Disentangling Parental Absences from Remittances in Economic Migration: The Case of Educational Attainment in Guatemala

Abstract: The influence of economic migration on left-behind children's educational attainment is complicated by the often countervailing and likely harmful effects of parental absences versus the beneficial effects of remittances. Most research has not decomposed these aspects of economic migration on children's human capital outcomes. We address this deficiency by employing an instrumental variables methodology that decouples the effects of parental absences from remittances on student enrolment and grade-by-age progression in Guatemala. Results indicate that parental absences are negatively related to enrolment and grade-for-age progression. Counter to expectations, remittances are also negatively correlated with enrolment but consistent with expectations, they neutralize the harmful influence of parental absences on grade-for-age progression for children enrolled in school. Delving further, we find that boys lose interest in school when a parent migrates while girls use remittance-derived opportunities to remain enrolled in school—essentially conforming to a culture of migration effect.

Introduction

A lively debate has ensued in the literature over the last three decades concerning the value of international migration and concomitant remittance transfers to emergent nation development (e.g., Durand et al., 1996; Reichert, 1981). One aspect of this debate addresses the influence of economic migration on left-behind children's education

outcomes. Much of this research shows beneficial associations between remittance income and school attendance, enrolment, performance, graduation rates, and reduced dropout (Acosta, 2011; Adams Jr, 2005; Antman, 2012; Calero et al., 2009; Edwards and Ureta, 2003; Kandel and Kao, 2001; Lu and Treiman, 2007; Yang, 2008). In contrast, a growing body of literature that largely developed within the qualitative research realm (Moran-Taylor, 2008b; Schmalzbauer, 2008; Smith, 2005), which has more recently taken hold in the quantitative research realm (Antman, 2011; Creighton et al., 2009; Halpern-Manners, 2011; McKenzie and Rapoport, 2011), addresses the more harmful aspects of parental absences on education metrics (e.g., lack of motivation and/or aspiration to progress in school). While ample research has considered migration and remittances separately, little research has considered how they jointly influence children's education outcomes (Amuedo-Dorantes and Pozo, 2010 is an exception). The separation of remittance effects from migration effects is important because the often-beneficial aspects of remittance transfers may be negatively countered by the long-term absences of household members. Furthermore, a clean decoupling of the two phenomena allows for prediction – i.e., determining the level of remitted income needed to ameliorate the likely harmful influence of parental absences on outcomes of interest. Using data from the 2000 Guatemala Living Standards Measurement Study, this investigation aims to address these research needs by simultaneously measuring the independent effects of parental migration and the receipt of remittances on child education outcomes.

A comparative analysis of remittances and migration effects is not without problems. The most serious methodological issue is that of selection, that is, individuals who migrate and their left-behind family members are inherently different either in

natural ability or in their collection of tangible and intangible assets from those who do not migrate. Contemporary research has only just started to tackle the issue of migrant selectivity bias. In order to minimize this bias investigators have relied on more sophisticated econometric techniques such as natural experiments, difference-in-differences models, instrumental variables and regression discontinuity (Alcaraz et al., 2012; Antman, 2011; Antman, 2012; Carletto et al., 2011; McKenzie and Rapoport, 2011; Nobles, 2011; Nobles, 2007; Robles and Oropesa, 2011). However, only a few investigations have simultaneously accounted for the differential influences of family member absence and remittances on research outcomes. We address this concern by using a simultaneous equation modelling framework to measure the independent effects of parental migration and household remittances on child school enrolment and grade-by-age progression. The identification of this model is based on the use of instrumental variables. We use measures of historic community migration networks as our migration instruments and US receiving community wage rates as our remittance instrument.

Previous studies that have used instrumental variables to decouple remittance effects from migration effects are largely concentrated in the agricultural change literature (Damon, 2010; Quisumbing and McNiven, 2010; Taylor et al., 2003; Vasco, 2011). The one exception in the educational attainment literature uses migrant destination employment rates and average real earning as instruments for remittances (Amuedos-Dorantes and Pozo (2010). The authors find a beneficial income effect on school attendance with children residing in remittance-receiving households in the Dominican Republic. However, the positive income effect on school attendance dissipates when

children are added from households that both receive remittances and have a member currently living abroad.

Guatemalan migration to the US makes for a compelling addition to the heavy Mexico/US migration literature for numerous reasons including: (1) Guatemalan migrants are much poorer than their Mexican counterparts; (2) the costs/risks in terms of time, money and safety for undocumented Guatemalan migrants to successfully navigate their way to the US are much higher than for Mexicans; and (3) Guatemalan migration to the US has been rare until recently. During Guatemala's thirty-six year civil war that ended in 1996, numerous refugees fled the country to take up residence in neighbouring Mexico while very few continued on to the US (Moran-Taylor, 2008a; Morrison, 1993). Guatemalans are now primarily using international migration as a means to alleviate poverty, to enhance social status, and to provide better opportunities for themselves and their children (Adams Jr and Page, 2005; Taylor et al., 2006). To more generally put Guatemalan emigration into perspective, approximately 1.4 million (11%) Guatemalans were living abroad in 2008—97% in the US and over 70% male (IOM, 2011). This contrasts with just under 500,000 living outside their native country in 1996—the year the peace accords were signed. Remittance transfers have also made nearly a seven-fold jump from US$ 596 million to US$ 4 billion between 2000 and 2009—representing 10.8% of Guatemala's GDP for that year. Furthermore, compared with Mexicans, the average Guatemalan earns less than a third of gross national income based on purchasing power parity (4,990 versus 16,440 current international dollars in 2012)(World Bank, 2013).

The bulk of the article follows by outlining our research questions and associated theoretical framework. We then describe our research strategy including the instrumental variables methodology and the data and variables used to answer our research questions. Next, we present research results and conclude with both a description of the dichotomous effect of parental absences and remittances on left-behind children's educational attainment and the importance of our research strategy to this phenomenon and to the greater migration research field.

Research questions and theoretical framework

How do the migration of parents and the resultant remittances influence educational attainment in migrant-sending households? Specifically, how does the migration/remittance phenomenon influence school enrolment and grade-by-age progression in school for left-behind children in Guatemala? We hypothesize that parental absences due to migration will lead to a lower probability of school enrolment and slower grade-by-age progression while the receipt of remittances will have a countervailing beneficial effect. Corresponding theory that bolsters the research hypotheses—separating the disruptive effects of parental absences from the income effects of remittances—is described below.

