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Migration, School Attainment and Child Labor: Evidence from Rural Pakistan

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Abstract

Inequalities in access to education pose a significant barrier to development. It has been argued that this reflects, in part, borrowing constraints that inhibit private investment in human capital by the poor. One promise of the recent proposals to open international labor markets to allow for the temporary economic migration of low skilled workers from developing to developed countries is its potential impact on human capital accumulation by the poor. The large remittance flows from migrants to their communities of origin underscores this aspect of migration. However, migration can also transform expectations of future employment and induce changes in household structure that can exert an independent effect on the private returns to investment in human capital. The paper explores the relationship between temporary economic migration and investment in child schooling. A key challenge for the paper is to deal appropriately with selection into migration. We find that the potential positive effects of temporary economic migration on human capital accumulation are large. Moreover, the gains are much greater for girls, yielding a very substantial reduction in gender inequalities in access to education. Significantly, though, the gains appear to arise almost entirely from the greater resource flows to migrant households. We cannot detect any effect of future migration prospects on schooling decisions. More significantly, we do not find any protective effect of migration induced female headship on schooling outcomes for girls. Rather, female headship appears to protect boys at the cost of girls.

Keywords: Migration, Child Labor, Education, Gender Inequality

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1 Introduction

It has been argued recently that a crucial aspect of "feasible globalization" is the opening of international labor markets to allow for temporary economic migration from developing countries into the more developed ones (Rodrik (2002), Bhagwati(2003)). The expected income gains from such a liberalization of labor markets is expected to be large and, from the perspective of developing countries, is underscored by the large fraction of migrant earnings that are remitted back to families of origin in sending communities.

A question of particular interest in this regard is how such temporary economic migration is likely to affect private investments in human capital by the poor. Low educational attainment in many developing countries has been viewed as arising, at least partly, from barriers to such private investment, located in incomplete or absent credit markets.[1] To the extent that migration releases such resource constraints, it is expected to increase human capital investment among the poor, thereby also reducing inequalities of opportunity arising from differential access to education. In a context where gender differences in educational attainment are large, as is the case in rural Pakistan, lowering resource constraints for the poor could also lead to higher investments in schooling for girls and a reduction in gender inequalities in access to schooling with all its attendant societal benefits.[2]

Sociologists have long argued, however, that migration can create other constraints or change preferences in a direction which dampens or even reverses this potential enhanced investment. The basic argument is that migration can disrupt family life in any number of ways. Children in migrant households may, for example, face greater emotional stress, have less adult supervision, or be required to spend more time on household production or the care of younger siblings. However, changes in household structure due to sex-specific migration may also change the balance of preferences over schooling in another direction. Migrant households are often female headed in the crucial period when schooling decisions need to be made. A substantial body of research has identified important gender differences in preferences over the welfare of children and has shown, in particular, that investments in child education increase significantly in contexts where mothers exercise greater control

[1] See, for example, Jacoby (1994) and Jacoby and Skoufias (1997).

[2] A multitude of development benefits are associated with higher female educational attainment, Studies show that more educated women tend to have greater labor productivity, lower fertility, better child outcomes, make better use of health and other community services, and even participate more in the political process. See, e.g., Summers (1992), Schultz, (1989), Strauss and Thomas (1995), Behrman and Deolalikar (1995) and Glewwe (1999). In Pakistan, Zia and Bari (1999) identify female illiteracy as a major obstacle to effective political participation in local government, post decentralization.

over the use of household resources. These contrary effects could, in principal, have gender differentiated impacts and lead to higher or lower net investments in human capital among children in migrant households.

In this paper, we examine the impact of temporary economic migration by a household member on investments in child schooling. We are particularly interested in disaggregating the role of the potentially contrary channels through which migration could influence schooling decisions. The data come from rural Pakistan. Temporary economic migration is quite substantial, with more than one in four rural households reporting at least one migrant. School enrollment rates also remain relatively low and the rural gender gap in schooling is large. This makes it a particularly useful context for examining the impact of migration on gender inequalities in human capital investment. School age children are also routinely engaged in home or market production so that foregone income from such activity is the appropriate opportunity cost of time spent in school. We examine this trade-off directly by looking at the labor market activity of school age children. A substantial number of migrant households are also female headed. We can therefore examine how variations in household structure among migrants influences schooling choices, and in particular, how it influences the gender allocation of labor and schooling among migrant children.

The literature on migration and human capital investment in origin communities is small and focused largely on the impact of migration on accumulated schooling (see, for example, Cox Edwards and Ureta (2003), Lopez Cordoba (2004), Yang (2004), Hanson and Woodruff (2003), deBrauw and Giles (2005) and McKenzie and Rapoport (2005)). Most of these studies find some positive impact of migration on school attainment, but none looks at the impact of migration on gender inequalities in schooling carefully. Hanson and Woodruff (2003) find that the gains in schooling are greatest for girls in the age group 13-15. McKenzie and Rapoport's (2005) finding that 16-18 year old boys in migrant households have significantly fewer years of schooling effectively reduces the gender gap in schooling among 16-18 year old children, but only via a net reduction in schooling for boys. We are also not aware of any studies that have looked at the effects of migration on schooling and labor market outcomes for children simultaneously, or on the effects of migration induced changes in household structure on child schooling and labor market participation.[3]

Since migration can affect child schooling through multiple channels, the paper focuses

[3] The one possible exception is Joshi (2004), who looks at the effects of household structure in Bangladesh on child schooling, but does not focus specifically on migration.

on migration, rather than on remittance levels. Data on remittances are also likely to be very noisy. The main econometric challenge for the paper lies in dealing with the endogeneity of the migration decision. Migration is not randomly assigned to households and many of the same characteristics which influence the decision to migrate are likely to also affect the household's ability to invest in schooling, the perceived returns from such schooling, and the labor market activity of children.

We use two strategies to address this potential endogeneity problem. The first is to identify selection in the migration decision by using instrumental variables. Since any number of unobserved community characteristics, such as local labor market conditions or school quality, could affect the returns to schooling and the propensity to migrate, we need an instrument that varies across households within a village. We use the prevalence rates of migration in the population, at the village level, as our main instrument for migration and use a feature of migration that is particular to the context we study to obtain household level variation in our instrument. Mobility and seclusion restrictions on women typically require the presence of an adult male in the household. Households with a single adult male are therefore much less likely to undertake migration. We can therefore interact the village migration network with the number of adult males in a household (males above age 20) to obtain an instrument which varies at the household level. The identification argument, then is that the incidence of migration, at the census level, interacted with the number of adult males in the household, should affect a household's opportunity to send a migrant but is unlikely to be correlated with unobservable household or child attributes that affect the costs or returns to education, conditional on household demographic characteristics and village fixed effects to clean out the potential effects of any time invariant unobserved village characteristics. We show that conditional on appropriate demographic characteristics, the number of adult males exercises no influence on any outcome of interest.

Our second strategy is to confine attention to migrant households and to use information on the year of initial migration and the child's age on the survey date to examine differences in educational outcomes for siblings, differentiated by their attained age before the first migration episode for the household. This allows us to exploit the fact that many schooling decisions are time sensitive and have sustained impacts on educational attainment. For example, in the context we study, children typically begin elementary school at age 6 or 7 and children who have not initiated formal schooling by age 9 rarely enter the formal schooling process. We can test, therefore, whether children in migrant households

who had turned age 9 before the household's first migration episode are less likely to be enrolled in school as compared to children in their age cohort who were younger than age 9 when the first migrant left the household. Similarly, the extent to which children engage in labor market activity is likely to be codetermined with schooling decisions and therefore also sensitive to the child's age at migration.

Finally, still confining attention to migrant households, we ask whether schooling and labor market outcomes vary significantly by female headship and whether we can discern any gender differentials in outcomes. Since female headship arises directly from the migration decision in our sample, we treat female headship as endogenous and use the same instrument set to identify selection into female headship.

The next section of the paper provides the context for our study and presents some preliminary evidence on gender differences in educational attainment and labor market activity of school age children. Section 3 presents the estimation and identification strategy. We test our main propositions in section 4. In 4.1 and 4.2 we use our instrumentation strategy to examine differences in educational attainment and labor market activity respectively. In 4.3, we restrict attention to migrant households and examine differences in educational attainment and labor among children in migrant households using our second strategy. In 4.4, we ask whether accounting for female headship among migrant households yields any further insights. Section 5 concludes.

2 Data and Context

2.1 Migration

More than one in four households in rural Pakistan have at least one migrant member. Migrants are typically adult males, who move temporarily to an international or domestic urban destination in search of employment leaving their families in the village.[4] Most maintain very close ties with their origin households and communities, returning frequently and sending substantial remittances.[5] This makes the context particularly useful for examining the impact of migration on outcomes in the sending community.

The study uses data from the Pakistan Rural Household Survey (PRHS) 2001-02, which collected detailed information on migration for each household member.[6] Complete

[4] Close to 80% of migrants in our study report having undertaken migration in search of employment.

[5] See Addleton (1984), Kazi (1989) and Arif (2004) for a review of migration patterns in Pakistan.

[6] In the PRHS, all individuals who were away from the household at the time of the survey, were classified as households members, provided they were regarded as members of the household before they

data is available for 2531 rural households in 143 villages in 16 districts across all 4 provinces. The survey contains detailed household and individual characteristics, including demographics, occupation, health, education, investments, assets, household expenditure, and the migration experience of all household members. For migrants, data were also collected on the year and duration of migration, migration destination, remittances, and social networks accessed prior to and post migration. Migrants were interviewed directly when possible. Otherwise, the individual designated as the male head of the household reported migration and other information for each migrant.

