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Drop out from primary to secondary school in Mexico: A life course perspective

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ABSTRACT

Preventing school dropout is a critical feature of the Millennium Development Goals. Yet, as primary school enrollments become universal, dropout rates in Mexico near 50% by the end of formal schooling. Using a unique, nationally representative data set (Mexico Family Life Survey) we track children ages 5–11 in 2002 to the years 2005–2006 to determine how many have students have dropped out of school. We then apply a life-course perspective to determine if the influences of family, school and macro-factors interact with the child's level of schooling and the transition from primary to secondary school. We find that the transition to secondary school has the highest dropout rates. Rurality matters most during this transition. As family factors are the most predictive indicator of dropout, the family's influence is dynamic over time—the role of mother's education fades while the influence of an unemployed father grows.

1. Introduction

Education is widely promoted as a means of improving individuals' prospects for economic security and overall social well-being. The centrality of education is highlighted in the Millennium Development Goals (MDG). One of the eight goals is universal primary school enrollment by the year 2015. And according to MDG data, this goal is close to being achieved. Primary school enrollment reached 89% in the developing world by 2008 (United Nations, 2010). Progress is clearly evident in Latin America where several countries have nearly reached universal enrollment (Urquiola and Calderon, 2006).

But, as countries become more successful in ensuring that all children begin formal education, preventing school dropout is the next obvious step (United Nations, 2010). This issue is clearly evident in Mexico. Mexico has one of the most successful enrollment rates in Latin America (95–99%, Urquiola and Calderon, 2006) yet concurrently suffers from dropout rates nearing 50% (ECLAC, 2001–2002). Children marginalized by rural residence and poverty experience particularly high risks of dropping out (Muñiz, 2001). As a result, Mexico has developed a large-scale cash-transfer program (Oportunidades) to encourage families to keep their children in school. Developed in 1997 as the Programa Nacional de Educación, Salud y Alimentación (Progresa), and renewed as Oportunidades in 2002, the program was created to provide subsidies to poor households if parents enrolled their children in school and made regular trips to health clinics. As of 2006, one-quarter of Mexicans were enrolled.

Given considerable attention to the dropout problem in Mexico, we argue that understanding why students dropout can be enhanced by considering how the determinants of school attendance shift as children transition from primary to secondary school. We focus on how the roles of family, school and social context change as children move through the education system.

To date, considerable scholarship has focused on the correlates of dropout in secondary school, often with cross-sectional data, but less attention has been placed on younger children either during primary school or in the transition from primary to secondary school. In order to more accurately assess the role of family, school and macro forces shaping school dropout, we adopt a life-course approach with a longitudinal sample of children age 5–11 who are enrolled in school at wave one of the Mexico Family Life Survey (MFLS) and predict whether they are still enrolled at wave two, three years later. We examine the influence of primarily family, but also consider school and macro forces on school dropout during primary school with a focus on the transition from primary to secondary school. We argue that the relative importance of these factors will shift over time.

2. Dropout in Mexico

The dropout rate in Mexico is significant, with nearly half of students dropping out before the end of secondary school (45% in

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2000, ECLAC, 2001–2002; Espíndola and León, 2002).[1] More specifically, of total dropouts, 10% dropout during primary school (first six years of school), and an additional 28% dropout at the end of primary school. Another 52% of student dropouts leave school at the start of secondary school (6–12 years of schooling) and 10% near the end of secondary school (ECLAC, 2001–2002). To understand why, we start with Buchmann and Hannum's (2001) conceptual framework for understanding educational outcomes in developing countries. Development research on educational inequalities has focused on three sources of explanation; macro-structural forces, school factors, and family factors. Macro-structural forces, such as state education policies and economic conditions, can shape educational outcomes by effecting school access and quality, and material conditions in the home. In turn, school and family conditions can also influence child dropout rates. Although macro-structural forces, family factors and school factors interact in complicated ways (i.e. child labor; remittances), we use this conceptualization to frame our review of the literature and structure our analysis of early age drop out.

2.1. Macro-structural forces

The decentralization movement in Mexican education radically transferred the control of education from the federal government to the states. As the movement was underway between the late 70s (Palafox et al., 1994) to early 90s (Torres and Puiggros, 1995; Bujanda, 2006) federal education spending significantly declined (Binder, 1999; Palafox et al., 1994). Although the impact of decentralization on dropout is unclear, some macro-structural forces thought to influence educational outcomes were relatively stable during this period. Inequality between the rich and poor, for example, remained relatively unchanged (World Bank, 2011).[2] Others, however, have played an important role in understanding dropout rates in Mexico—specifically migration and the federal education program Oportunidades.

Migration has been shown to be both positively and negatively associated with school dropout. Migratory experiences of family members and relatives can minimize school attachment (Halpern-Manners, 2011; Kandel and Kao, 2001; McKenzie and Rapoport, 2009)[3] and the absence of a family member can increase the labor burden at home (Meza and Carla Pederzini, 2008; Parreñas, 2005). In addition, the migration of family members can create a "culture of migration" (Massey et al., 1998) where kids devalue schooling with anticipation of migrating themselves. Conversely, migration may have positive effects on reducing dropout. Remittances from such family members can offset inhibitive costs of education (Edwards and Ureta, 2003; Taylor and Mora, 2006; Lopez-Cordova, 2005; Durand et al., 1996) and inspire children to do their part and stay in school (see Halpern-Manners, 2011).

The other notable macro-level impact on education is Oportunidades. Oportunidades provides subsidies to poor households. These subsidies, in the form of cash-transfers, are thought to offset the tendency for children in low income families to enter the labor force instead of attend school (Skoufias and Parker, 2001; Kandel and Post, 2003; Levison et al., 2001).[4] The program is extensive, with nearly one quarter of the Mexican population participating. As of 2004, the program served almost 40% of rural families and nearly 12% of all families in Mexico (Coady and Parker, 2004).

