Centre for Research and Analysis of Migration

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Discussion Paper Series

CDP No 01/06

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Non-Technical Abstract

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Can migration reduce educational attainments?

Depressing evidence from Mexico*

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March 2006

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Keywords: Migration, migrant networks, education attainments, Mexico
JEL codes: O15, J61, D31

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1. Introduction

The rapid growth in migrants' remittances has triggered considerable attention in policy circles (e.g. GCIM 2005, World Bank 2005) and has led to renewed research attention to development impacts of remittances. [1] Several recent empirical studies have emphasized the potential for remittance transfers to alleviate credit constraints and thereby increase educational attainment of children in migrant families.[2] The recent theoretical literature on the "beneficial brain drain" or "brain gain" suggests a second channel through which migration can increase educational attainments. The basic idea of such theories is that education has a high return when migrating, and so the prospect of migrating in the future raises the expected return to education, inducing higher domestic enrollment in schools.[3]

However, Chiquiar and Hanson (2005) have shown that the return to education is higher in Mexico than for Mexican migrants in the United States. This arises due to higher inequality in Mexico than in the U.S., and additionally from the fact that most first-time migration from rural Mexico is illegal, leading only to job opportunities with low formal educational requirements. As a result, the incentive effect of the prospect of future migration for children growing up in migrant households in Mexico may actually lower the incentive to invest in education, counteracting the remittances effect.

The implicit assumption in most of the existing studies of remittances is that migration only affects educational outcomes through remittances, and not through any

[1] See the recent survey of Rapoport and Docquier (2006), which provides an extensive discussion of different motives for remitting.
[2] See Cox Edwards and Ureta (2003) for Nicaragua, Lopez-Cordoba (2004) for Mexico and Yang (2004) for the Philippines.
[3] See for example Commander, Kangasniemi and Winters (2004) for a review of the various channels through which a beneficial brain drain can be obtained.

other channel such as this incentive effect. [4] However, in addition to the potential incentive effect, migration of a family member may have a number of other effects on child schooling. For example, parental absence as a result of migration may translate into less parental inputs into education acquisition and may also require remaining children to undertake housework or work to help meeting short-term labor and cash shortages. If any of these other channels operate, studies which focus just on the effect of remittances will generally give biased estimates[5].

This paper therefore focuses on identifying the overall impact of migration on educational attainments in Mexico, estimating the net impact of these various effects. Every fifth household in rural Mexico has at least one member with international migration experience,[6] so the impacts of migration on the next generation are potentially very large. We use historical migration networks formed by 1920 as an instrument for migration seven decades later in order to account for the potential endogeneity of household migration decisions. Our main finding is that living in a household with migration experience depresses the educational attainment of rural Mexican children, with a stronger effect on 16 to 18 year olds.

We begin with bivariate probit models of school attendance, which reveal large negative effects of being in a migrant household on school attendance of 16 to 18 year old males and females, and on 12 to 15 year old males, with insignificant results for 12 to 15 year old females. Estimation of two-stage least squares models of

[4] See the appendix in McKenzie (2005) for a methodological discussion of this point.
[5] Theoretically one could separate the effect of remittances from other effects of migration through the use of a valid instrument which predicts whether or not one migrant will send more remittances than another. Such instruments are uncommon in practice, with the exchange rate shocks used by Yang (2004) coming closest in this regard among the existing literature (although as he acknowledges, these shocks also affect migrant wealth holdings).
[6] Source: own calculations from ENADID data (see Table 1).

completed years of schooling then reveals negative effects of migration on 16 to 18 year olds, and insignificant effects on 12 to 15 year olds.

However, a high proportion of 12 to 15 year olds are still in school. Mexico's education system provides for nine grades of compulsory schooling, and so it is not until the age of 15 or 16 that children and their families begin making decisions about completion of non-compulsory grades. We allow for this censoring of attained education for children still in school, and for the potential nonlinearities in grade progression probabilities caused by natural stopping points such as the end of junior high (9^{th} grade). This occurs through estimation of an instrumented censored ordered probit model. Doing this reveals a significant negative effect of migration on educational attainment of 12 to 15 year old males, and increases the size of the estimated effects for 16 to 18 year olds. Overall, living in a migrant household is estimated to lower the probability of completing high school by 13 percent for males and 14 percent for females.

We then allow for heterogeneity in the effects of migration by interacting household migration status with maternal education, a proxy for wealth. We find marginally significant evidence for less negative effects of migration on educational attainment for children in poorer households, which is consistent with remittances relaxing credit constraints. However, the overall effect of migration on education is still negative for 16 to 18 year olds, even in poor households. When we explore the channels for this depressive effect of migration on schooling, we find the majority of the effect can be explained by young males in migrant households themselves migrating instead of attending school, and young females in migrant households dropping out of school to engage in housework.

In related work, Hanson and Woodruff (2003) also estimate the overall impact of migration on education in Mexico. They use the 2000 Mexican census, and look at the impact on number of school grades completed of 10 to 15 year olds. Their main finding is that migration to the U.S. is associated with more years of completed education for 13 to 15 year old girls, but only for those whose mothers have three years or less of education. We employ a large demographic survey instead of the Census, allowing us to consider a broader measure of household migration experience. We obtain an insignificant effect of migration on education for 12 to 15 year olds girls with poorly educated mothers, and can not reject positive effects of similar magnitudes to those they find. However, our work builds on their findings in three important respects. Most fundamentally, we consider 16 to 18 year olds, who are at the age when migration for work starts to become a possibility, especially for males, and who are also at the age when they may be entrusted with household responsibilities which take the place of schooling. That is, this is precisely the age range at which many of the other channels through which migration affects education start to manifest themselves.

Secondly, Hanson and Woodruff (2003) note that school attendance is high amongst their sample, with 82.5 percent of 10-15 year olds attending school. Nevertheless, they use two-stage least squares for estimation, which does not account for this high rate of right-censoring. Once we do this, insignificant 2SLS results for 12 to 15 year males become significant. Finally, the survey we use enables examination of what children are doing when they are not in school, enabling investigation of the channels through which migration is affecting schooling.

The remainder of this paper is organized as follows. Section 2 presents the demographic survey data used for the empirical analysis and contrasts it to the 2000

Mexican Census. Section 3 discusses our identification strategy and other econometric issues such as censoring and the presence of nonlinearities in education decisions. Section 4 provides a broad theoretical framework that outlines how the main effects of migration on the feasible and desired amounts of education balance out at different wealth levels. The results on school attendance and education attainments are presented in Section 5. Section 6 then asks what children in migrant households are doing instead of going to school and Section 7 concludes.

2. Data

This paper uses data from the 1997 Encuesta Nacional de la Dinámica Demográfica (ENADID) (National Survey of Demographic Dynamics) conducted by Mexico's national statistical agency (INEGI) in the last quarter of 1997.[7] The ENADID is a large nationally representative demographic survey, with approximately 2000 households surveyed in each state, resulting in a total sample of 73,412 households. We restrict our analysis to rural communities, defined here to be municipalities which are outside of cities of population 50,000 or more. Our main results are robust to lowering this threshold to cities with population below 15,000. Within these communities we have a sample of 20,388 children aged 12 to 18 years, living in 12,980 households.

The key variables of interest are migration and schooling. The ENADID asks several questions concerning migration, including whether household members have *ever* been to the United States in search of work. This question is asked of all household members who normally live in the household, even if they are temporarily studying or working elsewhere. Additional questions ask whether any household

[7] Survey methodology, summary tables, and questionnaires are contained in INEGI (1999).

members have gone to live in another country in the past five years, capturing migration for study or other non-work purposes in addition to work related migration. We define a child as living in a *migrant household* if the household has a member aged 19 and over who has ever been to the U.S. to work, or who has moved to the U.S. in the last five years for any other reason. The migrant member or members may have returned to Mexico or still be in the U.S. at the time of the survey.

Table 1 provides summary statistics for the key variables used in this study. Twenty two percent of all households in our sample with a child aged 12 to 18 have an adult member who has ever migrated to the U.S. Several recent studies of migration and schooling in Mexico have used the 2000 Mexican Census (Hanson and Woodruff, 2003; Lopez-Cordoba, 2004). The Mexican Census only asks about migration within the last five years. The ENADID questions on migration within the last five years are identically worded to the Census, and so for comparison we also calculate the proportion of households with migrants according to the Census definition. Table 1 shows that relying on the Census questions to define migrant status understates the proportion of households with migrant experience by almost fifty percent.

Examining migration within the last five years is likely not to be unduly restrictive for certain types of analysis. However, there are number of reasons to prefer looking at whether household members have ever migrated in examining the impact of migration on education. Schooling is a cumulative process, with each year building on the year before. Any impact of migration on schooling during the years of primary education may therefore affect schooling six to ten years later. A portion of this effect may be at the extensive margin: 10 percent of 12 year olds in our sample are not currently attending school, which makes it likely they will not be attending

school at age 18. There are also likely to be effects at the intensive margin, whereby household resources and effort devoted to schooling during primary school affect the ability of children to continue schooling in later years. In addition to these direct effects through prior schooling, migration by household members six or more years ago may still result in higher household wealth today, influencing the ability to pay for schooling later on. Furthermore, schooling decisions may depend on the expectation of migration in the future. This expectation will depend in part on previous household migration experience, whether or not the migration episodes occurred within the last five years. For these reasons we prefer the ENADID to the Census for examining the effects of migration on education.

