Does Parental Migration During Childhood Affect Children's Lifetime Educational Attainment? Evidence from Mexico

Abstract:

Existing scholarship reveals important and competing influences of parental migration on children's educational trajectories. On the one hand, in the short term, left-behind children commonly take on additional housework and sometimes devalue education if they aspire to follow in their parents' migratory footsteps. However, parental migration often leads to monetary transfers (remittances), which reduce financial pressure on sending households and can strengthen educational aspirations among children left behind. Because previous studies examine these effects on children still completing their educations, the cumulative impact of parental migration on children's educational attainment remains uncertain. In this study, we use retrospective life history data from the Mexican Migration Project to link parental migrations occurring during childhood with children's educational attainment measured in adulthood. Using a novel counterfactual approach, we find that parental migration during childhood is associated with increased years of schooling and higher probabilities of completing lower-secondary school, entering upper-secondary school, and completing upper-secondary school among adult children (i.e., 20-years-old). These associations were strongest among children whose parents did not complete primary school and those in rural areas. Results from a placebo test suggest that these positive associations cannot be attributed to unobserved household characteristics related to parental migration, which supports a causal interpretation of our main findings. When we restricted our sample to include adult children aged at least 25 years, we found similar positive effects of parental migration during childhood on entry into and completion of college. Thus, our analysis suggests that regarding children's educational attainment, on average, the long-term benefits associated of parental migration outweigh short-term disruptions and strain associated with parental absence.

Keywords: International Migration/Immigration; Education; Intergenerational Mobility; Causal Analysis; Mexico

International migration is a commonly-used strategy by which household members seek to accumulate resources, mitigate financial uncertainty, and provide better opportunities for their families (Garip, 2016; Massey et al., 1987; Stark, 1991). In particular, migrant parents often invest newly-acquired resources in their children's education as a way to create more opportunities for their futures (Abrego, 2014; Dreby, 2010). In 2017, about 260 million persons lived outside of their countries of birth (United Nations, 2017), and estimates suggest that 15-30% of children throughout Africa, Asia, and Latin America will live apart from at least one migrant parent (Bryant, 2005; DeWaard et al., 2018). Parental absence due to migration occurs most commonly in socioeconomically disadvantaged households—i.e., those with parents who have completed little schooling, and in rural areas with weaker educational institutions (Lu & Treiman, 2011; Nobles, 2013; Rendall & Parker, 2014). The ways in which parental migration affects educational attainment among children could have broad implications, positive or negative, for social mobility in migrant-sending areas, which are commonly characterized by high levels of inequality and low levels of intergenerational mobility (Huerta-Wong et al., 2013; Marteleto et al., 2012; Ravallion, 2014; Torche, 2014).

Existing scholarship reveals important and competing influences of parental migration on children's educational trajectories. For instance, in the short term, left-behind children commonly take on additional housework or enter the workforce to mitigate the loss of a primary breadwinner. Over time, these educational disruptions can be compounded by long-term family separation, particularly when children aspire to follow in their parents' migratory footsteps (Amuedo-Dorantes & Pozo, 2010; Jampaklay, 2007; Kandel & Massey, 2002). However, parental migration often leads to monetary transfers (remittances), which reduce financial pressure on sending households and can strengthen educational aspirations among children left behind (Abrego, 2014; Edwards & Ureta, 2003; Hanson & Woodruff, 2003; Nobles, 2011). Because previous studies examine these effects on children still completing their educations, the cumulative impact of parental migration on children's educational attainment remains uncertain.

Empirically, it is difficult to identify the cumulative association between parental migration during childhood and children's lifetime educational attainment because it requires linking two temporally distant events. Most surveys that capture international movement, such as those cited above, are cross-sectional or contain short panels covering only a few years. As a result, these studies generally restrict their foci to a single stage of a household's migration history, either immediately following parental departure (e.g., Antman, 2011; Chang et al., 2011) or while the parent is abroad, but without information about time since emigration or the household's pre-migration context (e.g., Halpern-Manners, 2011; Hanson & Woodruff, 2003; Nobles, 2011). International migration is a dynamic process that evolves at the household and community levels (Garip, 2012; Massey, 1990), and evidence suggests that the relationship between parental migration and children's schooling changes across household and community migration histories (Curran et al., 2004; Kandel & Massey, 2002). Thus, attempts to identify the relationship between parental migration and children's educational attainment based on single time points could bias research findings upward or downward depending on the timing of data collection.

In this study, we attempt to overcome these limitations by using retrospective life history data from the Mexican Migration Project (MMP) to link parental migrations occurring during childhood with children's educational attainment measured in adulthood. With this information, we address two research questions. First, what is the association between parental migration during childhood and children's lifetime educational attainment? Second, does the association between parental migration during childhood and children's lifetime educational attainment vary by level of household and community disadvantage? Figure 1 illustrates our analytical approach. We define the first parental migration (M1) as occurring at time T=1 (which we restrict to households in which the parent's first migration happened while the child was 1-14 years old). We link M1 to children's lifetime educational attainment (EA), which we measure at time T=1+K, where K is a non-negative integer greater than six to ensure that the child has aged out of their standard schooling years (i.e., is 20 years old or more).[1] We used a broad set of covariates (L_0), which we measured at time t=0, to match migrant children against the most similar children without migrant parents, thus providing counterfactual information about educational attainment sans parental migration. However, our models could not control for all household characteristics that may correlate with the likelihood of parental departure (U_0 in Figure 1), e.g., parent-child relationship quality. To address this limitation, we conducted a placebo test using adult children who were ages 15 or older at the time of parental migration, i.e., children whose schooling should be unaffected by parental departure. The placebo results were non-significant, indicating that unobserved household characteristics did not contaminate our primary models. This result supports a causal interpretation of our main findings.

BACKGROUND

Qualitative studies on the social and emotional hardships that transnational families experience, as well as the resiliency of these kinship ties despite physical separation, have found

[1] K cannot be less than six because the oldest persons identified as children at the time of parental migration were 14 and the youngest respondents that we define as "adult children" at the time of the survey are 20 (20-14=6). Our results are robust to restricting our sample to adult children aged 25 or older such that k is greater than or equal to 11.

migration to be a family-centered process that parents undertake in part to promote the mobility of their children (Dreby, 2010; Olwig, 1999; Orellana et al., 2001). Some parents manage to improve their children's quality of life by sending financial remittances, which left-behind children may grow to view as symbolic of their parents' sacrifices for their schooling and improved living conditions (Abrego, 2014). However, many parents and children also experience strain in their relationships, and children often express feelings of emotional loss and resentment toward their absent parents' decisions to move abroad (Dreby, 2010; Jingzhong & Lu, 2011; Parreñas, 2005). Parental migration can also increase financial burdens on family members left behind, particularly in the immediate aftermath of departure when migrant parents repay debts owed to smugglers or recruitment agencies and struggle to secure steady employment abroad (Abrego, 2014). Thus, while parental migration may enhance children's long-term academic opportunities, it can also result in behavioral issues and increased financial burdens, which sometimes lead to worse school performance and even dropout, thereby reducing children's lifetime educational attainment.

Survey-based research reflects these contradictory impacts of parental migration. Some scholars find that parental migration is associated with worse educational outcomes, which they attribute to a combination of family separation, a culture of migration, and financial hardships following parental departure (Creighton et al., 2009; Halpern-Manners, 2011; Lu, 2012). In particular, parent-child separation during migration can result in a loss of social support for left-behind children (Graham, 2011; Lu, 2014) that can worsen their school performance and increase their risk of dropping out (Creighton et al., 2009; Zhou et al., 2014). Increased financial burdens immediately following parental departure can compound the consequences of family separation. For instance, parental migration predicts short-term declines in children's time spent studying (Antman, 2011) and increases in time spent on housework and farm work (Chang et al., 2011). Consequently, parental migration can worsen schooling among children through various pathways, particularly in the immediate aftermath of departure. The emergence of a "culture of migration" can exacerbate declining social support and increased household responsibilities. Evidence shows that children living in households and communities within established migrant networks are more likely to aspire to migrate themselves, thereby disrupting their focus on school completion, and potentially muting the benefits of greater financial resources that stem from remittances (Halpern-Manners, 2011; Kandel & Massey, 2002).

In contrast, other survey-based studies highlight a positive association between parental migration and children's educational attainment due to the financial benefits associated with a parent's move abroad that can offset its adverse effects on children's schooling (Dustmann 2008; Nobles 2011; Pajaron 2018). These studies often conceptualize parental remittances, which sending households commonly invest in children's education (Massey, Durand, and Pren 2013), as a quasi-exogenous boost to household income (Hanson & Woodruff, 2003). For example, Curran et al.'s (2004) study in Thailand found that having at least one remitting parent increased the odds of transitioning from primary to lower secondary school, and Nobles (2011) documented a positive association between parental remittances and reported aspirations to attend college among the children of migrants in Mexico (see also, Amuedo-Dorantes & Pozo, 2010). In this way, remittances can positively influence school retention, potentially offsetting the culture of migration and the adverse effects of parental absence (Edwards & Ureta, 2003; Hu, 2013; Lu & Treiman, 2011).

The lack of consensus in previous research on how parental migration impacts children's education stems from data limitations, which have prevented scholars from directly testing the model shown in Figure 1. As our review of literature shows, scholars generally examine specific pieces of the migration-education relationship depending on available information. Figure 2 illustrates the limitations of this approach for drawing causal inferences. Scholars typically identify the association between the nth parental migration (MN_n)—or characteristics of the nth migration, such as financial remittances—and school-aged children's educational attainment or risk of dropout (E_n) measured concurrently or within a few years of departure. These studies generally adjust for household and community characteristics measured at time t=n (Acosta, 2011; e.g., Amuedo-Dorantes & Pozo, 2010; Creighton et al., 2009; Edwards & Ureta, 2003; Halpern-Manners, 2011; Lu, 2014; Lu & Treiman, 2011; Nobles, 2011) or time t=n-k in the case of short-wave panel studies, such as Antman's (2011) analysis of school and work outcomes among Mexican youth in response to a recent paternal migration (see also Chang et al., 2011).

These approaches introduce two potential sources of bias, one retrospective and one prospective. On the one hand, cross-sectional studies that only observe L_n, MN_n, and E_n (e.g., Creighton et al., 2009; Edwards & Ureta, 2003; Halpern-Manners, 2011; Hanson & Woodruff, 2003; Nobles, 2013) cannot adjust for the potentially confounding influence of earlier contextual features (L_0) or previous parental migrations (M1…n-1). Adjustment for L_n — possibly years or decades after the parent's first departure — could introduce substantial bias into these cross-sectional studies because contextual factors change over time in ways that often directly relate to households' and communities' migration histories (Massey, 1990; Massey et al., 1994; Mines & Massey, 1985). On the other hand, studies that predict educational outcomes, such as school dropout at time t=n in response to parental migration and household context at a previous time T=n-k, cannot capture the lifetime effects of parental migration. For instance, children could initially leave school to account for the loss of a migrant breadwinner, but later re-enroll upon the commencement of a remittance flow.

