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Disentangling fathers' absences from household remittances in international migration: The case of educational attainment in Guatemala

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Abstract

Estimating the effects of international migration on left-behind children's educational attainment is complicated by the potential offsetting effects of fathers' absences and household remittances. Most research has not separated these aspects of international migration on children's human capital outcomes. We address this deficiency by using instrumental variables to isolate the effects of fathers' international migration absences from international household remittances on student enrollment and grade progression in Guatemala. Results indicate that fathers' absences and household international remittances are negatively related to enrollment, providing evidence for a culture of migration effect. For students who remain in school, household international remittances neutralize the harmful influence of fathers' absences on grade progression.

Keywords

international migration; remittances; education; school enrollment; grade progression; Guatemala

1. Introduction

A lively debate has ensued in the literature over the last three decades concerning the value of international migration and 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

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shows beneficial associations between remittance income and school attendance, enrollment, performance, graduation rates, and reduced dropout (Acosta, 2011; Adams and Cuecuecha, 2010; Antman, 2012; Calero et al., 2009; Edwards and Ureta, 2003; Intemann and Katz, 2014; Kandel and Kao, 2001; Lu and Treiman, 2007; Yang, 2008). In contrast, a growing body of literature (Antman, 2011; Creighton et al., 2009; Halpern-Manners, 2011; Lara, 2015; McKenzie and Rapoport, 2011; Moran-Taylor, 2008b; Schmalzbauer, 2008; Smith, 2005), addresses the more harmful aspects of parental absences due to migration on education metrics (e.g., lack of motivation and/or aspiration to progress in school). While much research has considered migration and remittances separately, few studies have 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. Using data from the 2000 Guatemala Living Standards Measurement Study (LSMS), this investigation aims to address these research needs by simultaneously measuring the independent effects of a father's international migration and the receipt of household 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, migrants 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 (IVs) 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 absences and remittances on research outcomes. We address this concern by using a simultaneous equation modelling framework to measure the independent effects of a father's migration and household remittances on school enrollment and grade progression. The identification of this model is based on the use of IVs. We use measures of historic community migration networks as our migration instrument and US receiving community wage rates as our remittance instrument.

Previous studies that have used IVs to separate 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 used migrant destination employment rates and average real earning as IVs for remittances but did not instrument for migration (Amuedo-Dorantes and Pozo, 2010). The authors found a beneficial income effect on school attendance with children residing in remittance-receiving households in the Dominican Republic (DR). However, the positive income effect on school attendance dissipated when children from migrant-sending households were added to all remittance-receiving households. Our investigation expands upon the DR study's methodology by (1) employing IVs to address the independent effects of both fathers' migration and household remittances, (2) looking at multiple indicators of

educational attainment (enrollment and grade progression) rather than only school attendance, and (3) using nationally representative Guatemala LSMS rather than the migration-focused Latin American Migration Project DR survey data.

Guatemalan migration to the United States 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 United States are much higher than for Mexicans; and (3) Guatemalan migration to the United States 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 neighboring Mexico while very few continued on to the United States (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 United States 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 rest of the paper is organized as follows. In the next section, we outline the various theoretical perspectives that motivate our research questions and hypotheses. In Sections 3 and 4, we describe the data and empirical strategy. The results are presented in Section 5. Section 6 provides a discussion, and Section 7 summarizes the broad contributions of this study and outlines directions for future work.

2. Research questions and theoretical framework

How do fathers' absences due to international migration and the receipt of household remittances influence the school enrollment and grade progression of left-behind children in Guatemala? We hypothesize that a father's absence due to migration will lead to a lower probability of school enrollment and slower grade progression while the receipt of household remittances will have an offsetting beneficial effect on both measures. Corresponding theories that bolster the research hypotheses – separating the disruptive effects associated with fathers' absences from the income effects of remittances – are described below.

