and 5) and log of household's total annual education expenditure (Columns 2, 4 and 6). The coefficients have been estimated after controlling for household fixed effects and year fixed effects. The estimates are controlled for household characteristics that may influence household's expenditure on education of children including log of household annual income per person, household size or the number of household members, number of children in the household, ratio of girls to boys of the school age and household income quintile. In Columns 1 and 2, all three explanatory variables of interest, that is, a binary variable indicating if the household has a permanent migrant, a binary variable indicating if household has a temporary migrant and a binary variable indicating if household receives remittances, have been included. In columns 3 and 4, the binary variable indicating if the household receives remittances is removed to ensure there is no multicollinearity between household's migrant status and receipt of remittances. Similarly, in columns 5 and 6, the two variables indicating the if the household has migrant members is taken out. Sampling weights from round 1 are incorporated in all estimations. Robust standard errors are estimated. The results suggest, shown in Table 6, that there are no statistically significant effects on the education expenditures per child of households due to migration, either temporary or permanent. Nor do there appear any statistically significant effects of migration on the total education expenditures of the households. However, significant positive effect of remittances on children's education expenditures, both total and per child, are observed for households that receive remittances.

The coefficient of the binary variable indicating the households' receipt of remittances is between 0.44-0.48, that means that for households that receive remittances the average total annual education expenditures is 44 to 48 percent higher than the average expenditures of households that do not receive remittances.

Table 6 Dependent Variable Log of Household Education Expenditure per Child and Log of Household Education Expenditure (Full Panel)

VARIABLES	(1) Log Edu Exp/Child	(2) Log Edu Exp	(3) Log Edu Exp/Child	(4) Log Edu Exp	(5) Log Edu Exp/Child	(6) Log Edu Exp
Household has Permanent Migrant	-0.212	-0.282	-0.104	-0.173		
	(0.248)	(0.265)	(0.242)	(0.259)		
	(0.271)	(0.290)	(0.265)	(0.284)		
Household has a Temporary Migrant	0.0851	0.148	0.147	0.210		
	(0.173)	(0.193)	(0.171)	(0.189)		
	(0.282)	(0.311)	(0.281)	(0.311)		
Household Receives Remittances	0.483***	0.487***			0.450***	0.444**
	(0.170)	(0.185)			(0.166)	(0.181)
	(0.233)	(0.252)			(0.225)	(0.246)
Observations	4,655	4,655	4,655	4,655	4,655	4,655
R-squared	0.034	0.044	0.031	0.042	0.034	0.044
Number of hid	1,717	1,717	1,717	1,717	1,717	1,717
Household FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Household Controls	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Control Variables: Log of Household Annual Income per person, Household Size, Number of Children in the Household, Ratio of Girls to Boys, Household Income Quintile.

As data from round 4 has been gathered only from a sub-sample of the panel, equation (1) is re-estimated after restricting the sample to a balanced panel of the households included in round 4 of the survey. The results are shown in Table 7 below. The results echo the results from the full panel in terms of significance of the explanatory variables. Migrant households, both those having a permanent migrant and those with temporary migrants do not spend significantly different amounts on children's education. The binary variable indicating if the household receives remittances is significant and positive with the estimated coefficient between 0.66-0.71, that means that on average households that receive remittances have 66 to 71 percent higher expenditures on children's education than average.

The results from estimation of equation (1) indicate that households that receive remittances have higher total education expenditures and higher per child education expenditures. This is indicated by a positive and significant estimated coefficient of the dummy variable that takes value 1 if the household where the child belongs received remittances during the survey year. The sign and significance of the variable indicating households' receipt of remittances is robust to the inclusion and exclusion of the dummy variables indicating if the household had a temporary or a permanent migrant. The estimated coefficients are large, the per child expenditures of households that receive remittances are

between 70-73 percent higher (Columns 1 and 5 of Table 7). The complete estimated equations shown in Table 6 and Table 7 are provided in the appendix (Appendix Table 1 and Appendix Table 2).

Table 7 Dependent Variable Log of Household Education Expenditure per Child and Log of Household Education Expenditure (Balanced Panel)

VARIABLES	(1) Log Edu Exp/Child	(2) Log Edu Exp	(3) Log Edu Exp/Child	(4) Log Edu Exp	(5) Log Edu Exp/Child	(6) Log Edu Exp
Household has Permanent	-0.0137	-0.129	0.152	0.0484		
Migrant	(0.245)	(0.272)	(0.233)	(0.256)		
	(0.245)	(0.264)	(0.235)	(0.258)		
Household has a Temporary	-0.0314	0.0517	0.153	0.249		
Migrant	(0.286)	(0.317)	(0.262)	(0.290)		
	(0.446)	(0.490)	(0.456)	(0.503)		
Household Receives Remittances	0.673**	0.719**			0.669**	0.697**
	(0.278)	(0.306)			(0.262)	(0.289)
	(0.245)	(0.262)			(0.234)	(0.251)
Observations	891	891	891	891	891	891
R-squared	0.037	0.066	0.020	0.050	0.037	0.066
Number of hid	288	288	288	288	288	288
Household FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Household Controls	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Control Variables: Log of Household Annual Income per person, Household Size, Number of Children in the Household, Ratio of Girls to Boys, Household Income Quintile.

The estimates of households' income include remittance income. Therefore, households per person income and the binary variable indicating if the household receives any remittances may be collinear. When equation (1) is estimated after excluding remittance income from income estimates and added as a separate explanatory variable, a significant positive effect of remittances on children's education expenditure is observed. The results are shown in Appendix Table 3.

Share of Household Expenditure on Girls' Education

Table 8 shows the results of estimation of equation 2. Estimates have been controlled for household and year fixed effects. Column (1) shows the effects of three explanatory variables of interest on the dependent variable, column (2) shows the estimates after including household characteristics that are expected to affect girls' shares in education expenditures as control variables. In column (3) the dummy variable indicating if the household receives remittances is removed and in column (4) the dummy variables indicating

if the household has a permanent or temporary migrant are removed. Full set of control variables is included in estimations reported in columns (2), (3) and (4). These include log of household annual income per person, number of children in the household, ratio of girls to boys of the school going age in the household, share of women's income in household total income and ratio of adult women to men in the household. Sampling weights are incorporated in the estimation and robust standard errors are estimated. The sample is restricted to households with both girls and boys of the school age (5-17) present in the household at the time of the survey. Moreover, households with only girl children and those with zero education expenditures are excluded. The sample, therefore, is of households that had children of both sexes present in the household at the time of the survey and had positive expenditures on children's education even if some of the children had zero expenditures being incurred either because they were out of school or because the household had zero out of pocket expenditures on their education.