For purposes of the analysis we confine attention to male migrants age 18 or older who migrated for economic reasons.[7] Using this definition, 977 men (about 15% of all men in this age range) are classified as migrants Of these, 32% were back from a migration episode in the survey year, the rest were current migrants. Since migration is typically recurrent, a household is classified as a migrant household if it reported at least one male member with some migration experience current or past. At the household level, 699 households (26% of all households) had at least one male migrant.

The median age at first migration in the sample is 22. The typical migrant is either a household head (38%) or an older son of the head (54%). One indicator of the extent to which migrants are attached to their families of origin in the villages is that over two-thirds are married and have their spouses and/or children living in the village. Almost two-thirds of migrants also reported sending some remittances to their families in the village and three-fourths of those who sent remittances did so on a regular basis.[8] The survey has a companion section on cash and kind transfers received and given by the household, and the identity of all who send or receive such transfers. The median reported amount remitted annually by migrant household members is about Rs. 24,000.[9] In contrast, transfers by non-household members are insignificant.[10]

left and had not set up a permanant home elsewhere. This enabled collection of all relevant data on current migrants.

[7] There is virutally no migration among children under 18. The few who do not live at home move to join a family member or to attend school in a neighboring rural area. Women also typically migrate to join family members, most often a spouse.While 8% of reported migrants are women, over 82% report migrating to join a family member. Only 13 women (1% of the sample of migrants) report migrating for any economic reason.

[8] Remittances from international migrants constitute the single largest source of foreign exchange earnings for the country. According to one estimate, US$2.4 billion (or 4% of the country's GNP) is currently remitted annually by international migrants (see Gazdar (2003))..

[9] About $500 annually at the prevailing exchange rate in 2001.

[10] See Mansuri (2006) for a more extensive discussion of migration destination and remittance flows in

2.2 Schooling Decisions and Child Labor Market Activity: Preliminary Results

Most studies that have looked at the impact of migration on child schooling have focused on accumulated schooling as measured in completed grades. In the context we study, accumulated schooling is likely to reflect the combined effects of several distinct schooling decisions since enrollment rates are low, the withdrawal of children from school at the transition point from elementary to middle school is high, and there is significant participation by children in labor markets. This makes it important to disaggregate the impact of migration on accumulated schooling by examining schooling outcomes at both the intensive and extensive margin. We also examine accumulated schooling conditional on enrollment since this is a better measure of progress through school

We have data on schooling outcomes for 7181 children age 5 to 17 who belong to 2126 households. Of these 29% belong to migrant households. There is wide variation, in practice, in the age at which children start school. However, very few begin school after age 10. In examining the school enrollment decision and accumulated schooling, therefore, we confine attention to children age 11-17 in order to ensure that our estimates of enrollment or completed grades are robust to potential late entry. In looking at retention rates, however, we focus on children 10-15, since this is the age group which is most at risk for dropping out of school during the transition point from primary to middle school. In looking at completed grades, conditional on current attendance, however, we include all school age children (5-17).

Overall, 58% of children age 11-17 report having enrolled in school at some point. Of these, 38% had dropped out of school by the survey year. The bulk of dropouts, over 85%, had dropped out either before or at the end of elementary school.

While these overall rates of enrollment and retention and quite poor, they conceal very large gender differences in enrollment and retention rates. In the sample, 58% of girls age 11-17 had never been to school as compared to only 26% for boys in this age range. The picture only worsens when we look at school retention rates. While only 25% of enrolled boys in the sample had dropped out by the survey year without completing high school, 44% of enrolled girls were no longer in school. Not surprisingly, boys also have significantly more years of schooling, completing an additional half grade more than girls on average (p-val .000).

A number of household and community characteristics account for these low overall

rural Pakistan.

rates and the large observed gender gap.[11] At the household level, school enrollment and retention rates typically vary significantly with income and the gender gap declines as income increases. This pattern is evident in Figures 1-6 in the appendix. As wealth increases, enrollment rates rise and dropout rates decline across the board. The gender gap in both also narrows. as does the gap in completed grades, and both boys and girls do equally well in terms of completed grades for age if they remain in school. This suggests that migration should not only increase school enrollment and retention rates, it should yield relatively higher benefits for girls. This is indeed borne out in a simple comparison, by household migration status, of mean enrollment and dropout rates in our sample. Children in migrant households have higher levels of enrollment and lower dropout rates. Girls also do better in terms of completed grades (see table A2 in the appendix) and there is some evidence of smaller gender gaps in all outcomes.

Migration could, in principal, generate countervailing effects on child labor market activity. The relaxation of credit constraints should reduce participation in the labor market, while the potential disruption in family life and lack of available adults could place greater labor demands on the time of school age children, particularly in home production activities. Fortunately, we can use data on the time spent by children in household production and wage labor to directly examine this question.

While these simple mean comparisons are only suggestive at this stage, we do not appear to be in world where the income effect of migration is dampened or reversed by greater labor demands on the time of school age children due to migration induced family life disruption.

Nonetheless, we can examine this question directly by looking at the labor market activity of school age children. We have labor market participation information for 5780 children age 7 to 17 who belong to 1992 sample households. There is data on five major categories of work. Work on the family farm, agricultural wage work, work on a family enterprise or home based productive activity of any kind, non-farm wage work and care of livestock. For children up to age 13 we also have information on time spent on fetching firewood and water. We construct two definitions of work. The more restrictive definition (I) , includes only directly income generating activities. It therefore excludes livestock care, and the fetching of firewood and water. The less restrictive definition (II) includes all work.

Using the more restrictive definition, 18% of all children in the age group 7-17 report

[11] See the Pakistan Country Gender Assessment, Chapter 2, The World Bank. 2005 for an extensive overview and analysis.

doing some work and among children age 15 and up, more than a third report some work activity. Interestingly, there appears to be little difference in reported work activity by gender. Using an eight hour work day and 30 days of work per month, the median days worked by children who report some labor market activity is 1.3 months over a one year period. The average number of days worked is substantially higher at 2 months since there is a strong positive correlation between age and labor market participation. Again, there are no discernible gender differences in days worked. While boys work 12 more days, on average, per year, this difference arises entirely from children 16 and older where boys work for 24 more days per year than girls (p-value$<.00$). In all other age groups the difference is small and insignificant. If we use the broader definition of work, the labor activity of children age 7-17 rises to 29%. The median number of days worked are close to 2 months and the average number of days worked rises to about 3 months.

The principal work activity of children is unpaid work on the family farm. 63% of working children report working on their own family farms. However, more than a third (35%) also report working as agricultural wage labor and 13% report working on a family enterprise. In contrast, only 8% report working as non-farm wage labor. There are strong gender differences in the type of work undertaken by male and female children. If we focus on unpaid family labor, boys are much more likely to work on the family farm (68% of boys and 58% of girls: p-value $<.000$), but girls are more likely to work on the household's non-farm enterprise (16% of girls and 10% of boys: p-value $<.00$). If we focus on daily wage labor instead, girls are much more likely to work as agricultural wage workers (51% of girls as compared to only 20% of boys: p-value$<.0000$), while boys are more likely to work as non-agricultural wage workers (14% of boys but only 2% of girls: p-value $<.0000$). These differences are consistent with other work that has highlighted mobility constraints for girls, particularly after adolescence.[12] Non-agricultural wage work typically requires travel outside the village, and is often undertaken individually. In contrast, agricultural wage work is typically undertaken jointly with other family members, particularly other adult females. Wage labor is largely undertaken by children 14 and older in our sample, but this is particularly evident for non-farm wage work, which is almost exclusively done by boys 14 and up.

This pattern is reflected in Figures 7-10 (see Appendix). Girls work more than boys until age 13 if we use definition I (age 14 if we use definition II). Girls also bear a substantially larger burden of work in poorer households. Their participation in labor market

[12] See the Pakistan Country Gender Assessment, The World Bank (2005)

activity starts out significantly higher than that of boys, but falls sharply with wealth, and is significantly below that for boys in the highest wealth quintile (see figures 11-14).

As one might expect, there is also a strong negative correlation between school enrollment, school retention and labor market activity. Appendix Table A1 presents differences in labor market activity for children in three age groups, differentiated by whether they were ever enrolled and whether, conditional on enrollment, they were in school in the survey year. Children who are enrolled in school are significantly less likely to report work and work fewer days than those who are never enrolled in school and the differences are large, particularly for children between the ages of 11 and 17. Children who drop out of school, are also significantly more likely to report some work and work more days than children who remain in school. This suggests that the opportunity cost of time spent by children in school is quite substantial, at least for some households, and rises with age, so that withdrawal from school may be spurred at least in part by the need to allocate this time to labor market activity.

Table A2 in the appendix focuses on differences in child labor market activity by the migration status of the household. Mean comparisons indicate significantly lower child labor market activity in migrant households, with substantially larger effects for girls.

Our discussion so far has focused on three potential channels through which migration could impact household investments in child schooling: an increase in household income via remittances, increased risk bearing capacity, and changes in the demand for child labor time. As we note above, though, in a contexts such as ours, where there is evidence of strong boy preference, evidence of differentially better outcomes for girls due to migration may be capturing the effect of a rather different process: Male migration often leaves women effectively in charge of their households. If women have more benevolent preferences towards their children, and particularly their daughters, then it could be "male absence", which yields the larger observed benefits for girls.

