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LA SANGRE SE HEREDA, Y LA EDUCACIÓN SE APEGA:
THE ROLE OF EDUCATIONAL TRANSMISSION IN RELATIVE SOCIAL MOBILITY
IN MEXICO

TESINA
QUE PARA OBTENER EL TÍTULO DE
LICENCIADO EN ECONOMÍA

PRESENTA
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*Dedico esta tesina
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a mi padre, el músico José Luis,
y a mi abuelita, la maestra Juanita.
Gracias por su apoyo incondicional,
por siempre creer en mí,
y por ser mi inspiración,
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Abstract

Exploring the influence of parental schooling background on their child's educational opportunities and social mobility in Mexico provides valuable insights for equitable policy interventions. This work examines whether parents' schooling years and possession of completion certificates have an impact on children's high school and higher education enrollment and completion probabilities. The analysis was carried out using data from 2011 and 2017 ESRU-EMOVI surveys, both cross-sectional cohort data and random and nationally representative samples of the Mexican population. I use a probability approach employing Logit estimations to exploit the variation from 2011 to 2017 implementing controls such as socioeconomic status, child's sex, and household size.

The findings of this study highlight the significant positive impact of parents' education background variables on children's high school and higher education outcomes, with fathers' schooling showing a stronger influence in recent years. Moreover, higher socioeconomic levels play a crucial role, although its effect on high school enrollment probabilities has decreased in 2017 compared to 2011. As an extension of the study, I carry out further robustness checks and the results remain significant and consistent. Overall, while absolute social mobility is evident, the persistence in the relationship between parents' education and children's outcomes underscores the ongoing challenges in achieving educational equity, particularly for individuals from lower socioeconomic backgrounds. These results emphasize the need for specific policy actions to foster relative social mobility in education and support equal schooling opportunities in Mexico.

Keywords: social mobility, parental schooling background, high school and higher education enrollment and completion, Logit estimations, educational policy, Mexico.

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Chapter 1

Introduction

Social mobility in Mexico is limited and varies significantly across different social groups. The extent to which inequality is passed down from one generation to the next, known as intergenerational persistence of inequality, is 0.62. Moreover, there is a notable high persistence of inequality both at the lower and higher ends of the socioeconomic spectrum, with close to 50 percent of individuals remaining in the same economic position as their parents. In other words, economic opportunities and advantages are not evenly distributed, leading to a lack of upward mobility for many individuals and families in the country (Delajara et al., 2020). The study of social mobility integers at least the following four dimensions: economic, education, health, and occupation. Latest research has denoted the importance of education and the role it plays in shaping societies and determining individual opportunities for social mobility (Chetty et al., 2014).

Understanding the impact of education on social mobility is of great importance due to the persistent inequalities that have been maintained over time. The evidence provided for the Mexican context reveals that, on average, individuals have completed 9.2 years of schooling (not considering kindergarten), which is equivalent to the third year of *secundaria*. (Behrman & Grajales, 2015). Additionally, INEGI (s.f.) denotes some regional disparities. This is because Mexico City has the highest schooling level with almost 12 years and on the other side is Chiapas with almost 8 schooling years. These findings underscore the situation concerning educational attainment across the Mexican population. Lower rates of schooling completion indicate potential barriers to accessing education.

Departing from the idea that social mobility in education is being hindered by socioeconomic and family factors (Cabrera, 2016; Chetty et al., 2023), this research aims to look into variables that affect the probabilities of accessing and completing schooling levels. The objective of this is to shed light on the factors that contribute to educational disparities and their consequences for social mobility in Mexico. By examining families' schooling context from two national representative samples, I seek to answer how much impact does parents' schooling background and their economic position have on enrollment and completion probabilities for

high school and higher education. I focus on these two educational levels because they are the ones with lower rates of completion, as noted above

Based on existing research and empirical evidence, I expect to find that, even when inequalities in education persist, there may be an increase in the rate of admission to both schooling levels due to the expansion of available educational opportunities, which represents higher absolute mobility. However, the important about this is the comparison between high school and higher education enrollment and completion rates. This is because understanding the dynamics of educational access and achievement between these two levels is essential for formulating effective educational policies and interventions that address the specific challenges each level presents. The proposed hypothesis states that relative social mobility in education keeps being lower and systematic barriers are maintained from 2011 to 2017, especially on completion probabilities. This relates to the findings from Monroy-Gómez-Franco & Corak, (2020) and Solís (2018).

To shed light on the issue, I compare schooling data obtained from the 2011 and 2017 ESRU Survey on Social Mobility in Mexico and calculate the relationship of parents' schooling years and they obtaining a high school or high education completion certificate on their children's enrollment and completion probabilities from both schooling levels. I also use the socioeconomic position of the child's family, the child's sex, and the family's household size. Once I considered all these factors, I compare the marginal effects variation from 2011 year to 2017 to estimate absolute and relative social mobility in terms of education.

The reason I focus on high school and high education is because previous research about this has shown that, at the end of the last decade, there is a minimum increase in enrollment rate in high school; unfortunately, problems of school dropout and low educational achievement persist (Miranda López, 2018; Ruiz, 2014). Ramírez Raymundo et al. (2015) found that, analyzing schooling trajectory for the 1999-2010 cohort, out of all the students who enrolled in high school, only 60.6% completed it. This indicates that 40% of those who initially entered the program did not finish their studies. The dropout rate is especially high between the first and second year of this schooling level; this means that out of 100 students who started in the first grade, only 78 made it to the second grade. Thus, understanding the issue of high school dropout is crucial in the context of Mexico. OECD (2012) described that school failure and dropout have significant economic and social consequences.

Additionally, I decided to use parents' possession of a graduate certificate as a second explanatory variable because according to Cunha & Heckman (2007), noncognitive abilities such as perseverance, motivation, time preference, and risk aversion have direct effects on schooling. These abilities can fill most of the gaps in college attendance and dropout, but they are determined by early family factors. Therefore, the importance of this comes from the skills' formation throughout the completion of schooling years; the impact of enrolling and dropping out or getting a certificate by means other than studying is less, as is the transfer of abilities to daughters and sons (Cameron & Heckman, 1991)

The results suggest the positive and significant impact of parents' education and possession of a graduate certificate on the probability of high school enrollment. Notably, fathers' schooling years had a stronger influence in 2017, relative to 2011, keeping the SES constant. On the other hand, mothers' schooling years showed the opposite trend. Additionally, the study underscored the importance of socioeconomic status (SES) in influencing enrollment probabilities. The probability of enrolling in HEI was higher for people with more money and status, but this effect was less strong in 2017 than before. This means that people from poorer backgrounds had a slightly better chance of getting into college, which shows a small increase in social mobility. However, there was still a big gap between the rich and the poor in terms of educational opportunities, which shows that there are still many problems and obstacles that prevent everyone from having equal access to education.

This study also examined how parents' education and certification affected the chances of enrolling and completing higher education institutions (HEI). All things considered, the results of these estimations show that a parent's educational background is important for HEI enrollment and completion, even more, if your father has a graduation certificate of this level because the human capital and non-cognitive skills transmission is higher. However, I highlight the cautious interpretation due to different unit measurements for each variable. Socioeconomic status also mattered, with more obstacles for the middle SES group than the lower and higher ones.

Finally, comparing the results from high school and HEI enrollment and completion outcomes, the analysis underscored the significant influence of a parent's education background, especially if they possessed a graduate certificate, on both probabilities. Nonetheless, the impact suggested an increase in social mobility for HEI compared to high school, but also indicated the

enduring impact of socioeconomic factors on educational achievements. Socioeconomic status (SES) remained a pertinent factor for both educational levels, exerting a greater effect on high school, but its impact diminished concerning HEI completion.

In summary, the obtained results carry implications for understanding the transmission of education across generations and informed policymaking aimed at reducing educational disparities. This research seeks to make a substantial contribution to the existing knowledge base and offer invaluable insights for policy interventions geared towards mitigating educational inequalities and promoting upward mobility opportunities.

Furthermore, I explored heterogeneous effects within the samples, dividing them into lower and higher socioeconomic strata using quintiles. The results revealed consistent positive impacts of parents' schooling years and possession of a certificate on high school and higher education enrollment and completion probabilities from 2011 to 2017. Noticeably, in the lower socioeconomic levels, the effect of a mother's high school certificate increased in 2017, while in higher levels, it decreased. Besides, moving from one socioeconomic level to another had a more significant impact on enrollment probabilities in the lower strata, whereas higher levels showed smaller differences. In terms of absolute social mobility, this suggests an overall positive trend of upward educational mobility within the population. Regarding relative social mobility, this highlights the persistent differences in mobility chances between different economic groups.

In addition, I extend the analysis by conducting a robustness check with regional fixed effects. The results show consistent patterns for parents' schooling years, possession of a certificate, and SES, with positive impact and statistical significance on high school and higher education enrollment probabilities. Regional disparities are evident, with most regions showing a negative effect compared to the Center region. Notably, regional effects shift from negative to positive, particularly in the North-Center and South regions, suggesting potential advantages for completing higher education in these areas. Overall, these findings enrich our understanding of educational inequalities influenced by geography and align with existing studies on Mexico's regionalization (Delajara & Graña, 2017; Monroy-Gómez-Franco & Corak, 2020; Torche, 2019).

Several works analyzing social mobility in education in Mexico by different approaches are Delajara & Graña (2017), Monroy-Gómez-Franco & Corak, (2020), and Torche (2019,

2020). I differentiate from these by using schooling context variables to estimate enrollment and completion probabilities of two education levels in Mexico, it is one of a few studies analyzing this link with a probability approach. Some papers try to estimate social mobility in education by a rank-rank approach (Delajara et al., 2020). (Behrman & Grajales, 2015) conducted a study to analyze intergenerational mobility patterns for schooling, occupation, and household wealth where their empirical strategy was estimating parents' outcomes on grandparents' outcomes such as completed grades of schooling.

This research is structured as follows. The next section reviews the existing literature on the subject. Section 3 describes the data used here and provide some graphic visualization of Mexico's educational context. Section 4 details the methodology employed in the work. Section 5 shows the main results obtained, and section 6 discusses robustness checks and heterogeneous effects. Finally, I present my conclusions.

Chapter 2

Literature Review

The study of social mobility and education has had a gradually exponential development during the last years, especially when we refer to the Mexican context. That is why this literature review will be constituted of three main parts. In the first one, I will seek to lay the foundations of social mobility, specifically on how to measure it. In the second one, I will approach the study of intergenerational transmission of human capital, focusing on educational conditions and how the evidence until now tries to explain the importance of it. And the last one will unite both streams of analysis and will aim to centralize it to the Mexican context.

