Parental Absence, Remittances, and Educational Investment of Children Left Behind: Evidence from Nepal*

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Abstract

This study investigates the causal impact of work-related migration by parents on left behind children's education and investment in schooling. To isolate the direct impact of parental absence, we estimate the effects of parental migration and remittances separately. Using data from the third round of the Nepal Living Standard Survey and applying a two-step process to address self-selection into the migration statuses and correct for endogeneity into remittances, we find negative effect of parental absence and positive effect of remittances on education of children left behind. To further explore the heterogeneous impact of parental migration, we extend our analysis allowing heterogeneity by educational status of mother. We find that the children of educated mothers bear relatively less burden from parental migration. Furthermore, we find some evidence for heterogeneous effects of parental migration by child's gender and age.

JEL Classifications: D7, F22, H52, H75, J61, I22, I24

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1 Introduction

Parental migration is a widely observed phenomenon in South Asian countries. In Nepal, fifty percent of total households have at least one absentee away within country or abroad primarily for reasons of work, study or living with other relatives or friends (Central Bureau of Statistics (2011)). Among that, forty six percent are parent of school going children aged 5-16.

One of the concerns of parental migration is its effect on children left behind. In particular, the effect of parental absence on the education of children is one of the most important issues. The remittance from a migrated parent helps to meet the short term consumption and long term physical and human capital investment needs of the households (e.g., Adams and Cuecuecha (2010), Rapoport and Docquier (2006), Yang (2008)), the flip side of migration is the family disruption resulting from parental absence. This disruptive effect may be in the form of less of the parental input required to maintain the children health and educational needs. It may also require the left behind children to fill the household labor gap resulting from the absence of adult members from the household. In extremes cases, children may respond to migration by reducing their study hours and increasing hours of outside paid work (Antman (2011)).

In order to examine the effect of parental absence due to migration, it is extremely important to isolate the direct impact of parental absence from the effect of remittances. Investigation of overall impact of migration, which primarily represents the combined effect of migration and remittances, is inadequate to determine policy to mitigate the adverse direct effects of parental absence. For example, the total effect of migration is positive if the income effect of remittance more than offsets the absence effect of migration, but this large positive effect of remittances may mask the adverse effects of parental absence.

This study attempts to determine whether parental migration is disruptive for education of children, with explicit simultaneous consideration of both parental migration and remittances as variables of interest. In particular, we investigate the effects of parental absence and remittances on both intensive and extensive margin of educational investment: school enrollment and educational expenditure. Using data from the third round of the Nepal Living Standard Survey, we estimate the causal impact of work-related parental migration on school enrollment and educational expenditure of children. Although the paucity of adequate information on migration and remittance in the survey data primarily in developing countries is always problematic (Amuedo-Dorantes et al. (2010)), we avoid this problem by

exploiting the latest household survey data from Nepal, which affords rich information on both absentees and remittances, and thus facilitates identification of parental absence with more accuracy.

Addressing the issues of self-selection in migration status and endogeneity of remittances explicitly by applying the two-step estimation method with instruments for migration and remittances, our estimation results reveal disruptive effects of parental migration: probability of school enrollment of children with parental migration is 32 percent points lower than that with parents at home. Educational expenditure on children from households with migrated parents is about 200 percent lower than that on children without parental migration. Remittances have a positive effect on all the education variables of children left behind: a one percent increase in total remittances increases the probability of school enrollment by 3.4 percent points and the education expenditure by 0.25 percent. We also find that non-parental migration has negative effects on children's school enrollment and educational expenditure on children, although the effects are smaller than those due to parental migration.

To further explore the heterogeneous impact of parental migration, we extend our analysis by allowing heterogeneity by education status of mother. It is important to allow heterogeneity of maternal education given that an educated mother may be able to effectively direct the children's study both at home and at school. As such, we hypothesize that mothers' education in father-migrated households has the potential to at least partially mitigate the negative effects of absence. We find some evidence of the burden from parental absence in the case of the children with less educated mothers, whereas this burden is mitigated with an educated mother. This finding suggests that the informed mother can serve as a buffer against disruption.

Furthermore, we investigate heterogeneous effects of parental migration separately by child's gender and age. We find that the disruption resulting from parental absence is stronger for female than for male children. Similarly, we find that the spending of remittances received is significantly more on the education of girls than boys. Likewise, younger children are more likely to be out of school and education spending on older children is likely to be lower as a result of absence of an adult member from the household.

Our study is related to strands of the literature on the evaluation of the impact of migration on education of children left behind. Many studies have examined the overall impact of migration as the joint effect of migration and remittance (McKenzie and Rapoport (2011), McKenzie (2006), Mansuri (2006)). The results of these studies are mixed: Mansuri

(2006) and McKenzie and Rapoport (2011) report negative effects of parental migration on children's education in Pakistan and rural Mexico respectively, whereas Hanson and Woodruff (2003) report positive effect of migration on secondary school-aged girls in Mexico.

The total impact of remittances on children's education has been examined in many studies, and the results are again mixed. For example, Edwards and Ureta (2003), Yang (2008), and Acosta (2011) report positive effects, whereas Alcaraz et al. (2012) and Kroeger and Anderson (2014) report the opposite effects. Moreover, Amuedo-Dorantes and Pozo (2010) and Amuedo-Dorantes et al. (2010) show that remittance received by a migrant household weakly explains improvements in educational attainments by children left behind vis-a-vis the remittance received by a non-migrant household. The mixed results of the effects of migration and remittances indicate the importance of separate identification of migration and remittances in the total evaluation of the overall effect of migration on children's education.

This study is closely related to Bansak and Chezum (2009) and Acharya and Leon-Gonzalez (2014) in that it evaluates the effect of absence of household members and remittances on children's education separately using data from Nepal. Our study has at least two advantages over these papers. Firstly we use detailed information regarding migration status of household members, such information was unavailable in previous household surveys in Nepal. This finer information enables us to examine the effect of parental and non-parental absence separately. Secondly, and more importantly, our study assesses the effects of migration and remittance with careful sample-selection bias correction and endogeneity of remittances by exploiting a detailed set of instruments for parental absence and remittances.

The structure of the paper is as follows. Section 2 presents a concise description of the historical development of migration and the education system in Nepal. Section 3 illustrates the data and estimation strategy of the paper. Section 4 reports the main results. Section 5 presents heterogeneity analysis of the children by education of mother, age and gender. Section 6 tests the robustness of the main results. Section 7 concludes.

