The Role of U.S. Migration and Remittances on the Educational Attainment of Children in Mexico

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Abstract

Studies on the socioeconomic impact of U.S. migration in Mexico often focus on the investment of remittances in household assets and property. Little attention is given to its impact on the education of the children of migrants in Mexico. Human capital theory suggests migration may have a positive impact on education due to increased income; however, research suggests that migration also discourages education and creates an orientation towards U.S. labor markets. This paper analyzes the role of U.S. migration and remittances on the educational attainment of Mexican youth using the 10% sample of the 2000 Mexican Census. Results are consistent with the existence of two processes connecting migration and education. The first is family's investment on human capital, defined by the use of economic resources from migration on the education of children. The second is the discouragement of schooling among children living in communities with higher migration prevalence.

Introduction

Studies on the impact of international migration on socioeconomic status in Mexico often focus on the investment of remittances in household assets, such as residential property, agricultural land, or businesses. Less attention has been given to the long-term socioeconomic effects that international migration has on human capital formation in Mexico and the social mobility of the children of international migrants (Hanson and Woodruff, 2003).

Earlier work explored the relationship between rural-urban migration and socioeconomic mobility in Mexico by examining educational and occupational outcomes from one generation to the next (Balan, *et al.,* 1973; Solis, 2002; Solis and Billari, 2002). However, comparable work has not been completed on the effects of migration to the United States on education and intergenerational mobility in Mexico. Theory and limited research are mixed with respect to the direction of the relationship. Conventional human capital theory suggests that international migration should have a positive effect on household investments in children's education due to increased income from migrant earnings; however, limited findings based on small scale surveys suggest that migration discourages investments in education and creates an orientation toward U.S. labor markets when the returns on education in Mexico are heavily discounted.

In this paper, I will examine the impact of U.S. migration at the household and community level on the educational trajectories of youth in Mexico. This study explores alternate mechanisms through which remittances and international migration from members of the household enable investments in the education of children. More specifically this paper aims to,

1. Analyze the effect of father's migration and remittances on school enrollment for children 13 to 17 years-old controlling for individual, household and community characteristics.
2. Estimate the impact of father's migration and remittances on the completion of primary, middle, and high school among youth ages 13 to 20, controlling for individual, household and community level characteristics.

Primary and middle school are mandatory in Mexico, but according to previous studies, children begin dropping out of school at an increasing rate just after finishing primary school.[1] In the last fifty years educational opportunities increased importantly in the country and gender differences in schooling have reduced notably (Giorguli Saucedo, 2004). However, due to the economic restructuring Mexico experienced after several economic crises in the 1980s and 1990s, the labor market has become dominated by jobs in the services industry and by a growing informal economy sector; in both of these sectors returns to education are very small. As a result, many young men and women choose to leave school and start working as early as age 14 (Coubès and Zenteno, 2005; Mier y Terán and Rabell, 2005; Giorguli Saucedo, 2002).

To understand the effects that international migration has on children's educational attainment, in this study I use census micro data on children between 13 and 20 years of age. By examining outcomes among adolescents we can achieve a better understanding of the determinants of schooling outcomes at crucial ages in the life course, when youth make choices about schooling that affect their future transitions to adult roles such as employment.

[1] In Mexico elementary and secondary education are separated in three levels, primary or elementary education from grades first to sixth, secondary education or middle school from grades seventh to ninth, and preparatory or high school from ages tenth to twelfth. Children in Mexico usually finish primary school around age 12, secondary around age 15 and high school around age 18 .

Theoretical Framework

Mechanisms linking migration and education

Children's educational outcomes are determined by a wide array of characteristics such as family's socioeconomic status, cultural norms regarding expected behavior, the influence of peers and role models, and the socioeconomic context in which education decisions are made. For the purposes of this study, I identify three basic mechanisms through which international migration can be linked to the educational attainment of children:

(i) Family economic resources are known to be a key determinant of children's educational attainment. By increasing economic resources through improved family income and remittances, migration would influence children's schooling outcomes.

(ii) Children's educational aspirations and school performance are influenced by perceived returns to schooling which are based on expected earnings. Migration among members of the family links youth to U.S. labor markets and provides a demonstration effect of income returns on education.

(iii) Peers and the social context where children grow up also have an important role in defining expectations and aspirations regarding the value of education for future employment. In addition, the community of residence plays an important role in children's educational attainment by defining the context of local employment and international migration opportunities available to children.

The analysis presented in this paper will focus on these three processes; the following sections will define these mechanisms and elaborate on their influence on children's educational attainment.

Family Income and Educational Attainment

The positive relationship between family income and children's educational attainment is a well established line of sociological research. Several studies have analyzed the relationship between parental and household economic resources and children's educational outcomes. Possibly the most widely known example is Sewell and Hauser's (1975) study of male high school seniors in Wisconsin, where they found a highly significant relationship between parents' income and the educational attainment and earnings of sons at age 25.

Besides the Sewell and Hauser study, a wide variety of studies have consistently documented this relationship in the United States (Corcoran and Datcher, 1981; McLanahan, 1985; Shaw, 1982; Teachman, 1987; Binder, 1998). For instance, Jencks and others (1983) found significant effects of parental income on completed schooling of children; while Alwin and Thornton (1984) used a measure that combined family assets and income and found significant effects or early childhood resources on high school completion. Finally, Hill and Duncan (1987) tested several hypotheses regarding the effects of family income on the socioeconomic attainment of children; and found substantial support for the positive relationship between parental income and children's outcomes. More recently, Nam and Huang (2009) found that parental assets have a positive effect on children's educational attainment,

More current studies in developing countries also support earlier findings that socioeconomic factors in the family have the greatest influence on schooling attainment of children (Giorguli Saucedo, 2002; Mier y Terán and Rabell, 2003; Cerrutti and Binstock, 2004; Buchmann and Hannum, 2001). All of these studies agree that the family plays an important role in schooling outcomes; parents with higher education or higher income will provide human and material resources which will positively impact children's educational attainment (Binder, 1998;

Teachman, 1987) In addition, some of these studies have found that family resources tend to have a greater impact on women's education (Teachman 1987; Mier y Terán and Rabell, 2003).

Within the literature that links migration to children's schooling outcomes, studies argue that international migration and remittances have a positive effect on education because they result in increased economic resources which allow households to invest on children's education, and in some cases, protect children from leaving school to work and help the household make ends meet (Borraz, 2005; McKenzie and Rapoport, 2006; Hanson and Woodruff, 2003). Nonetheless, the effect of remittances on schooling is "still an empirical question not accurately answered by the literature" (Borraz, 2005:1) and more systematic studies are needed to fully understand this relationship.

In recent years, some studies have been done on limited samples from Mexico; for instance, Hanson and Woodroff (2003) analyzed the effect of remittances on children's schooling using the 10% sample of the 2000 Mexican Census from which they selected children ages 10 to 15 whose father is the head of the household and who live in rural areas. Their main findings are that children in households with migrants complete significantly more years of schooling, and this effect is particularly strong in households where mothers have low levels of education. The authors consider that their "findings are consistent with the idea that in low-income households sending a migrant abroad may generate remittances that help relax household credit constraints and raise the educational attainment of children" (Hanson and Woodruff, 2003:24). However, their study is limited to rural areas, which makes it hard to generalize their findings to the larger Mexican population. In addition, it makes it impossible to account for variation in the characteristics of the places where these children live.

In a later study, Borraz analyzed the impact of remittances on the educational level of children in Mexico using data from the 2000 Census. His paper compares the completed years of school for children living in homes that receive remittances to those of children who live in households that do not receive remittances (Borraz, 2005). The results "indicate a positive and small and statistically significant effect of remittances on schooling only for children living in cities with fewer than 2,500 inhabitants with mothers who have a very low level of education. […] children who live in remittance-receiving households complete more years of schooling than other children. However, the magnitude of this effect is not substantial" (Borraz, 2005:13).

In a more recent study, McKenzie and Rapoport also examine the impact of migration on educational attainment in rural Mexico. Using a different data source, the National Survey of Demographic Dynamics from 1997 –also known as ENADID– they found evidence of a significant negative effect of migration on school attendance and attainment of 12 to 18 year-old boys and 16 to 18 year-old girls. They argue that the prospect of future migration for children growing up in households with migrants in Mexico has a negative effect on their incentives to go to school, which in turn, may counteract the positive effect of remittances (McKenzie and Rapoport, 2006). This important finding leads to the second mechanism through which migration can influence educational outcomes.

Perceived Returns to Education and Educational Aspirations

Children's educational aspirations and school performance are influenced by perceived returns to schooling based on expected earnings. Family migration has an influence on children's aspirations because it links youth to U.S. labor markets and provides a demonstration effect of income returns on education. Unqualified jobs are better paid in the U.S. than they are in

Mexico, consequently Mexican youth may have strong incentives to emigrate to the U.S. even when they have low levels of education (Miranda, 2007).

It is well known in the literature that parents and family influences play an important role in constructing children's expectations regarding education. Theories of socialization consider that the impact of family on the educational outcomes of children goes beyond a direct influence through economic resources. Parents also influence children through the examples they provide as role models. Parents' actions help children understand what the acceptable choices for employment are, and give meaning to what is considered "success" in their social context (Hill and Duncan, 1987).

Studies agree that the amount of schooling children complete is affected by "the process of role modeling." According to this perspective, successful parents define success at a higher level than less successful parents, hence successful parents –either highly educated or with higher income– would motivate their children for higher achievement (Hill and Duncan, 1987). We could also argue that parents with international migration experience would define a positive role model of migration and modify children's perceptions regarding the returns to education and local employment as they compare to international migration.

McKenzie and Rapoport (2006) make an important contribution because they challenge the assumption that migration only affects educational outcomes through remittances, and not through any other channel such as an incentive effect. The authors argue that migration may have a number of other effects on children's schooling; for instance, parental absence due to migration may result in less parental control and more obligations for older children in the household. But more importantly, migration within the family may have more enduring effects by shaping

children's expectations regarding future employment opportunities and the prospects of future international migration.

By creating the social capital and networks necessary to ease the eventual migration of children, international migration in the family contributes to changing social norms regarding schooling and changes children's educational aspirations. So, by virtue of having positive role models for international migration within their families, children of migrant parents would have more incentives to migrate than to stay in school (Miranda, 2007). Nonetheless, the family is not the only influence shaping children's expectations, especially as children grow up and find role models among peers and people outside their household. A third mechanism connecting international migration with children's schooling relates to the role of peer influences and the context of employment and migration opportunities on children's schooling choices.