Social mobility has been a subject of great interest in sociology and other social disciplines since it analyzes the factors that intervene for a person or a group to improve their social position (Corak, 2016; Esping-Andersen & Cimentada, 2018). The understanding of this is crucial to analyze inequality and social justice, as well as to inform public policies aimed at reducing the gap between different social positions (Serrano Espinosa & Torche, 2010). In this literature review section, some of the key studies on social mobility will be exposed and I will discuss the main theories and approaches used in this work.

The concept of social mobility can be defined as shifts or changes that occur in the SES of individuals within a society (Chetty et al., 2014; Corak, 2016; Vélez Grajales, Campos Vázquez, et al., 2015). In order to achieve high levels of social mobility, it is essential to ensure that everyone competes on a level playing field, with equal access to opportunities and resources. In Vélez Grajales et al. (2015) authors explore and analyze the different aspects or dimensions that contribute to this phenomenon. Based on the evidence of recent studies, there exists an important link between social mobility and topics like poverty, socioeconomic inequality, and growth (Chetty et al., 2014; Corak, 2016; Paterson & Iannelli, 2008; Vélez Grajales, Campos Vázquez, et al., 2015).

There exist different ways to approach social mobility. First of all, we have intergenerational or intragenerational mobility. The first one refers to the change in someone's position compared to her home of origin. The second one is the shifts that exist in the socioeconomic position throughout the life cycle of people (Behrman et al., 2001). Depending on which one we want to study, there exist two other kinds of mobility: horizontal —changes

of an individual's position within a specific SES— and vertical —the movement of an individual from one social stratum or level to another, either upward (ascending) or downward (descending) (Torche, 2005; Vélez Grajales, Campos Vázquez, et al., 2015). Lastly, we can identify two types of social mobility. There exists *absolute* social mobility, which compares an individual's position or achievements concerning their previous generations. On the other hand, there is *relative* social mobility, and it examines how likely it is for someone from a particular social background to move to a higher or lower position in the social hierarchy compared to others in her generation (Erikson & Goldthorpe, 2008).

Now, the *maximally maintained inequality* (MMI) theory is employed in the research framework of this study to propose the potential impacts of education in situations where there are large disparities in social status and economic opportunities (Raftery & Hout, 1993). This principle suggests that individuals from the most privileged socioeconomic groups are more likely to benefit from educational opportunities. As a result, there will still be significant differences in entry rates between SES, with those in more advantaged positions having greater access to education. These inequalities will probably continue until the income rate of the most privileged individuals reaches a point where it can no longer increase any further (Cabrera, 2016).

In addition to MMI, *the effective maintained inequality* (EMI) theory questions the validity of the educational transitions approach and suggests that there are significant social background effects even for transitions that are nearly universal (Lucas, 2001). In other words, this implies that even if more students from diverse socioeconomic backgrounds are granted access to higher education, social inequalities can persist due to differences in the quality of education and opportunities available to them, which can be influenced by factors such as socioeconomic status and institutional biases (Cabrera, 2016; Lucas, 2001). An example related to this work is that if the probabilities of accessing to HEI depend less on the education of the parents then it represents a higher absolute mobility. If parents' education has a greater influence on completing some education level, this implies reduced relative mobility because the human capital transmission is stronger but with low levels of schooling. Thus, if we compared respect to their SES position, there are fewer prospects for its successful completion compared to those from higher income backgrounds within the same generation.

According to Milanović (2019), the combination of exorbitant education expenses and the perceived or actual educational excellence offered by prestigious schools serves two purposes. Firstly, it creates an insurmountable barrier for others to compete with the affluent individuals who control exclusive education. Secondly, it effectively communicates that individuals who have attended these schools not only hail from privileged backgrounds but also possess superior intellectual abilities.

Several studies have shown evidence that family is the main transmitter of culture, values, and principles in the life of a child (Corak, 2016; Esping-Andersen & Cimentada, 2018; Paterson & Iannelli, 2008). As far as we know, family is one of the oldest institutions in our society, and social mobility finds its roots in the analysis of people's context of origin. What is important to highlight from this is that, according to Esping-Andersen & Cimentada (2018), considering the child's family environment, there could exist a possibility that skill combinations can modify the mobility of a person. But this set of skills is also developed under certain circumstances that could explain why the son, or the daughter, makes certain decisions in life.

Following the argument by Erikson & Goldthorpe (1992), social mobility within developing class structures of modern industrial societies could be a "constant flux" as they named it. This means that, according to their evidence, there exists a persistence of low intergenerational class mobility. In other words, people tend to remain in the same social class as their parents, even when there have been changes in the economy and society over time. This kind of analysis we can also find it in Chetty et al. (2014). In this paper, the authors study the link between parents' income and the socioeconomic level of their children to describe how people move among the generation distribution. What they find is that there exists a relationship between parents' income and the future of their sons or daughters. Specifically, they showed that a 10% increase in parents' earnings is associated with a rise of 3.4% in children's future income.

Moreover, education is one of the dimensions that are part of social mobility, and its importance has been widely recognized in the academic literature (Blanden, 2020; Cabrera, 2016; Gu et al., 2022; Hanushek & Woessmann, 2020; Patrinos & Psacharopoulos, 2020; Psacharopoulos, 1972). The main argument about education and its effect on social mobility is the intergenerational transmission of human capital. This refers to the process by which parents

transmit their resources and characteristics to their children, including the educational level attained (Black et al., 2005).

Numerous studies have shown that the education of parents is a key factor in determining the educational level of their children and that the educational level of parents can have a significant impact on the social mobility of their children (Black et al., 2005; Doruk et al., 2022; Torche, 2011; Torche & Costa Ribeiro, 2010). In this sense, education is not only important for the development of specific skills and knowledge but also to acquire a higher social position than that of parents. In the research carried out by Chetty et al. (2020), the authors gathered data on parental income and earnings outcomes for college students in the United States. The purpose of this was to examine how the socioeconomic position of parents might affect the quality of their children's college education. The results revealed significant university segregation due to the self-selection of the students according to their family background.

Some of the findings for countries like China, Norway, England, Wales, and Scotland highlight the roles that educational attainment plays in the intergenerational mobility process and how it can be a vehicle to improve social mobility (Black et al., 2005; Gu et al., 2022; Paterson & Iannelli, 2008). Their discoveries show two positions, first that the relationship is mainly shaped by family attributes and inherent abilities rather than educational spillages, while the second is that estimations revealed a positive correlation between parental education and their children's university enrollment. Resolutions highlight the substantial expansion of non-manual employment, which initially facilitated upward mobility but has lately contributed to downward social mobility from middle-class backgrounds.

Certain studies that seek to carry out this type of research have focused their analysis on North America and Latin America (Behrman et al., 2001; Cabrera, 2016; Chetty et al., 2014; Corak, 2013; Doruk et al., 2022; Torche, 2011; Torche & Costa Ribeiro, 2010). These works present a comprehensive overview of intergenerational mobility, revealing a range of findings. Higher parent income is shown to positively correlate with increased child income, while various factors like reduced residential segregation, lower income inequality, better primary schools, stronger social capital, and family stability contribute to upward mobility. Disparities in intergenerational mobility between the United States and other countries are explored, particularly about growing inequality.

The context of Brazil uncovers declining economic returns to education and a diminishing influence of class origins on the class destination, influencing mobility dynamics across different national contexts. The relationship between educational attainment and intergenerational association follows a U-shaped pattern, with a strong connection among those with low education, a weakened or absent association among bachelor's degree holders, and a resurgence among individuals with advanced degrees. Finally, policy implications for reducing income inequality and fostering economic growth are emphasized in the examination of intergenerational income mobility in Brazil and Panama because of their socioeconomic environment.

Furthermore, there is research that emphasizes the measurement of relative social mobility. For example, in Cabrera (2016) the author focuses on the relationship between the socioeconomic status of young people in Chile and their admission to different types of higher education institutions (HEI). The objective is to analyze whether there are inequalities in the probabilities of access to the most prestigious institutions that are effectively maintained over time. This is important research for this work because it provides the necessary foundations to understand and develop the empirical strategy used here. Compared to this, Behrman & Grajales, (2015) found that for Mexico intergenerational relative schooling mobility consistently increased over time for all population subgroups.

Summarizing, the evidence presented until now suggests that education is a fundamental tool for social mobility, but it can also be a mechanism for the reproduction of inequality. The intergenerational transmission of human capital, especially in contexts with high levels of inequality such as in Latin America, has a significant impact on individuals' educational and employment opportunities.

The importance of understanding the patterns of social mobility in the Mexican context lies in the persistence of social and economic inequality, as well as in the search for public policies that promote equal opportunities and reduce the gap between the different social strata (Serrano Espinosa et al., 2008; Solís, 2018). Through the review of the specialized literature, it is possible to identify the trends and patterns of the multidimensionality of social mobility in Mexico, as well as their causes and consequences (Behrman & Grajales, 2015; Campos-Vázquez et al., 2012; Delajara et al., 2020; Delajara & Graña, 2017; Torche, 2019, 2020; Vélez Grajales, Campos Vázquez, et al., 2015).

Torche (2020) analyzed to what extent the intergenerational socioeconomic link is influenced by education and how much it occurs through non-educational channels. Considering the significant gender and regional stratification, separate analyses were performed for Mexican men and women, as well as for different regions of the country. This study found that among Mexican men, the intergenerational economic association increases across cohorts from those born between the 1950s to those born in the early 1970s, to then decline among younger cohorts. However, in the case of women, the increase in the intergenerational socioeconomic association across cohorts was due to a combination of growing socioeconomic returns to schooling and growing intergenerational association net of education, signaling declining mobility. On a positive note, the study found that across cohorts, individuals are increasingly able to attain more education regardless of their social origins (Torche, 2020).

Finally, in Delajara & Graña (2017) the authors conducted studies using rank-rank regressions to determine the extent of relative and absolute upward social mobility, which provided evidence of a negative association between low social mobility and inequality. They used survey data from 2011 and found a clear north-south gradient, where children of poor parents had greater upward mobility as they moved away from the south, the country's poorest region. This result is also provided by other similar analyses which reaffirm that there is an inequality of mobility in Mexico (Delajara et al., 2020; Delajara & Graña, 2017; Monroy-Gómez-Franco & Corak, 2020; Torche, 2019).