A sizable literature has emerged showing small to modest impacts of the program on several educational outcomes, including dropout (Skoufias and Parker, 2001; Buddelmeyer and Skoufias, 2003; Schultz, 2000a,b; Ravallion and Wodon, 2000; Skoufias and Parker, 2001; Bourguignon et al., 2003; see Azevedo et al., 2009 for a review). Specifically, Oportunidades has been shown to slightly influence the labor participation of boys between the ages of 12–17 and increase school attendance by 20%, with the largest impact for children above age 12 (Skoufias and Parker, 2001). But the effect of Oportunidades is limited to secondary school-age children (Azevedo et al., 2009). When examining primary school, the effects are small or nonexistent (de Janvry and Sadoulet, 2006; Schultz, 2004; Behrman et al., 2005; see Azevedo et al., 2009), perhaps because enrollment rates in primary schools are already high (Azevedo et al., 2009).[5]

Although migration and the Oportunidades are dominant forces in the literature, there are other important macro-level factors that may also help explain dropout, including gender (Post, 2001), indigenous identification (Halpern-Manners, 2011), and rurality (Kandel and Post, 2003; Halpern-Manners, 2011; Kandel, 2003; Lutz, 2007). Although partly an individual characteristic, ethnicity and gender can be considered part of the larger macro forces in Mexico because of the societal norms that underlie gender and ethnic inequality. Ethnic minorities are often at an educational disadvantage. This disadvantage arises from a history of discrimination, social and geographic isolation, and language (Hamel, 2008). In Mexico, darker skin is associated with lower education, occupational status and affluence even after other characteristics are taken into account (Villarreal, 2010) and non-Spanish speakers are at decided disadvantage due to Spanish-focused curriculums and instruction (Hamel, 2008).

Substantial research has focused on the gender gap in education. This gap is not as great in Latin American as in other regions (ECLAC, 2001–2002) and even favors women in some countries and at younger ages such as Argentina, Brazil, Colombia, Costa Rica, Honduras, Panama, Uruguay and Venezuela. Mexico, on average, has slightly more females than males dropping out of school (47% compared to 46%, ECLAC, 2001–2002) and has recently narrowed (Parker and Carla Pederzini, 2000). Poverty and the demand for female household labor play an important role in female dropout in Mexico (Post, 2001).

Finally, rural residents generally live farther from schools, have lower quality schools, and see education as less relevant given the job opportunities available (Shultz 2004; Behrman et al., 2005).

2.2. School

The role of school on educational outcomes has a sorted history. While the *Coleman Report* (Coleman et al., 1966) found that family background had a more profound effect on educational achievement in the United States, Heyneman and Loxley (1983) found that school and teacher quality explained a greater proportion of

[1] The term "secondary school" in this context refers to both "secundaria" and "secundaria superior." The first is equivalent to junior high in the U.S. or gymnasium in some European countries and lasts three years. The second refers to upper secondary school. It also lasts three years. We use the term "secondary school" to refer to both secundaria and secundaria superior school following conventions used elsewhere (ECLAC, 2001–2002). When we discuss dropout during the transition from primary to secondary school we are referring to the transition from primary to secundaria school. We are grateful to an anonymous reviewer for suggesting this clarification.

[2] The Gini coefficient for Mexico has been around 50 from the years 2000–2010. A score of zero represents perfect income equality and a score of 100 equals perfect income inequality. A score of 50 is relatively high by comparison.

[3] Strangely, child and sibling trips to the U.S. are linked to higher dropout, whereas a head of household trip is linked to staying in school (Kandel, 2003).

[4] Children in the program had to attend at least 85% of class per month. In secondary school, incentives are age-graded with a one-time cash transfer after high school completion. The program also provides school supplies. Yet, many eligible households did not sign up due to lack of knowledge or uncertainty regarding eligibility status (Azevedo et al., 2009).

[5] This has led some to argue for substantial scholarship increases in secondary schools and less investment in primary school (Azevedo et al., 2009).

educational achievement than nonschool factors for the majority of developing countries, including Mexico.[6]

But since Heyneman and Loxley's study (1983), educational access and quality in Mexico has improved with reductions in teacher-to-student ratios (Creighton and Park, 2010; Bujanda, 2006; Anderson, 2005) and near gender parity in school enrollment (Creighton and Park, 2010). The most notable change has been educational access (Urquiola and Calderon, 2006; Behrman et al., 2005). As of 2007, Mexico's primary enrollment rate was nearly universal at 95%[7] whereas half a century earlier enrollment rates in Central America hovered around 33% compared with nearly 80% in North America (Benavot and Riddle, 1988). This might explain why Baker et al. (2002) found, when revisiting the "Heyneman–Loxley Effect," that family background matters more than school factors across most developing and developed nations, including Mexico.

Overall, the role of school quality appears to be an important factor for understanding educational attainment in Mexico (Palafox et al., 1994), yet few studies capture rich school-level variables across the development literature (Buchmann and Hannum, 2001). Of the data that do have school-level measures, these data sources do not examine primary school-aged children over time (e.g. Fuchs and Wößmann, 2007; Alvarez et al., 2007).

2.3. Family

A large literature demonstrates the critical influence of family factors on dropout across developing countries and in Mexico. There is growing evidence that the decision to leave school is a family, rather than an individual, decision (Valdez et al., 2008; Blasco, 2009). Research documents that a child's socioeconomic background has a substantial influence on children's educational experience in a wide variety of contexts (Buchmann and Hannum, 2001). In Mexico, the role of poverty (Levison et al., 2008; Halpern-Manners, 2011; Lutz, 2007; Kandel, 2003), parental education (Kandel and Post, 2003; Halpern-Manners, 2011; Kandel, 2003; Lutz, 2007), father's occupation (Kandel and Post, 2003; Lutz, 2007), family structure (Saucedo, 2002), and single motherhood due to migration (Creighton et al., 2009) have all been shown to be associated with school dropout rates.

One important way scholars have understood the link between a child's socioeconomic background and dropout is child labor. Child labor—a child's economic activity outside the home—is understood as the result of family poverty, creating a pull from school into the labor market to supplement family income (Skoufias and Parker, 2001; Levison et al., 2001).[8] Although secondary education was made compulsory in 1993 (Kandel and Post, 2003), it is not directly enforced and, as a result, child labor persists (Post, 2001).