The ENADID asks migrants who have ever been to the U.S. for work a set of additional questions about their migrant experience, including the number of trips they have ever made, and whether they had legal documentation to work. Approximately 50 percent of all migrants have made more than one trip, with a mean of 2.8 trips per migrant. The vast majority of migrants in our sample had no legal documentation to work, especially on their first trip. Over 91 percent of first-time migrants who went to work in the U.S. had no legal documentation to do so. This is important to note, as it indicates that the majority of Mexicans in our sample contemplating migration are likely to end up working without documentation in the United States. Kossoudji and Cobb-Clark (2002) find evidence from an amnesty program that the returns to human capital are higher for legal workers than for illegal workers in the United States. This corroborates our conjecture that migration lowers the incentives to acquire education for prospective Mexican immigrants.[8]

[8] See also Rivera-Batiz (1999).

Our main measure of education is based on years of schooling attained by children and adults. Elementary education (grades 1 to 6) is compulsory in Mexico and is normally provided to children aged 6 to 14. Lower secondary education (grades 7 to 9) became compulsory in 1993 and is generally given to children aged 12 to 16 years who have completed elementary education. This is followed by three years of upper secondary schooling (grades 10 to 12) and higher studies. Despite education being compulsory, there is still far from complete compliance and a lack of infrastructure in some remote rural areas (SEP, 1999). Approximately half of all 15 year olds with less than 9 years of attained schooling were not attending school in 1997. We focus our study on children aged 12 to 18, the ages at which children will be receiving the majority of their post-primary education, and the age range at which children start leaving school. 90 percent of 12 year old males and 83 percent of 12 year females in our sample were attending school in 1997, compared to 51 and 47 percent of 15 year old males and females, and 20 and 16 percent of 18 year olds.

Figure 1 plots the proportion of females and males attending school by age and the migrant status of their households, along with mean years of schooling attained by age. The raw data show school attendance is higher in migrant households among young children of five or six years, and similar in migrant and non-migrant households in the early teenage years. However, school attendance drops among boys in migrant households relative to non-migrant households from age 14 onwards. The result of this is that mean schooling levels attained for boys are very similar in migrant and non-migrant households, while girls in migrant households have higher mean schooling levels as they age than girls in non-migrant households. However, these are unconditional differences, and do not take account of other differences

between migrant and non-migrant households which also affect schooling. We turn to this issue next.

3. Empirical Methodology and Identification Strategy

3.1. Identification

The first challenge in estimating the causal impact of migration on education outcomes is the possibility of unobserved characteristics of households which influence their decision to migrate also playing a role in their schooling decisions. For example, parents who care more strongly about the education of their children may migrate in order to earn income that can be used to pay for schooling expenses, and will also devote more attention and non-income resources to improving schooling outcomes of their children. A simple comparison of migrants and non-migrants would in this case overstate the education gains from migration. Alternatively, Hanson and Woodruff (2003) note that negative labor market shocks experienced by parents may both induce migration and require children to work instead of spending time in school, leading to a spurious negative relationship between migration and years of schooling. As such the direction of any selectivity bias is theoretically uncertain.

We therefore follow Woodruff and Zenteno (2001) and a number of subsequent studies[9] in using historic state-level migration rates as an instrument for current migration stocks. In particular, we use the U.S. migration rate from 1924 for the state in which the household is located, taken from Foerster (1925)[10]. Since this instrument only varies at the state level, we cluster our standard errors at the state

[9] Hanson and Woodruff (2003); McKenzie and Rapoport (2004); López-Córdoba (2004); and Hildebrandt and McKenzie (2004) all employ historic migration rates as instruments for current migration.

[10] Thanks to Chris Woodruff for supplying these historic rates.

level to allow for arbitrary correlation in the error structure of individuals within a state. These historic rates can be argued to be the result of the pattern of arrival of the railroad system in Mexico coupled with changes in U.S. demand conditions for agricultural labor. As migration networks lower the cost of migration for future migrants, they become self-perpetuating, and as a result, continue to influence the migration decisions of households today.

Our identifying assumption is then that historic state migration rates do not affect education outcomes over 70 years later, apart from their influence through current migration. Instrumental variables estimation relies on this exogeneity assumption, and so it is important to consider and counteract potential threats to its validity. One potential threat is that historic levels of inequality and historic schooling levels helped determine migration rates in response to the railroad expansion, and also influence current levels of schooling due to intergenerational transmission of schooling. To allow for this possibility we control for a number of historic variables at around the same time period as our historic migration measure. The controls are the proportion of rural households owning land by state in 1910 taken from McBride (1923)[11]; and the number of schools per 1000 population by state in 1930, and male and female school attendance for 6 to 10 year olds by state for 1930, both taken from DGE (1941).

A second possible threat to validity is that the development of the railroads in certain states and communities ushered in the subsequent development of other infrastructure, such as school facilities, and led to changes in the income distribution which themselves influenced the incentives and ability to invest in schooling. We include the following state-level controls for this possibility, all calculated from the

[11] Land ownership data were kindly provided by Ernesto López-Córdoba.

public use sample of the 1960 Mexican Census: the Gini of household income, the Gini of years of schooling accumulated for males and females aged 15-20, and the average levels of years of schooling accumulated for males and females aged 15-20. Spearman rank-order correlation tests do indeed indicate some significant correlations between the 1924 migration rates and some of these controls: states with higher historic migration rates had higher average rates of schooling and lower inequality in schooling in 1960. This might represent the influence of migration over the 1924-60 period, or the effects of concomitant trends, and so we prefer to include these 1960 education inequality and levels as controls. Even after controlling for these variables, historic migration rates remain a powerful predictor of current community migration prevalence, with a first-stage F-statistic of 28.

A final threat to the validity of this instrument is the possibility that the historic community migration network has a direct effect on educational attainment through changing the incentives to acquire education. We argue that the incentive effects should be much stronger if children have a household member who has previously migrated than if they merely have someone in their community who has migrated, so that the direct effect of the community network is likely to be second-order in the education decision. As a check on this assumption, we split states into those above and below the median migration rate in 1924, and then regress years of schooling on a dummy variable for being in a high migration state for children in non-migrant households. Table 2 shows the effect of the community network is insignificant for three out of the four groups, and has a small *positive* effect on school attainment of 12 to 15 year old females. This provides us with further confidence in our instrument and suggests that a finding of migration lowering education rates is not a result of the community network directly lowering education rates.

3.2. Estimation techniques

The first outcome of interest that we study is whether children are currently attending school. As this is a binary outcome, we use maximum-likelihood to estimate a bivariate probit model, following Newey (1987), which we will follow common practice in referring to as the IV-Probit model.[12] The marginal effects of this model will then be compared to marginal effects from standard probit estimation. However, current school attendance does not allow for possible delays in starting schooling, catch-up and grade repetition. As seen in Figure 1, it appears that children in migrant households are slightly more likely to start school at age 5 than children in non-migrant households. Therefore greater attendance in non-migrant households at older ages may just be the result of these late starters catching up.

Instead of school attendance, we therefore focus most of our attention on educational attainment, measured by the grade-years of schooling attained by children. Following Hanson and Woodruff (2003) we begin with two-stage least squares (2SLS) of the following equation:

$$Schooling_i = \alpha + \beta * Migrant_i + \delta' X_i + \varepsilon_i \quad (1),$$

where $Schooling_i$ is the years of schooling attained by child i, $Migrant_i$ is a dummy variable taking the value one if a household has a migrant member and zero otherwise, and X_i is a set of individual and community controls.

However, there are several features of education data that render OLS and 2SLS analysis inappropriate. Ideally one would like to observe the final level of schooling completed by individuals and relate it to the migrant status of the household in which they grew up. Here we face the problem that while schooling is complete for

[12] Estimation was carried out using the IVProbit command in STATA version 9.

adults, we have no information on the households in which they lived during their childhood, or on the migration status of their parents. We must therefore restrict our sample to children of school age. However, while we have information on the migration status of the households in which these children are living, many of them are still attending school and so we do not observe their completed level of schooling.

The data are thus right-censored for children who are attending school. OLS and 2SLS estimation ignores this censoring, treating the educational attainment of children still in school as identical to those who have finished schooling. This results in biased estimates of the impact of migration on final schooling attainment. Censoring is likely to be especially important for schooling outcomes of 12 to 15 year olds, since many in this age group will not have finished schooling.