2 Institutional background: migration and education in Nepal

2.1 Migration and remittance in Nepal

South Asia currently sends the largest number of migrants overseas and is the second largest recipient of remittances (World Bank (2016)). Nepal is among world's top ten recipients

of remittance relative to economic size (20% of GDP) with about 3.3 percentage of the population having migrant status. Nepal's stock of emigrants is also one of the largest among the low income countries (World Bank (2011)).

At the household level, 52 percent of households are remittance recipients. Surprisingly, only 71 percent of households with remittances are households with at least one absentee. Households without absentee receive remittances mostly from distant relatives and friends. On the other hand, 30 percent of households with at least one absentee receive zero remittances. There may be several reasons for not sending remittances such as low paying jobs, and manpower and hiring company fraud. As we will see later in the regression analysis, this household level heterogeneity for migrants in household and for receipt of remittances provides adequate variation at the household level for separate identification of the effects of migration and remittance.

Domestic migrants outnumber international migrants in Nepal (55% vs. 45% of total migrants respectively). The capital city of the country, Kathmandu, is the major destination for domestic migrants (34% of total domestic migrants) followed by Kaski (5%) and Sunsari (3%) .

[Table 1]

India is the major destination for Nepal's international migrants (Central Bureau of Statistics (2011)). The first column of Table 1 presents the proportion of international migrants by destination. Although in the last decade the number of international migrants leaving to work in Gulf Cooperation Council countries (GCC) and Malaysia has grown, India is still the single largest external destination for Nepalese migrants primarily because of the factors including easy access, open border and socio-cultural similarity. (Central Bureau of Statistics (2002), Central Bureau of Statistics (2012)).

The second column of Table 1 displays the percentage change in unemployment rates of destination countries between 2008 and 2009. These changes in unemployment rate may be systematically related to household migration decision. For example,the migration decision of a member of a household in a village with a historically high proportion of migrants to India is severely affected by adverse macroeconomic conditions in India. As reported later, we construct an instrument for migration decision facilitating the variation of macroeconomic conditions across the destination countries combined with the share of migrants by destination country.

[Figure 1]

Out-migrants to India mainly use the traditionally popular border points, i.e., the Indian border nearest to one's region of residence. World Food Programme Nepal and Nepal Development Research Institute (2008) identified 11 major migration routes to India of which *Gaddachauki* (in the far-west region), *Rupaidiha* (in the mid-west region), *Sunauli* (in the west region), *Raxaul* (in the Central Region) and *Panitanki* (in the east region) are the five Indian borders widely used by out-bound migrants, as can be seen in Figure 1. Since the largest proportion of internal and external migrants go to Kathmandu and India, respectively and that the majority of the out-bound migrants to India use the nearest Indian border, the cost of travel to Kathmandu and to the nearest Indian border may be systematically related to migration decision. We exploit this information to construct another instrument for migration decision, the income-adjusted travel cost of migration.

2.2 Education and school system in Nepal

Thirty three out of every one hundred South Asian children enrolled at the primary level leave school before reaching the last grade. The share of such children is highest in Nepal, at 38.3%, after Pakistan at 38.5% (UNESCO (2012)). The overall survival rate through various levels of schooling (from first grade of primary education through the last grade of secondary education) is 60 percent, and the rate is higher for female than male children (Ministry of Education (2011)). Although the recent figures for Nepal show encouraging trends in terms of promotion rate and lower grade repetition and dropout rates at different school levels, progress has been rather slow particularly towards realizing the Sustainable Development Goal (SDG) of ensuring quality education for all.

School education in Nepal today comprises twelve years; five years at the primary level (5-10 years of age), three years at the lower secondary level (11-14 years of age); two years at the secondary level (15-16 years of age); and two years at the higher secondary level. Basic education is defined as eight years, with five years in the primary cycle and additional three years in the lower secondary cycle. The secondary level concludes with the School Leaving Certificate (SLC), a national level exam, a criterion for admission to the higher secondary level and to the university.

Schools in Nepal are either a public or private type. Public schools are either fully or partially funded by the government and are managed either by the government or by the community. Private schools, on the other hand, are institutional schools that are managed by the private sector; there, the financing of school expenditure depends entirely upon the funds raised with the parents. The quality of public education, however, has remained con-

sistently poor compared to that of the private schools despite interventions in the form of, for example, improved access to schools and school infrastructure (e.g., provision of drinking water, separate toilets for girls, mid-day meals), construction of new schools, transfer of school management to the community, removal of economic barriers (no tuition fees and free textbooks. Although public education is now free (tuition and text books), an admission fee is charged to cover school repairs, extracurricular activities, exam fees, stationery and uniforms. Some schools charge an additional fee for items including computer classes. Concerns have also been raised about the student motivation, teacher attitude and principal leadership in public schools. Another serious concern raised is related to the teacher absenteeism (Thapa (2013)).

Central Bureau of Statistics (2011) reports that the private school enrollment increased more than three-fold between 1996 and 2011 (from 7.5 percent of total national enrollment in 1995-96 to 26.8 percent in 2010-11). Similarly, private school enrollment of girls (43 percent) remains lower than that of boys (57%) at all levels (Ministry of Education (2013)).

The disparity in educational attainment according to castes, gender, age, socio-economic status and location has also gained much attention among policymakers. In the estimation strategy described below, we include all these observable characteristics in an econometric model to test whether and how much they affect child schooling outcomes in the case of Nepal.

3 Data, empirical model and identification strategy

We use the data from the third round of a nationally representative household survey, the Nepal Living Standard Survey III (NLSS III), which is a cross-section sample of 5988 households from 499 primary sampling units (PSUs) with information on 8721 school going children aged 5-16 for the year 2010-2011.[1] However, the number of observations used in our specifications is only for 8617 for school enrollment and 7807 for education expenditure because of missing information on educational status of both children and parents. In order to identify the parent migrant, we match the highest education of the parent reported in household roster section of the survey with that of the highest education of the work-related absentee (who is adult and married) reported in the absentee section.

The theoretical foundation for the empirical model used in this study is drawn largely from human capital theory where the household derives utility from the human capital of

[1]See Table 2 for the summary statistics by household migration status

their children owing to the altruistic parental preference towards their children as well as from the consumption of goods and services of various types. Our theoretical framework is then largely motivated by (McKenzie and Rapoport (2011)),which builds upon human capital theory to demonstrate the overall impact of migration where remittances, by adding to the value of household resources, improves educational attainment of a children left behind, whereas family disruption resulting from parental absence, on the other hand, by increasing the nonfinancial costs of schooling, impede educational attainment. A reduced form of the model provides our regression equations, presented below.