As important as child labor is for understanding dropout, few children in primary schools participate in child labor. Most children begin entering the labor force after age 12 and only until age 14 does their study time drop significantly as a result (Levison et al., 2001).[9] Therefore, the link between socioeconomic status and dropout may result from parents *expected* returns to education (Blasco, 2009) making the commitment to schooling tenable even at the primary school years when so few children actually work.

Although the role of socioeconomic status and child labor are relatively clear, the influence of other family factors are more difficult to isolate. The influence of family structure can depend on specific arrangements. In the Mexico case, a single parent may result from a spouse working in another country. In some studies, single motherhood decreases the risk of dropout (Kandel and Post, 2003), most likely due to negative influence of fathers. In Mexico, fathers can have a negative influence on children's study time (Levison et al., 2008) and hold general disinterest in children pursuing education (Blasco, 2009). But, when both parents encourage schooling this effect is not significant (Kandel and Post, 2003). Overall, the effect of a single-parent household appears to have negative impact for staying in school (Kandel, 2003).

Like family structure, the influence of family size on dropout varies across different contexts. In the U.S., sibling size has a pronounced influence on educational outcomes (Downey, 2001), with the number of siblings being associated with a greater risk of dropping out (Blake, 1989). In Mexico, more siblings have been linked to dropout in one study (Lutz, 2007), with no effect in another (Halpern-Manners, 2011). Interestingly, the negative relationship between family size and educational attainment appears to grow as countries become more developed (Marteleto, 2010).

In total, there is a sizable literature about the correlates of dropout in Mexico, from macro-level explanations to the family, yet there has yet to be an understanding of how educational transitions might be differentially influenced by these factors as children progress through the education system, especially during the early years of school.

3. A life course perspective

The strength of our study is threefold. First, with longitudinal data, we account for the impact of educational transitions on dropout using a life-course perspective. The life-course perspective emphasizes dynamic influences of individual characteristics, family and school and broader social change that shape trajectories of experience (Crosnoe and Johnson, 2011). With longitudinal data, we can employ a life-course perspective that accounts for the transitions associated with movement through the educational system. The life-course perspective also highlights the role of earlier events on the likelihood of later experiences, and that some transitions are particularly important for educational outcomes (Alexander et al., 2007).

Applied to this study, transitions in and out of school are a process, rather than an event, that represents a shifting "ecological context" of overlapping influences of family, community, and school (Bronfenbrenner, 1979; Alexander et al., 2001). Thus, the family–school dichotomy often employed in the developmental education literature (Buchmann and Hannum, 2001) is unnecessarily restrictive when adopting a longitudinal focus. Family influences are an essential part of a child's first experiences in education and have lasting effects on school dropout, at least in the U.S. context (Alexander et al., 2001). As Alexander et al. (2001) describe, a life-course perspective views the roots of dropout in the earliest experiences in school and show how early set-backs, such as retention and school absences accumulate to create an orientation toward school that is increasingly disengaged.

In Mexico, as children age, the costs of attending school increase for the child and the family. Children become more capable of contributing household labor or entering the formal labor market (Fry, 2003). The likelihood of dropout increases as the curriculum becomes more difficult, financial costs increase, and the distance to

[6] This is especially true when there is limited variability of family background but large inequalities in school resources, as is the case with many countries (Heyneman, 1976; Heyneman and Jamison, 1980; Heyneman and Loxley, 1983; Lockheed et al., 1986; Behrman and Birdsall, 1983; see Hansen and Haller, 1973 for an example in Costa Rica).

[7] Or 99% when using a different measure (Urquiola and Calderon, 2006).

[8] Of course the term child labor is not easily agreed upon as it may suggest exploitative labor, in-home domestic tasks, etc. We apply the concept of child labor as "economic activities" with a direct link between labor performed and wages earned by the child (Post, 2001).

[9] The draw to child labor is gendered. Boys work more in formal work, girls more in informal work (time use age 8–17 in poor communities) (Skoufias and Parker, 2001). Girls' home duties are higher than boys and increases over time as boys' home duty hours remain low over time (Levison et al., 2001).

school becomes greater. Thus, dropout rates are expected to increase as children age (Kandel, 2003). We also account for the interaction of the child's level in school on the changing influence of family and school factors over time with the expectation that family context will become less important and school and contextual factors will become more important as children move through the education system. Moreover, Alexander et al. (2001) show prior school performance and grade retention will influence subsequent dropout rates. To capture important educational transitions, we focus on three stages of education; namely primary school, the transition into secondary school and secondary school. A focus on the transition to secondary school is especially critical transition given that his is the time period where considerable dropout occurs (ECLAC, 2001–2002). In sum, this approach is unique, given that few studies in developing countries are longitudinal and nationally representative (Buchmann and Hannum, 2001). With generalizable data, we account for simultaneous factors including child, family, and school characteristics, as well as other factors.

Second, with the Mexico Family Life Survey data, we can account for many of the macro-structural forces, school and family factors simultaneously. Macro measures in the Mexico Family Life Survey include participation in Oportunidades, travel to the U.S., rurality, sex, and language spoken in the home. School measures include distance to school, the cost of education, student/teacher ratios, and private versus public education. For family factors we use a range of measures including parents' education, employment, occupation, and household assets. To help clarify the role of other family influences on dropout, we model family structure and sibling size on school dropout. Finally we account for formal and informal child labor, although the number of students who have ever worked is small. These measures represent a wide array of information not usually available in conventional data examining Mexico.

Third, we focus on early age dropout, often unexplored in the literature. This is largely due to data availability (Post, 2001). Although the proportion of dropouts at the early ages of 5–11 is relatively small, dropout during these critical first years of education represent significant changes in the life-chances of these children. Also, the earliest indicators of dropout can reveal the changing relationship between macro, school and family factors as children age and transition through their schooling, especially in middle childhood. This developmental period may be critical as family conditions have a greater impact on children's educational trajectories than at any other point in time (Alexander et al., 2001).