2.1. 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). This disruption can negatively affect the educational well-being of left-behind children in a number of ways. First, it is

important to consider that migration success is neither immediate nor guaranteed. In the case of undocumented migrants, they must safely and successfully cross two international borders (Guatemala/Mexico and Mexico/United States), avoid migrant predators including dishonest law enforcement officers and criminal organizations while travelling through Mexico and crossing these borders, and find a place to establish themselves in the United States. After settling in the United States, 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 have been made if the migrant remained in the local workforce. Thus, the difficult and lengthy process of reaching the United States and finding steady employment will likely reduce the remittance-related benefits of migration, at least in the short-term.

Second, the absence of a household breadwinner might force children to seek wage labor or to assist with household maintenance and subsistence agricultural activities – likely hampering a child’s ability to progress in school (Frank and Wildsmith, 2005). The migration of a father also removes an authority figure that can compel and assist children to excel in school. For example, Creighton et al. (2009) found a higher risk of secondary school dropout in Mexican households with absent fathers compared with two-parent households.

Lastly, and most compellingly, the migration of a father represents a livelihood strategy for left-behind children. If they plan to follow in their fathers' footsteps as future migrants, left-behind children may discount the value of a local education, potentially leading to school absence and non-enrollment. This livelihood strategy is further reinforced at the community level if children reside in areas with a high prevalence of international migration. Within these communities, a “culture of migration” develops such that young people are expected to migrate in order to attain socioeconomic mobility (Kandel and Massey 2002). Halpern-Manners (2011) and McKenzie and Rapoport (2011) have shown evidence of this dynamic in Mexico.

2.2. Income effects

Whether through altruistic motives or enlightened self-interest, migrants who seek wage labor 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 from remittances would prompt human capital investment producing higher student enrollment and grade progression for those in school.

Research reveals that increases in both endogenous (e.g., pay raises) and exogenous (e.g., cash transfers) income to income-poor households are associated with increases in educational investment in developing economies (Behrman and Knowles, 1999; De Janvry et al., 2006). However, it is difficult to characterize remittances as a purely endogenous or exogenous source of income; while they often constitute a rise in an individual’s personal income, they are usually temporary and external to a household’s long-term income stream.

Studies considering remittances as exogenous have typically found beneficial effects. For example, Yang (2008) analyzed 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, 2008). The study found that a positive exchange rate shock 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. 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 United States to Mexico led to a decline in school attendance for remittance-receiving households but not for non-migrant households.

Additional studies provide further evidence regarding the significant influence of remittances on education outcomes. Schmalzbauer (2008) and Abrego (2009) reported 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 contributed to higher private school attendance (Salas, 2014).

3. Data and variables

Data used in this study are from the Guatemala *Encuesta Nacional de Condiciones de Vida* (ENCOVI), an LSMS national household survey conducted by the *Instituto Nacional de Estadísticas* in 2000. The nationally representative 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. Our analytic sample contains children ages 7–18 with fathers' migration and household remittance receipt information. To best isolate the disruptive effect of a father's absence attributable to international migration, we exclude children residing in households with an absent parent due to marital separation, divorce or spousal death.¹

Our two outcome variables are school enrollment and grade progression in school. The school enrollment variable indicates (0 = no, 1 = yes) whether the child was enrolled in school in the past year. The grade progression variable is a modification of Psacharopoulos and Yang's (1991) schooling-for-age variable. The variable measures the progress of a currently enrolled child in the school system controlling for when the child formally entered school. 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 – analyses not controlling for age at which the student enrolled in primary school yield similar results. Indigenous and rural children are more likely to delay their enrollment in primary school compared with

¹There are 400 children living in households with a father of unknown status even though the mother reports being in an active marriage. We argue that if the household is receiving remittances then the missing father is likely a migrant. We imputed the missing father's migrant status based on the mother's reported location of remittances: 130 received domestic remittances, 132 received international remittances, and 138 received no remittances. Missing fathers 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 fathers as either international or domestic migrants does not alter the results.

non-indigenous and urban students, *ceteris paribus*. The grade progression variable is defined as:

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

Students with a score under 100 on this index are progressing below normal because of grade repetition or temporary school withdrawal.