Our empirical specification for analysis of the differential impact of migration and remittances on child's educational outcomes is:

$$S_{i,j} = \alpha + \beta ParentMigrant_{i,j} + \theta NonParentMigrant_{i,j} + \delta Remittance_{i,j} + \gamma X_{i,j} + \lambda_j + \epsilon_{i,j} \tag{1}$$

where the dependent variable, $S_{i,j}$, is either a dummy variable indicating whether child i in district j attends school (extensive margin) or the logarithm of educational spending on a child (intensive margin).[2] $ParentMigrant$ equals one if at least one parent of one child is absent from the household, and equals zero otherwise. Similarly, $NonParentMigrant$ equals one if at least one non-parent of one child is absent from the household and zero otherwise.[3] We cannot identify from the survey data the precise non-parental relationship but these generally represent siblings, given the growing number of nuclear families in Nepal (Goldstein and Beall (1986)). $NoMigrants$ is a reference category. $Remittance$ is the log of remittances received by the household of child i in the year preceding the survey.[4] β, θ and δ are the coefficients of interest that captures the direct effect of parental absence, non-parental absence and remittances respectively.

Following strands of the literature on migration and education, other covariate vectors in $X_{i,j}$ include household assets and income (durable assets, non-remittance income, livestock, landholding and electricity), household head characteristics (gender and age), parental education (mother and father education) and child characteristics (age, gender, birth order and relationship to the household head). λ_j is a district fixed effect that captures various unobserved and omitted variables at district level that may potentially affect the migration and children educational outcomes; these include entrepreneurship, social and economic dynam-

[2]To include children with zero education spending in the analysis, we added one to all education spending.

[3]If both parents and non-parents are migrated from a household, we categorize that household as a parent migrated household.

[4]To include children with zero remittance in the analysis, we added one to all remittances.

ics, and infrastructural setups. $\epsilon_{i,j}$ is the random error term. In the estimation of standard error, we cluster at household level to allow for arbitrary correlation within households.

In order to deal with the self-selection into migration and endogenity of remittances, we employ the two-step estimation method to correct for self-selection into migration status and for endogeneity of remittances. In the first step, we estimate a multinomial logit model Equation (2) of household of child i selection into three migration statuses viz., $ParentMigrant$ $(k = 1)$, $NonParentMigrant$ $(k = 2)$, and $NoMigrant$ $(k = 3)$. In a second step, we estimate 2SLS using the predicted probabilities as instruments for migration status dummy variables.[5] The process produces consistent estimates even if the first step probit (choice) model is incorrectly specified and avoids the need to adjust the generated regressors problem in standard errors (see Angrist (2001) and Wooldridge (2010)).

$$M_{i,j}^{*,k} = \alpha_k + \beta^k Z_{i,j}^1 + \delta^k Z_{i,j}^2 + \gamma^k X_{i,j} + \lambda_j + \nu_{i,j}^k \tag{2}$$

and

$$M_{i,j}^k = 1 \quad \text{if} \quad M_{i,j}^{*,k} \geq M_{i,j}^{*,k'} \quad \forall k' \tag{3}$$

where $M_{i,j}^{*,k}$ is alternative-specific utility of child i in district j. $M_{i,j}^k$ is a categorical variable denoting migration statuses chosen by the household of child i in district j. Z_1 and Z_2 are excluded instruments for migration decision and remittance; this will be explained later. $X_{i,j}$ is the same covariate as in Equation (1). $\nu_{i,j}^k$ is a random disturbance term that changes across alternatives k and household of child i. [6] In the second step, we again add Z_2 to the list of excluded instruments (in addition to predicted parental and non-parental migration) following the usual 2SLS procedure to further identify the impact of remittances.

The excluded IVs we choose as Z_1 that primarily affects selection into migration is the village level variation in the unemployment rates at the countries of destination and the household level variation in the income-adjusted travel cost of migration. We compute the percentage change in the unemployment rate in the destination countries between 2008 and 2009, weighted by the proportion of international migrants from each village to each of those destinations. The unemployment rates at destination are extracted from the World Bank

[5] Dubin and McFadden (1984) propose this procedure and many researchers have used this approach to identification in the studies relating migration (and remittances) to education. For example, Alcaraz et al. (2012), Zhao et al. (2014), and Hu (2013) use the predicted probabilities obtained from a bivariate probit model in the first step as instruments in the second step 2SLS (two stage least squares). Likewise, Adams et al. (2009) use this approach to account for selection into being a founder-CEO and identify its impact on the firm's performance.

[6] We conduct a Hausman test for independence of irrelevant alternatives (IIA) and confirm that the estimated coefficients do not systematically differ due to the exclusion of some migration categories.

Database. (See Table 1). The income adjusted cost of travel is the weighted average of the travel cost from each district headquarters to the nearest Indian Border and to Kathmandu interacted with household non-remittance income. By doing so, we allow travel cost to vary across households. This is intuitively correct, and more so because richer households likely do not find the cost of travel as important as poorer households. Figure 1 shows the popular Indian border the outbound migrants from Nepal use to cross over to India depending upon the region of residence (This is based on the 2008 report by World Food Program and Nepal Development Research Institute) World Food Programme Nepal and Nepal Development Research Institute (2008). This IV is constructed on the premise that India is still the biggest market of international migrants from Nepal whereas Kathmandu of domestic migrants. We exploit the latest administrative data for bus fare and air fare information deflated to the year the particular absentee left the house as reported in the survey (**?** and Nepal Airlines Corporation (2014)). We use the consumer price index from the World Bank Database to adjust for inflation (for details on the construction of this variable, see Appendix A). We also choose the average amount of remittances at community level as a proxy for the migration network as Z_2 for instrumentation of remittances. We exclude the remittances received by observed households in the calculation of the network so as to avoid any direct effect of it on child outcomes.

4 Results

The main results (second step: second stage 2SLS) of extensive margin (school enrollment) and intensive margin (education expenditure) are presented in Table 5.[7] The signs of the coefficients of migration are negative and significant across both child outcomes. However, the (absolute value of) magnitude of parental absence is higher than that of non-parental absence. The probability of school enrollment of children is approximately 32 percentage points and 17 percentage points lower for children with parent absentee and non-parent absentee, respectively, than for children with no absentees. Likewise, average yearly education expenditure declines by about 11236 rupees (approx. 105 dollars) and 10722 rupees (approx. 100 dollars) respectively. Remittances, on the other hand, have a significant positive impact on all child outcomes, consistent with findings from previous studies. The above findings indicate that the presence of the parents in the household serves to ensure to some extent that children are enrolled in schools and those adequate investments are made on

[7]The results for the first step selection equation and the second step (first stage of 2SLS) are shown in Table 3 and Table 4.

their education. Non-parental absence has a relatively lesser impact.