We define female headship simply as the absence of an adult male in the household during the survey year. Using this definition, almost 12% of sample households can be classified as female headed. What is interesting, though, is that virtually all of these are migrant households. Among non-migrant households, the incidence of female headship is a meagre 2% as compared to 37% for migrant households. In rural Pakistan, therefore, female headship is almost exclusively a result of economic migration. We exploit this feature of our data by confining attention to migrant households and examining the impact of female headship on child schooling and labor outcomes, and more specifically, on gender

differences in such outcomes.

Given that the average duration of a migration episode is about 8 years and migration is often recurrent, these women are effectively left in charge of their households for long stretches of time. Most migrants are also relatively young married men with children, so these women are also likely to preside over important schooling decisions for their children. It is this aspect of female headship that is pertinent to the concerns of this paper.

More specifically, we are interested in whether any evidence we find for the protective effects of migration, particularly for girls, arises, at least in part, due to the substantial incidence of female headship among migrant households. A substantial body of research has identified important gender differences in preferences over the welfare of children and has shown, in particular, that investments in child education increase significantly in contexts where mothers exercise greater control over the use of household resources. In a context such as ours, where women's ability to make decisions regarding the disposal of such resources is, otherwise, severely circumscribed, the migration induced absence of males may well provide mothers with an opportunity to more easily realize their preferences with regard to investments in their children's education. The observe effect, of course, is that economic migration can also be disruptive of family life in any number of ways. As we note above, the absence of other adult labor, may result in greater pressure on children to assist with housework, household production or childcare. This creates a potential conflict for female heads between their desire to invest in their children and the greater opportunity cost of child time in school, with possible consequences for the gender allocation of labor and schooling. We examine this issue by confining attention to migrant households and asking whether schooling and labor market outcomes vary significantly by female headship and whether we can discern any gender differentials in outcomes.

In our schooling sample, close to 40% of migrant households are in fact female headed, with either no adult male present (17%) or a very young unmarried adult male (under 21) present in the household (23%). This is in sharp contrast to non-migrant households where such female headship is virtually absent, with only 3% of households reporting a female head.

We find, in line with other studies, that female headed households are smaller and have a higher dependency ratio. In our context, migrant males remain closely tied to their origin households and remittances are typically regular and substantial, particularly where a wife and or children are left behind. Nonetheless, female headed households do have significantly fewer assets, though they have more inherited land on average than other

migrant households and there are no discernible differences in per capita consumption expenditures.

A simple comparison of proportions indicates no difference in enrollment rates among migrant households by female headship. However, girls in female headed households are significantly more likely to dropout of school (with dropout rates rising from .25 to .41, p-val .02). Girls in female headed households are also significantly behind in terms of completed grades (by .58 grades, p-val .02) and conditional on current enrollment they fall a whole grade behind (p-val .01). There is, in contrast, no effect on boys.

These results indicate that female headship, in the context we study, might serve to dampen rather than accentuate, the potential positive gains from migration and, moreover, that girls are likely to bear the greatest burden. Of course, as descriptive statistics, these are only suggestive. They do, however, anticipate some key results.

3 Econometric Specification and Identification

In order to assess the effect of migration on schooling and child labor, we need to estimate a regression function of the form

$$S_{ijv} = \beta_1 M_{ijv} + \beta_2 B_{ijv} + \beta_3 B_{ijv} M_{ijv} + \gamma_1 C_{ijv} + \gamma_2 X_{jv} + \eta_{jv} + \varepsilon_{ijv} \qquad (1)$$

Where S_{ijv} is a measure of school attainment for child i, in household j and village v. M_{jv} is an indicator of whether the household has a migrant, B_{ijv} is the child's gender, and C_{ijv} and X_{jv} are vectors of exogenous child and household characteristics. The mean zero error term η_{jv} captures the effects of unobserved factors common to a given village and household. The child-specific error term ε_{ijv} reflects measurement error in our schooling variables and, potentially, unobserved attributes of the child, including innate ability, or parental preferences which vary by child gender. The key difference between η_{jv} and ε_{ijv} is of course that while the latter is not likely to be correlated with the migration decision, the former could influence both the decision to migrate and investments in human capital formation. At the village level, η_{jv} may, for example, include unobserved variation in local labor market conditions or in school quality, while at the household level, it could include preferences over human capital accumulation, access to credit or insurance markets or costs that affect schooling but are not observed in the data.

Regardless, since M_{jv} is likely to depend on at least one of the factors captured by η_{jv}, we need to contend with a potential endogeneity problem. We tackle the problem in two

ways. Our first strategy is to instrument for migration. To do this, we need instruments correlated with the migration decision but uncorrelated with unobserved attributes of the household or the community.

A number of recent papers have used a measure of the migrant network to instrument for migration. Migrant networks are seen as reducing the costs of migration for potential migrants via two channels First, they constitute an information network which can educate potential migrants about conditions in specific migration destinations as well as potential hazards and costs, both at home and in migration destinations (Massey 1988; Orrenious (1999)). Second, they serve to relax credit constraints (Genicot and Senesky (2004)). A number of studies have also shown that networks increase the economic returns to migration (Munshi (2003); McKenzie (2005)). All of this implies that the probability of migration should be higher for households residing in communities with significant migration experience.[13]

The PRHS 2001-02 includes a complete census of all village households which ascertained the household's current migration status.[14] Using this, we can construct a measure of the migration network for each village in our sample as the proportion of households in the village with a current migrant. While this census based measure of migrant networks is unlikely to be correlated with household specific unobservables in η_{jv}, this is of course not the case for any number of village level unobservables which could well be corrrelated with both the propensity to migrate at the village level and village average child outcomes. In order to deal with this problem, we need an instrument which varies at the household level.

Fortunately, a feature of migration that is particular to the context we study, provides us with such household level variation in the opportunity to migrate. Mobility and seclusion restrictions on women typically require the presence of an adult male in the household. Indeed, households without an adult male are a rare feature among non-migrants in rural Pakistan (less than 3%). Households with a single adult male are therefore much less

[13] This is indeed borne out in several empirical studies. For example, Winters et. al. (2001) show that the probability of migration to the United States is higher for households living in Mexican communities which have greater experience with migration. Banerjee (1991) and Caces(1986) have shown the importance of networks in the rural-urban migration decision in the Indian and Philippine context respectively. Ilahi and Jafarey (1999), have shown the importance of extended family networks in financing migration costs in Pakistan.

[14] In the census,14% of households report a current migrant. This is significantly below the migration incidence we get from the household survey since the latter is not restricted to current migrants. It is worth noting that the number of households in the sample with a current migrant is just above 13%, as we would expect from the census.

likely to undertake migration. One might argue, however, that the number of adult males in the household could also affect child schooling and labor through their affect on household income or the presence of adults who can supervise or otherwise provide guidance to children with schoolwork etc. We show however, that conditional on appropriate household demographic characteristics and a measure of inherited land wealth, which is clearly independent of the migration decision,[15] the number of adult males in the household has no residual impact on any outcomes of interest.

We can therefore interact the number of adult males in the household (males above age 20), NA_{jv},with our migrant network instrument to obtain a set of instruments that vary across households within a village. Using this instrument set, we can difference out any time invariant characteristics of the village and confine attention to differences in educational attainment among migrant and non-migrant children within each village, conditional on household demographic structure and inherited wealth.

Differencing equation 1 across households within a village, yields

$$S_{ij} = \beta_1 M_j + \beta_2 B_{ij} + \beta_3 B_{ij} M_j + \gamma_1 C_{ij} + \gamma_2 X_j + \zeta_{ij} \tag{2}$$

where $\zeta_{ij} = \eta_j + \varepsilon_{ij}$.

Our principal instrument for M_j in equation 2 is therefore a measure of the village migrant network (VM_v) interacted with the number of adult males in the household (NA_j). Additional instruments are constructed by interacting NA_j with the village land gini (VG).[16] These two instruments are interacted with the child's gender in order to estimate β_3.

The set of exogenous child characteristics, C_{ijv}, include the child's gender, age and age squared, mother's and father's level of education (in completed grades), the number of other school age siblings (age 6-17); the number of siblings age 5 or younger, also interacted with the child's gender in order to to ascertain any gender differences in child care responsibilities, and the presence of an older brother or sister under age 18. The rationale for this last set of variables is that children who have older siblings may be less likely to be removed from school in the event of an unexpected income loss or have fewer household production related responsibilities. The set of exogenous household level characteristics, X_{jv}, includes a further set of demographic controls, specifically, an indicator for whether

[15] Since land is primarily inherited in rural Pakistan, concerns about changes in land distribution due to migration are unwarranted.

[16] The direct effect of any village level observables has already been removed using the village fixed effect and we control for the household's own land holdings directly in the second stage.

there is more than one married male with coresident spouse and/or children in the household and the household dependency ratio. It also includes the household's inherited land holdings (in acres) our main control for household wealth. Given this set of child and household characteristics, $E\left[(VM * NA_j)\ \zeta_{ij}\right] = E\left[(VG * NA_j)\ \zeta_{ij}\right] 0$ should hold to a reasonable approximation.