Table 8 Dependent Variable: Share of Girls in Households' Expenditure on Schooling and Education of All Children of the School Age (Ages 5-17), Full Panel

VARIABLES	(1) Girls' Share in Edu Exp	(2) Girls' Share in Edu Exp	(3) Girls' Share in Edu Exp	(4) Girls' Share in Edu Exp
Household has Permanent Migrant (Left Behind HH)	0.156*	0.133*	0.149**	
	(0.0797)	(0.0790)	(0.0754)	
Household has a Temporary Migrant	0.140	0.160	0.176	
	(0.119)	(0.114)	(0.113)	
Household Receives Remittances	0.0905	0.0939		0.116
	(0.152)	(0.155)		(0.153)
Constant	0.622***	0.592***	0.566***	0.604***
	(0.0604)	(0.194)	(0.185)	(0.192)
Observations	2,020	2,020	2,020	2,020
R-squared	0.027	0.042	0.040	0.037
Number of hid	882	882	882	882
Year FE	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes
Income Quintile	Yes	Yes	Yes	Yes
Household Controls	No	Yes	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Control variables: Log of household income per person, number of children in household, ratio of girls to boys of the school going age, share of women's income in household income, ratio of adult women to men in the household.

The results shown in Table 8 suggest that households with a permanent migrant, that is left-behind households, have significantly higher shares of their education expenditures spent on education of girls. The coefficient of the binary variable indicating if a household has a migrant member is positive and statistically significant. The estimated coefficient is 0.13-

0.15, that is households with a permanent migrant have share of expenditure that are 0.13-0.15 higher than households that do not have a migrant. The average of households' shares of education expenditures spent on the schooling of girls is 0.71. That means that households with a permanent migrant have around 18-21 percent higher shares for the education of girl children. It should be noted that the effect of the binary variable indicating if the household receives remittances is not statistically significant.

Table 9 Dependent Variable: Share of Girls in Households' Expenditure on Schooling and Education of All Children of the School Age (Ages 5-17), Balanced Panel

VARIABLES	(1) Girls' Share in Edu Exp	(2) Girls' Share in Edu Exp	(3) Girls' Share in Edu Exp	(4) Girls' Share in Edu Exp
Household has Permanent Migrant (Left behind HH)	0.270***	0.239**	0.206**	
	(0.0957)	(0.109)	(0.100)	
Household has a Temporary Migrant	0.198	0.205	0.176	
	(0.153)	(0.149)	(0.143)	
Household Receives Remittances	-0.107	-0.118		-0.0501
	(0.0940)	(0.0944)		(0.0895)
Observations	430	430	430	430
R-squared	0.101	0.127	0.121	0.101
Number of hid	164	164	164	164
Year FE	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes
Income Quintile	Yes	Yes	Yes	Yes
Household Controls	No	Yes	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Control variables: Log of household income per person, household size, ratio of girls to boys of the school going age, share of women's income in household income, dummy variable indicating if the household has only girl children in the school going age group.

The results reported in Table 8 are based on full panel. Table 9 reports the result of estimation of equation (2) based on panel of the households included in round 4. The results corroborate the results presented in the earlier. The number of observations is low as the sample is again restricted to households with both girls and boys of the school age (5-17) present in the household and to households that had positive expenditures on children's schooling. The estimated coefficient of the variable indicating if the household was a left behind household is positive and significant and the magnitude greater than the coefficient estimated for the full sample. The average share spent on girls in this smaller sample is 0.75, the estimated coefficient of the variable indicating a left-behind household is 0.20 meaning that for left behind households, the share of education expenditures spent girls increase by

as much as 26 percent. The complete estimated equations shown in Table 8 and Table 9 are provided in the appendix (Appendix Table 4 and Table 5).

As mentioned earlier, there are children of the school age not attending school in the dataset. To calculate the share of households' education expenditures spent on the education of girls, children not attending school have been assumed to have zero expenditures incurred on their education by the household. It can be said then that the underlying assumption is that the decisions to enrol children in school or increase investment in children's schooling are driven by similar underlying processes. A change in expenditure on children's education because children previously not enrolled in school are now enrolled is treated same as a change in children's education expenditures because children are provided more books or stationery or enrolled in better quality schools. If, however, these decisions are treated as distinct and changes in household shares of expenditures are only gauged for households that send their children to school, that is, have positive expenditures on their schooling (while keeping the observations for expenditure missing for children out of school), the following estimates are obtained (Table 10).

Table 10 Dependent Variable: Share of Girls in Households' Expenditure on Schooling and Education of All Children of the School Age (Ages 5-17)

VARIABLES	(1) Girls' Share in Edu Exp	(2) Girls' Share in Edu Exp	(3) Girls' Share in Edu Exp	(4) Girls' Share in Edu Exp
Household has Migrant Member	0.112*	0.112*	0.126**	
	(0.0637)	(0.0648)	(0.0617)	
Household has a Temporary Migrant	0.0572	0.0810	0.0933*	
	(0.0548)	(0.0541)	(0.0530)	
Household Receives Remittances	0.0649	0.0649		0.0825
	(0.0957)	(0.0981)		(0.0960)
Observations	1,465	1,465	1,465	1,465
R-squared	0.047	0.070	0.066	0.061
Number of hid	671	671	671	671
Year FE	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes
Income Quintile	Yes	Yes	Yes	Yes
Household Controls	No	Yes	Yes	Yes

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Control variables: Log of household income per person, household size, ratio of girls to boys of the school going age, share of women's income in household income, dummy variable indicating if the household has only girl children in the school going age group.

The sample is limited to households that had both boys and girls of the school age present in the household and households had positive expenditures on the education of both boys and girls[17]. Estimates are controlled for household and year fixed effects. Control variables include, Log of household income per person, household size, ratio of girls to boys of the school going age, share of women's income in household income, dummy variable indicating if the household has only girl children in the school going age group. The results echo the results provided earlier, left behind households from where a male member had migrated and was away from the household have significantly higher shares of their education expenditures spent on the education of girl children.