[Table 5]

4.1 Discussion on disruption channel

The absence of one or more adult members may require children to fill the labor gap in the form of either paid activities or household work. We test for this channel by estimating Equation (1) with the dummy for child labor as a dependent variable in $S_{i,j}$. We find only the coefficients on non-parental migration significant as presented in Table B.1. This means that the disruption resulting from non-parental absence is mainly explained by the fact that left behind children have to assume the absent member's work.

We now test for disruption channels due to parental absence. For simplicity, we hypothesize that lack of parental monitoring and lack of educational aspirations are the two main channels leading to the disruption. Some researchers test for the first channel using childrens exam test scores and their hours spent studying (Antman (2011) and Zhang et al. (2014); an ideal test would also warrant data on (quality) hours shared by parents with their children. This renders the explicit test of this channel problematic. In our survey, drop out children are asked the reasons for their having to leave school. The majority of children with migrated parents gave poor academic progress as the major cause. This is also true for children with non-parent and no-migrant but the proportions are lower as can be seen in Table C.1. It is important to note that if this channel was also explaining the disruption due to non-parental absence, the coefficient of non-parental absence in the regression estimates of child labor in Table B.1 would not be significant.

The second channel of educational aspirations is related to the migration-related information that the potential migrants use to revise expected returns to education in the employment destination. The educational aspirations are lower if lower returns to education are expected; this may discourage household investment in child education (Chiquiar and Hanson (2005) and Kandel and Kao (2001)). Migrants from Nepal are mostly employed in wage jobs requiring moderate skills usually in destinations such as in India and the Gulf countries (GIZ and ILO (2015) World Food Programme Nepal and Nepal Development Research Institute (2008)). Seventy percent of total work absentees have less than secondary level of education. Also the proportions of primary and secondary graduates in the migrant households are significantly lower than in the non-migrant households. In Table C.2, it can be seen that households with migrant parents have the lowest proportion of educated members.

We therefore conclude that the disruption resulting from parental absence is largely explained by the lack of parental monitoring and supervision and lack of educational aspiration. The comparison of the importance of these two channels is left to the future research.

5 Heterogeneous effects

In this section, we extend our analysis, allowing heterogeneity by educational status of mother and child's gender and age.

5.1 Mother's education

The heterogeneity results by mother's education in Table 6 show that mother's education is important to mitigate or neutralize the negative effects of father's absence. We also find that mothers education does not explain the effect of remittances on child enrollment but it does explain the effect of remittances on education expenditure. This phenomenon may be explained in part by the fact that many children in recent years are attending school thanks to free public education, although indirect costs of education such as admission fees (in the form of school repairs, exam fees and the like), uniforms and travel expenses pose liquidity constraints, thus warranting more spending on education. Besides, the parental preference for providing quality education also reflects to some extent the significant positive effect of remittance on educational spending.

[Table 6]

5.2 Child's gender and age

The heterogeneity result for children gender shows that, although children of both genders suffer, parental absence has a much larger deteriorating effect for girls than boys; this suggests gender bias in household resource allocation and also larger time allocation for girls than boys to work previously performed by the absent parents. The direct effect of remittances shows that the remittances are mostly used for sending the girls to school and spending on their education relative to their male counterparts. This is consistent with the relaxation of the liquidity constraint hypotheses in the remittance recipient households where girls are also prioritized in education (See for e.g., Acosta (2011)). The heterogeneous effects by age suggest that the younger cohorts are more likely to suffer than the older from the effects of both parental and non-parental migration. This is at least true in case of

school enrollment. However, this negative effect does not extend to education spending for young children after they have been enrolled in school. This also indicates progressively higher costs of education in the higher grades. Nevertheless, absence has a negative effect on educational spending of older cohorts. This is not surprising, since enrollment decisions are made only during the early years of a childs education; we find no significant effect of all types of absence on the school enrollment of the older cohorts. This also offers an explanation why for these cohorts the direct impact of remittances on school enrollment is insignificant, but significant on educational expenditure.

6 Robustness

We run several robustness checks to confirm the stability of the baseline results. For example, validity of the instruments may be a concern since they may not be orthogonal to child outcomes. The exactly identified system in our design does not allow testing for over-identification unless one additional instrument is added in second step 2SLS only and not in the first step selection equation. Adding an instrument may result into omitted variable bias.[8] Furthermore, finding an ideal instrument affecting only remittances decisions and not migration decisions is difficult. If we ignore the possible bias of the estimates and the ideal instrument notion, we can comfortably run the over-identification test using standard statistical package. We use past rainfall shock at community level (the village level variation in the deviation of rainfall in the year 2008 from the historical average spanning 1970-2005) as an additional instrument for remittances and confirm that the chosen instruments are valid in Table B.2. Interestingly, the estimates of the main variables of interest also remain stable with almost identical standard errors.

7 Conclusions

The study attempts to identify the direct simultaneous impact of migration and remittances on child education outcomes i.e., school enrollment as extensive margins and education expenditure as intensive margins. It further decomposes effect of migration into parental and non-parental absence to determine the relative importance to child education of different family members' presence in the household. The results of application of the two step esti-

[8] Verbeek (2007) and Wooldridge (2010) suggests non-inclusion of extra variables in the outcome equation unless one is sure that these variables do not belong to the selection equation. Imposing exclusion restriction on selection equation otherwise may result into an omitted variable bias problem (see: http://www.stata.com/statalist/archive/2012-10/msg01369.html)

mation method underscore the importance of correcting both self-selection into migration and endogeniety of remittances to observe the direct effects of migration.

Although that result suggests heterogeneous impact of parental and non-parental absence, the overall findings are consistent with family disruption hypotheses. Parental absence negatively effects child education whereas non-parental absence has less impact. Children with educated mothers are better able to cope with the negative effects of parental absence than those with less educated mother. Analysis by gender and age reveals that female and young children suffer most from the parental absence.

Three important findings emerge from the results. First, non-parental migration is less detrimental to children in households with less educated mothers as this neutralizes the negative effects on school enrollment and potential withdrawal of resources from their education. Second, non-parental migration is also a less disruptive strategy for prioritizing girls in education. Third, the receipt of remittances ensures that the girls are enrolled in school and that they receive quality education in terms of higher investment in their education.