Since we get identification substantially from household level variation in NA_j, once we clean out the effects of village level unobservables, we present, for each schooling outcome, one specification, without village fixed effects, which includes the number of adult males in the household in the second stage. In all cases, the effect of including NA_j is negligible. It always fails to attract a significant coefficient and the F-statistic on the instrument set is essentially unchanged (see Tables 1-5, specification 3).[17]

Our second strategy for dealing with the potential endogeneity of the migration decision is to restrict attention to migrant households and use information on the year of migration and child age to look at differences in schooling and labor outcomes of siblings classified by their age in the year of migration. This allows us to exploit the fact that many schooling decisions are time sensitive and have sustained impacts on educational attainment. However, differences in schooling outcomes for siblings in the two groups should be free of any bias due to time invariant household level unobservables, including the determinants of the migration decision.

To examine the impact of migration on school enrollment, children who were 9 or older before the first migrant left the household are placed in group I and children who were younger than 9 in the year of first migration are placed in group II. The rationale for using 9 as the cut-off point is that decisions regarding child school enrollment are more or less made by age 10 in the context we study. The dependent variable is, as above, an indicator for whether the child was ever enrolled in school. The main migration variable is now the child specific group indicator ABM_{ij} which takes the value 1 if the child is in group I. Let us suppose, for the sake of exposition, that we have a sample consisting of two children, one in group I ($ABM_{ij} = 1$) and the other in group II ($ABM_{kj} = 0$). In this case, the first difference estimator is identical to the household fixed effect estimator (which we use in

[17] To the extent that the size or quality of the migration network influences not just current migration, but also the future migration prospects of children and thus investments in education, it is possible that the exclusion restriction on the village migrant network is not valid. This poses no problem as far as the schooling decisions of girls are concerned, since women do not migrate, except through marriage, in our context.

Regardless, though, our instrumentation strategy deals with this issue as well since we use village fixed effects to clean out the direct effect of all village level variables, including the village migrant network.

the empirical work). Replacing M_j in 1 with ABM_{ij} and differencing the equation across children within a household, yields

$$\Delta S_j = \beta_1 ABM_j + \beta_2 \Delta B_j + \beta_3 \Delta B_j M_j + \gamma_1 \Delta C_j + \Delta \varepsilon_j \quad (3)$$

where Δ is the difference operator and $\Delta ABM_j = ABM_{ij}$. The OLS estimates of β_1,β_2 and β_3 from this regression will be consistent provided that $E[ABM_{ij}\Delta\varepsilon_j] = 0$.[18] Note that while we have differenced out any time invariant household unobservables, it is conceivable that a time varying unobservable, such as an idiosyncratic shock, may have influenced the timing of migration as well as the educational outcomes of group I siblings in the household. Since we are interested in precisely this aspect of migration, i.e., its capacity to release credit constraints, this presents no problem.

4 Main Results

Tables 1-5 present the estimation results for the three measures of school attainment and the two measures of child labor, respectively. Both measures of labor market activity use the more restrictive definition of work. The first specification in all cases (column 1) presents the OLS estimates of the migration coefficient and its interaction with child gender under the assumption that the migration decision is uncorrelated with unobserved village and household attributes. The full set of controls (see Appendix Table A3) are included in this specification.

In specification 2 we relax the assumption that the migration decision is uncorrelated with unobserved household characteristics which could influence schooling choices. Since the endogeneity bias in the migration coefficient could work in either direction, we have no priors on the direction of the bias. The instrument in this specification is the village migration network and its interaction with child gender. The explanatory power of the instruments, conditional on the included household and child characteristics, is extremely high in all cases. The coefficient estimates for the full set of controls for this specification is presented in Appendix Table A3.

In specification 3, we add the number of adult males to the set of controls. It fails to attract a significant coefficient and the strength of the instruments is unaffected. This confirms that the number of adult males exercises no residual influence on schooling or

[18] Note that since η_{jv} differences out of this equation, we do not need to be concerned about the possibility that migrant households constitute a selective sample (i.e, that $E[\eta_{jv}|Migrant] \neq 0$).

labor decisions for children, conditional on inherited household wealth and the set of demographic controls included in the second stage.

Specification 4 presents the OLS estimates with village fixed effects. As expected, cleaning out unobserved village characteristics reduces the effect of migration on all three schooling outcomes, indicating that part of the observed migration effect arises from village level unobservables.

Specification 5 presents IV estimates with village fixed effects. The joint explanatory power of our instruments, conditional on the village fixed effect and included household and child characteristics, is high in all cases. The instruments also easily pass the overidentification test. All statistics are reported at the end of each table. The first stage is reported in appendix table A3 for the school enrollment.

In Table 3, specification 6 checks for any migration induced changes in returns to schooling among high school age children. Specification 7 examines accumulated schooling, conditional on having enrolled in school, and specification 8 examines progress through school among children, age 5-17, conditional on current enrollment.

The control variables are jointly significant and three facts stand out. First, parental education and inherited wealth both have a positive effect on enrollment as expected. Second, extended families have a negative effect on enrollment and three, the total number of siblings of school age has a positive effect on enrollment while the number of siblings 0-5 does not appear to have any significant negative effect on enrollment.

4.1 School Enrollment, Dropout Rates and Accumulated Grades for Age

The migration effect is positive and significant for all three schooling outcomes. Children in migrant households are not only more likely to attend school, they are also more likely to stay in school in the age range when school dropout rates are at their peak levels, have higher completed grades in their age cohort and progress through school at a rate that is significantly better than their counterparts in non-migrant households in the same village. Accounting for selection into migration only strengthens these results indicating that the selection bias is negative.

We also find evidence to support migration induced gender differentials in enrollment rates, school retention and progress through school. Enrollment rates increase by 54% for girls in migrant households (from .35 to .54). In comparison, being in a migrant household raises enrollment rates for boys by only 7% (from .73 to .78). As a result, the gender gap in enrollment rates in migrant households is quite a bit smaller (at .24 as compared to

.39 among non-migrant households). Of course since enrollment rates for boys are much higher to being with, one might argue that raising the enrollment rates for girls should be easier. Even in this respect, though, the gains for girls are larger. The increase in enrollment closes the gap relative to 100% enrollment by 29% for girls, compared to 19% for boys.

The decline in dropout rates is also substantially larger for girls. The dropout rate for girls falls by 55% (from .56 to .25), while it declines by 44% for boys (from .25 to .14). As a consequence the gender gap in dropout rates falls sharply (from .31 to .11). Once again this implies that for girls the gap from 0 dropout rates is closed by 70% while for boys this gap is closed by 44%.

Turning next to accumulated years of schooling, unconditional on past or current enrollment, the gender differential is rather small. Girls in migrant households have about 1.5 more years of schooling compared to their counterparts in non-migrant households in the same village, while boys have about a grade more. Significantly though, prospects of migration in the future do not appear to exercise any effect on years of schooling for either boys or girls. (Table 3, specification 6).

When we look at accumulated schooling, conditional on having attended school at some point (table 3, specification 7), we get large differences in outcomes for girls and boys. In fact, comparing children in migrant households, we find that girls actually exceed boys in absolute terms, completing about a fifth of a grade more. The increase in accumulated schooling for girls is also larger than for boys if we compare children in migrant households with those in non-migrant households. While girls in migrant households complete almost 2 grades more than girls in non-migrants households, boys complete a little less than a grade more than boys in non-migrant households. The net effect is that in non-migrant households, boys are almost a full grade ahead of girls in their age cohort, while in migrant households, girls more than make up the gap, exceeding boys in their age cohort by .2 grades. Restricting the sample further by conditioning on current enrollment (table 3, specification 8) strengthens these effects further.

Since there is no gender difference in the average age in first grade, our evidence suggests either a disproportionate benefit to girls from improved household capacity to bear income risk or a higher incidence of migration generated burdens on boys. The latter is certainly plausible in the context of rural Pakistan, where migration induced male absence may imply greater reliance on boys for any number of activities that women and girls cannot undertake due to seclusion related restrictions on their mobility. We turn

to this issue below when we examine the effect of migration on labor market participation.

4.2 Child Labor Market Participation and Days Worked

Migration has a strong dampening effect on child labor market participation, regardless of whether we look at an indicator for whether the child works or the reported number of days worked over the survey year. Overall, days worked fall by about 66% (from 27 to 10 for boys and 27 to 9 for girls) (Tables 4 and 5). Unlike all three measures of schooling, however, there are no gender differentials in labor market activity. Children in non migrant households work about 27 days over the period of a year, and migration reduces labor market activity for both boys and girls by roughly the same number of days, though boys are more likely to report some work. Interestingly, the presence of older siblings is significant and reduces labor market activity for both boys and girls (see Appendix Table A3). Finally, accounting for selection into migration serves to strengthen the migration effect substantially, suggesting, again, that there is significant negative selection into migration.[19]

While these results are consistent with our results on schooling, given the strong negative correlation with school attainment and labor market activity, they do not suggest that the poorer performance of boys in school retention or accumulated schooling can be ascribed to increased labor market activity. Of course, the increased work burden may come from increased responsibilities for domestic activities and home production that are captures poorly in the data.

Although these results are strong, the IV estimates we present above cannot really account for the time sensitivity of educational investments. In particular, we cannot separate the impact of migration among children within a household. However, in reality such differences must be important if our argument is correct. Children who have already reached an age beyond which school enrollment is unlikely before the first migration episode for the household or who have been withdrawn from school due to resource constraints prior to migration are unlikely to catch up to children whose crucial schooling decisions were made post migration and the ensuing increase in resource flows. To this extent, our IV estimates are thus likely to understate the true impact of migration on schooling. To examine these differences more carefully, we now turn to our second strategy.