Taken together, this study offers a first-of-its kind assessment of early dropout using a broad assessment of children's varied ecological contexts, mapping their influence on young children's educational transitions over time.

4. Data and methods

Data for this analysis is taken from the Mexico Family Life Survey (http://www.ennvih-mxfls.org), which is based on a national probability sample of households in Mexico. The Mexico Family Life Survey is one of the first nationally representative surveys to study families and their links to key institutions over time in Mexico (http://www.ennvih-mxfls.org). Survey questions cover a wide range of topics including family demographics, the household economy, health, and education. The sample includes approximately 8440 households. Information on family structure and parental education is taken from the household roster. The survey also includes information regarding employment and schooling for household members over age 5. Information regarding children's school experience and reasons for leaving school are based on interviews with the children in the household.

The longitudinal structure of this survey provides a major advantage in model specification. Data were collected in 2002, and approximately 90% of households were reinterviewed in 2005–2006. This panel approach has obvious advantages over cross-sectional data. In cross-sectional surveys, it is difficult to determine temporal order of events. For example, if children have stopped attending school and are working, the order of these events is unknown unless detailed event histories are included. In our analysis, all explanatory variables are taken from the 2002 survey.

The duration of primary and secondary education is an important consideration when calculating dropout rates as countries vary in the length of formal schooling. Mexico has a 12 year education system, similar to that of most Latin American countries (ECLAC, 2001–2002). The duration of primary school in Mexico is 6 years, with student ages ranging from approximately 6 to 12 years of age. The duration of secondary school is also 6 years, with student ages ranging from 12 to 18 (ECLAC, 2001–2002). The first three years is considered "lower secondary" school. Because of the young ages of our sample, lower secondary is the range of school attainment for most children in the study.

School dropout is measured by comparing reported enrollment in 2002 and 2005–2006. Analysis is restricted to children aged 5–12 who were enrolled in school in 2002. If these children are no longer attending school in the second survey they are coded as dropouts. Because the Mexico Family Life Survey is panel data, children in the first wave were approximately three years older in the second wave, ages ranging from 8 to 15. Our analysis includes a total of 3791 children who were enrolled in 2002 of which 120 or 3.2% dropped out. This low number reflects the strength of the data—a high distribution of young children in the sample. This allows us to track a large number of young children as the progress through the earliest stages of their education.

Characteristics of the children and their households, along with frequencies, are reported in Tables 1–3. Children who were old enough at wave 1 to have entered secondary school by wave 2, and who completed primary school but who did not make the transition to secondary school by wave 2 are classified as dropouts at the end of primary school. Children who drop out before the transition and after the transition are classified as primary and secondary dropouts respectively. Forty-five percent of dropouts did so at the end of primary school. It is worth noting that this number is slightly lower than the 56% rate reported 5 years earlier in 2000 (ECLAC, 2001–2002).

Child characteristics include, gender, whether they speak an indigenous language, and reasons for dropping out. Their history of school attendance is measured by whether they have ever stopped attending school or repeated a grade. Family characteristics include a dichotomous variable for presence of both parents in the household, mother's and father's education (ranging from 1 to 9), mother's and father's occupation (classified as not working, agriculture, professional, or other), number of people in the household under 18, and number of household assets (the items include land, savings, motorized vehicles, and electric appliances). Measures of school content include time it takes to get to school, costs for school fees, class size, whether the family receives support from Oportunidades, whether the school is private or public, and whether the community is rural or urban. Finally, measures of competing responsibilities or alternatives include whether anyone in the household has traveled to the U.S. or plans to travel to the U.S., whether the child has worked, whether the child has responsibilities taking care of others in the household, or whether the household receives income from people who are not living there (as an indicator of remittances).

Table 1
Macro and contextual factors and school dropout in the Mexico family life survey.

	n	% dropout in primary	Transition to secondary	Secondary	Overall odds	*p* level for interaction
Receive Oportunidades						
No	3301	1.6	10.2	3.5		
Yes	490	.7	10.1	3.0	.766	n.s.
Plan travel to U.S.						
No	3551	1.4	8.9	3.4		
Yes	240	2.2	14.7	3.0	1.41	n.s.
Travel to U.S.						
No	3716	1.4	9.1	3.4		
Yes	75	2.4	16.7	–	1.26	n.s.
Residence						
Urban	1902	1.3	4.9	3.3		
Rural	1889	1.6	13.1	3.3	1.64	<.10
Sex						
Male	1876	1.7	10.1	2.9	1.30	n.s.
Female	1915	1.2	8.4	3.7		
Indigenous language						
No	3356	1.6	8.6	2.3		
Yes	435	.7	15.5	3.4	1.05	.10
Spanish language						
No	112	2.5	8.3	–		
Yes	3679	1.4	9.3	3.4	.987	n.s.

Table 2
Characteristics of families and school dropout in the Mexico family life survey.

	n	% dropout in primary	Transition to secondary	Secondary	Overall odds	*p* level for interaction
Both parents present						
No	835	1.4	8.4	5.6		
Yes	2956	1.5	8.5	2.8	.862	n.s.
Father's education						
None	193	6.4	18.2	4.7		
Elementary	1308	1.4	14.5	2.9		
Secondary	803	1.3	3.1	2.7		
High school	343	0.0	.0	4.3		
Higher	295	.6	.0	.0	.678	<.10
Mother's education						
None	288	5.4	22.0	1.7		
Elementary	1777	1.4	13.3	3.4		
Secondary	1097	1.0	3.8	4.7		
High school	307	.5	.0	1.0		
Higher	204	.0	.0	.0	.632	<.05
Father's employment						
None	1426	1.3	5.2	5.6	1.887	
Agriculture	758	2.7	19.7	2.2	2.91	
Professional	302	1.3	.0	3.3	.858	
Other	13,053	.9	8.9	1.9	–	<.05
Mother's employment						
None	2814	1.8	9.0	3.4	1.26	
Agriculture	53	.0	.0	12.5	2.28	
Professional	236	.0	2.4	.0	.26	
Other	688	.5	12.5	3.1	–	<.10
# household assets						
0–2	274	2.1	9.1	4.8		
3	416	2.1	13.3	4.3		
4	906	2.2	8.7	5.2		
5	818	.7	8.9	1.6		
6	329	1.2	1.9	2.0		
7	78	2.9	.0	.0	.809	n.s.
Persons < 18						
1	223	.0	.0	5.0		
2	954	.9	7.1	3.1		
3	1154	1.3	7.0	3.3		
4	692	1.7	6.5	4.5		
5	350	2.9	16.1	2.3		
6+	416	2.3	21.3	1.3	1.22	<.05
Ever work						
No	3764	1.5	9.2	3.3		
Yes	26	.0	14.3	7.1	1.78	n.s.
Helping others						
No	1618	1.2	8.7	4.0		
1	1472	1.3	9.0	3.5		
2	701	2.4	10.5	2.1	1.01	n.s.