The short term policy options include: selective policy to promote household sending of non-parents than parents as migrants; counseling sessions, particularly for less educated mothers about the value of and returns on education can also be another option; and special programs targeting young children with absent parents, either to correct their behavioral changes so that they can continue their schooling or to help them perform better at schools. In the long run, however, it is important to reverse pro-migration policy, since it has the effect of weakening the prospects of human capital formation in the country as a whole.

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Table 1: Proportion of International Migrants and Percentage Change in Unemployment Rates by Destination

Destination Country	International Migrants (%)	Change in Unemp. Rate (2008-2009)
India	45.23	-0.05
Bhutan	0.04	0.05
China	0.37	0.00
Bangladesh	0.22	0.14
Hong Kong	1.25	0.44
Malaysia	9.46	0.12
Japan	0.81	0.25
Saudi Arabia	8.87	0.06
Qatar	11.74	0.00
United Arab Emirates	3.83	0.05
United kingdom	3.17	0.44
United States	3.42	0.59
South Korea	0.52	0.12
Australia	2.10	0.33
Israel	0.52	0.23
Other countries	8.47	0.11

Notes: Some villages report no international migrants. We estimated the missing unemployment rates of villages as the predicted values obtained by regressing the observed unemployment rates on district level geographic characteristics (hill, mountain, plains, maximum elevation, area of forest normalized by area of district) , socio-economic characteristics (such as Human Development income index 2001, length of road normalized by area of district, literacy rate, infant mortality rate) demographic characteristics (such as caste), political characteristic (such as number of people killed during the state-Maoist conflict between 1992 and 2006 normalized by population of the district and the region fixed effects. District level data for elevation, forest area, road, literacy rate, caste and number of people killed in conflict are obtained from Do and Iyer (2010). For other countries, we use the World Unemployment Rates. Source: Central Bureau of Statistics (2011) and World Bank (2015).

Table 2: Descriptive Statistics for Children by Migration Status, 5-16 years-old

Migrants	Parent		Non-Parent		No	
VARIABLES	Mean	SD	Mean	SD	Mean	SD
Dependent Variables						
School Attendance (dummy)	0.93	0.25	0.89	0.32	0.90	0.30
Male	0.94	0.24	0.90	0.30	0.91	0.28
Female	0.93	0.26	0.87	0.33	0.89	0.31
Total Education Expenditure (in 000 NRs.)	6.34	9.90	4.18	9.10	6.81	12.15
Male	7.00	10.60	4.55	7.99	7.37	12.14
Female	5.65	9.08	3.81	10.10	6.26	12.14
HHD Characteristics						
HHD Head age	42.25	13.73	47.57	12.50	43.18	11.28
Male HHD Head (dummy)	0.30	0.46	0.72	0.45	0.90	0.30
HHD Size	5.84	3.37	6.40	2.90	6.17	2.33
Number of children aged less than 5	0.60	0.88	0.60	0.87	0.46	0.74
Total number of students	2.53	1.28	2.29	1.24	2.45	1.30
Father education-Primary and more (dummy)	0.68	0.47	0.37	0.48	0.52	0.50
Mother education-Primary and more (dummy)	0.29	0.45	0.14	0.34	0.23	0.42
Caste						
Brahmin chettri (dummy)	0.34	0.48	0.27	0.45	0.32	0.47
Hill dalit (dummy)	0.11	0.32	0.11	0.32	0.09	0.28
Terai dalit (dummy)	0.02	0.15	0.04	0.20	0.05	0.21
Newar (dummy)	0.04	0.19	0.05	0.21	0.08	0.27
Hill janajati (dummy)	0.21	0.41	0.25	0.43	0.21	0.41
Terai janajati (dummy)	0.09	0.29	0.08	0.28	0.06	0.24
Muslim (dummy)	0.05	0.22	0.07	0.25	0.04	0.21
Other castes (dummy)	0.00	0.05	0.00	0.05	0.01	0.10
Children's Characteristics						
Age	10.13	3.42	10.99	3.42	10.63	3.38
Male (dummy)	0.50	0.50	0.50	0.50	0.49	0.50
Son or Daughter of HHD Head (dummy)	0.69	0.46	0.73	0.45	0.83	0.37
Grandchildren of HHD Head (dummy)	0.24	0.43	0.18	0.38	0.10	0.31
Other relationship to HHD Head (dummy)	0.07	0.25	0.08	0.28	0.05	0.22
Eldest (dummy)	0.22	0.41	0.16	0.37	0.21	0.41
Middle order (dummy)	0.30	0.46	0.34	0.47	0.32	0.46
Youngest (dummy)	0.39	0.49	0.41	0.49	0.39	0.49
Singleton (dummy)	0.09	0.28	0.09	0.29	0.09	0.28
Income and assets						
Value of durable assets (in 000 NRS)	92.61	136.54	95.15	271.51	115.83	334.92
Non remittance income (in 000 NRS)	114.28	221.67	137.05	248.11	255.30	1010.30
Negative non-remittance income(dummy)	0.01	0.11	0.01	0.10	0.01	0.09
Livestock units (in Tropical livestock unit)	1.74	1.77	2.58	2.49	1.80	1.95
Landholding size (in hectares)	0.88	1.58	1.18	2.82	0.91	2.04
Electricity(dummy)	0.72	0.45	0.63	0.48	0.68	0.47
Household remittance (in 000 NRS)	109.13	208.51	67.24	164.94	6.13	67.15
Community characteristics						
Rural (dummy)	0.77	0.42	0.83	0.37	0.67	0.47
Primary school within 30 min. (dummy)	0.06	0.24	0.07	0.25	0.05	0.23
VDC Unemployment rate (2008)	0.02	0.04	0.02	0.03	0.03	0.04
Instrumental variables						
Weighted UR at Destination (VDC, Change in %)	0.035	0.086	0.028	0.080	0.057	0.103
Weighted cost of travel (in NRs)	623.45	0.80	796.71	1.09	777.34	1.09
Average remittance (VDC, in 000 NRS)	328.54	1.603	214.44	949.05	233.16	1307.32
Observations	1671		1966		5084	

Notes: $*$ indicates reference category.