Mechanism Check

The above results indicate that households' share of education expenditures spent on girls increase in households from where a male member migrates for employment reducing gender inequality in terms of education expenditures. This could be because when men migrate for employment, household decisions, including household expenditure decisions, are taken by women in the left-behind household. However, it may also be that migration leads to a transfer of gender egalitarian norms to the migrant households that lead households to treat boys and girls more equally. To delineate the mechanism through which girls' share increase, permanent migrants are separated into two categories based on migrant destination. Households from where men migrate to countries outside Pakistan (international migrants) and households from where men migrate to destinations inside Pakistan (internal migrants). Data limitations do not allow such a disaggregation of temporary migrants into international and internal migrants. Therefore, only left-behind households (households with a permanent migrant) are disaggregated into international and internal migrants. The transfer of norms mechanism is expected to come into play via international migration as international migrants may be more exposed to gender egalitarian ways of living. However, for international migrants from Pakistan, majority's destination is the countries of the Gulf where gender norms remain conservative. Hence, the effect of international migration on gender equality in the left behind household in rural Pakistan may be positive if gender egalitarian

[17] That is, girls' share in households' education expenditures are therefore missing either because no child in the household was attending school or because no girls in the household were attending school.

norms are transferred or the effects could be negative if gender conservative norms are transferred. The results are shown in columns (1) and (2) of Table 11 below. The results suggest that left-behind households with internal migrants have significantly higher girls' share, the category of permanent migrants appears to have been driven by these households and not by left-behind households of international migrants. The effect of having an international migrant is insignificant but negative suggesting perhaps that the transfer of norms mechanism if present may be weak. However, if changes of the role of women in left behind households is the mechanism at play, why do left-behind households of international migrants not increase these shares? It may be that in left-behind households of international migrants the decision-making role of women is lower than the role of women in left-behind households of internal migrants. This is expected because international migrants emigrate farther and are more restricted to come back easily in time of need, they are more likely to leave women and children under the supervision of another male relative who in turn is responsible for household decision making.

Table 11 Dependent Variable: Share of Girls in Households' Expenditure on Schooling and Education of All Children of the School Age (Ages 5-17)

VARIABLES	(1) Girls' Share in Edu Exp	(2) Girls' Share in Edu Exp	(3) Girls' Share in Edu Exp	(4) Girls' Share in Edu Exp
Left Behind HH of Internal Migrant	0.223**	0.223**	0.211**	0.217**
	(0.0962)	(0.0963)	(0.0947)	(0.0950)
Left Behind HH of International Migrant	-0.0108	-0.0119	-0.0452	-0.0490
	(0.102)	(0.101)	(0.123)	(0.121)
Household has a Male Return Migrant			-0.168	-0.172
			(0.140)	(0.139)
Household Receives Remittances				0.105
				(0.157)
Household has a Temporary Migrant				0.175
				(0.114)
Observations	2,020	2,020	2,020	2,020
R-squared	0.040	0.041	0.044	0.046
Number of hid	882	882	882	882
Year FE	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes
Income Quintile	Yes	Yes	Yes	Yes
Household Controls	Yes	Yes	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Control variables: Log of household income per person, household size, ratio of girls to boys of the school going age, share of women's income in household income, dummy variable indicating if the household has only girl children in the school going age group.

It can also be argued that if the observed changes in girls' shares is due to increased role of women in household decisions in the absence of migrants, it may be that these roles are reversed upon migrants' return. We may then observe a decrease in girls' shares. To assess if return of permanent migrants affects the girls' shares, a category of male return migrants is included in the estimation of equation (2). The category identified includes male migrants who had emigrated from the village before the start of the survey and hence were not counted as household members. However, in between the four rounds of the survey, these men had returned to their households and had settled back. These members are different from the permanent and temporary migrants identified earlier as they had migrated some time before the beginning of the survey unlike those in the other categories who had migrated some time during the year preceding the survey. These members had re-joined the households as members during the survey time period and were reported by households as having settled back in the household. This differentiates them from permanent and temporary migrants identified earlier; permanent migrants had left the households and were away at the time of the survey while temporary migrants had returned to the household, after being only away for between 1-5 months during the year preceding the survey. These temporary migrants may migrate again for work.

The results of the estimation of equation (2) with an added category of return male migrants included are presented in column (3) of Table 11 above. The estimated coefficient of the binary variable that takes value one if the household has a male return migrant is negative although its statistically insignificant in Table 11. The negative sign may be indicative that returning male members reverse the decision-making roles of men and women in the households, but the effect is not strong. The negative sign also indicates that a transfer of gender egalitarian norms mechanism is not at play.

Table 12 Dependent Variable: Share of Girls in Households' Expenditure on Schooling and Education of All Children of the School Age (Ages 5-17)

VARIABLES	(1) Girls' Share in Edu Exp	(2) Girls' Share in Edu Exp	(3) Girls' Share in Edu Exp	(4) Girls' Share in Edu Exp	(5) Girls' Share in Edu Exp
Left Behind HH of Internal Migrant	0.223**	0.224**	0.224**	0.212**	0.218**
	(0.0962)	(0.0964)	(0.0964)	(0.0948)	(0.0951)
Left Behind HH of International Migrant	-0.0108	-0.00319	0.00866	-0.0244	-0.0281
	(0.102)	(0.0969)	(0.0972)	(0.119)	(0.118)
Household has a Male Return Migrant (inside Pakistan)			-0.195	-0.206	-0.210
			(0.139)	(0.144)	(0.143)
Household has a Male Return Migrant (outside Pakistan)			0.260	0.261	0.256
			(0.238)	(0.300)	(0.294)
Household Receives Remittances				0.112	0.106
				(0.157)	(0.157)
Household has a Temporary Migrant					0.174
					(0.114)
Observations	2,020	2,020	2,020	2,020	2,020
R-squared	0.040	0.042	0.042	0.045	0.047
Number of hid	882	882	882	882	882
Year FE	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes	Yes
Income Quintile	Yes	Yes	Yes	Yes	Yes
Household Controls	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Control variables: Log of household income per person, household size, ratio of girls to boys of the school going age, share of women's income in household income, dummy variable indicating if the household has only girl children in the school going age group.

In an attempt to further delineate these mechanisms, the category of male return migrants is also disaggregated into international returnees and returnees from within Pakistan. However, for the sample of households for which the equation (2) has been estimated, there are only 3 households with international return migrants. Equation (2) is still estimated with these categories. The results are provided in Table 12 above. The binary variable indicating if household is a left-behind household of an internal migrant is significant, positive and robust to the inclusion of the additional variables. The coefficient of the variable that indicates if the household had an international returnee is positive (though insignificant) suggesting that there may be some transfer of gender egalitarian norms effect which is not strong. Looking at all these results together, we may infer that left behind households from where a male member migrates for employment, the share of households' education expenditures spent on girls increase due to the increased role of women in household decisions including decisions regarding expenditures.