Disruption effects

The disruption hypothesis argues that during the act of migration and the intervening time required to settle in a new location, the normal functioning of the household is disrupted (Goldstein and Goldstein, 1983; Stephen and Bean, 1992). Migration can be disruptive to left-behind children's education in a number of ways. First, it is important to consider that migration success is not automatic or guaranteed. Migrants must safely and successfully cross two international borders (Guatemala/Mexico and Mexico/US), elude migrant predators including unscrupulous law enforcement officers and criminal organizations while travelling through Mexico and crossing these borders, and find a place to establish oneself in the US. After settling in the US, migrants face a new set of obstacles, including obtaining gainful employment and repaying accrued debt that was used to finance the migration journey (*i.e.*, hiring a human smuggler). Furthermore, migration must be considered in respect to the opportunity costs of wages or other benefits of work that could be made if the migrant remained in the local workforce. Thus, the arduous process of reaching the US and finding steady employment will likely dampen the benefits of migration bestowed through remittance transfers at least in the short-term.

From the perspective of a left-behind child, parental absences harm educational attainment in a number of ways. The absence of a household breadwinner might force children to seek wage labour or to assist with home production (e.g., subsistence agriculture or household maintenance). Such short-term needs are likely to negatively influence a child's ability to progress in school. Parental migration also removes from the household an authority figure to compel children to excel in school or to assist children in doing so. More compellingly, the migration of a parent actualizes a livelihood strategy

that the child is likely to adopt. In doing so, that child may discount the value of a local education and/or fail to enrol in school if he/she plans to follow in a parent's footsteps as a future migrant. The latter category of education disruption conforms to Kandel and Massey's (2002) 'culture of migration' that develops in communities where migration becomes so prevalent that entire communities are completely tied to it. Halpern-Manners (2011) and McKenzie and Rapoport (2011) show evidence of this dynamic in Mexico. In the former case, progressing from primary to lower secondary and from lower secondary to secondary school was negatively influenced by the absence of family members due to migration. In the latter case, boys from migrant households attain about a half-year less schooling than children from households without migrants. The reduction in educational attainment was attributable to boys leaving school early to migrate.

Income effects

Whether through altruistic motives or enlightened self-interest, migrants who seek wage labour in cities or abroad do so with the intention of elevating overall household income (Lucas and Stark, 1985; Stark and Lucas, 1988; Vanwey, 2004). As argued by Becker and others, when household income rises parents tend to invest more in the human capital of their children through education and health expenditures (Becker and Lewis, 1974; Becker and Tomes, 1976; Hildebrandt et al., 2005). Therefore, a rise in household income attributable to remittances would prompt human capital investment producing higher student enrolment and grade-for-age progression for those in school.

Research reveals that increases in both endogenous (e.g., pay raise) and exogenous (e.g., cash transfer) income to income-poor households are associated with increases in educational investment in developing economies. From the endogenous side, Behrman and Knowles (1999) summarize much of this research through their meta-analysis of 42 studies spanning 21 countries. They found small but significantly positive associations between household income and children's education, indicating that households generally expend more money on their children's education when overall household income rises. When the boost in income is exogenous, as is the case when households receive payments through a conditional cash transfer program for maintaining their children's school enrolment, the results are similar. Indeed, in the case of Mexico's *Progresa* program, de Janvry *et al.* (2006) found that conditional cash transfers fully mitigated the negative effects of an income shock attributable to parental unemployment, illness, or the occurrence of a natural calamity. Instead of removing children from school to work during difficult economic times, families that received conditional cash transfers choose to keep their children in school and continue to receive regular cash payments. An important distinction between the influence of cash transfer programs and remittances on children's education is that cash transfer programs do not usually co-occur with parental absences.

It is difficult to characterize remittances as a purely endogenous or exogenous source of income; while they often constitute a raise in an individual's personal income, they are usually temporary and external to a household's long-term income stream. However, two studies considered their effect on education spending from an exogenous income perspective. The first study analysed changes in international exchange rates on

remittance income that flow to Filipino households and the propensity of these households to adjust their spending on household maintenance and education expenses accordingly (Yang, 2005). The study found that a positive exchange rate shock, a situation where the value of money sent from abroad to Filipino households increased due to a positive change in the foreign exchange rate, led to an increase in education expenditures, while the consumption of food and other family maintenance products remained stable. A second natural experiment in Mexico used the 2008-2009 US economic crisis as a shock to remittance flows (Alcaraz et al., 2012). In this study, the authors show that a decline in remittances sent from the US to Mexico led to a decline in school attendance for remittance-receiving households when compared to non-migrant households.

Additional studies reinforce the conclusions evident in these natural experiments. Adams (2005) found that remittance-receiving households spent more income on investment goods, including education, with very little earmarked for food consumption in Guatemala. Schmalzbauer (2008) and Abrego (2009) report that remittances received in Honduran and Salvadoran households respectively were used to help children attend public and private school. Similarly, a recent study using historic department-level migration rates in Peru as an instrument for remittance shocks also found remittances contribute to higher private school attendance (Salas, 2014). In another study, Edwards and Ureta (2003) show profound income effects on the dropout rates of El Salvadoran children in remittance-receiving households. Specifically, households that received the median amount of remittances, approximately 100 $US in 1998, had lower hazards for dropping out of school—54% lower for urban first through sixth graders, 27% lower for

urban children beyond the sixth grade, and 25% lower for all rural children. Acosta (2011), however, challenged the Salvadoran results. Using instrumental variable models to account for migration selectivity and endogeneity, Acosta did not find a beneficial remittance effect on school dropout rates. Likewise, an investigation of school attendance in the Dominican Republic found lower child dropout rates when households received remittances (Amuedo-Dorantes and Pozo, 2010). However, the co-occurrence of a household member's absences removed this beneficial effect on educational attainment.

Data and variables

Data used in our study are from the Guatemala *Encuesta Nacional de Condiciones de Vida* (ENCOVI) 2000 Survey, a national household survey conducted by the *Instituto Nacional de Estadisticas*. The ENCOVI followed a two-stage stratified cluster sampling design that takes into account regional affiliation and urbanicity. The survey includes 7,276 households representative both at the national level and for urban and rural areas. The survey collected information on a variety of topics, including household expenditures, financial assets and living conditions. Our analytic sample contains children ages 7-18 with parental migration and household remittance receipt information. We exclude children in single-parent households due to separation, divorce and the death of a spouse.[i]

Our two outcome variables are school enrolment and grade-by-age progression in school. The school enrolment variable indicates (0 = no, 1 = yes) whether the child was enrolled in school in the past year. The grade-by-age progression (GAGE) variable is a

modification of Psacharopoulos and Yang's (1991) schooling-for-age variable. The variable measures the progress of a child in the school system controlling for when the child formally entered school.[ii] The variable is defined as

$$GAGE = \left(\frac{Current\ grade\ level}{(Age - (Age\ of\ first\ enrollment\ in\ primary\ school - 1))} \times 100\right)$$

Students with a score under 100 on this index are progressing below normal because of grade repetition or temporary school withdrawal. The analytic sample using school enrolment as the dependent variable is 8,565 children. The analytic sample using GAGE as the outcome variable contains the 6,015 children currently enrolled in school.