Table 3: First step Selection Equation (Multinomial logit model)

Variables	Parent	Non-Parent
Log of cost of migration * non-Remittance Income	1.380***	2.416**
	[0.195]	[1.196]
% Change in UR at destination (2008-2009)	-3.220***	-0.996
	[1.195]	[0.992]
Migration network at village Level	0.388***	0.135***
	[0.071]	[0.041]
Household assets and income	Yes	Yes
Parents education	Yes	Yes
Household (head) and child characteristics	Yes	Yes
Community level characteristics	Yes	Yes
District fixed effects	Yes	Yes
Observations	8,617	8,617
Hausman test for IIA [P-Value]	0.00[1.00]	0.00[1.00]

Clustered standard errors in brackets
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Notes: Household assets and income include value of durable assets, non-remittance income, negative non-remittance income, livestock units (measured in Tropical livestock units), landholding size, and electricity. Parents' education includes mother's and father's education. Household (head) characteristics include household head age, age squared and gender, ethnicity, number of children less than five years old and total number of students. Child characteristics include student's age, age squared, gender, relationship to the household head and the birth order. Community Characteristics include rural dummy, village past unemployment rate, dummy for the availability of primary and private school in the locality.

Table 4: Second Step Results (First Stage of 2SLS)

Variables	Parental Migration	Non-Parental Migration	Log of Remittance
Predicted parental migration	1.057***	0.145*	8.236***
	[0.0734]	[0.0765]	[0.905]
Predicted non-parental migration	0.291***	0.964***	7.233***
	[0.082]	[0.097]	[1.040]
Migration network at village Level	-0.0044	-0.00194	0.200***
	[0.0035]	[0.0053]	[0.0519]
Household assets and income	Yes	Yes	Yes
Parents' education	Yes	Yes	Yes
Household (head) and child characteristics	Yes	Yes	Yes
Community level characteristics	Yes	Yes	Yes
District fixed effects	Yes	Yes	Yes
Observations	8,617	8,617	8,617
R-squared	0.397	0.149	0.333
First Stage F-stat	78.65	36.93	54.06

Clustered standard errors in brackets
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Notes: Household assets and income include value of durable assets, non-remittance income, negative non-remittance income, livestock units (measured in Tropical livestock units), landholding size, and electricity. Parents' education includes mother's and father's education. Household (head) characteristics include household head age, age squared and gender, ethnicity, number of children less than five years old and total number of students. Child characteristics include student's age, age squared, gender, relationship to the household head and the birth order. Community Characteristics include rural dummy, village past unemployment rate, dummy for the availability of primary and private school in the locality.

Table 5: Second Step Results (Second Stage 2SLS: Main Results)

VARIABLES	School enrollment	Log of education expenditure
Parental migration	-0.321***	-2.168***
	[0.107]	[0.724]
Non-parental migration	-0.171*	-1.326**
	[0.110]	[0.623]
Log of total remittances	0.0335***	0.247***
	[0.013]	[0.083]
Number of children aged less than five	0.0528***	-0.0978*
	[0.00845]	[0.0547]
Number of students	0.111***	0.0372
	[0.00643]	[0.0409]
Head age	-0.00452**	-0.00808
	[0.00228]	[0.0145]
Head age squared	4.97e-05**	3.79e-05
	[2.29e-05]	[0.000145]
Head male	0.0289	-0.00941
	[0.0201]	[0.138]
Terai madhesh other Caste	-0.0539***	-0.447***
	[0.0184]	[0.134]
Hill dalit	0.00946	-0.262**
	[0.0132]	[0.103]
Terai dalit	-0.137***	-0.690***
	[0.0311]	[0.195]
Newar	0.0648***	0.146
	[0.0166]	[0.115]
Hill janajatis	0.0115	-0.192**
	[0.0107]	[0.0809]
Terai janajatis	-0.00309	-0.364***
	[0.0176]	[0.116]
Muslims	-0.105***	-0.322*
	[0.0248]	[0.181]
Other castes	-0.0293	0.0946
	[0.0444]	[0.358]
Household size	-0.0480***	-0.0278
	[0.00458]	[0.0249]
Student age	0.0998***	0.268***
	[0.00719]	[0.0464]
Student age Squared	-0.00489***	-0.00680***
	[0.000330]	[0.00203]
Student male	0.0224***	0.191***
	[0.00652]	[0.0376]
Son or daughter of a household head	0.0679***	0.184*
	[0.0182]	[0.112]
Grandchildren of a household head	0.124***	0.357**
	[0.0247]	[0.158]
Eldest son or daughter	-0.0677***	-0.255***
	[0.0143]	[0.0864]
Middle order son or daughter	-0.0951***	-0.524***
	[0.0158]	[0.0948]
Youngest son or daughter	-0.0622***	-0.431***
	[0.0127]	[0.0806]
Father's education (Primary and Above=1)	0.0159	0.222***
	[0.0117]	[0.0761]
Mother's dducation (Primary and Above=1)	0.0175	0.213***
	[0.0110]	[0.0764]
Log value of durable assets (in 000 NRS)	0.00697	0.169***
	[0.00548]	[0.0382]
Log of non remittance Income (in 000 NRS)	0.00781	0.113***
	[0.00496]	[0.0321]
Negative non-remittance Income (dummy)	0.0900	1.035**
	[0.0605]	[0.453]
Livestock units (measured in Tropical Livestock Unit)	0.000684	-0.0698***
	[0.00270]	[0.0203]
Log of landholding size (in hectares)	-0.00181	-0.0148
	[0.00191]	[0.0133]
Electricity (dummy)	0.0108	0.114
	[0.0128]	[0.0872]
Primary school in the locality	-0.0201	-0.129
	[0.0167]	[0.135]
Private school in the locality	0.0226**	0.0964
	[0.0108]	[0.0776]
Rural (dummy)	0.0130	-0.423***
	[0.0125]	[0.0893]
VDC Unemployment rate (2008)	-0.0951	2.321**
	[0.150]	[0.920]
District fixed effects	Yes	Yes
Constant	0.140	1.485**
	[0.0898]	[0.610]
Observations	8,617	8,617
Parental Migration=Non-Parental Migration [Chi-square]	5.92**[]	3.73*[]

Clustered standard errors in brackets
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