Peer Influences and Socioeconomic Context

Studies on the social consequences of Mexican migration to the United States consider that remittances and international migration among members of the family, friends, and within the community result in the development of a "culture of migration" which discourages youth from viewing education as a way to economic mobility. In communities with a high prevalence of U.S. migration, migration becomes so deeply rooted that it eventually becomes an established social norm. In these places, young people expect to go to the U.S. for work at some point in their lives, and more importantly, migration is seen as an acceptable vehicle for economic mobility, deterring children from staying in school (Kandel and Massey, 2002; Massey, *et al.*, 1987).

A heavy involvement of the community in international migration contributes to the creation of a culture where young people focus on becoming international labor migrants and not so much on getting educated in Mexico. Consequently, children from communities where migration is high are more likely to express a desire to live and work in the U.S. (Kandel and Massey, 2002).

The level of migration prevalence in the community of origin is instrumental in making migration not only attainable, but also desirable as a medium for further socioeconomic advancement in lieu of education. Hence, the presence of migration in the community may result in changing expectations among young people, who grow up seeing international migration as a valid and desirable alternative to education for achieving economic mobility.

In addition to the factors discussed above, decisions regarding education are deeply rooted in the context of economic opportunity in the local community. The value placed on education varies depending upon the expected returns to education in the economy of the community which can make a great difference between seeing education as an investment in future economic success or not.

The existing body of empirical analyses on the determinants of education as they relate to international migration has mostly relied on information from selected regions of Mexico or has restricted the analysis to communities in rural areas. No studies to date that have addressed these issues using nationally representative data, nor have approached the influence of the social and economic context in a systematic way. The primary goals of this paper are to approach this issue using data representative at the national level, as well as to systematically address the influence of the socioeconomic context in schooling decisions.

Research Questions and Expected Relationships

This paper focuses on the effects of family and community level migration on the educational attainment of children in Mexico. According to previous findings in the literature, this paper asks:

(1) *Does U.S. migration in the household have an impact on the school enrollment and educational attainment of children in Mexico?*

(2) *Does the prevalence of U.S. migration in the community have a negative impact on the school enrollment and educational attainment of children?*

(3) *Does the impact of family migration vary by the economic context of the community of origin?*

(4) *Do the relative effects of U.S. migration at the household and community levels vary by level of education as children age and acquire agency and make educational choices?*

The first couple of questions aim at understanding the impact that migration at the family and community level has on school enrollment and attainment of children, net of individual, family and context characteristics. The second question aims at determining whether the impact of U.S. migration is mediated by the level of local economic opportunities. The last question aims at exploring the increasing importance of peer influence and the diminishing influence of families on children's educational choices as they grow up. Given what we know so far through the literature, one would expect that:

- International migration in the family provides important economic resources that increase the probability that children will be enrolled in school.

- Family and parental migration to the U.S. will have a positive effect on children's educational attainment, making it more likely for children from households with migrants to successfully complete primary, secondary and high school education.
- The effects of migration will be different depending on the socioeconomic conditions of the municipality of residence. Parents' migration will have a bigger positive effect in less economically developed places.
- Higher migration prevalence in the municipality will reduce the positive economic effect of family migration due to changes in social norms and expectations regarding paths to economic success. In these places, children may find it more appealing to migrate in comparison to staying in school.
- As children grow older, the influences of family on education should reduce, and the influence of the community should increase. These relationships should be different at different points in the schooling trajectories of children.

Contributions of this Paper

This research paper will provide important insights into the relationship between educational attainment and the use of remittances for investments in human capital acquisition for younger generations. Moreover, we will have a better understanding of the interplay between family and place of residence and the ways in which they influence educational outcomes among young Mexican men and women.

And, above all, this study will provide a systematic analysis using nationally representative data of the effects of migration and remittances on children's educational outcomes. Using nationally representative data allows to incorporate a wide array of

configurations between development levels and migration prevalence, which will help achieve a clearer understanding of the effects of remittances and migration on educational outcomes of children in Mexico.

Data

In order to answer the questions posed above, this paper uses data from the 2000 Mexican Census of Population and Housing. More specifically, it uses the 10.6% sample available through IPUMS International, which contains information on 2,312,035 households, yielding data on 10,099,182 individuals. This dataset includes relevant education, work and migration information for each individual, as well as characteristics of the household and the dwelling where the individual lives. Additionally, the data extract system of IPUMS-International allowed to attach information on the education, work and migration characteristics of the mother and father of each individual, provided that they are members of the same household.

In addition, information on the characteristics of the municipalities of residence was attached to the individual observations. These include two indices, created by the Mexican Population Council.[2] The first one is an Index of Marginalization (Índice de Marginación) which measures the degree of socioeconomic exclusion of a municipality in Mexico. In the multivariate analyses presented in this paper the direction of this indicator is reversed for ease of interpretation. So, this recode will allow interpreting negative scores as lower degree of socioeconomic development and positive scores as a higher degree of socioeconomic development. Additionally, the second index included in the multivariate analysis is an Index of

[2] For more detailed information on the construction of these indices see Appendix II.

Migration Intensity (Índice de Intensidad Migratoria) which measures the prevalence of migration in each municipality in the country.

The two indices discussed above allow for the understanding of the specific effects of local U.S. migration prevalence and socioeconomic marginalization on the school enrollment and educational attainment of children. But, more importantly, they bring important insight on the interactive effect of these two contextual characteristics, in addition to the individual's own characteristics.

These data altogether, provide information at three levels of analysis: the individual, family of origin, and municipality. Having data at these levels of analysis provides with the unique opportunity to understand the effects of U.S. migration on the educational attainment of children given different contextual and family configurations, as well as, the interactive effects of many of these covariates.

This analysis is limited to children ages 13 to 20, and only includes children with at least one parent living in the household, regardless of their relationship to the household head. Whenever parental information and migration information were missing, the observation was excluded from the sample. This selection resulted in the loss of approximately 5% of the initial sample of children.[3]

[3] The final sample size of children 13 to 20 is 1,357169. Where 52.22% (708,769) are boys and 47.78% (648,400) are girls.

Methods

The analytical strategy of this paper is twofold. First, I estimate the probability of school enrollment among children ages 13 to 17 using a logistic regression model where the dependent variable is dichotomous and indicates whether the child is currently in school. Even though primary and middle school are required in Mexico, it is after primary school where many children are at a higher risk of dropping out of school to enter the labor market (Coubès and Zenteno, 2005; Mier y Terán and Rabell, 2005).[4] For this reason, I would like to focus on understanding the effects of international migration on school enrollment during this particularly sensitive period of life.

Covariates in this model include individual characteristics like age, gender, and ethnicity of the child. Additionally, models control for family background characteristics like parents' education, father's status, whether the household has international migrants and whether the family received remittances. Father's status is defined according to three categories: 1) the father is a member of the household and did not migrate to the U.S. in the five years prior to the Census; 2) the father is a member of the household and has migrated to the U.S. in the five years before the Census; and 3) the father is not a member of the household, which captures both the children who do not have a father and the children whose father is not a household member. Lastly, the models controls for community level characteristics of the municipality of residence of the child.

[4] In Mexico the law limits the age at which children can start formal employment; children can begin working at age 14 for a maximum of six hours per day and only in work that does not interfere with secondary school and work that is not defined as dangerous. After age 16 children are allowed to begin work as adults. However, we should emphasize that many children begin doing informal work at even earlier ages (Levison, *et al.*, 2001).

Second, I estimate models for the probability of making school transitions. I fit logistic regression models to estimate three schooling transitions. First, I model the probability of having finished elementary school among children between 13 and 17 years old. Then, I estimate the likelihood of completing middle school given that primary school has been completed among children between 16 and 17 years old. And last, I estimate the probability of finishing high school among children who are 19 and 20 years old, conditional on having finished middle school. Like the school enrollment models, the school transitions models control for individual, household and community characteristics.

Different models will be estimated for boys and girls in order to understand the ways in which each covariate affects the probability of being in school and making educational transitions differently for boys and girls. Earlier work in Latin American countries agrees that the gender gaps in primary education are narrowing, but that gender differences in secondary education attainment still prevail. Studies in Mexico reveal greater parental investment in the education of males compared to females at the secondary level. However, it should be considered that female labor force participation of women has significantly increased in the last few decades, as has the social acceptance of girls' education beyond primary school (Mier y Terán and Rabell, 2003; Giorguli Saucedo, 2004).

In addition, models control for the ethnic status of children. Making a distinction between indigenous children and *mestizo*[5] children is important because the indigenous population in Mexico is, by all socioeconomic indicators, the most disadvantaged and poorest in the country. In addition, most indigenous-language speakers live in small isolated areas of the country with limited access to major services. More importantly, the indigenous population is also

[5] The term *mestizo* denotes the population of mixed European and Amerindian ancestry in former Spanish colonies in Latin America. In Mexico *mestizos* comprise the majority of the population.

geographically concentrated in municipalities with very high levels of socioeconomic marginalization (Giorguli Saucedo, 2004; Mier y Terán and Rabell, 2003).

In order to measure family's socioeconomic status, studies in developing countries highlight using occupation and education of the household heads as a better estimate compared to a direct measure of income, since families gather resources from diverse sources that, especially in the case of rural areas, may not be reflected in a measure of income (Mier y Terán and Rabell, 2003). In preliminary analysis I used parents' occupation, occupational prestige and highest educational attainment, as three different measures of parents' socioeconomic status. Since the results from all these different covariates were similar and consistent I decided to use parents' education for ease of interpretation and parsimony.

Additionally, in this analysis I will use remittances as an indicator variable and not as a continuous variable. I estimated models using the log of the amount of remittances received in the household and models with a dummy variable indicating if the household received remittances, I decided to use the latter since the results were virtually the same with respect to direction and significance. Moreover, previous studies agree that we could question the accuracy of reports of the amount of remittances received, as Borraz explains, people usually do not report the exact amount of remittances they receive, and they are more likely to report correctly whether they received remittances at all (Borraz, 2005).

A similar issue comes up when controlling for international migration of members of the household. The Census reports the number of international migrants in each household, but these migrants may or may not be in the household member roster. As a result, larger families would potentially have more international migrants than smaller families; hence, using this covariate

will produce biased results. In the same way as with remittances, I will use a dichotomous variable indicating whether the household has one or more international migrants.

Finally, I tested for the possibility that the effect of the level of economic development in the community of origin might not be lineal by estimating models that added a quadratic term for the development index. The results from these models were not significantly different from the ones without the quadratic term so this paper presents only the initial models.