We selected school enrollment and grade progression as our dependent variables because they provide short- and long-term indications of economic migration's influence on educational attainment and are appropriate measures of educational success in Guatemala. Specifically, school enrollment can capture short-term economic shocks such as the initial absence of a primary breadwinner, whereas grade progression measures chronic educational disruption over many years. Both dependent variables work well in the relatively poor Guatemalan context where the majority of households are impoverished and thus make school enrollment and progression decisions based on immediate economic need (*i.e.*, children are taken out of school when their labor is required to meet household subsistence needs).

The analytic sample using school enrollment as the dependent variable includes all 8,560 school-aged children. Grade progression data are available only for the subset of children (5,999) currently enrolled in school. By conditioning on enrollment, our measure of grade progression is not merely a function of school enrollment. This separation is important because the decision to enroll and the process of grade progression are not driven by completely overlapping factors. In the case of migration and remittances, they may impact school enrollment, but have disparate effects on the educational well-being of students who continue with school. For example, Kandel and Kao (2001) found that US migration provides financial benefits that allow Mexican children to continue schooling, but reduces their motivation to perform well and attain above-average years of schooling.

The key independent variables of interest are fathers' international migration² and the receipt of household international remittances. The father migration variable indicates (1 = yes, 0 = no) whether a child's father has lived internationally at any point in the past year. We exclude from the analysis children of mothers who migrated internationally since these cases make up less than 1% of the sample. Our remittances variable indicates (1 = yes, 0 = no) whether a child's household received international remittances in the past year. Because the survey data contain no information on the characteristics of the remittance sender, households may be receiving remittances from members other than a father.

²Earlier iterations of this investigation that considered the effects of internal migration on children's education attainment yielded non-significant results. Unlike international migration to the United States which arguably represents a mobility-constrained population that makes infrequent movements between Guatemala and the United States, internal migration allows for frequent movement between migration origin and destination, meaning less fathers' absences. Furthermore, the transfer of remittances through cash transfer agencies are less likely to be adequately measured by internal remittance variables because large percentages of internal migrants are unlikely to pay exorbitant money transfer fees, instead opting to physically return home with saved earnings.

We control for a variety of child, parent and community characteristics in the analysis that we believe are correlated with migration, household remittance income, school enrollment, and grade 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), gender, age, number of siblings age 7–18 present in the household, the presence of a grandparent in the household, and Guatemala's eight regional categories: Metropolitan, Southwest, Northwest, North, North-eastern, South-eastern, Central and Petén.

This investigation also controls for relative household wealth. This variable provides a good measure of household affluence, which can influence both migration decision-making and human capital investment (Acosta, 2011). 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 based on three broad categories: home composition, access to utilities and infrastructure, and ownership of durable goods.

4. Methodology

The remittance income literature suggests that receiving remittances from either a father or another source has beneficial effects. The parental migration literature, in contrast, indicates that a father's absence due to international 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 international fathers' migration and receiving remittances simultaneously. Using an IV framework, we fill this gap in the literature by analyzing how international fathers' migration and international remittances are jointly related to measures of child educational attainment.

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

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

where Y is a measure of school enrollment or grade progression, X is a matrix of child and parental control variables, M measures the international migration status of the father, R indicates the receipt of international remittances, $g(\cdot)$ is the response function, and ε is an idiosyncratic shock.

In order to estimate unbiased effects of the parameters of interest, we must account for selection into international migration and the household receipt of remittances. If households with certain characteristics receive remittances and fathers with certain characteristics decide to migrate and these same characteristics are also correlated with child enrollment or grade progression, 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, a father's decision 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 fathers' migration and household remittances, respectively.

