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Intergenerational Educational Mobility During Expansion Reform: Evidence from Mexico

Daniela R. Urbina[1]

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Abstract How does intergenerational educational mobility change under educational expansion? This paper examines this question in Mexico, which enacted two important school expansion plans between 1959 and 1992. Using the 2011 Mexican Social Mobility Survey, I analyze how intergenerational mobility changes under different phases of expansion reform, and how do these trends vary according to the particular stage of the schooling process. Main findings indicate that mobility patterns are not stalled across cohorts, as reproduction theories predict. However, they do not reflect equalization at all levels of education either, as modernization hypotheses anticipate. Expansion reforms, especially the "11-year plan," are associated with positive trends in mobility in primary and lower-secondary schooling, but also with a decrease in intergenerational mobility at higher levels of education. Thus, these findings are consistent with the maximally maintained inequality hypothesis.

Keywords Intergenerational mobility · Education · Maximally maintained inequality · Cohort analysis · Expansion reform · Latin America · Mexico

Introduction

Social scientists have extensively studied the predictive association between parents' education and their descendants' educational attainment. The underlying motivation of these studies was that as societies modernize educational outcomes would not depend on the social origin of individuals. In this vein, scholars and

✉ Daniela R. Urbina
djulio@princeton.edu

[1] Department of Sociology and Office of Population Research, Princeton University, 104 Wallace Hall, Princeton, NJ, USA

policy makers have been particularly interested in how educational expansion reforms shape intergenerational educational mobility trends. Indeed, several industrialized countries implemented expansion policies during the twentieth century with the purpose to reduce inequality of educational opportunity (Guao and Wu 2010). Nevertheless, the empirical evidence to date indicates mixed findings on the role of these reforms on educational mobility across generations (Shavit and Blossfeld 1993; Gerber and Hout 1995; Breen et al. 2009; Tieben et al. 2010).

While this question has been extensively studied in industrialized societies this has not been the case in Latin America. Although these countries have implemented unprecedented expansion reforms in the last decades, to date there is still very little evidence on how expansion reforms have shaped intergenerational educational mobility trends for men and women (Torche 2014). The latter is extremely important at a time when different Latin American democracies are reassessing where to allocate more resources in the schooling process to combat high levels of inequality.

This paper intends to expand current scholarship on intergenerational educational mobility and expansion reform in Latin America by examining the case of Mexico, one of the most unequal societies in the region with a Gini index of 43.4 (World Bank 2016). This country represents an interesting case of study for several reasons. By now Mexico has a long history of education reform that has distinctively affected the educational attainment of many birth cohorts. In the 1960s, the Mexican government started to gradually implement expansion reforms at the primary and lower-secondary levels, first with the "11-year plan" (1959–1975) and later with the "Education for everyone" program (1976–1992) (Post 2001; Creighton and Park 2010). However, further expansion efforts at all educational levels were truncated due to the severe economic crisis that hit Mexico in the 1980s. This process meant that different birth cohorts faced schooling progression decisions under different stages of the expansion process. Thus, Mexico's temporal and grade variation in educational expansion constitutes an interesting scenario to study how patterns of intergenerational educational mobility change throughout these reforms.

Second, women's educational mobility has been understudied in Latin America, mainly because of the lack of surveys that include information on female respondents and their parents (Torche 2014). This is also the case for Mexico, where the majority of evidence on this topic only refers to male respondents and their fathers. Therefore, a special advantage of this study is that it not only incorporates both male and female respondents, but that it also includes father's and mother's educational attainment. This is important as previous empirical work has demonstrated that using joint-parent measures of class origin, such as education and occupation, captures mobility patterns significantly better than relying solely on father characteristics (Beller 2009).

Using data from the Mexican Social Mobility Survey 2011, this article answers two research questions. First, how intergenerational educational mobility patterns change under different phases of expansion reform in Mexico? Second, how do these changes vary according to the particular stage of the schooling process? To answer these questions, I apply educational transition models, which conceptualize schooling as a series of educational transitions that are qualitative distinct from each other. Moreover, I use grouped birth cohorts to capture general trends in intergenerational educational mobility under different expansion reforms. It is important to note that the focus of this article is not to assess the causal effect of specific policies on intergenerational mobility, but rather to present a description of mobility trends in the context of educational expansion. Ultimately the purpose of this analysis is to shed light on possible mechanisms and generate informed hypothesis on the observed trends in intergenerational mobility in Mexico.

Evidence on Intergenerational Educational Mobility and Expansion Reforms

Educational attainment is associated with a variety of structural factors, such as school quality, peer effects, and neighborhood composition (e.g., Coleman et al. 1966; Raudenbush and Wills 1995; Reardon 2016), as well as individual characteristics of students—gender, ethnicity, and cognitive ability (e.g., Wolfle 1985; Steele 1997; Kaufman et al. 2013). Nevertheless, the role of family background in the attainment process, especially parent's education, has had a central role in social science research. The motivation underlying these studies is the idea that in modern societies an individual's chances to succeed should not be shaped by their social origin (Breen and Jonsson 2005). In other words, in mobile societies, the intergenerational association between parents' and their descendants' educational attainment should be minimal.

In this literature, the study of intergenerational educational mobility has been strongly tied to debates on the role of educational expansion in the attainment processes. On the one hand, modernization theories claim that the effect of parent's education on their descendant's attainment should gradually decline as educational systems expand (e.g., Treiman 1970). In other words, as larger segments of the population have access to education, the role of family background should be less predictive of educational attainment. On the other, reproduction theories argue that educational systems are organized in a way to reproduce existent social inequalities over time (e.g., Bourdieu and Passeron 1977). Thus, despite expansion reforms, there would be a persistence in the transmission of educational advantage and, as a result, stalled levels of intergenerational mobility.

Nevertheless, previous scholarship has found mixed evidence. For instance, a landmark study of industrial societies demonstrates that in eleven out of thirteen countries[1] the levels of intergenerational educational mobility were stable over time regardless of educational expansion (Shavit and Blossfeld 1993). Evidence of stability has also been found in the U.S. (Mare 1980; Hout and Dohan 1996; Breen and Goldthorpe 1997). In contrast, other studies have found upward educational mobility trends between parents and offspring in Sweden (Erikson and Jonsson 1996; Breen et al. 2009), the Netherlands (De Graaf and Ganzeboom 1993; Tieben

[1] The countries included in the study were the U.S, the Federal Republic of Germany, England and Wales, Italy, Switzerland, the Netherlands, Sweden, Japan, Taiwan, Poland, Hungary, and Czechoslovakia.

et al. 2010), Norway (Lindbekk 1998) and Germany (Henz and Maas 1995). In turn, there is also evidence of downward educational mobility in post-Soviet Russia (Gerber and Hout 1995; Gerber 2000; Tieben et al. 2010) and China (Deng and Treiman 1997; Guao and Wu 2010).

Different theories have sought to explain this variation across countries and over time in empirical research. One of the most influential explanations has been the Maximally Maintained Inequality (MMI) hypothesis—developed by Raftery and Hout (1993)—which focuses on the role of competition in access to specific educational levels. Similarly to modernization theory, MMI predicts that with educational expansion the importance of social origin for educational attainment will decrease, provided that the upper class has reached universal access or a “saturation point” to that particular educational level. Under these conditions, lower-class children are now able to attend this educational level, and thus intergenerational mobility will increase (Raftery and Hout 1993). However, in situations where educational expansion at lower levels of education is not coupled with a sizable expansion at higher educational transitions, the increased competition to transition from one level to the next—say from high school to college—generates a bottleneck in the educational system (Gerber and Hout 1995). When faced with a higher demand than available slots, institutions necessarily have to select students, and to the extent that upper-class individuals have more comparative advantages, the role of social origin on attainment will increase (Torche 2010). What is particularly insightful about the MMI hypothesis is the fact that intergenerational educational mobility might decrease at transition levels above those levels which experienced educational expansion. Overall, this hypothesis has found empirical support in several countries such as England and Wales (Kerckhoff and Trott 1993), Ireland (Raftery and Hout 1993), Israel (Shavit 1993) and Russia (Gerber 2000; Gerber and Hout 1995).[2]

But what about educational mobility in developing countries? In the case of Latin America, there are three landmark studies that compare intergenerational educational mobility trends over time. First, Behrman et al. (2001) examined the evolution of parents–offspring schooling correlations in Brazil, Colombia, Mexico, the U.S, and Peru. They conclude that although children have consistently surpassed their parent’s education, the latter is still highly predictive of their educational attainment. For example, the association between parents’ and adult children’s schooling is 0.5 in Mexico and 0.7 in Brazil, whereas in the U.S is only 0.35. Second, Hertz et al. (2008) estimated 50-year trends in educational mobility for 42 nations. The schooling correlations between parents and offspring in Latin American countries, which included Mexico, were found to be the highest (with an average of 0.60) across all analyzed regions. Yet every Latin American country, except Nicaragua, showed a significant reduction in the regression coefficient of parents’ education as a predictor of schooling in the next generation.

[2] Subsequent theories have also incorporated the role of qualitative differences within each particular level of schooling as a mechanism through which upper-class families ensure their advantage in the educational attainment process (Lucas 2001). Yet this mechanism is beyond the scope of the present article.

Furthermore, Torche (2010) examined the case of Brazil, Chile, Colombia and Mexico, moving beyond correlations and focusing on mobility trends at specific educational transitions. For instance, in the case of completing primary and entering secondary school, she found evidence of equalization—upward intergenerational educational mobility—in all countries. However, for recent cohorts (born between 1970 and 1975) in Brazil, Colombia and Mexico she finds a decrease in educational mobility particularly in the transition to high school and college. Unfortunately, in the case of Mexico and Chile, the study only included male respondents.

In Mexico in particular, Binder and Woodruff (2002) examined intergenerational educational mobility between heads of households—the father in 83% of the cases—and their offspring. Their findings indicate that the effect of parental education decreased for primary completion. Yet for younger cohorts (born between 1965 and 1971), and especially men, there seems to be a reversal in educational mobility in completing secondary and entering some postsecondary education, due to a bottleneck at the lower-secondary level. The authors argue that these findings are partly explained by the economic crisis that occurred in the 1980s, which resulted in major budget cuts in education policy. Indeed, Parrado (2005) analyzes intragenerational class mobility across different cohorts of men and found that for younger cohorts (born between 1966 and 1968) higher levels of education no longer protected workers from experiencing downward mobility during the economic crisis of the 1980s. The latter suggests that during this crisis the economic returns to higher educational transitions were decreasing, which seems consistent with Binder and Woodruff's findings on intergenerational mobility for this cohort of men.

In addition, Torche (2015) explicitly studies gender differences in intergenerational socioeconomic mobility in Mexico. Overall, she finds that among respondents between 30 and 50 years old, women experienced higher levels of economic mobility relative to men. However, these results mask some heterogeneity according to parental socioeconomic advantage. In particular, affluent parents are more likely to transmit their advantages to their sons rather than their daughters, which explains the higher gender gap in intergenerational persistence at the top quintile of the distribution. Although this study does not study intergenerational educational mobility, it does suggest that gender plays an important role in the status attainment process in Mexico.

Overall, the empirical evidence on educational intergenerational mobility in Mexico is still very limited. Existing studies suggest there might have been an increase in equalization for lower levels of schooling followed by a decrease in upward mobility for higher levels of education. However, we need to test these hypotheses in a sample that includes both male and female respondents as well as father's and mother's education. To the best extent of my knowledge, this is the first study that will do so.

Educational Expansion in Mexico

This article analyzes how intergenerational educational mobility changes under different phases of expansion reform in Mexico. Educational expansion in this country was a gradual process that started with efforts to increase enrollments in primary and lower-secondary education.[3]

The first federal policy that intended to increase enrollments at the primary and lower-secondary levels was the “11-year plan,” implemented between 1959 and 1975 (Post 2001). The main components of this policy were the expansion of school infrastructure, the increment of teacher training and the implementation of mechanisms to increase school attendance, such as providing meals in the schools and standardization of the school calendar (Caballero 1981). Estimations indicate that between 1958 and 1964 around 21,000 new classrooms were built and over 17,000 new teachers graduated from the Federal Teachers College (Caballero 1981). These efforts resulted in an increase of enrollments from 160 to 215 students per school (Creighton and Park 2010).

The second phase of Mexican expansion, “Education for everyone,” was implemented between 1976 and 1992. This reform intended to continue school expansion in order to make primary and lower-secondary school truly universal (Creighton et al. 2016). However, these efforts could not match up the “11-year plan” investments as the country’s economy was severely hit by the economic crisis of the 1980s. In fact, scholars estimate that enrollment gains made during the 11-year plan may have been reversed during this period (Post 2001).

Together, the description of these reforms reveal their potential impact on educational mobility, especially at the primary and lower-secondary levels. Components of the “11-year plan” and “Education for everyone,” such as expanding school infrastructure and providing meals in the school, suggest these policies were especially beneficial for the most disadvantaged students. For example, recent scholarship has looked at the role of these policies on educational attainment gaps by gender (Creighton and Park 2010) and ethnicity (Creighton et al. 2016). Creighton and Park (2010) find that the gender gap for primary completion was significantly reduced during the “11-year plan” expansion period (1959–1975). In the case of ethnicity, Creighton et al. (2016) find a reduction in the attainment gap in primary and lower secondary starting from the establishment of the Department of Indigenous Affairs in 1934. In addition, the role of these reforms for increasing men’s intergenerational educational mobility in Mexico was demonstrated by Binder and Woodruff (2002) and Torche (2010). As mentioned, both studies found that cohorts impacted by these two reforms were more likely to complete primary and entering secondary school net of their parent’s education. Together, this evidence suggests we should expect equalization trends for lower educational transitions for the cohorts that experienced these reforms.

[3] Primary education comprises 6 years. Secondary education consists of other 6 years, which include three years of lower secondary and three years of upper secondary.

Research Questions and Hypotheses

This articles examines two research questions: How do intergenerational educational mobility patterns change under different phases of expansion reform in Mexico? And if existent, how do these changes vary according to the particular stage of the schooling process?

Previous scholarship leads us to the following hypotheses regarding the relationship between intergenerational mobility and educational expansion:

- *Hypothesis 1* According to reproduction theories, despite the implementation of expansion reforms educational systems will still reproduce existing social inequalities. Therefore, we should expect stability in intergenerational mobility trends across all birth cohorts and schooling stages.
- *Hypothesis 2* According to modernization theory, educational expansion should continuously decrease the role of parent's education on their descendants' educational attainment. Consequently, we should expect continuous upward trends in intergenerational educational mobility starting with the cohorts that experienced the "11-year plan" reform onward. Moreover, we should expect to find these upward trends across all stages of the schooling process.
- *Hypothesis 3* Following the Maximally Maintained Inequality hypothesis, we should expect an increase in upward mobility for primary and lower-secondary education starting from the cohorts that experienced the "11-year plan" expansion reform. However, we should also expect a decrease in upward mobility for higher educational levels (upper-secondary education and postsecondary education) for younger birth cohorts, as no expansion policies were implemented at these transitions. Thus, we expect a "bottleneck" effect for these cohorts.