Education Expenditure per Girl Child and Selection

Table 13 reports results of estimation of equation (3) and (4). Estimates are based on pooled data from the four rounds. Estimates are controlled for village fixed effects and year fixed effects. The sample is restricted to households with school aged girl children present in the household restricting it to 3638 observations. Out of these observations, there are 1646 observations where households have girls of the school age present in the household but were not attending school (that is, all girls of the school age in the household at the time period were out of school). Hence the annual per girl education expenditure for these households is missing and these households are not selected into the sample of households that have positive expenditures on girls schooling. It is important to note that for the households where expenditure on girls' education is positive still may have some girls who were out of school. The households with missing expenditure on girls' education are those where no girl of the school age was attending school.

Control variables included in both the equations are log of household's annual income per person, the ratio of school aged girls to boys in the household, total number of children in the household, the ratio of adult women to men in the household, education of the head of the household, sex of the head of the household, a binary variable indicating if the household has only girl children and a binary variable indicating if the household is an extended/joint family household. The selection equation includes all explanatory variables including the three binary variables indicating if the household has 1. permanent migrant 2. temporary migrant 3. receives remittances. A binary variable that identifies if a household has a male return migrant is also included in both the equations. The selection equation further includes households' distance to girls' primary and secondary schools. For households that did not send girls to school, the village average distance of households to girls' primary and secondary schools is used. The selection equation does not have village level fixed effects, year fixed effects are included. In column 2 of Table 13 the binary variable indicating if the household received remittances is removed to ensure that there is no collinearity between having a migrant and receiving remittances. Similarly, in column 3 of Table 13 the two binary variables indicating if the household had a migrant are taken out.

Table 13 Dependent Variable Log of Expenditure on Girls' Education

VARIABLES	(1) Log of Annual per Girl Exp	(2) Log of Annual per Girl Exp	(3) Log of Annual per Girl Exp
Household has Permanent Migrant	0.0970 (0.124)	0.117 (0.125)	-
Household has a Temporary Migrant	0.267 (0.206)	0.264 (0.206)	-
Household Receives Remittances	0.104 (0.0906)	-	0.132 (0.0916)
Household has a Male Return Migrant	-0.205 (0.176)	-0.197 (0.176)	-0.195 (0.174)
Selection Equation			
Distance to Girls' Primary School	-0.0731*** (0.0141)	-0.0723*** (0.0140)	-0.0731*** (0.0141)
Distance to Girls' Secondary School	-0.0118* (0.00649)	-0.0121* (0.00667)	-0.0119* (0.00653)
Household has Permanent Migrant	-0.0162 (0.125)	0.0794 (0.120)	-
Household has a Temporary Migrant	0.180 (0.232)	0.226 (0.240)	-
Household Receives Remittances	0.352*** (0.0979)	-	0.353*** (0.0934)
Household has a Male Return Migrant	-0.385** (0.161)	-0.342** (0.164)	-0.380** (0.159)
athrho	0.902*** (0.109)	0.854*** (0.138)	0.894*** (0.106)
lnsigma	0.128*** (0.0463)	0.115** (0.0533)	0.127*** (0.0456)
Observations	3,496	3,496	3,496
Village FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Household Income Quintile	Yes	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Control Variables: Log of household's annual income per person, ratio of school aged girls to boys in the household, number of children in the household, ratio of adult women to men in the household, education of the head of the household, sex of the head of the household, binary variable indicating if a girl-only household, binary variable indicating if an extended/joint family household
Selection equation: Log of household's annual income per person, ratio of school aged girls to boys in the household, number of children in the household, ratio of adult women to men in the household, education of the head of the household, sex of the head of the household, binary variable indicating if a girl-only household, binary variable indicating if an extended/joint family household

The results indicate that greater distance to girls' schools make it less likely that girls are sent to school. The results are in line with literature in Pakistan's context that greater distance to school reduces the likelihood that girls are sent to school (Lodhi, 2012). Among the three explanatory variables of interest, it appears that remittances increase the likelihood that girl children are sent to school. This is implied by a significant and positive estimated coefficient of the variable that indicates if the household received any remittances in the selection equation. The estimated coefficient is robust to the inclusion and exclusion of the variable indicating if the household had temporary or permanent migrants. It also appears

that having a male return migrant makes it less likely that girls are enrolled in school. All three explanatory variables of interest appear to not significantly affect the per girl child annual expenditure of these households.

Table 14 Dependent Variable Log of Expenditure on Girls' Education

VARIABLES	(1) Log of Annual per Girl Exp	(2) Log of Annual per Girl Exp	(3) Log of Annual per Girl Exp
Household has Permanent Migrant	0.284* (0.162)	0.309* (0.163)	
Household has a Temporary Migrant	0.285 (0.222)	0.293 (0.214)	
Household Receives Remittances	0.185 (0.113)		0.251** (0.115)
Household has a Male Return Migrant	-0.291 (0.241)	-0.248 (0.235)	-0.283 (0.239)
Selection Equation			
Distance to Girls' Primary School	-0.102*** (0.0180)	-0.101*** (0.0189)	-0.102*** (0.0181)
Distance to Girls' Secondary School	-0.0155** (0.00694)	-0.0158** (0.00724)	-0.0154** (0.00695)
Household has Permanent Migrant	0.153 (0.158)	0.258* (0.152)	
Household has a Temporary Migrant	0.148 (0.238)	0.196 (0.248)	
Household Receives Remittances	0.315*** (0.117)		0.347*** (0.112)
Household has a Male Return Migrant	-0.545*** (0.188)	-0.534*** (0.191)	-0.531*** (0.185)
athrho	0.967*** (0.134)	0.802*** (0.199)	0.962*** (0.129)
lnsigma	0.136** (0.0570)	0.0889 (0.0723)	0.136** (0.0560)
Observations	2,606	2,606	2,606
Village FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Household Income Quintile	Yes	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Control Variables: Log of household's annual income per person, ratio of school aged girls to boys in the household, number of children in the household, ratio of adult women to men in the household, education of the head of the household, sex of the head of the household, binary variable indicating if a girl-only household, binary variable indicating if an extended/joint family household
Selection equation: Log of household's annual income per person, ratio of school aged girls to boys in the household, number of children in the household, ratio of adult women to men in the household, education of the head of the household, sex of the head of the household, binary variable indicating if a girl-only household, binary variable indicating if an extended/joint family household

However, restricting the sample to households with both boys and girls of the school age, as done for comparisons of shares of education expenditures, results in significantly

positive estimated coefficient of the variable indicating if the household was a left behind household. The results are shown in Table 14 above. The results indicate that greater distance to school discourage households from sending children to school. Unlike the estimates for girls' shares, variables indicating if the household receives remittances and if the household has a permanent male migrant are both significant in different specifications. It could mean that since remittances have been shown to increase households' overall expenditures, these translate into higher per girl expenditures as well. While the shares were being tilted in favour of girls in households with permanent migrants, that effect may be captured by the variable here.