Beyond these issues of timing, it is well-established that household-level migration behaviors evolve (Garip, 2012; Massey et al., 1987; Mines & de Janvry, 1982; Reichert, 1981). First-time migrants often accrue debt, which can limit their ability to send remittances and push left-behind family members into the workforce (Abrego, 2014; Antman, 2011; Mines & Massey, 1985). However, across multiple trips abroad, migrant-sending households gain considerable asset advantages relative to their non-migrant peers (Garip, 2012; Massey et al., 1994; Mines & Massey, 1985), and remittance levels increase significantly with accumulated migration experience (Garip, 2012, 2014). Even studies that focus on intervening mechanisms, such as the presence of a remittance flow (e.g., Amuedo-Dorantes & Pozo, 2010; Nobles, 2011), could introduce bias to the extent that current patterns are endogenous to previous events. Curran et al. (2004), for instance, contend that the relationship between parental migration and children's schooling changes at varying stages of household and community migration histories.

In our study, we aim to overcome the limitations of earlier work by identifying the association between parental migration during childhood and children's total educational attainment measured in adulthood. To do so, we use retrospective longitudinal data from the MMP to connect adult children's educational attainment with their parents' life histories. With this data, we estimate the association between M1 and EA, net of L_0, as described in Figure 1. As such, we provide a precisely adjusted estimate of the association between parental migration during childhood and children's educational attainment measured in adulthood.

Based on our initial findings, we also assess whether the lifetime impacts of parental migration are more substantial among children from socioeconomically disadvantaged backgrounds. Given that parental movement can contribute to academic achievement through the remission of financial resources (Abrego, 2014; Dreby, 2010; Massey et al., 2013; Nobles, 2013), we expect that the observed benefits (losses) attributable to parental migration will be largest (smallest) among more socioeconomically disadvantaged children, i.e., those who have the most to gain (lose) from an economic infusion (depletion) in their households. This expectation is consistent with prior studies that document a larger contemporaneous association between parental migration and children's education in rural areas and households with lower levels of parental education (Hanson & Woodruff, 2003; Lu & Treiman, 2011). Building on these studies, we examine differences in the association between parental migration during childhood and children's lifetime educational attainment by household socioeconomic status (i.e., parental education) and community context (i.e., rural/urban).

DATA AND METHODS

To estimate the effect of parental migration during childhood on educational attainment in adulthood requires panel data containing information on parents, children, households, and communities. We are unaware of a sufficiently long panel that includes a large sample of parents who migrated while their children were in school. Therefore, we used retrospective life history data from the Mexican Migration Project (MMP) to link adult children's educational attainment to their parents' first U.S. migrations that occurred during childhood.

Each year since 1987, the MMP has collected random household samples in four to six Mexican communities and respondent-driven samples of migrant households from those same communities in the United States. As of 2018, the MMP sample included 27,274 households in 170 communities, spread across 24 of Mexico's 32 states. These data are representative of the sample regions when compared to nationally representative surveys administered by the Mexican Census Bureau (Massey & Zenteno, 2000). Massey and Zenteno (2000) found that the MMP captures areas responsible for sending 90% of Mexican migrants to the United States. Thus, these data provide an ideal source with which to describe social and demographic processes related to Mexico-U.S. migration, the largest binational migration flow in the world over the last 50 years (Abel & Sander, 2014).

Data collection staff use ethnographic and survey techniques to collect detailed demographic information about household heads, their spouses, and all resident and, importantly, non-resident children of the household head. With this information, we can identify years of schooling and the highest level of education completed by resident and nonresident adult children of household heads. Because we are interested in the effect of parental migration during childhood on children's educational attainment in adulthood, we restricted our sample to adult children, here defined as 20 years of age or older. Therefore, lifetime educational attainment refers to schooling completed during standard educational years.

EDUCATIONAL ATTAINMENT

We assessed multiple dimensions of educational attainment: total years of schooling, completion of lower-secondary school (nine years), entry into upper-secondary school (10 years), and completion of upper-secondary school (12 years).[2] Although years of schooling quantifies total educational attainment, it also obscures the structural characteristics of Mexico's educational system. Throughout the latter half of the twentieth century, the Mexican government

[2] We also replicated our analysis among children aged 25 years and older with the addition of some college and college completion to our set of educational outcome variables.

enacted a series of significant reforms to increase educational opportunities. Beginning in 1950, Mexico widely expanded its public education system by constructing thousands of primary and lower secondary schools, principally in poor and rural communities (Creighton & Park, 2010). Then, in 1992, Mexico passed the National Agreement to Modernize Basic Education, which made lower secondary school (seventh through ninth grade) mandatory and tuition-free (Parker et al., 2007).[3] These expansions and reforms significantly increased primary and secondary school completion among Mexicans born since about 1980 (Behrman et al., 2007), with conditional matriculation into lower secondary school reaching 96% in 2017 (OECD 2018). However, by that same year, only half of Mexicans under 25 had completed upper secondary school (grades 10 to 12), which remains non-mandatory and requires tuition payments (OECD, 2018). Advancement beyond lower-secondary school is a valuable marker of educational mobility, particularly among children with less-educated parents (Urbina, 2018).

PARENTAL MIGRATION

We restricted our sample to the children of the household head that were born in the post-Bracero era, post-1964, and were at least 20 years old at the time of the survey (n=38,813). Although our sample could technically include children whose parents migrated as recently as 2012 (i.e., children six years before 14-year-olds would turn 20 and become eligible for our study, we capped our range at 2003. Mexican migration to the United States declined precipitously in the twenty-first century (Massey et al., 2015). Despite an average 47 parental departures per year on average, we observed 24 total departures from 2003-2012, with no

[3] Students' families are still responsible for their uniforms, notebooks, and other materials.

departures recorded in multiple years. These miniscule cell sizes raise concerns given our reliance on community and year fixed effects (see below). Thus, we restricted our analysis to person-years between 1965-2003 inclusive.

We defined childhood as ages 0-14, which includes children who are at home or in primary or lower-secondary school but have not matriculated into upper-secondary education. We dichotomously identified parental migration based on the year of initial departure of the household head. We restricted our focus to migrations undertaken by the household head because only children of the household head are explicitly linked to their parent (the household head). That is, we cannot guarantee that a household head's spouse at the moment of the survey is also the parent of the household head's children or that the current spouse was present in the household during childhood.

If the household head's first migration occurred when a child was between 0-14, we identified that child as a migrant-child and placed them in the treated group. We classified children whose household heads never migrated or first migrated before the child was born or after their fifteenth birthday as non-migrant children and placed them in the set of potential control observations.[4] Thus, our treatment variable dichotomously identified 2,839 children of the household head whose parent first migrated traveled to the United States when those children were aged 0-14. We counted 574 migrant-children whose household heads accumulated fewer than twelve months of total U.S. migration experience as missing,[5] which left 2,265 migrant-

[4] Our results were consistent when we exclude non-migrant children whose parents had migrated prior to or after their childhood.

[5] Our results were substantively unchanged with the inclusion of these respondents as migrant-children. The coefficient magnitudes reduced slightly with the inclusion of these shorter trips, but no coefficients changed in direction or significance.

children in our sample. For each of these adult children, we retained time-invariant measures of educational attainment, year of birth, and sex.

CHILDHOOD CONTEXT

To measure context during childhood, we linked each adult child to their household heads' retrospective life history. The life history technique locates significant events such as marriages or migrations with visual calendar cues (Axinn et al., 1999). The MMP relies on these techniques, in tandem with community observations and ethnographic methods, to collect accurate retrospective data (Massey, 1987). With these life histories, we created panels describing each respondents' yearly household context during childhood, yielding a dataset of 587,330 child-years.

For children whose parents migrated to the United States during childhood, we identified the year of a first parental migration, T=1. We dropped 39,206 migrant child-years other than year T=0, i.e., the year immediately before parental migration (see Figure 1), which left a total sample of 548,124 child-years. In this way, we linked each migrant child's schooling measured in adulthood to their childhood context immediately before parental departure. However, identifying migrant children's household context in year T=0 created a new challenge: the delineation of an appropriate control group. While we reduced each migrant child to a single child-year, there were still 15 child-years for each non-migrant child. To identify an appropriate control group with which to estimate the association between parental migration during childhood and children's lifetime educational attainment in adulthood, we used propensity score matching (PSM) to compare each migrant child-year with the most similar non-migrant child-year based on the migrant child's household and community context in year T=0.

The PSM design mimics a randomized control trial with applicability to observational data (Hernán & Robins, Forthcoming; Rubin, 1974; Winship & Morgan, 1999). PSM models approximate the counterfactual framework by matching treated observations to (nearly) identical controls using observable pre-treatment information. PSM models allow for the inclusion of numerous, potentially colinear control variables, an essential attribute for research on international migration, which relates to a broad set of sociodemographic and economic factors (Garip, 2016; Massey et al., 1999). Treatment and control groups are well-matched when differences between the two groups on these observable characteristics are negligible (Hernán & Robins, Forthcoming). In our model, the control group represents the counterfactual in which a migrant child's parent had not migrated.

PSM uses a three-stage design to identify appropriate counterfactuals. In the first stage, we estimated a logistic regression model to determine the probability of exposure to treatment (parental migration). These results are used to generate predicted probabilities, or propensity scores, of exposure to treatment. In the second stage, the PSM matches each treated observation to the control observation with the closest propensity score. This stage ensures that each migrant child matches against a single non-migrant child-year, rather than including all 15 child-years that were available for each non-migrant child. We enforced a fairly strict caliper range of 0.01 to ensure high-quality matches (Morgan & Winship, 2015).[6] We excluded 16 treated observations (0.06%) that lacked well-matched controls. In 21 cases where migrant children matched with two identical controls (0.07%), we included both tied control observations.[7] We

[6] The caliper range defines the maximum difference in the propensity score that is allowed between treated observations and their matched controls.
[7] We weighted our sample such that all treated and unique control observations counted as one observation and each tied control contributed one half of an observation.

did not allow replacement, such that our model used each non-migrant child-year either once or not at all.[8] Once these matches were constructed, the third stage defined the average treatment effect on the treated (ATT) as the difference in educational attainment between the treated and control observations averaged across the entire matched sample.

The ATT captures the net impact of parental migration on children's lifetime educational attainment among migrant children. The average treatment effect on the untreated (i.e., the effect of a hypothetical parental migration on a non-migrant child) cannot be reliably estimated when the treatment is rare and not evenly distributed across the population (Morgan & Winship, 2015), as is the case for parental migration. Therefore, our target outcome of interest is the ATT, which we define as the average difference between the educational attainment of migrant children and their "nearest neighbor" non-migrant children.[9]

A benefit of nearest neighbor matching is the removal of cases that are extremely "unlike the treated" (Morgan & Winship, 2015). In multiple regression models of rare events such as parental migration during childhood, the inclusion of control observations with marginal propensity scores, i.e., those that are extremely unlikely to be treated based on other observable characteristics, can inflate standard errors, which limits the interpretability of coefficient estimates (Hernán & Robins, Forthcoming). PSM solves this problem by only including control observations that have a propensity to be treated that closely resembles at least one treated individual. As Smith (1997, p. 349) explains, "[B]y focusing attention on the overlap of treatments and controls with respect to the distribution of covariates, matching effectively

[8] Our results were substantively identical in models that allowed replacement—i.e., when single controls could be paired with multiple treated observations.
[9] Morgan and Winship (2015, pp. 173–175) discuss why the average treatment effect on the untreated can rarely be estimated in observational studies.

delimits the range of causal inference." Although this exclusion prevents us from generalizing our results to the entire population, with a well-matched control group, it enables a precise estimation of the ATT (Angrist et al., 1996).