Formally, we postulated that migration and remittances are a function of IVs. We then used the predicted values from these first-stage models to estimate the effects of migration and remittances on school enrollment and grade progression. For the migration prediction model, we estimated the following equation:

$$P(M=1|X, MN)=\Phi(\beta_0+\beta_1MN+\beta_2X), \quad (2)$$

where $P(M=1|X, MN)$ is the probability that a father 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 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 behavior (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, customs and jobs in other areas. Additionally, more migrants in a community signal a higher success rate, further motivating those who have not migrated to consider leaving their communities to seek opportunities elsewhere. We operationalized 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 (Adams and Cuecuecha, 2010). 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 interacted 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 because 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 shocks 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 obtained annual municipal level rainfall data (in millimeters) 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 interpolated 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. We measured 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 obtained the lowest indicator of potential bias.

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 enrollment and grade progression equations. In order to minimize this potential endogeneity, we controlled for rainfall levels in 1999 in all estimating equations.

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

$$P(R=1|X, WAGE)=\Phi(\beta_0+\beta_1WAGE+\beta_2X), \quad (3)$$

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*. The $WAGE$ instrumental variable was created in multiple steps following similar methodology described in Adams and Cuecuecha (2010). We first obtained 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 converted remittance volume estimates into percentages by US city of origin. Next, we obtained 1998 average non-skilled hourly wage rates for the 25 US cities from the Bureau of Labor Statistics (1998). Finally, we created 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 interacted this variable with the square of the age of the head of the household.

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

$$P(Enroll=1|X, \hat{M}, \hat{R})=\beta_0+\beta_1\hat{M}+\beta_2\hat{R}+\beta_3X, \quad (4)$$

where $P(Enroll=1|X, \hat{M}, \hat{R})$ is the probability that a child is enrolled in school, \hat{M} is the predicted probability of international father migration from equation (2), and \hat{R} is the

predicted probability of receiving international remittances from equation (3). Similarly, we modelled the relationship between grade progression and M and R for currently enrolled students using a linear specification (when including the inverse Mills ratio in the grade progression equation to control for potential selectivity into school enrollment, the coefficients of interest and their standard errors did not change):

$$\text{Grade Progression} = \beta_0 + \beta_1 \hat{M} + \beta_2 \hat{R} + \beta_3 X \quad (5)$$

In order to account for correlation between children within households, we clustered standard errors at the household level. We jointly estimated 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 used 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 included 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 were 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 enrollment status and schooling progression. However, given that Guatemala has only recently adopted international migration to the United States 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 enrollment and grade progression levels.

5. Results

5.1. Descriptive Results

Summary statistics of the variables used in the analysis disaggregated by a father's migration status and receipt of household international remittances are presented in Table 1.

Approximately 4% of sampled Guatemalan children had a father residing abroad in 2000 and 8% of children received international remittances from any source. Although there are

no statistically significant differences between children with and without a migrant father 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. There are also significant differences between children receiving and not-receiving remittances. With respect to the outcome variables, children without a migrating father compared to children with a migrating father are less likely to be enrolled in school but equally likely to progress in school. Similarly, we found that children receiving international remittances have a higher probability of enrollment but do not differ significantly in their grade progression.

Table 2 summarizes school enrollment and grade progression statistics by four migration and remittance categories. Among the four categories, children living in households with a migrant father 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 father have the lowest probability of being enrolled. These results suggest that both remittances and fathers' migration have positive (amplifying) effects on school enrollment. Furthermore, it appears that migration has a larger positive effect on enrollment. The probability of enrollment increases by 11 percentage points (70.17 to 80.65) if a child has an internationally migrating father conditioned on not receiving remittances. In comparison, the probability increases by six percentage points (70.17 to 76.31) for a child receiving remittances conditioned on not having a father migrate. We found mixed results for the grade progression variable. The difference in schooling progression between non-migrant, non-remittance receiving children compared to migrant, remittance receiving children is small (65.17 vs. 65.27). However, it appears that there is a negative effect of remittances on grade progression (61.86 vs. 65.17) whereas there is a positive effect of fathers' migration (68.08 vs. 65.17). 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. The next section presents results from IV models that minimize endogeneity due to background characteristics.