4. Discussion

This paper has estimated the effects of migration on education expenditures and its gendered distribution in left-behind migrant households. The paper disaggregates the effects of migration from the effect of households' receipt of remittances. The analysis has also differentiated between left-behind households (households with a permanent migrant) from households with a temporary migrant to delineate the mechanisms through which expenditures may be affected.

The analysis does not find evidence that left-behind households and households with temporary migrants have significantly different expenditures on their children's education. The hypothesis that migrant households have same education expenditures; the annual total education expenditures and the annual per child education expenditures; as non-migrant households was not rejected at 10 percent significance. There is, however, robust evidence that households that receive remittances increase the expenditures on children's education. Results indicate that households that receive remittances have up to 40-48 percent higher expenditures on children's education.

Absence of men from the rural households due to their migration for employment, however, seems to have significantly positive effect on the shares of households' education expenditures spent on the education of girls. Rural households with both girl and boy children of the school age have significantly higher shares of their education expenditures spent on the education of girls. It appears that in the absence of an increase in overall expenditures on children's education, gender inequality in expenditures reduces in left-behind households. Estimates suggest that these shares are by 18-26 percent higher in households from where men have migrated than the average households. Analysis with disaggregated categories that has attempted to delineate the mechanism behind this effect point towards women's role in household decisions in the absence of men.

Considering the large number of out-of-school children, particularly girls, in the rural households, a Heckman Selection Model has been estimated to assess the effects of migration and remittances on households' expenditures on girls' education after tackling selection of households into sending children to school. Estimates from this selection model suggest that

left behind households with girls and boys of school age positively correlate with higher per girl education expenditures.

There are obvious limitations of the study. First, the explanatory variables are constructed as binary variables that confounds more information that may be useful for the analysis. For example, the amount of remittances that a household receives or the length of absence of male members can provide more insights into the channels identified in this research. Similarly, it is implied that women's changed role due to the absence of male members may be a mechanism to improve households' girls' shares. Although the dataset used in this study has information on women's role in household decisions, it is not available for all four rounds. The fixed effects model used in the analysis reduces endogeneity of migration arising due to time-invariant factors. The model can neither take into account nor adequately tackle simultaneity of decision making. The Heckman Selection Model, moreover, does not adequately tackle endogeneity of migration and the results can only be treated as correlative rather than causative.

References

Acosta, P. (2011). School attendance, child labour, and remittances from international migration in El Salvador. *Journal of Development Studies*, 47(6), 913-936.

Adams Jr, R. H. (2011). Evaluating the economic impact of international remittances on developing countries using household surveys: A literature review. *Journal of Development Studies*, *47*(6), 809-828.

Alcaraz, C., Chiquiar, D., & Salcedo, A. (2012). Remittances, schooling, and child labor in Mexico. *Journal of Development Economics*, 97(1), 156-165.

Antman, F. M. (2011). International migration and gender discrimination among children left behind. *American Economic Review*, 101(3), 645-49.

Antman, F. M. (2015). Gender discrimination in the allocation of migrant household resources. *Journal of Population Economics*, *28*(3), 565-592.

Antman, F.M. (2018): Women and Migration, *IZA Discussion Papers, No. 11282*, Institute of Labor Economics (IZA), Bonn

Azizi, S. (2018). The impacts of workers' remittances on human capital and labor supply in developing countries. *Economic Modelling*, *75*, 377-396.

Ballard, R. (2005). Remittances and economic development in India and Pakistan. *Remittances: Development Impact and Future Prospects*, 103-18.

Beine, M., Docquier, F., & Oden-Defoort, C. (2011). A panel data analysis of the brain gain. *World Development*, 39(4), 523-532.

Bodvarsson, Ö.B., Simpson, N.B., & Sparber, C. (2015). Migration theory. In *Handbook of the economics of international migration* (Vol. 1, pp. 3-51). North-Holland.

Boucher, S., Stark, O., & Taylor, J.E. (2009). A gain with a drain? Evidence from rural Mexico on the new economics of the brain drain. In *Corruption, development and institutional design* (pp. 100-119). Palgrave Macmillan, London.

Brown, R.P., & Jimenez-Soto, E. (2015). Migration and remittances. In *Handbook of the economics of international migration* (Vol. 1, pp. 1077-1140). North-Holland.

Brown, R.P., Connell, J., Jimenez Soto, E.V., & Leeves, G.D. (2006). Cents and Sensibility: The Economic Benefits of Remittances, in At Home and Away. World Bank, chapter (3) pp 47-99.

Calero, C., Bedi, A. S., & Sparrow, R. (2009). Remittances, liquidity constraints and human capital investments in Ecuador. *World Development*, *37*(6), 1143-1154.

Chang, H., Dong, X.Y., & MacPhail, F. (2011). Labor migration and time use patterns of the left-behind children and elderly in rural China. *World Development*, *39*(12), 2199-2210.

Cohen, J.H. (2011). Migration, remittances, and household strategies. *Annual Review of Anthropology*, *40*, 103-114.

Cortes, P. (2013). The feminization of international migration and its effects on the children left behind: Evidence from the Philippines. *World Development*, 65, 62-78. http://dx.doi.org/10.1016/j.worlddev.2013.10.021

Di Maria, C., & Lazarova, E.A. (2012). Migration, human capital formation, and growth: An empirical investigation. *World Development*, *40*(5), 938-955.

Edwards, A.C., & Ureta, M. (2003). International migration, remittances, and schooling: evidence from El Salvador. *Journal of development economics*, *72*(2), 429-461.

Fargues, P. (2006). *The demographic benefit of international migration: hypothesis and application to the Middle Eastern and North African contexts*. World Bank Policy Research Working Paper 4050. The World Bank.

Fargues, P. (2011). International migration and the demographic transition: A two-way interaction. *International Migration Review*, *45*(3), 588-614.