Comparing these findings with the international ones it is clear that education is a key factor in intergenerational mobility. Formal studies highlight the relationship between parental education and children's educational attainment, indicating that family attributes and inherent abilities influence this connection. Additionally, some results show a positive correlation between parental education and children's university enrollment, underscoring the importance of education in facilitating upward mobility. Factors such as reduced residential segregation, lower income inequality, and social capital are identified as contributing to upward mobility in both non-Mexican countries and Mexico. These common findings emphasize the significance of creating an environment that supports equal opportunities and reduces barriers to mobility. Last, similar dynamics between Brazil and Mexico suggest that both countries face common challenges and opportunities to promote intergenerational mobility. Therefore, the policy implications in countries such as Brazil, Panama, and Mexico are focused on reducing income

inequality and fostering economic growth, which highlights the importance of implementing measures that address disparities and create a more equitable society.

This literature review identified several studies that explored the patterns and causes of social mobility in Mexico (Behrman & Grajales, 2015; Campos-Vázquez et al., 2012; Delajara et al., 2020; Monroy-Gómez-Franco & Corak, 2020; Serrano Espinosa et al., 2008; Solís, 2011, 2018; Torche, 2019, 2020; Vélez Grajales, Huerta Wong, et al., 2015), reflecting the persistent social and economic inequality in the country and the need for policies that promote equal opportunities. The following section will discuss the data and methods used in this study to estimate relative schooling social mobility in Mexico.

Chapter 3

Data

3.1 Database

To estimate the models and test the hypothesis proposed, I use the information from 2011 and 2017 ESRU Survey on Social Mobility in Mexico (EMOVI) of the Centro de Estudios Espinosa Yglesias (CEEY). Both are cross-sectional cohort data and random and nationally representative samples of Mexican men and women between 25 and 64 years of age.¹ These surveys are the most adequate source for this analysis since they collect detailed information on schooling, labor force, adult labor income, assets, and socioeconomic level of the interviewed person, which in most cases it was the head of household. It also compiles school information of this person's parents, partner, and children. The 2011 module collected 11,001 interviews and for the 2017 module, there were a total of 17,665.

The purpose of this research is to analyze children's enrollment and completion probabilities from high school (*preparatoria*) and university of controlling by their context of education and SES, for both 2011 and 2017. To achieve this, I compute years of schooling based on normative Mexican school grades, and household socioeconomic classification was made based on their human capital; practical Infrastructure; connectivity and entertainment, and basic infrastructure and space. Finally, to avoid bias on estimates due to age because we are studying a certain schooling level which is almost at the end of the educational pyramid, it remained the information of those cases where children were 12 years or older. Thus, my final samples comprise 9,249 individuals for 2011 and 11,805 for the 2017 module.

3.2 Descriptive statistics

Table 1 contains descriptive statistics for the variable of interest (schooling) and other useful information for both survey samples. As ESRU-EMOVI collects data from an interviewed adult and also gathers information on the parents and children of these adults, the mention of "parents" in this research is referring to the interviewed and her partner, while "children" is about their

¹ The first version of this national study on social mobility is from 2006, but for reasons of the questionnaire structure, this module had to be left out of this analysis.

daughters and sons. Last, “grandparents” are the parents of the interviewed adult. The first panel summarizes the 2011 data and the second one is about the 2017 survey.

Table 3.1: Descriptive statistics

Variables	Obs	Mean	St. Dev.	Min	Max
2011					
Household size	9,249	4.8	2.2	1	26
Children’s age	9,249	23.1	8.5	12	54
Children’s schooling	8,915	12.6	3.2	3	26
Interviewee’s age	9,249	49.1	9.5	25	64
Father’s schooling	6,587	10.8	3.8	1	26
Mother’s schooling	7,790	10.4	3.5	1	26
Grandfather’s schooling	3,586	8.5	3.1	1	28
Grandmother’s schooling	3,425	8.3	2.8	1	21
2017					
Household size	11,805	4.6	1.7	1	15
Children’s age	11,805	22.6	8.2	12	54
Children’s schooling	11,680	13.6	3.3	4	26
Interviewee’s age	11,805	48.8	8.9	25	64
Father’s schooling	11,219	12.0	4.2	4	26
Mother’s schooling	11,186	11.6	3.8	4	26
Grandfather’s schooling	5,350	8.9	3.9	2	26
Grandmother’s schooling	4,116	9.4	4.1	3	26

Source: EMOVI 2011 and 2017.

In 2011 mean household size was 4.8 with a maximum of 26 members, while in 2017 the mean was alike, with 4.6 people, but the maximum reported was 15 members. Now, if we pay attention to schooling information there is a valuable perspective of the family context. According to this data, we observe an increase in mean years of education from generation to generation for both panels. On average, grandparents have 8 to almost 9 schooling years, while the next generation, the parents, have 10 to 12 years. Nevertheless, there exists a difference between 2011 and 2017 about this because for the second one parents report to have studied at least one or two years more compared to 2011. In the case of children, both the first and second sections show similar data, with a difference of one year from 2011 to 2017. So, there exists at least a jump of a minimum of four years between grandparents and grandchildren, which at first glance denotes progress in education.

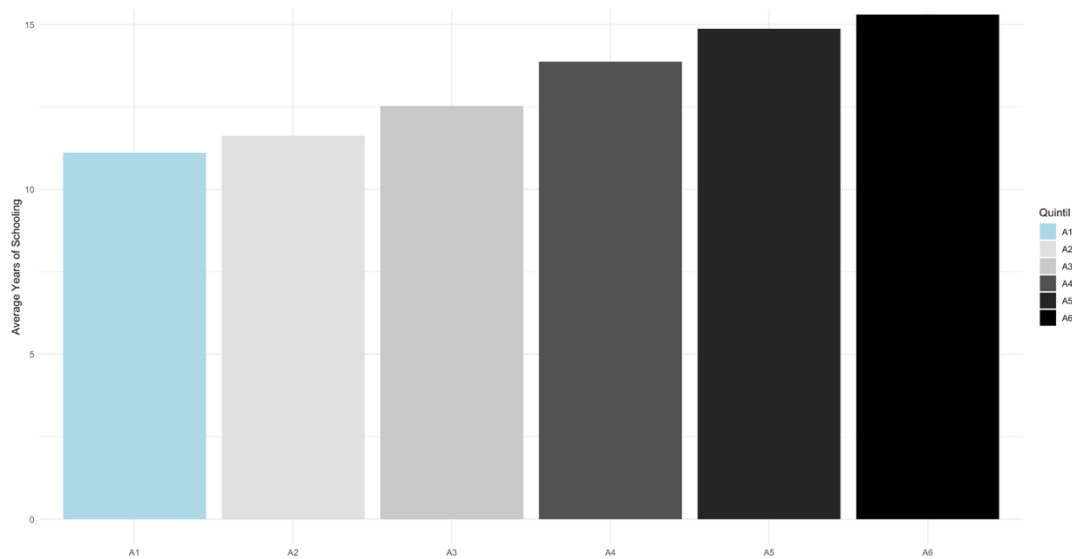
Figures 3.1 and 3.2 present a visualization of the average total schooling years reached by children in the sample divided by AMAI levels² (2011 module) and socioeconomic quintiles

² The “Niveles Socioeconómicos de la Asociación Mexicana de Agencias de Inteligencia de Mercado y Opinión AC” (NSE-AMAI) are a measure of socioeconomic status based on a statistical model, that allows grouping and classifying Mexican households into seven levels (current version), according to their ability to meet

(2017 module). We can appreciate that there is a persistence in the lower SES to have a total education between 11 and 12 schooling years. While the upper quintiles have a higher frequency reaching an average of 15 years. These graphs offer a perspective of schooling inequality where a sector of society is leading with its economic and cultural barriers while others are benefitting from their socioeconomic position to improve their education. The importance of this derives from the persistence of this inequality for both years, denoting the need to study the factors that build educational barriers and offer an approach to possible ways to address them.

Figures 3.3 and 3.4 show the comparison of the schooling variable’s distribution between father and child for 2011 and 2017, respectively. Similar graphs can be found in Appendix A.1 but comparing mother-child and father-mother distributions. According to these graphs, it is clear that the distribution for schooling years is different from child to parents. First, when we compare a child to her father or mother, there are markable differences on the spikes. For example, the fathers’ distribution for both years shows that there is a greater composition of parents who reach most very low levels of education (i.e., elementary) while their children have managed to reach at least one higher level, which means secondary or even high school. As we follow those curves it is possible to observe that the majority is located in the intermediate levels of education. The previous conclusions from these relationships are valid for 2011 and 2017 data. The value of these observations is that they motivate this work because they help to

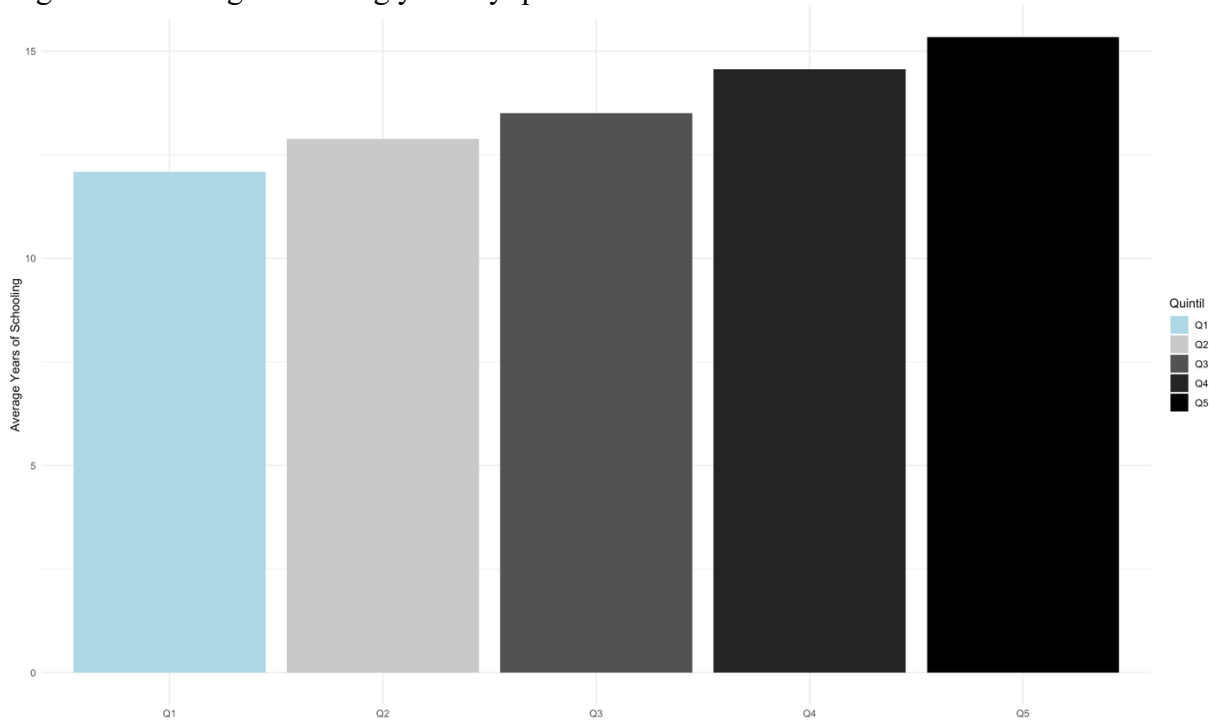
Figure 3.1 Average schooling years by AMAI level



Source: Own elaboration.