Table 3
Characteristics of schools, school experience and school dropout in the Mexico family life survey.

	Sample, *n*	% dropout in primary	Transition to secondary	Secondary	Overall odds	*p* level for interaction
Time to school						
<10 min	1204	1.6	6.9	2.6		
10–14 min	831	2.1	9.5	3.8		
15–20 min	703	2.3	12.6	4.5		
21–30 min	262	2.1	12.8	3.0		
31+ min	84	.0	7.7	3.2	1.00	n.s.
Cost (annual fees)						
0–199	500	2.8	13.3	4.3		
200–349	521	3.1	14.9	3.4		
350–524	525	1.2	9.5	5.1		
525–849	531	.8	6.6	4.2		
850+	540	1.4	2.8	2.0	.998	n.s.
Students in class						
0–19	433	1.5	11.1	4.9		
20–24	596	3.2	12.6	4.3		
25–29	588	1.2	9.8	1.6		
30–34	677	1.5	7.1	4.4		
35+	668	1.4	5.9	2.5	.979	n.s.
Repeat a grade						
No	3366	.9	7.4	3.2		
Yes	425	6.5	17.3	4.7	3.38	.05
Ever stopped						
No	3737	1.3	9.0	3.3		
Yes	54	14.3	17.6	6.3	3.53	n.s.

A substantial number of cases did not have data for school characteristics (time to school, students in the classroom, and costs to attend school) or household assets. We first report dropout patterns for these characteristics with only valid cases. In the multivariate analysis, we use imputation to incorporate all cases in the analysis. Specifically, we use parental education, parental occupation, and rural residence to impute scores for the variables with missing data.

5. Results

Table 1 reports macro and contextual characteristics included in the analysis. First, we report bivariate relationships, then a logistic regression predicting school dropout, and finally we add the significance level for the interaction between each characteristic and level of schooling (primary, transition to secondary or secondary). Odds ratios show whether the likelihood of dropping out is associated with independent variables. Results are generally consistent with expectations. Dropout rates are higher if families did not receive Oportunidades, if there is less exposure to migration to the U.S. Dropout rates are also higher in rural areas and among those with a language disadvantage. However, most of these relationships are not statistically significant and odds ratios for the likelihood of dropping out are relatively small. Only rural residence has a coefficient that is statistically significant. None of the interactions with level of schooling are statistically significant at the conventional level but rural residence and indigenous language approach statistical significance. Patterns indicate that the transition to secondary school is particularly problematic for rural children and children who speak an indigenous language. In short, contextual factors may make some difference, but these differences are not particularly large, with the exception of rural residence, and their influence remains relatively stable as children move through the school system.

Table 2 reports characteristics of families and associated dropout rates. Patterns are generally consistent with expectations based on prior research. Dropping out of school is less common in intact families with educated parents. Children are more likely to drop out if the father is in agriculture or is unemployed. Wealth, as measured by household assets, is also positively associated with staying in school. Children are more likely to dropout when there are more children in the home, when they are employed. The relationship between helping out around the house and dropping out is weak. Several family factors also evidence significant interactions with level of schooling. In particular, parental education and occupation tends to matter less the further children go in school. Household size matters less in secondary school than at early stages.

Characteristics of school environments are reported in Table 3. Travel time to school does not have a close relationship with dropout rates. Since costs for school had many missing cases, we used multiple imputation for this variable in multivariate models. Perhaps surprisingly, the cost of schooling is negatively related with dropping out. It is possible that families who are more committed to quality education are willing to pay more and their children stay in school longer. Larger classes also have slightly lower dropout rates for reasons that are unclear. Even though these relationships are in the expected direction, none of the relationships are statistically significant. In contrast, the child's prior school experience is very important. Children who have struggled in school in prior years, as indicated by leaving school for a time or repeating a grade have substantially higher risks of dropping out. Moreover, the impact of repeating a grade is much stronger in primary school than at later stages in the education system.

The last step in the analysis is to combine variables from each of the subsets of relevant factors. This was done in a few steps. First, all variables found to be statistically significant in each subset were included in a model. Then variables that were not statistically significant were eliminated from the combined model. The final results are shown in Table 4. The first model reports only main effects. Given the large number of factors that were considered, this model is relatively straight forward. Dropout rates are particularly high in the transition to secondary school. Children at the greatest risk of dropping out have less educated parents, and have fathers who are not employed or are in agriculture. Children who have repeated a grade or dropped out for a period have much higher risks of dropping out. These findings are consistent with prior literature.

The second column adds interactions to determine whether relationships shift as children move through the education system.

Table 4
Logistic regression predicting school dropout (odds ratios).