School enrolment and GAGE were selected as our dependent variables because they both provide short- and long-term indications of economic migration's influence on educational attainment and they provide a good fit to the Guatemalan educational environment. Specifically, school enrolment can capture short-term economic shocks such as the initial absence of a primary breadwinner, while GAGE measures chronic educational disruption over many years. Both dependent variables work well in the relatively poor Guatemalan context where the majority of households live at the economic margin and thus make school enrolment and progression decisions based on immediate economic need (*i.e.*, children are taken out of school when their labour is required to meet household subsistence needs).

The key independent variables of interest are parental international migration and the receipt of household international remittances. The parental migration variable indicates (1 = yes, 0 = no) whether a child's mother or father has lived internationally at

any point in the past year.[iii] Our remittances variable indicates (1 = yes, 0 = no) whether a child's household received international remittances in the past year. Since the survey data contain no information on the characteristics of the remittance sender, households may be receiving remittances from members other than a parent.

We control for a variety of child, parental and community characteristics in the analysis that we believe are correlated with parental migration, household remittance income, school enrolment, and grade-by-age progression. These variables include highest parental educational attainment, which we code into three categories: no education, primary, and secondary and above. We also control for urbanicity (urban and rural), a child's native language (Spanish and non-Spanish) and other spoken language (Spanish, non-Spanish and none), gender, age, number of siblings age 7-18 present in the household, and the presence of a grandparent in the household. Following the methodology described in Filmer and Pritchett (2001), McKenzie (2005) and Filmer and Scott (2012), we use principal components analysis to create a household wealth index. Specifically, 39 variables representing three broad categories, household size and construction materials (e.g., number of rooms, roof, wall and floor construction materials), access to utilities and infrastructure (e.g., electricity, sewage, telephone service), and ownership of durable goods (e.g., automobile, cell phone, computer, oven, refrigerator, stove, and television) are used to create this index. It should be noted that only the primary principal component is used as a household wealth indicator in the analyses. We also control for region by grouping children into the following three categories: 1) Metropolitan, 2) Southwest and Northwest and 3) North, North-eastern,

South-eastern, Central and Petén—the largest and northernmost department in Guatemala.

Summary statistics of the variables used in the analysis disaggregated by parental migration and receipt of household international remittances are presented in Table 1. Approximately 4% of sampled Guatemalan children had a parent residing abroad in 2000, with the father as the likely migrant (90% of the time), and 8% of children received international remittances. Although there are no statistically significant differences between children with and without a migrant parent with respect to their gender, parents' educational attainment, and presence of a grandparent in the household, the two groups differ across a number of other characteristics, including age, region, household wealth, and number of siblings. Similarly, we find significant differences between children receiving and not-receiving remittances. With respect to the outcome variables, children without a migrating parent compared to children with a migrating parent are less likely to be enrolled in school but equally likely to progress in school. Similarly, we find that children receiving international remittances have a higher probability of enrolment but do not differ significantly in their grade-by-age progression.

{Table 1 about here}

Research strategy

The remittance income literature suggests that receiving remittances either from a parent or another source has beneficial effects. The parental migration literature, in

contrast, indicates that parental absence due to migration has detrimental effects on the educational success of left-behind children. These two lines of research imply that both phenomena influence educational attainment, but few studies have considered both parental migration and receiving remittances simultaneously. Using an instrumental variables framework, we fill this gap in the literature by analysing how parental migration and remittances are jointly related to measures of child educational attainment.

In order to estimate the effects of international parental migration and household remittances on the educational well-being of children, we estimate the following relationship:

$$Y = g(\beta;\ X, M, R) + \varepsilon, \qquad (1)$$

where *Y* is a measure of school enrolment or grade-by-age progression, *X* is a matrix of child and parental control variables, *M* measures the international migration status of the parents, *R* indicates the receipt of international remittances and $g(\cdot)$ is the response function.

In order to estimate unbiased effects of the parameters of interest, we must account for selection into international parental migration and the household receipt of remittances. If parents with certain characteristics decide to migrate and send remittances and these same characteristics are also correlated with child enrolment or grade-by-age progress in school, then the estimated coefficients β in equation 1 are biased. We minimize endogeneity by controlling for observed covariates *X* that correlate with *Y* and the decision to migrate and/or receive remittances. However, there are likely

characteristics that are not captured by the available data, such as the degree of parental concern over a child's welfare that may simultaneously influence the receipt of remittances, parental decisions to migrate and child educational outcomes. Such endogeneity concerns motivate this article's empirical strategy—the use of migration networks and the average wage rate for non-skilled workers in US migration destinations as instruments for parental migration and remittances, respectively.

Formally, we postulate that migration and remittances are a function of instrumental variables. We then use the predicted values from these first-stage models to estimate the effects of migration and remittances on school enrolment and grade-by-age progression. For the migration prediction model, we estimate the following equation:

$$P(M = 1|X, MN) = \Phi(\beta_o + \beta_1 MN + \beta_2 X), \qquad (2)$$

where $P(M = 1|X, MN)$ is the probability that either parent migrated internationally modelled using a probit specification, where Φ is the standard normal cumulative distribution function. To statistically control for potential endogeneity with respect to parental migration decisions, we argue that migration is a function of migration networks *MN* or contact with individuals who have previously migrated. Previous literature has shown that migration networks significantly influence migration behaviour (Carrington et al., 1996; McKenzie and Rapoport, 2007; Taylor and Wyatt, 1996). Members of a community who have previously migrated lower the costs of out-migration by sharing information about travel, process and jobs in other areas. Additionally, the more migrants in a community signals a higher success rate, further motivating those who have not

migrated to consider leaving their communities to seek opportunities elsewhere. We operationalize migration networks as the percent of households in the municipality that have an international migrant in the past year. The migration prevalence instrument was derived from the 2002 Guatemala Census. The census asked whether anyone from the household migrated internationally in the preceding ten years. We used responses to this question to categorize migrant-sending households as those with at least one member venturing abroad in the preceding decade. Finally, the proportion of migrant versus non-migrant households was extrapolated to the municipality level.