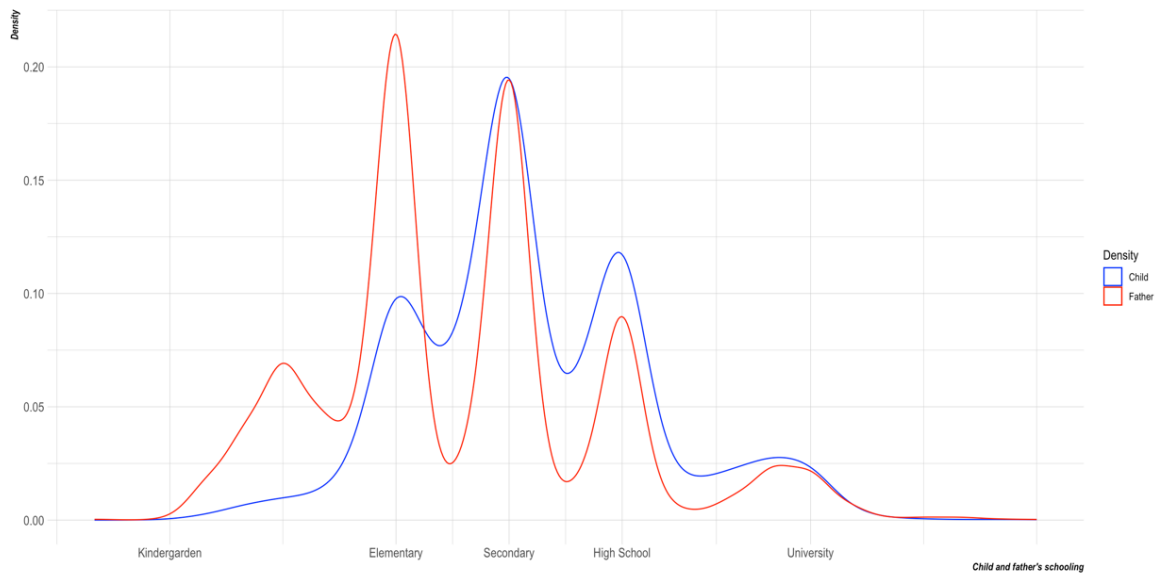
the needs of their members. The 2011 sample used the former version of this measure and reported six levels, instead of seven.

Figure 3.2 Average schooling years by quintiles



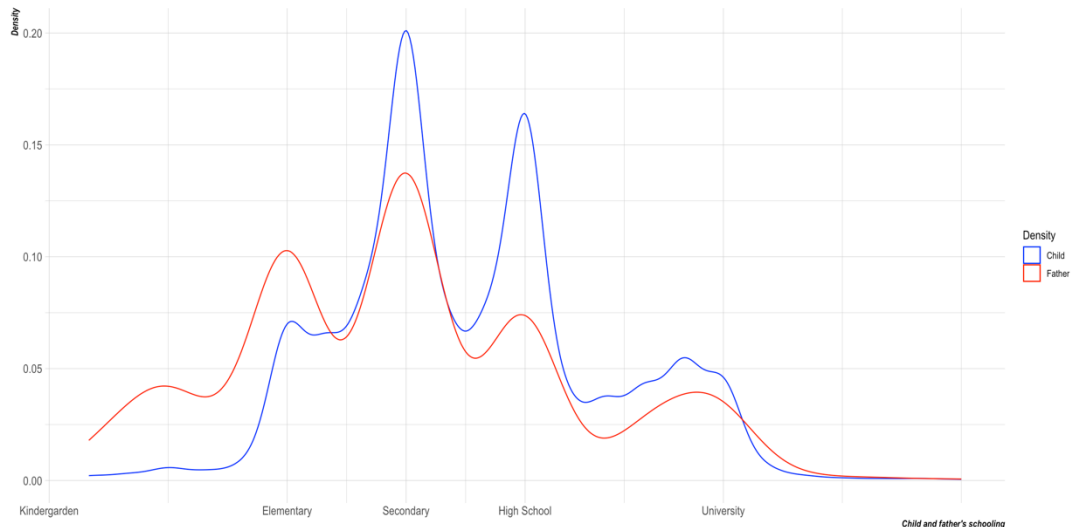
Source: Own elaboration.

Figure 3.3 Child's total schooling years compared to father's, 2011



Source: Own elaboration.

Figure 3.4 Child's total schooling years compared to father's, 2017



Source: Own elaboration.

understand in a better way what kind of intergeneration transmission is happening when it comes to education. Now, the following chapters will develop the idea using an econometric model to test if there exists an influence of the socioeconomic context and educational background on children's academic trajectory.

Chapter 4

Empirical Strategy

The objective of this research is to identify how much impact has parental' schooling background on children's high school and high education enrollment and completion probabilities and the dynamic of this relationship in recent years. To achieve this, I use Logit regressions with family background controls. These kinds of models are useful for situations in which a dichotomous response is available that is thought to be influenced or caused by the levels of one or more independent variables and is particularly suitable for this data, just like is proposed here. The model would be formed as the following equation:

$$\Pr(Y_{ijt} = 1 | X_{it}, X_{jt}) = G(\beta_1 X_{1t} + \beta_2 X_{2t} + \epsilon_i) \quad (1)$$

Where $\Pr(Y_{ijt} = 1 | X_{it}, X_{jt})$ is the representation of the probability of realization of Y_{ijt} per individual i at time $t = 2011, 2017$ for the education level $j =$ high school, HEI. Depending on the case, this will mean if she did or did not enter high school or to some HEI and in the second case if she finished it or not. The marginal effects come from the derivative of the function G concerning X_{1t} which is a vector of explanatory variables. For the first part of the analysis, these are the fathers' and mothers' schooling years.

There are some methodological challenges when it comes to the analysis between families' sociocultural and economic capital and the academic achievement of their daughters and sons. As some scientists have explored the impact of just parental income on children's outputs, this work interest is based on a multidimensional measure of family background. If we analyze income as an explanatory variable, it could bias our estimations due to the temporary impact of earnings. As has been reported in previous literature, income long-term effects have been reported to be more important with respect to academic trajectories (Carneiro & Heckman, 2003; Huang et al., 2009; Kane, 2001).

Sometimes these kinds of studies cannot be done because lack of information but, fortunately, in this work the data from EMOVI 2011 and 2017 provide the position of parents and children in the socioeconomic distribution that may reflect long-term income. For the first

module is captured throughout the “AMAI level” and for the 2017 survey quintiles were estimated and the households were classified according to their human capital; practical infrastructure; connectivity and entertainment and basic infrastructure and space, very similar to AMAI classification rules.

Following the model explanation, if this research is trying to capture and visualize the impact of parental educational factors on both child’s enrollment and completion probabilities, it is also important to divide between those parents that completed the schooling levels studied here and the ones that did not. Children coming from “better” families, for example with parents with more schooling, and with high ability can improve their future schooling by developing those abilities and skills that are transmitted by their parents (Bueno, 2019; Carneiro & Heckman, 2003).

Thus, given the assumption that the person who has completed studies must have the certificate, two sets of regression are being tested with different independent variables. For this second part, the explanatory variables are *dummies* that capture whether the parents have a certificate that proves that they have completed the level of studies to be analyzed, which could be high school or some HEI. Due to this, the model will fit as follows:

$$\Pr(Y_{ijt} = 1 | X_{ijt}, X_{jt}) = G(\beta_1 X_{1jt} + \beta_2 X_{2t} + \epsilon_i) \quad (2)$$

This dummy serves here as an approximation to the study of the impact of parents’ educational level completion, since I use the assumption that the person who has completed studies must have the certificate. Being X_{1jt} the vector that includes those dummies. Last, for both models, the X_{2t} vector of regressors includes household context variables used as controls. These variables are household size; socioeconomic level (AMAI or quintile) and child’s sex. The difference with model 1 is that here the first vector of explanatory variables depends now on which schooling level is being tested. So, for the first part of the analysis, Equation 1 can be rewritten as:

$$\begin{aligned} \text{Enrollment}_{ijt} = & \beta_1 + \beta_1 \text{SchoolingF}_{it} + \beta_2 \text{SchoolingM}_{it} \\ & + \beta_3 \text{HouseholdSize}_{it} + \beta_4 \text{SElevel}_{it} + \beta_5 \text{ChildSex}_{it} + \epsilon_i \end{aligned} \quad (3)$$

$$\begin{aligned}
\mathbf{Completion}_{ijt} &= \beta_1 + \beta_1 \mathbf{SchoolingF}_{it} + \beta_2 \mathbf{SchoolingM}_{it} \\
&+ \beta_3 \mathbf{HouseholdSize}_{it} + \beta_4 \mathbf{SElevel}_{it} + \beta_5 \mathbf{ChildSex}_{it} + \epsilon_i
\end{aligned} \tag{4}$$

And, for the second part of the analysis, Equation 2 can be rewritten as:

$$\begin{aligned}
\mathbf{Enrollment}_{ijt} &= \beta_1 + \beta_1 \mathbf{CertificateF}_{ijt} + \beta_2 \mathbf{CertificateM}_{ijt} \\
&+ \beta_3 \mathbf{HouseholdSize}_{it} + \beta_4 \mathbf{SElevel}_{it} + \beta_5 \mathbf{ChildSex}_{it} + \epsilon_i
\end{aligned} \tag{5}$$

$$\begin{aligned}
\mathbf{Completion}_{ijt} &= \beta_1 + \beta_1 \mathbf{CertificateF}_{ijt} + \beta_2 \mathbf{CertificateM}_{ijt} \\
&+ \beta_3 \mathbf{HouseholdSize}_{it} + \beta_4 \mathbf{SElevel}_{it} + \beta_5 \mathbf{ChildSex}_{it} + \epsilon_i
\end{aligned} \tag{6}$$

In this sense, the empirical strategy implemented is a logit model with four derivations, depending on the dependent and independent variables. First, the impact of parents' years of schooling or graduation certificate possession on enrollment or completion of high school or HEI is estimated, with and without control vectors. After running logit regressions, marginal effects are estimated to provide a clearer interpretation. In the next chapter, I will present these results together with a more detailed description of what we can conclude from them.