	Basic model	With interactions
Level of schooling		
Primary (implicit)		
Transition to secondary	6.55	5.07
Secondary	2.77	.90
Rural	.87	.76
Rural*transition to secondary		2.49
Father education	.81	.79
Mother education	.78	.65
Mother education*secondary		1.37
Father occupation: other (implicit)		
Agriculture	1.92	
Professional	1.48	
Not employed	1.82	1.03
Father not employed*secondary		2.56
Mother occupation: other (implicit)		
Agriculture	1.23	
Professional	.55	
Mother not employed	1.01	
# persons under 18	1.07	
Household assets	.97	
School costs	1.01	
Stopped attending	3.41	
Repeat grade	2.35	5.16
Repeat*transition to secondary		.36
Repeat*secondary		.25

These interactions test our central hypothesis that determinants of dropout shift as children move through the education system. Interactions reveal some important shifts. First, rural residence is particularly problematic in the transition to secondary school, perhaps because primary schools are often much more accessible than secondary schools. Second, consistent with the expectation that parental characteristics become less important at later stages in the education system, mother's education matters less after children are in secondary school. Before secondary school, the odds of dropping out is reduced by about one third for each unit increase in mother's education. Once the children are in secondary school, however, mothers education has a much smaller influence ($.65 \times 1.37 = .89$). Third, contrary to the general expectation that parent's characteristics matter less in later years, the odds that a child will drop out when the father does not report an occupation are particularly high after children are in secondary school. It is possible that the demand for child labor becomes much higher for older children who do not have an employed father. Finally, the impact of repeating a grade on dropping out is especially high during primary school.

To provide a different perspective on results, we consider the reasons children give for not attending school at wave 2. Children who were not enrolled were asked why they stopped. The interviewer could make 16 possible reasons. Consistent with regression results, helping with income or household responsibilities is not a major factor in school dropout. Only 9% of dropouts said this was the main reason they were not attending. Characteristics of the school, such as distance from the child's home, lack of a teacher, or school closure do not matter much either. Only 4% of students listed these as reasons for not attending. But 16% said they couldn't afford to pay school expenses. This percentage seems high given that reported costs had a negative relationship with dropping out. Not surprisingly, costs are a function of parental education and other factors. When parental education, occupation and income are included in the model, the relationship between cost and dropout is minimal. One way to understand this result is that the survey did not accurately capture the burden of school expenses. The school expense survey question, however, is fairly thorough, asking respondents to list yearly school expenses across nine categories, including costs associated with enrollment, exams, special courses, school maintenance, and school festivities. It may be that students point to finances even if school expenses are not the major explanation (Table 5).

Table 5
Reasons for not attending school at wave 2.

Reason	*n*	Percent
Household reasons: earning money or helping with household responsibilities	13	9
School reasons: too far away, no teacher, closed, doesn't have legal documents	5	4
Financial: can't afford to pay school expenses	23	16
Does not want to attend school	83	58
Other: not accepted, ill, finished	19	13
Total	143	100

Thirteen percent gave reasons including they were not accepted, they graduated or they became ill. But the most common reason given was that they did not want to attend school. Fifty-eight percent of the dropouts gave this response. It seems very plausible that a prior history of inconsistent school attendance, uneducated parents, and a father who does not need education for the type of work he does would all detract from motivation to attend school.

6. Conclusion

As enrollment rates in Mexican schools continue to increase, the importance of understanding high dropout rates requires careful attention. The social forces influencing dropout rates are varied and complex. Our analysis shows modest relationships between dropout rates and several macro, school and family characteristics. But the central story is much more straightforward. Parental education and father's employment are the key socioeconomic factors that influence school dropout. As children move through the education system they are at increased risk of dropping out, especially in the transition to secondary school. Finally, kids who have struggled to keep up as indicated by intermittent enrollment and grade repetition are much more likely to stop going to school.

A key contribution of this study is to show that the relative importance of these factors shifts as children move through the education system. Prior problems in school, as measured by grade repetition, matters most in primary school when children are particularly sensitive to teachers. The strong influence of maternal education wanes as children move through the system, but father's employment status is more critical when children reach secondary school. We find that rural residence matters most in the transition into secondary school. The influence of rurality may be due to limited secondary school possibilities in rural locations and the associated costs of sending children to urban schools. In short, at each phase in the process, different factors matter most, which should stimulate new ways of thinking about dropout as a dynamic and contextualized process that begins early in children's educational lives.

These findings have important policy implications. First, results indicate that children are at greater risk if their parents have less education, if they have had prior problems with leaving or repeating a grade, and if they do not have a father who is employed. Moreover, these risks increase as children transition out of primary school. Taken together, these results reveal that the mother's education level matters less over time as father's employment status matters more, suggesting that family influences depend on family circumstances linked to the life-course of the child. This is

especially true for rurality. Rurality is not an important predictor of dropout in primary school, but becomes an important factor in the transition to secondary school. Although not clear in this study, it is reasonable to think that this may result from the poor availability of secondary schooling in rural locations.

Second, given that households assets, school costs, children working or helping others did not predict dropout, policies that aim to increase income or reduce child responsibilities outside the school may not have huge impacts. Although other aspects of child formal and informal work beyond what can be accounted for in the Mexico Family Life Survey may still account for dropout, we simply find no evidence with the available measures that children working or children helping others impacts dropout. Rather, we argue that a focus on key family predictors of dropout—mother's education level and father's occupation—and how they change across stages of schooling is a fundamental starting point for policy intervention. As noted above, the decision to leave school is generally a family decision. Although we identify quantitative results regarding important family characteristics, more research is needed to uncover how these factors play in the decision making process within the homes of children (see Blasco, 2009 as an example).

It is important to note that although our findings do not identify the specific policies that will be most beneficial, they do add important information for policymakers. As reported in Social Panorama of Latin America (ECLAC, 2001–2002, p. 109), there are several leading policy approaches to dropout across Latin American that are results may support. First, our findings compliment efforts to improve child performance and other factors that reduce the incidence of grade repetition. Second, if availability of adequate secondary schooling in rural areas explains why rurality matters most for the transition from primary to secondary school, improvements to secondary school quality in rural locations may be effective to offset dropout. Third, efforts to increase greater parental involvement in schools would seem to matter earlier in children's educational careers when a mother's influence (as we show with education level) seems greatest. A father's influence appears to increase over time, suggesting that a father's occupation shapes a child's educational plans either directly (e.g. child labor) or indirectly (e.g. educational expectations) (see Blasco, 2009). Finally, although state efforts, such as Oportunidades, may have a sizable impact on enrollment rates (ECLAC, 2001–2002), they may have little to no impact on dropout in the early ages.