Because we could only adjust for selection on observed variables, we invoke the ignorability assumption (IA). The IA states that potential outcomes are uncorrelated with unobserved variables, conditional on observed covariates (Morgan & Winship, 2015). In practice, the IA cannot be verified and should not be taken as true when applied to observational data. Instead, the quality and variety of available covariates can render the IA *more* plausible (Brand & Xie, 2010).

To increase confidence in the IA, we conducted our matches within communities and included year fixed effects in our propensity score equation. As a result, contextual social, cultural, and economic structures, which influence both adults' migration behavior and children's schooling outcomes (Massey, 1990; Valentine et al., 2016), cannot confound our results, as these exposures are held constant between treated and control observations. We could not match within households because siblings experience identical parental migration behavior. Thus, we relied on a set of observable covariates, which Table 1 summarizes.[10] First, we included children's age, sex, birth order, and year of observation to remove concern due to age, period, sibship, and gender effects. Second, we included sociodemographic characteristics of the household head: year of birth, sex, marital status, education, internal migration history, and occupation, as well as household properties, business holdings, land holdings, and family composition. The inclusion of these characteristics mitigates the possibility that children are

[10] We also address the possibility of unobserved household level confounding with a placebo test that we describe below.

differentially selected into parental migration according to household sociodemographic context or class background, which are highly correlated with schooling outcomes in Mexico (Marteleto et al., 2012; Urbina, 2018). Third, we included specific measures of household migration networks to adjust for the possibility that parental migration is selective on transnational ties, which increase parents' opportunities to migrate, but can reduce their children's school attachment (Kandel & Massey, 2002; Palloni et al., 2001). Together, these variables capture a broad range of social, economic, and demographic factors related to parental selection into migration and children's educational attainment.

To reduce our dependence on the IA assumption, we also conducted a placebo test by replicating our PSM analysis among respondents whose parents migrated after they had aged out their primary schooling years. This test, which we report after our main finding, suggests that unobserved factors did not bias our primary conclusions.

RESULTS

CONVENTIONAL DESCRIPTIVE AND MULTIVARIABLE RESULTS

Before presenting our PSM results, we first examined educational attainment within the full MMP sample. Figure 3 shows that parental migration during childhood was associated with significantly lower adult educational attainment across three of our four schooling outcomes. Of course, these bivariate associations do not account for numerous household and community-level factors that have been shown to affect exposure to parental migration (Massey & Espinosa, 1997).

Accordingly, Table 2 presents two multivariable models that estimate the association between parental migration during childhood and children's educational attainment in adulthood.

These models adjusted for time-invariant characteristics that we could link to each adult child's educational attainment (See note below Table 2). The first model included time-invariant demographic characteristics of children and their household heads, which are not at risk of being endogenous to parental migration. The second model incorporated community fixed effects. Both models revealed a weak positive association between parental movement and completion of lower-secondary school and a modest negative association between parental migration and continued education into and through upper-secondary school. These cross-sectional analyses identify an ambiguous association between parental migration and children's educational attainment. This ambiguity is consistent with the mixed evidence from prior cross-sectional studies on parental migration and children's education (Creighton et al., 2009; Halpern-Manners, 2011; Hanson & Woodruff, 2003; Nobles, 2011). However, like those studies, the models shown in Table 2 ignore the contribution of the pre-migration context (L_0) to selection into parental migration.

These cross-sectional models also provided an opportunity to assess our invocation of the IA with the present set of control variables. Oster (2019) proposes a method for assessing the coverage derived from a set of observed covariates. Her approach compares a regression coefficient of interest between uncontrolled and controlled models to infer the "degree of selection on unobservables relative to observables that would be necessary to explain away the result" (2019, p. 195). To assess the set of observed covariates used throughout our PSM models, we estimated the delta coefficient for Model B in Table 2. The test returned a delta coefficient of 24.435. Thus, children's education would need to be selected on unobserved factors at a rate of 24 times that of our observed variables to depress the coefficient on household head migration down to zero. Such a large delta coefficient provides considerable support for our invocation of the ignorability assumption, particularly given our robust set of contextual and individual level fixed effects. Thus, we now turn to our PSM analysis."

PSM RESULTS: FULL SAMPLE

Table A1 in the Appendix presents the results from the first-stage logistic regression model that we estimated to generate propensity scores. We retained non-significant predictors because overfitting improves PSM results (Lunceford & Davidian, 2004). However, readers should not substantively interpret these coefficients. Figure A1 plots the estimated propensity scores for treated and control observations. We observed significant divergence in the propensity to have a parental migrant between treated and control cases, which confirms our expectation that migrant children are a non-random segment of the population. After matching each treated observation with its nearest within-community neighbor (stage two), we calculated summary statistics for our control variables, which we present in Table A2. Table A2 also shows the percent bias between treated and control observations and treated and unmatched observations. The average bias fell by 77%, from 19.1% on average in the unmatched sample down to just 4.4% on average in the treated-control sample. Thus, our propensity scores adjusted for the majority of selection on household and individual level observables—recall that we also corrected for 100% of potential selection bias on community-level factors by matching within communities and including year fixed effects in our propensity score models.

Table 3 presents the ATTs for the full sample, and Figure 4 plots the proportional treatment effects implied by these ATTs (i.e., ATT/mean educational attainment among controls, henceforth PTT). The PTTs contextualize the ATTs relative to baseline educational attainment among controls—i.e., the PTTs report proportional increases in education attributable to parental migration when compared to the counterfactual of no parental migration. Parental migration was associated with 0.45 additional years of schooling ($p<0.001$) and a seven-percentage-point higher probability of lower-secondary school completion ($p<0.001$). Parental migration also predicted an increased likelihood of entry into (2.97%, $p<0.01$) and completion of (2.88%, $p<0.01$) upper-secondary school. The PTTs, shown in Figure 4, equated to 10%-13% increases in the probability of matriculation and completion across the three schooling levels. Thus, net of community and household context immediately before parental departure, we found evidence of a substantial positive effect of parental migration during childhood on educational attainment in adulthood, with significant impacts identified at the lower- and upper-secondary levels.

However, this aggregate estimate reflects the average effect of parental migration on children's education across 40 years and 170 different communities surveyed between 1987 and 2018. As discussed above, Mexico experienced rapid economic development and invested in a substantial expansion of its education system throughout this period. Thus, our aggregate estimates likely obscure contextual variations in the relationship between parental migration and children's educational attainment across time and space. To better understand when and why parental migration increases children's lifetime educational attainment, we now report a series of stratified models that capture theoretically distinct pieces of the overall relationship depicted in Table 3.

PSM RESULTS BY PARENTAL EDUCATION, RURAL/URBAN RESIDENCE, AND MIGRATION PREVALENCE

Table 4 reports PSM results that we estimated separately by parental education (Panels A and B), rural/urban context (Panels C and D), community migration prevalence (Panels E and F), and time period (Panels G and H). Figure 5 plots PTTs based on these stratified results. Parental migration during childhood was associated with substantial absolute and proportional increases in lifetime educational attainment among children whose parents did not complete primary school (fewer than six years of schooling). It predicted an increase of 0.57 years of schooling ($p<0.001$) and a 7.5 percentage point (14%) increase in the probability of completing lower-secondary school among children whose parents did not complete primary school ($p<0.001$). Parental migration also predicted higher rates of matriculation into and completion of upper-secondary school. Indeed, parental migration was associated with a 31% increase in the probability of completing upper-secondary school among children whose parents attained fewer than six years of schooling ($p<0.001$). By contrast, we found little evidence of a relationship between parental migration and educational attainment among children whose parents had completed primary school. Only the ATT for lower-secondary school was statistically significant, and the absolute and relative effect sizes among children with more educated parents were far smaller than among their less-advantaged peers.

We also found large positive ATTs among children in rural areas ($p<0.001$ for all educational outcomes). As was the case among children with less-educated parents, the PTTs increased at the upper-secondary levels, with parental migration during childhood increasing the probability of entry into upper-secondary school by 24% and increasing the likelihood of completing upper-secondary school by 23%. Similar to children with more educated parents, we found little evidence of an effect of parental migration on educational attainment in urban areas. Three of the four ATTs did not reach statistical significance, and the absolute and relative magnitudes of the effects in urban areas were far smaller than those in rural communities. These stratified results indicate that parental migration during childhood increases lifetime educational attainment among children in more socioeconomically disadvantaged households and communities, but that it is unrelated to educational attainment among children whose parents have more education and those living in more advantaged areas.

Our stratified analysis of communities with high and low migration prevalences showed a strong effect of parental migration on educational attainment in low prevalence communities and little to no effect in high prevalence communities. In low prevalence communities, we again observed the largest proportional effects at the upper-end of the education spectrum, with parental migration associated with a 24% increase in the likelihood of entering upper-secondary school and a 25% increase in the likelihood of completion. These results suggest that the educational benefits associated with parental migration may be offset in communities with established cultures of migration where children often aspire to follow in their parents' footsteps rather than pursue higher education (Abrego, 2014; Amuedo-Dorantes & Pozo, 2010; Kandel & Massey, 2002; Nobles, 2011).

We also stratified our sample into those whose parents migrated before and after the passage of the Immigration Reform and Control Act (IRCA) in 1986. Despite major changes in U.S. immigration enforcement and a shift from circular to permanent migration encouraged by IRCA (Massey et al., 2002), we observed substantively similar ATTs between the two periods (although the smaller sample size reduced coefficient significance following IRCA. However, we observed a shift in the coefficients between the two periods. Notably, parental migration's effect on completion of lower-secondary school declined, while the effect on entry into and completion of upper-secondary school increased. These changes correspond to Mexico's educational reforms, which made lower-secondary schooling free and enhanced access to upper-secondary school (Behrman et al., 2007; Parker et al., 2007). Not surprisingly, parental migration became less important for lower-secondary school after the financial barrier was removed. The larger impact of parental migration on entry into and completion of upper-secondary school corresponds to the substantially higher rate of completion of lower-secondary school, creating a larger population of children at risk of entering upper-secondary school, which continues to charge tuition fees.