Data and Methods

Data

The data used in this analysis comes from the 2011 Mexican Social Mobility Survey (MSMS), collected by the Fundación Espinosa Rugarcía (ESRU). The objective of the MSMS is to measure intergenerational social mobility in Mexico. This survey is representative of the national population, and its sample design was probabilistic, stratified, and multistage. The survey was applied face-to-face to an adult in each household between 25 and 64 years old (born between 1986 and 1947). Each respondent provided information on all the members of the household and also on his/her partner, children, and siblings.

The 2011 MSMS dataset offers two distinct advantages not found in other Mexican surveys. First, it contains detailed biographical information on the respondents' family background, such as education, occupation, and ethnicity of both parents, family structure at age 14, and number of siblings. All these variables are retrospective and reported by the respondents. Second, this survey contains intergenerational information for both female and male respondents, which is a scarce characteristic among Latin American datasets. In addition, the MSMS has been the preferred dataset for previous work in intergenerational mobility in Mexico (Torche 2010, 2015).

By design, the sample used in this analysis considers only respondents between 25 and 64 years old. This is especially convenient for educational mobility studies as this age interval eliminates individuals who have not finished their schooling. Additionally, this helps preventing selection bias coming from differences in survival rates between individuals from different social backgrounds (Behrman et al. 2001). Moreover, I also excluded from the sample those respondents who at the time of the survey were attending an educational institution ($N = 345$). This yielded a final analytical sample of 10,656 cases.

Measures

The dependent variables of this paper are four educational transitions: completion of primary education (T1); entering secondary education, given the completion of primary school (T2); completion of secondary education, given entrance to secondary school (T3); and entering postsecondary education, given the completion of secondary school (T4). Each outcome is measured as a dummy coded as (1) if the individual made that specific school transition, and (0) if he/she did not. To construct each of these dummy variables, I recoded the measures of educational attainment in the MSMS in terms of educational transitions, following the International Standard Classification of Education 2011 (ISCED). The latter uniforms the particular structure of education systems and standardizes their educational degrees according to internationally agreed definitions. Moreover, the respondents were asked for their last level of education, their last grade completed in that level, and if they received the corresponding completion certificate for each level. With this information, I was able to determine whether the respondents completed each educational cycle by checking if they received the certificate of completion of each specific transition.[4] As shown in Table 1, almost 83% of respondents completed primary, around 78% entered secondary education, while 44% completed secondary and only 38% entered postsecondary education. In the

[4] Specifically, those who answered “Pre-school or Pre-kinder” or “None/I did not go to school” were classified as having “Less than Primary.” Moreover, those who responded “General Secondary” and “Technical Secondary” were classified as having “Some Secondary,” as these grades correspond to Lower-secondary education according to the ISCED standards. Then, “General Preparatory” or “Technical Preparatory” was considered as “Complete Secondary.” Respondents who answered “Technical Education with some Primary” were classified as “Some Secondary” (If the respondent reported less grades than needed to complete this education level or did not have a certificate of completion, their level of education was considered as “Completed Primary”), and those who responded “Technical Education with some Secondary” (If the respondent reported less grades than needed to complete this education level or did not have a certificate of completion, their level of education was considered as “Some Secondary.”) were coded as “Complete Secondary.” Finally, those who responded “Normal” (This category refers to the “Normal School of Education” which trains individuals to become school teachers in Mexico), “Professional,” or “Postgraduate” were classified as having “Some Postsecondary.”

Table 1 Summary statistics

Variable	Mean	SD	Min.	Max.	*N*
Primary completion (%)	83.0	0.4	0	1	10,622
Some secondary (%)	77.7	0.4	0	1	8762
Secondary completion (%)	44.5	0.5	0	1	6735
Some postsecondary (%)	37.6	0.5	0	1	2879
Father's years of education	4.2	4.5	0	25	9246
Mother's years of education	3.8	4.0	0	22	9652
Father's ISEI	26.8	15.9	0	85	8604
C1 1947–1954 (%)	12.9	0.3	0	1	10,656
C2 1955–1962 (%)	11.1	0.4	0	1	10,656
C3 1963–1970 (%)	13.9	0.4	0	1	10,656
C4 1971–1978 (%)	18.9	0.5	0	1	10,656
C5 1979–1986 (%)	43.2	0.4	0	1	10,656
Sex (% female)	45.4	0.5	0	1	10,656
Family structure (% both parents)	82.3	0.4	0	1	10,620
Number of siblings	3.6	2.9	0	16	10,523
Parent's ethnicity (% indigenous)	17.6	0.4	0	1	10,008
Father deceased (%)	4.3	0.2	0	1	9742

Using weighted sample

remainder of the article, I will refer to completing primary school or entering secondary education as "low educational transitions," and to the completion of secondary education and entering postsecondary education as "high educational transitions."

The main explanatory variables of this study are the educational attainment of the father and educational attainment of the mother measured as years of education. To construct this measure, I used respondent's accounts on whether (1) their father/mother went to school, (2) the last level of study of their father/mother, and (3) the last grade their father/mother attended in their last level of education. As seen in Table 1, the average education of fathers is of 4.2 years, while for mothers it is 3.8 years. I also constructed a categorical measure for the educational attainment of both parents to assess the role of achieving specific educational transitions on intergenerational mobility.

As mentioned, I include a set of birth cohort dummies to analyze over time changes in intergenerational educational mobility. I constructed 8-year rolling cohorts: 1947–1954 (C1), 1955–1962 (C2), 1963–1970 (C3), 1971–1978 (C4), and 1979–1986 (C5). The selection of cohorts was driven by substantive interest in analyzing the interplay between intergenerational educational mobility and expansion reforms. Figure 1 presents the timings at which each birth cohort supposedly entered and completed their educational transitions and the expansion policies that were in place.

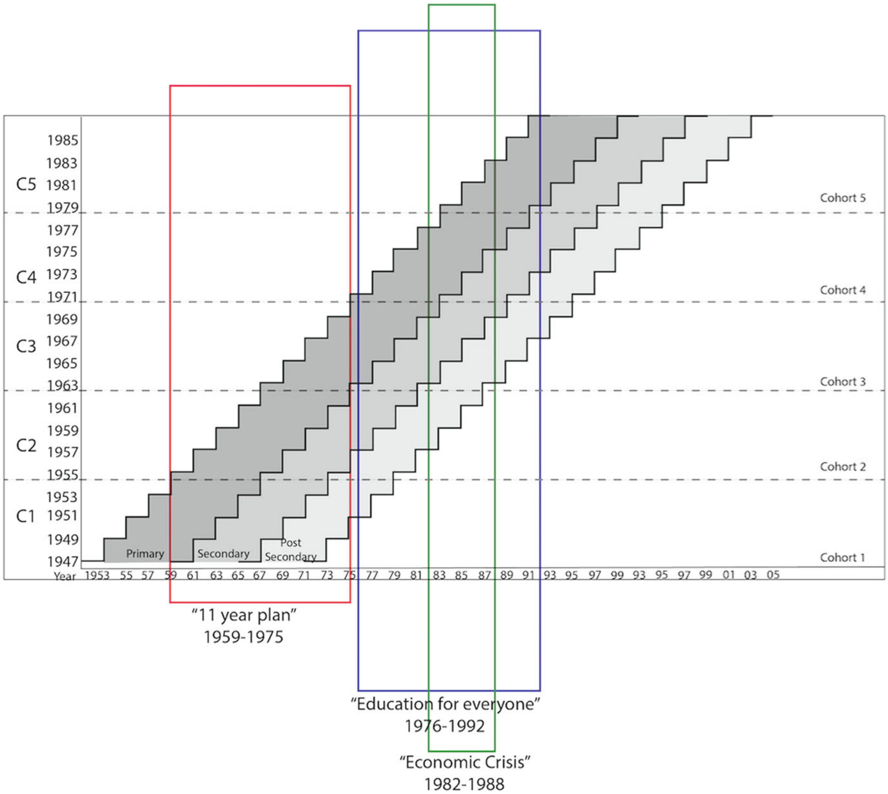


Fig. 1 Educational careers and educational policies by birth cohort

Most individuals in cohort 1, born between 1947 and 1954, went through primary and secondary schooling without any expansion policy in place. Cohorts 2 (1955–1962) and 3 (1963–1970) experienced the enactment of the "11-year Plan" during their primary and secondary education. Moreover, cohort 4 (1971–1978) and older individuals from cohort 5 (1979–1986) experienced the second stage of Mexican educational reform—"Education for everyone"—focused on primary and lower-secondary education. Finally, younger members of cohort 5 entered primary school, when the Mexican government declared lower-secondary education as a mandatory school level.

In terms of higher education, younger individuals from cohorts 1 and 2 benefited from the expansion of higher education. Presumably, cohort 3 and older individuals of cohort 4 were greatly affected by the contraction of public funding to higher education during the economic crisis of the 1980s. Cohort 5 experienced higher education at a moment when expansion at this level was revitalized by the creation of private universities and technical schools (Kent 1998).

All models include other measures of social origin besides parent's education. I include father's occupational status when the respondent was age 14. This measure is traditionally incorporated in educational mobility models as it is considered a proxy of household permanent income. Since this dataset includes a detailed measure of occupations for fathers, following the International Standard Classification of Occupations (ISCO-88), I was able to code this variable using the International Socio-Economic Index (ISEI) (Ganzeboom et al. 1992). If respondents declared having an unemployed or deceased father at age 14 these cases were coded as having a 0 score in the ISEI scale. Additionally, as a sensitivity check I included a dummy variable for having a deceased father in the models. In addition, gender is another key independent variable; as Table 1 indicates 45.4% of respondents in the sample are female.

Moreover, all models control for other family characteristics related to educational attainment. These include (i) the number of siblings that lived with the respondent at age 14; this measure is important, as it has been demonstrated that educational attainment is inversely associated with the size of an individual's sibship (e.g., Hauser and Featherman 1976; Mare and Chang 2006). Table 1 shows that respondent's average number of siblings is of 3.6. I also include a dummy variable for (ii) parent's ethnicity that measures if the respondent's father is indigenous or not. Recent studies have demonstrated that in the Mexican case ethnicity plays an important role in the attainment process (Creighton et al. 2016). Finally, I introduce a categorical variable for (iii) family structure when the respondent was 14 years old—coded as (1) if the respondent lived with both parents and (0) if it did not. In our sample, 82.3% of respondents lived with both parents at age 14. I decided to include this variable in the models due to the extensive discussion about the effects of family structure on children's educational outcomes in the social sciences (e.g., MacLanahan and Sandefur 1994; Biblartz and Raftery 1999; Evenhouse and Reilly 1994).

Analytical Strategy

To analyze intergenerational educational mobility, I use educational transitions models (Mare 1980). Under this analytical strategy, schooling processes are conceptualized as a sequence of educational transitions, in which at the end of each stage the individual decides to continue or not into the next one. This model is described by the following equation:

$$Y_{ik} = \ln\left(\frac{P_{ik}}{1 - P_{ik}}\right) = \beta_{ku} + \sum_{J} \beta_{kj} X_{ikj}\,, \tag{1}$$

where P_{ik} represents the probability that a student i at some educational level $k-1$ completes the subsequent level k. Y_{ik} is the logistic transformation of P_{ik}. X_{ikj} is the value of the jth explanatory variable for the ith person at risk of completing the kth transition, and β_{kj} are parameters to be estimated from the data (Mare 1980).

In this article, I separately model four school transitions for the Mexican case: completion of Primary Education (T1), entering Secondary Education (T2), completion of Secondary Education (T3), and entering Postsecondary (T4). Each school transition model considers only the individuals who completed the previous transition, in order not to confound the effects of family background on completing a specific educational transition (Mare 1980). To analyze how intergenerational educational mobility changes over time, in addition to the main effects of parent's education, gender, and birth cohort, I test a set of interaction terms between (1) Father's years of education and birth cohort; (2) Mother's years of education and birth cohort; (3) Father's ISEI and birth cohort; (4) Father's years of education and gender; (5) Mother's years of education and gender; and (6) Birth cohort and gender. The purpose of these interaction terms is to identify cohort-specific effects of each of these variables in the likelihood of completing an educational transition.

Since log odds coefficients do not fully capture the relation between all family background variables and educational attainment, I present predicted probabilities for specific profiles in the distribution.[5] For each transition, I estimate predicted probabilities for respondents with both father's and mother's education at the 15th ("low educational background"), 50th ("middle educational background") and 90th percentile ("high educational background") of the distribution. Empirically, this corresponds to no formal schooling for both mother and father (15th percentile); a father with four and a mother with three years of schooling (50th percentile); and nine years of schooling for both parents (90th percentile). Furthermore, I computed these probabilities separately by gender and over birth cohorts, leaving all other variables at their means. All predicted probability graphs include confidence intervals in order to distinguish whether differences are statistically significant. In addition, as a complementary analysis I calculated predicted probabilities at particular educational transitions for both parents. More specifically, for each transition I estimated predicted probabilities for respondents whose parents have (i) less than a primary education, (ii) completed primary, and (iii) completed lower secondary. I did not estimate predictions for higher educational transitions given the low proportion of parent's in Mexico that attained those levels of education. Again, I computed these probabilities by gender and over birth cohorts, leaving all other variables at their means.

In addition, given important levels of missing data in several family background variables, models were alternatively estimated using multiple imputation by chained equations[6] (e.g., Rubin 1987; Allison 2001; Little and Rubin 2002). In my analysis, the most serious amounts of missing data were on the variables pertaining parental characteristics, which were reported retrospectively by the respondent. Specifically, I had a 20% of missing cases in father's ISEI, 12% in father's education, and 8% in

[5] I did not include father's ISEI in the creation of these profiles, given that this variable was not interacted by birth cohort in the preferred model.

[6] In the case of multiple imputation using chained equations (MICE), Rubin's recommendation is to include all potentially relevant variables for predicting *X* in the multiple imputation model (Rubin 1996). The key idea is to use all available information that enhances the prediction of the missing cases, usually this includes the dependent variable of the main analysis. Following these recommendations, the imputation model for these variables included all the predictors of my substantive models, all dependent variables, and all sample design variables (Van Buuren et al. 1999; Little and Rubin 2002). Also, I included a rich set of other measures that theoretically could predict the missingness of these variables, such as age, parental assets, and other socioeconomic characteristics of the parent's household. This procedure, which included the creation of 10 new datasets, resulted in the imputation of 97% (2080 observations) of the missing cases corresponding to father's ISEI, 94% (960 observations) of the missing cases in mother's education, and 96% (1392 observations) of missing cases in father's education.

mother's education. Tables 5, 6 and 7 in the appendix provide more information on the characteristics of cases with missing data in these variables. However, since the models and predicted probabilities estimated using multiple imputation do not significantly differ from those excluding missing cases, I decided to focus my analysis on the latter. Models using multiple imputed datasets are provided in the appendix (Tables 18 and 19).