Descriptive Analysis Results

Figure 1 depicts current school enrollment by age and gender. In this graph we can observe that among children between the ages of 13 and 15 a slightly smaller percentage of girls are enrolled in school compared to boys, however, this gap is almost closed by age 15 and the trend reverses at ages 16 and 17. About 88% of the boys age 13 are enrolled in school, compared to 86% of girls; the gap between the two sexes closes steadily so that at age 15, 68.8 percent of boys and 69 percent of girls attend school. However, at age 17, only 49% of the boys go to school but 54% of the girls are still enrolled.

Among children ages 13 to 17 more than 85% have finished primary school (Figure 2). And though differences are smaller between boys and girls at ages 16 and 17, there are more sizeable gaps in attainment in the younger children, probably due to boys falling behind. For instance, 80% of girls age 13 have finished primary school compared to only 75% of boys, the differences decrease and at age fourteen 87% and 84% of girls and boys respectively have

completed primary school. The gender gap continues reducing so that at age seventeen 90% of boys and 92% of girls finished sixth grade.

More than two-thirds of children ages 16 and 17 have finished middle school. Here sex differences continue to favor girls, among children age sixteen, 57% of the boys and 65% of girls have completed ninth grade. Moreover, among children age seventeen, 65% and 71% of boys and girls respectively have made it through middle school (figure 3). Looking at those who have completed high school we can appreciate that, compared to girls, a much smaller number of boys actually completes grade 12 –30% of boys and 40% of girls. This disparity is present at both ages 19 and 20 (figure 4).

Table 2 presents basic characteristics of the children age 13 to 20 in the 10% Census sample. About half of them are male, around six percent are indigenous, and their parents have 7 years of education on average. Only 0.3% of boys and girls are children of a U.S. migrant. About 16 percent of boys and 17 percent if girls do not live in the same household as their fathers, or do not have a father, and seven percent of boys and girls live in a household that has one or more international migrants. Lastly, around four percent of boys and five percent of girls live in households that declared receiving remittances from abroad.

Table 3 presents school enrollment and educational attainment by father's status for boys and girls. Among the 13 to 17 year olds, 70% of those whose father is not a U.S. migrant are enrolled in school at the time of the census; this figure is larger than the 67 percent of boys and 66 percent of girls enrolled in school among the children of U.S. migrants. In comparison, 67 percent of boys and 70 percent of girls whose father does not live in the household are enrolled in school.

Among 13 to 17 year old children the percentage that completed primary school is higher among the children of U.S. migrants –96% for boys and 91% for girls. Regarding primary completion among girls, there is no sizeable difference among the children of non-migrants and those without a father in the household, about 88 of these girls have finished sixth grade.

As we observed in the previous graphs, completion of middle and high school is higher for girls than it is for boys. More specifically, completion of middle school among boys ages 16 to 17 is higher for those whose father is not a U.S. migrant. For instance, among 16 to 17 year old girls, secondary school completion is higher for those whose father is not at home (68.4%) followed by those whose father is not a migrant (67.6%). Among 19 to 20 year old children, the percent of high school completion varies importantly by father's status and gender. About 30 percent of the sons of U.S. migrants have finished high school, compared to only 27 percent of boys who do not live with their fathers. In comparison, differences among girls are much smaller, 38 percent of the girls whose father does not live in the household have finished twelfth grade, compared to 40 percent among the rest of the girls ages 19 and 20.

The descriptive analysis reveals important variations in school enrollment and educational attainment by gender and father's status among youth in Mexico. First of all, among children over 15 years old, a greater percent of girls is currently attending school, compared to boys. Moreover, in every age group and schooling level, when compared to boys, we observe that a larger proportion of girls made educational transitions. Additionally, we find that there are important differences in schooling outcomes by father status and gender. A higher percentage of girls are enrolled in school and has made schooling transitions, particularly at higher levels of schooling.

Multivariate Analysis Results

Appropriately Assessing the Effects of Migration on Educational Outcomes

An important part of this study's argument is that U.S. migration at the family and household level should have different effects than U.S. migration at the community level because these variables tap into two different processes of educational attainment. On one side we incorporate the impact of family resources and on the other the role of peer influences and the socioeconomic context. Among the main goals of this analysis is to test specific hypothesis regarding the role that migration at the community level has on the educational outcomes of youth. Furthermore, another set of hypotheses considers that the impact of migration would vary according to the level of economic development in the municipality.

In order to demonstrate the pertinence of incorporating both household and community level characteristics, I began by specifying multivariate models that only included individual, parental and household level characteristics (see appendix I), which I then compared to the models estimated using community characteristics. The results of the different models point at the importance of a theory driven methodological approach, as well as the importance of the social context as a determinant of economic opportunities.

For instance, compare the first column of table A in appendix I, which presents odds ratios for boys' school enrollment controlling only for individual and household level characteristics, to model 1 in table 4 which also presents odds ratios for boys' school enrolment but also controls for community characteristics. For instance, according to the model in table A, having migrants in the household and receiving remittances have a negative effect on the odds of being enrolled in school for adolescent boys. In contrast, the model in table 4 shows that having

migrants in the household has no significant effect in the odds of being enrolled in school, but receiving remittances has a positive effect. As we can observe, by not controlling for community characteristics we misestimate the effects of migration characteristics in the family.

From this specific model we would have concluded that migration has a negative impact on children's odds of attending school, while in the second specification we observed that remittances do have a positive effect in keeping boys in school, once we control for the migration intensity and economic development in the community. This has important implications not only to the statistical results presented in this analysis but also to the overall understanding of the educational attainment process. In this case, I argue that the models controlling for community characteristics are in tune with our specific expectations, but are also in line with educational attainment theory.

School Enrollment

Tables 4 and 5 show the results from the multivariate logistic regression models for school enrollment for boys and girls respectively. In model 1 of table 3 I estimated the probability of being enrolled in school for boys ages 13 to 17, controlling for different individual, family, and community characteristics. As expected, every year of age makes boys less likely to be enrolled in school. For instance, compared to boys age 13, at age 14 boys are 46% less likely to be in school, and by age 17, they are about 91% less likely to be in school than their youngest counterparts.

Controlling for individual and family background characteristics, as well as municipal development and migration intensity levels, indigenous boys are about 33% more likely to be enrolled in school compared to *mestizo* boys. This finding seems confusing given that in Mexico

most indigenous-language speakers live in small isolated areas of the country, where school facilities exist but are inadequate. Mier y Terán and Rabell (2003) had similar findings and they believed that this contradictory result could be explained as a result of compensatory programs that increased school enrollment in rural, poor and indigenous communities.

Although the results for indigenous children seem puzzling, there is prior empirical evidence that they may be consistent with expectations for poor children in Latin American countries. Studies about school enrollment and attainment using DHS data in different developing countries have found that in Latin America even poor children attend school, however, the real disadvantage lies on the fact that they do not make important progress towards higher grades of schooling (Filmer and Pritchett, 1999). Given this, it is possible that Mexican indigenous children have higher odds to be attending school year-by-year, but that they may not be making grade advancements. In this particular study, only the models of school attainment will give us a full picture of this relationship.

Every additional year of parental schooling increases the odds of school enrollment for boys by 23%, this is a strong effect and captures the impact of parents' socioeconomic status on children's educational outcomes. In addition, having a father with U.S. migration experience does not significantly alter the odds of being in school. However, boys whose father is not a member of the household have greater odds of being enrolled in school. This finding is consistent with previous findings from Mexico and other developing countries. In prior studies, female headship of household was associated to an improved status of the woman and to increased child wellbeing. The premise is that mothers are more child-oriented and when they have greater access to economic resources or more freedom to make economic decisions in their

homes they will increase investments in children's education (Giorguli Saucedo, 2004; Levison, *et al.,* 2001).

International migration in the household, as measured by the presence of international migrants among family members and the receipt of remittances by the household have positive effects on the odds of being in school, although only remittances receipt have a significant impact. The effect of having international migrants in the household is rather modest, but remittances significantly increase the odds of being in school by 11 percent. This finding provides support for the hypothesis that increased economic resources in the household, such as remittances, increase the likelihood of being in school.

When we control for individual and household characteristics, the level of development in the community has no significant effect on boys' likelihood of school attendance. In contrast, migration intensity in the municipality has a negative and highly significant effect; boys living in communities with higher migration intensity are less likely to be enrolled in school. This outcome is consistent with the "culture of migration" hypothesis which predicts a negative effect of migration at the community level on the probability of children's school enrollment.

In order to better describe the relationship between international migration in the household and the local economic context, I estimated three additional models with interactions between the different measures of migration in the family and the level of development at the community level. All interactions are significant and are presented in models 2 to 4 in table 4.

We can observe consistently that in places with a lower level of development, the effects of migration in the family have a greater impact on boy's school enrollment. To illustrate this effect, figure 5 plots the log odds of being in school for boys by father's status and level of development in the community. In other words, the economic resources that families obtain

through migration have a more important role in keeping children in school in poorer communities; therefore, migration compensates for the lack of economic resources in the place of origin. This finding is consistent with the hypothesis that the effects of migration on school enrollment would depend on the local economic context where the child lives, and that migration will have a more positive impact in less developed communities.

A different interaction effect is observed in model 5, where I present results for a model an interaction between parents' education and level of community development. Model 5 illustrates that the effect of parental improved socioeconomic status is weaker for children living in communities with fewer economic opportunities. Conversely, in places where economic resources are more available, the impact of U.S. migration in the household and family socioeconomic status –as measured by parental education– is slightly increased, context and peers may play a more important role than parental socioeconomic status in the choices of children living in less developed places.

Table 5 presents the multivariate logistic regression models for the probability of being in school for 13 to 17 year old girls. For girls, almost all covariates follow the same direction and significance as for boys, although there are important differences regarding the magnitude of the effects. After controlling for individual, household and community characteristics (model 1) there is no statistically significant difference in the odds of indigenous girls to attend school compared to *mestizo* girls.

The socioeconomic status of the parents, as measured by their education, plays a significant role on girls' likelihood of attending school. In this case, every additional year of parental education increases the odds of being in school about 24%. Regarding father's characteristics, having a father with U.S. migration experience does not significantly alter the

odds of being in school compared to girls whose parents were not U.S. migrants in the 5 years prior to the Census. However, girls whose father is not present in the household are 30% more likely to be attending school. It is important to highlight that this effect is greater for girls than it was for boys. This finding also relates to the idea that when mothers are the ones making decisions about the allocation of economic resources they will choose to invest more on children's wellbeing, in this case on education (Giorguli Saucedo, 2004).