ROBUSTNESS CHECKS

We assessed the robustness of our results to a variety of specifications, which we report here and present in the Appendix. First, we estimated our models separately among male and female children to assess whether our findings varied significantly by sex (Table A3). Our results were nearly identical among men and women, suggesting that our main findings were not driven by one sex or the other. Second, we replicated our PSM models with each treated case matched to their three or five nearest neighbors (Table A5). Consistent with expectations (Morgan & Winship, 2015), these expanded control samples resulted in stronger significance from the larger sample sizes, but smaller ATTs due to the less precise matches. Third, to check for potential issues with the quality of our matched propensity scores, we computed ATTs conditional on the variable with the most substantial post-treatment bias, brother of the household head with migration experience (see Table A2). We estimated a PSM model that excluded respondents whose household head had a brother with prior migration experience. Table A5 reports these results (Panel A). Fourth, we replicated our study results without including households that were interviewed in the United States (Table A5, Panel B). These results indicate that our main findings were not driven by unusually high educational attainment among children who joined their parents abroad. Fifth, we restricted our definition of adult children to only include those 25 years old or older (Table A5, Panel C). Again, these models confirmed our main findings. Among these older respondents, we also found evidence that the positive effect of parental migration on schooling persists at the post-secondary level, with parental migration associated with a two-percentage-point (25%) increase in the probability of entering and completing college ($p<0.05$). Collectively, these supplemental analyses provide confidence that our findings did not result from model misspecification or biased sample construction. However, our primary conclusions still rest on the IA assumption that unobserved factors not included in our PSM estimation did not affect our findings. To support a causal interpretation of our analysis, we turn to the results from our placebo test.

PLACEBO TEST

Our primary analyses could not adjust for unobserved household characteristics, which may correlate with the likelihood of parental migration (U_0 in Figure 1) and children's lifetime educational attainment. U_0 could include genetic traits passed down across generations or the quality of parent-child relationships, both of which could reasonably covary with parental migration and affect children's schooling (Abrego, 2014; Dreby & Stutz, 2012; Hagan et al., 2015). For example, if international migrants are innately ambitious and risk-taking, those same traits might motivate their children to excel in school regardless of benefits directly attributable to their parents' migrations. To assess the influence of these or other unobserved household-level characteristics, we conducted a placebo test (Hartman & Hidalgo, 2018; Heckman et al., 1987). In econometrics, placebo tests involve showing that the effect of interest does not exist when it "should not exist" (Rothstein, 2010).

In our case, we considered the effect of parental migration on children who had aged out of lower-secondary school before their parents' first departures. We replicated the PSM analyses presented in Tables 3, A1, and A2, among children who were aged 15 years or older when their parents first migrated to the United States.[11] If parental migration affects children's progression through lower-secondary school and into upper-secondary school through the remission of financial resources, changes in parent-child relationship quality, or other factors that are directly attributable to international movement, then parental migration should be uncorrelated with educational attainment among older children who were beyond lower-secondary school at the time of parental departure. On the other hand, if parental migration is associated with children's educational attainment because of unobserved household characteristics, then we would expect to observe similar associations between parental migration and the educational attainment of all children regardless of their age at the time of migration—i.e., in that case, parental migration would simply provide an indicator of other unobserved and "exceptional" characteristics of sending household that are shared among their inhabitants.

Table 5 presents the placebo test results. Among these older children, none of the ATTs were statistically significant, and all the coefficients were small in magnitude. Comparing the placebo results to our main findings presented in Table 3, the size of the ATTs ranged from 0-30% of the size of the coefficients in our study sample, with an average of 12%. These results fail to reject the null hypothesis that unobserved household characteristics related to selection into migration do not explain the positive association between parental migration during childhood and children's educational attainment in adulthood. The null results from our placebo

[11] The PSM yielded good matches among these older children, with a mean bias of just 5%. There were not sufficient observations to reliably restrict the sample to children who were even older than 15, such as 20+, when a parent first departed for the United States.

test strengthen the IA that underpins our PSM models and support a causal interpretation of our main findings.

We should note that the results from our placebo test could stem from differences between households where parents migrate while their children are young, versus those where migration occurs after children have aged out of lower-secondary school. Because we cannot capture these variations beyond the observed control variables, our placebo test does not supply iron-clad evidence of causality. Rather, it offers another source of support for causality, one that augments our propensity score analysis and the foregoing robustness checks.

CONCLUSION

We investigated the effect of parental migration on children's lifetime educational attainment by matching adult Mexicans whose parents migrated during childhood against adults without migrant parents who grew up in nearly identical households within the same communities. Data from the MMP enabled us to include both resident and nonresident children of the household head in our analysis. We found that parental migration during childhood predicted 0.45 additional years of schooling and increased both the probability of completing lower-secondary school by seven percentage points and the likelihood of entering and completing upper-secondary school by nearly three percentage points (an increase of more than 10% relative to counterfactual non-migrant children). The effects of parental migration on children's schooling were most substantial among those who grew up with more considerable disadvantages. Among children whose parents did not complete primary school, parental migration increased the likelihood of entry into and completion of upper-secondary school by 18% and 31%, respectively. Parental migration increased the likelihood of attaining these educational milestones by 24% and 23%, respectively, among children who grew up in rural communities. In contrast, we found little evidence that parental migration affects schooling among children with more educated parents and those who grew up in urban areas.

We also assessed whether unobserved factors that we did not include in the matching algorithm could have biased our results. We conducted a placebo test in which we replicated our PSM analysis among children who were at least 15 years old in the year before their parent's first U.S. migration. If parental migration and higher schooling outcomes among children result from unobserved household characteristics, then we would expect to observe similar results among older children, i.e., those who were no longer school age when their parents first migrated. The placebo test, which yielded null results with substantively small magnitudes, increased our confidence in the IA that underpins our PSM models. The null results of the placebo test support a causal interpretation of the positive associations between parental migration during childhood and children's total educational attainment measured in adulthood.

Collectively, our results clarify the mixed evidence generated by studies that applied causal methods to cross-sectional data. Collectively, these causally inclined analyses find that relative to their peers children with currently absent parents or living in households supported by remittances are less likely to matriculate throughout lower and upper-secondary school, attain more years of schooling, and are both more and less likely to enter the workforce before turning eighteen (Amuedo-Dorantes & Pozo, 2010; Halpern-Manners, 2011; Hanson & Woodruff, 2003; McKenzie & Rapoport, 2011). These mixed results likely reflect the multiple direct and indirect impacts of parental departure, which can force children into the labor market temporarily, while their parents repay smuggling debts and secure employment abroad but can also enhance educational opportunities via the remittance of foreign earnings (Curran et al., 2004; Hu, 2013;

See also, Figure 2). Studies that observe currently absent parents cannot capture the long-term financial implications of parental migration. Our study's retrospective longitudinal results corroborate previous non-causal studies that find the benefits of these educational investments offset short-term costs of parental departure (Chang et al., 2011; Creighton et al., 2009). One extension of our project would be to examine school-work-school sequences among migrants' children. These sequences could highlight critical points for intervention to reduce school dropout and maximize the benefits of parental migration.

Beyond our study's substantive contributions, we also introduced a novel propensity score approach that can link events occurring during childhood to temporally distal outcomes measured years or decades later within a counterfactual framework. Longitudinal data is limited in developing countries, and existing panels most commonly track individuals or households across only a few years. Our approach suggests that community-based studies that collect retrospective information about households could be used to estimate long-term effects of household member migration and other major life events on a variety of long-term outcomes among the migrants and other household members. These studies could explore the consequences of migration during childhood for children's future marital behavior, childbearing, occupational attainment, long-term health, and migration behavior.

Despite these advantages, retrospective panel data can introduce sampling bias (Assaad et al., 2018; Beauchemin, 2014). Retrospective surveys that rely on community sampling yield biased samples to the extent that current residents (those present at the time of the survey collection) differ from ex-residents, i.e., those that were present during some portion of the household-years included in the survey but relocated prior to the actual moment of the survey (Riosmena, 2016). Moreover, because the MMP collects information about non-resident children, our results include children who relocated prior to survey collection—either internally or internationally. However, retrospective studies such as the MMP will lose entire households that relocate internally or to U.S. communities other those surveyed by the MMP. Thus, our coefficients should be interpreted as the effect of parental migration on children's education within households with at least one long-term resident either in the sampled Mexican community or its primary sister community in the United States.[12] Large-scale panel studies, such as the Mexican Family Life Survey (MxFLS), could be used to overcome this limitation, by following households from an initial set of communities as their migration trajectories unfold internally and abroad. Still, these studies present their own limitations—high cost of data collection and observation of only one cohort. It is our hope that future scholars will address the unavoidable limitations herein as we continue to advance this important area of research.

Our study's findings have implications for policy. In areas with high rates of out-migration, children would benefit from more academic and social support in the classroom to offset some of the short-term costs of family separation. In rural communities where parental migration is prevalent and children often face greater pressure to enter the workforce before finishing their studies. Empirical analyses highlight the unique educational challenges faced by children with migrant parents (Abrego, 2014; Curran et al., 2004; Zhou et al., 2014). Yet, our results suggest that when children overcome short-term challenges associated with parental departure, migration can lead to greater lifetime scholastic attainment. This non-linear association suggests that targeted interventions aimed at the period surrounding parental departure could mitigate temporary school dropout and enhance long-term educational gains

[12] Household respondents provide educational information for non-resident children of the household head. Thus, our results capture the effects of parental migration on educational attainment among children who relocated between the moment of parental migration and survey completion

among migrants' children. For example, policymakers could partner with researchers to test the effectiveness of short-term loans for migrants, intended to bridge the gap between border-crossing and foreign employment. This policy could be implemented in partnership with the United States' H-2 visa programs, which includes a rapidly expanding proportion of less educated Mexican migrants (Hernández-León, 2020).