Although educational transition models are still the dominant strategy to study intergenerational mobility, these models have not been exempt of criticism. Indeed, some have argued they are more sensitive to bias from unobserved heterogeneity than other models (Cameron and Heckman 1998). As transition models are a simplification of the world, they are unable to include all variables that predict the completion of a transition. This implies that even if unobserved variables are uncorrelated with the predictors at lower transitions, they will become confounders at higher transitions, as the individuals that make it to that stage are a selected subsample of the population (Cameron and Heckman 1998; Buis 2011). In order to have a sense of the bias introduced by unobserved heterogeneity, I conduct a sensitivity analysis proposed by Buis[7] (2011), in which models are reestimated under different scenarios of unobserved heterogeneity.

Finally, some limitations of this analysis have to be considered. All my covariates are retrospective measures that describe family background when the respondent was 14 years old. These are imperfect measures, as they do not necessarily represent the family conditions of respondents at the different stages of the schooling process. Also, there is some bias that could be introduced due to selective mortality among the older cohorts. Nevertheless, since my oldest cohort is 64 years old at the time of the survey and average life expectancy is around 77 years old in Mexico (World Bank 2016), I suspect that this is unlikely to be an issue in my results. Finally, important urban/rural differences have been reported in studies of intergenerational educational mobility in Mexico (Post 2001; Creighton and Park 2010). Unfortunately, due to significant missing data on the variables pertaining to urban/rural differences, I could not incorporate these measures in my analysis.

Results

Educational Attainment and Transition Rates: Descriptive Trends

A first approach to analyze the role of Mexican expansion reforms on educational mobility is to observe educational attainment across cohorts. Figure 2 presents unconditional completion rates for each educational transition. For the oldest cohorts (born between 1947 and 1962), approximately 30% of respondents just completed primary school, while a significantly lower proportion entered or completed secondary. Nevertheless, we can see that this dramatically changes starting from cohort 3 (born between 1971 and 1978), where a higher proportion of individuals (around 30%) entered secondary education. Overall, this figure reveals

[7] Implemented in Stata using the package seqlogit (Buis 2011).

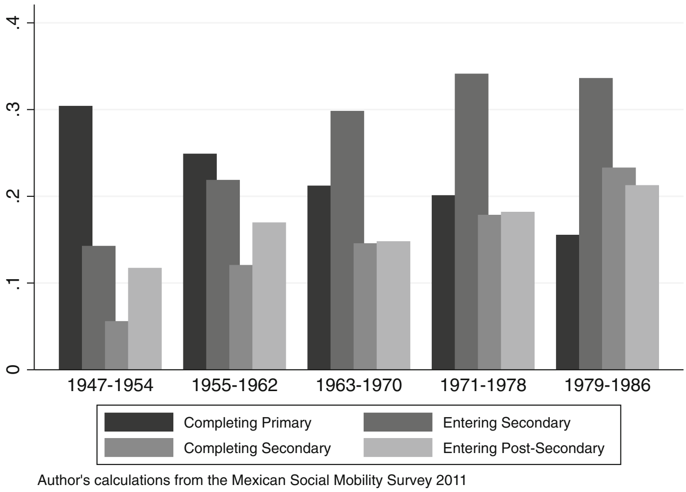
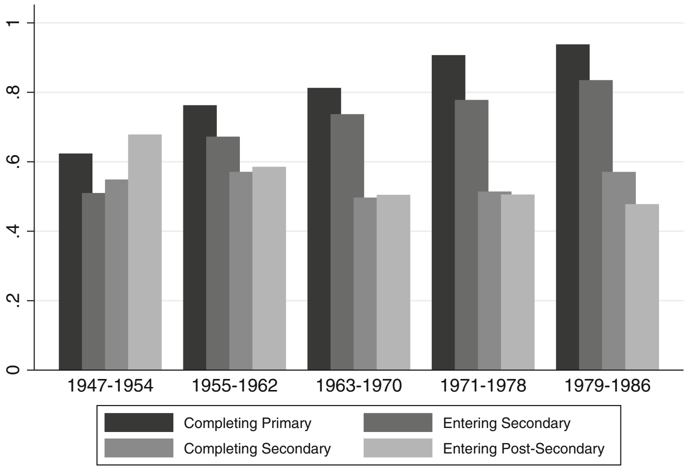


Fig. 2 Unconditional educational transition rates of Mexican men and women by birth cohort

how educational attainment rises by birth cohort, leading to an increase of the population at risk of completing secondary and entering postsecondary education.

Conditional transition rates, provide us a different view on how educational attainment changes across birth cohorts. Figure 3 displays educational attainment rates, conditional on completion of the previous educational level. First, we can see a substantial increase across cohorts in the rates of primary completion and entering secondary education. Indeed, primary completion, conditional on having entered primary school, rose from a 60% to almost universal coverage between cohort 1 and cohort 5. Similarly, the rate of individuals that entered secondary increased almost a 30% in the same period. The strong expansion of lower transition rates could be explained by the implementation of the "11-year plan" (1959) by the Mexican government. As mentioned, this reform intended to expand primary and lower-secondary enrollments, especially among disadvantaged sectors of the population.

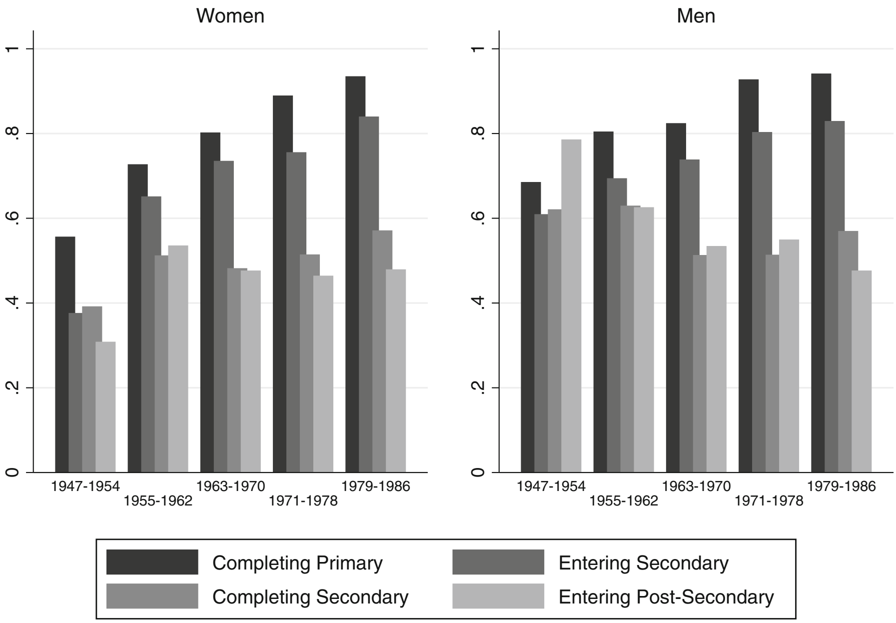
In contrast, the trends for higher educational transitions are dramatically different. We can see that while the transition rates for primary and entering secondary were increasing, the rates of secondary completion were decreasing, reaching their lowest level in cohorts 3 and 4. In postsecondary education, the conditional rates show a constant decrease, marked by a sharp decline between cohort 1 and 2. Although this finding might seem surprising it is expected in a scenario of expansion at lower educational transitions. As shown in Fig. 2, as higher proportions of the population complete primary and enter secondary, more individuals are at risk of completing secondary and subsequently entering postsecondary. The declining transition rates at higher transitions show that over time a smaller proportion of individuals at risk actually completed secondary and entered postsecondary. Another surprising trend occurs in the 1947–1954 birth cohort where the transition rates for entering postsecondary education are slightly higher than completing primary. The latter shows that once individuals completed



Author's calculations from the Mexican Social Mobility Survey 2011

Fig. 3 Conditional educational transition rates of Mexican men and women by birth cohort

secondary education, a very small proportion of the population at the time, a higher portion of this population actually entered postsecondary education. Presumably these individuals were a highly selected group, as during this period postsecondary education enrollment was very low (Rodriguez-Gomez 1998).



Author's calculations from the Mexican Social Mobility Survey 2011

Fig. 4 Conditional educational transitions by birth cohort and gender

Transition rates by gender also reveal interesting trends. As seen in Fig. 4, in time 1 Mexican women started having significantly lower transition rates for all educational outcomes. Gender differences are especially noticeable in cohort 1, where for example women had a secondary to postsecondary transition rate of 0.3 while men had a rate of 0.8. Nevertheless, these differences started to rapidly decrease. From cohort 3 onward, transition rates started to behave similarly for men and women, showing a constant expansion of lower transitions and decreasing rates for secondary and postsecondary education. Yet the fall of higher education transition rates were much more pronounced for men than for women. Finally, by the time cohort 5 enters the Mexican educational system, gender differences in transition rates are almost nonexistent.

Over time conditional transition rates reveal that the Mexican educational system experienced significant educational expansion in lower transitions between 1959 and 1992. In contrast, transitions rates for secondary completion and some postsecondary education suffered an important decline in that same time period. How do these changes map into intergenerational educational mobility trends in Mexico?

Intergenerational Educational Mobility in Mexico

First to provide an intuitive measure of the degree of intergenerational mobility, I present partial correlations between the respondents education and that of their father and mother, respectively. As seen in Table 2, the correlation between father's and respondent's education decreased substantively between cohorts 1 and 3—from 0.51 to 0.45 (difference significant at the $p < 0.05$)—while it increased somewhat between cohorts 3 and 5. The same U-shaped pattern is found for the correlation between mother's and respondent's education; it decreased significantly between cohorts 1 and 3, from 0.5 to 0.43 (difference significant at the $p < 0.05$), while it slightly increased for younger cohorts. To have a sense of the magnitude of these correlations, we can recall Behrman et al.'s (2001) estimates for the U.S, which yielded a correlation of 0.35 between parents' and respondents' years of education.

Educational transition models further examine these changes in educational mobility. Table 3 presents the findings from the baseline models, which only include the main effects of key variables. As seen in the table, father's years of education has a positive and statistically significant effect on all educational transitions, except for primary completion where the effect is not significant. In the case of mother's education, the effect is positive and significant for the first two educational

Table 2 Correlation between parent's education and respondent education by cohort

	Father's education	Mother's education
C1 1947–1954	0.513	0.494
C2 1955–1962	0.467	0.446
C3 1963–1970	0.448	0.425
C4 1971–1978	0.461	0.457
C5 1979–1986	0.477	0.460

Author's calculations from the Mexican Social Mobility Survey 2011

Table 3 Logit baseline model: effect of parent's education on educational attainment

	(1) Primary	(2) Some secondary	(3) Secondary	(4) Some postsecondary
Father's education	0.054	0.173***	0.097***	0.118**
	(0.041)	(0.028)	(0.023)	(0.036)
Mother's education	0.296***	0.075**	0.046	− 0.042
	(0.053)	(0.029)	(0.025)	(0.038)
Father's ISEI	0.018**	0.004	0.022***	0.008
	(0.007)	(0.006)	(0.005)	(0.007)
Female	− 0.403**	− 0.233	− 0.214	− 0.302
	(0.149)	(0.135)	(0.136)	(0.208)
C1	− 1.496***	− 1.002***	0.471	1.787***
	(0.216)	(0.253)	(0.319)	(0.454)
C2	− 0.750**	− 0.196	0.813***	1.060**
	(0.236)	(0.208)	(0.232)	(0.328)
C3	− 0.500*	0.072	0.318	0.704*
	(0.228)	(0.204)	(0.191)	(0.281)
C4	0.044	0.038	0.121	0.387
	(0.251)	(0.177)	(0.166)	(0.261)
Controls				
Siblings	0.004	− 0.013	− 0.043	0.069
	(0.024)	(0.026)	(0.032)	(0.050)
Family structure	0.025	− 0.075	− 0.184	− 0.700*
	(0.246)	(0.241)	(0.253)	(0.356)
Ethnicity	− 0.654***	− 0.320	− 0.211	− 0.197
	(0.171)	(0.185)	(0.198)	(0.278)
Deceased father	0.357	− 0.519	0.733	0.485
	(0.454)	(0.397)	(0.401)	(0.584)
Constant	1.241***	0.393	− 1.081***	− 0.711
	(0.341)	(0.312)	(0.315)	(0.477)
Observations	7886	6539	5049	2307

Standard errors in parentheses

$^{*}p<0.05$, $^{**}p<0.01$, $^{***}p<0.001$

transitions, excluding completion of secondary education and entering postsecondary education.

Birth cohort estimates reveal interesting differences in the likelihood of educational progression. Particularly, respondents of cohorts 1, 2, and 3 are less likely to complete primary education than those from cohort 5 (the reference category). Similarly, respondents of cohort 1 are also less likely to achieve some secondary. Yet, older cohorts have significantly higher chances of completing higher educational transitions. As expected, birth cohort estimates can be interpreted in light of the different stages of educational policy in this country. Younger cohorts were greatly benefited by the expansion reforms of the 1960s at the primary and lower-secondary levels, which is reflected in their higher odds of completing these transitions versus older cohorts. In contrast, in higher educational transitions, younger cohorts are less likely to complete secondary and enter postsecondary education. These trends pose an interesting scenario to test how the effect of parent's education changes for cohorts that experienced different stages of educational expansion.[8]

In addition, I also estimated these models using a categorical measure for father's and mother's education (See Table 9 in the Appendix). Most notably, these models show that having a father with completed secondary does significantly increase the likelihood of completing secondary, and achieving some postsecondary. Meanwhile having a mother with completed primary significantly increases the likelihood of completing primary, and similarly having a mother with some secondary has a sizable significant effect on achieving some secondary. As Table 9 shows, these coefficients are especially large, which suggests that parental achievement of specific educational transitions plays a special role on intergenerational mobility. Although, for parsimony, preferred models are specified with a continuous measure of parent's education, predicted probabilities will also be estimated at particular educational transitions for both parents.

The results of the preferred models are found in Table 4.[9] As mentioned, given the difficulties in interpreting log odds coefficients, I will mainly focus on the predicted probabilities of achieving each particular transition for specific profiles of respondents. The value of presenting predicted probabilities is that they capture nonlinearities that are not detected in logit coefficients, and by doing so, it allows for a clearer interpretation of the results.

[8] In addition, I also estimated a baseline model that included an interaction term between gender and parent's education to check whether the role of parental education varies by gender of the offspring. As Table 8 in the Appendix shows, these interactions terms are very small in magnitude and nonsignificant across educational transitions. Indeed, t-tests do not reject the null hypothesis that these coefficients are equal to zero. Thus, I decided not to include an interaction between parental education and gender in the preferred model.