A second issue is that OLS and 2SLS assume a continuous distribution for the dependent variable, years of schooling attained. However, as seen in Figure 2, the observed schooling distribution is characterized by large spikes at 6 years and 9 years, representing the completion of primary and lower secondary school. As noted in the education literature (see e.g., Glick and Sahn, 2000), grade attainment is the outcome of a series of ordered discrete choices. The choice to continue onto junior secondary school or onto high school for one year is thus likely to be different from the choice to continue for an extra year once one has started junior high or high school.

As a result of these features of education grade data, King and Lillard (1987) and subsequent studies in the economics of education literature (e.g. Glick and Sahn (2000), Holmes (2003), Maitra (2003)) have adopted a censored ordered probit framework when examining the impact of household characteristics on schooling. In this framework, an individual's desired latent propensity for schooling, y_i is determined by a linear relationship analogous to equation (1):

$$y_i = \alpha + \beta * Migrant_i + \delta' X_i + \varepsilon_i \quad (2)$$

However, y_i is unobserved. For individuals who have finished their schooling, we observe schooling level S if the value of y_i falls between two cut-off points, corresponding to grades S and $S+1$:

$$\mu_S < y_i \leq \mu_{S+1} \quad (3)$$

For individuals with no schooling, we only know that the index falls below the lowest threshold, normalized to zero, and for individuals with the maximum level of schooling, we know only that $y_i \geq \mu_{max}$. We classify education grade attainment into seven ordered categories for the purposes of this analysis: no schooling, 1 to 5 years, 6 years (complete primary), 7 to 8 years, 9 years (completed junior high), 10 to 11 years, and 12 and above years (completed high school). Assuming normality of the error terms, ε_i, one can then write down the likelihood function, and via this ordered probit model, estimate these cutoff points along with the coefficients of interest (see Greene, 2000). For children who are still in school, we know that they will attain at least their current grade, and hence that for an individual currently in school with J grades of schooling attained, $y_i \geq \mu_J$. One can therefore modify the likelihood function to allow for this censoring, and estimate the censored ordered probit model via maximum-likelihood.[13]

To allow for the potential endogeneity of household migration status within the ordered probit and censored ordered probit model we follow the methodology of Rivers and Vuong (1988). In the first stage, a household migrant status is regressed on the instrument and exogenous regressors. The fitted values and residuals from this first stage are then both included in the censored ordered probit model estimated in

[13] See Appendix A of Glick and Sahn (2000) for specification of the likelihood function. Estimation was carried by programming the likelihood in STATA version 9.

the second stage.[14] We will refer to the estimates from this process as IV-Ordered Probit and IV-Censored Ordered Probit estimates.

4. Theoretical framework

We now turn to an examination of the theoretical impact of migration on the schooling of children. Let $r_{i,s}$ denote the present discounted value of the additional returns to child i of completing schooling year s, $c_{i,s}$ denote the additional financial costs of the child completing this additional year of schooling, and $k_{i,s}$ denote the additional non-financial costs of the child completing this additional schooling year, such as foregone income and the disutility of school effort. Costs are realized at the moment of schooling whereas returns are not realized until the future. Financial costs of schooling must therefore be met out of the household's current resources. The household's schooling decision is then to choose $s \in \{0,1,2,\ldots,N\}$ to maximize the net present discounted value of schooling, subject to the condition that total financial schooling costs must be met out of current household resources net of subsistence needs, A_i. That is,

$$s_i^* = \underset{s\in\{0,1,2,\ldots,N\}}{\arg\max} \sum_{j=1}^{s}\left(r_{i,j} - c_{i,j} - k_{i,j}\right) \quad s.t. \sum_{j=1}^{s} c_{i,j} \leq A_i \tag{4}$$

Let s_i^U denote the unconstrained optimal level of education for child i, which occurs when the financing constraint does not bind. We expect this to be weakly increasing in mother's education and household resources due to the possibility of more educated mothers lowering the disutility and non-financial costs of schooling by placing higher emphasis on education, helping with schoolwork, and perhaps due to a

[14] Such an approach is also carried out by Maitra (2003).

genetic ability component. The returns to schooling may also be higher for richer households due to peer effects and the ability to enter occupations with high start-up costs. Denote by s_i^P the maximum possible years of schooling the household can afford under its budget constraint. This is clearly increasing in wealth, and is likely to be increasing in maternal education since household resources are likely to be correlated with mother's schooling. Then:

$$s_i^* = \min\left(s_i^U, s_i^P\right) \tag{5}$$

Figure 3 then illustrates the relationship between s_i^* and household wealth levels or maternal education. Child schooling is predicted to increase with household resources, both due to relaxing of credit constraints and to the possible higher desired levels of education for children in richer households with more educated mothers.

Now consider the potential impacts of migration on a household's optimal education. Remittances and potentially higher earnings after migration (such as from entrepreneurship, see Woodruff and Zenteno, 2001, or farm investments, see Taylor and Wyatt, 1996) increase the value of household resources A_i, increasing the maximum years of schooling the household can afford, s_i^P. The relaxation of credit-constraints allows households to move to or towards their unconstrained optimal level of education, resulting in higher education for their children. In contrast, if credit constraints are not binding, then remittances will have no effect on their schooling.

In addition to remittances, migration can have a number of other effects on child schooling. Hanson and Woodruff (2003) note that one potential negative effect is that migration may disrupt household structure, removing children from the presence of guardians and role models, and require older children to take on additional household responsibilities. In our model this can be thought of as

increasing the non-financial costs of schooling, $k_{i,s}$, leading households to lower s_i^U, their unconstrained level of education.

A further effect which we wish to consider is the possibility that due to information and network effects, having a migrant parent increases the likelihood that the children themselves will become migrants. This may have an *immediate substitution effect*, whereby as a result of the opportunity cost of staying in school increasing due to higher potential earnings abroad, children drop out of school in order to migrate to work. Again this can be viewed as increasing $k_{i,s}$, leading households to lower s_i^U.

Even if children do not migrate at the age when they would be attending school, the possibility they may migrate in the future can influence the expected returns to education, changing $r_{i,s}$ in our framework. As returns to schooling appear to be higher in Mexico than in the United States, the possibility of migration in the future will *lower* the expected returns from migration. Since children of migrants are more likely to migrate in the future than children of non-migrants, we would therefore expect this *incentive effect* to lower s_i^U in migrant households.[15]

Each of these three additional channels through which migration may affect child schooling (disruption of household structure, direct substitution of schooling today for migration today, and the change in expected future returns to education) all act to lower s_i^U. Assume first that this reduction in the unconstrained desired level of schooling occurs equally across wealth and maternal education levels. Coupling this with the increase in s_i^P arising from remittances gives an overall effect of migration as seen in Figure 4. Two possibilities arise. Figure 4a shows the case where the effect of

[15] For example, in a survey of students in Zacatecas, Kandel and Kao (2001) find that living in a migrant household is negatively associated with directly elicited university aspirations.

alleviating credit constraints outweighs the reduction in desired schooling levels for the poor, so that child schooling increases in poor households. In contrast, unconstrained households only experience the effects of reductions in desired schooling, and so schooling falls. Figure 4b shows the case in which the fall in desired schooling is sufficiently large that no household would have been credit-constrained, even in the absence of remittances. In this case, schooling falls for all wealth levels after migration, but still should fall by more for richer households.

Nevertheless, under some circumstances one might anticipate seeing more of a reduction in schooling among poorer households following migration, and a corresponding increase in education inequality. Figure 4c outlines one such scenario. Basic education is provided free by the state along with free textbooks (SEP, 1999). Along with a number of targeted programs towards the poor, it is likely that even the poorest Mexican households have sufficient household resources to afford some years of post-primary schooling. It is therefore possible that desired schooling levels lie below possible schooling. Migration may then lower s_i^U by more for poorer households than for richer households. Therefore in addition to the overall impact of migration on education being uncertain, it is also uncertain as to how the size of the effect will vary with wealth.

5. Results

5.1. School Attendance

Table 3 presents the probit and iv-probit estimates of the impact of being in a migrant household on school attendance. The probit results show a significant, but small, negative impact of being in a migrant household on school attendance of boys, and an insignificant effect on school attendance of girls. Once we instrument for migration

however, these effects become larger, and being in a migrant household is estimated to significantly lower the probability of attending school by 16 percentage points for 12 to 15 year old males, 21 percentage points for 16 to 18 year olds males, and 20 percentage points for 16 to 18 year old females. The coefficient on migration for females aged 12 to 15 is also negative, but is insignificant. All specifications also show a strong positive effect of mother's years of education on school attendance, and that children in areas which have historically had more schools are currently more likely to attend school.

5.2. Years of Schooling Attained

Tables 4 to 7 present the results of estimating the impact of being in a migrant household on grade years of schooling attained for each sex-age group. In each table, Columns 1 and 2 first present the OLS and 2SLS estimates of equation (1). Column 3 gives the ordered probit estimates, and Column 4 gives the iv-ordered probit estimates. Column 5 gives the censored ordered probit estimates, while column 6 adjusts these for endogeneity of migration.