Chapter 5

Results

The results presented here are going to be structured as follows: first, the estimated coefficients from the first and second parts of the model for the probability of enrollment and completion from high school will be explained. Then, the extension of the same logit model is implemented to estimate both parts of the analysis for the same probabilities but for the case of HEI.

5.1 Marginal and impact effects on enrollment to and completion of high school

Table 5.1 presents the marginal effects on the probability of enrollment to the high school of eight Logit estimations for both years, 2011 and 2017. Each column represents a different regression; columns 1 to 4 correspond to 2011 and columns 5 to 8 are from 2017. Now, the regressions that show marginal effects on high school enrollment probability that include just the explanatory variables (parents' schooling years and possession of certificate) are in columns 1, 2, 5, and 6. The other ones that control by socioeconomic status, household size, and child's sex are in columns 3, 4, 7, and 8.

Results show that the impact of parents' education and graduate certificate on this probability is positive and statistically significant. The difference among coefficients for 2011 and 2017 can be observed after controlling for household context. For example, in 2011 the model with full controls shows that the impact of the father's schooling years has a marginal effect of 1.2 percent points, while in 2017 the marginal impact is 2 p.p. Though, for the mother's schooling years there is a decrease in the marginal impact from 1.6 p.p. to 0.8 p.p. in 2017.

Furthermore, if we analyze the coefficients for SES, they reveal that for higher levels the enrollment probabilities significantly increase from 5.4 p.p. to 32.7 p.p. in 2011 (with respect to parents in the first level). For 2017, the estimations are lower for higher SES levels compared to 2011 (having 22.9 p.p. as the maximum), while for level 2 the marginal effect is now 7 p.p.

These numbers suggest two things. First, the father's schooling years present a significant impact on children's enrollment probability with and without controls, which means that there is an important human capital transmission from parents to daughters and sons and is stronger for 2017 than in 2011. This indicates that absolute social mobility is lower because you

Table 5.1: Logit model: marginal and impact effects on enrollment to high school

	Dependent variable: Probability of high school enrollment							
	2011				2017			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Father's schooling	0.022*** (0.002)		0.012*** (0.001)		0.026*** (0.001)		0.020*** (0.011)	
Mother's schooling	0.020*** (0.002)		0.016*** (0.001)		0.014*** (0.001)		0.008*** (0.012)	
Father's HS certificate		0.212*** (0.017)		0.098*** (0.019)		0.257*** (0.016)		0.169*** (0.019)
Mother's HS certificate		0.205*** (0.020)		0.101 (0.023)		0.257*** (0.021)		0.038 (0.023)
SES level 2			0.054 (0.039)	0.081*** (0.025)			0.070*** (0.015)	0.097*** (0.015)
SES level 3			0.189*** (0.038)	0.198*** (0.024)			0.128*** (0.015)	0.164*** (0.014)
SES level 4			0.278*** (0.038)	0.366*** (0.024)			0.214*** (0.014)	0.280*** (0.014)
SES level 5			0.334*** (0.039)	0.419*** (0.025)			0.229*** (0.016)	0.314*** (0.015)
AMAI level 6			0.327*** (0.053)	0.459*** (0.031)				
Household size			-0.006** (0.003)	-0.006*** (0.002)			-0.018*** (0.015)	-0.019*** (0.003)
Child's sex			0.027* (0.014)	0.022** (0.011)			0.032** (0.061)	0.037*** (0.010)
Observations	5,872	9,083	5,430	8,430	10,843	10,843	9,737	10,843
Adjusted R ²	0.054	0.039	0.078	0.080	0.059	0.037	0.079	0.075
Log Likelihood	-3,769.962	-5,789.918	-3,406.324	-5,164.225	-7,010.218	-6,855.838	-6,490.727	-6,234.916
Akaike Inf. Crit.	7,545.924	11,585.830	6,832.649	10,348.450	14,026.440	13,729.680	12,987.450	12,487.830

*p<0.1; **p<0.05; ***p<0.01

Source: Own estimations with EMOVI data. Marginal effects of parents' schooling certificates represent a percentage change in enrollment probability (e.g., an increase of 2.2%). Columns 1 to 4 correspond to 2011 and columns 5 to 8 are from 2017. The regressions controlled by socioeconomic level, household size, and child's sex are in columns 3, 4, 7, and 8. The socioeconomic level's omitted category is the first level. Standard errors are in parentheses.

are more dependent on your father's schooling background. However, the opposite occurs for the mother's schooling years which shows that for recent years the marginal impact is low and denotes that the school attachment by the mother's side is weaker.

Finally, the influence on enrollment probability has a clear inclination towards the highest SES levels, but in general, for 2017 estimations this impact is lower. This means that socioeconomic factors are less relevant than in 2011 but they keep being significant and strong. These findings suggest a subtle improvement in relative social mobility, indicating that individuals from lower SES backgrounds might have slightly better access to educational opportunities compared to before. Despite this progress, the persistence of inequality and cultural constraints associated with lower income and ownership continue to hinder substantial upward mobility for those at the bottom of the socioeconomic ladder.

Another main observation is that the impact of the certificate is higher than the one of education and this persists even after adding controls, for both 2011 and 2017 estimations.³ Interpreting these numbers as a linear comparison is wrong because of the unit of measure for each variable. Assuming linearity, obtaining the certificate increases the probability as much as if we increased 10 years of education to the father. The large impact that this variable has can be correlated to non-cognitive skills transmission throughout parents, just as it was described before (Carneiro & Heckman, 2003; Cunha & Heckman, 2007).

Now, conclusions from this can be important to understand schooling and skill intergenerational transmission. For this, we need to look at the relationship between SES levels and possession of certificate coefficients. As it was expected, controlling by quintiles and AMAI strata the estimations for the main independent variable reduce, but they remain significant, also the socioeconomic ones. This denotes that this characteristic alters the probability of enrollment due to results that show an impact of 9.8 p.p. for fathers and 10.1 p.p. for mothers in 2011, and 16.9 p.p. and 3.8 p.p. respectively for the 2017 panel. The marginal effect that a certificate has could be a signal of the strong influence that parents have on children's abilities and educational achievements.

Table 5.2 has the marginal effects on the probability of graduating from high school. Just as in the previous results visualization, in this one, the composition of each column is the same

³ Interpreting these numbers as a linear comparison is wrong because of the unit of measure for each variable.

Table 5.2: Logit model: marginal and impact effects on high school completion

	Dependent variable: Probability of high school completion							
	2011				2017			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Father's schooling	0.015*** (0.002)		0.006*** (0.002)		0.023*** (0.001)		0.016*** (0.001)	
Mother's schooling	0.013*** (0.002)		0.008*** (0.002)		0.010*** (0.001)		0.003** (0.001)	
Father's HS certificate		0.144*** (0.016)		0.044*** (0.016)		0.253*** (0.017)		0.154*** (0.019)
Mother's HS certificate		0.161*** (0.019)		0.061*** (0.019)		0.095*** (0.020)		0.024 (0.021)
SES level 2			0.057 (0.040)	0.058** (0.025)			0.054*** (0.018)	0.078*** (0.017)
SES level 3			0.190*** (0.040)	0.181*** (0.025)			0.132*** (0.017)	0.156*** (0.016)
SES level 4			0.274*** (0.044)	0.332*** (0.029)			0.232*** (0.017)	0.285*** (0.016)
SES level 5			0.359*** (0.047)	0.402*** (0.032)			0.260*** (0.018)	0.329*** (0.018)
AMAI level 6			0.364*** (0.060)	0.470*** (0.039)				
Household size			-0.008*** (0.003)	-0.008*** (0.002)			-0.028*** (0.003)	-0.027*** (0.003)
Child's sex			0.024* (0.012)	0.018* (0.010)			0.047*** (0.009)	0.045*** (0.010)
Observations	5,872	9,083	5,430	8,430	10,843	9,737	10,843	9,737
Adjusted R ²	0.034	0.027	0.059	0.065	0.045	0.038	0.072	0.078
Log Likelihood	-3,525.919	-5,313.277	-3,193.215	-4,766.885	-7,036.424	-6,237.938	-6,836.562	-5,975.739
Akaike Inf. Crit.	7,057.838	10,632.550	6,406.431	9,553.769	14,078.850	12,481.880	13,691.120	11,969.480

*p<0.1; **p<0.05; ***p<0.01

Source: Own estimations with EMOVI data. Marginal effects of parents' schooling certificates represent a percentage change in enrollment probability (e.g., an increase of 2.2%). Columns 1 to 4 correspond to 2011 and columns 5 to 8 are from 2017. The regressions controlled by socioeconomic level, household size, and child's sex are in columns 3, 4, 7, and 8. The socioeconomic level's omitted category is the first level. Standard errors are in parentheses.

but now the dependent variable is different. As we can see, again, almost every coefficient is statistically significant and with a positive impact on the probability tested. The effect of parents' schooling years is substantially reduced when adding controls to the regressions at almost half of their initial coefficient. If we pay attention to comparisons between both years, we will have a better notion of social mobility. For example, the estimated schooling and certificate impact for 2011 is lower in comparison to 2017, principally when we refer to the father's years. This means that the marginal effects of both variables are strong and significantly related to high school completion and also that there is a stronger dependency by the father's side on high school completion but weaker by the mother's side.

Comparing the values obtained for enrollment and completion analysis denotes that, even though more children are going to study, not everyone is reaching graduation, mainly those whose parents have fewer schooling years or incomplete high school. If we look at SES coefficients and their relationship with parents' certificates, the estimations show that from 2011 to 2017 there is a decrease in SES marginal effects that can be correlated to a slight increase in relative social mobility. Though contrasting the marginal effects of socioeconomic variables on enrollment probability, the coefficients are higher on completion analysis. This indicates that there is a strong relation as the SES is higher, therefore signifies that people with more resources have higher probabilities to graduate.

Altogether, the conclusions about this first part are that there exists absolute social mobility, but relative social mobility stills lower because of socioeconomic factors' high impact, mainly when comparing completion probability between years. This finding is very important due to its political relevance which denotes that people managing to achieve graduation from high school is being benefited by their economic privileges.