Since the international migration rate in 2002 is likely correlated with events in 2000, the year of the survey, and thus correlated with education outcomes measured in 2000, we interact the variable with unexpected rainfall shocks in 1991. Rainfall shocks have been used in prior research as instruments for migration (Adams and Cuecuecha, 2010; Munshi, 2003; Yang and Choi, 2007). Drawing from these studies, we argue that since rain is correlated with agricultural production and income, an unexpected drop in rain levels in one year may cause people to migrate, particularly out of rural areas. Unexpected rainfall should be a valid instrument, as it is likely to have an important effect in a country such as Guatemala, where a majority of households directly or indirectly depend on agriculture as a source of income. We obtain annual municipal level rainfall data (in millimetres) for the years 1990 to 2010 from Guatemala's Instituto Nacional de Sismología, Vulcanología, Meteorología e Hidrología (INSVMH 2014). Since several municipalities are missing several years of rainfall data, we spatially interpolate the annual rainfall using inverse distance weighting, an interpolation method that averages the rainfall of nearby municipalities, giving greater weight to the closest

municipalities. From this yearly data, we estimated a model that predicts the change in rainfall from time *t*-1 to *t* from the level of rainfall in time *t*-1. We then used the residuals in 1991 from this model as the unexpected municipal-level rainfall shock[iv]. While rainfall shocks may be temporally random, they may occur in certain areas (e.g., wet regions) vs. others (e.g., dry regions). This spatial association potentially introduces a correlation between rainfall shocks and unobserved components in the enrolment and grade-by-age progression equations. In order to minimize this potential endogeneity, we control for rainfall levels in 1999 in all estimating equations (Adams and Cuecuecha (2010).

For the first-stage remittances equation, we estimate the following probit model

$$P(R = 1|X, WAGE) = \Phi(\beta_o + \beta_1 WAGE + \beta_2 X), \qquad (3)$$

where $P(R = 1|X, WAGE)$ is the probability a child's household receives international remittances and *WAGE* is an instrument measuring the average wage rate for non-skilled workers in US migration destinations. The logic for using *WAGE* as an instrument is that a non-skilled migrant is more likely to remit excess income from areas where the average non-skilled wage rate is higher, *ceteris paribus*. Furthermore, this US non-skilled wage IV only influences children's education outcomes through its influence on remittance volume to the household. The *WAGE* instrumental variable was created in multiple steps following similar methodology described in Adams and Cuecuecha (2010). We first obtain from the International Office of Migration (IOM, 2004) the total remittance transfer estimates in 2004 for each of Guatemala's 22 departments disaggregated by the 25 US cities (represented by metro area) with the highest remittance income sent to

Guatemala. We then convert remittance volume estimates into percentages by US city of origin. Next, we obtain 1998 average non-skilled hourly wage rates for the 25 US cities from the Bureau of Labor Statistics (1998). Finally, we create a weighted-average hourly wage rate at the Guatemalan department level based on the percentage of remittance volume from each US city of remittance origin to that department. To obtain variation at the household level, we interact this variable with the square of the age of the head of the household.

In the second stage of the modelling process, we estimate the relationship between school enrolment and *M* and *R* using a linear probability model

$$P(Enroll = 1|X, \widehat{M}, \hat{R}) = \beta_o + \beta_1 \widehat{M} + \beta_2 \hat{R} + \beta_3 X, \qquad (4)$$

where $P(Enroll = 1|X, \widehat{M}, \hat{R})$ is the probability that a child is enrolled in school, $\widehat{M}$ is the predicted probability of international parental migration from equation (2), and $\hat{R}$ is the predicted probability of receiving international remittances from equation (3). Similarly, we model the relationship between *GAGE* and *M* and *R* for currently enrolled students using a linear specification:[v]

$$GAGE = \beta_o + \beta_1 \widehat{M} + \beta_2 \hat{R} + \beta_3 X, \qquad (5)$$

In order to account for correlation between children within households, we cluster standard errors at the household level. We jointly estimate the equations using the Stata 12.0 command *cmp* developed by Roodman (2009). The command generates conditional

mixed-process estimators using limited-information maximum likelihood. We use the Likelihood Ratio statistic proposed by Buis (2011) to test for the joint significance of our instruments. The test determines whether our instruments jointly suffer from the weak instrument problem (McKenzie et al., 2010).

Our identifying assumption is that our instruments do not affect education outcomes apart from their influence through current migration and remittances. One potential threat to this assumption is that past economic conditions and schooling levels helped determine migration rates and remittance sending as well as influence current levels of schooling. This threat is a specific concern in the Guatemalan context given the civil conflict that occurred in the country into the 1990s. To control for this possibility, all estimating equations include variables capturing community-level economic and schooling conditions before 2000. The controls are the unemployment rate for males ages 15-69 and the percentage of children ages 7-14 years old not enrolled in school by municipal level for the year 1994. Both of these variables are taken from the 2002 Guatemala Census.

Another potential concern is past remittance spending may provide multiplier effects within the community or be directly used to improve local infrastructure (Lowell and De la Garza, 2000). These improvements may then have direct or indirect effects on schooling quality, which then has an impact on a child's enrolment status and schooling progression. However, given Guatemala's recent adoption of international migration to the US as a livelihood strategy, we argue that insufficient time has elapsed for significant remittance-related community-level improvements to have been made. Thus, we do not believe remittance accumulation at the community level has risen to the level from which

tangible improvements in school quality would have significantly influenced school enrolment and progression levels.

Results

Table 2 summarizes school enrolment and grade-by-age progression statistics by four migration and remittance categories. Among the four categories, children living in households with a migrant parent that received international remittances have the greatest probability of being enrolled in school. In contrast, children living in non-remittance receiving households without a migrant parent have the lowest probability of being enrolled. These results suggest that both remittances and parental migration have positive (amplifying) effects on school enrolment. Furthermore, it appears that migration has a larger positive effect on enrolment. The probability of enrolment increases by 11 percentage points (0.70 to 0.81) if a child has an internationally migrating parent conditioned on not receiving remittances. In comparison, the probability increases by seven percentage points (0.70 to 0.77) for a child receiving remittances conditioned on having neither parent migrate. We find mixed results for the grade-by-progression variable. The difference in schooling progression between non-migrant, non-remittance receiving children compared to migrant, remittance receiving children is small (65.16 vs. 65.27). However, it appears that there is a negative effect of remittances on grade progression (61.86 vs. 65.16) while there is a positive effect of parental migration (69.76 vs. 65.16). These initial findings are merely suggestive since they do not account for the

individual- and family-level characteristics that may be driving the patterns shown in the table.