[19] This effect only increases if we use the less restrictive definition of work (not reported here) and, again both boys and girls appear to gain equally on average. For days worked per year, IV estimation of the migration effect with tobit and tehsil fixed effects (not reported here) generated very similar results.

4.3 Comparing Siblings Before and After Migration

We classify sample children into two groups by their attained age before the first migration episode for the household. We group children by whether they were 9 or older before the first migrant left the household (group I) or younger than 9 (group II) for all schooling and labor market outcomes, except accumulated grades for age, where we group children by the average reported age in grade 1. This accounts for both delayed entry into schooling as well as any interrupted schooling, since we cannot disaggregate these in the data. Specifically, we group children by whether they had turned 7 or older before the first migration episode of the household.

For each outcome, we also report results from a village fixed effects specification. While this is more restrictive, it is likely to be more efficient given our sample size once we confine attention to migrant households. In the case of school dropout rates, we report only this specification since we are unable to compare siblings since we now need to further restrict the sample to children who have enrolled in school at some point

For enrollment and accumulated schooling, the sample includes all children in migrant households age 11 or older at the time of the survey. For school retention we enlarge the sample to include children age 10, since conditional on enrollment, we no longer need to worry about late entry into schooling. We do the same for both labor market outcomes, but constrain the sample to focus only on children in the age range 10-16 since by age 17, a large fraction of boys are working and girls are getting married.[20]

There are 891 children in 388 households who were age 11 or older at the time of the survey and 36% of them fall into group I. Every age cohort has at least 24% of such children though there is some increase in the proportion of children in group II in the older age cohorts as one might expect. There is no difference, however, in the proportion of children ever enrolled in school by age.

The results with household fixed effects are presented in Table 6. The main variables of interest are the group indicator which takes the value 1 if the child is in group I, and its interaction with child gender. Columns (1) and (2) present the results for enrollment using village and household fixed effects, respectively. As before migration has a strong positive effect on enrollment, and this effect more than doubles when we move from a comparison of migrant children within a village to a comparison of siblings. Among siblings, enrollment

[20] Including the 17 years olds, has little effect on the odds of working, but the gender difference in days worked disppapears for children in group I. Using the more generous definition of work, increases the size of the effect but the results are qualitatively unchanged.

rates for girls rise by a whopping 65% (from .40 to .66) while for boys they rise by 15%(from .81 to .93) The net effect is a very substantial narrowing of the gender gap from .41 to .27. Again, migration not only has a positive impact on enrollment, overall, it generates a substantial catch up effect in enrollment for girls.

We turn next to school retention, conditional on enrollment. The group indicator now identifies all children who were 10 or older before first migration and were thus less likely to benefit from changes in household resources or preferences towards schooling, particularly for girls. The sample consists of 770 children in 92 villages. 24% of these children are in group I and every age cohort has at least 10% of such children, most have about 20%. Given the smaller sample, we use the more restrictive village fixed effects specification only.

School retention rates for girls rise dramatically after migration. While 55% of girls age 10-17 in group I dropped out of school, only 39% of girls who turned 9 after first migration dropped out. In comparison, there is no change in the dropout rate for boys before and after migration. Once again, this closes the gender gap in retention rates substantially.

We also find support for our results on accumulated schooling. Unconditional on enrollment, both boys and girl have significantly more grades for their age after migration, and once again, girls do a little better, but not significantly so, gaining 1.4 grades over their siblings in group I while boys gain about a grade. Note that boys remain ahead by a full grade when we restrict comparison to siblings.

Having found further and stronger evidence in support of our earlier results on schooling, we turn now to examining whether there are differences in labor market participation rates and work burden among same sex siblings who are differentiated by their age relative to the year of first migration for the household. We again use age 9 as the cut-off point since school enrollment and labor market participation are, as one might expect, strongly negatively correlated. There are 963 children age 10 and up in 402 migrant households. Almost a third of this sample (31%) had turned age 9 before first migration[21] and every age cohort has at least 15% of such children.

Focusing first on labor market participation, we find that 29% of girls and 24% of boys who had turned 9 or older before first migration, report some labor market activity. As before, post migration, labor market activity drops for both boys and girls (p-value$<.00$). However, now we get sharply divergent rates of decline for girls and boys. Only 6% of girls who turned 9 after first migration report any work. This represents a 79% decline in

[21] Overall, there are slighly more boys in this group (33% of boys and 29% of girls are in this sample).

labor market participation. In contrast, the decline in labor market activity is about 33% for boys. This gender differential in labor market participation is also visible when we use days worked instead of a dichotomous measure of work. Moreover, as with labor market participation, the decline is much larger for girls. Since days worked are more likely to be subject to measurement error as compared to the simpler dichotomous measure, and we have a much smaller sample, we use log of days worked when comparing siblings.

These results suggest that migration reduces the work burden of girls to a much greater degree than it does for boys. Of course these results may overstate the work benefits of migration for girls. Our measures of work do not include housework or child care, activities in which girls are much more likely to be involved. Nonetheless, their weaker participation in income related activities clearly reduces their overall work burden and suggests that migration induced "male absence" increases the opportunity cost of time spent in school for boys to a greater degree than for girls? If so, this could explain some of the observed gender differential in schooling outcomes. An alternative hypothesis is that "male absence" generates larger gains for girls due to the more benevolent preferences of mother's towards their daughters. Of course, both forces may simultaneously be at work. We now turn to this question.

4.4 Does Female Headship Matter?

Tables 7 and 8 present the estimation results. The main variables of interest are an indicator for whether the household is female headed and the interaction of this indicator with child gender. The first specification is OLS with village fixed effects. The second specification treats female headship as endogenous. Although female headship emerges almost exclusively in the context of migration, unobserved household or community characteristics, such as family or community norms around female seclusion could well determine both schooling outcomes and female headship. Fortunately, our instruments for migration vary at the household level and, plausibly, also influence the prospects of female headship in the event of migration. As before, we also difference out any unobserved village characteristics that could influence schooling decisions.

The joint explanatory power of our instruments, conditional on the village fixed effect and included household and child characteristics, is very high in all cases. The instruments also easily pass the overidentification test. (all statistics reported at the end of each table). All specifications include the full set of child and household characteristics described earlier (see Appendix Table 4 for coefficient estimates for the IV specification and the first stage

for the enrollment sample).

The results are somewhat surprising. First, female headship has no additional effect on school enrollment for either boys or girls. Second, while boys in female headed migrant households are significantly less likely to drop out as compared to boys in male headed migrant households, with dropout rates declining from .18 to .06, girls in such households do much worse than girls in male headed migrant households, with dropout rates increasing from .27 to .50. In fact, girls in female headed migrant households fare little better than girls in non-migrant households! Moreover, while female headship has no effect on completed grades for boys, it has a large negative effect on girls. In fact, girls in female headed migrant households do about as well in progressing through school as girls in non-migrant households!

Finally, both boys and girls work substantially more in female headed households (24 days as compared to about 16 days for children in male headed migrant households). This is consistent with the hypothesis that "male absence" can increase the work burden of children in migrant households. However, there is no differential increase in the work burden of boys, male absence appears to affect both boys and girls equally, in this respect. These results are essentially unchanged if we use the less restrictive definition of work.

In sum, our results suggest that girls do much better in male headed migrant households. This may be because the higher opportunity cost of child time in female headed households, falls disproportionately on girls. Our estimates suggest that girls work about as much as boys on income related activities, but this implies a much greater total work burden since our measures of work do not include housework or child care, activities in which girls are much more likely to be engaged.

5 Conclusions

The paper finds evidence of a significant positive effect of migration on school attainment and child labor market activity in rural Pakistan. The evidence suggests that children in migrant households are not only more likely to attend school, they are also more likely to stay in school and accumulate more years of schooling in comparison to their counterparts in non-migrant households in the same village. They are also less likely to be involved in economic work and report working for substantially fewer hours.

The paper also finds support for large gender differentials in the gains from migration, with relative gains for girls outstripping those for boys by a good margin, with a substantial

net reduction in gender inequalities in access to education.

We account for selection into migration using two strategies. We use a census measure of village migration prevalence rates and obtain within village variation in this measure by interacting it with the number of adult males in the household, which, in the context we study, is a strong predictor of migration. This allows us to clean out any unobserved community characteristics, such as local labor market conditions or school quality, which could affect the returns to schooling and the propensity to migrate. Our results indicate negative selection into migration.

Our second strategy is to confine attention to migrant households and to use information on the year of initial migration and the child's age on the survey date to examine differences in educational outcomes for siblings, differentiated by their attained age before the first migration episode for the household. This allows us to exploit the fact that many schooling decisions are time sensitive and have sustained impacts on educational attainment. A comparison of siblings using this strategy further corroborates our results on school attainment and child labor activity.

Finally we ask whether the evidence we find for the protective effects of migration, and its disproportionate benefit for girls, in particular, arises, at least in part, due to the substantial incidence of female headship among migrant households. It has been argued that a woman's ability to make decisions regarding the disposal of household resources is a key determinant of child outcomes. It is reasonable to ask therefore if the migration induced absence of males provides mothers with an opportunity to more easily realize their preferences with regard to investments in their children's education. Of course this must be balanced against the potential disruptive effect of migration on family life. We examine this issue by confining attention to migrant households and asking whether schooling and labor market outcomes vary significantly by female headship, and whether we can discern any gender differentials in outcomes.