The OLS results show a positive overall association of migration with attained years of schooling, which is significant for females and for males aged 12 to 15. However, once we control for the endogeneity of migration, the 2SLS results all show a negative impact for migration on schooling, with this effect being significant for 16 to 18 year old males and females. Comparison of the OLS and 2SLS results therefore suggests that children in migrant households have unobserved characteristics which make them *more* likely to receive schooling than observationally similar children in

non-migrant households. This would be consistent with migration of parents who care a lot about the education of their children.

The iv-ordered probit and iv-censored order probit results show the importance of allowing for these more complex specifications. The negative impact of migration on education of males aged 12 to 15 is significant in these two specifications, compared to the insignificant 2SLS specification. The significance level also increases for the negative impact on males and females aged 16 to 18. Comparison of the iv-ordered probit and iv-censored ordered probit results shows a stronger negative impact of migration after allowing for censoring, with this difference greater amongst 12 to 15 year olds than amongst 16 to 18 year olds. This concurs with our a priori view that censoring was particularly likely to be a problem for estimation of schooling at younger ages. The impact of migration on schooling is still insignificant for females aged 12 to 15 after allowing for censoring and differential schooling level effects.

The size of the effects can not be easily seen from the coefficients in Tables 4 to 7. Interpretation of the coefficients of an ordered probit model is complicated by the fact that the direction of the effect is only unambiguous for the lowest and highest category (see Greene, 2000, p. 878). As a result, we calculate the marginal effect of a change in household migrant status on the probability of having schooling of each one of our seven categories. Marginal effects can be further complicated in a censored model, since a change in a variable of interest will affect both schooling attained at the time of observation, and the probability of the observation being censored by the child continuing to attend school. We report marginal effects for the change in the latent index, which captures both of these effects, and therefore provides an estimate of the impact of migrant status on final schooling attainment.

Table 8 reports the marginal coefficients from the iv-ordered probit and iv-censored ordered probit models. These effects demonstrate that living in a migrant household has different effects at different levels of schooling, and it is not the case that the effects are linear. For example, for 12 to 15 year old males, the instrumented censored order probit model shows that living in a migrant household lowers the probability of having 9 years of completed education by 22.5 percent, and lowers the probability of having 10 or 11 years of education (or more) by 12 percent. These effects are substantially larger than in the ordered probit model which does not allow for censoring, reflecting the fact that many 12 to 15 year olds are still in school. Similarly for 15 to 18 year old males and females, allowing for censoring shows a much larger effect of migration on lowering the probability of completing 12 years or more education. Overall these marginal effects show migration having very little effect on the probability of completing 7 to 8 years of education, while lowering the probabilities of receiving more years than this, and increasing the probability of receiving less years than this.

5.3. Allowing for heterogeneous effects

As discussed in Section 4, the impact of migration on education may possibly vary with household wealth, since households with lower wealth may be more likely to be liquidity constrained when making their education decisions. In such cases, the remittance effect of migration is likely to relax these liquidity constraints and therefore potentially increase education, or at least not reduce it as much as one sees for those with higher wealth levels. Unfortunately the ENADID contains only limited information on household wealth, in the form of current asset indicators, which are themselves affected by a household's migration decision. We therefore instead use

maternal education as a proxy for household wealth: mother's years of schooling has a 0.46 correlation with an asset index formed as the first principal component of a number of asset indicators in our sample.

Table 9 then reports the results of 2SLS estimation of the impact of living in a migrant household on child schooling, interacted with mother's education. We employ two methods of carrying out this interaction. The first is a straight interaction with the number of years of schooling. Secondly, we concentrate on the poorest segment by interacting with whether or not the child's mother has two years or less of education. We use 2SLS rather than the censored ordered probit for ease of interpreting the coefficients on the interactions, and because the likelihood functions did not always converge in ordered probit estimation with interactions.

Table 9 offers only limited evidence for heterogeneous effects of migration on child's schooling. The interaction effect with total years of schooling of the mother is always negative, indicating that children in households which are likely to be richer have even more of a negative impact from migration. However, none of these interaction terms are significant. When we interact with the mother having two years or less of schooling, we find positive interaction effects, showing that children in poorer households are less likely to face a reduction in years of schooling from migration. These interaction effects are significant at the 10 percent level for females 16 to 18 and at the 11 percent level for females 12 to 15. For the 12 to 15 year females, the size of the coefficient is almost enough to take the overall effect of migration for children with less-educated mothers to zero. Moreover, the standard error is such that we can't reject a positive effect for this group of magnitudes similar to the 0.7 years estimated by Hanson and Woodruff (2003). However, for the 16 to 18

year old females, the overall effect of migration is still negative, just less negative than for females of this age with more educated mothers.

6. What are they doing instead of school?

The above analysis has found that children in migrant households are less likely to be attending school and complete less total years of schooling than children in non-migrant households. In this section we explore what these children are doing instead of schooling. It is possible that the absence of a migrant parent may require the child to undertake tasks normally carried out by that migrant, such as working in a family business or doing housework. Since it can take a while for migrants to start earning money and remitting, children may also need to work to cover short-term household liquidity constraints.[16] Any of these activities are also consistent with the child (or the parents) no longer valuing schooling due to future migration plans. Finally we can also examine whether or not the child has migrated during this age range where they could be still engaged in schooling.

Table 10 reports the percentage of 12 to 18 year olds by sub-age group and gender who are in school, working, working and not in school, migrated, doing housework, and working in family businesses. Children in migrant households are more likely to have migrated themselves than children in non-migrant households, especially among males. 3.4 percent of 12 to 15 year olds males and 8.2 percent of 16 to 18 year old males with older migrant members in the household have themselves migrated, compared to only 0.2 percent of males in non-migrant households. Males also are more likely to be working, especially as unpaid workers in family businesses,

[16] The ENADID asks whether or not you have worked in the past week, regardless of whether or not you are also attending school, which we define as *working*. Another possible activity in the last week for individuals who were not students and who were not working was doing *housework.* Among the individuals who are working, we also look more closely to see whether or not they are working as unpaid workers in a family enterprise, defined as *unpaid family workers*.

if they are in migrant households. In contrast, women in migrant households are not that likely to migrate themselves, and instead are more likely to be engaged in housework than women in non-migrant households.

In Table 11 we examine whether the differences observed in Table 10 are significant once we control for observable differences between children in migrant and non-migrant households and control for the endogeneity of migration. We present probit results for whether or not the child has migrated, since the historic migrant network instrument is clearly not excludable from this model. For the other outcomes, we again instrument living in a migrant household with historic migration rates, using iv-probit models. The results show children living in migrant households to be significantly more likely to migrate themselves than observationally similar children living in non-migrant households. This effect is largest for 16 to 18 year old males, who are 7.3 percent more likely to migrate when living in migrant households. Migrant and non-migrant males do not exhibit significantly different probabilities of working or engaging in housework, and the higher likelihood of working in family businesses observed for males in migrant households in Table 10 is not significant. Among females, we see a strong significant effect of living in a migrant household on doing housework.

How much then do these other activities explain the lower school participation of children in migrant households? Comparing the marginal effects of migration on school attendance in Table 3 to those on participation in these other activities in Table 11 shows that current migration can more than account for the lower likelihood of school participation for 16 to 18 year old males, and can account for 60 percent of the lower likelihood of school participation for 12 to 15 year old males. For 12 to 15 year old females, there was no significant effect of migration on school attendance, but

housework can account for the size of the point estimate. For 16 to 18 year old females, the increase in housework as the main activity more than accounts for the decrease in schooling, with a decrease in non-school work also needed to account for the large increase in housework.

7. Conclusion

This paper examined the overall impact of migration on educational attainments in rural Mexico. This impact is the sum of three main effects: the effect of remittances on the feasible amount of education investment, which is likely to be positive where liquidity constraints are bidding; the effect of having parents absent from the household as a result of migration, which may translate into less parental inputs into education acquisition and maybe into more house and farm work by remaining household members, including children; and the effect of migration prospects on the desired amount of education, which is likely to be negative, as we argued, in the face of lower returns to schooling in the U.S. than in Mexico, especially in a context of illegal immigration.

Our results are in line with these predictions. Using historical migration rates by state to instrument for current migration, we find evidence of a significant negative effect migration on schooling attendance and attainments of 12 to 18 year-old boys and of 16 to 18 year-old girls. IV-Censored Ordered Probit results show that living in a migrant household lowers the chances of boys completing junior high-school (by 22 percent) and of boys and girls completing high-school (by 13 to 15 percent). This is consistent with migration increasing the opportunity cost, and lowering the expected return to education. However, the negative effect of migration on schooling is somewhat mitigated for younger girls with low educated mothers, which is consistent

with remittances allowing to relax credit constraints on education investment at the lower end of the wealth and income distribution.