{Table 2 about here}

We now turn to the IV results. Table 3 presents results from the probit models predicting parental migration status and remittance receipt. The results suggest that age is negatively associated with the probability of a migrating parent. In contrast, household wealth, urbanicity, living in areas other than the Metropolitan, Southwest and Northwest regions, and speaking Spanish as the primary language are associated with higher probabilities of a parent migrating internationally. We find similar associations with the probability of receiving international remittances. The only differences are that urbanicity is no longer statistically significant and speaking Spanish either as the primary or alternative language is positively associated with receiving remittances. The most important result in the table relates to the validity of the instruments. Both instruments show the expected signs and are statistically significant. The negative sign on the parental migration instrument indicates that if there is more rainfall than expected, there are fewer international migrants. The positive sign on the remittances instrument indicates that higher wages for non-skilled labour in traditional Guatemalan remittance sending cities in the United States increase the probability of receiving international remittances. The variables also jointly appear to be strong instrumental variables: the Wald Chi-square statistic for the test of the joint significance of the instruments is 6.93, with a p-value less than 0.05.

{Table 3 about here}

Table 4 shows our primary results for the school enrolment and grade-by-age progression models. The results for the control variables align with previous research on the demographic characteristics associated with the education outcomes of Guatemalan children. We find that higher parental education, speaking Spanish, living in a region other than the Metropolitan area, and household wealth are positively associated with school enrolment. In contrast, girls and older children are associated with a lower probability of enrolling in school. Only parental education and age are significantly associated with schooling progress; in this case, a lower age and a highly educated parent are associated with higher values of grade-by-age progression.

For school enrolment, the primary findings for the purposes of our study are: parental international migration is associated with a 40 percentage point decrease in the probability of enrolling in school while receiving international remittances is associated with an even larger percentage point decrease (55). For schooling progression, while international parental migration is associated with a 16.76 point decline in grade-by-age progression, receiving international remittances is associated with a 20.42 point increase. In this case, receiving international remittances counterbalances the negative effect of parental migration. In sum, the results suggest that international parental migration and receiving international remittances decrease the likelihood of enrolment; however, once a student does enrol in school, parental migration delays student schooling progress while remittances support it.

{Table 4 about here}

Discussion

The present study assesses whether remittances sent from abroad counteract the harmful effects of parental absence during the same year on student enrolment and grade-by-age progression. As expected, student enrolment was negatively associated with parent absence. Intriguingly, remittance transfers were also, unexpectedly, negatively associated with enrolment. The independent negative influences of parental absences and remittances on school enrolment supports the supposition that students from economic migrant-sending households are themselves actively reprioritizing the value of a Guatemalan education given their future migration prospects. Under a culture of migration framework, students from communities with strong migration networks are compelled to migrate themselves when they reach the appropriate age (Kandel and Massey, 2002). An indirect effect of this phenomenon is students often reach the conclusion that education from places like Guatemala will not provide them with the skills needed to thrive in the US labour market, thus they discount the value of education even when remittances flow back to the household. Halpern-Manners (2011, pg. 95) attributes the association between international parental migration and lower child educational attainment to this culture of migration construct arguing that, ‘the intergenerational transmission of migratory expectations reorients nonmigrants away

from homeland institutions of upward mobility and toward opportunities in foreign markets.'

To further assess the culture of migration dynamic, we categorize responses to the question, 'For what reason was (....) not registered for school in 2000?', by gender, parental absence and the receipt of remittances. Results presented in Table 5 bolster the conclusion that the culture of migration phenomenon affects boys but not girls. While some boys lose interest in school when a parent is away, many more boys lose interest when the household receives remittances—the opposite dynamic applies to girls. This finding suggests that while parental absence contributes to disinterest in school among left behind youth, the transfer of remittances truly grounds the culture of migration mentality into boys. For Guatemalan girls that reside in communities with relatively few international migration female role models, it is not surprising that remittances are not associated with school disinterest. Instead, school reprioritizing for girls is just the opposite of that experienced by boys—namely, remittances likely provide the means to liberate girls to attend school in lieu of assisting with domestic activities.

{Table 5 about here}

The association of parental absences and GAGE is negative, while remittances have a countervailing positive association, as expected. Furthermore, less than one year of international remittances appears to fully counterbalance any reduction in school progression attributable to parental absences. However, caution should be exercised when interpreting these results. It cannot be assumed that migrants start sending remittances

immediately upon leaving their households. As described earlier, there are numerous obstacles that migrants must navigate (e.g., successfully crossing two international borders, evading predators, finding work, and repaying debt) before they can begin to send meaningful remittances back to their left-behind family members. Since our data do not clearly establish when remittances senders originally left the household, the remittance variable likely represents a time-period longer than a year in length encompassing the total time needed to successfully navigate these many migration obstacles. Therefore, we believe the short-term influence of economic migration on GAGE is likely negative due to the immediate harm associated with parental absence. Nevertheless, the results do indicate that migration success (as validated by the transmission of remittances) can eventually lead to greater progression in school for children who remain enrolled.

Results presented here extend past research by demonstrating the importance of separating parental absences from remittances when evaluating the impact of economic migration on child educational attainment. Evidence from this study suggests that the disruptive aspects of economic migration make it a poor short-term strategy for advancing the educational prospects of all children as evidenced by lower school enrolment but perhaps a positive long-term strategy for children that are not influenced by the culture of migration effect—especially girls. In the case of boys, both parental absences and remittances reinforce future migration expectations and by extension negatively influence their educational attainment. In contrast, girl's educational attainment appears to be ultimately benefited by remittances once migration obstacles have been cleared. The disentangling of economic migration into it component parts,

parental absences and remittances, thus provides policymakers with more complete information about the multiple influences of economic migration on the educational attainment of left-behind children. Such information can produce more informed educational interventions such the targeting of motivation for boys and short-term economic assistance for both genders.

An important future direction of research would be combining the models used in this study with longitudinal data to further shed light on how much time is required for the average migrant to begin the transmission of meaningful remittances homeward, thus triggering their positive effects on the grade-for-age progression of enrolled children. Additionally, measuring the effects of international migration on other educational outcomes, such as test scores and grades, may further capture components of a child's educational success and motivation that are not reflected in a child's enrolment status or progression through school. We also suggest research that tracks adult outcomes of children of migrant parents. Such research can help identify whether students are translating their education gains due to remittances into local employment or largely following in their parents' footsteps by migrating northward.