5.2. IV Results

Table 3 presents results from the first-stage IV probit models predicting fathers' migration status and remittance receipt. The results suggest that age is negatively associated with the probability of a migrating father. In contrast, household wealth, urbanicity, and living in the Northwest region are associated with higher probabilities of a father migrating internationally. We found similar associations with the probability of receiving international remittances. The only differences are that urbanicity is no longer statistically significant and living in the Northeast, Southeast or Southwest 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 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 labor 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 IVs: the Wald Chi-square statistic for the test of the joint

significance of the instruments is 13.63, with a p-value less than 0.05. We also calculated F statistics based on linear two-stage least squares models to test for weak identification. The F values are statistically significant and exceed the benchmark value of 10 (Stock and Yogo, 2005).

Table 4 shows our primary results for the school enrollment and grade progression models. For school enrollment, the primary findings for the purposes of our study are: a father's international migration is associated with a 36.7 percentage point decrease in the probability of enrolling in school while receiving international remittances is associated with an even larger percentage point decrease (57.6). For schooling progression, while international migration is associated with a 12.879 point decline in grade progression, receiving international remittances is associated with a 23.640 point increase. In this case, receiving international remittances completely counterbalances the negative effect of a father's migration for enrolled children. In sum, the results suggest that international migration and receiving international remittances decrease the likelihood of enrollment; however, when a child enrolls in school, a father's migration delays student schooling progress while remittances support it.

The results for the control variables align with previous research on the demographic characteristics associated with the education outcomes of Guatemalan children. We found that higher parental education, living in a region other than the Metropolitan area, and household wealth are positively associated with school enrollment. In contrast, gender, urbanicity and age are associated with a lower probability of enrolling in school. Household wealth, parental education, age, and living in the Southwest are significantly associated with grade progression for enrolled students; in this case, a lower age, greater household wealth, more educated parents, and not living in the Southwest region are associated with higher values of grade progression.

6. Discussion

The present study assesses whether household international remittances counteract the harmful effects of a father's absence due to international migration during the same year on student enrollment and grade progression. As expected, student enrollment is negatively associated with a father's absence due to migration. Intriguingly, remittance transfers are also negatively associated with enrollment. The independent negative influences of a father's absence and remittances on school enrollment support the perspective 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 lesser developed locales will not provide them with the skills needed to thrive in the US labor market, thus they discount the value of education even when remittances flow back to the household. Regarding the reduced role of schooling within a culture of migration, Halpern-Manners (2011, pg. 95) argues, "...the intergenerational transmission of migratory expectations reorients nonmigrants away from homeland institutions of upward mobility and

toward opportunities in foreign markets.” We found that youths are not just factoring the father migration event in their reorientation, but also the success of international migration in the form of remittances flowing back to the household.

To further assess the culture of migration dynamic, we examined responses to the survey question, “For what reason was (....) not registered for school in 2000?”, which include financial reasons, wage labor, performing housework, no interest in school, and other. A tabulation of these responses by gender, father's migration status and the receipt of remittances are provided in Table A1 of the appendix. The responses suggest that the culture of migration phenomenon affects boys, but not girls. While some boys lose interest in school when a father is away, many more boys lose interest when the household receives remittances. This finding suggests that while a father's migration contributes to disinterest in school among left behind youth, the transfer of remittances further grounds the culture of migration mentality into boys. In contrast, school disinterest is not a primary reason for non-enrollment for girls residing in either migrant-sending or remittance receiving households. For Guatemalan girls that reside in communities with relatively few female international migration role models, it is not surprising that economic migration is not associated with school disinterest. What is surprising is the lack of evidence that remittances might free girls to enroll in school rather than assuming their traditional gendered roles. Greater percentages of girls in remittance receiving households compared to their non-remittance receiving counterparts report performing housework or wage labor as reasons for not enrolling. This contradicts findings by Antman (2012) in Mexico where mothers have used remittances to invest in their daughter's human capital when husbands were away.