We also examine what children are doing instead of going to school and find that living in a migrant household significantly increases the chances of boys migrating themselves at all school ages and of older (16 to 18) girls doing housework. Comparison of the marginal effects of migration on school attendance and on participation to other activities shows that the observed decrease in schooling of 16 to 18 year olds is more than accounted for by current migration of boys and increases in housework for girls. This is at an age where work is also an important form of human capital accumulation, so it appears that Mexican females in migrant households are losing out on both schooling and work.

To the extent that this reduction in education is a conscious choice of individuals in the face of better opportunities abroad, it should be less of a policy concern than a restriction on schooling due to liquidity constraints. However, given the large literature on positive externalities of education, there may still be some concern at this effect of potential migration on schooling incentives. One possible policy solution would be to take measures to increase the return to schooling in the U.S., which is likely to occur if migrants have better access to legal jobs.

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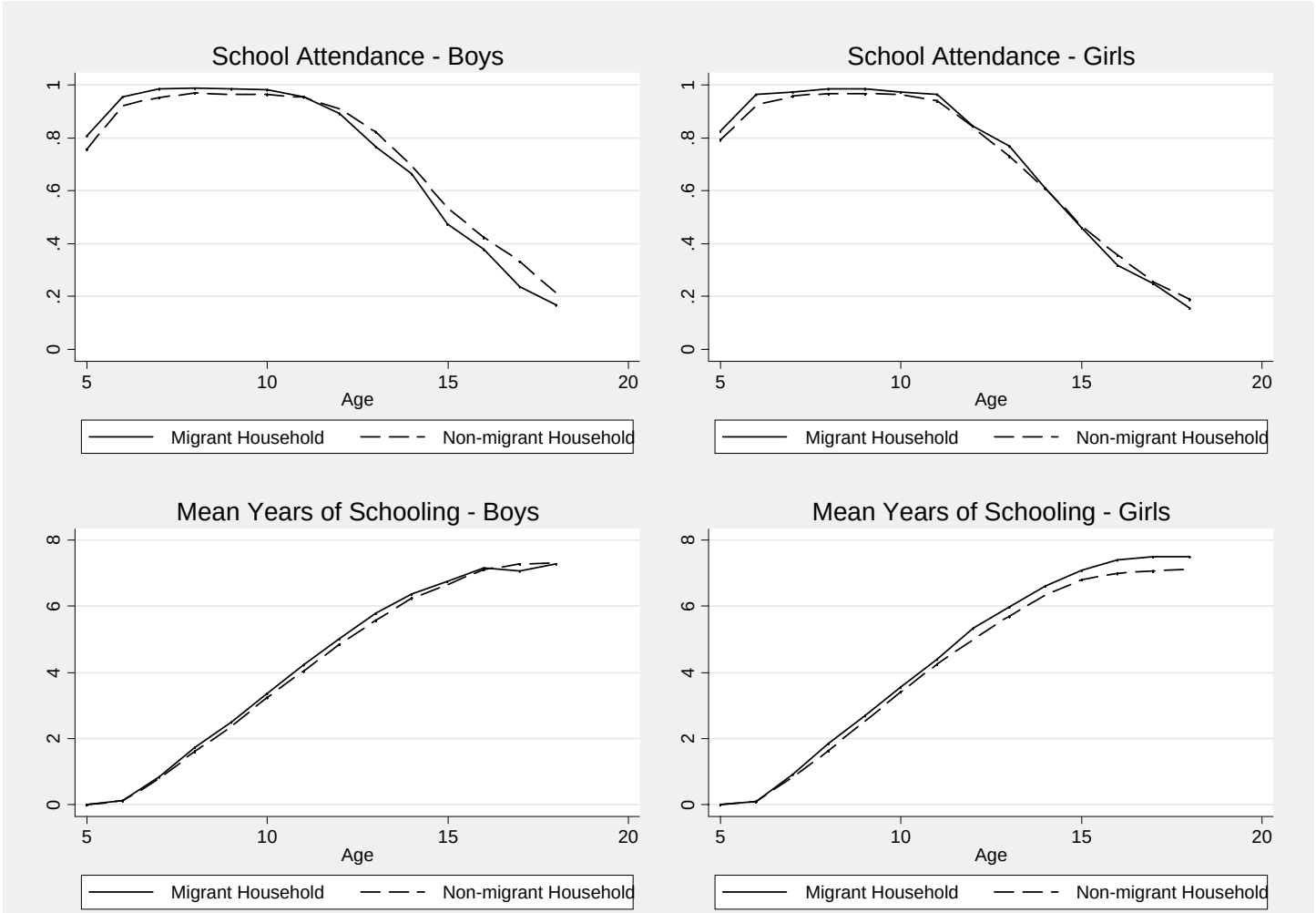


Figure 1: School attendance and attainment by age and sex

Figure 2: Distribution of Years of Schooling Attained by 16 to 18 year olds

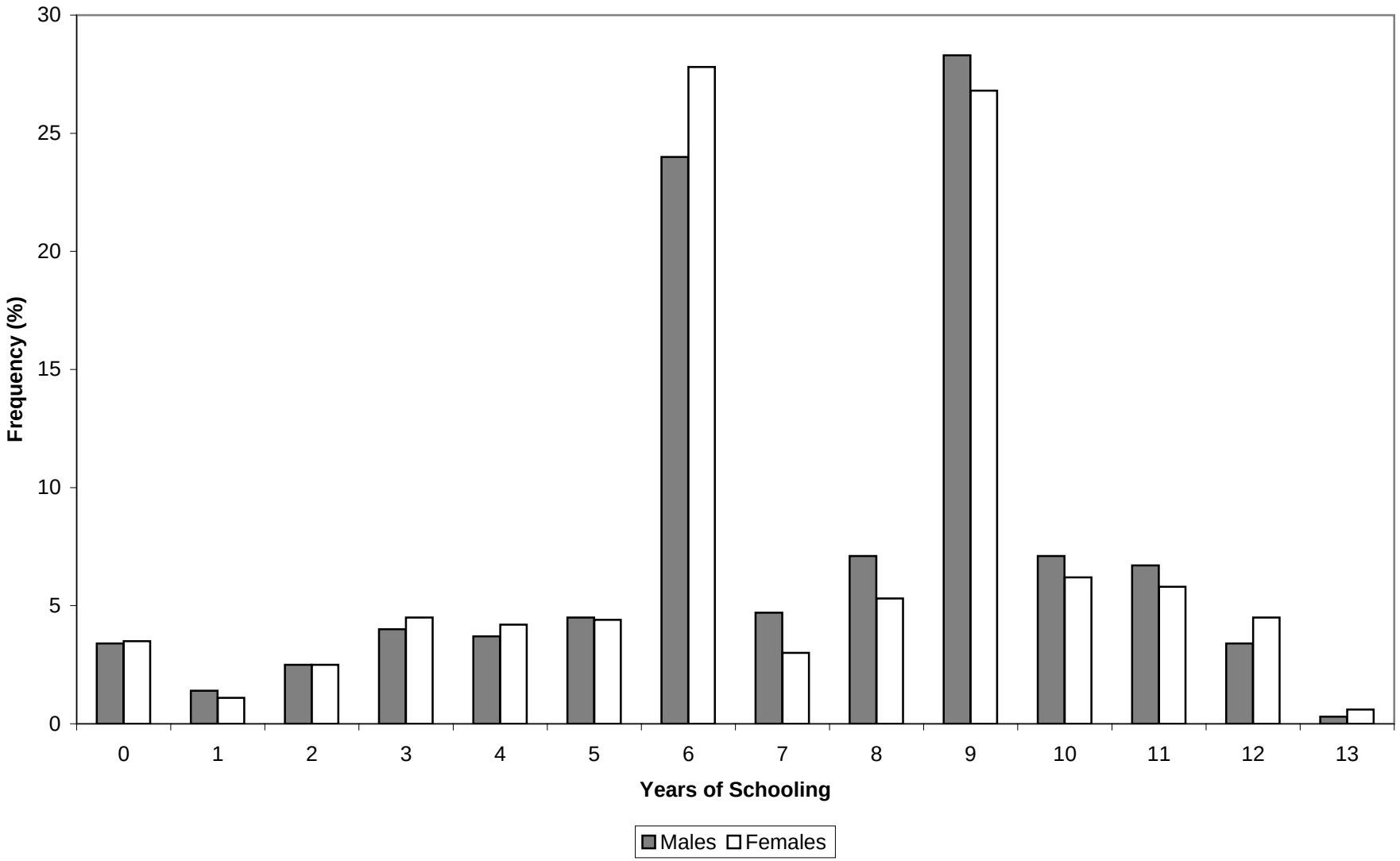
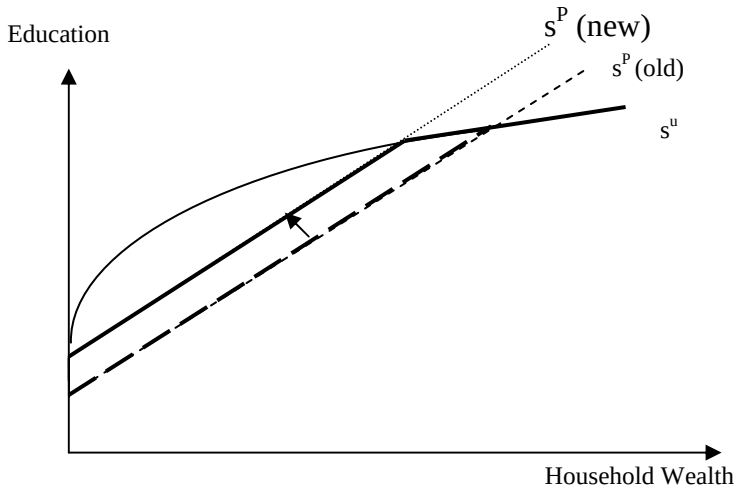
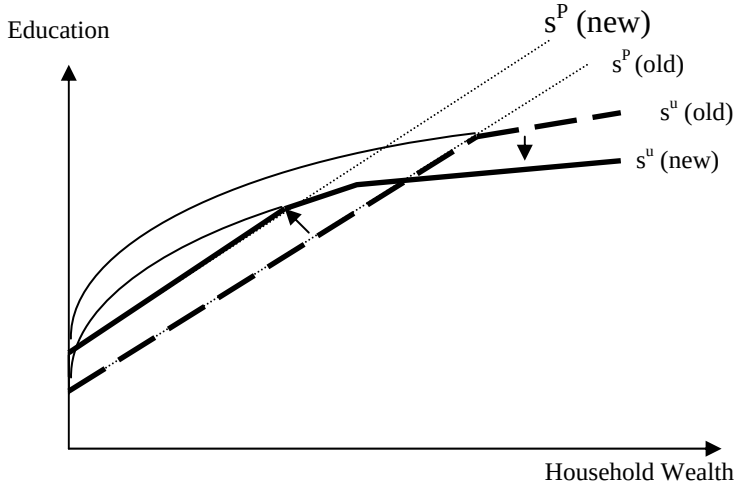