APPENDIX

Table A1. Logit model predicting migration of the household head in year t+1

Variable name	Beta	(SE)	
Age	0.059	(0.021)	**
Age-squared	-0.005	(0.001)	***
Sex	-0.029	(0.043)	
Household head characteristics			
Year born	0.078	(0.004)	***
Sex=Male	1.096	(0.097)	***
Married	0.307	(0.077)	***
Years of school	-0.040	(0.007)	***
Has domestic migration experience	0.370	(0.048)	***
Occupation of the household head			
Agricultural	0.610	(0.081)	***
Unskilled	0.318	(0.077)	***
Skilled/professional	-0.416	(0.151)	**
Household context			
Minors	0.079	(0.017)	***
Adults	0.100	(0.038)	**
Sibling rank	-0.071	(0.022)	**
Land	-0.388	(0.060)	***
Property	-0.420	(0.044)	***
Business	-0.489	(0.080)	***
Migration experience of the household head			
Parent has migrated	0.540	(0.087)	***
Brother has migrated	0.144	(0.027)	***
Sister has migrated	0.064	(0.053)	
Constant	-158.200	(8.593)	***
Year fixed effects		Yes	
Child-years	543,298		

* p<0.05, ** p<0.01, *** p<0.001

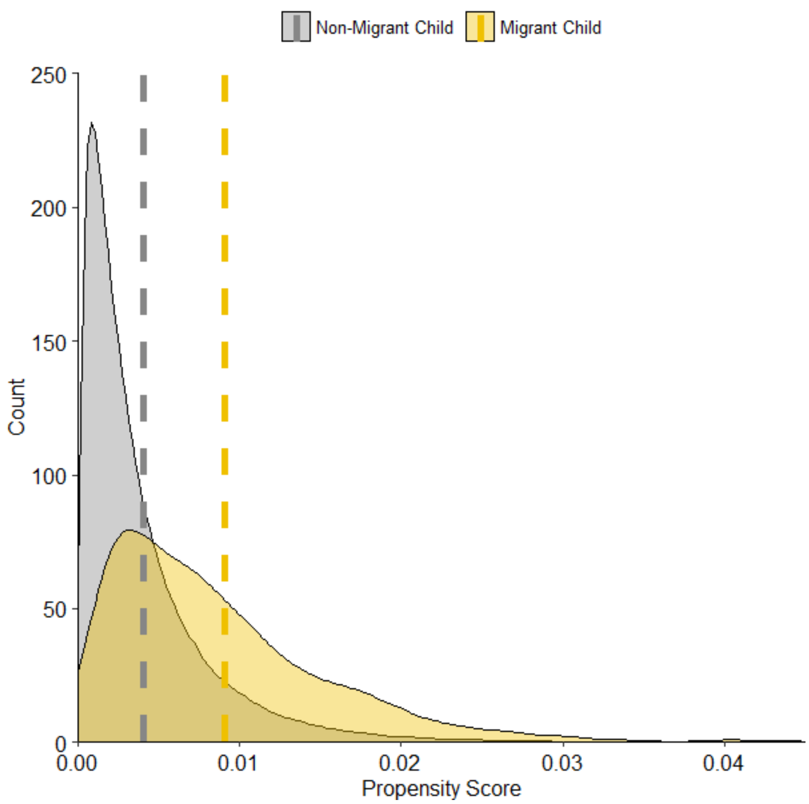


Fig. A1 Density distribution of propensity scores among migrant and non-migrant children.

Table A2. Covariate balance pre- and post-matching

Variable	Treated	Mean Control	Unmatched	Treated-control %bias	Treated-unmatched %bias
Child characteristics					
Age	5.70	5.75	6.91	-1.3%	-30.1%
Age-squared	48.35	49.50	66.18	-2.0%	-32.0%
Sibling rank	2.98	3.07	3.69	-4%	-0.302
Sex	0.50	0.50	0.50	-0.9%	-0.8%
Household head characteristics					
Year born	1949	1947	1945	14.4%	32.5%
Sex=Male	0.93	0.93	0.82	1.0%	36.3%
Married	0.91	0.93	0.88	-5.0%	11.6%
Years of school	4.12	3.85	4.46	7.5%	-10.0%
Has domestic migration experience	0.31	0.33	0.26	-5.2%	10.1%
Occupation of the household head					
Agricultural	0.49	0.53	0.38	-6.5%	23.8%
Unskilled	0.36	0.33	0.33	6.2%	4.5%
Skilled/professional	0.02	0.02	0.05	1.2%	-11.2%
Household context					
Minors	4.40	4.47	4.65	-3.0%	-10.6%
Adults	0.23	0.26	0.62	-2.3%	-32.9%
Land	0.14	0.14	0.21	-1.5%	-17.1%
Property	0.45	0.43	0.62	3.6%	-33.7%
Business	0.07	0.09	0.14	-3.2%	-20.3%
Migration experience of the household head					
Parent has migrated	0.08	0.09	0.04	-5.5%	16.2%
Brother has migrated	0.29	0.40	0.20	-15.0%	13.4%
Sister has migrated	0.08	0.08	0.06	-2.5%	5.1%
Mean %bias				4.4%	19.1%
%Bias reduction				77%	

Table A3. Average treatment effects of parental migration on children's educational attainment by sex

Outcome	Treated	Controls	ATT	S.E.	Z-score	
A. Men						
Years	8.76	8.31	0.45	0.15	2.98	**
Completed lower secondary	61%	55%	5%	1.9%	2.89	**
Began upper secondary	28%	25%	3%	1.7%	2.07	*
Completed upper secondary	25%	21%	4%	1.6%	2.22	*
Observations	1,110	1,110				
B. Women						
Years	9.14	8.65	0.49	0.15	3.34	***
Completed lower secondary	64%	57%	7%	1.8%	4.01	***
Began upper secondary	33%	30%	3%	1.7%	1.73	
Completed upper secondary	30%	26%	4%	1.7%	2.12	*
Observations	1,112	1,112				

* p<0.05, ** p<0.01, *** p<0.001

Table A4. Average treatment effects of parental migration on children's educational attainment with multiple matched controls

Outcome	Treated	Controls	ATT	S.E.	Z-score	
A. Neighbors = 3						
Years	8.95	8.59	0.36	0.07	4.96	***
Completed lower secondary	62%	57%	6%	1.0%	5.85	***
Began upper secondary	30%	28%	2%	0.9%	2.33	*
Completed upper secondary	27%	25%	2%	0.9%	2.44	*
Observations	2,225	6,384				
B. Neighbors = 5						
Years	8.95	8.56	0.39	0.07	5.72	***
Completed lower secondary	62%	56%	6%	0.9%	6.85	***
Began upper secondary	30%	28%	3%	0.9%	2.85	**
Completed upper secondary	27%	25%	2%	0.9%	2.73	**
Observations	2,225	10,388				

* p<0.05, ** p<0.01, *** p<0.001

Table A5. Average treatment effects of parental migration on children's educational attainment with alternative sample restrictions

Outcome	Treated	Controls	ATT	S.E.	Z-score	
A. No Migrant brothers of the household head						
Years	9.01	8.56	0.44	0.12	3.67	***
Completed lower secondary	63%	56%	7%	1.6%	4.50	***
Began upper secondary	31%	27%	4%	1.5%	2.59	*
Completed upper secondary	28%	24%	4%	1.5%	2.75	*
Observations	1,822	1,822				
B. Excludes households surveyed in the United States						
Years	8.81	8.47	0.34	0.11	3.02	***
Completed lower secondary	61%	55%	6%	1.5%	3.73	***
Began upper secondary	28%	27%	2%	1.4%	1.08	
Completed upper secondary	25%	23%	2%	1.3%	1.49	
Observations	2,064	2,064				
B. Restricted to children of the household head aged 25 years or older at the time of the survey						
Years	8.98	8.54	0.44	0.14	3.2	***
Completed lower secondary	60%	55%	5%	1.7%	2.69	***
Began upper secondary	29%	26%	3%	1.6%	2.18	*
Completed upper secondary	27%	23%	4%	1.5%	2.63	**
Some college	12%	10%	2%	1.1%	2.18	*
Completed college	10%	8%	2%	1.0%	2.06	*
Observations	1,246	1,246				

* p<0.05, ** p<0.01, *** p<0.001

REFERENCES

Abel, G. J., & Sander, N. (2014). Quantifying Global International Migration Flows. *Science*, *343*(6178), 1520–1522. https://doi.org/10.1126/science.1248676

Abrego, L. (2014). *Sacrificing Families: Navigating Laws, Labor, and Love Across Borders*. Stanford University Press.

Acosta, P. (2011). School Attendance, Child Labour, and Remittances from International Migration in El Salvador. *The Journal of Development Studies*, *47*(6), 913–936. https://doi.org/10.1080/00220388.2011.563298

Amuedo-Dorantes, C., & Pozo, S. (2010). Accounting for Remittance and Migration Effects on Children's Schooling. *World Development*, *38*(12), 1747–1759. https://doi.org/10.1016/j.worlddev.2010.05.008

Angrist, J. D., Imbens, G. W., & Rubin, D. B. (1996). Identification of Causal Effects Using Instrumental Variables. *Journal of the American Statistical Association*, *91*(434), 444–455. https://doi.org/10.1080/01621459.1996.10476902

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*(2), 200–208. https://doi.org/10.1016/j.jdeveco.2010.11.002

Assaad, R., Krafft, C., & Yassin, S. (2018). Comparing retrospective and panel data collection methods to assess labor market dynamics. *IZA Journal of Development and Migration*, *8*(1), 17. https://doi.org/10.1186/s40176-018-0125-7

Axinn, W. G., Pearce, L. D., & Ghimire, D. (1999). Innovations in Life History Calendar Applications. *Social Science Research*, *28*(3), 243–264. https://doi.org/10.1006/ssre.1998.0641

Beauchemin, C. (2014). A Manifesto for Quantitative Multi-sited Approaches to International Migration. *International Migration Review*, *48*(4), 921–938. https://doi.org/10.1111/imre.12157

Behrman, J. R., Parker, S. W., & Todd, P. E. (2007). *The Impacts of Obligatory Secondary School Education in Mexico* (pp. 1–41). CIDE, Mimeo.

Brand, J. E., & Xie, Y. (2010). Who Benefits Most from College?: Evidence for Negative Selection in Heterogeneous Economic Returns to Higher Education. *American Sociological Review*, *75*(2), 273–302. https://doi.org/10.1177/0003122410363567

Bryant, J. (2005). *Children of International Migrants in Indonesia, Thailand, and the Philippines: A Review of Evidence and Policies* (Innocenti Working Paper No. 2005–05). UNICEF. http://www.unicef-irc.org/publications/381

Chang, H., Dong, X., & MacPhail, F. (2011). Labor Migration and Time Use Patterns of the Left-behind Children and Elderly in Rural China. *World Development*, *39*(12), 2199–2210. https://doi.org/10.1016/j.worlddev.2011.05.021

Creighton, M. J., & Park, H. (2010). Closing the Gender Gap: Six Decades of Reform in Mexican Education. *Comparative Education Review*, *54*(4), 513–537. https://doi.org/10.1086/653702

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*(5), 1325–1339. https://doi.org/10.1111/j.1741-3737.2009.00671.x

Curran, S. R., Cadge, W., Varangrat, A., & Chung, C. (2004). Boys and Girls' Changing Educational Opportunities in Thailand: The effects of siblings, migration, and village remoteness. *Research in Sociology of Education*, *14*, 59–102.

DeWaard, J., Nobles, J., & Donato, K. M. (2018). Migration and parental absence: A comparative assessment of transnational families in Latin America. *Population, Space and Place*, *24*(7), e2166. https://doi.org/10.1002/psp.2166

Dreby, J. (2010). *Divided by Borders: Mexican Migrants and their Children*. University of California Press.

Dreby, J., & Stutz, L. (2012). Making something of the sacrifice: Gender, migration and Mexican children's educational aspirations. *Global Networks*, *12*(1), 71–90. https://doi.org/10.1111/j.1471-0374.2011.00337.x

Dustmann, C. (2008). Return Migration, Investment in Children, and Intergenerational Mobility Comparing Sons of Foreign- and Native-Born Fathers. *Journal of Human Resources*, *43*(2), 299–324. https://doi.org/10.3368/jhr.43.2.299

Edwards, A. C., & Ureta, M. (2003). International migration, remittances, and schooling: Evidence from El Salvador. *Journal of Development Economics*, *72*(2), 429–461. https://doi.org/10.1016/S0304-3878(03)00115-9

Garip, F. (2012). Repeat Migration and Remittances as Mechanisms for Wealth Inequality in 119 Communities From the Mexican Migration Project Data. *Demography*, *49*(4), 1335–1360.