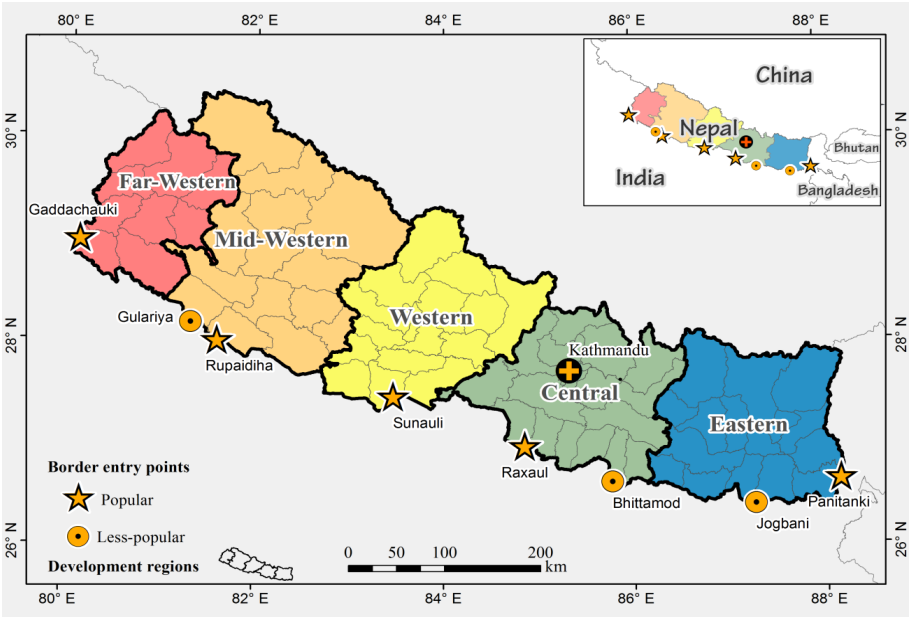
Notes: Reference category is High Caste i.e. Brahmin and Chettri. Reference category is other relationship to the Household Head. Reference category is singleton

Table 6: Heterogenous Effects

	Parental Migration	Non-Parental Migration	Log of Remittance
Dependent Variable: School Enrollment			
Gender			
Male	-0.227**	0.0033	0.0241*
	[0.109]	[0.085]	[0.0136]
Female	-0.315**	-0.266	0.035*
	[0.158]	[0.164]	[0.020]
Age			
Young (5-10)	-1.059***	-0.637**	0.107**
	[0.403]	[0.304]	[0.043]
Old (11-16)	-0.054	-0.033	0.001
	[0.081]	[0.083]	[0.108]
Mother's education			
Educated mother	-0.068	-0.0431	0.00831
	[0.092]	[0.088]	[0.009]
Uneducated mother	-0.220	-0.125	0.025
	[0.140]	[0.110]	[0.020]
Dependent Variable: Log(Education Expenditure)			
Gender			
Male	-1.616**	-1.230**	0.181**
	[0.760]	[0.539]	[0.088]
Female	–2.425**	-1.949*	0.311**
	[1.038]	[1.065]	[0.124]
Age			
Young (5-10)	2.873	2.268	0.298
	[1.877]	[1.415]	[0.197]
Old (11-16)	-1.898***	-0.978*	0.253***
	[0.549]	[0.519]	[0.070]
Mother's education			
Educated mother	–0.931	-1.623**	0.170**
	[0.813]	[0.740]	[0.080]
Uneducated mother	-1.764**	-0.740	0.229*
	[0.724]	[0.740]	[0.121]

Clustered standard errors in brackets

Figure 1: Map of Nepal with Indian Borders for Outbounding Migrants to India



Source: World Food Programme Nepal and Nepal Development Research Institute (2008).

Appendices

A Construction of Weighted Cost of Travel

In this appendix, we provide further detail on the construction of the cost of travel.The Department of Transport and Management in Nepal (DoTM) only recently began proper documentation of bus fare information and made it publicly available. Therefore in areas with good road networks, we use the latest bus fare information to calculate the weighted cost of travel to the nearest Indian border and to Kathmandu. In the high hilly or mountain districts where there are no good road networks, we use the airfare between the district airports (or the nearest airport in the proximate district) and the airport district with the nearest Indian border (or proximate airport district). If the airport is in another district and not in the district with the nearest Indian border, we add the bus fare from the airport district to the border district to the airfare. Similarly, we use the airfare information from airports in those hilly and mountains districts to Kathmandu airport to calculate the cost of travel from each district to Kathmandu. The formula is used for calculation:

$$W_j = w_j^d * \frac{\sum_{i=1}^{N} TC_{ij}^d}{N} + w_j^e * \frac{\sum_{i=1}^{N} TC_{ij}^e}{N} \tag{4}$$

where W_j is the weighted average cost of travel at district level j. w_j^d and w_j^e are the proportion of domestic and external migrants from district j respectively. TC_{ij}^d and TC_{ij}^e are the cost of travel to Kathmandu and to the nearest Indian border respectively deflated to the year absentee i left the household in district j and N is the total number of absentees in district j.

B Regression Estimates

Table B.1: Instrumental Variable Estimates for Child Labor

Variables	Child Labor=1
Parental migration	0.222
	[0.151]
Non-parental migration	0.353***
	[0.143]
Log of total remittances	-0.030*
	[0.017]
Household assets and income	Yes
Parents education	Yes
Household (head) and child characteristics	Yes
Community level characteristics	Yes
District fixed effects	Yes
Cragg-Donald F Stat	17.834
Kleibergen-Paap F Stat	8.443
Observations	8617
R-squared	0.2875

Clustered standard errors in brackets
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Notes: Household assets and income include value of durable assets, non-remittance income, negative non-remittance income, livestock units (measured in Tropical livestock units), landholding size, and electricity. Parents' education includes mother's and father's education. Household (head) characteristics include household head age, age squared and gender, ethnicity, number of children less than five years old and total number of students. Child characteristics include student's age, age squared, gender, relationship to the household head and the birth order. Community Characteristics include rural dummy, village past unemployment rate, dummy for the availability of primary and private school in the locality.

Table B.2: Test for Exclusion Restriction by adding one additional IV in the second step 2SLS only

Variables	School Enrollment=1	Log of Education Expenditure
Parental migration	-0.327***	-1.928***
	[0.107]	[0.682]
Non-parental migration	-0.181*	-1.116*
	[0.0937]	[0.572]
Log of total remittances	0.034***	0.217***
	[0.013]	[0.0785]
Household assets and income	Yes	Yes
Parents education	Yes	Yes
Household (head) and child characteristics	Yes	Yes
Community level characteristics	Yes	Yes
District fixed effects	Yes	Yes
Cragg-Donald F Stat	14.054	12.643
Kleibergen-Paap F Stat	6.726	6.369
Hansen J-stat [p-value]	0.7636	0.1263
Observations	8512	7702
R-squared	0.1251	0.2717

Clustered standard errors in brackets
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Notes: Household assets and income include value of durable assets, non-remittance income, negative non-remittance income, livestock units (measured in Tropical livestock units), landholding size, and electricity. Parents' education includes mother's and father's education. Household (head) characteristics include household head age, age squared and gender, ethnicity, number of children less than five years old and total number of students. Child characteristics include student's age, age squared, gender, relationship to the household head and the birth order. Community Characteristics include rural dummy, village past unemployment rate, dummy for the availability of primary and private school in the locality.