FIGURE 3: REMITTANCE EFFECT ON CHILD SCHOOLING



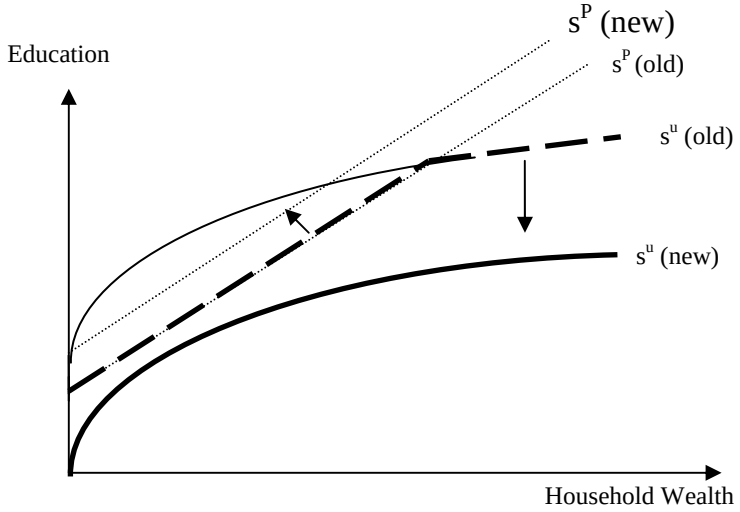
Remittances shift the possible schooling line upwards, increasing education for poorer households. Bold line shows the new education choice, bold dashed line shows the old education choice.

FIGURE 4: OVERALL EFFECT OF MIGRATION ON CHILD SCHOOLING
Figure 4a: Equal but small reduction in unconstrained schooling



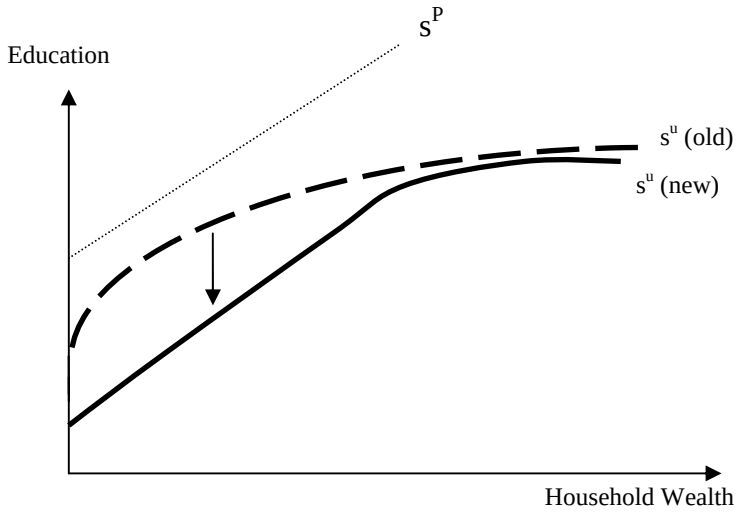
Bold dotted line shows the original schooling decision, bold solid line shows the new schooling decision after migration.

Figure 4b: Equal but larger reduction in unconstrained schooling



Bold dotted line shows the original schooling decision, bold solid line shows the new schooling decision after migration, which lies entirely below the original levels.

Figure 4c: More of a reduction in unconstrained schooling for the poor



Bold dotted line shows the original schooling decision, bold solid line shows the new schooling decision after migration, which lies entirely below the original levels, but more so for the poor.

TABLE 1: SUMMARY STATISTICS OF KEY VARIABLES

	Number of	All households		Migrant Households		Non-migrant households	
	Observations	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Household Variables (for households with a child aged 12 to 18)							
Proportion of Households with a migrant	12980	0.22		1		0	
Proportion of Households with a migrant by census definition	12980	0.13		0.60		0.002	
Proportion receiving remittances[1]	12301	0.06		0.22		0.02	
Percentage share of income from remittances[1]	12301	3.83	16.79	14.91	30.87	0.80	7.43
Individual Variables							
Years of Schooling of Mother for children aged 12 to 18	20388	3.32	3.20	3.47	2.98	3.28	3.27
Years of Schooling of Males 12 to 15	6537	5.79	2.02	5.94	1.82	5.74	2.08
Years of Schooling of Males 16 to 18	4159	7.10	2.85	7.10	2.73	7.10	2.88
Years of Schooling of Females 12 to 15	6196	5.92	2.05	6.23	1.79	5.83	2.11
Years of Schooling of Females 16 to 18	3489	7.32	2.87	7.52	2.58	7.26	2.96
State level variables							
State migration rate in 1924	20388	0.006	0.008	0.011	0.008	0.004	0.007
Percentage of rural households owning land in 1910	20388	2.283	1.705	2.698	1.514	2.159	1.739
Male School Attendance in 1930 (% of 6 to 10 year olds)	20388	39.39	9.00	39.902	8.153	39.242	9.226
Female School Attendance in 1930 (% of 6 to 10 year olds)	20388	36.84	10.00	38.944	9.264	36.211	10.121
Gini of Household Income in 1960	20388	0.783	0.069	0.778	0.068	0.784	0.069
Number of Schools per 1000 population in 1930	20388	1.100	0.319	0.993	0.305	1.131	0.315
Gini of Years of Schooling for Males 15-20 in 1960	20388	0.554	0.080	0.551	0.087	0.555	0.078
Gini of Years of Schooling for Females 15-20 in 1960	20388	0.573	0.099	0.556	0.100	0.578	0.098
Average Male Years of Schooling in 1960	20388	2.614	0.638	2.671	0.647	2.597	0.635
Average Female Years of Schooling in 1960	20388	2.437	0.745	2.561	0.756	2.400	0.738

Source: own calculation from ENADID 1997 communities with population <100,000 and 50 or more households sampled.
Education Ginis are only reported for communities with 20 or more children in the given age category

TABLE 2: DOES THE HISTORIC NETWORK AFFECT EDUCATION LEVELS IN NON-MIGRANT HOUSEHOLDS?

Dependent Variable: Years of education attained (non-migrant households only)

	Males 12 to 15	Males 16 to 18	Females 12 to 15	Females 16 to 18
Living in state with migration rate above median in 1924	0.14	-0.07	0.18	0.27
	(1.35)	(0.33)	(2.24*)	(1.50)

T-statistics are in parentheses with standard errors clustered at the state level.
* significant at the 5% level.
Coefficients from OLS regressions which also include age of child, age of child squared, maternal education, proportion of rural households owning land in 1910, school attendance in 1930, income gini in 1960, number of schools per 1000 population in 1930, gini of years of schooling in 1960, and mean years of schooling in 1960 as other controls.