Overall, we see great promise in exploiting the econometric techniques described and employed in this study to provide a fuller understanding of the benefits and harms of economic migration. Children’s educational attainment represents one research area where economic migration can be decomposed into negative and positive components of parental absences and remittances. However, there are numerous other examples where the bipartite effects of economic migration may also be important including health outcomes, local development, land use practices, and intra-household dynamics. Thus,

decoupling these often-opposing forces will allow migration researchers to more accurately model the influence of economic migration on variables of research interest in the future.

Tables

Table 1: Descriptive statistics by parental migration status and household remittances receipt in Guatemala

	No migrating parent	Migrating parent	two-tailed t-test of differences	Received no international remittances	Received international remittances	two-tailed t-test of differences
Enrolled in school	0.71	0.84	5.46***	0.71	0.79	4.98***
Grade-by-age progression [a]	64.93	67.32	1.30	65.28	62.88	1.73
Highest parental education						
Below primary	0.29	0.29	0.05	0.29	0.26	1.71
Primary	0.53	0.54	0.39	0.53	0.55	1.25
Secondary	0.18	0.17	0.56	0.18	0.19	0.40
Primary language						
Spanish	0.32	0.37	2.02*	0.33	0.25	4.17***
Non-Spanish	0.68	0.63	2.02*	0.67	0.75	4.17***
Secondary language						
Spanish	0.03	0.04	0.96	0.03	0.01	2.23*
Non-Spanish	0.20	0.28	3.96***	0.20	0.19	0.77
None	0.78	0.68	4.15***	0.77	0.80	1.60
Female	0.47	0.49	0.66	0.47	0.51	1.90
Age [a]	11.96	11.47	2.72**	11.89	12.41	3.89***
Region						
Metropolitan	0.09	0.07	0.95	0.09	0.07	1.29
Southwest and Northwest	0.56	0.23	12.1***	0.56	0.40	8.11***
Other	0.35	0.70	13.49***	0.36	0.53	9.13***
Living in rural area	0.63	0.69	2.37*	0.63	0.56	4.09***
Household Wealth Index [a]	1.88	2.18	3.54***	1.83	2.58	11.77***
Number of siblings [a]	2.14	1.96	2.33*	2.14	1.99	2.78**
Grandparent lives in household	0.08	0.09	0.78	0.08	0.11	3.57***
Rainfall in 1999 [a]	1816.15	1677.72	4.80***	1813.74	1770.49	2.03*
Municipal Male 15-69 years old Unemployment Rate (1994) [a]	0.10	0.14	6.61***	0.10	0.11	3.00**
Municipal 7-14 years old Non-Enrolment Rate (1994) [a]	0.30	0.33	3.65***	0.30	0.29	1.82
		Instrumental Variables				
International migration rate in 2002 times unexpected rainfall in municipality [a]	-15.34	-35.09	14.23***			
Non-skilled wages in the United States in 1998 times the square of the age of household head [a]				11,919.30	13,654.77	7.77***
Number of children	8,195	370		8,565	707	

$*** p \leq 0.001, ** p \leq 0.01, * p \leq 0.05$

[a] Mean values

Table 2: Mean percent child enrolment and school grade-by-age progression by household type in Guatemala [1]

	Non-migrant, non-remittance-receiving	Non-migrant, remittance-receiving	Migrant, non-remittance-receiving	Migrant, remittance-receiving
% enrolled	70.27	76.61	80.68	86.60
Number of children	7,682	513	176	194
Log grade progression [2]	65.16	61.86	69.76	65.27
Number of children	5,318	391	140	166

[1] A migrant household means a child's father or mother has migrated internationally in 2000 while a remittance-receiving household means the household has received international remittances from any member of the household in 2000.
[2] Calculated only for enrolled students

Table 3: Independent and instrumental variable effects on parental migration and remittance transmission to Guatemala households

	Parent migrated internationally	Household received international remittances
Highest Parental Education - Primary	0.087	0.081
	(0.098)	(0.071)
Highest Parental Education - Secondary	0.128	-0.196
	(0.128)	(0.112)
Primary Language Spoken - Spanish	0.565***	0.412***
	(0.130)	(0.095)
Other Language Spoken - Spanish	0.312	0.699***
	(0.186)	(0.145)
Other Language Spoken - None	-0.161	0.319**
	(0.152)	(0.115)
Female	-0.035	-0.014
	(0.051)	(0.038)
Age	-0.057***	-0.021**
	(0.010)	(0.007)
Region - Southwest and Northwest	-0.108	0.197*
	(0.138)	(0.094)
Region – Other	0.397***	0.473***
	(0.121)	(0.101)
Urban	0.272**	0.017
	(0.090)	(0.062)
Household Wealth Index	0.167***	0.228***
	(0.032)	(0.023)
Number of Siblings	-0.028	-0.020
	(0.031)	(0.020)
Grandparent lives in household	-0.073	0.081
	(0.139)	(0.094)
Rainfall in 1999	-0.0001	0.00002
	(0.000)	(0.000)
Municipal Male 15-69 years old Unemployment Rate (1994)	0.418	-0.049
	(0.313)	(0.232)
Municipal 7-14 years old Non-Enrolment Rate (1994)	1.026***	0.475*
	(0.328)	(0.216)
Instrumental Variables		
International migration rate in 2002 times unexpected rainfall in municipality	-0.007*	
	(0.003)	
Non-skilled wages in the United States in 1998 times the square of the age of household head		0.00001*

		(0.000)
Intercept	-2.112***	-2.702***
	(0.361)	(0.299)
Wald Chi-Squared(2)[1]	6.930*	

$***\ p \leq\ 0.001, **\ p \leq\ 0.01, *\ p \leq\ 0.05$

Standard errors are clustered at the household level. Models are estimated using a probit specification.

[1]Test of joint significance for IVs in both equations.