Several limitations prohibit definitive conclusions. First, adequate measurement is always an issue. There is the possibility that we have not included the best indicators of school environment, macro forces and family context. Second, the structure of the panel data does not allow us to track children who leave the household so it is not possible to follow the total sample of children who pass the age of secondary school completion. This prohibits examination of the full range of age effects, including interactions. But, as our data suggests, age is relevant in understanding how one's life-course can alter explanations and for future work, our results lend support for more life-course applications with important factors of dropout not explored here.

In sum, understanding dropout requires a life-course perspective. As the spheres of family, school, and community merge and shift, many of the family-level factors we find early in a child's educational path may simply set a stage where a child's retention in school is either strengthened or made tenuous.

References

Alexander, K.L., Entwisle, D.R., Kabbani, N.S., 2001. The dropout process in life course perspective: early risk factors at home and school. Teachers College Record 103, 760–822.

Alexander, K.L., Entwisle, D.R., Olson, L., 2007. Lasting consequences of the summer learning gap. American Sociological Review 72, 167–180.

Alvarez, J., Moreno, V.G., Patrinos, H.A., 2007. Institutional effects as determinants of learning outcomes: exploring state variations in Mexico.In: World Bank Policy Research Working Paper No. 4286. . Available at SSRN: http://ssrn.com/abstract=1004200.

Anderson, J.B., 2005. Improving Latin America's school quality: which special interventions work? Comparative Education Review 49, 205–229.

Azevedo, V., Bouillon, C.P., Yanez-Pagans, P., 2009. How much are we willing to pay to send poor adolescents to school? Simulating changes to Mexico's Oportunidades in urban areas. In: RES Working Papers 4631. Inter-American Development Bank, Research Department.

Baker, D.P., Goesling, B., LeTendre, G.K., 2002. Socioeconomic status, school quality, and national economic development: a cross-national analysis of the "Heyneman–Loxley effect" on mathematics and science achievement. Comparative Education Review 46, 291–312.

Behrman, J.R., Birdsall, N., 1983. The quality of schooling: quantity alone is misleading. American Economic Review 73, 928–946.

Behrman, J., Sengupta, P., Todd, P., 2005. Progressing through PROGRESSA: an impact assessment of a school subsidy experiment in Mexico. Economic Development and Cultural Change 54, 237–275.

Benavot, A., Riddle, P., 1988. The expansion of primary education, 1870–1940: trends and issues. Sociology of Education 61, 191–210.

Binder, M., 1999. Schooling indicators during Mexico's "lost decade". Economics of Education Review 18, 183–199.

Blake, J., 1989. Family Size and Achievement. Univ. Calif. Press, Berkeley.

Blasco, M., 2009. Linking rights with lives: the micropolitics of educational decision making in urban Mexico. Comparative Education Review 53, 41–61.

Bourguignon, F., Ferreira, F.H.G., Leite, P.G., 2003. Conditional cash transfers schooling, and child labor: micro-simulating Brazil's Bolsa Escola program. World Bank Economic Review 17, 229–254.

Bronfenbrenner, U., 1979. The Ecology of Human Development: Experiments by Nature and Design. Harvard University Press.

Buchmann, C., Hannum, E., 2001. Education and stratification in developing countries: a review of theories and research. Annual Review of Sociology 27, 77–102.

Buddelmeyer, H., Skoufias, E., 2003. An evaluation of the performance of regression discontinuity design on PROGRESSA.In: World Bank Policy Research Working Paper No. 3386, IZA Discussion Paper No. 827. . Available at SSRN: http://ssrn.com/abstract=434600.

Bujanda, L.F., 2006. Accounting for the Changing Educational Achievement of Mexican Youth Between 1984 and 2000. (Ph.D. dissertation)Department of Economics, University of California at Riverside Retrieved from ProQuest Dissertations and Theses Database, 3226536.

Coady, D.P., Parker, S.W., 2004. Cost-effectiveness analysis of demand- and supply-side education interventions: the case of PROGRESSA in Mexico. Review of Development Economics 8, 440–451.

Coleman, J.S., Campbell, E., Hobson, C., McPartland, J., Mood, A., Weinfeld, F., York, R., 1966. Equality of Educational Opportunity. US Government Printing Office, Washington, DC.

Creighton, M., Park, H., 2010. Closing the gender gap: six decades of reform in Mexican education. Comparative Education Review 54, 513–537.

Creighton, M., Hyunjoon, P., Teruel, G.M., 2009. The role of migration and single motherhoos in upper secondary education in Mexico. Journal of Marriage and the Family 71, 1325–1339.

Crosnoe, R., Johnson, M.K., 2011. Research on adolescence in the twenty-first century. Annual Review of Sociology 37, 439–460.

de Janvry, A., Sadoulet, E., 2006. Making conditional cash transfer programs more efficient: designing for maximum effect of the conditionality. World Bank Economic Review 20, 1–29.

Downey, D.B., 2001. Number of siblings and intellectual development: the resource dilution explanation. American Psychologist 56, 497–504.

Durand, J., Kandel, W., Parrado, E.A., Massey, D.S., 1996. International migration and development in Mexican communities. Demography 33, 249–264.

Economic Commission for Latin America and the Caribbean (ECLAC), 2001–2002. Social Panorama of Latin America. ECLAC, Santiago, Chile.

Edwards, A.C., Ureta, M., 2003. International migration, remittances, and schooling: evidence from El Salvador. Journal of Development Economics 72, 429–461.

Espíndola, E., León, A., 2002. La deserción escolar en Amérca Latina. Revista Iberoamericana de Educación 30, 3.

Fry, R., 2003. Hispanic Youth Dropping Out of U.S. Schools: Measuring the Challenge. Pew Hispanic Center Report. Washington, DC.

Fuchs, T., Wößmann, L., 2007. What accounts for international differences in student performance? A re-examination using PISA data. Empirical Economics 32, 433–464.