Our results are quite surprising. Female headship appears to protect boys at the cost of girls. Girls in such households are significantly more likely to dropout and they lose most of the benefits of migration on accumulated schooling as well. We cannot find direct support for this effect in the work burden of girls since both boys and girls work more in female headed migrant households and work about as much. However, we do not have data on domestic work or child care, which may place a much larger burden on girls in female headed households. In sum, our results suggest that female headship is not the source of the migration effects we observe in our data. Rather, it seems to put households

under labor pressure which more or less reverses the protective effects of migration, at least for girls.

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Figure 1:Enrollment Rates

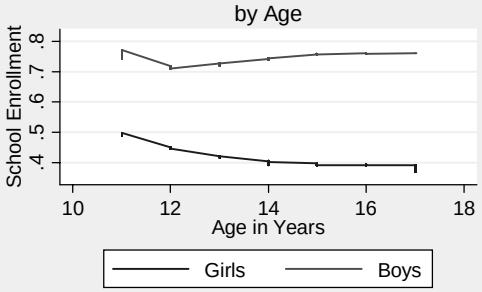


Figure 2:Dropout Rates

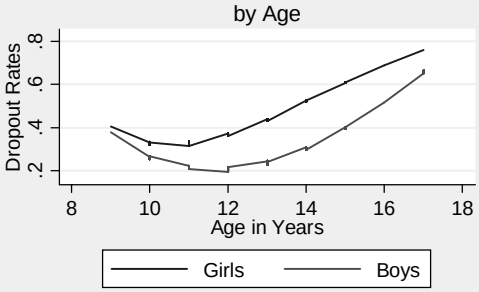


Figure 3:Completed Grades

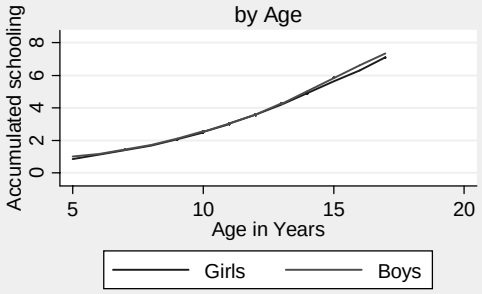


Figure 4:Enrollment Rates

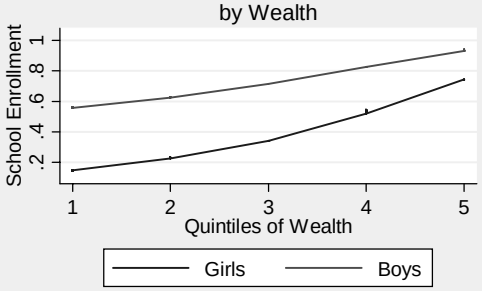


Figure 5:Dropout Rates

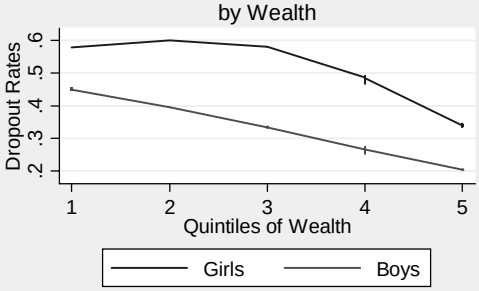
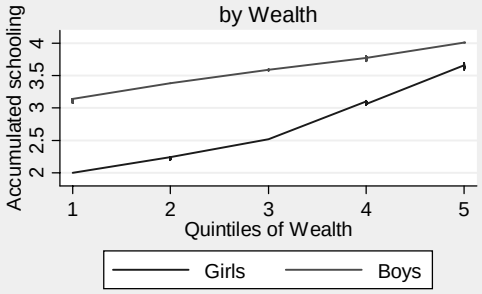


Figure 6:Completed Grades



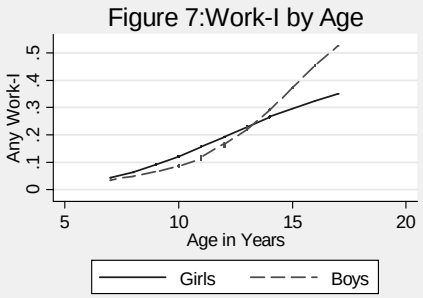


Figure 7:Work-I by Age
Any Work-I
0 .1 .2 .3 .4 .5
5 10 15 20
Age in Years
Girls
Boys

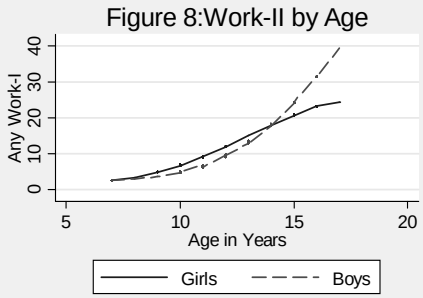


Figure 8:Work-II by Age
Any Work-I
0 10 20 30 40
5 10 15 20
Age in Years
Girls
Boys

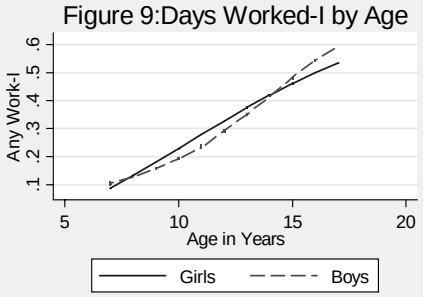


Figure 9:Days Worked-I by Age
Any Work-I
.1 .2 .3 .4 .5 .6
5 10 15 20
Age in Years
Girls
Boys

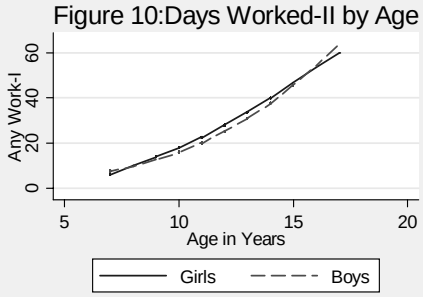


Figure 10:Days Worked-II by Age
Any Work-I
0 20 40 60
5 10 15 20
Age in Years
Girls
Boys

Figure 11:Work-I by Wealth

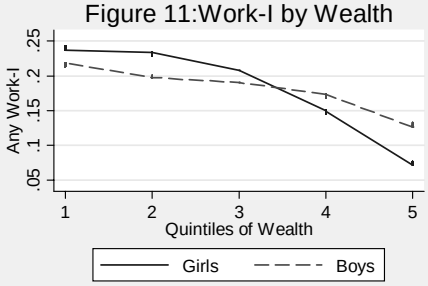


Figure 13:Days Worked-I by Wealth

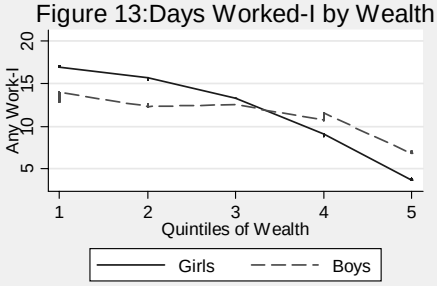


Figure 12:Work-II by Wealth

Figure 14:Days Worked-II by Wealth

Table 1: School Enrollment Rates (Age 11-17)

	(1)	(2)[a]	(3)[a]	(4)	(5)[a]
	OLS	IV	IV	OLS	IV
Migrant Household	0.15***	0.34***	0.35***	0.06**	0.18**
	[0.04]	[0.09]	[0.09]	[0.02]	[0.09]
Migrant Household*Boy	-0.03	-0.11	-0.11	-0.03	-0.12*
	[0.04]	[0.09]	[0.09]	[0.03]	[0.07]
Boy	0.31***	0.35***	0.35***	0.32***	0.38***
	[0.02]	[0.03]	[0.03]	[0.02]	[0.03]
Number of Adult Males			-0.01		
Test of IV relevance		594.8	551.6		164.4
Over-id. test χ_2 p-value					.10
Sample Size	3327	3279	3279	3327	3249
F for MHH (No. of inst.)		74.1 (2)	62.7 (2)		46.0 (4)
F for MHH*boy (No. of inst.)		60.2 (2)	60.5 (2)		113.4 (4)
Village Fixed Effects	No	No	No	Yes	Yes

Notes: Robust standard errors in brackets; * significant at 10%; ** significant at 5%; *** significant at 1%.
The dependent variable is an indicator for whether the child has ever enrolled in school. The full set of controls is described in appendix table A3.
a: Migrant household endogenous. Instrument set: village migrant network in columns 2 and 3 and village migrant network and village land gini interacted with the number of adult males in the household in column 5. First stage on migrant household for specification 5 in Table 6.