Garip, F. (2014). The Impact of Migration and Remittances on Wealth Accumulation and Distribution in Rural Thailand. *Demography*, *51*(2), 673–698. https://doi.org/10.1007/s13524-013-0260-y

Garip, F. (2016). *On the Move: Changing Mechanisms of Mexico-U.S. Migration*. Princeton University Press.

Graham, E. (2011). Migrant Parents and the Psychological Well-Being of Left-Behind Children in Southeast Asia. *Journal of Marriage and Family*, *73*(4), 763–787.

Hagan, J. M., Hernández-León, R., & Demonsant, J. L. (2015). *Skills of the Unskilled: Work and Mobility among Mexican Migrants*. University of California Press.

Halpern-Manners, A. (2011). The Effect of Family Member Migration on Education and Work Among Nonmigrant Youth in Mexico. *Demography*, *48*(1), 73–99. https://doi.org/10.1007/s13524-010-0010-3

Hanson, G. H., & Woodruff, C. M. (2003). *Emigration and Educational Attainment in Mexico* [Working Paper].

Hartman, E., & Hidalgo, F. D. (2018). An Equivalence Approach to Balance and Placebo Tests. *American Journal of Political Science*, *62*(4), 1000–1013. https://doi.org/10.1111/ajps.12387

Heckman, J. J., Hotz, V. J., & Dabos, M. (1987). Do We Need Experimental Data To Evaluate the Impact of Manpower Training On Earnings? *Evaluation Review*, *11*(4), 395–427. https://doi.org/10.1177/0193841X8701100402

Hernán, M. A., & Robins, J. M. (Forthcoming). *Causal Inference*. Chapman & Hall/CRC. https://www.hsph.harvard.edu/miguel-hernan/causal-inference-book/

Hernández-León, R. (2020). The work that brokers do: The skills, competences and know-how of intermediaries in the H-2 visa programme. *Journal of Ethnic and Migration Studies*, *0*(0), 1–18. https://doi.org/10.1080/1369183X.2020.1731989

Hu, F. (2013). Does migration benefit the schooling of children left behind?: Evidence from rural northwest China. *Demographic Research*, *29*(2), 33–70. https://doi.org/10.4054/DemRes.2013.29.2

Huerta-Wong, J. E., Burak, E., & Grusky, D. (2013). Is Mexico the Limiting Case? Social Mobility in the New Gilded Age. In R. Velez, R. Campos, & J. E. Huerta-Wong (Eds.), *Social Mobility in Mexico*. Centre for Studies Espiosa Yglesias.

Jampaklay, A. (2007). Parental Absence and Children's School Enrolment: Evidence from a longitudinal study in Kanchanaburi, Thailand. *Asian Population Studies*, *2*(1), 93–110. https://doi.org/10.1080/17441730600700598

Jingzhong, Y., & Lu, P. (2011). Differentiated childhoods: Impacts of rural labor migration on left-behind children in China. *The Journal of Peasant Studies*, *38*(2), 355–377. https://doi.org/10.1080/03066150.2011.559012

Kandel, W., & Massey, D. S. (2002). The Culture of Mexican Migration: A Theoretical and Empirical Analysis. *Social Forces*, *80*(3), 981–1004.

Lu, Y. (2012). Education of Children Left Behind in Rural China. *Journal of Marriage and Family*, *74*(2), 328–341. JSTOR.

Lu, Y. (2014). Parental Migration and Education of Left-Behind Children: A Comparison of Two Settings. *Journal of Marriage and Family*, *76*(5), 1082–1098. https://doi.org/10.1111/jomf.12139

Lu, Y., & Treiman, D. J. (2011). Migration, Remittances and Educational Stratification among Blacks in Apartheid and Post-Apartheid South Africa. *Social Forces*, *89*(4), 1119–1143. JSTOR.

Lunceford, J. K., & Davidian, M. (2004). Stratification and weighting via the propensity score in estimation of causal treatment effects: A comparative study. *Statistics in Medicine*, *23*(19), 2937–2960. https://doi.org/10.1002/sim.1903

Marteleto, L., Gelber, D., Hubert, C., & Salinas, V. (2012). Educational Inequalities among Latin American Adolescents: Continuities and Changes over the 1980s, 1990s and 2000s. *Research in Social Stratification and Mobility*, *30*(3), 352–375. https://doi.org/10.1016/j.rssm.2011.12.003

Massey, D. S. (1987). The Ethnosurvey in Theory and Practice. *The International Migration Review*, *21*(4), 1498–1522. https://doi.org/10.2307/2546522

Massey, D. S. (1990). Social Structure, Household Strategies, and the Cumulative Causation of Migration. *Population Index*, *56*(1), 3–26.

Massey, D. S., Alarcón, R., Durand, J., & González, H. (1987). *Return to Aztlan: The social process of international migration from western Mexico*. University of California Press. http://books.google.com/books?id=NNW6QgAACAAJ

Massey, D. S., Arango, J., Hugo, G., Kouaouci, A., & Pellegrino, A. (1999). *Worlds in Motion: Understanding International Migration at the End of the Millennium*. Oxford University Press.

Massey, D. S., Durand, J., & Malone, N. J. (2002). *Beyond Smoke and Mirrors: Mexican Immigration in an Era of Economic Integration*. Russell Sage Foundation.

Massey, D. S., Durand, J., & Pren, K. A. (2013). Migradollars and Development in Eight Latin American Nations. In E. C. Suárez (Ed.), *Los que se quedan: Una imagen de la migración internacional desde el ámbito local y del hogar* (pp. 43–67). Centro de Investigaciones Interdisciplinarias en Ciencias y Humanidades.

Massey, D. S., Durand, J., & Pren, K. A. (2015). Border Enforcement and Return Migration by Documented and Undocumented Mexicans. *Journal of Ethnic & Migration Studies*, *41*(7), 1015–1040. https://doi.org/10.1080/1369183X.2014.986079

Massey, D. S., & Espinosa, K. E. (1997). What's Driving Mexico-U.S. Migration? A Theoretical, Empirical, and Policy Analysis. *American Journal of Sociology*, *102*(4), 939–999.

Massey, D. S., Goldring, L., & Durand, J. (1994). Continuities in Transnational Migration: An Analysis of Nineteen Mexican Communities. *American Journal of Sociology*, *99*(6), 1492–1533. https://doi.org/10.2307/2782582

Massey, D. S., & Zenteno, R. (2000). A Validation of the Ethnosurvey: The Case of Mexico-U.S. Migration. *International Migration Review*, *34*(3), 766–793.

McKenzie, D., & Rapoport, H. (2011). Can migration reduce educational attainment? Evidence from Mexico. *Journal of Population Economics*, *24*(4), 1331–1358.

Mines, R., & de Janvry, A. (1982). Migration to the United States and Mexican Rural Development: A Case Study. *American Journal of Agricultural Economics*, *64*(3), 444–454. https://doi.org/10.2307/1240636

Mines, R., & Massey, D. S. (1985). Patterns of Migration to the United States from Two Mexican Communities. *Latin American Research Review*, *20*(2), 104–123.

Morgan, S. L., & Winship, C. (2015). *Counterfactuals and Causal Inference* (2nd ed.). Cambridge University Press.

Nobles, J. (2011). Parenting From Abroad: Migration, Nonresident Father Involvement, and Children's Education in Mexico. *Journal of Marriage and Family*, *73*(4), 729–746. https://doi.org/10.1111/j.1741-3737.2011.00842.x

Nobles, J. (2013). Migration and Father Absence: Shifting Family Structure in Mexico. *Demography*, *50*(4), 1303–1314.

OECD. (2018). *Education at a Glance 2018: Mexico* (pp. 1–8) [Country Note]. OECD Publishing. https://read.oecd-ilibrary.org/education/education-at-a-glance-2016/mexico_eag-2016-70-en#page1

Olwig, K. F. (1999). Narrative of the Children Left Behind: Home and Identity in Globalised Caribbean Families. *Journal of Ethnic and Migration Studies*, *25*(2), 267–284.

Orellana, M. F., Thorne, B., Chee, A., & Lam, W. S. E. (2001). Transnational Childhoods: The Participation of Children in the Process of Family Migration. *Social Problems*, *48*(4), 572–591.

Palloni, A., Massey, D. S., Ceballos, M., Espinosa, K., & Spittel, M. (2001). Social Capital and International Migration: A Test Using Information on Family Networks. *American Journal of Sociology*, *106*(5), 1262–1298. https://doi.org/10.1086/320817

Parker, S., Rubalcava, L. N., Teruel, G. M., & Behrman, J. R. (2007). *The Quality of Education in Latin America and the Caribbean Region: The Mexican Case*. Inter-American Development Bank.

Parreñas, R. S. (2005). *Children of Global Migration: Transnational Families and Gendered Woes*. Stanford University Press.

Ravallion, M. (2014). Income inequality in the developing world. *Science*, *344*(6186), 851–855. https://doi.org/10.1126/science.1251875

Reichert, J. S. (1981). The Migrant Syndrome: Seasonal U.S. Wage Labor and Rural Development in Central Mexico. *Human Organization*, *40*(1), 56–66.

Rendall, M. S., & Parker, S. W. (2014). Two Decades of Negative Educational Selectivity of Mexican Migrants to the United States. *Population and Development Review*, *40*(3), 421–446. https://doi.org/10.1111/j.1728-4457.2014.00692.x

Riosmena, F. (2016). The Potential and Limitations of Cross-Context Comparative Research on Migration. *The ANNALS of the American Academy of Political and Social Science*, *666*(1), 28–45. https://doi.org/10.1177/0002716216650629

Rothstein, J. (2010). Teacher Quality in Educational Production: Tracking, Decay, and Student Achievement. *The Quarterly Journal of Economics*, *125*(1), 175–214. https://doi.org/10.1162/qjec.2010.125.1.175

Rubin, D. B. (1974). Estimating causal effects of treatments in randomized and nonrandomized studies. *Journal of Educational Psychology*, *66*(5), 688–701. https://doi.org/10.1037/h0037350

Smith, H. (1997). Matching with Multiple Controls to Estimate Treatment Effects in Observational Studies. *Sociological Methodology*, *27*(1), 325–353.

Stark, O. (1991). *The Migration of Labor*. Basil Blackwell.

Torche, F. (2014). Intergenerational Mobility and Inequality: The Latin American Case. *Annual Review of Sociology*, *40*(1), 619–642. https://doi.org/10.1146/annurev-soc-071811-145521

United Nations, D. of E. and S. A., Population Division. (2017). *International Migration Report 2017: Highlights*. United Nations.