In line with the results for boys, having international migrants in the household does not have a significant effect on girls' odds of being in school, whereas living in a household that receives remittances increases the odds of being in school by 11 percent. Also, unlike results for boys, the level of development of the municipality of residence has a significant effect in raising the odds of school enrollment for girls, while more migrants in the community result in lower odds of staying in school for girls. The negative effects of migration prevalence in the local context for girls also support the hypothesis on the negative effects of a "culture of migration" on the education of children.

In models 2 to 4, which incorporate interaction effects, we can appreciate that the relationship between the migration in the household measures and level of economic development in the municipality work in the same way as they did for boys, which means that for girls, as well as for boys, migration has a more sizeable impact on the likelihood of children attending school in less developed communities, model 5 shows that the same interaction effect exists for parents' level of education and local economic characteristics. The results of the interaction models for boys and girls are consistent with my expectations. Family migration and remittances will have a higher positive effect on children's school enrollment in places where economic opportunities are more limited. However, as it was observed with boys, parental

education has a weaker effect in increasing the likelihood of school enrollment when the children are living in less developed communities.

The models for school enrollment show evidence of two mechanisms linking U.S. migration and school enrollment are at play. The first is the influence of the family through household migration and socioeconomic characteristics, and second, the impact of peer influence and context characteristics on school enrollment. As seen in the interaction effects, family's economic resources impact children's odds of attending school differently depending on the community's economic resources. Another important finding is that children who live only with their mothers are more likely to go to school. This provides important evidence for the protective role of mothers, who have an even more significant role in keeping girls in school.

Completing Primary School

Table 6 presents results from the logistic regression models for the probability of finishing primary school among boys ages 13 to 17. Model one includes individual, household, and community level covariates. As anticipated, older boys are much more likely to have finished primary school, and indigenous boys are about 18% less likely to have done so, even though in the models for school enrollment indigenous children were more likely to be in school. This finding is consistent with expectations for poorer children who are likely to be enrolled in school but are not likely to make transitions to higher levels of schooling (Filmer and Pritchett, 1999).

Additionally, parental education has a positive and significant effect on the probability of finishing sixth grade, every year of parental schooling is associated with 24% increased likelihood of finishing primary school. This finding supports the expectation that parents' socioeconomic status plays an important role in increasing children's educational attainment.

However, having a father who has migrated to the U.S. does not increase the odds of finishing primary school compared to having a father who is not a migrant. Whereas, when the child's father does not live in the household the odds of finishing sixth grade rise by 13 percent.

U.S. migration at the household level significantly increases the odds of finishing primary school. This effect is consistent with the expectation that higher economic resources from migration at the household level increase the probability of making school transitions, and ultimately increase the educational attainment of children. Living in a municipality with a higher level of economic development significantly increases the likelihood of finishing primary school; this effect is consistent with the hypotheses of this research. On the other hand, migration prevalence in the community has no impact on the odds of completing elementary education.

Models 2 to 5 in table 6 present the interaction effects between migration characteristics and parental education with the level of development in the community. Although the interactions between father's U.S. migration and parental education are not significant, the other two interactions are significant and consistent with the results previously presented for school enrollment. International migration in the household of origin and remittances receipt both have a stronger positive effect for boys who live in communities with lower levels of development.

Table 7 presents the results for the logistic regression models for the probability of completing primary school for girls. For the most part, models for the probability of completing primary for girls are similar to those of boys; however, important differences can be observed. For instance, indigenous girls are much less likely to have finished sixth grade compared to *mestizo* girls. In the same way as for boys, parental education significantly increases the odds of finishing elementary education. Consistent with results for boys, father's migration to the U.S.

does not significantly alter the odds of finishing primary school, however, girls whose father is not in the household are 20 percent more likely to have done so.

For girls, having international migrants and receiving remittances in the household increase the odds of finishing elementary school by 26 and 13 percent respectively. Moreover, the level of development in the *municipio* is associated with greater odds of completing primary school and, unlike the results for boys, for girls higher levels of migration intensity in the community significantly increases the odds of sixth grade completion. This effect, contrary to my expectations sheds light at the important gender differences regarding the determinants of schooling.

From the four models with interaction effects, all of them had significant effects except for father's U.S. migration The impact of migration in the family and parents' education on the odds of finishing primary school is stronger for girls who live in less developed communities. These results help us qualify the mechanisms that influence girls' education. Economic resources in the household appear to be instrumental in helping these girls complete primary education, and when combined with the strong effect of not living in the same household as their fathers we can say that girls are more likely to receive education when their mothers are making schooling decisions and when the household has more disposable income through remittances. These effects are importantly mediated by the level of economic development in the community.

Results from these models emphasize important gender differences, for instance, migration prevalence in the community has no significant effect on boy's likelihood of completing primary school, while it increases the odds of girls finishing sixth grade. In the models for primary completion, the effects of migration at the community level are rather modest, when compared to the impact of migration at the family level; these findings provide

evidence that the role of family on education is greater than the influences from the context among younger children.

Completing Middle School

Tables 8 and 9 present results for the logistic regression models estimating the probability of finishing middle school for boys and girls who completed primary school. Model 1 presents results for the model using individual, family and community characteristics for boys. According to these results, indigenous boys are less likely to complete middle school compared to *mestizo* boys. The socioeconomic status of the parents, measured by their education, significantly increases the odds of middle school completion, but father's migration to the U.S. has no significant effect. Among those boys whose father is not a member of the household, the odds of finishing middle school increase by 15 percent. Interestingly, having international migrants in the household and receiving remittances have no significant effect on the likelihood of completing ninth grade.

In contrast, community characteristics have highly significant effects on the odds of finishing middle school for boys. Boys living in communities with higher levels of development are more likely to have finished middle school, whereas those living in communities where migration is more prevalent are less likely to have done so.

Models 2 to 5 present the regression estimates for the models with interaction effects, most have similar magnitude than the effects observed for school enrollment and primary completion. So far, we have consistently observed that migration in the family and receipt of remittances matter more for boys living in poorer places, which is consistent with my hypothesis on the effects of migration and the local economic context. These interactions illustrate the

different role that household migration and socioeconomic characteristics have on the educational attainment of children at different levels of economic development in the community. Thanks to these interactions, we can appreciate that in communities with more economic opportunities, family may play a smaller role in shaping children's outcomes, whereas, in places where children have limited economic opportunities, parental input will go a long way.

There are important differences in the models for girls, as compared to those of boys. First of all, the effect of parents' education on increasing the odds of middle school completion is higher for girls, 26 percent higher likelihood compared to 22 percent for boys, which provides evidence for an important role of parental socioeconomic status on the education of girls. In addition, among girls whose father is not a household member, the odds of finishing middle school are much higher –compared to those of boys in the same situation, these girls are 32 percent more likely to have completed 9^{th} grade.

In contrast to boys, the migration characteristics of the household had significantly positive effects for girls. International migrants in the household and remittances receipt significantly increase the odds of middle school completion for boys and girls. Higher levels of economic development in the municipality increase the odds of middle school completion for girls while a higher level of U.S. migration decreases the odds. This result supports the expected negative effects of a "culture of migration" on children's educational attainment. All interaction effects presented in models 2 to 4 are significant and they follow the same pattern observed in earlier stages of the analysis; however, the interaction between parental education and level of development was insignificant. These are important findings, with very consistent magnitude and significance. We can say with certainty that migration and remittances make a greater difference

on the likelihood of school enrollment and school attainment up to ninth grade among children living in less economically developed communities.

The models for middle school completion illustrate a different side of the gender based differences regarding the determinants of schooling. Whereas migration among members of the household and the receipt of remittances did not have an effect on boys' odds of finishing middle school, they increased the odds that girls would finish middle school.

Completing High School

Table 10 presents results for the logistic regression models estimating the probability of finishing high school for both boys and girls who have completed middle school. The models include individual, family and community level covariates. I do not present models with interactions for this outcome because none of them were significant.

Higher parental education increases the odds of finishing high school for both boys and girls; in contrast, being indigenous significantly decreases the odds of completing twelfth grade. U.S. migration of the children's father does not significantly influence the odds of finishing high school. For boys, the fact that their fathers are not members of the household does not affect the likelihood of having finished high school, in contrast, girls whose fathers are not members of the same household are 15 percent more likely to finish 12^{th} grade. At higher levels of education, living in a household where the father is not present importantly increases girls' chances of finishing high school.

In addition, living in a household that has international migrants decreases de odds of finishing high school for both boys and girls; these effects illustrate the role that migration in the family had on altering children's aspirations regarding schooling. However, some of this effect

seems to differ by gender, remittances do not significantly affect the likelihood of high school completion for boys, but for girls they result in lower odds of completion. For boys, the level of development in the community does not have a significant effect; while for girls, living in a more economically developed municipality raises the odds of finishing high school. Additionally, the level of U.S. migration in the community continues to have negative effects on the likelihood of school completion, which is consistent with the idea that among children living in communities where migration is more prevalent, expectations to migrate internationally would replace expectations to stay in school.

In the models for high school completion, the interactions between the level of economic development in the community and family characteristics are not significant. But the different impact of family and migration characteristics continues to be different for boys and girls. For girls, remittances and family migration have negative effects on high school completion.

Conclusions

The core objective of this paper was to explore the effect that migration to the U.S. has on the education of children in Mexico. For this purpose I used data from the 2000 Mexican Census to analyze the role of migration and remittances in the family and community levels on school enrollment and educational attainment.

The first hypothesis tested in this analysis stated that international migration in the family provides important economic resources that increase the probability that children will be enrolled

in school. This hypothesis is fully supported by the models on school enrollment, which show a positive impact of remittances on children's likelihood of attending school.

The second hypothesis stated that family and parental migration to the U.S. will have a positive effect on children's educational attainment, making it more likely for children to successfully complete elementary, secondary and upper secondary education. Support for this hypothesis is mixed at different levels of schooling and by gender. The different measures for migration in the family had positive effects for lower levels of schooling, and they did not have a significant impact for boys finishing middle school. However, having one or more international migrants in the household had negative effects for the odds of finishing high school.

These findings are important, because they show that migration is positive up to the point where children have finished compulsory education. Contrary to conventional expectations, migration in the household does not always have a positive impact on children's educational attainment; and in this case it seems to hinder girls' attainment past middle school. It is also worth mentioning that father's U.S. migration has a significant and stronger effect among children living in poor areas of the country.