Giannelli, G.C., & Mangiavacchi, L. (2010). Children's schooling and parental migration: Empirical evidence on the 'left-behind 'generation in Albania. *Labour,* 24, 76-92.

GOP, Government of Pakistan. (2017). Pakistan Bureau of Statistics (PBS) http://www.pbs.gov.pk/sites/default/files/PAKISTAN%20TEHSIL%20WISE%20FOR%20WEB%20CENSUS_2017.pdf

Hanson, G.H., & Woodruff, C. (2003). *Emigration and educational attainment in Mexico*. Mimeo., University of California at San Diego.

IFPRI, & IDS (2012). Pakistan Rural Household Panel Survey (PRHPS) 2014, Round 3. http://dx.doi.org/10.7910/DVN/JWMCXY. International Food Policy Research Institute (IFPRI), Innovative Development Strategies (IDS), Washington, USA.

IFPRI, & IDS (2014). Pakistan rural household panel survey (PRHPS) 2012, round 1.5. http://dx.doi.org/10.7910/DVN/T9GGYA. International Food Policy Research Institute (IFPRI), Innovative Development Strategies (IDS), Washington, USA.

Jingzhong, Y., & Lu, P. (2011). Differentiated childhoods: impacts of rural labor migration on left-behind children in China. *The Journal of peasant studies*, 38(2), 355-377.

Kandel, W., & Kao, G. (2000). Shifting orientations: How US labor migration affects children's aspirations in Mexican migrant communities. *Social Science Quarterly*, 81(1), 16-33.

Kuhn, R. (2006). The effects of fathers' and siblings' migration on children's pace of schooling in rural Bangladesh. *Asian Population Studies*, 2(1), 69-92.

Lefebvre, A. (1999). *Kinship, honour and money in rural Pakistan: subsistence economy and the effects of internal migration.* Curzon Press

Lodhi, A.S (2012). *Education, Child Labor and Human Capital Formation in Selected Urban and Rural Settings of Pakistan* (Doctoral dissertation, Zentrum für Entwicklungsforschung ZEF, Universität Bonn, Bonn, Germany). Retrieved from https://www.researchgate.net/profile/Abdul_Lodhi3/publication/340477142 Accessed on 23.11.2020

López-Córdova, E., Tokman R., A., & Verhoogen, E. (2005). Globalization, Migration, and Development: The Role of Mexican Migrant Remittances [with Comments]. *Economía, 6*(1), 217-256. Retrieved from http://www.jstor.org/stable/20065489

Lu, Y. (2012). Education of children left behind in rural China. *Journal of Marriage and Family*, 74(2), 328-341.

Mansuri, G. (2006). *Migration, school attainment, and child labor: evidence from rural Pakistan*. World Bank Policy Research Working Paper 3945, June 2006. The World Bank.

McKenzie, D., & Rapoport, H. (2011). Can migration reduce educational attainment? Evidence from Mexico. *Journal of Population Economics*, 24(4), 1331-1358.

Mendola, M. (2012). Rural out-migration and economic development at origin: A review of the evidence. *Journal of International Development*, 24(1), 102-122.

Meyerhoefer, C.D., & Chen, C.J. (2011). The effect of parental labor migration on children's educational progress in rural China. *Review of Economics of the Household*, 9(3), 379-396.

Nazli, H., & Heider, S.H. (2012). Pakistan Rural Household Panel Survey 2012 (Round 1): Methodology and community characteristics. Retrieved from https://www.semanticscholar.org/paper/Pakistan-Rural-Household-Panel-Survey-2012-(Round-Nazli-Haider/0211c711db4590e9533fd0987e03469960ce910f. Accessed on 28.05.2021

Nguyen, L., Yeoh, B.S., & Toyota, M. (2006). Migration and the well-being of the 'left behind 'in Asia: Key themes and trends. *Asian Population Studies*, 2(1), 37-44.

Pickbourn, L. (2015). Remittances and Household Expenditures on Education in Ghana's Northern Region: Why Gender Matters. *Feminist Economics*, *22*(3), 74-100.

Vogel, A., & Korinek, K. (2012). Passing by the girls? Remittance allocation for educational expenditures and social inequality in Nepal's households 2003–2004. *International Migration Review*, *46*(1), 61-100.

Ye, J., Wang, C., Wu, H., He, C., & Liu, J. (2013). Internal migration and left-behind populations in China. Journal of Peasant Studies, 40(6), 1119-1146.

Zhou, M., Murphy, R., & Tao, R. (2014). Effects of parents' migration on the education of children left behind in rural China. *Population and Development Review,* 40(2), 273-292.

Appendix

Appendix Table 1: Dependent Variable Log of Household Education Expenditure per Child and Log of Household Education Expenditure (Full Panel)

VARIABLES	(1) Log Edu Exp/Child	(2) Log Edu Exp	(3) Log Edu Exp/Child	(4) Log Edu Exp	(5) Log Edu Exp/Child	(6) Log Edu Exp
Household has Permanent Migrant	-0.212	-0.282	-0.104	-0.173		
	(0.248)	(0.265)	(0.242)	(0.259)		
Household has a Temporary Migrant	0.0851	0.148	0.147	0.210		
	(0.173)	(0.193)	(0.171)	(0.189)		
Household Receives Remittances	0.483***	0.487***			0.450***	0.444**
	(0.170)	(0.185)			(0.166)	(0.181)
Log of Income per Person	-0.0103	-0.00692	-0.00175	0.00172	-0.00836	-0.00424
	(0.0295)	(0.0323)	(0.0295)	(0.0324)	(0.0290)	(0.0317)
Household Size	0.0975	0.0640	0.0916	0.0581	0.111	0.0822
	(0.0820)	(0.0900)	(0.0833)	(0.0913)	(0.0828)	(0.0905)
No of Children in Household	0.233**	0.454***	0.236**	0.458***	0.220**	0.437***
	(0.107)	(0.119)	(0.108)	(0.120)	(0.107)	(0.119)
Ratio of School Aged Girls to Boys in HH	-0.167	-0.0766	-0.168	-0.0778	-0.174	-0.0861
	(0.116)	(0.132)	(0.117)	(0.133)	(0.115)	(0.131)
RHPS round indicator = 2	0.535***	0.595***	0.545***	0.604***	0.529***	0.586***
	(0.0973)	(0.107)	(0.0977)	(0.107)	(0.0979)	(0.107)
RHPS round indicator = 3	0.194*	0.240*	0.254**	0.300**	0.184	0.226*
	(0.115)	(0.127)	(0.114)	(0.126)	(0.117)	(0.128)
RHPS round indicator = 4	0.151	0.231	0.311	0.392*	0.116	0.183
	(0.228)	(0.246)	(0.215)	(0.232)	(0.226)	(0.245)
Income Quintile = 2	0.0654	0.0742	0.0621	0.0709	0.0669	0.0759
	(0.146)	(0.161)	(0.146)	(0.161)	(0.146)	(0.160)
Income Quintile = 3	0.190	0.196	0.174	0.179	0.189	0.194
	(0.171)	(0.188)	(0.171)	(0.188)	(0.171)	(0.187)
Income Quintile = 4	0.0676	0.0703	0.0560	0.0586	0.0644	0.0656
	(0.222)	(0.240)	(0.223)	(0.241)	(0.221)	(0.240)
Observations	4,655	4,655	4,655	4,655	4,655	4,655
R-squared	0.034	0.044	0.031	0.042	0.034	0.044
Number of hid	1,717	1,717	1,717	1,717	1,717	1,717
Household FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Household Controls	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix Table 2: Dependent Variable Log of Household Education Expenditure per Child and Log of Household Education Expenditure (Balanced Panel)