Table 3: The Impact of Migration on School Attendance

	Males 12 to 15		Males 16 to 18		Females 12 to 15		Females 16 to 18	
	Probit	IV-Probit	Probit	IV-Probit	Probit	IV-Probit	Probit	IV-Probit
Child is in a Migrant Household	-0.036	-0.162	-0.042	-0.217	0.011	-0.090	-0.020	-0.205
	(2.04)**	(1.69)*	(1.67)*	(2.21)**	(0.44)	(1.11)	(0.75)	(2.49)**
Age of Child	-0.108	-0.080	0.383	0.389	-0.348	-0.333	0.431	0.524
	(0.66)	(0.52)	(0.64)	(0.63)	(1.70)*	(1.60)	(0.48)	(0.55)
Age of Child Squared	-0.001	-0.002	-0.014	-0.015	0.008	0.008	-0.016	-0.018
	(0.13)	(0.32)	(0.82)	(0.81)	(1.10)	(1.01)	(0.59)	(0.65)
Mother's Years of Education	0.031	0.031	0.034	0.033	0.045	0.046	0.053	0.051
	(14.52)***	(13.66)***	(10.67)***	(9.53)***	(11.76)***	(12.47)***	(20.25)***	(12.29)***
Proportion of rural households owning land in 1910	-0.015	-0.010	0.008	0.017	-0.007	-0.004	-0.008	0.001
	(2.31)**	(1.55)	(0.86)	(1.64)	(1.26)	(0.67)	(0.87)	(0.08)
School Attendance in 1930 (6 to 10 year olds)[1]	-0.003	-0.002	-0.002	-0.001	-0.002	-0.001	-0.003	-0.001
	(1.56)	(0.83)	(0.89)	(0.42)	(1.00)	(0.53)	(1.03)	(0.28)
Gini of Income in 1960	-0.267	-0.222	-0.278	-0.180	-0.088	-0.028	-0.719	-0.587
	(1.60)	(1.34)	(1.31)	(1.10)	(0.38)	(0.11)	(2.68)***	(2.05)**
Number of Schools per 1000 population in 1930	0.149	0.099	0.148	0.082	0.135	0.097	0.096	0.016
	(4.12)***	(1.76)*	(3.77)***	(1.41)	(4.72)***	(2.41)**	(2.58)**	(0.35)
Gini of Years of Schooling for 15-20 year olds in 1960[1]	0.068	0.085	0.375	0.438	0.005	0.020	-0.844	-0.754
	(0.18)	(0.23)	(0.84)	(0.98)	(0.02)	(0.05)	(1.83)*	(1.50)
Average Years of Schooling in 1960[1]	-0.004	-0.007	-0.016	-0.008	0.028	0.027	-0.123	-0.118
	(0.10)	(0.18)	(0.29)	(0.15)	(0.56)	(0.50)	(2.28)**	(1.88)*
Observations	6454	6454	4094	4094	6108	6108	3430	3430

Notes:
1. These variables are for historic male schooling in columns 1-3, and historic female schooling in columns 4-6.
T-statistics are in parentheses with standard errors clustered at the state level.
Instruments are 1924 state-level migration rate
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 4: The Impact of Migration on the Education of Males Aged 12 to 15

	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	2SLS	Ordered Probit	IV-Ordered Probit	Censored Ordered Probit	IV-Censored Ordered Probit
Child is in a Migrant Household	0.151	-0.438	0.013	-0.362	-0.037	-0.512
	(2.13)*	(1.41)	(0.30)	(2.24)*	(0.55)	(2.20)**
Age of Child	3.655	3.779	2.094	2.176	0.203	0.376
	(6.37)**	(6.62)**	(5.92)**	(6.07)**	(0.21)	(0.39)
Age of Child Squared	-0.113	-0.118	-0.061	-0.064	-0.008	-0.014
	(5.26)**	(5.49)**	(4.64)**	(4.80)**	(0.22)	(0.40)
Mother's Years of Schooling	0.205	0.207	0.128	0.129	0.161	0.163
	(18.56)**	(18.96)**	(22.48)**	(23.39)**	(11.51)**	(11.54)**
Proportion of rural households owning land in 1910	-0.066	-0.044	-0.039	-0.024	-0.091	-0.070
	(1.68)	(1.15)	(1.70)	(1.18)	(3.99)**	(3.11)**
Male School Attendance in 1930 (6 to 10 year olds)	0.002	0.008	0.001	0.004	-0.005	0.000
	(0.42)	(1.27)	(0.15)	(1.26)	(1.09)	(0.10)
Gini of Income in 1960	-1.305	-1.155	-0.766	-0.673	-1.560	-1.365
	(1.76)	(1.43)	(1.65)	(1.46)	(2.90)**	(2.61)**
Number of Schools per 1000 population in 1930	-0.154	-0.383	-0.092	-0.239	0.240	0.026
	(0.96)	(1.84)	(0.99)	(2.12)*	(2.01)**	(0.17)
Gini of Male Years of Schooling for 15-20 year olds in 1960	-4.336	-4.251	-2.536	-2.486	-2.625	-2.517
	(2.92)**	(3.19)**	(3.05)**	(3.19)**	(3.08)**	(2.99)**
Average Male Years of Schooling in 1960 for 15-20 year olds	-0.451	-0.471	-0.249	-0.261	-0.300	-0.313
	(2.90)**	(2.79)**	(3.00)**	(3.31)**	(2.73)**	(2.83)**
Observations	6451	6451	6451	6451	3226	3226

Robust t-statistics in parentheses clustered at the state level.
Instrument is the 1924 state-level migration rate.
Censored ordered probit regressions are carried out on a 50% random sample, and use school attendance as censoring variable.
* significant at 5%; ** significant at 1%

Table 5: The Impact of Migration on the Education of Males Aged 16 to 18

	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	2SLS	Ordered Probit	IV-Ordered Probit	Censored Ordered Probit	IV-Censored Ordered Probit
Child is in a Migrant Household	0.151	-1.366	0.041	-0.613	-0.012	-0.653
	(1.34)	(1.99)*	(0.87)	(2.92)**	(0.16)	(2.81)**
Age of Child	-3.945	-3.921	-1.716	-1.709	-1.137	-1.096
	(0.84)	(0.82)	(0.76)	(0.75)	(9.41)**	(9.11)**
Age of Child Squared	0.120	0.119	0.053	0.053	0.033	0.032
	(0.87)	(0.84)	(0.80)	(0.78)	(8.15)**	(7.70)**
Mother's Years of Schooling	0.340	0.337	0.139	0.138	0.149	0.149
	(12.98)**	(12.52)**	(15.88)**	(15.09)**	(12.38)**	(12.34)**
Proportion of rural households owning land in 1910	-0.107	-0.043	-0.039	-0.011	-0.022	0.006
	(1.98)	(0.71)	(1.71)	(0.55)	(1.05)	(0.31)
Male School Attendance in 1930 (6 to 10 year olds)	-0.003	0.007	-0.002	0.002	-0.005	-0.001
	(0.25)	(0.48)	(0.40)	(0.51)	(1.23)	(0.26)
Gini of Income in 1960	-2.173	-1.475	-0.793	-0.495	-0.167	0.142
	(1.56)	(1.04)	(1.43)	(0.99)	(0.35)	(0.30)
Number of Schools per 1000 population in 1930	0.483	0.005	0.209	0.004	0.355	0.149
	(1.90)	(0.01)	(2.01)*	(0.03)	(2.91)**	(1.08)
Gini of Male Years of Schooling for 15-20 year olds in 1960	-5.168	-4.690	-1.878	-1.681	-2.295	-2.117
	(1.76)	(2.13)*	(1.58)	(2.02)*	(2.84)**	(2.64)**
Average Male Years of Schooling in 1960 for 15-20 year olds	-0.574	-0.528	-0.204	-0.185	-0.218	-0.198
	(1.98)	(1.95)	(1.67)	(1.97)*	(0.034)	(1.92)*
Observations	4094	4094	4094	4094	2047	2047

Robust t-statistics in parentheses clustered at the state level.
Instrument is the 1924 state-level migration rate.
Censored ordered probit regressions are carried out on a 50% random sample, and use school attendance as censoring variable.
* significant at 5%; ** significant at 1%