[9] Two methodological remarks need to be made. First, I introduce each interaction term with birth cohorts one at a time. I start with (i) parent's education, (ii) father's ISEI, and then (ii) gender (Tables 10, 11 and 12 in the appendix). In the case of parent's education, most interaction terms are insignificant with some notable exceptions. For primary completion, father's education by cohort 1 has a positive and statistically significant effect compared to the base category (father's education by cohort 5). Similarly, for achieving some postsecondary, the interaction between mother's education by cohort 3 has a positive and statistically significant effect, while father's education by cohort 3 has a negative and significant effect. In the case of father's ISEI, interactions are small and insignificant. In contrast, gender by cohort 1 interactions has a sizable and negative effect compared to the base category for almost all transitions. Second, in order to have more parsimonious models, I decided not to include interaction terms between father's ISEI and birth cohorts as neither of these terms significantly improved model fit (This according to a t test performed for each outcome). The results of the model that includes all interaction terms between family background predictors and gender with birth cohorts are presented in Table 13 in the appendix.

Table 4 Logit preferred model: effect of parent's education on educational transitions including all interaction terms

	(1) Primary	(2) Some secondary	(3) Secondary	(4) Some postsecondary
Father's education	0.027	0.178***	0.103**	0.232***
	(0.119)	(0.050)	(0.035)	(0.060)
Mother's education	0.285*	0.045	0.039	− 0.119
	(0.137)	(0.045)	(0.040)	(0.063)
Father's ISEI	0.018**	0.005	0.022***	0.007
	(0.006)	(0.006)	(0.005)	(0.007)
Female	− 0.354	0.071	− 0.052	− 0.207
	(0.335)	(0.245)	(0.205)	(0.339)
C1	− 1.749***	− 0.433	1.225**	2.441**
	(0.322)	(0.405)	(0.428)	(0.771)
C2	− 0.618	− 0.205	0.991*	2.158***
	(0.357)	(0.370)	(0.396)	(0.581)
C3	− 0.813*	0.104	0.271	0.946
	(0.330)	(0.349)	(0.356)	(0.550)
C4	0.198	− 0.009	0.131	0.704
	(0.385)	(0.338)	(0.368)	(0.597)
Interaction mother's education and birth cohort				
Mother's education × C5 (base category)				
Mother's education × C1	− 0.099	0.015	− 0.126	0.260
	(0.178)	(0.087)	(0.092)	(0.162)
Mother's education × C2	0.069	0.019	0.088	− 0.152
	(0.168)	(0.109)	(0.089)	(0.147)
Mother's education × C3	0.071	0.144	0.041	0.271*
	(0.169)	(0.093)	(0.078)	(0.108)
Mother's education × C4	0.021	0.007	0.002	0.072
	(0.177)	(0.066)	(0.060)	(0.091)
Interaction father's education and birth cohort				
Father's education × C5 (base category)				
Father's education × C1	0.343*	− 0.017	0.062	− 0.121
	(0.147)	(0.078)	(0.090)	(0.091)
Father's education × C2	− 0.094	0.036	− 0.076	− 0.003
	(0.143)	(0.106)	(0.079)	(0.127)
Father's education × C3	0.070	− 0.122	− 0.024	− 0.270**
	(0.145)	(0.083)	(0.068)	(0.099)
Father's education × C4	− 0.062	0.047	− 0.001	− 0.098
	(0.139)	(0.070)	(0.055)	(0.083)

Table 4 continued

	(1) Primary	(2) Some secondary	(3) Secondary	(4) Some postsecondary
Interaction gender and birth cohort				
Female × C5 (base category)				
Female × C1	− 0.174	− 1.400**	− 2.151***	− 4.052***
	(0.439)	(0.511)	(0.640)	(1.043)
Female × C2	− 0.174	− 0.295	− 0.427	− 0.336
	(0.459)	(0.417)	(0.481)	(0.592)
Female × C3	0.238	− 0.221	− 0.036	− 0.013
	(0.452)	(0.386)	(0.375)	(0.541)
Female × C4	− 0.128	− 0.262	− 0.036	− 0.058
	(0.499)	(0.355)	(0.330)	(0.539)
Controls				
Siblings	0.001	− 0.012	− 0.043	0.077
	(0.024)	(0.027)	(0.033)	(0.047)
Family structure	0.026	− 0.067	− 0.238	− 0.742*
	(0.253)	(0.241)	(0.241)	(0.343)
Parent's ethnicity	− 0.643***	− 0.340	− 0.223	− 0.236
	(0.173)	(0.185)	(0.200)	(0.288)
Deceased father	0.362	− 0.519	0.676	0.628
	(0.467)	(0.399)	(0.394)	(0.616)
Constant	1.287***	0.318	− 1.129**	− 1.095*
	(0.360)	(0.385)	(0.346)	(0.540)
Observations	7886	6539	5049	2307

Standard errors in parentheses

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

Transition into Primary Completion and Entering Secondary Education

Figure 5 shows predicted probabilities of completing primary for each birth cohort, separately for men and women.

As seen in Fig. 5, respondents from low and middle educational backgrounds experienced a statistically significant increase in their probabilities of completing primary. These trends reveal an important rise in upward intergenerational mobility at the primary level, which is noticeable in the reduction of the achievement gap across groups. These findings also apply to women with the only difference being their starting predicted probabilities were lower than men. Also, it is worth noting that starting from cohort 1, men and women from high educational backgrounds already had universal rates of primary completion.

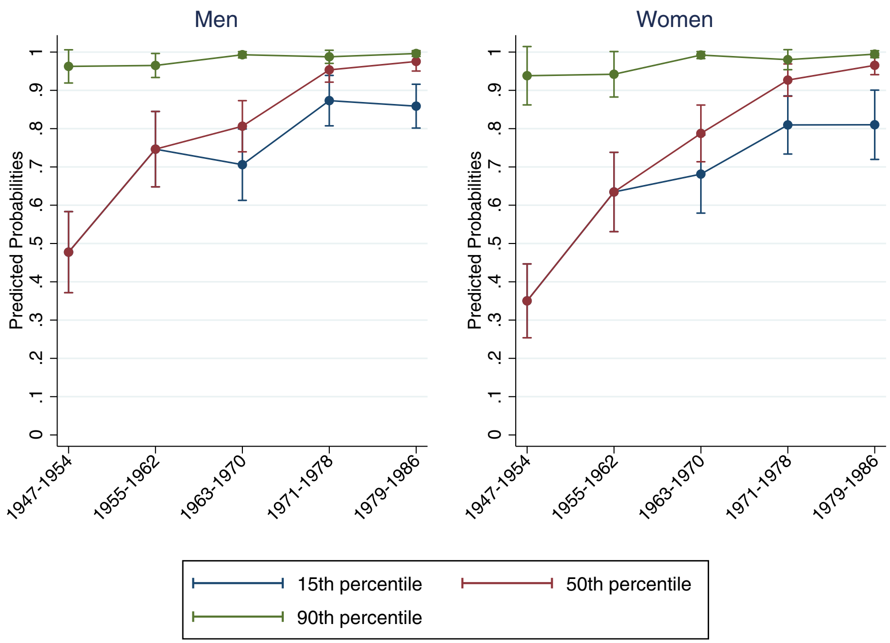


Fig. 5 Adjusted predictions for primary completion with 95% CIs

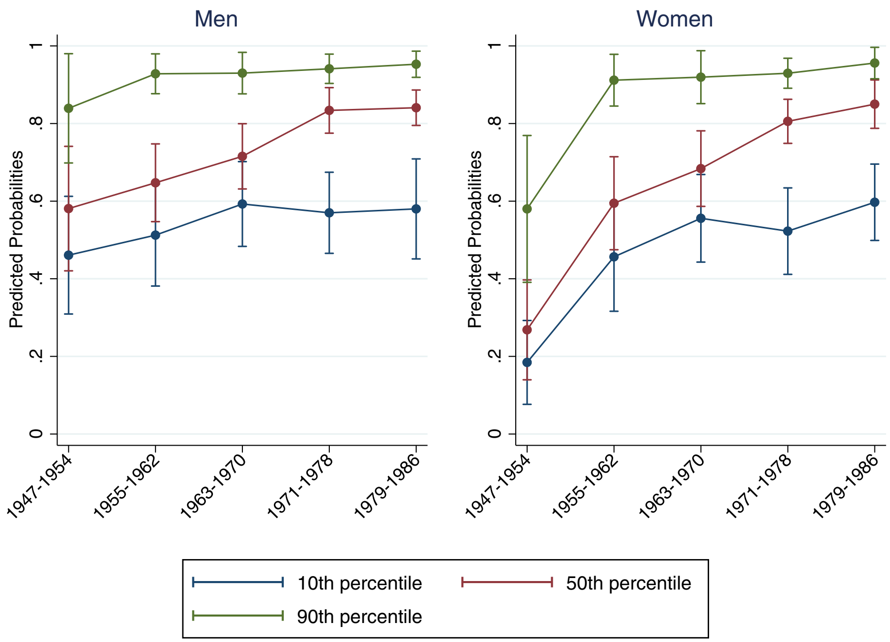


Fig. 6 Adjusted prediction for entering secondary, conditional on primary completion with 95% CIs

Figure 6 shows predicted probabilities of entering secondary conditional on primary completion for each birth cohort. As seen in the figure, there is a decrease in the effect of parent's education on entering secondary. Particularly, middle background men experience a statistically significant rise in their probabilities of achieving this transition. Nevertheless, respondents from low educational backgrounds display stalled predictions. In the case of Mexican women, all groups experienced a statistically significant rise in their probabilities of having some secondary. However, similar to men, women from middle educational backgrounds were the ones who advanced the most.

Overall, predicted probabilities for completing primary and entering secondary reveal progress in terms of upward educational mobility. Regarding policy reforms, it is interesting to note that equalization trends for both transitions are noticeable from cohort 2 (1955–1962) onward. This cohort indicates the beginning of the 11-year plan, whose main purpose was to increase enrollments at primary and lower-secondary levels. The latter suggests that this policy was successful in increasing the likelihood of finishing primary and entering secondary for individuals from low and especially middle educational backgrounds. Yet it seems that the "Education for everyone" policy implemented between 1976 to 1992, who mostly affected cohorts 4 and 5, did not significantly increase the equalization progress made by the 11-year plan. Indeed educational mobility trends for low and middle backgrounds respondents are mostly flat for these cohorts.

Transition into Completing Secondary and Entering Postsecondary Education

Predicted probabilities for higher educational transitions reveal a more complex story. Figure 7 shows adjusted probabilities of completing secondary education, conditional on entering secondary schooling. For Mexican men, trends show a decrease of upward intergenerational mobility for younger cohorts. Specifically, respondents from low and middle educational backgrounds suffer a fall in their chances of achieving secondary schooling between cohorts 2 and 4. Meanwhile point estimates show stalled probabilities for elite men. For women, Fig. 6 shows that all groups experience a rise in their predicted probabilities of completing secondary between cohorts 1 and 2. Nevertheless, we see a small decline in point estimates for low and middle-class women between cohorts 2 and 4. It is important to note that expansion policies in place for cohorts 2 to 4—the "11-year plan" and "Education for everyone"—were focused on primary and lower-secondary enrollments, and therefore there were not paralleled efforts to absorb this increase in enrollments at upper-secondary levels.

Finally, findings regarding entrance to postsecondary education must be taken with caution given small sample sizes for older cohorts and large confidence intervals. Figure 8 shows that men from middle and low educational backgrounds experience a stark and significant decline in their conditional probabilities of achieving some postsecondary education. This trend is especially focused on younger cohorts 3–5. Additionally, point estimates indicate that elite groups have stalled predictions throughout the observed period. Similarly, from cohort 2 onward, middle and low background women experience a sizable decline in their probability

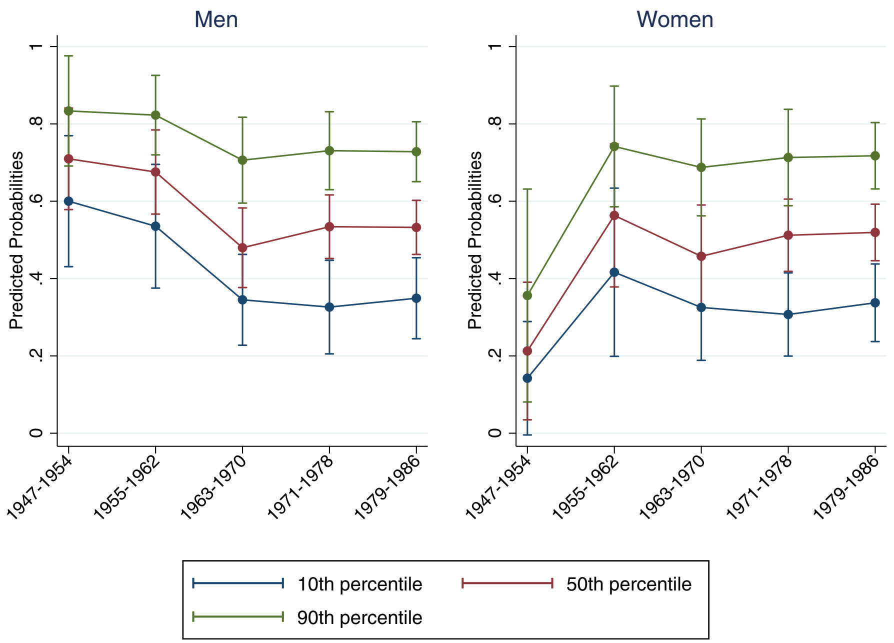


Fig. 7 Adjusted prediction for secondary completion, conditional on some secondary with 95% CIs

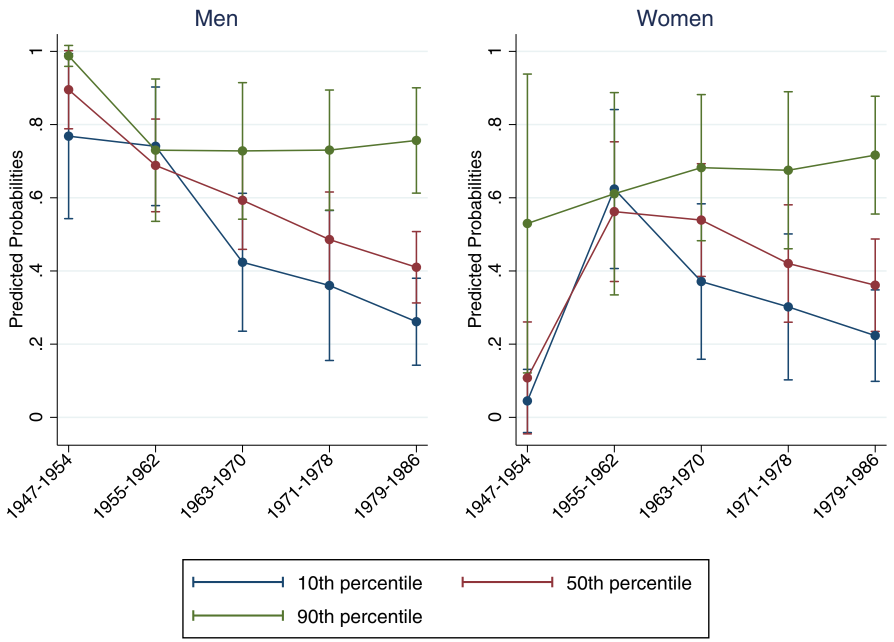


Fig. 8 Adjusted prediction for some postsecondary, conditional on secondary completion with 95% CIs

of entering this transition, which is statistically significant for lower class groups.[10] Yet, elite women do not display relevant changes in their predicted probabilities.