Halpern-Manners, A., 2011. The effect of family member migration on education and work among nonmigrant youth in Mexico. Demography 48, 73–99.

Hamel, R.E., 2008. Indigenous language policy and education in Mexico. In: May, S., Hornberger, N.H. (Eds.), Encyclopedia of Language and Education, Volume 1: Language Policy and Political Issues in Education. 2nd ed. pp. 301–313.

Hansen, D.O., Haller, A.O., 1973. Status attainment of Costa Rican males: a cross-cultural test of a model. Rural Sociology 38, 269–282.

Heyneman, S.P., 1976. Influences on academic achievement: a comparison of results from Uganda and more industrialized societies. Sociology of Education 49, 200–211.

Heyneman, S.P., Jamison, D.T., 1980. Student learning in Uganda: textbook, availability and other factors. Comparative Education Review 24, 206–220.

Heyneman, S.P., Loxley, W.A., 1983. The effect of primary school quality on academic achievement across twenty-nine high- and low-income countries. American Journal of Sociology 88, 1162–1194.
Kandel, W., 2003. The impact of U.S. migration on Mexican children's educational attainment. In: Cosio, M., Marcoux, R., Pilon, M., Quesnel, A. (Eds.), Education, Family and Population Dynamics. Committee for International Cooperation in National Research in Demography (CICRED).
Kandel, W., Kao, G., 2001. The impact of temporary labor migration on Mexican children's educational aspirations and performance. International Migration Review 35, 1205–1231.
Kandel, W., Post, D., 2003. After school work in Mexico: competing for children's time success. International Journal of Educational Development 23, 299–314.
Levison, D., Moe, K.S., Knaul, F.M., 2001. Youth education and work in Mexico. World Development 29, 167–188.
Levison, D., Moe, K.S., Knaul, F.M., 2008. Marking time: an analysis of youth hours of work and study in urban Mexico. Review of Development Economics 12, 751–763.
Lockheed, M.E., Vail, S.C., Fuller, B., 1986. How textbooks affect achievement in developing countries: evidence from Thailand. Educational Evaluation and Policy Analysis 8, 379–392.
Lopez-Cordova, E., 2005. Globalization, migration and development: the role of Mexican migrant remittances. In: Working Paper 20. Inter-American Development Bank.
Lutz, A., 2007. Barriers to high-school completion among immigrant and later-generation Latinos in the USA: language, ethnicity and socioeconomic status. Ethnicities 7, 323–342.
Marteleto, L., 2010. Family size, adolescents' schooling and the demographic transition: evidence from Brazil. Demographic Research 23, 421–444.
Massey, D.S., Arango, J., Hugo, G., Kouaouci, A., Pellegrino, A., Taylor, J.E., 1998. Worlds in Motion: Understanding International Migration at the End of the Millennium. Clarendon, Oxford, England.
McKenzie, D., Rapoport, H., 2009. Can migration reduce educational attainment. Journal of Population Economics 24, 1331–1358.
Meza, G.L., Carla Pederzini, V., 2008. International Migration and Schooling as Alternative Means to Social Mobility: The Mexican Case. Population Association of America, New Orleans, LA.
Muñiz, P.E., 2001. La situacíon escolar de niñas y niños rurales in México. Estudios Demográphicos y Urbanos 16, 53–83.
Palafox, J.C., Prawda, J., Velez, E., 1994. Primary school quality in Mexico. Comparative Education Review 38, 167–180.
Parker, S.W., Carla Pederzini, V., 2000. Género y educación en México. Estudios Demográphicos y Urbanos 15, 97–122.
Parreñas, R., 2005. Children of Global Migration: Transnational Families and Gendered Woes. Stanford University Press, Stanford, CA.
Post, D., 2001. Region, poverty, sibship and gender inequality in Mexican education. Gender and Society 15, 468–489.
Ravallion, M., Wodon, Q., 2000. Does child labour displace schooling? Evidence on behavioral responses to an enrollment subsidy. The Economic Journal 110, 158–175.
Saucedo, S.G.E., 2002. Estructuras familiares y oportunidades educativas de los niños y niñas en México. Estudios Demográphicos y Urbanos 17, 523–546.
Schultz, T.P., 2000a. Impact of Progresa on School Attendance Rates in the Sampled Population. International Food Policy Research Institute, Washington, DC, United States. Available at: www.ifpri.org/themes/progresa/pdf/Schultz_attend.pdf.
Schultz, T.P., 2000b. Final Report: The Impact of PROGRESA on School Enrollments. International Food Policy Research Institute, Washington, DC, United States. Available at: http://www.ifpri.org/themes/progresa/pdf/Schultz_enroll.pdf.
Schultz, T.P., 2004. School subsidies for the poor: evaluating the Mexican Progresa Poverty program. Journal of Development Economics 74, 199–250.
Skoufias, E., Parker, S.W., 2001. Conditional cash transfers and their impact, on child work and schooling: evidence from the PROGRESSA program in Mexico. Economía 2, 45–96.
Taylor, J.E., Mora, J., 2006. Does migration reshape expenditures in rural households? Evidence from Mexico. In: World Bank Policy Research Working Paper No. 3842. .
Torres, C.A., Puiggros, A., 1995. The state and public education in Latin America. Comparative Education Review 39, 1–27.
United Nations, 2010. The Millennium Development Goals Report 2010. United Nations, New York.
Urquiola, M., Calderon, V., 2006. Apples and oranges: educational enrollment, and attainment across countries in Latin America and the Caribbean. International Journal of Educational Development 26, 572–590.
Valdez, E.A., Pérez, R.R., Cubillas, M.J., Celaya, R.I.M., 2008. Deserción o autoexclusión? Un análisis de lascausas de abandono escolar en, estudiantes deeducación media superior en Sonora, México. Revista electrónica de investigación educativa 10 .
Villarreal, A., 2010. Stratification by skin color in contemporary Mexico. American Sociological Review 75, 652–678.
World Bank, 2011. Data on Mexico.. Retrieved from: http://data.worldbank.org/country/mexico.