VARIABLES	(1) Log Edu Exp/Child	(2) Log Edu Exp	(3) Log Edu Exp/Child	(4) Log Edu Exp	(5) Log Edu Exp/Child	(6) Log Edu Exp
Household has Permanent Migrant	-0.0137	-0.129	0.152	0.0484		
	(0.245)	(0.272)	(0.233)	(0.256)		
Household has a Temporary Migrant	-0.0314	0.0517	0.153	0.249		
	(0.286)	(0.317)	(0.262)	(0.290)		
Household Receives Remittances	0.673**	0.719**			0.669**	0.697**
	(0.278)	(0.306)			(0.262)	(0.289)
Log of Income per Person	0.00900	0.0150	0.0278	0.0351	0.00898	0.0170
	(0.0451)	(0.0500)	(0.0460)	(0.0510)	(0.0446)	(0.0493)
Household Size	-0.0263	-0.133	-0.0440	-0.152	-0.0256	-0.119
	(0.107)	(0.119)	(0.104)	(0.116)	(0.105)	(0.116)
No of Children in Household	0.250	0.587***	0.251	0.588***	0.249	0.577***
	(0.186)	(0.207)	(0.188)	(0.208)	(0.184)	(0.203)
Ratio of School Aged Girls to Boys in HH	-0.189	-0.0163	-0.173	0.00106	-0.189	-0.0279
	(0.184)	(0.206)	(0.192)	(0.215)	(0.188)	(0.211)
RHPS round indicator = 2	0.244	0.267	0.301*	0.327*	0.246	0.270
	(0.159)	(0.174)	(0.166)	(0.181)	(0.159)	(0.174)
RHPS round indicator = 3	-0.196	-0.197	-0.107	-0.103	-0.197	-0.204
	(0.193)	(0.211)	(0.196)	(0.214)	(0.189)	(0.205)
RHPS round indicator = 4	-0.220	-0.151	0.00976	0.0946	-0.220	-0.169
	(0.276)	(0.298)	(0.243)	(0.263)	(0.272)	(0.296)
Income Quintile = 2	-0.0802	-0.0490	-0.122	-0.0937	-0.0788	-0.0435
	(0.251)	(0.279)	(0.255)	(0.284)	(0.248)	(0.276)
Income Quintile = 3	0.0340	0.0813	-0.0684	-0.0282	0.0338	0.0779
	(0.264)	(0.285)	(0.274)	(0.296)	(0.263)	(0.285)
Income Quintile = 4	-0.246	-0.294	-0.318	-0.371	-0.246	-0.293
	(0.391)	(0.420)	(0.404)	(0.434)	(0.390)	(0.420)
Observations	891	891	891	891	891	891
R-squared	0.037	0.066	0.020	0.050	0.037	0.066
Number of hid	288	288	288	288	288	288
Household FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Household Controls	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix Table 3 Dependent Variable Log of Household Education Expenditure per Child and Log of Household Education Expenditure

VARIABLES	(1) Log Edu Exp	(2) Log Edu Exp	(3) Log Edu Exp/Child	(4) Log Edu Exp	(5) Log Edu Exp/Child	(6) Log Edu Exp
Household has Permanent Migrant	0.136	0.159	0.164	0.185		
	(0.187)	(0.191)	(0.190)	(0.196)		
Household has a Temporary Migrant	0.126	0.0830	0.155	0.109		
	(0.548)	(0.672)	(0.546)	(0.667)		
Household Receives Remittances	0.166	0.148			0.187	0.170
	(0.210)	(0.231)			(0.208)	(0.228)
Observations	2,020	2,020	2,020	2,020	2,020	2,020
R-squared	0.042	0.037	0.040	0.036	0.041	0.036
Number of hid	882	882	882	882	882	882
Household FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Household Controls	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Control variables: Log of household income per person, household size, ratio of girls to boys of the school going age, share of women's income in household income, dummy variable indicating if the household has only girl children in the school going age group.

Appendix Table 4 Dependent Variable: Share of Girls in Households' Expenditure on Schooling and Education of All Children of the School Age (Ages 5-17), Full Panel