5.2 Marginal and impact effects on enrollment to and completion from Higher Education Institutes

Table 5.3 shows the variables' marginal effects on enrollment and completion probabilities from HEI. The results denote that from 2011 to 2017, using control vectors, the father's schooling years increase by 0.8 p.p. and also the fathers' certificate by 12 p.p. However, in the mother's case, this is different. There is a decrease for both coefficients, but for mother's certificate is reduced by 5.5 p.p. and leaving this variable without statistical significance in 2017. This

Table 5.3: Logit model: marginal and impact effects on enrollment to higher education

	Dependent variable: Probability of higher education enrollment							
	2011				2017			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Father's schooling	0.013*** (0.001)		0.006*** (0.001)		0.020*** (0.001)		0.014*** (0.001)	
Mother's schooling	0.009*** (0.001)		0.005*** (0.001)		0.010*** (0.001)		0.004*** (0.001)	
Father's HEI certificate		0.218*** (0.028)		0.048** (0.019)		0.296*** (0.018)		0.160*** (0.017)
Mother's HEI certificate		0.119*** (0.033)		0.059** (0.026)		0.046** (0.022)		0.004 (0.018)
SES level 2			0.057 (0.042)	0.039* (0.023)			0.062*** (0.019)	0.082*** (0.018)
SES level 3			0.146*** (0.045)	0.131*** (0.025)			0.120*** (0.019)	0.160*** (0.018)
SES level 4			0.216*** (0.060)	0.267*** (0.039)			0.236*** (0.021)	0.313*** (0.020)
SES level 5			0.353*** (0.078)	0.416*** (0.049)			0.257*** (0.023)	0.370*** (0.021)
AMAI level 6			0.333*** (0.092)	0.462*** (0.062)				
Household size			-0.005** (0.002)	-0.006*** (0.001)			-0.017*** (0.002)	-0.017*** (0.002)
Child's sex			0.022** (0.008)	0.018*** (0.006)			0.033** (0.007)	0.032*** (0.007)
Observations	5,872	9,177	5,430	8,514	10,843	11,551	10,843	11,551
Adjusted R ²	0.061	0.028	0.086	0.081	0.080	0.043	0.112	0.108
Log Likelihood	-2,353.032	-3,528.517	-2,128.352	-3,120.982	-5,239.436	-5,595.129	-5,057.470	-5,218.941
Akaike Inf. Crit.	4,712.064	7,063.033	4,276.703	6,261.963	10,484.870	11,196.260	10,132.940	10,455.880

*p<0.1; **p<0.05; ***p<0.01

Source: Own estimations with EMOVI data. Marginal effects of parents' schooling certificates represent a percentage change in enrollment probability (e.g., an increase of 2.2%). Columns 1 to 4 correspond to 2011 and columns 5 to 8 are from 2017. The regressions controlled by socioeconomic level, household size, and child's sex are in columns 3, 4, 7, and 8. The socioeconomic level's omitted category is the first level. Standard errors are in parentheses.

behavior shows that, even though both parents' variables have a positive impact on enrollment probabilities, fathers keep being the ones with more influence on the child. Now, if we observe the SES coefficients there is a slight increase in level two from 2011 to 2017 and now estimations are significant. For the other levels, values are almost the same but for the last SES, the effect is lower than in 2011. In terms of relative social mobility, this indicates that socioeconomic barriers have more impact on middle SES levels compared to the first level, but as the strata is higher there is less impact. In other words, a change from level one to level two or three than to level five or six is more significant and stronger, which means that there exist barriers that persist among individuals from the same generations to enroll in HEI. Thus, these results show an important persistence of parents' education transmission when we talk about this educational level.

Finally, findings about HEI completion are shown in Table 5.4 and they are similar to those for enrollment. Fathers' schooling variables keep their significance and increase from 2011 to 2017, while mother's impact is lower. Mother's certificate variable has a decrease of 1.1 p.p., and it lost statistical significance, which means that child's schooling transference is stronger coming from the father's side rather than the mother's. Last, SES coefficients behave in a positive pattern, but the second level obtains significance until 2017. Comparing these estimations with enrollment's denotes that there is a decreasing effect on socioeconomic factors due to the lower values for completion probability. In other words, once the student achieved to get into some HEI, socioeconomic variables explain to a lesser extent completion of this school level.

When comparing schooling coefficients with high school estimations, it is revealed that the impact is higher for high school probability than HEI's. Although, SES values denote that despite its positive marginal effect on both probabilities, there is a stronger effect on high school but significant for both school levels. Even that, the marginal effect is higher for levels four and five (in comparison to the first level) in HEI 2017 enrollment estimations. This evidence is linked to EMI theory due to the persistent relationship between child's socioeconomic and cultural background and their academic achievements. Therefore, controlling by SES and using parents' schooling years and possession of a certificate as dependent variables, from 2011 to 2017 there exists higher absolute and relative social mobility for HEI than for high school.

Table 5.4: Logit model: marginal and impact effects on higher education completion

	<i>Dependent variable: Probability of higher education completion</i>							
	2011				2017			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Father's schooling	0.007*** (0.000)		0.002*** (0.000)		0.011*** (0.000)		0.007*** (0.001)	
Mother's schooling	0.003*** (0.001)		0.001 (0.000)		0.003*** (0.000)		0.000 (0.001)	
Father's HEI certificate		0.153*** (0.024)		0.036*** (0.012)		0.184*** (0.016)		0.088*** (0.012)
Mother's HEI certificate		0.053*** (0.020)		0.027** (0.013)		0.041*** (0.016)		0.016 (0.012)
SES level 2			0.022 (0.033)	0.058 (0.021)			0.045*** (0.018)	0.047*** (0.014)
SES level 3			0.082* (0.042)	0.090*** (0.027)			0.071*** (0.017)	0.081*** (0.015)
SES level 4			0.185** (0.081)	0.237*** (0.061)			0.151*** (0.017)	0.184*** (0.019)
SES level 5			0.288** (0.121)	0.355*** (0.086)			0.173*** (0.018)	0.216*** (0.022)
AMAI level 6			0.243* (0.128)	0.324*** (0.097)				
Household size			-0.005*** (0.001)	-0.004*** (0.001)			-0.013*** (0.003)	-0.012*** (0.001)
Child's sex			0.004 (0.005)	0.004 (0.003)			0.009* (0.009)	0.007 (0.005)
Observations	5,872	9,177	5,430	8,514	10,843	11,783	10,843	11,551
Adjusted R ²	0.060	0.040	0.103	0.103	0.057	0.038	0.087	0.090
Log Likelihood	-1,379.621	-2,014.906	-1,223.440	-1,772.180	-3,732.691	-3,997.905	-3,613.761	-3,674.116
Akaike Inf. Crit.	2,765.241	4,035.811	2,466.880	3,564.360	7,471.381	7,999.809	7,245.522	7,366.231

*p<0.1; **p<0.05; ***p<0.01

Source: Own estimations with EMOVI data. Marginal effects of parents' schooling certificates represent a percentage change in enrollment probability (e.g., an increase of 2.2%). Columns 1 to 4 correspond to 2011 and columns 5 to 8 are from 2017. The regressions controlled by socioeconomic level, household size, and child's sex are in columns 3, 4, 7, and 8. The socioeconomic level's omitted category is the first level. Standard errors are in parentheses.

Chapter 6

Sensitivity Analysis and Heterogeneous Effects

In this section, a sensitivity analysis will be carried out and the heterogeneous effects present in the study will be explored. The sensitivity analysis will allow evaluating of the robustness of the results obtained, implementing fixed effects by geographic region. Likewise, heterogeneous effects will be examined to identify possible variations in the results according to socioeconomic levels, dividing between the lowest and the highest. This analysis will provide a more complete and detailed vision of the findings, allowing us to better understand the different dynamics and nuances present in the relationship between education and social mobility in the Mexican context.

6.1 Robustness check

The validity of previous results assumes that a child's schooling background is formed just by parents' schooling years and that non-cognitive skills transmission is throughout the parent's schooling completion. Though these presumptions appear to be reasonable, in this section I substantiate them further controlling by another factor that could be possibly correlated with a child's academic achievement. According to research, there exists evidence of a phenomenon called "geography of prosperity" where certain regions and societies are no longer coming together in terms of trade and technological advancements, leading to concentrated prosperity in some regions while leaving many other places struggling and disadvantaged (Shambaugh & Nunn, 2018). This kind of heterogeneous development provides a beneficial context for families residing in better cities due to the quality of education for their children (Delajara et al., 2020).

Studies trying to capture this effect in Mexico have been carried out and interesting patterns among regions have been found (Campos-Vázquez et al., 2020; Delajara et al., 2020; Delajara & Graña, 2017; Monroy-Gómez-Franco & Corak, 2020). So, to see if the region factor changes the estimations, I add regional fixed effects to the econometric model to capture this phenomenon. The variable "region" here refers to Mexico's geographic zone where the state in which children's actual residence is located. The reason for this is that this analysis is focusing on children's academic performance throughout enrollment and completion probabilities of two

schooling levels. As they are growing up in those states, this is a period of accumulation of human capital; therefore, the impact of socioeconomic differences is probably greater.

For regionalization, this research adopted the one used by the Bank of Mexico (2016). In this classification, Mexico's states are grouped into four regions. North: Tamaulipas, Nuevo León, Chihuahua, Coahuila, Sonora, and Baja California. South: Guerrero, Oaxaca, Chiapas, Quintana Roo, Yucatán, Campeche, Tabasco, and Veracruz. Central: Morelos, Puebla, Tlaxcala, Hidalgo, Guanajuato, Querétaro, State of Mexico and Mexico City. North-Central: Michoacán, Colima, Jalisco, Baja California Sur, Nayarit, Aguascalientes, Zacatecas, San Luis Potosí, Sinaloa, and Durango.⁴

Tables A2.1 and A2.2 in Appendix A2 show the results for high school probabilities. The region's omitted variable is the Center region. For enrollment probability we can observe that patterns of both parents' schooling years and possession of certificate did not change, they keep their positive impact and statistical significance. It also occurs something similar with SES values since they still behave in the same pattern benefiting higher SES levels. Thus, in comparison with original estimations, these coefficients are almost the same ones, which denotes that previous conclusions remain.