As a complementary analysis, I estimated predicted probabilities at particular educational transitions for both parents, namely, (i) less than primary education, (ii) completed primary, and (iii) completed lower secondary. As seen in Figs. 9 and 10, respondents whose parents had less than primary significantly increased their chances of completing primary and entering secondary schooling. In the case of secondary completion, Fig. 11 shows that all family background groups experienced a decrease in their probabilities of completing this transition from cohort 2 onward. Still, point estimates indicate this reduction was higher for respondents whose parents only had less than primary schooling, especially among men. Finally, predictions for entering postsecondary education (Fig. 12) reveal that all groups experienced a decline in their chances to attain this transition from cohort 2 onward. Now, we can see that the gap between these groups is maintained between cohorts 3 and 5 for both men and women. This is mostly because respondents with higher origins are not captured by these groupings. As mentioned, I did not estimate predicted probabilities for parents with completed secondary given the low proportion of cases that attain that educational level in this sample. Indeed, parents at the 90th percentile of the educational distribution have 9 years of education, which means they did not finish secondary schooling. Nevertheless, this analysis reveals that respondents from lower family origins—both parents with less than primary—significantly experienced equalization for lower educational transitions. In the case of secondary completion, the attainment gap between these respondents and those whose parents had primary or lower-secondary schooling increased across cohorts.

Overall, these results suggest significant changes in Mexico's patterns of intergenerational educational mobility. On the one hand, we can see a reduction of the effect of parent's education on educational attainment at lower educational transitions, which suggests expansion reforms at these levels were successful. However, for younger cohorts of Mexicans (especially cohorts 4 and 5) there is a decrease in upward intergenerational mobility at higher educational transitions (Figs. 5, 6, 7, 8).

Sensitivity Analysis

Despite educational transition models being the preferred strategy to study intergenerational mobility, the role of unobserved heterogeneity at higher educational transitions is cause of concern to some scholars (e.g., Cameron and Heckman 1998). In order to address this issue, I implement a sensitivity analysis proposed by Buis (2011), in which models are reestimated under different scenarios of unobserved heterogeneity. The purpose of this analysis is to provide an assessment

[10] As seen in Fig. 8, point estimates for women born in cohort 1 have extremely high confidence intervals. This is partly because only 12 female respondents from this cohort attained some postsecondary education, which makes this outcome a rare event. Given that these predictions might be especially unstable, I decided not to consider them as the initial benchmark to test if they were statistically significant differences between cohorts.

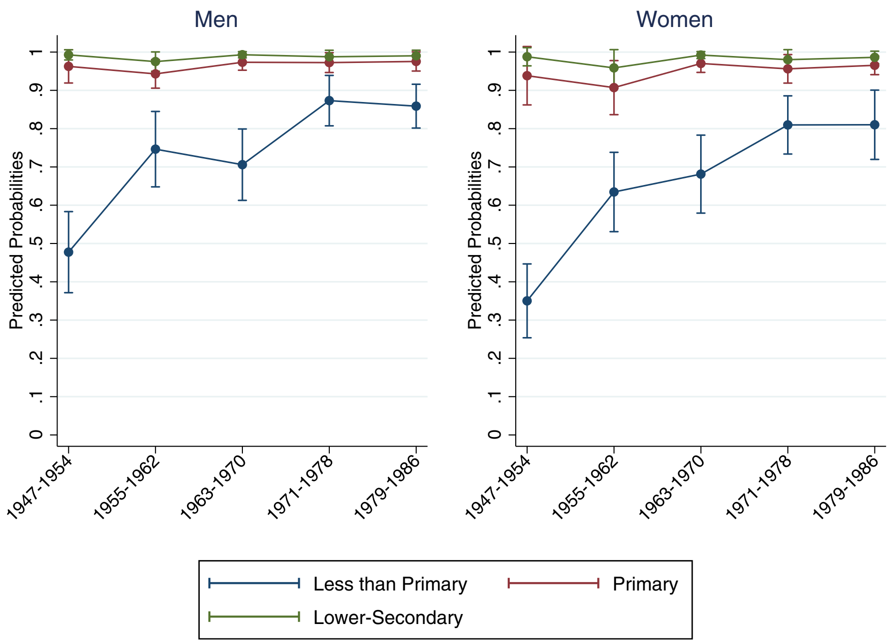


Fig. 9 Adjusted predictions for primary completion with 95% CIs

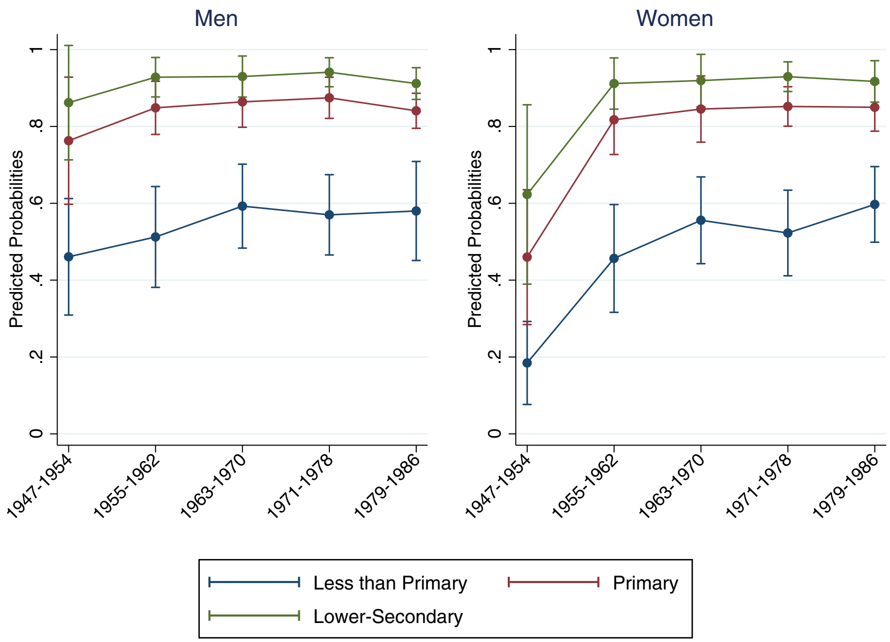


Fig. 10 Adjusted prediction for entering secondary, conditional on primary completion with 95% CIs

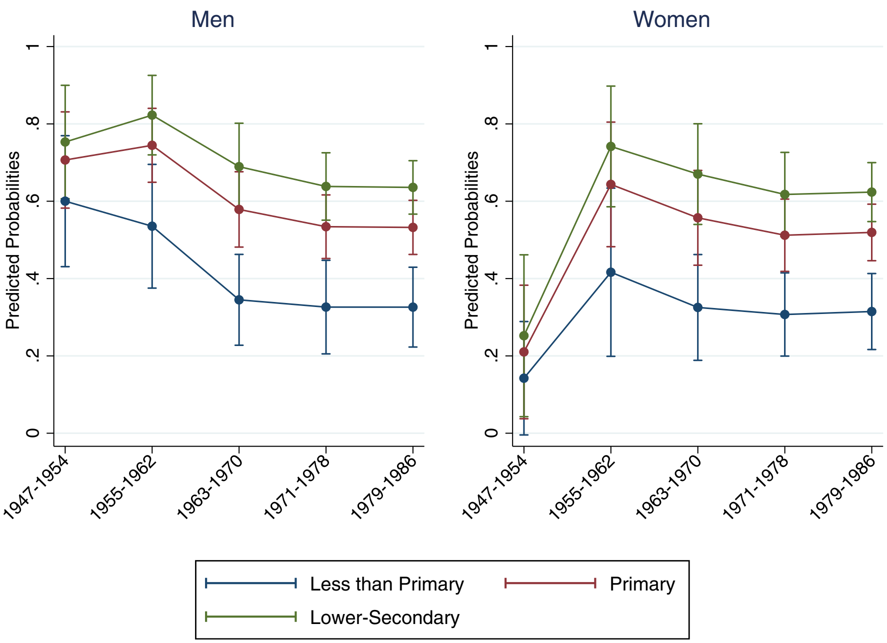


Fig. 11 Adjusted prediction for secondary completion, conditional on some secondary with 95% CIs

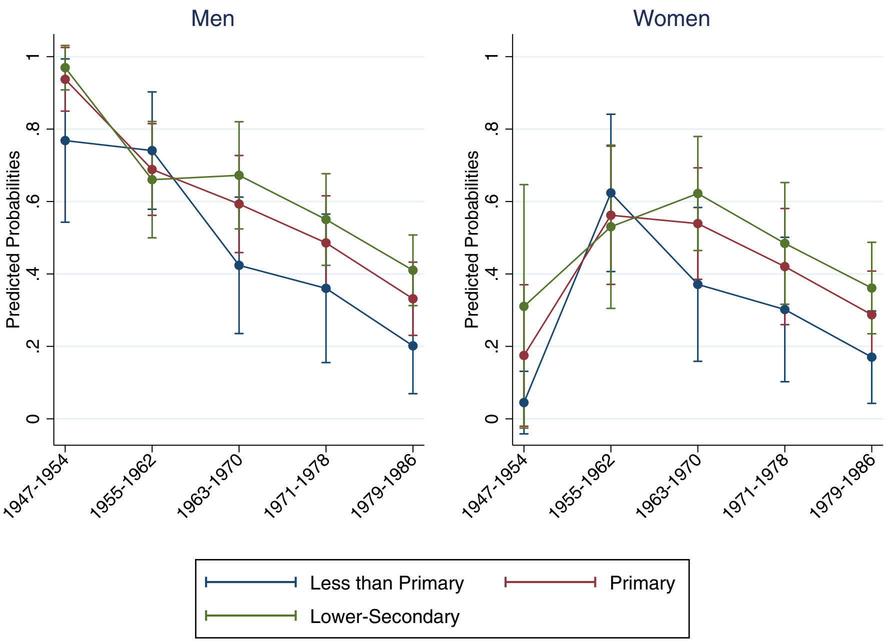


Fig. 12 Adjusted prediction for some postsecondary, conditional on secondary completion with 95% CIs

of how sensitive model estimates are to different hypothetical distributions of unobserved heterogeneity (Creighton et al. 2016). In practice, we assume a range of scenarios in which the distribution of the unobserved variable *u*—understood as the weighted sum of all the unobserved variables of interest—ranges from a having a standard deviation of 0 to 1.5.

The results of this analysis for our preferred model are shown in Tables 14, 15, 16 and 17 in the appendix. The first column of each table displays the estimates under the scenario of no unobserved heterogeneity, while subsequent columns display how estimates would change under different levels of unobserved heterogeneity.[11] We can see that for all educational transitions, the direction and significance of family background variables remain stable across different scenarios, with the magnitudes of some coefficients increasing somewhat, which is expected. This is also the case for most interaction terms of family background with birth cohorts.[12] According to this analysis, a model that assumes no bias does not produce misleading findings.

Discussion and Conclusions

Following the educational transitions approach (Mare 1980), I examine how intergenerational educational mobility changes under different stages of Mexico's expansion reform. I specifically use data from the Mexican Social Mobility Survey 2011, a unique dataset that contains intergenerational information for successive birth cohorts born between 1947 and 1986. This paper expands current scholarship on educational mobility in Latin America, by conducting this analysis for both Mexican men and women.

Consistent with previous research, the evidence of this study indicates that intergenerational educational mobility has increased for primary completion and entering secondary education, while it has decreased for higher educational transitions. More specifically, conditional probabilities indicate that individuals from low and middle educational backgrounds experienced a statistically significant increase in their chances of finishing primary school. In the case of entering secondary school, there is also an increase in intergenerational educational mobility but mainly due to the significant progress of middle educational background respondents, leaving the probabilities of low educational background individuals relatively unchanged over time.

The situation for higher educational transitions is very different. As mentioned, intergenerational mobility in completing secondary education decreases across cohorts. However, the mechanisms through which this occurs differ by gender. For men, it is mainly driven by the significant decrease in the predicted probabilities of secondary completion for middle and lower educational background groups. For

[11] Given that the seqlogit package in Stata does not allow for the inclusion of survey strata, estimates for the model with no unobserved heterogeneity contains small differences with the estimates of our preferred model in Table 4.

[12] The exception being those in the secondary completion model, where cohort 1 loses significance in the last scenario.

women, all groups increase their likelihood of attaining this transition, followed by a small decline for low and middle-class women in younger cohorts. Lastly, in postsecondary education, men and women from low and middle educational backgrounds experience a decrease in their predicted probabilities of entering this transition.

Similar to previous studies in Latin America, these results indicate that there have been changes in intergenerational educational mobility across time in Mexico (Torche 2010; Binder and Woodruff 2002). In contrast to reproduction theories (Hypothesis 1) that predict stability in mobility trends, my findings not only suggest variation across cohorts, but also divergent trends among lower and higher educational transitions. Likewise, mobility trends are not continuously upward across all stages of the schooling process as modernization theory predicts (Hypothesis 2). Overall, intergenerational mobility trends reveal more complex patterns consistent with the maximally maintained inequality (MMI) hypothesis (Hypothesis 3). According to the latter, we should expect an increase in upward mobility for primary and lower-secondary education for cohorts that experienced the "11-year plan" expansion reform onward. In addition, we should also expect a decrease in upward mobility for higher educational levels (upper-secondary education and postsecondary education) for younger birth cohorts, as no expansion policies were implemented at these transitions. Indeed, the findings from this study seem to follow these predictions, especially for the first three educational transitions.