Table 2: School Dropout Rates (Age 10-15)

	(1)	(2) [a]	(3)[a]	(4)	(5)[a]
	OLS	IV	IV	OLS	IV
Migrant Household	-0.11***	-0.19***	-0.18**	-0.08**	-0.31**
	[0.04]	[0.07]	[0.08]	[0.04]	[0.15]
Migrant Household*Boy	0.05	-0.02	-0.02	0.07	0.21**
	[0.05]	[0.10]	[0.10]	[0.05]	[0.09]
Boy	-0.21***	-0.18***	-0.18***	-0.26***	-0.31***
	[0.03]	[0.05]	[0.05]	[0.04]	[0.05]
Number of Adult Males			-0.02		
			[0.01]		
Test of IV relevance		326.7	299.9		66.9
Over-id. test χ_2 p-value			.81		.74
Sample Size	1860	1840	1840	1860	1824
F for MHH (No. of instruments)		65.1 (2)	65.1 (2)		17.3 (4)
F for MHH*boy (No. of instruments)		74.2 (2)	74.2 (2)		71.1 (4)
Village Fixed Effects				Yes	Yes

Notes: Robust standard errors in brackets; significant at 10%; ** significant at 5%; *** significant at 1%.
The dependent variable is an indicator for whether the child has dropped out of school, conditional on having attended at some point. The full set of controls is described in appendix table A3.
a: Migrant household endogenous. Instrument set: village migrant network and village land gini interacted with the number of adult males in the household.

Table 3: Accumulated Years of Schooling

	(1)	(2) [a]	(3) [a]	(4)	(5) [a]	(6) [a]	(7) [a]	(8) [a]
						Age 14-17	Age 11-17 [b]	Age 5-17 [c]
	OLS	IV	IV	OLS	IV	IV	IV	IV
Migrant Household (MHH)	0.50***	1.13***	1.09***	0.18	1.43***	1.82**	1.65**	1.77***
	[0.17]	[0.39]	[0.42]	[0.14]	[0.55]	[0.85]	[0.71]	[0.49]
Migrant Household*Boy	-0.07	-0.45	-0.44	-0.09	-0.39	0.15	-0.92**	-1.17***
	[0.21]	[0.43]	[0.42]	[0.17]	[0.37]	[0.59]	[0.47]	[0.33]
Boy	1.35***	1.50***	1.50***	1.42***	1.55***	1.75***	0.68***	0.74***
	[0.13]	[0.19]	[0.19]	[0.12]	[0.16]	[0.25]	[0.24]	[0.19]
Number of Adult Males			0.04					
			[0.05]					
Test of IV relevance		594.8	551.6		154.6	88.1	74.8	84.6
Over-id. test χ_2 p-value					.81	.18	.49	.29
Sample Size	3327	3279	3279	3327	3248	1764	1909	1923
F for MHH (No. of inst.)		74.1 (2)	62.7 (2)		39.8 (4)	22.7 (4)	18.9 (4)	21.5 (4)
F for MHH*boy (No. of inst.)		60.2 (2)	60.5 (2)		152.5 (4)	82.9 (4)	63.9 (4)	67.9 (4)
Village Fixed Effects	No	No	No	Yes	Yes	Yes	Yes	Yes

Notes: Robust standard errors in brackets; significant at 10%; ** significant at 5%; *** significant at 1%.
The dependent variable is the number of completed grades in the survey year. The full set of controls is described in appendix table A3.
a: Migrant household endogenous . Instrument set: village migrant network in columns 2 -3 and village migrant network and village land gini interacted with the number of adult males in the household in column 5-7.
b: conditional on having attended school
c: conditional on current attendance

Table 4: Child Wage and Non-Wage Labor (Age 7-17)

	(1)	(2)	(3)[a]	(4)	(5)[a]
	OLS	IV	IV	OLS	IV
Migrant Household	-0.06***	-0.26***	-0.26***	-0.04**	-0.26***
	[0.02]	[0.07]	[0.08]	[0.02]	[0.07]
Migrant Household*Boy	0.04*	0.08	0.08	0.04*	0.08**
	[0.02]	[0.07]	[0.07]	[0.02]	[0.04]
Boy	-0.02	-0.03	-0.03	-0.02	-0.03
	[0.02]	[0.03]	[0.03]	[0.01]	[0.02]
Number of Adult Males			0		
			[0.01]		
Test of IV relevance		580.8	323.4		190.4
Over-id. test χ_2 p-value					.49
Sample Size	5867	5775	5775	5867	5725
F for MHH (No. of inst.)		56.5 (2)	50.9 (2)		46.8 (4)
F for MHH*boy (No. of inst.)		35.0 (2)	35.4 (2)		185.8 (4)
Village Fixed Effects	No	No	No	Yes	Yes

Notes: Robust standard errors in brackets; significant at 10%; ** significant at 5%; *** significant at 1%.

The dependent variable is an indicator for whether the child has done any work over the past year. It includes all wage labor as well as work on household production. The full set of controls is described in appendix table A3.

a: Migrant household endogenous . Instrument set: village migrant network in columns 2 -3 and village migrant network and village land gini interacted with the number of adult males in the household in column 5.

Table 5: Days Worked by Children (Age 7-17)

	(1)	(2)	(3)[a]	(4)	(5)[a]
	OLS	IV	IV	OLS	IV
Migrant Household	-5.54***	-18.78***	-18.58***	-3.99**	-18.27***
	[1.89]	[5.23]	[5.42]	[1.63]	[6.59]
Migrant Household*Boy	1.78	1.16	1.11	1.17	1.69
	[2.09]	[5.64]	[5.64]	[2.04]	[2.88]
Boy	-0.26	-0.18	-0.16	-0.15	0.33
	[1.77]	[2.71]	[2.70]	[1.44]	[1.91]
Number of Adult Males			-0.25		
			[0.66]		
Test of IV relevance		852.5	807.2		190.4
Over-id. test χ_2 p-value					.13
Sample Size	5867	5775	5775	5867	5725
F for MHH (No. of inst.)		56.5 (2)	50.9 (2)		46.9 (4)
F for MHH*boy (No. of inst.)		35.0 (2)	35.4 (2)		185.8 (4)
Village Fixed Effects	No	No	No	Yes	Yes

Notes: Robust standard errors in brackets; significant at 10%; ** significant at 5%; *** significant at 1%.

The dependent variable is the number of days worked by children over the survey year. It includes all wage labor as well as work on household production. The full set of controls is described in appendix table A3.

a: Migrant household endogenous. Instrument set: village migrant network and village land gini interacted with the number of adult males in the household.

Table 6: A Comparison of Siblings in Migrant Households – Age 11-17

	Schooling					Labor			
	Enrollment [a]		Dropout [a]	Completed Grades [b]		Any Work [a]		Days Worked [ac]	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Age Before Migration	-0.11**	-0.26***	0.16***	-0.57**	-1.42***	0.10***	0.23***	0.42***	0.97***
	[0.05]	[0.09]	[0.06]	(0.26)	(0.55)	[0.04]	[0.07]	[0.15]	[0.26]
Age Before Migration*Boy	0.11*	0.14**	-0.15**	0.16	0.43	-0.13***	-0.15***	-0.52***	-0.44**
	[0.06]	[0.07]	[0.07]	(0.33)	(0.39)	[0.05]	[0.05]	[0.18]	[0.21]
Boy	0.20***	0.27***	-0.15***	1.12***	1.12***	0.07***	0.10***	0.23**	0.30**
	[0.04]	[0.04]	[0.05]	(0.26)	(0.26)	[0.03]	[0.03]	[0.10]	[0.12]
Sample Size	881	891	770	891	891	963	963	963	963
Village Fixed Effects	Yes		Yes	Yes		Yes		Yes	
Household Fixed Effects		Yes			Yes		Yes		Yes

Notes: Robust standard errors in brackets; significant at 10%; ** significant at 5%; *** significant at 1%.
The dependent variables are as described in tables 1-5. The full set of controls for specifications 1,3,4,6 and 8 are as described in appendix table A3. Specifications 2, 5, 7 and 9 include controls for child's age and age squared.

a 9 years or older before first migration

b 8 years or older before first migration

c log of days worked

Table 7: Child Schooling in Migrant Households. Does Female Headship Matter?

	Enrollment		Dropout Rates		Accumulated Grades-Age 11-17		Accumulated Grades-Age 5-17 (conditional on current enrollment)	
	(1)	(2) [a]	(3)	(4) [a]	(5)	(6) [a]	(7)	(8) [a]
	OLS	IV	OLS	IV	OLS	IV	OLS	IV
Female Headed HH	-0.01	0.02	0.24***	0.26**	-0.27	-0.12	-0.53**	-0.80**
	[0.05]	[0.08]	[0.08]	[0.12]	[0.28]	[0.43]	[0.23]	[0.33]
Female Headed*Boy	0.05	0.07	-0.21**	-0.37***	0.19	0.26	0.57**	0.66**
	[0.05]	[0.08]	[0.08]	[0.11]	[0.33]	[0.45]	[0.24]	[0.31]
Boy	0.26***	0.25***	-0.18***	-0.12*	1.19***	1.21***	-0.12	-0.14
	[0.04]	[0.04]	[0.06]	[0.07]	[0.23]	[0.26]	[0.18]	[0.21]
Test of IV relevance		318.2		188.2		366.2		314.6
Over-id. test χ_2 p-value		.88		.17		.25		.39
Sample Size	1032	1021	450	424	1032	1021	764	742
F for MHH (No. of inst.)		93.1 (4)		52.3 (4)		75.1 (4)		75.9 (4)
F for MHH*boy (No. of inst.)		124.7 (4)		136.4 (4)		103.2 (4)		184.5 (4)
Village Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Robust standard errors in brackets; significant at 10%; ** significant at 5%; *** significant at 1%.
The dependent variables are as described in tables 1-3. The full set of controls is described in appendix table A4.
a: Female head endogenous. Instrument set: village migrant network and village land gini interacted with the number of adult males in the household.

Table 8: Child Labor in Migrant Households. Does Female Headship Matter?