Table 6: The Impact of Migration on the Education of Females Aged 12 to 15

	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	2SLS	Ordered Probit	IV-Ordered Probit	Censored Ordered Probit	IV-Censored Ordered Probit
Child is in a Migrant Household	0.272	-0.225	0.125	-0.205	0.126	-0.307
	(3.36)**	(0.77)	(2.78)**	(1.34)	(1.53)	(1.04)
Age of Child	1.613	1.671	0.748	0.787	0.475	0.477
	(2.18)*	(2.23)*	(1.81)	(1.90)	(0.21)	(0.39)
Age of Child Squared	-0.036	-0.038	-0.010	-0.012	-0.016	-0.016
	(1.31)	(1.36)	(0.66)	(0.74)	(0.19)	(0.35)
Mother's Years of Schooling	0.216	0.217	0.144	0.145	0.196	0.198
	(25.93)**	(24.32)**	(23.28)**	(23.29)**	(13.30)**	(13.37)**
Proportion of rural households owning land in 1910	-0.094	-0.082	-0.060	-0.052	-0.031	-0.020
	(3.98)**	(2.82)**	(3.75)**	(3.37)**	(1.13)	(0.73)
Female School Attendance in 1930 (6 to 10 year olds)	0.002	0.007	-0.000	0.003	-0.005	-0.001
	(0.34)	(1.00)	(0.13)	(0.90)	(1.09)	(0.11)
Gini of Income in 1960	-1.143	-0.887	-0.665	-0.496	0.323	0.561
	(1.61)	(1.06)	(1.41)	(0.98)	(0.50)	(0.94)
Number of Schools per 1000 population in 1930	0.066	-0.112	0.086	-0.032	0.256	0.098
	(0.53)	(0.62)	(0.95)	(0.29)	(2.42)**	(0.67)
Gini of Female Years of Schooling for 15-20 year olds in 1960	-4.061	-3.969	-2.295	-2.236	-0.798	-0.690
	(4.83)**	(5.11)**	(4.64)**	(4.67)**	(0.76)	(0.68)
Average Female Years of Schooling in 1960 for 15-20 year olds	-0.304	-0.305	-0.150	-0.150	0.088	0.087
	(2.94)**	(2.64)**	(2.57)*	(2.24)*	(0.61)	(0.64)
Observations	6107	6107	6107	6107	3053	3053

Robust t-statistics in parentheses clustered at the state level.
Instrument is the 1924 state-level migration rate.
Censored ordered probit regressions are carried out on a 50% random sample, and use school attendance as censoring variable.
* significant at 5%; ** significant at 1%

Table 7: The Impact of Migration on the Education of Females Aged 16 to 18

	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	2SLS	Ordered Probit	IV-Ordered Probit	Censored Ordered Probit	IV-Censored Ordered Probit
Child is in a Migrant Household	0.338	-1.443	0.098	-0.663	0.037	-0.824
	(2.75)*	(2.21)*	(1.92)	(2.83)**	(0.48)	(3.26)**
Age of Child	0.695	1.354	0.291	0.581	-0.236	0.128
	(0.19)	(0.33)	(0.18)	(0.35)	(1.62)	(0.02)
Age of Child Squared	-0.015	-0.034	-0.006	-0.014	0.005	-0.005
	(0.14)	(0.28)	(0.12)	(0.29)	(1.08)	(0.02)
Mother's Years of Schooling	0.418	0.414	0.176	0.176	0.215	0.213
	(16.33)**	(15.07)**	(18.32)**	(17.76)**	(14.72)**	(14.77)**
Proportion of rural households owning land in 1910	-0.140	-0.069	-0.052	-0.021	-0.058	-0.023
	(2.07)*	(0.83)	(1.95)	(0.89)	(2.27)**	(0.91)
Female School Attendance in 1930 (6 to 10 year olds)	-0.027	-0.006	-0.012	-0.003	-0.008	0.002
	(1.75)	(0.39)	(1.93)	(0.56)	(1.72)	(0.41)
Gini of Income in 1960	-3.478	-2.477	-1.477	-1.054	-1.30	-0.751
	(1.94)	(1.21)	(2.10)*	(1.51)	(2.38)**	(1.38)
Number of Schools per 1000 population in 1930	0.396	-0.270	0.184	-0.101	0.153	-0.176
	(1.23)	(0.59)	(1.45)	(0.70)	(1.54)	(1.34)
Gini of Female Years of Schooling for 15-20 year olds in 1960	-7.445	-6.971	-2.987	-2.801	-1.846	-1.638
	(2.79)**	(2.78)**	(2.85)**	(3.09)**	(2.06)**	(1.85)
Average Female Years of Schooling in 1960 for 15-20 year olds	-0.534	-0.537	-0.218	-0.221	-0.153	-0.152
	(1.76)	(1.56)	(1.86)	(1.76)	(1.37)	(1.33)
Observations	3431	3431	3431	3431	1716	1716

Robust t-statistics in parentheses clustered at the state level.
Instrument is the 1924 state-level migration rate.
Censored ordered probit regressions are carried out on a 50% random sample, and use school attendance as censoring variable.
* significant at 5%; ** significant at 1%

Table 8: Marginal Effects from Ordered Probit Models

	Males 12 to 15		Males 16 to 18		Females 12 to 15		Females 16 to 18	
	IV-Ordered Probit	IV-Censored Ordered Probit	IV-Ordered Probit	IV-Censored Ordered Probit	IV-Ordered Probit	IV-Censored Ordered Probit	IV-Ordered Probit	IV-Censored Ordered Probit
No Schooling	0.009	0.043	0.038	0.044	0.005	0.024	0.030	0.053
	(0.004)*		(0.014)**		(0.004)		(0.012)**	
1 to 5 years	0.121	0.159	0.127	0.123	0.063	0.106	0.129	0.144
	(0.053)*		(0.041)**		(0.046)		(0.042)**	
6 years	0.001	0.137	0.078	0.080	0.006	0.117	0.103	0.115
	(0.004)		(0.030)**		(0.006)		(0.041)*	
7 to 8 years	-0.100	0.006	-0.002	0.001	-0.052	-0.002	0.002	-0.001
	(0.045)*		(0.003)		(0.039)		(0.002)	
9 years	-0.029	-0.225	-0.110	-0.079	-0.021	-0.145	-0.106	-0.122
	(0.013)*		(0.038)**		(0.015)		(0.036)**	
10 to 11 years	-0.002	-0.120	-0.094	-0.039	-0.001	-0.100	-0.110	-0.046
	(0.001)*		(0.034)**		(0.001)		(0.042)**	
12 years or more	n.a.	n.a.	-0.036	-0.130	n.a.	n.a.	-0.047	-0.145
			(0.013)**				(0.017)**	

n.a. denotes not applicable, as 12 to 15 year olds have not reached 12 years of schooling.

* significant at 5%; ** significant at 1%

Table 9: Interaction of Migration with Mother's Schooling

	Males 12 to 15 (1) 2SLS	Males 12 to 15 (2) 2SLS	Males 16 to 18 (3) 2SLS	Males 16 to 18 (4) 2SLS	Females 12 to 15 (5) 2SLS	Females 12 to 15 (6) 2SLS	Females 16 to 18 (7) 2SLS	Females 16 to 18 (8) 2SLS
Child is in a Migrant Household	-0.201	-0.538	-1.244	-1.741	0.138	-0.520	-0.817	-2.211
	(0.52)	(1.48)	(1.51)	(2.16)*	(0.31)	(1.44)	(0.94)	(2.53)*
in a Migrant Household *Mother's Years Schooling	-0.072		-0.042		-0.098		-0.187	
	(1.43)		(0.34)		(1.34)		(1.34)	
in a Migrant Household * Low Mother's education		0.355		0.796		0.489		1.090
		(1.03)		(1.43)		(1.60)		(1.82)
Observations	6451	6451	4093	4093	6107	6107	3431	3431

Robust z statistics in parentheses
* significant at 5%; ** significant at 1%
Regressions also include all controls in Tables 3-6.

Table 10: Percentage of 12 to 18 year olds doing other activities than schooling

	Males 12 to 15		Males 16 to 18		Females 12 to 15		Females 16 to 18	
	Migrant Household	Non-migrant Household	Migrant Household	Non-migrant Household	Migrant Household	Non-migrant Household	Migrant Household	Non-migrant Household
Percent attending school	70.7	74.8	26.9	32.4	67.0	66.9	24.4	26.8
Percent who have migrated	3.4	0.1	8.2	0.2	2.4	0.1	3.1	0.3
Percent working	39.3	36.8	70.9	69.0	16.5	17.5	33.2	35.4
Percent working and not in school	20.6	19.2	61.3	58.7	9.6	11.2	29.0	30.9
Percent housework as main activity	1.8	1.7	1.2	1.1	23.2	21.8	45.2	40.7
Percent unpaid family workers	25.4	21.7	26.3	21.3	9.0	9.0	8.8	10.2

Table 11: Marginal Effect of being in a Migrant Household on Other Activities of 12 to 18 year olds

	Males 12 to 15		Males 16 to 18		Females 12 to 15		Females 16 to 18	
	Coefficient	Z-statistic	Coefficient	Z-statistic	Coefficient	Z-statistic	Coefficient	Z-statistic
Has Migrated themselves	0.022	6.50**	0.073	11.53**	0.018	6.95**	0.023	7.54**
Works	0.040	0.22	-0.087	0.47	-0.095	0.87	-0.203	1.59
Works and is not in school	0.059	0.82	0.002	0.03	-0.058	0.94	-0.149	1.20
Does housework as main activity	0.011	0.62	-0.004	0.31	0.093	2.23*	0.346	3.74**
Is an unpaid family worker	0.010	0.06	0.015	0.08	-0.090	1.11	-0.076	0.85

Coefficients are marginal effects from probit (Migration) and iv-probit (other activities)
Probits contain all controls in Tables 3 through 6
* significant at 5%; ** significant at 1%