First, educational attainment trends by birth cohort suggest that equalization in completing primary and entering secondary is patterned by the implementation of the "11-year plan." Birth cohorts that experienced both school transitions under this policy (Birth cohorts 2 and 3) show important increases in upward intergenerational mobility. Equalization trends for primary and entering secondary continue under the "Education for everyone" policy period (Birth cohorts 4 and 5). Yet mobility patterns do not show such sharp increases for low and middle educational background respondents as they did for older cohorts. The latter seems to suggest the "11-year plan" was more influential in increasing upward intergenerational mobility than the "Education for everyone" policy, which is reasonable given that the federal investments in the former policy were significantly greater (Solana et al. 2002). Also, as the MMI hypothesis proposes, these equalization trends take place at the time when upper-class students have reached universal access or a "saturation point" for primary completion and entering secondary.

Second, the fact that expansion efforts were mostly focused on primary and lower-secondary education may have contributed to the decrease in equalization for higher transitions by generating a bottleneck between lower-secondary and upper-secondary levels. This is one of MMI's key insights. As shown, transitions rates for entering secondary education, which comprises lower secondary, experienced a strong rise across cohorts. In Mexico, once students finish lower-secondary education they have to move to a new school that focuses on upper-secondary schooling (SEP 1964). Given that this sector was not subject to the expansion reform, students between cohorts 2 and 4 might have faced a shortage of educational facilities, leading existing schools to select their students. Presumably this process would especially affect students from middle and low educational backgrounds as different selection strategies, such as interviews, diagnostics tests, etc., tend to benefit high status students (Jennings 2010). This explanation could be empirically tested by analyzing at which specific point of secondary education a higher proportion of students dropout.

In addition, we have to consider that these cohorts (cohorts 2, 3, and 4) entered secondary education around the 1980s when Mexico faced one of its strongest economic crisis. Previous empirical evidence demonstrated that this crisis increased the cost of opportunity of studying for low-income students, generating a shrinkage in the demand for noncompulsory education (Marteleto et al. 2012; Torche 2010; Parrado 2005). Overall, it is possible that both of these processes, a bottleneck between low and high transitions—as MMI proposes—and the economic crisis, have reinforced the role of parental educational background on completing secondary schooling.

Finally, trends in entering postsecondary education do not reveal a very clear picture. Yet we can distinguish that intergenerational mobility has somewhat decreased as the gap between the predicted probabilities for high educational background respondents versus low and middle background respondents widened from cohort 3 onward. Given that secondary completion rates were stagnant in the analyzed period, the MMI explanation does not seem to capture this finding. As previous studies have also suggested (e.g., Torche 2010; Binder and Woodruff 2002), the factor that most likely explains these trends is the economic crisis of the 1980s. This shock not only decreased the demand of postsecondary education from middle and low educational background students, but also reduced the federal budget allocated to higher education expansion (Post 2001).

In light of current social disparities in Mexico, empirical evidence that explains the social dynamics reproducing these differences is greatly needed. This paper sought to contribute in this regard by studying changes in intergenerational educational mobility in the context of educational expansion. These findings indicate that mobility patterns in Mexico are not stalled across cohorts, as reproduction theories predict. However, they do not reflect equalization at all levels of education either, as modernization hypotheses anticipate. Whereas the Mexican expansion, especially the “11-year plan,” is associated with positive trends in mobility at lower educational transitions, findings suggest it is also related to a decrease in intergenerational mobility at higher levels of education. Together, these findings present new evidence for the MMI hypothesis in the Mexican context.

Of course, this article does not argue against educational expansion, but rather seeks to identify where, in the schooling processes, social inequalities need to be tackled by policymakers and governmental authorities. Furthermore, this paper shows the importance of taking into account individuals’ responses to macroeconomic shocks in the analysis of intergenerational educational mobility. Certainly, one of the limitations of this study is that the relationship between educational expansion and intergenerational educational mobility was not assessed using a causal approach. Future research should definitely take this direction. Further scholarship should also explore in more detail the effects of ethnicity and region, which might affect the educational transitions of particularly vulnerable groups in Mexican society.

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Appendix

See Tables 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18 and 19.

Table 5 Descriptive statistics: missing mother's education

	No missing		Missing	
	Mean	SD	Mean	SD
Primary completion	0.83	0.38	0.79	0.41
Some secondary	0.77	0.42	0.72	0.45
Secondary completion	0.43	0.50	0.39	0.49
Some post secondary	0.35	0.48	0.29	0.46
Father's years of education	4.03	4.22	4.13	4.51
Mother's years of education	3.77	3.96	–	–
Father's ISEI	26.20	15.35	22.99	16.39
Gender	0.45	0.50	0.50	0.50
Family structure	0.85	0.36	0.60	0.49
Number of siblings	3.19	2.73	3.02	3.00
Parent's ethnicity	0.18	0.39	0.13	0.34

Table 6 Descriptive statistics: missing father's education

	No missing		Missing	
	Mean	SD	Mean	SD
Primary completion	0.83	0.38	0.81	0.40
Some secondary	0.77	0.42	0.74	0.44
Secondary completion	0.43	0.50	0.39	0.49
Some postsecondary	0.35	0.48	0.32	0.47
Father's years of education	4.03	4.23	–	–
Mother's years of education	3.73	3.94	4.42	4.22
Father's ISEI	26.55	15.10	19.92	17.58
Gender	0.45	0.50	0.51	0.50
Family structure	0.88	0.33	0.46	0.50
Number of siblings	3.23	2.74	2.82	2.83
Parent's ethnicity	0.18	0.38	0.18	0.39

Table 7 Descriptive statistics: missing father's ISEI

	No missing		Missing	
	Mean	SD	Mean	SD
Primary completion	0.817	0.387	0.858	0.349
Some secondary	0.757	0.429	0.816	0.388
Secondary completion	0.413	0.492	0.481	0.5
Some postsecondary	0.338	0.473	0.364	0.481
Father's years of education	3.844	4.152	5.042	4.477
Mother's years of education	3.557	3.893	4.745	4.131
Father's ISEI	25.957	15.457	–	–
Gender	0.464	0.499	0.434	0.496
Family structure	0.856	0.351	0.683	0.465
Number of siblings	3.293	2.778	2.662	2.594
Parent's ethnicity	0.183	0.387	0.157	0.364

Table 8 Logit baseline model A1: effect of parent's education on educational attainment including interaction term between gender and parent's education

	(1) Primary	(2) Some Secondary	(3) Secondary	(4) Some postsecondary
Father's education	0.121	0.182***	0.107***	0.098*
	(0.065)	(0.041)	(0.030)	(0.041)
Mother's education	0.241**	0.066	0.011	− 0.020
	(0.083)	(0.041)	(0.031)	(0.042)
Father's ISEI	0.018**	0.004	0.021***	0.008
	(0.007)	(0.006)	(0.005)	(0.007)
Female	− 0.336	− 0.238	− 0.450	− 0.276
	(0.172)	(0.179)	(0.241)	(0.390)
Father's education × female	− 0.112	− 0.016	− 0.021	0.045
	(0.082)	(0.055)	(0.045)	(0.070)
Mother's education × female	0.093	0.018	0.071	− 0.054
	(0.107)	(0.057)	(0.050)	(0.084)
C1	− 1.511***	− 1.004***	0.445	1.807***
	(0.214)	(0.253)	(0.316)	(0.457)
C2	− 0.746**	− 0.193	0.832***	1.059**
	(0.235)	(0.207)	(0.234)	(0.327)
C3	− 0.503*	0.073	0.325	0.703*
	(0.226)	(0.204)	(0.191)	(0.282)
C4	0.035	0.039	0.139	0.385
	(0.249)	(0.176)	(0.166)	(0.262)
Controls				
Siblings	0.004	− 0.012	− 0.041	0.069
	(0.024)	(0.026)	(0.032)	(0.050)
Family structure	0.023	− 0.076	− 0.187	− 0.691

Table 8 continued

	(1) Primary	(2) Some Secondary	(3) Secondary	(4) Some postsecondary
	(0.246)	(0.241)	(0.254)	(0.356)
Parent's ethnicity	− 0.641***	− 0.321	− 0.229	− 0.206
	(0.170)	(0.185)	(0.198)	(0.278)
Deceased father	0.370	− 0.520	0.707	0.492
	(0.452)	(0.397)	(0.399)	(0.591)
Constant	1.198***	0.394	− 0.970**	− 0.717
	(0.328)	(0.315)	(0.331)	(0.484)
Observations	7886	6539	5049	2307

Standard errors in parentheses

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

Table 9 Logit baseline model: effect of parent's education on educational attainment including categorical measure of parent's education

	(1) Primary	(2) Some Secondary	(3) Secondary	(4) Some postsecondary
Father primary	0.477	0.672***	0.113	− 0.418
	(0.263)	(0.195)	(0.201)	(0.334)
Father some secondary	0.393	1.054**	0.392	0.335
	(0.569)	(0.376)	(0.219)	(0.325)
Father secondary	− 0.535	0.661	1.082***	1.418***
	(0.833)	(0.792)	(0.319)	(0.367)
Mother primary	1.554***	0.159	0.028	− 0.057
	(0.350)	(0.195)	(0.203)	(0.348)
Mother some secondary	0.327	1.372***	0.349	− 0.270
	(0.636)	(0.372)	(0.214)	(0.302)
Mother secondary	0.526	− 0.866	0.540	0.616
	(1.095)	(0.559)	(0.336)	(0.378)
Father's ISEI	0.022***	0.005	0.021***	0.006
	(0.006)	(0.005)	(0.005)	(0.007)
Female	− 0.432**	− 0.254	− 0.232	− 0.327
	(0.149)	(0.133)	(0.136)	(0.209)
C1	− 1.598***	− 0.996***	0.359	1.701***
	(0.219)	(0.241)	(0.319)	(0.496)
C2	− 0.812***	− 0.271	0.704**	0.938**
	(0.235)	(0.209)	(0.233)	(0.334)
C3	− 0.526*	0.030	0.220	0.578*
	(0.232)	(0.206)	(0.191)	(0.279)
C4	0.012	0.059	0.088	0.321

Table 9 continued

	(1) Primary	(2) Some Secondary	(3) Secondary	(4) Some postsecondary
	(0.248)	(0.181)	(0.171)	(0.262)
Controls				
Siblings	0.006	− 0.009	− 0.040	0.070
	(0.024)	(0.026)	(0.031)	(0.048)
Family structure	0.015	− 0.009	− 0.154	− 0.660
	(0.251)	(0.248)	(0.261)	(0.368)
Parent's ethnicity	− 0.655***	− 0.279	− 0.263	− 0.317
	(0.173)	(0.182)	(0.203)	(0.276)
Deceased father	0.357	− 0.515	0.647	0.379
	(0.448)	(0.398)	(0.401)	(0.571)
Constant	1.458***	0.625*	− 0.687*	− 0.108
	(0.342)	(0.315)	(0.315)	(0.477)
Observations	7886	6539	5049	2307

Standard errors in parentheses

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

Table 10 Logit model: effect of parent's education on educational transitions including family background interaction terms

	(1) Primary	(2) Some secondary	(3) Secondary	(4) Some postsecondary
Father's education	0.027	0.176***	0.103**	0.234***
	(0.119)	(0.049)	(0.035)	(0.060)
Mother's education	0.286*	0.050	0.042	− 0.119
	(0.138)	(0.045)	(0.041)	(0.065)
Father's ISEI	0.019**	0.005	0.022***	0.008
	(0.006)	(0.006)	(0.005)	(0.007)
Female	− 0.392**	− 0.227	− 0.204	− 0.357
	(0.149)	(0.133)	(0.136)	(0.209)
C1	− 1.838***	− 0.978**	0.821*	2.173**
	(0.267)	(0.312)	(0.401)	(0.711)
C2	− 0.722*	− 0.346	0.793*	2.046***
	(0.281)	(0.297)	(0.371)	(0.533)
C3	− 0.683*	0.003	0.268	0.973
	(0.279)	(0.268)	(0.322)	(0.523)
C4	0.115	− 0.129	0.136	0.712
	(0.296)	(0.269)	(0.316)	(0.561)

Table 10 continued

	(1) Primary	(2) Some secondary	(3) Secondary	(4) Some postsecondary
Interaction mother's education and birth cohort				
Mother's education × C5 (base category)				
Mother's education × C1	− 0.099	− 0.011	− 0.152	0.189
	(0.178)	(0.086)	(0.099)	(0.140)
Mother's education × C2	0.074	0.015	0.092	− 0.150
	(0.169)	(0.109)	(0.091)	(0.149)
Mother's education × C3	0.070	0.140	0.038	0.273*
	(0.169)	(0.094)	(0.078)	(0.109)
Mother's education × C4	0.020	0.002	− 0.002	0.070
	(0.178)	(0.066)	(0.060)	(0.092)
Interaction father's education and birth cohort				
Father's education × C5 (base category)				
Father's education × C1	0.343*	− 0.013	0.035	− 0.189
	(0.147)	(0.078)	(0.095)	(0.114)
Father's education × C2	− 0.098	0.039	− 0.079	− 0.009
	(0.143)	(0.106)	(0.079)	(0.128)
Father's education × C3	0.073	− 0.119	− 0.021	− 0.273**
	(0.146)	(0.083)	(0.068)	(0.100)
Father's education × C4	− 0.060	0.049	− 0.000	− 0.101
	(0.140)	(0.069)	(0.055)	(0.084)
Controls				
Siblings	0.003	− 0.012	− 0.044	0.070
	(0.024)	(0.027)	(0.033)	(0.047)
Family structure	0.028	− 0.064	− 0.201	− 0.711*
	(0.251)	(0.241)	(0.245)	(0.340)
Parent's ethnicity	− 0.637***	− 0.326	− 0.191	− 0.191
	(0.173)	(0.185)	(0.198)	(0.280)
Deceased father	0.362	− 0.519	0.712	0.682
	(0.459)	(0.398)	(0.395)	(0.620)
Constant	1.299***	0.462	− 1.095**	− 1.076*
	(0.343)	(0.351)	(0.343)	(0.531)
Observations	7886	6539	5049	2307

Standard errors in parentheses

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

Table 11 Logit model: effect of parent's education on educational transitions including father's ISEI interaction terms