	Any Work (For Wages or Household Production)		Days Worked in Preceding Year	
	(1)	(2)[a]	(3)	(4)[a]
Female Headed HH	-0.03	0.12**	-1.43	9.57**
	[0.03]	[0.05]	[2.61]	[4.65]
Female Headed*Boy	0.02	0.01	-0.47	-1.33
	[0.03]	[0.04]	[2.95]	[3.81]
Boy	0	0.01	1.07	1.72
	[0.02]	[0.03]	[2.18]	[2.41]
Test of IV relevance		.18		.74
Over-id. test χ_2 p-value		672.9		672.9
Sample Size		1703		1703
F for MHH (No. of inst.)		175.0 (4)		175.0 (4)
F for MHH*boy (No. of inst.)		266.3 (4)		266.3 (4)
Village Fixed Effects	Yes	Yes	Yes	Yes

Notes: Robust standard errors in brackets; significant at 10%; ** significant at 5%; *** significant at 1%.
The dependent variables are as described in tables 4-5. The full set of controls is described in appendix table A4.
a: Female head endogenous. Instrument set: village migrant network and village land gini interacted with the number of adult males in the household.

6 Appendix

Table A1: Labor Market Activity of Children by School Enrollment and Retention

	Child Ever Enrolled in School (age 7-17)								
	Age 7-10			Age 11-13			Age 14-17		
	Yes	No	*p*-val	Yes	No	*p*-val	Yes	No	*p*-val
Any Work-I[a]	.04	.09	<.000	.11	.24	<.000	.32	.42	<.000
Days worked per year-I[a]	2	5	<.000	6	14	<.000	21	30	<.000
Any Work-II[b]	.10	.20	<.000	.20	.43	<.000	.42	.61	<.000
Days worked per year -II[b]	8	16	<.000	17	37	<.000	39	63	<.000
	Child Currently in School (conditional on enrollment)								
	Age 7-10			Age 11-13			Age 14-17		
	Yes	No	*p*-val	Yes	No	*p*-val	Yes	No	*p*-val
Any Work-I[a]	.04	.04	-	.07	.22	<.000	.23	.41	<.000
Days worked per year-I[a]	2	2	-	3	16	<.000	11	31	<.000
Any Work-II[b]	.10	.10	-	.17	.32	<.000	.30	.53	<.000
Days worked per year -II[b]	7	8	-	12	33	<.000	23	56	<.000

Notes: ***a*** Includes agricultural and non-agricultural wage work, work on the family farm and on any household enterprise, but excludes livestock care and other household tasks (principally collection of firewood and water); ***b*** Includes all work

Table A2: Schooling and Labor Market Activity of Children by Household Migration Status (Migrant Household=MHH)

	Girls			Boys		
	MHH	Non-MHH	*p*-value	MHH	Non-MHH	*p*-value
Enrollment Rates (11-17)	.56	.35	.000	.86	.69	.000
Dropout Rates (11-17)	.43	.56	.001	.25	.35	.000
Accumulated Schooling (5-17)	3.41	3.01	.027	3.81	3.63	.170
Any Work-I[a]	.13	.20	.000	.16	.19	.100
Days worked per year-I[a]	.25	.32	.000	.25	.30	.010
Any Work-II[b]	7.00	13.00	.000	8.00	13.00	.001
Days worked per year -II[b]	21.00	30.00	.000	20.00	28.00	.001

Notes: ***a*** Includes agricultural and non-agricultural wage work, work on the family farm and on any household enterprise, but excludes livestock care and other household tasks (principally collection of firewood and water); ***b*** Includes all work

Table A3: Child and Household Characteristics (Tables 1-5)

	Schooling		Labor			
	Enrollment	Dropout	Completed Grades	Any Work	Days Worked	Migrant Hhold
	(1)	(2)	(3)	(4)	(5)	(6)
Age (years)	-0.063	-0.402***	1.808***	-0.032**	-4.833***	-0.035
	[0.055]	[0.091]	[0.354]	[0.013]	[1.361]	[0.057]
Age2	0.002	0.018***	-0.055***	0.003***	0.324***	0.001
	[0.002]	[0.004]	[0.013]	[0.001]	[0.065]	[0.002]
Father's Education	0.028***	-0.009***	0.113***	-0.003*	-0.393**	0.001
	[0.003]	[0.003]	[0.012]	[0.002]	[0.163]	[0.002]
Mother's Education	0.014***	-0.006	0.053**	-0.007**	-0.163	0.002
	[0.005]	[0.004]	[0.022]	[0.003]	[0.304]	[0.004]
No. of Siblings 0-5	0.004	0.011	-0.138***	-0.007	0.233	-0.009
	[0.016]	[0.016]	[0.051]	[0.008]	[0.718]	[0.008]
No. of Siblings 0-5 *Boy	-0.021*	0.001	0.088	0.009	-0.354	-0.003
	[0.011]	[0.020]	[0.069]	[0.009]	[0.849]	[0.011]
No. of Sibling 6-17	0.027**	0.002	0.048	0.007	0.651	0.012**
	[0.012]	[0.009]	[0.032]	[0.005]	[0.462]	[0.005]
Older Boy less than 18	-0.004	0.009	-0.166	0.009	-2.216*	-0.031*
	[0.008]	[0.024]	[0.108]	[0.009]	[1.342]	[0.017]
Older Girl less than 18	0.007	-0.031	-0.057	-0.024*	1.212	0.007
	[0.023]	[0.026]	[0.109]	[0.014]	[1.135]	[0.017]
Dependency Ratio	0.002	-0.011	0.146*	0.017	-1.055	-0.038***
	[0.020]	[0.016]	[0.079]	[0.011]	[0.720]	[0.012]
Indicator for Joint Family	-0.077***	0.032	-0.405***	-0.011	0.693	-0.058***
	[0.022]	[0.024]	[0.099]	[0.009]	[1.497]	[0.018]
Inherited Land	0.001**	-0.001*	0.013***	0.018	-0.107**	-0.002***
	[0.001]	[0.001]	[0.004]	[0.017]	[0.043]	[0.001]
Migrant Network*No. of Adult Males						-0.015
						[0.024]
Gini*No. of Adult Males						0.092***
						[0.013]
Village Fixed Effects	No	No	No	No	No	Yes

Notes: Robust standard errors in brackets; significant at 10%; ** significant at 5%; *** significant at 1%.
The dependent variables are as described in tables 1-5. The regression coefficients refer to Tables 1-5, columns 2
The first stage for migrant household uses the school enrollment sample.

Table A4: Child and Household Characteristics (Tables 7-8)

	Schooling		Labor			
	Enrollment	Dropout	Completed Grades	Any Work	Days Worked	Female Head
	(1)	(2)	(3)	(4)	(5)	
Age (years)	-0.187*	-0.549	1.510**	-0.044**	-5.776***	-0.035
	[0.103]	[0.489]	[0.643]	[0.022]	[1.994]	[0.057]
Age2	0.006*	0.023	-0.043*	0.003***	0.345***	0.001
	[0.004]	[0.020]	[0.024]	[0.001]	[0.091]	[0.002]
Father's Education	0.011***	0.003	0.069***	-0.003	-0.263*	0.001
	[0.003]	[0.005]	[0.020]	[0.002]	[0.147]	[0.002]
Mother's Education	0.005	-0.012	0.031	-0.009**	-0.805***	0.002
	[0.005]	[0.007]	[0.035]	[0.004]	[0.251]	[0.004]
No. of Siblings 0-5	-0.019	-0.005	-0.163*	-0.004	-0.135	-0.009
	[0.018]	[0.030]	[0.094]	[0.008]	[0.627]	[0.008]
No. of Siblings 0-5 *Boy	0.032	0.042	0.06	0.025*	-0.111	-0.003
	[0.021]	[0.038]	[0.128]	[0.014]	[1.073]	[0.011]
No. of Sibling 6-17	0	-0.006	0.028	-0.008	0.024	0.012**
	[0.010]	[0.015]	[0.061]	[0.006]	[0.409]	[0.005]
Older Boy less than 18	-0.006	0.015	-0.173	0.032*	0.966	-0.031*
	[0.034]	[0.042]	[0.185]	[0.019]	[1.567]	[0.017]
Older Girl less than 18	0.001	-0.097*	0.039	0.014	1.174	0.007
	[0.033]	[0.049]	[0.195]	[0.021]	[1.775]	[0.017]
Dependency Ratio	-0.019	-0.036	0.202	-0.053***	-1.796	-0.038***
	[0.030]	[0.043]	[0.171]	[0.018]	[1.483]	[0.012]
Indicator for Joint Family	-0.045	-0.027	-0.029	0.078**	8.909***	-0.058***
	[0.045]	[0.069]	[0.262]	[0.035]	[3.367]	[0.018]
Inherited land (acres)	0.002	0	0.007	0.005**	0.283	-0.002***
	[0.004]	[0.004]	[0.020]	[0.002]	[0.180]	[0.001]
Migrant Network*Indicator for No. of Adult Males						-0.532***
						[0.040]
Gini*No. of Adult Males						-0.079***
						[0.014]
Village Fixed Effects	No	No	No	No	No	Yes

Notes: Robust standard errors in brackets; significant at 10%; ** significant at 5%; *** significant at 1%.
The dependent variables are as described in tables 1-5. The regression coefficients refer to Table7, columns 2, 4 and 7 and Table 8, columns 2 and 4. The first stage for female head uses the school enrollment sample.