Admittedly, results presented in Table A1 provide a descriptive indication for how migration and remittances may differentially effect school enrollment based on a child's gender. Although not presented here, we reanalyzed our IV models to formally estimate gender differences by (1) running separate models for boys and girls and (2) running a full model with gender by migration and remittances interaction terms (results available on request). The results from these gender-based models remain unchanged from the main results. Future research using more refined and detailed data that defines who actually sent and received the remittances along with how they were spent will be required to truly tease out the mechanisms underlying these gendered education responses to economic migration. The association of a father's absence due to international migration and grade progression is negative, while international remittances have an offsetting positive association, as expected. Furthermore, less than one year of international remittances appears to fully counterbalance any reduction in school progression attributable to a father's absence. These results indicate that conditioned on school enrollment, a father's absence due to migration stunts schooling progress, but remittances support it. However, these results should be placed in context. 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 families. Because our cross-sectional data do not clearly establish when remittance senders originally left the household, the remittance variable likely captures a 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 grade progression is likely negative due to the immediate harm associated with a father's migration. Annual panel data that accurately measure migration events in relation to child enrollment and schooling progression would provide more compelling results. Additional limitations of the study include not knowing the relationship between the international remittance sender and the child or for what purpose the remittances were sent. Data that identifies migrant goals prior to their migration could more exactly model the true effect of international migration on left-behind children's educational attainment. Also, due to the insufficient sample of migrant mothers, the study cannot speak to the potential effects of a mother's international migration.

7. Conclusion

Despite the limitations described above, the study's findings extend past research in a number of important ways. The results demonstrate the importance of separating fathers' 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 enrollment but perhaps a positive long-term strategy for children that are not influenced by the culture of migration effect as evidenced by a greater progression in school upon enrollment. The disentangling of economic migration into its 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 allows for more informed educational interventions. For example, the results of the current study indicate that targeting the motivation to remain in school for boys and providing short-term economic assistance for both genders may be the most effective strategy for counteracting the negative influence of economic migration on the educational health of Guatemalan youth.

An important future direction of migration and education research, or migration and development research in general, is to use longitudinal data to understand how the effects of economic migration rely on the timing of migration establishment and the initiation of remittance transfers. Remittances may not positively effect left-behind children and households until migrants are fully established in their destination locations, after which remittances are larger and sent back at a more consistent rate. 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 gains or are opting to migrate like their fathers.

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 an important 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 separate effects of economic migration may also be important including health

outcomes, local development, land use practices, and intra-household dynamics. Thus, splitting these often-opposing forces will allow migration researchers to more accurately model the influence of economic migration on variables of research interest.

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Appendix

Table A1

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

	Migrant Father Household				Remittance Receiving Household			
	Female		Male		Female		Male	
	No	Yes	No	Yes	No	Yes	No	Yes
Financial reasons	32	28	31	21	32	29	31	28
Wage labor	9	4	32	42	8	13	33	27
Performing housework	17	28	1	3	17	20	1	1
Not interested	21	20	20	27	21	14	19	32
Other reasons	21	20	16	7	22	24	16	12
N	1,242	25	1,174	33	1,192	76	1,133	74

Percentages are based on child responses to the following survey question: "For what reason was (...) not registered for school in 2000?" The percentages in each column sum up to 100%.