Table B.3: Regression Estimates of Overall Effects of Migration and Controlling For Remittance

	Overall Migration Effects		Controlling for Remittances	
Variables	School Enrollment=1	Log of Education Expenditure	School Enrollment=1	Log of Education Expenditure
Parental migration	-0.044	-0.094	-0.053	-0.191
	[0.0298]	[0.232]	[0.0428]	[0.322]
Non-parental migration	0.556	0.395	0.049	0.314
	[0.045]	[0.286]	[0.059]	[0.371]
Log of total remittances			0.0009	0.0116
			[0.00236]	[0.0150]
Household assets and income	Yes	Yes	Yes	Yes
Parents education	Yes	Yes	Yes	Yes
Household (head) and Child characteristics	Yes	Yes	Yes	Yes
Community level characteristics	Yes	Yes	Yes	Yes
District fixed effects	Yes	Yes	Yes	Yes
Cragg-Donald F Stat	135.626	117.834	107.355	93.001
Kleibergen-Paap F Stat	51.715	46.934	44.620	41.055
Observations	8617	7807	8617	7807
R-squared	0.3020	0.4392	0.3021	0.4403

Clustered standard errors in brackets
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Notes: Household assets and income include value of durable assets, non-remittance income, negative non-remittance income, livestock units (measured in Tropical livestock units), landholding size, and electricity. Parents' education includes mother's and father's education. Household (head) characteristics include household head age, age squared and gender, ethnicity, number of children less than five years old and total number of students. Child characteristics include student's age, age squared, gender, relationship to the household head and the birth order. Community Characteristics include rural dummy, village past unemployment rate, dummy for the availability of primary and private school in the locality.

C Miscellaneous

Table B.4: Instrumental Variable Estimates for Choice of School

Variables	Private School=1
Parental migration	-0.390**
	[0.165]
Non-parental migration	-0.335**
	[0.146]
Log of total remittances	0.045**
	[0.018]
Household assets and income	Yes
Parents education	Yes
Household (head) and child characteristics	Yes
Community level characteristics	Yes
District fixed effects	Yes
Cragg-Donald F Stat	15.819
Kleibergen-Paap F Stat	7.933
Observations	7807
R-squared	0.3025

Clustered standard errors in brackets
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Notes: Household assets and income include value of durable assets, non-remittance income, negative non-remittance income, livestock units (measured in Tropical livestock units), landholding size, and electricity. Parents' education includes mother's and father's education. Household (head) characteristics include household head age, age squared and gender, ethnicity, number of children less than five years old and total number of students. Child characteristics include student's age, age squared, gender, relationship to the household head and the birth order. Community Characteristics include rural dummy, village past unemployment rate, dummy for the availability of primary and private school in the locality.

Table B.5: Instrumental Variable Estimates with Father Absentee Only

Variables	School Enrollment=1	Log of Education Expenditure
Parental migration	-0.325***	-2.284***
	[0.109]	[0.751]
Non-parental migration	-0.164*	-1.354**
	[0.094]	[0.627]
Log of total remittances	0.034***	0.256***
	[0.013]	[0.085]
Household assets and income	Yes	Yes
Parents education	Yes	Yes
Household (head) and child characteristics	Yes	Yes
Community level characteristics	Yes	Yes
District fixed effects	Yes	Yes
Cragg-Donald F Stat	17.751	15.458
Kleibergen-Paap F Stat	8.453	7.805
Observations	8571	7763
R-squared	0.1347	0.1995

Clustered standard errors in brackets
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Notes: Household assets and income include value of durable assets, non-remittance income, negative non-remittance income, livestock units (measured in Tropical livestock units), landholding size, and electricity. Parents' education includes mother's and father's education. Household (head) characteristics include household head age, age squared and gender, ethnicity, number of children less than five years old and total number of students. Child characteristics include student's age, age squared, gender, relationship to the household head and the birth order. Community Characteristics include rural dummy, village past unemployment rate, dummy for the availability of primary and private school in the locality.

Table B.6: Instrumental Variable Estimates with Remittance Dummy

Variables	School Enrollment=1	Log of Education Expenditure
Parental migration	-0.288***	-2.036***
	[0.103]	[0.778]
Non-parental migration	-0.193*	-1.572*
	[0.112]	[0.815]
Remittance receipt (=1)	0.413**	3.198***
	[0.172]	[1.243]
Household assets and income	Yes	Yes
Parents education	Yes	Yes
Household (head) and Child characteristics	Yes	Yes
Community level characteristics	Yes	Yes
District fixed effects	Yes	Yes
Cragg-Donald F Stat	9.952	8.047
Kleibergen-Paap F Stat	4.797	4.087
Observations	8671	7807
R-squared	0.0064	-0.0232

Clustered standard errors in brackets
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Notes: Household assets and income include value of durable assets, non-remittance income, negative non-remittance income, livestock units (measured in Tropical livestock units), landholding size, and electricity. Parents' education includes mother's and father's education. Household (head) characteristics include household head age, age squared and gender, ethnicity, number of children less than five years old and total number of students. Child characteristics include student's age, age squared, gender, relationship to the household head and the birth order. Community Characteristics include rural dummy, village past unemployment rate, dummy for the availability of primary and private school in the locality.

Table C.1: Reasons for Dropping Out from School by Household Migration Statuses

Q.Reason for leaving School	Parent migrated	Non-parent migrated	No migration
Poor academic progress	45%	41%	32%
Household work	19%	17%	23%
Expensive	6%	11%	7%
Parents unwilling	10%	5%	7%
Paid job	3%	1%	6%
Others	17%	25%	25%

Source: Central Bureau of Statistics (2011).

Table C.2: Proportion of Primary Graduates and Secondary Graduates by Household Migration Status

Migration status	Proportion of Primary Graduates	Proportion of Secondary Graduates
Parental migration	0.17	0.077
Non-parental migration	0.20	0.079
No migrant	0.27	0.13
Test of means proportion (assuming equal covariance group matrices)		
Wilks Lambda [P-Value]	0.96[0.00]	0.98[0.00]
Pillais trace [P-Value]	0.040[0.00]	0.013[0.00]
Lawley-Hotelling trace [P-Value]	0.041[0.00]	0.013[0.00]
Roy's Largest Root [P-Value]	0.041[0.00]	0.013[0.00]

Note: Test results does not change when we assume unequal covriance matrices. Source: Central Bureau of Statistics (2011)