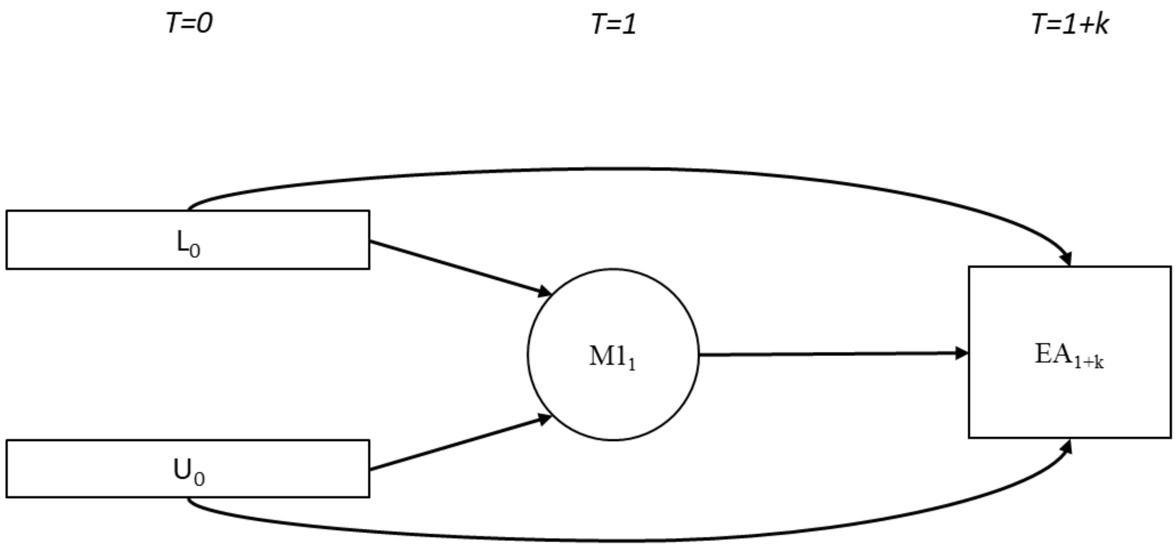
Urbina, D. R. (2018). Intergenerational Educational Mobility During Expansion Reform: Evidence from Mexico. *Population Research and Policy Review*, *37*(3), 367–417. https://doi.org/10.1007/s11113-018-9466-4

Valentine, J. L., Barham, B., Gitter, S., & Nobles, J. (2016). Migration and the Pursuit of Education in Southern Mexico. *Comparative Education Review*, *61*(1), 141–175. https://doi.org/10.1086/689615

Winship, C., & Morgan, S. L. (1999). The Estimation of Causal Effects from Observational Data. *Annual Review of Sociology*, *25*(1), 659–706. https://doi.org/10.1146/annurev.soc.25.1.659

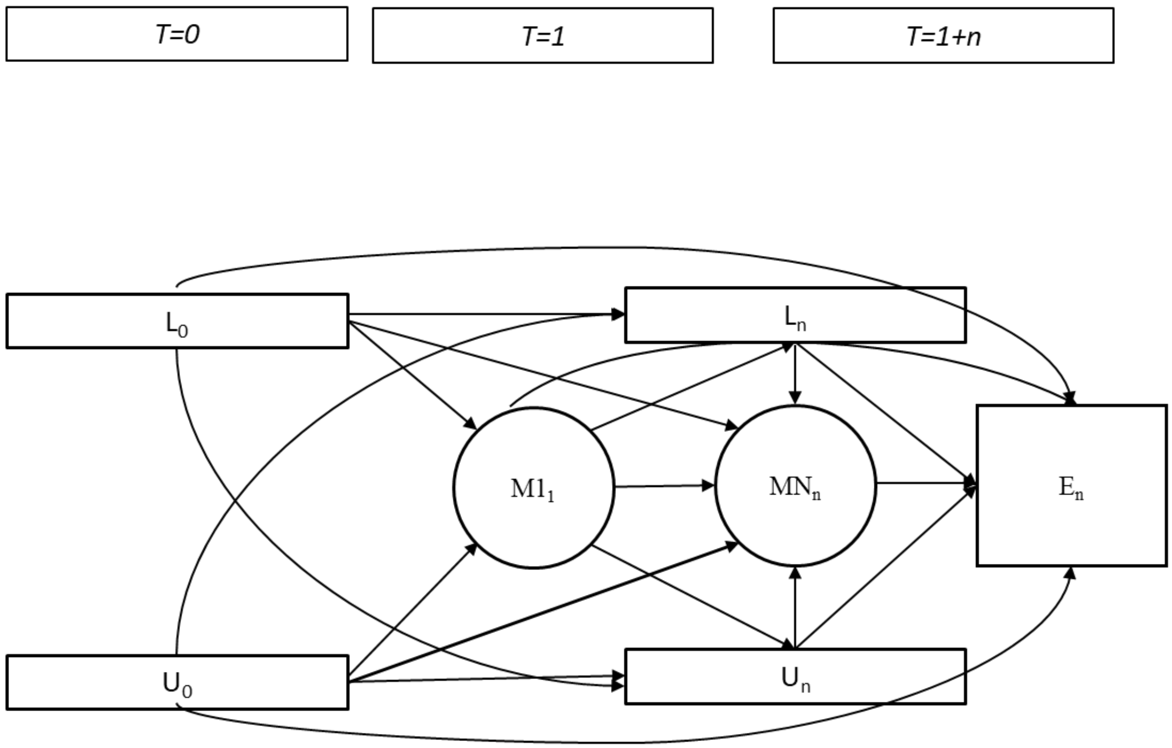
Zhou, M., Murphy, R., & Tao, R. (2014). Effects of Parents’ Migration on the Education of Children Left Behind in Rural China. *Population and Development Review*, *40*(2), 273–292.

TABLES AND FIGURES



- L_0: Observed pre-migration household and community context
- U_0: Unobserved Pre-migration household and community context
- M1: A first parental migration
- EA: child's educational attainment measured during adulthood

Fig. 1 Causal diagram depicting the effect of a first parental migration during childhood on a child's educational attainment measured in adulthood



- L: Observed household and community context
- U: Unobserved household and community context
- M: parental migration
- E_n: children's educational attainment measured at time T=1+n

Fig. 2 Causal diagram depicting the effect of a parental migration n during childhood on a child's educational attainment measured at time n

Table 1. Description of variables used to estimate propensity scores

Variable name	Mean/ prop	Min	Max	SD	Variable definition
Child characteristics					
Migrant child	0%	0	1	--	Parent migrated to the United States during childhood
Age	6.91	0.00	14.00	4.30	Child's age in child-year
Sex	50%	0.00	1.00	--	Child's sex (1=male, 0=female)
Year	1983	1965	2003	8.55	Year of observation
Survey Year	2004	1987	2018	8.33	
Household head characteristics					
Year born	1945	1895	1981	11.03	Year in which the household head was born
Sex	18%	0	1	--	Sex of the household head (1=male, 0=female)
Married	88%	0	1	--	Marital status of the household head (1=married, 0=unmarried)
Education	4.47	0	23	3.95	Years of schooling of the household head
Domestic migration	26%	0	1	--	Household head previously migrated within Mexico
Occupation of the household head					
Agricultural	38%	0	1	--	Held agricultural occupation
Unskilled	33%	0	1	--	Held unskilled manual occupation
Skilled/professional	5%	0	1	--	Held skilled manual or professional occupation
Household context					
Minors	4.65	0	18	2.36	Number of minors in the household
Adults	0.62	0	17	1.46	Number of adult children of the household head
Sibling rank	3.69	1	18	2.58	
Land	21%	0	4	0.48	Number of land parcels owned by the household
Property	62%	0	6	0.52	Number of properties owned by the household
Business	14%	0	4	0.37	Number of businesses operated by the household
Household migration experience[a]					
Parent migrated	4%	0	1	--	One or both parents of the household head have previously migrated to the United States
Brothers migrated	20%	0	11	0.67	Number of brothers of the household head with prior migrated to the United States
Sisters migrated	6%	0	7	0.35	Number of sisters of the household head with prior migrated to the United States
Adult children		38,813			
Child years		470,723			

[a] We did not include receipt of legal status by family members because less than 0.1% of household heads had family members with LPR status prior to their first U.S.-migration trips.

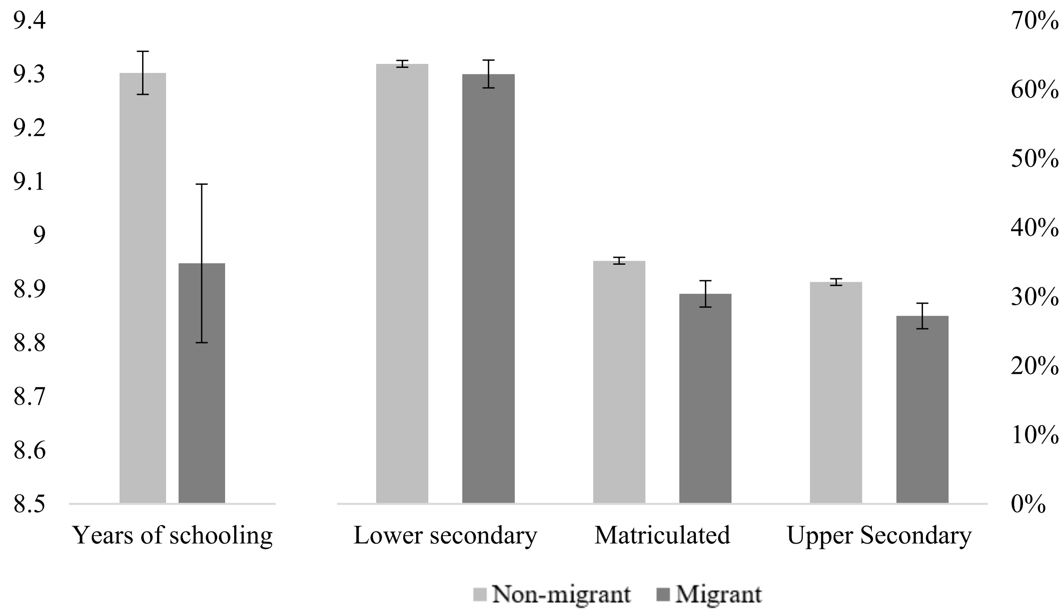


Fig. 3 Bivariate differences in educational attainment between children with parental migrants and those without observed for the full sample (N=38,813)

Table 2. Cross-sectional models regressing adult children's educational attainment in the year of the survey on parental migration during childhood

	Years	Completed lower secondary	Began upper secondary	Completed upper secondary
A. Model 1[a]				
Household head migrated during childhood	0.00381	0.012	-0.0178**	-0.0133*
	(0.003)	(0.007)	(0.006)	(0.006)
B. Model 1 + community fixed effects				
Household head migrated during childhood	0.00357	0.0156*	-0.0207***	-0.0156*
	(0.003)	(0.007)	(0.006)	(0.006)
	38,813	38,813	38,813	38,813

Standard errors in parentheses

* p<0.05, ** p<0.01, *** p<0.001

[a] Model 1 adjusts for time-invariant characteristics: children's age and sex, the year of the survey, birth cohort, sex, and education of the household head, community size, and region of Mexico.