Highlights

Fathers' international migration absences are negatively related to educational attainment

Remittances have mixed education results

Gendered differences conform to culture of migration theory

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Table 1

Descriptive statistics by migration status and household remittances receipt in Guatemala

	No migrating father	Migrating father	Two-tailed t-test of differences	Received no international remittances	Received international remittances	Two-tailed t-test of differences
<i>Dependent variables</i>						
Enrolled in school	0.706	0.835	5.236***	0.704	0.789	4.807***
Grade progression ^{a b}	64.94	66.468	0.811	65.233	62.878	1.694
<i>Instrumental Variables</i>						
International migration rate in 2002 times unexpected rainfall in municipality ^d	-15.359	-35.918	14.404***			
Non-skilled wages in the United States in 1998 times the square of the age of the household head ^a				11,693.48	12,653.47	4.794***
<i>Control Variables</i>						
Highest parental education						
Below primary	0.288	0.271	0.712	0.29	0.26	1.68
Primary	0.53	0.553	0.834	0.529	0.55	1.059
Secondary	0.182	0.177	0.243	0.181	0.19	0.602
Primary language						
Spanish	0.324	0.353	1.15	0.331	0.259	3.946***
Non-Spanish	0.676	0.647	1.15	0.669	0.741	3.946***
Female	0.474	0.484	0.362	0.472	0.511	1.989*
Age ^a	11.959	11.456	2.756**	11.897	12.392	3.779***
Region						
Metropolitan	0.087	0.077	0.671	0.088	0.073	1.351
North	0.125	0.023	5.782***	0.128	0.042	6.762***
Northeast	0.064	0.046	1.385	0.06	0.096	3.715***
Southeast	0.113	0.048	3.802***	0.11	0.114	0.282
Central	0.164	0.048	5.817***	0.165	0.094	4.975***
Northwest	0.158	0.368	10.344***	0.161	0.239	5.387***

	No migrating father	Migrating father	Two-tailed t-test of differences	Received no international remittances	Received international remittances	Two-tailed t-test of differences
Southwest	0.196	0.313	5.371***	0.193	0.288	6.076***
Petén	0.091	0.077	0.893	0.094	0.053	3.583***
Living in rural area	0.626	0.672	1.768	0.634	0.554	4.240***
Household Wealth Index ^a	1.878	2.226	3.928***	1.83	2.579	11.868***
Number of siblings ^a	2.136	1.886	3.234**	2.139	1.986	2.748**
Grandparent lives in household	0.078	0.097	1.288	0.076	0.114	3.640***
Rainfall in 1999 ^a	1,816.30	1,685.79	4.407***	1,814.66	1,769.98	2.098*
Municipal male 15–69 years old unemployment rate (1994) ^a	0.102	0.14	7.037***	0.102	0.115	3.198**
Municipal 7–14 years old Non-Enrollment rate (1994) ^a	0.302	0.328	3.337***	0.304	0.294	1.804
Number of children	8,209	351		7,849	711	

****p* 0.001,

***p* 0.01,

**p* 0.05

^aMean values.

^bCalculated only for enrolled students.

Table 2Mean percent child enrollment and school grade progression by household type in Guatemala¹

	Non-migrant, non-remittance- receiving	Non-migrant, remittance- receiving	Migrant, non- remittance receiving	Migrant, remittance- receiving
% enrolled	70.17	76.31	80.65	85.71
Number of children	7,694	515	155	196
Grade progression ²	65.17	61.86	68.08	65.27
Number of children	5,319	391	123	166

¹ A migrant household means a child's father 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

Estimated effects on migration and remittance transmission to Guatemala households