This leads to my third hypothesis, which states that the effects of migration will be different depending on the economic conditions of the municipality of residence. Results point at the expected direction; migration of the father and among members of the family had a bigger positive effect in less economically developed places, as demonstrated by the interaction terms in the various models. In less developed areas of the country, migration may have an important effect compensating for the lack of economic opportunities, and will give families the resources to keep children in school for longer. This last set of findings is important because it reflects the

different impacts of migration in different regions of Mexico. The only outcome for which this does not hold is the probability of finishing high school.

Last, I expected that higher migration prevalence in the municipality will reduce the positive economic effect of family migration due to changes in social norms and expectations regarding paths to economic success. Support for this hypothesis was consistent across all models, higher prevalence of migration resulted in a lower likelihood of school enrollment and school transition completion –except for girls finishing primary school.

The results presented on this paper are consistent with the existence of two different processes connecting U.S. migration and education in Mexico. The first process is the investment of families on human capital, defined by the use of resources from migration on the educational advancement of children, which has a stronger positive impact on communities with a lower level of economic development. The second process is that of discouragement of schooling among children living in communities with higher migration prevalence, once we controlled for the level of development in the municipality. Additionally, these results also show two different sources of influence on children's schooling. On one side, there is parental influence, and on the other side, peers and context's influence. According to the results presented in this paper, both influences take children in opposite directions with regards to schooling decisions.

The evidence presented in this paper incorporates two sides of the schooling choices: the investment and influence of parents and the role of the social context. Parents influence children through their desires and expectations for the children's schooling and their investments on education; but at older ages, children become agents in the decision-making process and are influenced by what they see among their peers and in their social context. This change is illustrated by the effect that migration prevalence in the community has on children's schooling,

at the primary level it had a positive effect on girls and a marginal negative effect on boys, possibly because at this level of schooling, decisions about schooling depend on parents and not on the children. However, later on, in middle and high school, migration prevalence had a stronger negative impact on education because, at this point, children participate more of their schooling decisions, and they begin making choices based on peer influences.

The findings of this study emphasize that it would be incorrect to say that migration has either a positive or a negative impact on education; what we can observe is that the impact is in fact mixed. Previous analyses discussed positive and negative impacts separately, but the results presented in this study help synthesize different perspectives and provides evidence of the complexity of the relationship between parents' influence and context's influence on children's schooling at different levels.

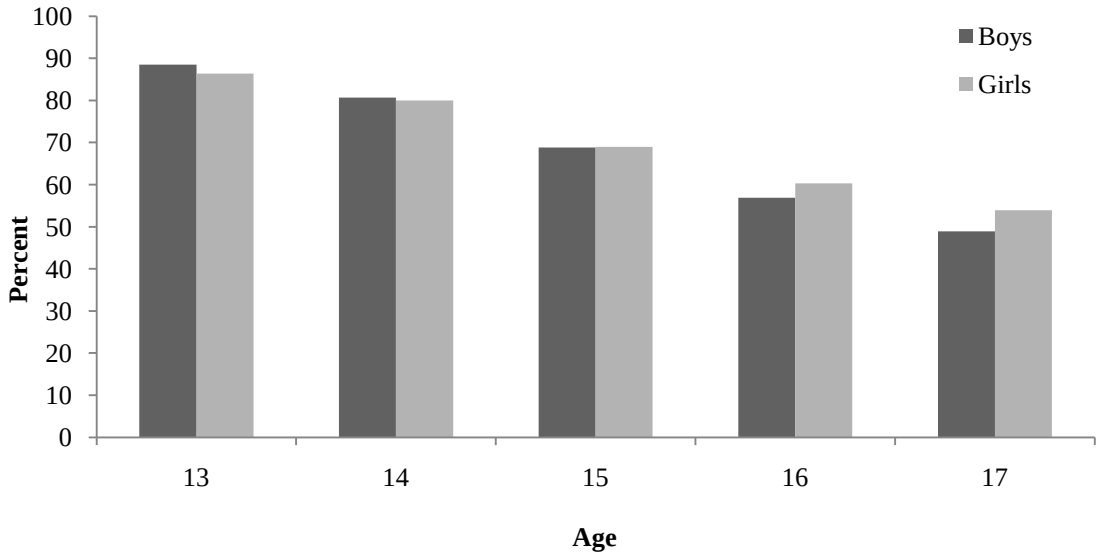
Additionally, it is worth mentioning that these results shed light into the important role that mother's have on their children's wellbeing. Children whose father did not live in the household were consistently more likely to be in school and to make schooling transitions; and more importantly, the absence of the father greatly benefited girls. This study supports the idea that mothers have a positive influence on children's wellbeing and that when given the freedom to make economic decisions in their homes they will invest in their children's education.

This paper provides important insight to the relationship between international migration and investments on education for younger members of the family. It also has important implications for the understanding of the interaction between family characteristics and the local economic context. Moreover, this study makes an important contribution to the literature on the effects of migration in children's education by conducting an analysis that is representative at the national level.

This research also improves on the literature on migration and education by systematically exploring the different ways in which migration in the family and in the community may affect children's outcomes. Future work will expand on this research by exploring the role of U.S. migration on youth's work status, and intergenerational educational mobility among Mexican youth.

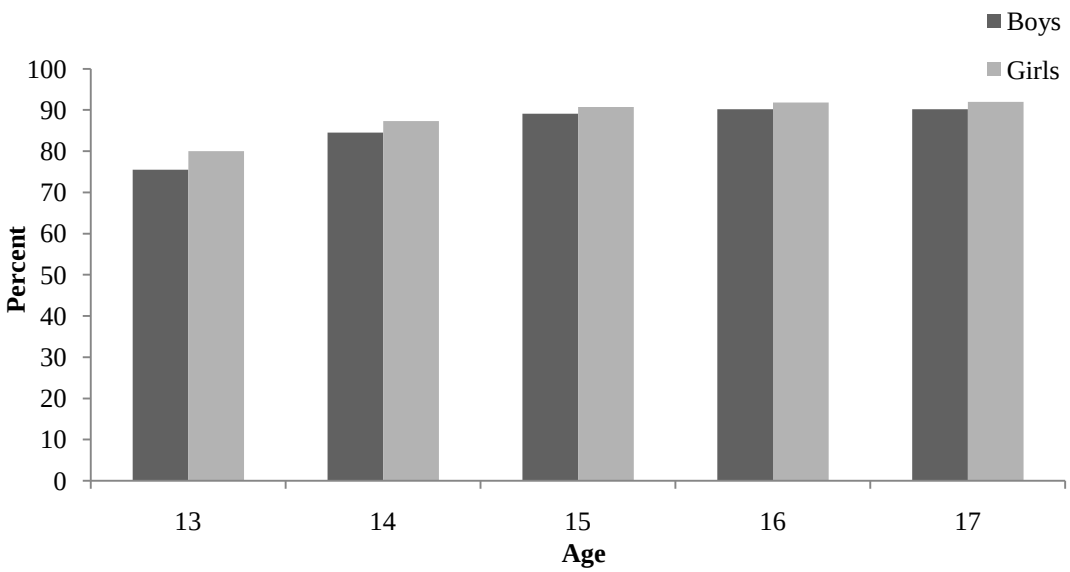
Tables and Figures

Figure 1. Children Enrolled in School by Age and Sex, Mexico, 2000



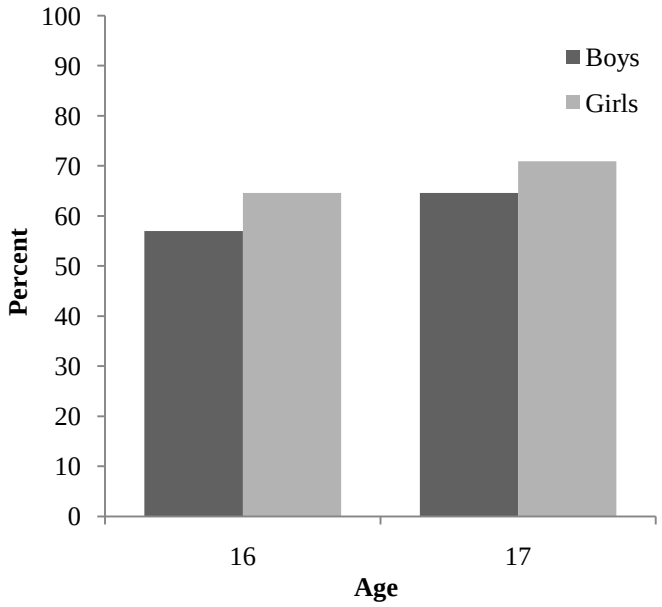
Source: 2000 Mexican Census Subsample, IPUMS International

Figure 2. Children Who Completed Primary School by Age and Sex, Mexico, 2000



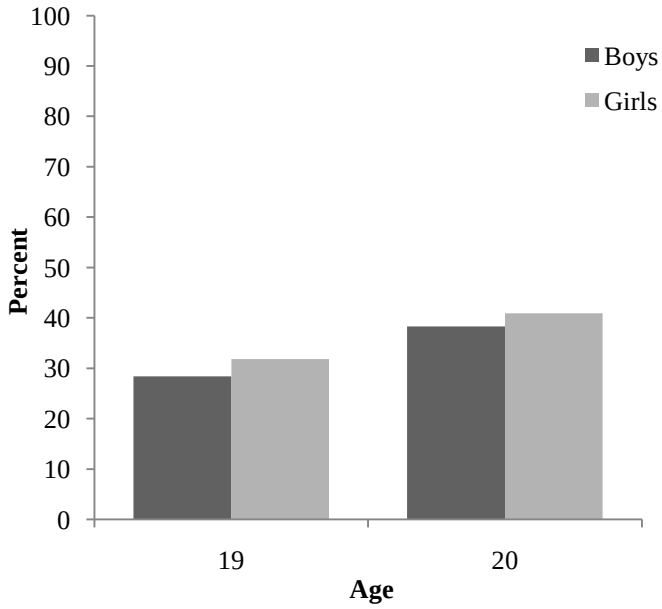
Source: 2000 Mexican Census Subsample, IPUMS International