	(1) Primary	(2) Some secondary	(3) Secondary	(4) Some postsecondary
Father's education	0.049	0.175***	0.096***	0.121**
	(0.042)	(0.028)	(0.023)	(0.037)
Mother's education	0.302***	0.074*	0.044	− 0.045
	(0.053)	(0.029)	(0.025)	(0.039)
Father's ISEI	0.040*	− 0.000	0.024***	0.018
	(0.016)	(0.011)	(0.007)	(0.010)
Female	− 0.414**	− 0.227	− 0.222	− 0.329
	(0.149)	(0.134)	(0.137)	(0.206)
C1	− 1.356**	− 1.010	0.244	0.291
	(0.488)	(0.530)	(0.687)	(1.072)
C2	− 0.045	− 0.481	0.446	1.968**
	(0.525)	(0.454)	(0.453)	(0.708)
C3	0.258	− 0.058	0.574	1.098
	(0.499)	(0.414)	(0.395)	(0.601)
C4	0.560	− 0.128	0.330	1.027
	(0.515)	(0.395)	(0.360)	(0.538)
Interaction father's ISEI and birth cohort				
Father's ISEI × C5 (base category)				
Fisei × C1	− 0.008	0.000	0.008	0.052
	(0.019)	(0.017)	(0.022)	(0.033)
Fisei × C2	− 0.033	0.011	0.014	− 0.026
	(0.020)	(0.016)	(0.014)	(0.018)
Fisei × C3	v0.034	0.005	− 0.009	− 0.011
	(0.018)	(0.015)	(0.011)	(0.017)
Fisei × C4	− 0.024	0.006	− 0.007	− 0.019
	(0.018)	(0.014)	(0.011)	(0.013)
Controls				
Siblings	0.007	− 0.014	− 0.044	0.076
	(0.023)	(0.026)	(0.032)	(0.048)
Family structure	0.047	− 0.079	− 0.163	− 0.727*
	(0.250)	(0.239)	(0.248)	(0.356)
Parent's ethnicity	− 0.683***	− 0.316	− 0.215	− 0.238
	(0.171)	(0.185)	(0.198)	(0.281)
Deceased father	0.353	− 0.495	0.831*	0.375
	(0.466)	(0.389)	(0.392)	(0.602)
Constant	0.732	0.526	− 1.158***	− 1.063
	(0.490)	(0.395)	(0.343)	(0.542)

Table 11 continued

	(1) Primary	(2) Some secondary	(3) Secondary	(4) Some postsecondary
Observations	7886	6539	5049	2307

Standard errors in parentheses

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

Table 12 Logit model: effect of parent's education on educational transitions including gender interaction terms

	(1) Primary	(2) Some secondary	(3) Secondary	(4) Some postsecondary
Father's education	0.054	0.173***	0.098***	0.120***
	(0.041)	(0.028)	(0.023)	(0.035)
Mother's education	0.296***	0.076**	0.047	− 0.043
	(0.053)	(0.029)	(0.025)	(0.037)
Father's ISEI	0.018**	0.005	0.022***	0.007
	(0.007)	(0.006)	(0.005)	(0.007)
Female	− 0.352	0.060	− 0.054	− 0.096
	(0.346)	(0.250)	(0.207)	(0.324)
C1	− 1.389***	− 0.398	1.134***	2.526***
	(0.317)	(0.369)	(0.338)	(0.607)
C2	− 0.623	− 0.049	1.033***	1.235***
	(0.346)	(0.276)	(0.283)	(0.365)
C3	− 0.636	0.175	0.334	0.758*
	(0.333)	(0.270)	(0.248)	(0.352)
C4	0.113	0.165	0.137	0.473
	(0.418)	(0.246)	(0.225)	(0.320)
Interaction gender and birth cohort				
Female × C5 (base category)				
Female × C1	− 0.213	− 1.422**	− 2.296***	− 3.578**
	(0.431)	(0.511)	(0.679)	(1.155)
Female × C2	− 0.213	− 0.289	− 0.453	− 0.383
	(0.473)	(0.414)	(0.480)	(0.655)
Female × C3	0.242	− 0.209	− 0.034	− 0.117
	(0.455)	(0.396)	(0.372)	(0.544)
Female × C4	− 0.110	− 0.258	− 0.034	− 0.166
	(0.519)	(0.354)	(0.330)	(0.527)
Controls				
Siblings	0.002	− 0.013	− 0.041	0.074
	(0.024)	(0.026)	(0.032)	(0.049)

Table 12 continued

	(1) Primary	(2) Some secondary	(3) Secondary	(4) Some postsecondary
Family structure	0.021	− 0.081	− 0.220	− 0.714*
	(0.248)	(0.240)	(0.242)	(0.360)
Parent's ethnicity	− 0.662***	− 0.334	− 0.238	− 0.227
	(0.171)	(0.185)	(0.200)	(0.283)
Deceased father	0.356	− 0.521	0.697	0.463
	(0.464)	(0.397)	(0.396)	(0.584)
Constant	1.226**	0.241	− 1.151***	− 0.809
	(0.388)	(0.335)	(0.316)	(0.482)
Observations	7886	6539	5049	2307

Standard errors in parentheses

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

Table 13 Logit model: effect of parent's education on educational transitions including all interaction terms

	(1) Complete primary	(2) Enter secondary	(3) Complete secondary	(4) Enter postsecondary
Father's education	− 0.012	0.156***	0.117**	0.177**
	(0.910)	(0.001)	(0.001)	(0.002)
Mother's education	0.306**	0.075	0.058	− 0.023
	(0.003)	(0.092)	(0.111)	(0.724)
Father's ISEI	0.045**	0.006	0.0202*	0.008
	(0.001)	(0.494)	(0.012)	(0.443)
Female	− 0.011	0.08	0.033	− 0.395
	(0.971)	(0.726)	(0.858)	(0.182)
C5 (base category)				
C1	− 0.990*	− 0.586	0.961	1.376
	(0.041)	(0.283)	(0.092)	(0.205)
C2	0.128	− 0.463	0.886	1.831**
	(0.803)	(0.310)	(0.057)	(0.007)
C3	0.216	− 0.107	0.652	0.692
	(0.649)	(0.810)	(0.128)	(0.254)
C4	0.628	0.044	0.124	0.524
	(0.208)	(0.918)	(0.775)	(0.429)
Interaction father's education and birth cohort				
Father's education × C5 (base category)				
F_edu × C1	0.265*	− 0.020	− 0.094	− 0.114
	(0.022)	(0.787)	(0.223)	(0.260)

Table 13 continued

	(1) Complete primary	(2) Enter secondary	(3) Complete secondary	(4) Enter postsecondary
F_edu × C2	0.025	0.01	− 0.05	− 0.003
	(0.830)	(0.919)	(0.568)	(0.978)
F_edu × C3	0.129	− 0.124	− 0.017	− 0.156
	(0.277)	(0.109)	(0.774)	(0.075)
F_edu × C4	0.028	0.039	0.016	− 0.055
	(0.806)	(0.540)	(0.755)	(0.510)
Interaction mother's education and birth cohort				
Mother's education × C5 (base category)				
M_edu × C1	− 0.04	0.010	− 0.009	0.303
	(0.773)	(0.893)	(0.901)	(0.089)
M_edu × C2	0.014	0.009	0.029	− 0.129
	(0.918)	(0.920)	(0.699)	(0.272)
M_edu × C3	− 0.007	0.148	0.003	0.135
	(0.959)	(0.100)	(0.969)	(0.171)
M_edu × C4	− 0.02	0.004	− 0.016	0.037
	(0.890)	(0.951)	(0.775)	(0.705)
Interaction father's ISEI and birth cohort				
Father's ISEI × C5 (base category)				
Fisei × C1	− 0.025	0.001	0.013	0.038
	(0.173)	(0.942)	(0.441)	(0.249)
Fisei × C2	− 0.034	0.009	0.003	− 0.005
	(0.065)	(0.528)	(0.848)	(0.782)
Fisei × C3	− 0.037*	0.006	− 0.009	0.000
	(0.030)	(0.678)	(0.440)	(0.985)
Fisei × C4	− 0.021	− 0.004	− 0.005	0.000
	(0.221)	(0.761)	(0.631)	(0.983)
Interaction gender and birth cohort				
Female × C5 (base category)				
Female × C1	− 0.545	− 0.918*	− 1.246*	− 3.564***
	(0.181)	(0.041)	(0.036)	(0.000)
Female × C2	− 0.462	− 0.151	− 0.629	0.187
	(0.275)	(0.682)	(0.124)	(0.727)
Female × C3	− 0.262	− 0.087	− 0.194	0.133
	(0.528)	(0.805)	(0.547)	(0.787)
Female × C4	− 0.505	− 0.217	0.168	0.166
	(0.261)	(0.507)	(0.561)	(0.724)
Controls				

Table 13 continued

	(1) Complete primary	(2) Enter secondary	(3) Complete secondary	(4) Enter postsecondary
Siblings	0.000	− 0.019	0	0.058
	(0.996)	(0.420)	(.)	(0.173)
Family structure	0.010	0.093	0	− 0.608
	(0.961)	(0.646)	(.)	(0.066)
Parent's ethnicity	− 0.628***	− 0.206	0	− 0.246
	(0.000)	(0.229)	(.)	(0.361)
Deceased father	0.087	− 0.200	0.292	0.538
	(0.828)	(0.576)	(0.419)	(0.366)
Constant	0.661	0.171	− 1.364***	− 1.289*
	(0.109)	(0.656)	(0.000)	(0.017)
Observations	9696	8084	6308	2899

Standard errors in parentheses

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

Table 14 Sequential logit model of educational transitions under different assumptions of unobserved heterogeneity: primary completion

	(1) 0	(2) 0.5	(3) 1.0	(4) 1.5
Father's education	0.027	0.031	0.040	0.053
	(0.119)	(0.120)	(0.124)	(0.134)
Mother's education	0.285*	0.291*	0.309*	0.346*
	(0.137)	(0.138)	(0.140)	(0.149)
Father's ISEI	0.018**	0.020**	0.022**	0.026**
	(0.006)	(0.007)	(0.007)	(0.008)
Female	− 0.354	− 0.346	− 0.348	− 0.388
	(0.335)	(0.344)	(0.369)	(0.408)
C1	− 1.749***	− 1.815***	− 2.013***	− 2.311***
	(0.322)	(0.334)	(0.370)	(0.423)
C2	− 0.618	− 0.619	− 0.657	− 0.739
	(0.357)	(0.368)	(0.401)	(0.454)
C3	− 0.813*	− 0.829*	− 0.900*	− 1.024*
	(0.330)	(0.341)	(0.375)	(0.428)
C4	0.198	0.196	0.198	0.209
	(0.385)	(0.395)	(0.428)	(0.484)

Table 14 continued

	(1) 0	(2) 0.5	(3) 1.0	(4) 1.5
Interaction mother's education and birth cohort				
Mother's education × C5 (base category)				
M_edu × C1	− 0.099	− 0.098	− 0.099	− 0.107
	(0.178)	(0.181)	(0.192)	(0.211)
M_edu × C2	0.069	0.075	0.089	0.099
	(0.168)	(0.171)	(0.178)	(0.191)
M_edu × C3	0.071	0.073	0.078	0.080
	(0.169)	(0.171)	(0.178)	(0.192)
M_edu × C4	0.021	0.023	0.025	0.020
	(0.177)	(0.179)	(0.186)	(0.200)
Interaction father's education and birth cohort				
Father's education × C5 (base category)				
F_edu × C1	0.343*	0.358*	0.399*	0.454**
	(0.147)	(0.150)	(0.157)	(0.172)
F_edu × C2	− 0.094	− 0.095	− 0.098	− 0.105
	(0.143)	(0.146)	(0.154)	(0.168)
F_edu × C3	0.070	0.075	0.087	0.100
	(0.145)	(0.148)	(0.157)	(0.173)
F_edu × C4	− 0.062	− 0.063	− 0.070	− 0.082
	(0.139)	(0.141)	(0.148)	(0.161)
Interaction gender and birth cohort				
Female × C5 (base category)				
Female × C1	− 0.174	− 0.211	− 0.289	− 0.362
	(0.439)	(0.455)	(0.499)	(0.564)
Female × C2	− 0.174	− 0.228	− 0.331	− 0.420
	(0.459)	(0.475)	(0.518)	(0.582)
Female × C3	0.238	0.222	0.204	0.221
	(0.452)	(0.467)	(0.509)	(0.572)
Female × C4	− 0.128	− 0.124	− 0.116	− 0.094
	(0.499)	(0.512)	(0.551)	(0.615)
Controls				
Siblings	0.001	0.001	− 0.000	− 0.002
	(0.024)	(0.025)	(0.027)	(0.031)
Family structure	0.026	0.027	0.036	0.053
	(0.253)	(0.264)	(0.293)	(0.335)
Parent's ethnicity	− 0.643***	− 0.664***	− 0.724***	− 0.818***
	(0.173)	(0.181)	(0.201)	(0.230)
Deceased father	0.362	0.398	0.482	0.583
	(0.467)	(0.489)	(0.545)	(0.622)
Constant	1.287***	1.323***	1.449***	1.657***

Table 14 continued

	(1) 0	(2) 0.5	(3) 1.0	(4) 1.5
	(0.360)	(0.373)	(0.408)	(0.460)

Standard errors in parentheses

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

Table 15 Sequential logit model of educational transitions under different assumptions of unobserved heterogeneity: some secondary completion

	(1) 0	(2) 0.5	(3) 1.0	(4) 1.5
Father's education	0.178***	0.187***	0.211***	0.245***
	(0.050)	(0.052)	(0.058)	(0.066)
Mother's education	0.045	0.052	0.071	0.096
	(0.045)	(0.047)	(0.052)	(0.059)
Father's ISEI	0.005	0.006	0.008	0.010
	(0.006)	(0.006)	(0.007)	(0.008)
Female	0.071	0.075	0.083	0.090
	(0.245)	(0.255)	(0.283)	(0.323)
C1	− 0.433	− 0.523	− 0.738	− 1.001
	(0.405)	(0.427)	(0.480)	(0.543)
C2	− 0.205	− 0.227	− 0.285	− 0.350
	(0.369)	(0.389)	(0.438)	(0.500)
C3	0.104	0.087	0.044	− 0.011
	(0.349)	(0.368)	(0.415)	(0.476)
C4	− 0.009	− 0.019	− 0.036	− 0.041
	(0.338)	(0.356)	(0.402)	(0.462)
Interaction mother's education and birth cohort				
Mother's education × C5 (base category)				
M_edu × C1	0.015	0.016	0.020	0.024
	(0.087)	(0.092)	(0.105)	(0.121)
M_edu × C2	0.019	0.025	0.039	0.059
	(0.109)	(0.114)	(0.125)	(0.140)
M_edu × C3	0.144	0.150	0.168	0.193
	(0.093)	(0.097)	(0.107)	(0.121)
M_edu × C4	0.007	0.006	0.008	0.010
	(0.066)	(0.069)	(0.078)	(0.090)