	Father migrated internationally	Household received international remittances
<i>Instrumental variables</i>		
International migration rate in 2002 times unexpected rainfall in municipality	-0.003 [*] (0.001)	
Non-skilled wages in the United States in 1998 times the square of the age of the household head		0.00001 ^{**} (0.000004)
<i>Control variables</i>		
Highest parental education - Primary	0.127 (0.104)	0.118 (0.069)
Highest parental education - Secondary	0.147 (0.142)	-0.113 (0.105)
Primary language spoken - Spanish	0.226 (0.123)	0.102 (0.071)
Female	-0.048 (0.057)	-0.015 (0.037)
Age	-0.054 ^{***} (0.012)	-0.021 ^{**} (0.007)
Region – North	-0.262 (0.26)	0.090 (0.132)
Region - Northeast	0.022 (0.177)	0.385 ^{**} (0.129)
Region - Southeast	-0.164 (0.202)	0.356 ^{**} (0.112)
Region - Central	-0.139 (0.187)	0.124 (0.110)
Region - Northwest	0.502 ^{***} (0.133)	0.453 ^{***} (0.104)
Region - Southwest	0.217 (0.162)	0.567 ^{***} (0.110)
Region - Petén	0.043 (0.204)	0.187 (0.121)
Urbanicity	0.223 [*] (0.100)	0.009 (0.062)
Household wealth index	0.173 ^{***} (0.033)	0.216 ^{***} (0.021)
Number of siblings	-0.043	-0.019

	Father migrated internationally	Household received international remittances
	(0.026)	(0.020)
Grandparent lives in household	-0.056	0.134
	(0.138)	(0.092)
Rainfall in 1999	0.000	0.000
	(0.000)	(0.000)
Municipal male 15–69 years old unemployment rate (1994)	0.481	0.092
	(0.344)	(0.241)
Municipal 7–14 years old Non-Enrollment rate (1994)	1.161 *	0.122
	(0.467)	(0.229)
Intercept	-2.017 ***	-2.110 ***
	(0.369)	(0.225)
Wald Chi-Squared(2) ^I		13.63 **
Cragg-Donald Wald F-statistic	112.947 ***	14.123 ***

p 0.001,

**
p 0.01,

*
p 0.05

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

^ITest of joint significance for IVs in both equations.

Table 4

Estimated effects on school enrollment and grade progression in Guatemala

	Enrolled in school	Grade progression
Father migrated internationally	-0.367 *** (0.106)	-12.879 ** (4.987)
Household received international remittances	-0.576 *** (0.057)	23.640 *** (4.944)
<i>Control variables</i>		
Highest parental education - Primary	0.107 *** (0.018)	-1.410 (1.344)
Highest parental education - Secondary	0.082 *** (0.025)	3.524 * (1.755)
Primary language spoken - Spanish	0.032 (0.020)	0.959 (1.221)
Female	-0.044 *** (0.010)	0.270 (0.791)
Age	-0.046 *** (0.002)	-5.848 *** (0.259)
Region – North	0.088 ** (0.032)	1.518 (2.096)
Region – Northeast	0.090 ** (0.034)	-1.637 (2.239)
Region – Southeast	0.136 *** (0.029)	0.728 (1.945)
Region – Central	0.038 (0.028)	-1.058 (1.817)
Region – Northwest	0.155 *** (0.027)	-1.876 (1.756)
Region – Southwest	0.158 *** (0.030)	-4.288 * (1.938)
Region – Petén	0.119 *** (0.036)	-0.309 (2.110)
Urbanicity	-0.043 * (0.017)	-0.387 (1.057)
Household wealth index	0.092 *** (0.006)	1.366 ** (0.518)
Number of siblings	-0.005 (0.006)	0.016 (0.326)
Grandparent lives in household	0.022	-0.662

	Enrolled in school	Grade progression
	(0.027)	(1.643)
Rainfall in 1999	0.000	0.000
	(0.000)	(0.001)
Municipal male 15–69 years old unemployment rate (1994)	0.115	–3.141
	(0.077)	(3.974)
Municipal 7–14 years old non-enrollment rate (1994)	–0.053	–1.842
	(0.067)	(4.371)
Intercept	0.980***	133.924***
	(0.049)	(3.256)

 $p < 0.001$,

**
 $p < 0.01$,

*
 $p < 0.05$

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