Figure 3. Children Who Completed Middle School by Age and Sex, Mexico, 2000



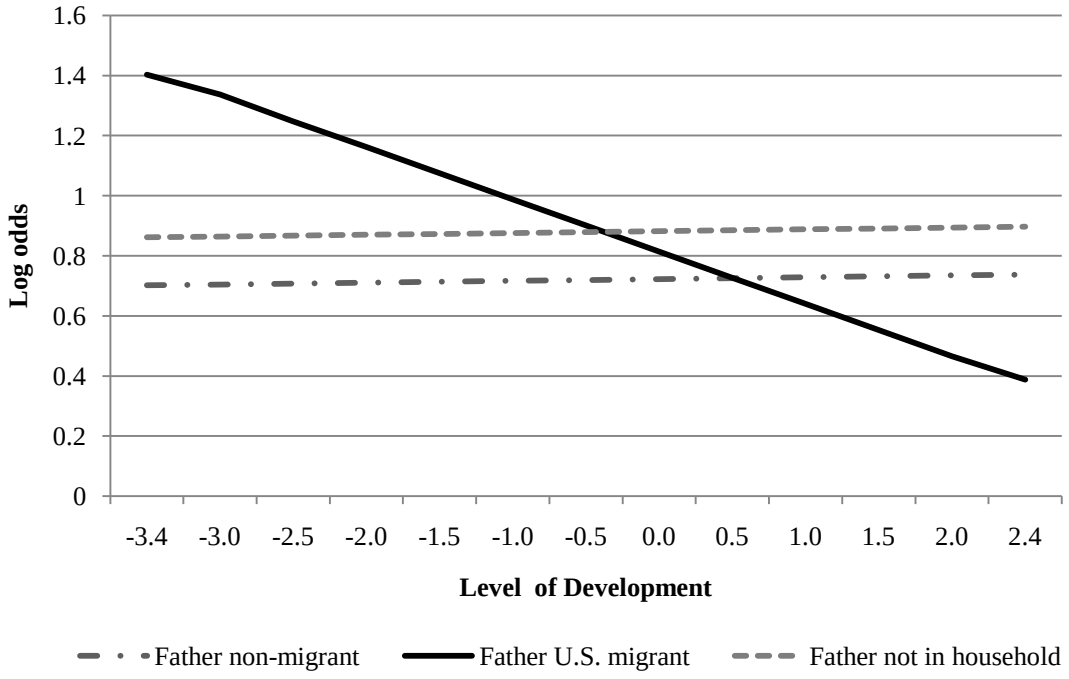
Source: 2000 Mexican Census Subsample, IPUMS International

Figure 4. Children Who Completed High School by Age and Sex, Mexico, 2000



Source: 2000 Mexican Census Subsample, IPUMS International

Figure 5. Log Odds of chool Enrollment by Level of Development and Father's Status, Boys 13 to 17 years old, Mexico 2000



Source: 2000 Mexican Census Subsample, IPUMS International

Table 1. Variable Definitions

Dependent Variables	
In School	=1 if child is enrolled in school in the current year, 0 otherwise
Primary	=1 if child completed primary school (grade 1 to 6), 0 otherwise
Middle School	=1 if child completed middle school (grades 7 to 9), 0 otherwise
High School	=1 if child completed high school (grades 10 to 12), 0 otherwise
Independent Variables	
Age	Children's age in years
Indigenous	=1 if child belongs to an indigenous group, as identified by the parents
Parents' Education	Years of schooling, takes the highest value among mother's and father's
Father migrated to the U.S.	=1 if the child's father is a member of the household and migrated to the U.S. in the 5 years prior to the Census
Father is not a household member	=1 if the child's father is not a member of the household
Household has international migrants	=1 if there are any current or former household members who, in the past 5 years went to live in another country
Household received remittances	=1 if the household receives remittances
Household assets index	Household assets' ownership index
Development level	Constructed variable for the level of development in the municipality of residence
Migration intensity	Constructed variable for the migration prevalence in the municipality of residence

Table 2. Sample Characteristics, Youth Ages 13 to 20, Mexico, 2000

	Boys	Girls
Indigenous	5.9%	5.5%
Parents' education (years) [b]	7.00(4.59)	6.88(4.58)
Father is U.S. migrant [a]	0.3%	0.3%
Father not in household	16.3%	17.1%
Household has international migrants [a]	6.7%	7.5%
Household receives remittances [a]	4.1%	4.7%

[a] In the five years prior to the Census
[b] Mean, standard deviation in parentheses
Source: 2000 Mexican Census Subsample, IPUMS International
Weighted frequencies

Table 3. School Enrollment and Educational attainment by Father's Status [a] and Sex, Mexico 2000

	Boys	Girls
Enrolled in School [b]		
Father in household, non-migrant	69.9%	71.1%
Father in household, migrant	66.5	66.3
Father not at home	67.2	70.5
Completed Primary [b]		
Father in household, non-migrant	85.8	88.0
Father in household, migrant	95.6	90.9
Father not at home	85.2	88.4
Finished Middle School [c]		
Father in household, non-migrant	61.2	67.6
Father in household, migrant	58.5	60.8
Father not at home	58.9	68.4
Finished high school [d]		
Father in household, non-migrant	30.7	40.0
Father in household, migrant	30.1	39.6
Father not at home	27.5	38.0

[a] In the five years prior to the Census
[b] Among 13-17 year olds
[c] Among 16-17 year olds
[d] Among 19-20 year olds
Source: 2000 Mexican Census Subsample, IPUMS International
Weighted frequencies

Table 4. Logistic Regression Models for the Probability of School Enrollment Among Boys Ages 13 to 17 (Odds Ratios)

	Model 1		Model 2		Model 3		Model 4		Model 5	
Individual Characteristics										
Age										
(13 Years) [a]										
14 Years	0.536	***	0.536	***	0.535	***	0.536	***	0.536	***
15 Years	0.258	***	0.258	***	0.258	***	0.258	***	0.259	***
16 Years	0.139	***	0.139	***	0.139	***	0.139	***	0.140	***
17 Years	0.093	***	0.093	***	0.093	***	0.093	***	0.093	***
Ethnicity										
(*Mestizo*)										
Indigenous	1.326	***	1.327	***	1.335	***	1.332	***	1.272	***
Parents' Education (in years)	1.229	***	1.229	***	1.228	***	1.229	***	1.206	***
Father's Status										
(Father in the household, non migrant)										
Father migrated to the U.S.	0.999		1.096		1.000		0.999		0.999	
Father is not a household member	1.173	***	1.173	***	1.172	***	1.174	***	1.168	***
Household's Migration Characteristics										
Household has international migrants	1.023		1.023		1.088	***	1.019		1.024	
Household received remittances	1.109	***	1.109	***	1.105	***	1.190	***	1.108	***
Context Characteristics										
Development level	1.006		1.006		1.016		1.012		0.895	***
Migration intensity	0.753	***	0.752	***	0.750	***	0.751	***	0.764	***
Interactions										
Migrant father*Development			0.835	†						
Migrants in household*Development					0.858	***				
Remittances*Development							0.851	***		
Parents' education*Development									1.026	***
Log likelihood	-256394		-256390		-256328		-256349		-256009	
N	494014		494014		494014		494014		494014	

† p < 0.05 * p < 0.01 ** p < 0.005 *** p < 0.000
Source: 2000 Mexican Census Subsample, IPUMS International
Standard errors adjusted for clustering at the municipality level
[a] Reference categories in parentheses

Table 5. Logistic Regression Models for the Probability of School Enrollment Among Girls Ages 13 to 17 (Odds Ratios)

	Model 1		Model 2		Model 3		Model 4		Model 5	
Individual Characteristics										
Age										
(13 Years) [a]										
14 Years	0.610	***	0.610	***	0.610	***	0.610	***	0.612	***
15 Years	0.311	***	0.311	***	0.311	***	0.311	***	0.312	***
16 Years	0.190	***	0.190	***	0.190	***	0.190	***	0.191	***
17 Years	0.138	***	0.138	***	0.138	***	0.138	***	0.138	***
Ethnicity										
(*Mestizo*)										
Indigenous	1.056		1.056		1.063		1.060		1.014	
Parents' Education (in years)	1.243	***	1.243	***	1.242	***	1.242	***	1.218	***
Father's Status										
(Father in the household, non migrant)										
Father migrated to the U.S.	0.990		1.084		0.997		0.991		0.996	
Father is not a household member	1.302	***	1.301	***	1.300	***	1.303	***	1.298	***
Household's Migration Characteristics										
Household has international migrants	1.019		1.019		1.080	***	1.015		1.019	
Household received remittances	1.109	***	1.109	***	1.105	***	1.173	***	1.110	***
Context Characteristics										
Development level	1.109	***	1.109	***	1.121	***	1.116	***	0.969	***
Migration intensity	0.799	***	0.799	***	0.797	***	0.798	***	0.812	***
Interactions										
Migrant father*Development			0.838	†						
Migrants in household*Development					0.857	***				
Remittances*Development							0.867	***		
Parents' education*Development									1.030	***
Log likelihood	-242933		-242929		-256349		-242897		-242467	
N	465705		465705		465705		465705		465705	

* p < 0.01 ** p < 0.005 *** p < 0.000
Source: 2000 Mexican Census Subsample, IPUMS International
Standard errors adjusted for clustering at the municipality level
[a] Reference categories in parentheses

Table 6. Logistic Regression Models for the Probability of Completing Primary School Among Boys Ages 13 to 17 (Odds Ratios)

	Model 1		Model 2		Model 3		Model 4		Model 5	
Individual Characteristics										
Age										
(13 Years) [a]										
14 Years	1.947	***	1.947	***	1.947	***	1.947	***	1.947	***
15 Years	2.990	***	2.991	***	2.990	***	2.990	***	2.990	***
16 Years	3.393	***	3.393	***	3.394	***	3.394	***	3.392	***
17 Years	3.420	***	3.420	***	3.420	***	3.421	***	3.419	***
Ethnicity										
(*Mestizo*)										
Indigenous	0.821	***	0.822	***	0.824	***	0.824	***	0.821	***
Parents' Education (in years)	1.242	***	1.242	***	1.241	***	1.241	***	1.241	***
Father's Status										
(Father in the household, non migrant)										
Father migrated to the U.S.	1.028		1.088		1.028		1.028		1.028	
Father is not a household member	1.133	***	1.133	***	1.133	***	1.134	***	1.133	***
Household's Migration Characteristics										
Household has international migrants	1.216	***	1.216	***	1.239	***	1.213	***	1.216	***
Household received remittances	1.130	***	1.129	***	1.128	***	1.169	***	1.130	***
Context Characteristics										
Development level	1.243	***	1.244	***	1.250	***	1.249	***	1.237	***
Migration intensity	0.989		0.989		0.988		0.988		0.989	
Interactions										
Migrant father*Development			0.851							
Migrants in household*Development					0.916	***				
Remittances*Development							0.881	***		
Parents' education*Development									1.001	
Log likelihood	-195819		-195817		-195804		-195800		-195818	
N	493522		493522		493522		493522		493522	