Last, regions' coefficients provide a new perspective to this research. We observe that every region has a negative impact and with high statistical significance. This makes sense because, as was mentioned, the Center region is the omitted variable, and it is taken as the baseline. So, for the North and North Center region it is captured a negative effect for those children living in the Center. But something interesting happens to the South region where three out of four coefficients are positive. Nevertheless, marginal effects are low and not even with significance. The same pattern can be found in high school completion probability results. Overall, regional fixed effects captured Mexico's centralization of education and life opportunities. This is denoted with larger coefficients in 2017 estimations, which represents the disadvantages of not living in the Center region.

On the other hand, Tables A2.3 and A2.4 have the estimations for both HEI probabilities. As it is shown, adding regional fixed effects does not change in great magnitudes our original estimation for enrollment and completion. However, for completion analysis, the mother's

⁴ Using this classification has its benefits as it increases the number of observations available per region, which is essential for accurately estimating regressions since the EMOVI is nationally representative.

schooling years coefficient in 2011 is lower in 0.2 p.p. SES estimations keep being similar to previous ones, but also for completion probability, there is a lower impact of socioeconomic status to enrollment probability. Last, SES level 2 shows a larger marginal effect on completion HEI concerning level 1, which says that with this new control variable is more significant to move from the first SES level to the next one to improve your probability to complete high education studies.

Finally, regional coefficients for HEI analysis reveal some interesting information. Again, most of the estimations denote a negative marginal effect on probabilities, but now just the North region keeps it for both 2011 to 2017. Although in enrollment analysis its coefficient increases by 1 p.p. from one panel to another, for completion it is reduced by almost 4 p.p. While for North-Center and South regions, there is a sign change from negative to positive from 2011 to 2017 on completion probability. This change is important due to that North-Center region has a weak negative marginal effect on enrollment, though this denotes that living in those regions is benefiting to complete children's high education.

In conclusion, results obtained by this extension of the original analysis provide a large visualization of this research's purpose. Due to the addition of the regional variable, it was possible to observe if there is a different impact on our main variables' estimations, nonetheless with no significative changes. However, this brought a new perspective to this research that includes the analysis of geography on schooling probabilities. The regions' coefficients denoted that there exists a centralization in Mexico and high school education is becoming greater because of large negative marginal effects estimated. This is related to other research carried out to study Mexico's regionalization such as Campos-Vázquez et al. (2020), Delajara & Graña (2017), and Torche (2020).

6.2 Heterogeneous effects

The objective of this last part of the analysis extension is to divide the 2011 and 2017 samples by quintiles into two other sub-samples, one for the lower and the other one for the highest SES. For these classifications, the first and second SES levels constituted the sub-sample 1 and the levels three, four, five, and six (for 2011) are the sub-sample 2. Thus, the same original estimations were carried out but now for both groups. The purpose of this is to understand the different dynamics that can be presented in different social strata and see if this research results

persist even with this division. For the lower SES estimations, the baseline level is SES level 1 while for the higher is SES level 3.

Tables A3.1 and A3.2 in Appendix A3 show the marginal effects on high school enrollment and completion probabilities, respectively, for lower SES levels while Tables A3.3 and A3.4 for the higher ones. Results denote that parents' schooling years and certificate possession impacts remain positive and significant from 2011 to 2017. But if we focus on the changes from one year to another and throughout low and high SES, we found that for lower socioeconomic levels mother's high school certificate effect is 7 p.p. higher in 2017 while in higher levels it is reduced almost by its totality (10 p.p.) and fathers' variable has that increase by 7 p.p. from 2011 to 2017. In addition, the SES level 2 coefficient increased by 3 p.p. (2011 to 2017) while higher levels denote a small increase among them. This means that for lower SES going from one level to the other one represents a significant impact on enrollment probabilities while for higher levels (taking as reference the third level) just the highest level has a larger impact on this probability, but estimations are lower than the originals.

For high school completion analysis, something similar happens but coefficients for both independent variables are lower than enrollment estimations for lower and higher SES levels. Now, the father's schooling years has a larger impact on both sub-samples but both parents' certificate possession increased from 2011 to 2017. This indicates a higher effect in recent years of this factor that, as it was discussed before, represents a transmission of non-cognitive skills and motivates children to finish their studies. Overall, what can be concluded from this first comparison is that in lower SES the change from one level to another is more significant, and recent years bring higher coefficients for the mother's variables. On the other hand, higher SES have small estimations differences among them, but these coefficients favor the impact of the father's schooling variables rather than the mother's.

Tables A3.5 and A3.6 have the results of the estimations for enrollment and completion probabilities for lower SES while Tables A3.7 and A3.8 for the higher ones. For this last part the positive marginal effect for both independent variables change because for enrollment and completion HEI probabilities in lower SES, the mother's certificate denotes a negative effect for both years. Now these coefficients show a greater dependency on the father's schooling background and a significant impact from SES level 2 just as the high school analysis. For the higher SES results even though the mother's variables have positive marginal effects, the

father's impact is larger. Last, the estimation for SES level 4 increased from 2011 to 2017 which indicates that in recent years, moving from medium SES to the next one represents a significant increase in going to some HEI. These stronger coefficients denote that in lower and higher socioeconomic strata there exists low relative social mobility due to the great impact of changing from one level to the other one. But apparently, this just happens in the immediate next ones because once you achieved a certain SES level the coefficient does not change so much among them.

Finally, analyzing completion probabilities can be found that for lower SES the marginal effect of level 2 increased by almost 10 p.p. from 2011 to 2017, and for higher SES the level 4 impact went up by almost 17 p.p. After all, this last comparison denotes that HEI there is a stronger dependency on father's schooling background rather than on mother's. In addition, it was revealed that for both enrollment and completion probabilities exist a large marginal effect among lower and middle socioeconomic levels when someone moves to the next one. This does not persist in higher levels like 5 or 6.

In conclusion, these last estimations aimed to provide a broader perspective on the probabilities studied in this research. The findings are crucial because even though the pattern of our independent variables was nearly consistent between lower and higher SES levels, some changes in SES coefficients were observed, shedding light on the nuanced dynamics of the relationship between SES and high school and HEI enrollment and completion probabilities.

Chapter 7

Conclusion

In this work, I examine the importance of parents' schooling background on their children's high school and higher education enrollment and completion probabilities using data from two national representative surveys oriented to study social mobility in Mexico. The analysis carried out used samples for 2011 and 2017 ESRU-EMOVI data and the findings were that parents' schooling years and possession of a certificate had a positive and significant impact on both child's outcomes, with father's schooling variables showing a stronger impact in recent years. Notably, the marginal effect in 2017 by father's schooling years is 2 percent for enrollment and 1.6 for completion from high school; on the other hand, the impact for higher education was 1.4 for enrollment and 0.7 percent for completion probability. Moreover, SES also played a crucial role, with higher SES levels showing higher impact on probabilities of enrollment and completion (almost 40 percent for 2011 and 35 percent for 2017 case). However, the impact of SES decreased for HEI completion in 2017 compared to 2011.

Although several research has used rank-rank regressions or Mincer earnings equations to study education's impact from generation to generation (Delajara et al., 2020; Patrinos & Psacharopoulos, 2020), this work proposed to employ Logit regressions to capture the impact of parent's schooling variables on probabilities. The choice of using this approach is justified due to the dichotomous nature of the response variables. Additionally, this model is particularly appropriate for this data, aligning perfectly with the nature of this study.

While there are signs of absolute social mobility in high school and HEI, the influence of SES on high school enrollment probabilities has shifted, with higher SES levels showing a significant increase in 2011, but a lower impact in 2017. Despite that, this could indicate a slightly improved relative social mobility, the persistence of socioeconomic factors underscores the current challenges in achieving equitable educational opportunities, particularly for those from lower socioeconomic backgrounds. This brings evidence about the low relative social mobility in education for the Mexican context and highlights that not everyone graduates, especially those from lower parental schooling backgrounds. However, it is important to highlight that those who have arrived at higher education are already self-selected, this is because most of the more disadvantaged have already dropped out. Thus, even when comparing

both schooling levels, higher education denotes SES's lower marginal effect than high school enrollment, this cannot be interpreted as more opportunities for relative social mobility for HEI. But even for those self-selected, socioeconomic status is weaker for higher education.

This research also sheds light on sensitivity analysis and the heterogeneous effects that this approach can provide. The robustness check, which includes regional fixed effects, confirms the consistency of the original estimations. The addition of regional controls provides new insights, revealing the centralization of education and opportunities in Mexico. The negative marginal effects observed in most regions highlight the disadvantages of not living in the Center region. However, the South region shows positive coefficients, although with low significance. Notably, higher education completion probability showed that North-Center and South regions improve with a sign change from negative to positive impacts on completion. Overall, this extension enriches the research by exploring the geographical influence on schooling probabilities, supporting the findings of regionalization studies in Mexico.

The analysis of heterogeneous effects carried out by dividing the samples into lower and higher socioeconomic strata revealed that in lower SES levels, there was a significant increase in the impact of a mother's high school certificate in 2017. For high school completion, the father's schooling years had a larger impact in both sub-samples, indicating a stronger influence from the father's educational background. Moreover, the estimations highlighted that changing from one SES level to another had a more significant effect on enrollment probabilities in the lower strata, while the impact was smaller for higher SES levels. This suggests higher relative social mobility in higher SES groups, as the coefficients showed less variation among them which indicates fewer barriers attached to their SES level. These findings provide a comprehensive understanding of the complexities in the relationship between socioeconomic status and educational probabilities and the notable differences between the two groups.

An important limitation of this study is that it relies on cross-sectional data from two-time points (2011 and 2017) to measure the effect of parents' educational background on their child's educational outcomes. Cross-sectional data can reveal useful patterns, but it may not account for the full dynamics of social mobility over time. Longitudinal panel data, which follows individuals or families over a long period, would provide a more comprehensive understanding of intergenerational mobility and how educational outcomes change over generations. Still, this work assesses an approximation of social mobility in education by

analyzing the parents' variables' marginal effects on children's enrollment and completion probabilities. However, this approach has inherent assumptions, and the results' interpretation has to be taken with caution.

Additionally, while the explanatory variables proposed here are undoubtedly crucial in shaping opportunities for social mobility in education, there are likely other important factors that also influence educational attainment and mobility, such as the quality of schools, access to educational resources, and socio-cultural factors. Nevertheless, because of data limitations and constraints, this research was unable to include a more extensive set of variables. Despite this, the robustness check section aimed to provide an analysis extension by adding one control variable to the empirical strategy.