VARIABLES	(1) Girls' Share in Edu Exp	(2) Girls' Share in Edu Exp	(3) Girls' Share in Edu Exp	(4) Girls' Share in Edu Exp
Household has Migrant Member	0.156*	0.133*	0.149**	
	(0.0797)	(0.0790)	(0.0754)	
Household has a Temporary Migrant	0.140	0.160	0.176	
	(0.119)	(0.114)	(0.113)	
Household Receives Remittances	0.0905	0.0939		0.116
	(0.152)	(0.155)		(0.153)
RHPS round indicator = 2	0.0513	0.0538	0.0550	0.0572*
	(0.0329)	(0.0330)	(0.0338)	(0.0328)
RHPS round indicator = 3	-0.0304	-0.0202	-0.00792	-0.0155
	(0.0580)	(0.0550)	(0.0422)	(0.0553)
RHPS round indicator = 4	-0.223**	-0.195*	-0.190*	-0.182*
	(0.104)	(0.110)	(0.110)	(0.110)
Income Quintile = 2	0.0977	0.131*	0.127*	0.133*
	(0.0630)	(0.0695)	(0.0663)	(0.0701)
Income Quintile = 3	0.149	0.190	0.186*	0.194*
	(0.106)	(0.117)	(0.112)	(0.117)
Income Quintile = 4	0.0756	0.134	0.124	0.142
	(0.0868)	(0.106)	(0.0969)	(0.106)
Log of Income per Person		-0.0227	-0.0200	-0.0251
		(0.0155)	(0.0134)	(0.0155)
Share of Women's Inc in HH Income		-0.229	-0.225	-0.211
		(0.158)	(0.155)	(0.160)
Ratio of School Aged Girls to Boys in the Household		-0.0199	-0.0181	-0.0121
		(0.0434)	(0.0430)	(0.0432)
No of Children in Household		0.0262	0.0254	0.0233
		(0.0330)	(0.0329)	(0.0330)
Ratio of Adult Women to Men		0.129***	0.136***	0.143***
		(0.0435)	(0.0436)	(0.0446)
Constant	0.622***	0.592***	0.566***	0.604***
	(0.0604)	(0.194)	(0.185)	(0.192)
Observations	2,020	2,020	2,020	2,020
R-squared	0.027	0.042	0.040	0.037
Number of hid	882	882	882	882
Year FE	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes
Income Quintile	Yes	Yes	Yes	Yes
Household Controls	No	Yes	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix Table 5 Dependent Variable: Share of Girls in Households' Expenditure on Schooling and Education of All Children of the School Age (Ages 5-17), Balanced Panel

VARIABLES	(1) Girls' Share in Edu Exp	(2) Girls' Share in Edu Exp	(3) Girls' Share in Edu Exp	(4) Girls' Share in Edu Exp
Household has Migrant Member	0.270***	0.239**	0.206**	
	(0.0957)	(0.109)	(0.100)	
Household has a Temporary Migrant	0.198	0.205	0.176	
	(0.153)	(0.149)	(0.143)	
Household Receives Remittances	-0.107	-0.118		-0.0501
	(0.0940)	(0.0944)		(0.0895)
RHPS round indicator = 2	0.0909	0.103	0.0987	0.0732
	(0.0645)	(0.0628)	(0.0628)	(0.0617)
RHPS round indicator = 3	0.0290	0.0624	0.0531	0.0651
	(0.0640)	(0.0656)	(0.0652)	(0.0673)
RHPS round indicator = 4	-0.208*	-0.215*	-0.218*	-0.204
	(0.110)	(0.125)	(0.126)	(0.127)
Income Quintile = 2	-0.0625	-0.0785	-0.0639	-0.0852
	(0.0796)	(0.0965)	(0.0992)	(0.0971)
Income Quintile = 3	0.109	0.0960	0.116	0.104
	(0.104)	(0.132)	(0.137)	(0.136)
Income Quintile = 4	-0.137	-0.149	-0.115	-0.110
	(0.127)	(0.153)	(0.157)	(0.165)
Log of Income per Person		0.00525	0.00104	5.38e-05
		(0.0244)	(0.0238)	(0.0239)
Share of Women's Inc in HH Income		-0.180	-0.179	-0.114
		(0.141)	(0.136)	(0.166)
Ratio of School Aged Girls to Boys in the Household		0.00108	-0.00616	0.0150
		(0.0838)	(0.0849)	(0.0820)
No of Children in Household		-0.0225	-0.0243	-0.0358
		(0.0737)	(0.0737)	(0.0729)
Ratio of Adult Women to Men		0.195**	0.190**	0.223***
		(0.0785)	(0.0793)	(0.0796)
Constant	0.760***	0.603	0.643*	0.692*
	(0.0788)	(0.388)	(0.383)	(0.384)
Observations	430	430	430	430
R-squared	0.101	0.127	0.121	0.101
Number of hid	164	164	164	164
Year FE	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes
Income Quintile	Yes	Yes	Yes	Yes
Household Controls	No	Yes	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix Table 6: Dependent Variable: Share of Girls in Households' Expenditure on Schooling and Education of All Children of the School Age (Ages 5-17)

VARIABLES	(1) Girls' Share	(2) Girls' Share	(3) Girls' Share	(4) Girls' Share
Internal Migrants	0.176***	0.170***	0.172***	
	(0.0505)	(0.0615)	(0.0617)	
International Migrants	-0.0368	-0.0431	-0.0469	
	(0.0772)	(0.0763)	(0.0769)	
Household Receives Remittances	-0.0330			-0.0168
	(0.0557)			(0.0576)
Return International Migrant	0.206	0.209		0.237
	(0.155)	(0.147)		(0.156)
Constant	0.678***	0.904***	0.905***	1.020***
	(0.0513)	(0.147)	(0.147)	(0.132)
Observations	2,481	2,481	2,481	2,481
R-squared	0.019	0.024	0.023	0.020
Number of hid	1,056	1,056	1,056	1,056
Year FE	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes
Income Quintile	Yes	Yes	Yes	Yes
Household Controls	No	Yes	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Control variables: Log of household income per person, household size, ratio of girls to boys of the school going age, share of women's income in household income, dummy variable indicating if the household has only girl children in the school going age group.

Appendix Table 7 Dependent Variable: Share of Girls in Households' Expenditure on Schooling and Education of All Children of the School Age (Ages 5-17)

VARIABLES	(1) Girls' Share	(2) Girls' Share	(3) Girls' Share	(4) Girls' Share
Household has Migrant Member	0.108**	0.104*	0.106**	
	(0.0459)	(0.0538)	(0.0537)	
Household has a Temporary Migrant	0.0128	0.0145	0.0155	
	(0.0774)	(0.0801)	(0.0800)	
Household Receives Remittances	0.00812	0.0178		0.0352
	(0.0534)	(0.0558)		(0.0558)
Household has a Male Return Migrant	-0.131	-0.128	-0.126	-0.115
	(0.0878)	(0.0861)	(0.0856)	(0.0832)
Constant	0.689***	0.927***	0.926***	1.007***
	(0.0517)	(0.144)	(0.144)	(0.131)
Observations	2,481	2,481	2,481	2,481
R-squared	0.016	0.022	0.022	0.020
Number of hid	1,056	1,056	1,056	1,056
Year FE	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes
Income Quintile	Yes	Yes	Yes	Yes
Household Controls	No	Yes	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Control variables: Log of household income per person, household size, ratio of girls to boys of the school going age, share of women's income in household income, dummy variable indicating if the household has only girl children in the school going age group.