† p < 0.05 * p < 0.01 ** p < 0.005 *** p < 0.000
Source: 2000 Mexican Census Subsample, IPUMS International
Standard errors adjusted for clustering at the municipality level
[a] Reference categories in parentheses

Table 7. Logistic Regression Models for the Probability of Completing Primary School Among Girls Ages 13 to 17 (Odds Ratios)

	Model 1		Model 2		Model 3		Model 4		Model 5	
Individual Characteristics										
Age										
(13 Years) [a]										
14 Years	1.853	***	1.853	***	1.853	***	1.853	***	1.854	***
15 Years	2.678	***	2.678	***	2.678	***	2.678	***	2.682	***
16 Years	2.949	***	2.949	***	2.949	***	2.949	***	2.953	***
17 Years	2.954	***	2.955	***	2.955	***	2.954	***	2.959	***
Ethnicity										
(*Mestizo*)										
Indigenous	0.693	***	0.693	***	0.695	***	0.695	***	0.696	***
Parents' Education (in years)	1.252	***	1.252	***	1.251	***	1.251	***	1.254	***
Father's Status										
(Father in the household, non migrant)										
Father migrated to the U.S.	1.161		1.196		1.168		1.164		1.160	
Father is not a household member	1.203	***	1.203	***	1.202	***	1.205	***	1.204	***
Household's Migration Characteristics										
Household has international migrants	1.258	***	1.258	***	1.277	***	1.254	***	1.258	***
Household received remittances	1.131	***	1.131	***	1.129	***	1.161	***	1.130	***
Context Characteristics										
Development level	1.320	***	1.320	***	1.328	***	1.326	***	1.348	***
Migration intensity	1.066	***	1.066	***	1.065	***	1.065	***	1.064	***
Interactions										
Migrant father*Development			0.915							
Migrants in household*Development					0.907	***				
Remittances*Development							0.882	***		
Parents' education*Development									0.995	†
Log likelihood	-165006		-165006		-164991		-164991		-164997	
N	465166		465166		465166		465166		465166	

† p < 0.05 * p < 0.01 ** p < 0.005 *** p < 0.000
Source: 2000 Mexican Census Subsample, IPUMS International
Standard errors adjusted for clustering at the municipality level
[a] Reference categories in parentheses

Table 8. Logistic Regression Models for the Probability of Completing Middle School Conditional on Completing Primary School, Boys Ages 16 to 17 (Odds Ratios)

	Model 1		Model 2		Model 3		Model 4		Model 5	
Individual Characteristics										
Age										
(16 Years) [a]										
17 Years	1.564	***	1.564	***	1.564	***	1.564	***	1.565	***
Ethnicity										
(*Mestizo*)										
Indigenous	0.795	***	0.795	***	0.798	***	0.796	***	0.801	***
Parents' Education (in years)	1.225	***	1.225	***	1.225	***	1.225	***	1.233	***
Father's Status										
(Father in the household, non migrant)										
Father migrated to the U.S.	1.005		1.147		1.007		1.007		1.006	
Father is not a household member	1.151	***	1.151	***	1.150	***	1.151	***	1.152	***
Household's Migration Characteristics										
Household has international migrants	1.000		1.000		1.048		0.998		1.000	
Household received remittances	1.034		1.034		1.031		1.083	+	1.034	
Context Characteristics										
Development level	1.180	***	1.181	***	1.188	***	1.185	***	1.225	***
Migration intensity	0.881	***	0.881	***	0.880	***	0.880	***	0.878	***
Interactions										
Migrant father*Development			0.792	†						
Migrants in household*Development					0.906	***				
Remittances*Development							0.912	**		
Parents' education*Development									0.993	***
Log likelihood	-91376		-91374		-91366		-91371		-91365	
N	159527		159527		159527		159527		159527	

† p < 0.05 * p < 0.01 ** p < 0.005 *** p < 0.000
Source: 2000 Mexican Census Subsample, IPUMS International
Standard errors adjusted for clustering at the municipality level
[a] Reference categories in parentheses

Table 9. Logistic Regression Models for the Probability of Completing Middle School Conditional on Completing Primary School, Girls Ages 16 to 17 (Odds Ratios)

	Model 1		Model 2		Model 3		Model 4		Model 5	
Individual Characteristics										
Age										
(16 Years) [a]										
17 Years	1.469	***	1.469	***	1.469	***	1.469	***	1.469	***
Ethnicity										
(*Mestizo*)										
Indigenous	0.705	***	0.705	***	0.710	***	0.708	***	0.705	***
Parents' Education (in years)	1.264	***	1.263	***	1.263	***	1.263	***	1.263	***
Father's Status										
(Father in the household, non migrant)										
Father migrated to the U.S.	1.020		1.182		1.026		1.020		1.020	
Father is not a household member	1.316	***	1.316	***	1.313	***	1.317	***	1.316	***
Household's Migration Characteristics										
Household has international migrants	1.082	**	1.083	**	1.149	***	1.079	**	1.082	**
Household received remittances	1.071	†	1.070	†	1.067	†	1.152	***	1.071	†
Context Characteristics										
Development level	1.301	***	1.301	***	1.316	***	1.312	***	1.296	***
Migration intensity	0.874	***	0.873	***	0.871	***	0.872	***	0.874	***
Interactions										
Migrant father*Development			0.753	†						
Migrants in household*Development					0.865	***				
Remittances*Development							0.836	***		
Parents' education*Development									1.001	
Log likelihood	-76526		-76523		-76506		-76507		-76526	
N	146761		146761		146761		146761		146761	

† p < 0.05 * p < 0.01 ** p < 0.005 *** p < 0.000
Source: 2000 Mexican Census Subsample, IPUMS International
Standard errors adjusted for clustering at the municipality level
[a] Reference categories in parentheses

Table 10. Logistic Regression Models for the Probability of Completing High School Conditional on Completing Middle School, Children Ages 19 to 20 (Odds Ratios)

	Boys		Girls	
Individual Characteristics				
Age				
(19 Years) [a]				
20 Years	1.363	***	1.249	***
Ethnicity				
(*Mestizo*)				
Indigenous	0.769	***	0.748	***
Parents' Education (in years)	1.182	***	1.205	***
Father's Status				
(Father in the household, non migrant)				
Father migrated to the U.S.	1.258		0.926	
Father is not a household member	1.033		1.146	***
Household's Migration Characteristics				
Household has international migrants	0.875	***	0.910	*
Household received remittances	1.054		0.915	†
Context Characteristics				
Development level	1.015		1.040	*
Migration intensity	0.945	***	0.899	***
Log likelihood	-48858		-44941	
N	80778		73424	

† $p < 0.05$ * $p < 0.01$ ** $p < 0.005$ *** $p < 0.000$
Source: 2000 Mexican Census Subsample, IPUMS International
Standard errors adjusted for clustering at the municipality level
[a] Reference categories in parentheses
Note: Interactions were not significant, models with interactions excluded from table

Appendix II
Models without Community Level Controls

Table A. Logistic Regression Models for Educational Outcomes without Contextual Level Controls, Boys Ages 13 to 20 (Odds Ratio)

	School Enrollment		Primary Completion		Secondary Completion		High School Completion	
Individual Characteristics								
Age								
13 Years	(reference)		(reference)					
14 Years	0.541	***	1.944	***				
15 Years	0.264	***	3.009	***				
16 Years	0.144	***	3.426	***	(reference)			
17 Years	0.097	***	3.482	***	1.574	***		
18 Years								
19 Years							(reference)	
20 Years							1.364	***
Ethnicity								
(*Mestizo*)								
Indigenous	1.497	***	0.629	***	0.673	***	0.765	***
Parents' Education (in years)	1.236	***	1.273	***	1.250	***	1.185	***
Father's Status								
(Father in the Household, non migrant)								
Father migrated to the U.S.	0.794		1.022		0.907		1.209	
Father is not a household member	1.205	***	1.194	***	1.213	***	1.040	
Household's Migration Characteristics								
Household has international migrants	0.825	***	1.192	***	0.896	***	0.845	***
Household received remittances	0.935	***	1.121	***	0.951		1.024	
Log likelihood	-258748		-197113		-91931		-48871	
N	494014		493522		159527		80778	

+ p < 0.05 * p < 0.01 ** p < 0.005 *** p < 0.000
Source: 2000 Mexican Census Subsample, IPUMS International
Standard Errors adjusted for clustering at the municipality level
a Reference categories in parentheses

Table B. Logistic Regression Models for Educational Outcomes without Contextual Level Controls, Girls Ages 13 to 20 (Odds Ratio)

	School Enrollment		Primary Completion		Secondary Completion		High School Completion	
Individual Characteristics								
Age								
13 Years	(reference)		(reference)					
14 Years	0.613	***	1.856	***				
15 Years	0.316	***	2.696	***				
16 Years	0.195	***	2.998	***	(reference)			
17 Years	0.143	***	3.040	***	1.482	***		
18 Years								
19 Years							(reference)	
20 Years							1.252	***
Ethnicity								
(*Mestizo*)								
Indigenous	1.023		0.478	***	0.531	***	0.728	***
Parents' Education (in years)	1.263	***	1.289	***	1.302	***	1.212	***
Father's Status								
(Father in the Household, non migrant)								
Father migrated to the U.S.	0.807	***	1.257	**	0.888		0.854	
Father is not a household member	1.360	***	1.282	***	1.422	***	1.168	***
Household's Migration Characteristics								
Household has international migrants	0.847	***	1.306	***	0.940	*	0.842	***
Household received remittances	0.963		1.176	***	0.962		0.859	***
Log likelihood	-244837		-166847		-77506		-44999	
N	465705		465166		146761		73424	

+ p < 0.05 * p < 0.01 ** p < 0.005 *** p < 0.000
Source: 2000 Mexican Census Subsample, IPUMS International
Standard Errors adjusted for clustering at the municipality level
a Reference categories in parentheses

Appendix II:

Construction of Indices of Marginalization and Migration Intensity

The models in this analysis use two indices of contextual information created by the Mexican National Council of Population (Consejo Nacional de Población, CONAPO) with information of the 2000 Mexican Census of Population and Housing. These two indices are calculated at both the state and municipality levels; however, for the multivariate analyses presented in this paper I used the municipality level scores.