Table 3. Average treatment effects of parental migration on children's educational attainment

Outcome	Treated	Controls	ATT	S.E.	Z-score	
Years	8.95	8.50	0.45	(0.100)	4.48	***
Completed lower secondary	62.4%	55.2%	7.16%	(0.013)	5.49	***
Began upper secondary	30.5%	27.5%	2.97%	(0.012)	2.46	**
Completed upper secondary	27.4%	24.5%	2.88%	(0.012)	2.48	**
N	2,222	2,222				

* p<0.05, ** p<0.01, *** p<0.001

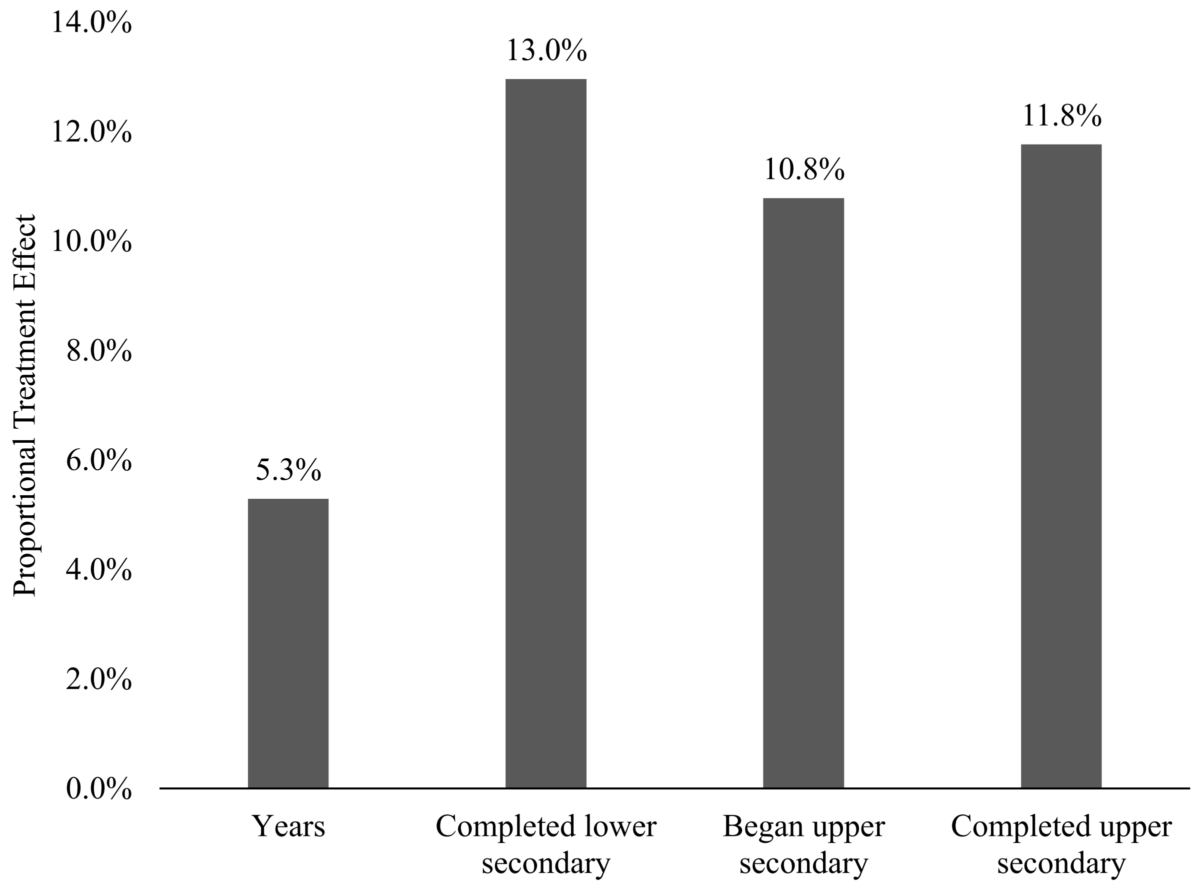


Fig. 4 Proportional treatment effects of parental migration on children's educational attainment

Table 4. Average treatment effects of parental migration on children's educational attainment by parental education

Outcome	Treated	Controls	ATT	S.E.	Z-score		Outcome	Treated	Controls	ATT	S.E.	Z-score	
A. Neither parent completed primary school							**B. Parent completed primary school**						
Years	7.88	7.39	0.49	0.12	4.09	***	Years	10.70	10.71	-0.01	0.17	-0.06	
Completed lower secondary	50%	42%	7.4%	1.7%	4.38	***	Completed lower secondary	83%	80%	2.8%	1.8%	1.57	
Began upper secondary	19%	17%	1.4%	1.3%	1.05		Began upper secondary	50%	51%	-1.4%	2.1%	-0.68	
Completed upper secondary	16%	13%	2.7%	1.2%	2.2	*	Completed upper secondary	45%	47%	-1.3%	2.1%	-0.63	
Observations	1,364	1,364					Observations	854	854				
C. Rural							**D. Urban**						
Years	8.80	8.25	0.55	0.13	4.39	***	Years	9.26	8.91	0.35	0.17	2.13	*
Completed lower secondary	61%	52%	9%	1.7%	5.09	***	Completed lower secondary	65%	60%	6%	2.1%	2.82	**
Began upper secondary	29%	25%	5%	1.5%	3.27	***	Began upper secondary	33%	35%	-2%	2.0%	-1.13	
Completed upper secondary	26%	21%	5%	1.4%	3.34	***	Completed upper secondary	29%	30%	-1%	1.9%	-0.36	
Observations	1,367	1,367					Observations	856	856				
E. Low Migration Prevalence							**F. High Migration Prevalence**						
Years	9.67	8.85	0.82	0.15	5.59	***	Years	8.27	8.16	0.11	0.14	0.81	
Completed lower secondary	72%	60%	11.6%	1.8%	6.42	***	Completed lower secondary	54%	50%	4.0%	1.9%	2.12	*
Began upper secondary	37%	30%	6.9%	1.7%	4.06	***	Began upper secondary	24%	26%	-1.4%	1.7%	-0.83	
Completed upper secondary	34%	27%	6.7%	1.6%	4.10	***	Completed upper secondary	21%	22%	-0.3%	1.6%	-0.20	
Observations	1,111	1,111					Observations	1,108	1,108				
G. 1965-1986							**H. 1987-2008**						
Years	8.51	7.93	0.57	0.12	4.61	***	Years	10.06	9.82	0.24	0.21	1.71	

Completed lower secondary	57%	49%	8.0%	1.5%	5.45	***	Completed lower secondary	76%	74%	2.2%	2.3%	1.33	
Began upper secondary	26%	21%	4.3%	1.3%	2.68	***	Began upper secondary	43%	38%	4.8%	2.4%	2.15	*
Completed upper secondary	22%	18%	4.5%	1.2%	3.11	***	Completed upper secondary	40%	35%	4.8%	2.4%	1.98	*
Observations	1,583	1,583					Observations	640	640				

* p<0.05, ** p<0.01, *** p<0.001

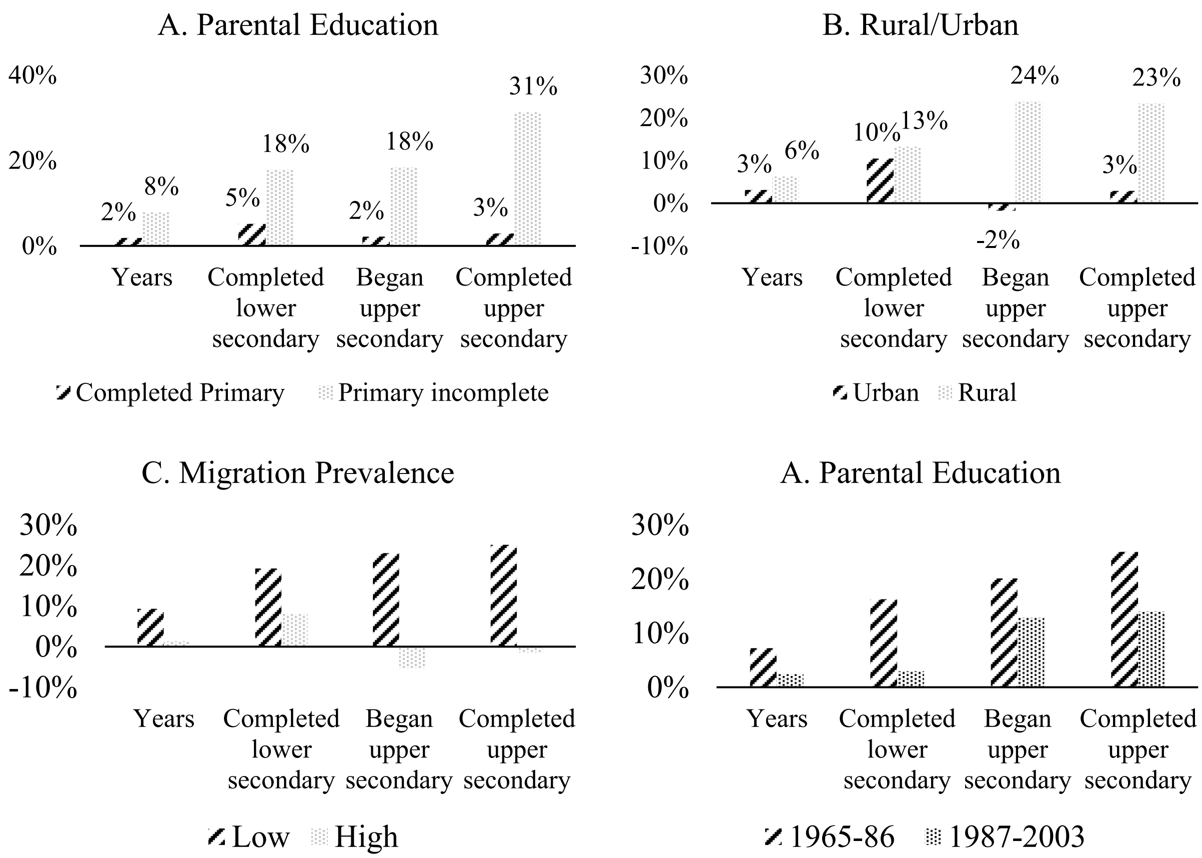


Fig. 5 Proportional treatment effects of parental migration on children's educational attainment by parental education, Rural/Urban context, community migration prevalence, and period

Table 5. Average treatment effects of parental migration on children's educational attainment among children who were beyond their schooling years at the time of parental departure

Outcome	Treated	Controls	ATT	S.E.	Z-score
A. Children aged 15 years or older					
Years	8.7266	8.60	0.132	0.188	0.7
Completed lower secondary	60%	58%	1.8%	2.3%	0.77
Began upper secondary	27%	27%	-0.1%	2.0%	-0.07
Completed upper secondary	24%	24%	0.0%	2.0%	0
Observations	684	684			

* p<0.05, ** p<0.01, *** p<0.001