Table 4: Estimated effects of parental migration and receiving remittances on school enrolment and grade-by-age progression in Guatemala

	Enrolled in school	Grade-by-age progression
Parent migrated internationally	-0.402***	-16.764**
	(0.066)	(6.241)
Household received international remittances	-0.552***	20.418***
	(0.048)	(3.305)
Highest Parental Education - Primary	0.092***	-1.035
	(0.018)	(1.536)
Highest Parental Education - Secondary	0.076**	4.186*
	(0.025)	(1.953)
Primary Language Spoken - Spanish	0.222***	3.921
	(0.026)	(2.578)
Other Language Spoken - Spanish	0.243***	1.065
	(0.036)	(3.161)
Other Language Spoken - None	-0.025	-2.858
	(0.027)	(2.020)
Female	-0.038***	0.058
	(0.010)	(0.845)
Age	-0.048***	-6.240***
	(0.002)	(0.469)
Region - Southwest and Northwest	0.064**	0.270
	(0.024)	(1.552)
Region - Other	0.125***	-1.967
	(0.025)	(1.690)
Urban	-0.033*	-0.545
	(0.017)	(1.037)
Household Wealth Index	0.091***	-0.711
	(0.006)	(0.756)
Number of Siblings	-0.006	0.125
	(0.006)	(0.349)
Grandparent lives in household	0.023	-0.511
	(0.026)	(1.615)
Rainfall in 1999	0.00002	-0.0002
	(0.000)	(0.001)
Municipal Male 15-69 years old Unemployment Rate (1994)	0.038	-3.086
	(0.073)	(3.779)
Municipal 7-14 years old Non-Enrolment Rate (1994)	0.115	-0.854
	(0.059)	(4.061)
Intercept	0.833***	133.958***
	(0.058)	(4.011)

$***\ p \leq\ 0.001, **\ p \leq\ 0.01, *\ p \leq\ 0.05$
Standard errors are clustered at the household level.

Table 5: Percent of students not enrolled in school by reason for not enrolling by gender and parental migration/remittances receiving status

	Migrant Parent Household				Remittance Receiving Household			
	Female		Male		Female		Male	
	No	Yes	No	Yes	No	Yes	No	Yes
Financial reasons	32	32	31	23	33	30	31	29
Wage labour	9	4	32	46	9	14	33	27
Performing housework	17	28	1	3	17	21	1	1
Not interested in school	21	20	20	26	21	15	19	33
Other reasons	21	16	16	3	21	21	16	10
N	1,235	25	1,168	35	1,187	73	1,130	73

Percentages are based on child responses to the following survey question: "For what reason was (....) not registered for school in 2000?"

References

Abrego, L., 2009. Economic Well-Being in Salvadoran Transnational Families: How Gender Affects Remittance Practices. Journal of Marriage and Family 71, 1070-1085.
Acosta, P., 2011. School Attendance, Child Labour, and Remittances from International Migration in El Salvador. Journal of Development Studies 47, 913-936.
Adams Jr, R., 2005. Remittances, household expenditure and investment in Guatemala. World Bank policy research working paper.
Adams Jr, R.H., Page, J., 2005. Do international migration and remittances reduce poverty in developing countries? World Development 33, 1645-1669.
Adams, R.H., Cuecuecha, A., 2010. Remittances, household expenditure and investment in Guatemala. World Development 38, 1626-1641.
Alcaraz, C., Chiquiar, D., Salcedo, A., 2012. Remittances, schooling, and child labor in Mexico. Journal of Development Economics 97, 156-165.
Amuedo-Dorantes, C., Pozo, S., 2010. Accounting for Remittance and Migration Effects on Children's Schooling. World Development 38, 1747-1759.
Antman, F.M., 2011. The intergenerational effects of paternal migration on schooling and work: What can we learn from children's time allocations? Journal of Development Economics 96, 200-208.
Antman, F.M., 2012. Gender, educational attainment, and the impact of parental migration on children left behind. Journal of Population Economics 25, 1187-1214.
Becker, G.S., Lewis, H.G., 1974. Interaction between quantity and quality of children, Economics of the family: Marriage, children, and human capital. UMI, pp. 81-90.
Becker, G.S., Tomes, N., 1976. Child endowments and quantity and quality of children. Journal of Political Economy 84, S143-S162.
Behrman, J.R., Knowles, J.C., 1999. Household income and child schooling in Vietnam. The World Bank Economic Review 13, 211-256.
Buis, M.L., 2011. Stata tip 97: Getting at rho's and sigma's. Stata Journal 11, 315-317.
Bureau of Labor Statistics, 1998. Occupational Employment Statistics, accessed on 11/1/2014, http://www.bls.gov/oes/1998/oessrcma.htm.
Calero, C., Bedi, A.S., Sparrow, R., 2009. Remittances, liquidity constraints and human capital investments in Ecuador. World Development 37, 1143-1154.
Carletto, C., Covarrubias, K., Maluccio, J.A., 2011. Migration and child growth in rural Guatemala. Food Policy 36, 16-27.
Carrington, W.J., Detragiache, E., Vishwanath, T., 1996. Migration with endogenous moving costs. American Economic Review 86, 909-930.
Creighton, M.J., Park, H., Teruel, G.M., 2009. The Role of Migration and Single Motherhood in Upper Secondary Education in Mexico. Journal of Marriage and Family 71, 1325-1339.
Damon, A.L., 2010. Agricultural land use and asset accumulation in migrant households: The case of El Salvador. Journal of Development Studies 46, 162-189.
De Janvry, A., Finan, F., Sadoulet, E., Vakis, R., 2006. Can conditional cash transfer programs serve as safety nets in keeping children at school and from working when exposed to shocks? Journal of Development Economics 79, 349-373.
Durand, J., Parrado, E.A., Massey, D.S., 1996. Migradollars and development: A reconsideration of the Mexican case. International Migration Review 30, 423-444.