Construction of the Mexico-U.S. Migration Intensity Index[6]

The first of the two indices used for this analysis is the Migration Intensity index. This indicator was constructed using the principal components technique with the purpose of differentiating states and municipalities according with the global intensity of their migration flux to the United States. For the estimation o the index of Migration Intensity CONAPO used household data from the 10% sample of the 2000 Mexican Census which yields information on 2.2 million households.

The index was created with four measures of migration to the U. S.:

- Households that receive remittances: This variable is the percent of households where at least one of their members declared receiving money transfers from family living abroad. The variable was calculated by dividing the number of households where at least one of its members receives remittances by the total number of households within the same municipality times 100.
- Households with emigrants to the U.S. in the past five years: this is the percentage of households where some of its members left the country in the last 5 years to establish residence in the U.S. This indicator is created by dividing the households with U.S. emigrants by the total of households in the municipality, times 100.
- Households with circular migrants in the past five years: the percent of household members who went to the U.S. in the past five years and returned by the time of the Census.
- Households with return migrants: the percent of households with some member, born in Mexico, who lived in the U.S. in 1995 but came back to live in the country before the time of the Census.

These four indicators were reduced into an index using the Principal Components technique. The resulting index was then divided through Optimal Stratification Technique into five categories of migration intensity for each municipality: very low, low, medium, high and very high. This classification identified 93 municipalities with no evidence of migration, 863 with very low, 593 with low 392 of medium migration intensity, 330 with high, and 162 with very high migration intensity. In the models presented in this paper I used the Migration intensity index as a continuous variable and not these five categories. However, the categories are useful to summarize and map the data.

[6] For more information see: Consejo Nacional de Población. 2000. Metodología del Índice de Intensidad Migratoria México-Estados Unidos. México, Available online: http://conapo.gob.mx/publicaciones/intensidadmig/anexoC.pdf

Construction of the Index of Marginalization[7]

Like the index of Migration Intensity, this index was also constructed using the 10% sample of the 2000 Mexican Census, and data was reduced used Principal Components analysis. The variables that constitute the Index of Marginalization aim at measuring diverse forms of exclusion and are the following:

- Percent of people 15 years old and older who are illiterate
- Percent of people 15 years old and older who did not complete elementary school
- Percent of people who live in dwellings without sewage or toilet service
- Percent of people residing in dwellings without electricity
- Percent of people living in dwellings without piped water
- Percent of people living in crowded quarters. Crowding was defined as 3 or more people living in a 1 bedroom house, 5 and more residents in 2 bedroom houses, 7 or more residents for 3 bedroom houses, and last for houses with 4 bedrooms those where 9 or more people live
- Percent of people living in households with dirt floors
- Percent of people in localities with less than 5,000 inhabitants
- Percent of working people with no income, or with income less or equal than two minimum wages

The idea behind the creation of this index is to come up with an indicator that measures the global impact of social exclusion and allows for geographic comparison. CONAPO created an index using principal components analysis in order to synthesize the complexity of the different dimensions of marginalization into a measure that allows to order and differentiate states and municipalities according to the intensity of exclusion and deprivation affection their population. This index has a standard normal distribution where positive scores indicate a high degree of marginalization and negative scores indicate a lower degree of marginalization.

Using an optimal stratification technique the municipalities were classified into five groups according to their degree of marginalization: very low, low, medium, high and very high. Again, the multivariate analysis models presented in this paper use the index as a continuous variable, but the classification into groups is useful for descriptive purposes. As a result of this categories' distribution we have 247 municipalities with very low degree of marginalization, 417 with low, 486 with medium, 906 with high, and 386 with very high level of marginalization.

In the multivariate analyses presented in this paper I used this index as a continuous variable and reversed the direction of this indicator in order to interpret negative scores as lower degree of socioeconomic development and positive scores as a higher degree of socioeconomic development.

[7] For more detail see: Consejo Nacional de Población. 2000. Metodología de Estimación del Índice de Marginación, México. Available online: http://conapo.gob.mx/publicaciones/indices/pdfs/006.pdf

References

Alwin, Duane F., and Arland Thornton. 1984. "Family Origins and the Schooling Process." *American Sociological Review* 49(6): 784-802.

Balán, Jorge, Harley L. Browning and Elizabeth Jelin. 1973. *Men in a developing society; geographic and social mobility in Monterrey, Mexico*. Austin: University of Texas Press, 384p.

Binder, Melissa. 1998. "Family Background, Gender and Schooling in Mexico." *The Journal of Development Studies* 35(2):54-71.

Borraz, Fernando. 2005. "Assessing the Impact of Remittances on Schooling: the Mexican Experience." *Global Economy Journal* 5(1): Art. 9.

Buchmann, Claudia, and Emily Hannum. 2001."Education and Stratification in Developing Countries : A Review of Theories and Research." *Annual Review of Sociology,* 27:77-102.

Cerrutti, Marcela and Georgina Binstock. 2004. "Camino a la exclusión: Determinantes del abandono escolar en el nivel medio en la Argentina." Paper presented at the 2004 Congreso de la Asociación Latinoamericana de Población Meeting, Caxambu, Brazil.

Corcoran, Mary, and Linda Datcher. 1981. "Intergenerational Status Transmission and the Process of Individual Attainment." In *Five Thousand American Families–Patterns of Economic Progress* edited by Martha S. Hill, Daniel H. Hill and James N. Morgan. Ann Arbor, Mich.: Survey Research Center.

Coubès, Marie-Laure, and René Zenteno. 2005. "Transición hacia la vida adulta en el contexto mexicano: una discusión a partir del modelo normativo." Pp. 331-353 in *Cambio demográfico y social en el México del siglo XX: Una perspectiva de historias de vida*, edited by Marie-Laure Coubès, María Eugenia Zavala de Cosío and René Zenteno. Tijuana: El Colegio de la Frontera Norte.

Filmer, Deon and Lant Pritchett. 1999. "The Effect of Household Wealth on Educational Attainment Around the World: Demographic and Health Survey Evidence." *World Bank Policy Research Working Paper No. 1980*. The World Bank, 38p.

Giorguli Saucedo, Silvia E. 2004. *Transitions from school to work: Educational outcomes, adolescent labor and families in Mexico.* Ph. D. Dissertation, Sociology, Brown University.

Giorguli Saucedo, Silvia E. 2002. "Estructuras Familiares y Oportunidades Educativas de los Niños y Niñas en México." *Estudios Demográficos y Urbanos* 51:523-546.

Hall, Patricia Kelly, Robert McCaa and Gunnar Thorvaldsen. 2000. "Introduction. International Historical Microdata: A New Resource for Research and Planning." Chapter 1 in Hall, Patricia Kelly, Robert McCaa and Gunnar Thorvaldsen (eds.).*Handbook of International Historical Microdata for Population Research.* Minneapolis: Minnesota Population Center.

Hanson, Gordon H. and Christopher Woodruff. 2003. "Emigration and Educational Attainment in Mexico." Working Paper, University of California, San Diego.

Hill, Martha S., and Greg J. Duncan. 1987. "Parental Family Income and the Socioeconomic Attainment of Children." *Social Science Research* 16:39-73.

Instituto Nacional de Estadística, Geografía e Informática. 2003. *Síntesis Metodológica. XXII Censo General de Población y Vivienda 2000*. Mexico: INEGI.

Instituto Nacional de Estadística, Geografía e Informática, Mexico. 2000a. *XII Censo General de Población y Vivienda, México*. Minnesota Population Center. Integrated Public Use Microdata Series — International: Version 4.0. Minneapolis: University of Minnesota, 2008.

Instituto Nacional de Estadística, Geografía e Informática (INEGI), 2000b. *Estadísticas educativas de hombres y mujeres.* Mexico: INEGI, 308p.

Jencks, Christopher, James Crouse, and Peter Meuser. 1983. "The Wisconsin Model of Status Attainment: A National Replication with improved Measures if Ability and Aspiration." *Sociology of Education* 56(1):3-19.

Kandel, William, and Douglas S. Massey. 2002. "The Culture of Mexican Migration: A Theoretical and Empirical Analysis." *Social Forces* 80(3):981-1004.

Levison, Deborah, Karine S. Moe and Felicia Marie Knaul. 2001. "Youth Education and Work in Mexico." *World Development* 29(1):167-188.

Massey, Douglas S., Rafael Alarcon, Jorge Durand and Humberto Gonzalez. 1987. *Return to Aztlan: the social process of international migration from western Mexico,*. Berkeley: University of California Press.

McKenzie, David and Hillel Rapoport. 2006. "Can Migration Reduce Educational Attainment? Evidence from Mexico." *World Bank Policy Research Working Paper* 3952, June 2006.

McLanahan, Sarah. 1985. "Family Structure and the Reproduction of Poverty." *American Journal of Sociology* 90:873-901.

Mier y Terán, Marta and Cecilia Andrea Rabell. 2005. "Cambios en los patrones de corresidencia, la escolaridad y el trabajo de los niños y los jóvenes." Pp. 285-329 in *Cambio demográfico y social en el México del siglo XX: Una perspectiva de historias de vida,* edited by M.-L. Coubès, María Eugenia Zavala de Cosío and René Zenteno. Tijuana: El Colegio de la Frontera Norte.

Mier y Terán, Marta, and Cecilia Rabell Romero. 2003. "Inequalities in Mexican Children's Schooling." *Journal of Comparative Family Studies* 34(3):435-454.

Minnesota Population Center. 2009. *Integrated Public Use Microdata Series — International: Version 5.0*. Minneapolis: University of Minnesota.

Miranda, Alfonso. 2007. "Do Migrant Networks Affect Education in Source Countries? Evidence from Urban Mexico." Paper presented at the Fourth IZA Annual Migration Meeting, Bonn Germany.

Sewell, William H., and *Robert* M. Hauser. 1975. *Education, Occupation, and Earnings: Achievement in the Early Career*. New York: Academic Press.

Shaw, Lois B. 1982. "High School Completion for Young Women." *Journal of Family Issues* 3(2):147-163.

Solís, Patricio. 2002. *Structural change and Men's Work Lives: Transformations in Social Stratification and Occupational Mobility in Monterrey, Mexico* Ph.D. Dissertation, Sociology. University of Texas, Austin.

Solís, Patricio and Francesco C. Billari. 2002 "Structural Change and Occupational Attainment in Monterrey, Mexico." *Max Planck Institute for Demographic Research Working Paper* Num. 38.

Teachman, Jay D. 1987. "Family Background, Educational Resources, and Educational Attainment." *American Sociological Review.* 52(4): 548-557.