Table 15 continued

	(1) 0	(2) 0.5	(3) 1.0	(4) 1.5
Interaction father's education and birth cohort				
Father's education × C5 (base category)				
F_edu × C1	− 0.017	-0.007	0.016	0.041
	(0.078)	(0.082)	(0.093)	(0.107)
F_edu × C2	0.036	0.038	0.039	0.034
	(0.106)	(0.111)	(0.122)	(0.136)
F_edu × C3	− 0.122	− 0.123	− 0.128	− 0.138
	(0.083)	(0.088)	(0.099)	(0.113)
F_edu × C4	0.047	0.052	0.063	0.070
	(0.070)	(0.074)	(0.083)	(0.095)
Interaction gender and birth cohort				
Female × C5 (base category)				
Female × C1	− 1.400**	− 1.487**	− 1.701**	− 1.972**
	(0.511)	(0.532)	(0.587)	(0.658)
Female × C2	− 0.295	− 0.349	− 0.475	− 0.636
	(0.417)	(0.435)	(0.483)	(0.546)
Female × C3	− 0.221	− 0.236	− 0.271	− 0.312
	(0.386)	(0.404)	(0.448)	(0.508)
Female × C4	− 0.262	− 0.269	− 0.295	− 0.336
	(0.356)	(0.370)	(0.408)	(0.462)
Controls				
Siblings	− 0.012	− 0.012	− 0.013	− 0.014
	(0.027)	(0.028)	(0.031)	(0.034)
Family structure	− 0.067	− 0.065	− 0.056	− 0.042
	(0.241)	(0.250)	(0.275)	(0.307)
Parent's ethnicity	− 0.340	− 0.375	− 0.464*	− 0.580*
	(0.185)	(0.193)	(0.214)	(0.241)
Deceased father	− 0.519	− 0.524	− 0.533	− 0.538
	(0.398)	(0.413)	(0.452)	(0.504)
Constant	0.318	0.269	0.145	− 0.022
	(0.385)	(0.404)	(0.452)	(0.513)

Standard errors in parentheses

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

Table 16 Sequential logit model of educational transitions under different assumptions of unobserved heterogeneity: secondary completion

	(1) 0	(2) 0.5	(3) 1.0	(4) 1.5
Father's education	0.103**	0.114**	0.141***	0.176***
	(0.035)	(0.037)	(0.041)	(0.047)
Mother's education	0.039	0.047	0.064	0.083
	(0.040)	(0.042)	(0.047)	(0.054)
Father's ISEI	0.022***	0.024***	0.027***	0.032***
	(0.005)	(0.005)	(0.006)	(0.007)
Female	− 0.052	− 0.059	− 0.069	− 0.078
	(0.205)	(0.217)	(0.246)	(0.284)
C1	1.225**	1.189**	1.119*	1.046
	(0.428)	(0.454)	(0.515)	(0.588)
C2	0.991*	0.999*	1.027*	1.074*
	(0.396)	(0.416)	(0.460)	(0.516)
C3	0.271	0.253	0.227	0.211
	(0.356)	(0.377)	(0.425)	(0.487)
C4	0.131	0.133	0.144	0.166
	(0.368)	(0.387)	(0.438)	(0.504)
Interaction mother's education and birth cohort				
Mother's education × C5 (base category)				
M_edu × C1	− 0.126	− 0.132	− 0.146	− 0.161
	(0.092)	(0.097)	(0.109)	(0.124)
M_edu × C2	0.088	0.099	0.124	0.154
	(0.089)	(0.093)	(0.102)	(0.113)
M_edu × C3	0.041	0.050	0.071	0.097
	(0.078)	(0.082)	(0.090)	(0.101)
M_edu × C4	0.002	0.002	0.004	0.006
	(0.060)	(0.063)	(0.072)	(0.082)
F_edu × C1	0.062	0.076	0.104	0.134
	(0.090)	(0.095)	(0.106)	(0.120)
Interaction father's education and birth cohort				
Father's education × C5 (base category)				
F_edu × C2	− 0.076	− 0.078	− 0.085	− 0.093
	(0.078)	(0.082)	(0.090)	(0.101)
F_edu × C3	− 0.024	− 0.026	− 0.033	− 0.043
	(0.068)	(0.071)	(0.080)	(0.090)
F_edu × C4	− 0.001	0.001	0.002	0.003
	(0.055)	(0.058)	(0.065)	(0.076)
Interaction gender and birth cohort				
Female × C5 (base category)				
Female × C1	− 2.151***	− 2.327***	− 2.723***	− 3.186***

Table 16 continued

	(1) 0	(2) 0.5	(3) 1.0	(4) 1.5
	(0.640)	(0.666)	(0.731)	(0.815)
Female × C2	− 0.427	− 0.482	− 0.607	− 0.761
	(0.480)	(0.504)	(0.561)	(0.634)
Female × C3	− 0.036	− 0.042	− 0.064	− 0.098
	(0.375)	(0.395)	(0.444)	(0.508)
Female × C4	− 0.036	− 0.043	− 0.064	− 0.094
	(0.330)	(0.349)	(0.395)	(0.455)
Controls				
Siblings	− 0.043	− 0.046	− 0.052	− 0.060
	(0.033)	(0.034)	(0.039)	(0.044)
Family structure	− 0.238	− 0.245	− 0.264	− 0.292
	(0.241)	(0.255)	(0.291)	(0.337)
Parent's ethnicity	− 0.223	− 0.267	− 0.365	− 0.482
	(0.200)	(0.211)	(0.238)	(0.271)
Deceased father	0.676	0.694	0.737	0.787
	(0.394)	(0.416)	(0.468)	(0.532)
Constant	− 1.129**	− 1.314***	− 1.763***	− 2.318***
	(0.346)	(0.365)	(0.413)	(0.475)

Standard errors in parentheses

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

Table 17 Sequential logit model of educational transitions under different assumptions of unobserved heterogeneity: some postsecondary

	(1) 0	(2) 0.5	(3) 1.0	(4) 1.5
Father's education	0.232***	0.249***	0.289***	0.338***
	(0.060)	(0.062)	(0.067)	(0.074)
Mother's education	− 0.119	− 0.118	− 0.116	− 0.117
	(0.063)	(0.066)	(0.071)	(0.078)
Father's ISEI	0.007	0.009	0.013	0.018
	(0.007)	(0.007)	(0.008)	(0.009)
Female	− 0.207	− 0.219	− 0.240	− 0.262
	(0.339)	(0.354)	(0.388)	(0.430)
C1	2.441**	2.495**	2.625**	2.796**
	(0.771)	(0.803)	(0.870)	(0.948)
C2	2.158***	2.267***	2.518***	2.823***
	(0.582)	(0.610)	(0.671)	(0.746)
C3	0.946	0.959	1.006	1.080
	(0.550)	(0.575)	(0.632)	(0.704)

Table 17 continued

	(1) 0	(2) 0.5	(3) 1.0	(4) 1.5
C4	0.704	0.720	0.773	0.857
	(0.598)	(0.626)	(0.694)	(0.780)
Interaction mother's education and birth cohort				
Mother's education × C5 (base category)				
M_edu × C1	0.260	0.262	0.268	0.275
	(0.162)	(0.171)	(0.187)	(0.202)
M_edu × C2	− 0.152	− 0.150	− 0.144	− 0.134
	(0.147)	(0.155)	(0.174)	(0.196)
M_edu × C3	0.271*	0.292*	0.337**	0.390**
	(0.108)	(0.113)	(0.125)	(0.139)
M_edu × C4	0.072	0.075	0.084	0.096
	(0.091)	(0.094)	(0.102)	(0.113)
Interaction father's education and birth cohort				
Father's education × C5 (base category)				
F_edu × C1	− 0.121	− 0.112	− 0.096	− 0.080
	(0.091)	(0.097)	(0.109)	(0.125)
F_edu × C2	− 0.003	− 0.007	− 0.019	− 0.034
	(0.127)	(0.133)	(0.148)	(0.168)
F_edu × C3	− 0.270**	− 0.282**	− 0.312**	− 0.349**
	(0.098)	(0.104)	(0.116)	(0.131)
F_edu × C4	− 0.098	− 0.100	− 0.106	− 0.116
	(0.083)	(0.086)	(0.095)	(0.106)
Interaction gender and birth cohort				
Female × C5 (base category)				
Female × C1	− 4.052***	− 4.365***	− 5.027***	− 5.766***
	(1.049)	(1.080)	(1.145)	(1.225)
Female × C2	− 0.336	− 0.411	− 0.579	− 0.771
	(0.593)	(0.628)	(0.706)	(0.802)
Female × C3	− 0.013	− 0.027	− 0.064	− 0.105
	(0.541)	(0.569)	(0.632)	(0.711)
Female × C4	− 0.058	− 0.061	− 0.078	− 0.103
	(0.540)	(0.567)	(0.630)	(0.709)
Controls				
Siblings	0.077	0.080	0.084	0.088
	(0.047)	(0.050)	(0.056)	(0.064)
Family structure	− 0.742*	− 0.788*	− 0.888*	− 1.013*
	(0.344)	(0.366)	(0.418)	(0.479)
Parent's ethnicity	− 0.236	− 0.285	− 0.387	− 0.499
	(0.287)	(0.300)	(0.331)	(0.369)
Deceased father	0.628	0.666	0.761	0.880

Table 17 continued

	(1) 0	(2) 0.5	(3) 1.0	(4) 1.5
	(0.616)	(0.648)	(0.723)	(0.814)
Constant	− 1.095*	− 1.410*	− 2.137***	− 3.009***
	(0.540)	(0.567)	(0.629)	(0.707)
Observations	7541	7541	7541	7541

Standard errors in parentheses

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

Table 18 Logit baseline MI model: effect of parent's education on educational attainment

	(1) Complete primary	(2) Enter secondary	(3) Complete secondary	(4) Enter postsecondary
Father's education	0.073*	0.146***	0.106***	0.117***
	(0.036)	(0.026)	(0.023)	(0.033)
Mother's education	0.283***	0.101***	0.056*	0.000
	(0.043)	(0.026)	(0.024)	(0.036)
Father's ISEI	0.019**	0.008	0.018**	0.008
	(0.006)	(0.005)	(0.006)	(0.007)
Female	− 0.372**	− 0.124	− 0.099	− 0.359
	(0.135)	(0.121)	(0.118)	(0.184)
C1	− 1.430***	− 0.973***	0.387	1.568***
	(0.206)	(0.225)	(0.290)	(0.403)
C2	− 0.728**	− 0.242	0.560**	0.966**
	(0.222)	(0.187)	(0.201)	(0.302)
C3	− 0.492*	0.0366	0.205	0.492
	(0.215)	(0.183)	(0.168)	(0.256)
C4	− 0.039	− 0.031	0.063	0.422
	(0.230)	(0.163)	(0.145)	(0.238)
Controls				
Siblings	− 0.000	− 0.020	− 0.032	0.042
	(0.022)	(0.023)	(0.028)	(0.046)
Family structure	− 0.003	0.08	− 0.123	− 0.579
	(0.208)	(0.205)	(0.231)	(0.323)
Parent's ethnicity	− 0.618***	− 0.202	− 0.179	− 0.239
	(0.157)	(0.171)	(0.173)	(0.251)
Deceased father	0.07	− 0.258	0.277	0.497
	(0.408)	(0.364)	(0.378)	(0.557)
Constant	1.259***	0.196	− 1.128***	− 0.964*
	(0.302)	(0.273)	(0.281)	(0.446)

Table 18 continued

	(1) Complete primary	(2) Enter secondary	(3) Complete secondary	(4) Enter postsecondary
Observations	9696	8084	6308	2899

Standard errors in parentheses

$^{*}p<0.05$, $^{**}p<0.01$, $^{***}p<0.001$

Table 19 Logit preferred MI model: effect of parent's education on educational transitions including interaction terms

	(1) Complete primary	(2) Enter secondary	(3) Complete secondary	(4) Enter postsecondary
Father's education	0.012	0.153***	0.119***	0.176**
	(0.094)	(0.046)	(0.034)	(0.055)
Mother's education	0.297**	0.076	0.058	− 0.024
	(0.108)	(0.044)	(0.036)	(0.066)
Father's ISEI	0.019***	0.009	0.018**	0.009
	(0.006)	(0.005)	(0.006)	(0.007)
Female	0.012	0.08	0.037	− 0.395
	(0.319)	(0.228)	(0.182)	(0.297)
C5 (base category)				
C1	− 1.470***	− 0.560	1.255**	2.309***
	(0.291)	(0.372)	(0.419)	(0.673)
C2	− 0.535	− 0.252	0.954**	1.724**
	(0.322)	(0.341)	(0.354)	(0.545)
C3	− 0.533	0.018	0.438	0.699
	(0.304)	(0.316)	(0.325)	(0.524)
C4	0.230	− 0.056	0.002	0.535
	(0.342)	(0.316)	(0.345)	(0.574)
Interaction mother's education and birth cohort				
Mother's education × C5 (base category)				
Mother's education × C1	− 0.031	0.009	− 0.014	0.292
	(0.141)	(0.079)	(0.076)	(0.171)
Mother's education × C2	0.016	0.013	0.03	− 0.126
	(0.139)	(0.093)	(0.074)	(0.116)
Mother's education × C3	0.006	0.146	0.006	0.136
	(0.141)	(0.089)	(0.065)	(0.099)
Mother's education × C4	− 0.011	0.002	− 0.016	0.037
	(0.145)	(0.060)	(0.057)	(0.097)
Interaction father's education and birth cohort				

Table 19 continued

	(1) Complete primary	(2) Enter secondary	(3) Complete secondary	(4) Enter postsecondary
Father's education × C5 (base category)				
Father's education × C1	0.243*	− 0.018	− 0.079	− 0.071
	(0.114)	(0.072)	(0.069)	(0.082)
Father's education × C2	− 0.005	0.019	− 0.043	− 0.015
	(0.115)	(0.098)	(0.073)	(0.099)
Father's education × C3	0.097	− 0.118	− 0.028	− 0.155
	(0.117)	(0.076)	(0.056)	(0.085)
Father's education × C4	0.010	0.038	0.012	− 0.055
	(0.113)	(0.062)	(0.051)	(0.082)
Interaction gender and birth cohort				
Female × C5 (base category)				
Female × C1	− 0.566	− 0.916*	− 1.167	− 3.438***
	(0.410)	(0.456)	(0.602)	(0.919)
Female × C2	− 0.461	− 0.171	− 0.624	0.166
	(0.423)	(0.371)	(0.403)	(0.535)
Female × C3	− 0.279	− 0.091	− 0.205	0.136
	(0.421)	(0.352)	(0.324)	(0.493)
Female × C4	− 0.524	− 0.214	0.169	0.163
	(0.452)	(0.328)	(0.289)	(0.470)
Controls				
Number of siblings	− 0.000	− 0.018	− 0.029	0.055
	(0.022)	(0.024)	(0.028)	(0.043)
Family structure	0.007	0.086	− 0.124	− 0.595
	(0.214)	(0.204)	(0.227)	(0.329)
Parent's ethnicity	− 0.614***	− 0.210	− 0.202	− 0.238
	(0.159)	(0.171)	(0.175)	(0.268)
Deceased father	0.083	− 0.258	0.270	0.600
	(0.410)	(0.365)	(0.365)	(0.589)
Constant	1.163***	0.137	− 1.307***	− 1.308*
	(0.314)	(0.341)	(0.317)	(0.515)
Observations	9696	8084	6308	2899

Standard errors in parentheses

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

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