Edwards, A.C., Ureta, M., 2003. International migration, remittances, and schooling: evidence from El Salvador. Journal of Development Economics 72, 429-461.
Filmer, D., Pritchett, L.H., 2001. Estimating wealth effects without expenditure data - Or tears: An application to educational enrollments in states of India. Demography 38, 115-132.
Filmer, D., Scott, K., 2012. Assessing asset indices. Demography 49, 359-392.
Goldstein, S., Goldstein, A., 1983. Migration and fertility in peninsular Malaysia: An analysis using life history data. Rand.
Halpern-Manners, A., 2011. The Effect of Family Member Migration on Education and Work Among Nonmigrant Youth in Mexico. Demography 48, 73-99.
Hildebrandt, N., McKenzie, D.J., Esquivel, G., Schargrodsky, E., 2005. The effects of migration on child health in Mexico [with comments]. Economia, 257-289.
Instituto Nacional de Sismología, V., Meteorología e Hidrología (INSVMH), 2014. http://www.insivumeh.gob.gt/.
IOM, 2004. Encuesta Nacional sobre el Impacto de Remesas Familiares en los Hogares Guatemaltecos. International Organization for Migration, Geneva.
IOM, 2011. Encuesta sobre remesas 2010 ninez y adolescencia. International Organization for Migration, Geneva.
Kandel, W., Kao, G., 2001. The impact of temporary labor migration on Mexican children's educational aspirations and performance. International Migration Review 35, 1205-1231.
Kandel, W., Massey, D.S., 2002. The culture of Mexican migration: A theoretical and empirical analysis. Social Forces 80, 981-1004.
Lowell, B.L., De la Garza, R.O., 2000. The developmental role of remittances in US Latino Communities and in Latin American countries. Final project report prepared for the Thomás Rivera Policy Institute (TRPI), University of Texas, Austin, Texas, and the Inter-American Dialogue.
Lu, Y., Treiman, D.J., 2007. The effect of labor migration and remittances on children's education among blacks in South Africa. California Center for Population Reserach -- Working Paper.
Lucas, R.E.B., Stark, O., 1985. Motivations to remit: Evidence from Botswana. Journal of Political Economy 93, 901-918.
McKenzie, D., Rapoport, H., 2007. Network effects and the dynamics of migration and inequality: Theory and evidence from Mexico. Journal of Development Economics 84, 1-24.
McKenzie, D., Rapoport, H., 2011. Can migration reduce educational attainment? Evidence from Mexico. Journal of Population Economics 24, 1331-1358.
McKenzie, D., Stillman, S., Gibson, J., 2010. How Important is Selection? Experimental VS. Non-Experimental Measures of the Income Gains from Migration. Journal of the European Economic Association 8, 913-945.
McKenzie, D.J., 2005. Measuring inequality with asset indicators. Journal of Population Economics 18, 229-260.
Moran-Taylor, M.J., 2008a. Guatemala's Ladino and Maya migra landscapes: The tangible and intangible outcomes of migration. Human Organization 67, 111-124.
Moran-Taylor, M.J., 2008b. When Mothers and Fathers Migrate North Caretakers, Children, and Child Rearing in Guatemala. Latin American Perspectives 35, 79-95.

Morrison, A.R., 1993. Violence or economics - what drives internal migration in Guatemala. Economic Development and Cultural Change 41, 817-831.
Munshi, K., 2003. Networks in the modern economy: Mexican migrants in the US labor market. The Quarterly Journal of Economics 118, 549-599.
Nobles, J., 2011. Parenting From Abroad: Migration, Nonresident Father Involvement, and Children's Education in Mexico. Journal of Marriage and Family 73, 729-746.
Nobles, J.E., 2007. The effects of Mexican migration on sending families. ProQuest.
Psacharopoulos, G., Yang, H., 1991. Educational attainment among Venezuelan youth: An analysis of its determinants. International Journal of Educational Development 11, 289-294.
Quisumbing, A., McNiven, S., 2010. Moving forward, looking back: The impact of migration and remittances on assets, consumption, and credit constraints in the rural Philippines. The Journal of Development Studies 46, 91-113.
Reichert, J.S., 1981. The migrant syndrome: Seasonal US wage labor and rural development in central Mexico. Human Organization 40, 56-66.
Robles, V.F., Oropesa, R.S., 2011. International Migration and the Education of Children: Evidence from Lima, Peru. Population Research and Policy Review 30, 591-618.
Roodman, D., 2009. Estimating fully observed recursive mixed-process models with cmp. Center for Global Development Working Paper 168, 1-57.
Salas, V.B., 2014. International Remittances and Human Capital Formation. World Development 59, 224-237.
Schmalzbauer, L., 2008. Family divided: the class formation of Honduran transnational families. Global networks 8, 329-346.
Smith, R., 2005. Mexican New York: Transnational lives of new immigrants. University of California Press, Berkeley, CA.
Stark, O., Lucas, R.E.B., 1988. Migration, remittances, and the family. Economic Development and Cultural Change 36, 465-481.
Stephen, E.H., Bean, F.D., 1992. Assimilation, disruption and the fertility of Mexican-origin women in the United States. International Migration Review 26, 67-88.
Taylor, J.E., Rozelle, S., de Brauw, A., 2003. Migration and incomes in source communities: A new economics of migration perspective from China. Economic Development and Cultural Change 52, 75-101.
Taylor, J.E., Wyatt, T., 1996. The shadow value of migrant remittances, income and inequality in a household-farm economy. The Journal of Development Studies 32, 899-912.
Taylor, M.J., Moran-Taylor, M.J., Ruiz, D.R., 2006. Land, ethnic, and gender change: Transnational migration and its effects on Guatemalan lives and landscapes. Geoforum 37, 41-61.
Vanwey, L.K., 2004. Altruistic and contractual remittances between male and female migrants and households in rural Thailand. Demography 41, 739-756.
Vasco, C., 2011. The Impact of International Migration and Remittances on Agricultural Production Patterns, Labor Relationships and Entrepreneurship. The Case of Rural Ecuador. kassel university press GmbH.

World Bank, 2013. International Comparison Program database. World Bank, Washington, D.C.
Yang, D., 2005. International migration, human capital, and entrepreneurship: evidence from Philippine migrants' exchange rate shocks. World Bank-free PDF.
Yang, D., 2008. International migration, remittances and household investment: Evidence from Philippine migrants' exchange rate shocks. Economic Journal 118, 591-630.
Yang, D., Choi, H., 2007. Are remittances insurance? Evidence from rainfall shocks in the Philippines. World Bank Economic Review 21, 219-248.

[i] There are 454 children who live in households with a missing parent. These parents are likely migrants that are not living in the household during the time of the survey. We imputed their migrant status based on the spouse's reported location of remittances: 134 received domestic remittances, 182 received international remittances, and 138 received no remittances. Missing parents in the first group are designated as domestic migrants, the second group as international migrants, and the last group are excluded from the analysis. However, including the 138 children from the non-remittances group by designating their missing parents as either international or domestic migrants does not alter the results.

[ii] We control for the age at which a student entered school to best handle non-random, ethnic and geographic differences of age at first enrollment. Essentially, indigenous and rural children are more apt to delay their enrollment in primary school compared with non-indigenous and urban students, *ceteris paribus*. Analyses not controlling for age at which the student enrolled in primary school yields similar results.

[iii] We do not estimate separate effects of father and mother migration since the percent of mothers in the sample who migrated internationally is small (less than 1%).

[iv] We measure rainfall shocks in 1991 for the following two reasons. First, we wanted to obtain rainfall shocks in the earliest year possible with the most complete rainfall data. Rainfall data prior to 1991 is significantly incomplete for most municipalities. Second, based on statistical tests (see Adams and Cuecuecha 2010) unexpected rainfall shocks from 1991 obtain the lowest indicator of potential bias.

[v] When including the inverse Mills ratio in the grade-by-age equation to control for potential selectivity into school enrollment, the coefficients of interest do not change.