In conclusion, this work contributes to the existing literature on social mobility in education, providing a more recent analysis within the Mexican context. The importance of researching this topic becomes evident as it emphasizes the need for policies and interventions addressing the impact of parental schooling background on children's educational outcomes. The variation in marginal effects across different socioeconomic levels in Mexico highlights the existence of a segment of society that faces fewer economic and cultural barriers to accessing quality education. These findings underscore the urgency of developing policy recommendations and prioritizing reforms in public administration to ensure equitable educational opportunities. Future research in this field holds promise in two key areas: first, exploring the intricate interactions between educational policies, school quality, and access to resources to understand and address disparities; second, investigating socio-cultural factors influencing educational choices to design tailored interventions aimed at closing educational gaps.

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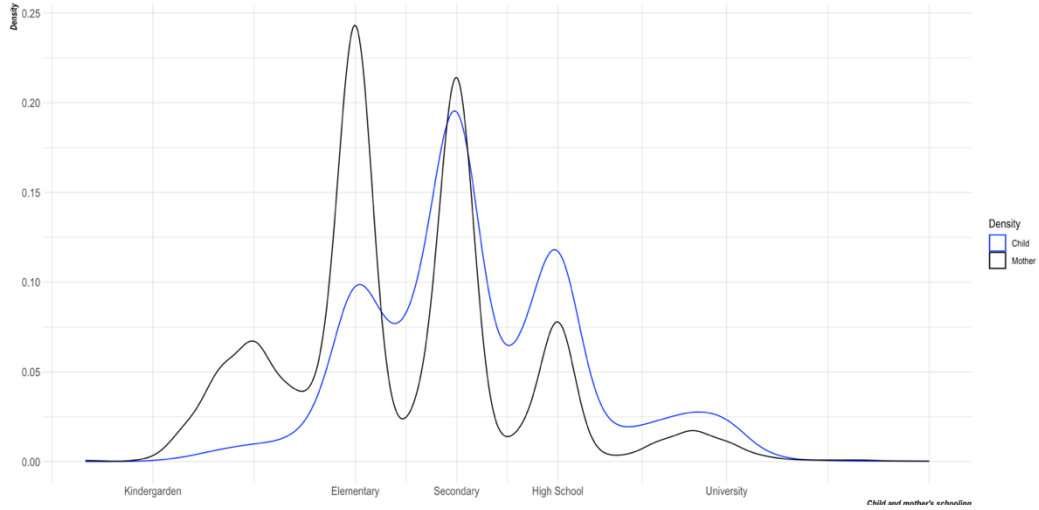
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Appendices

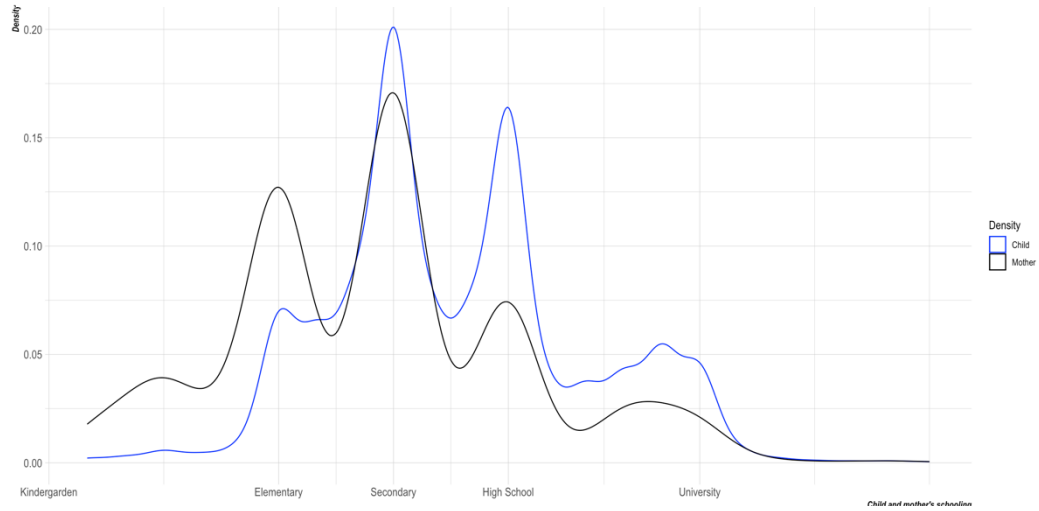
A1. Descriptive Statistics

Figure A1.1 Child's total schooling years compared to mother's, 2011



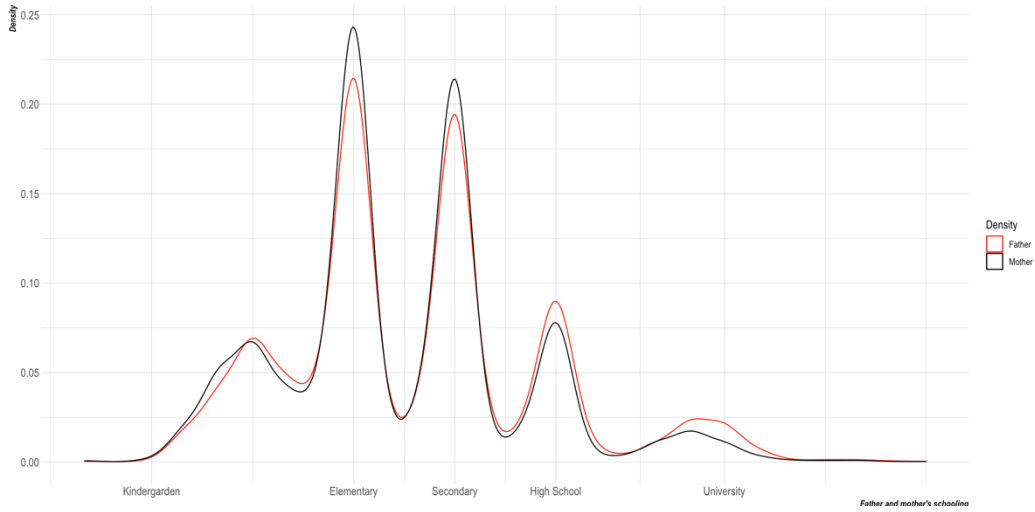
Source: Own elaboration.

Figure A1.2 Child's total schooling years compared to mother's, 2017



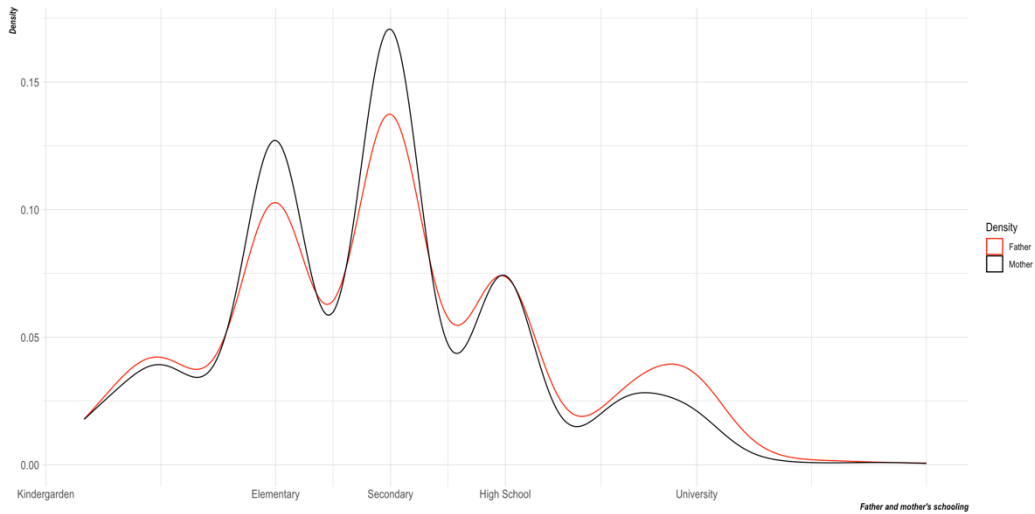
Source: Own elaboration.

Figure A1.3 Father's total schooling years compared to mother's, 2011



Source: Own elaboration.

Figure A1.4 Father's total schooling years compared to mother's, 2017



Source: Own elaboration.

A2. Robustness check

Table A2.1: Logit model: marginal and impact effects on enrollment to high school using fixed effects by region

	<i>Dependent variable: Probability of high school enrollment</i>			
	2011		2017	
	(1)	(2)	(3)	(4)
Father's schooling	0.011*** (0.002)		0.019*** (0.001)	
Mother's schooling	0.016*** (0.002)		0.009*** (0.001)	
Father's HS certificate		0.096*** (0.019)		0.167*** (0.019)
Mother's HS certificate		0.096*** (0.023)		0.036 (0.023)
SES level 2	0.062 (0.039)	0.376*** (0.026)	0.083*** (0.016)	0.119*** (0.015)
SES level 3	0.200*** (0.038)	0.214*** (0.025)	0.143*** (0.015)	0.187*** (0.015)
SES level 4	0.288*** (0.039)	0.382*** (0.024)	0.229*** (0.014)	0.299*** (0.014)
SES level 5	0.340*** (0.039)	0.428*** (0.025)	0.244*** (0.016)	0.332*** (0.015)
AMAI level 6	0.336*** (0.053)	0.469*** (0.030)		
Household size	-0.007** (0.003)	-0.006*** (0.002)	-0.018*** (0.003)	-0.019*** (0.003)
Child's sex	0.028** (0.014)	0.023** (0.011)	0.033*** (0.010)	0.038*** (0.010)
North-Center Region	-0.068*** (0.018)	-0.076*** (0.014)	-0.042*** (0.013)	-0.072*** (0.014)
North Region	-0.035* (0.021)	-0.019 (0.016)	-0.323*** (0.015)	-0.086*** (0.017)
South Region	-0.008 (0.019)	0.018 (0.014)	0.011 (0.014)	0.009 (0.015)
Observations	5,430	8,430	10,843	9,737
Adjusted R ²	0.081	0.083	0.082	0.080
Log Likelihood	-3,398.653	-5,145.129	-6,834.886	-6,206.134
Akaike Inf. Crit.	6,823.306	10,316.260	13,693.770	12,436.270

*p<0.1; **p<0.05; ***p<0.01

Source: Own estimations with EMOVI data. Marginal effects of parents' schooling certificates represent a percentage change in enrollment probability (e.g., an increase of 2.2%). Columns 1 and 2 correspond to 2011 and columns 3 and 4 are from 2017. The socioeconomics level's omitted category is the first level, and the region's omitted variable is the Center region. Standard errors are in parentheses.

Table A2.2: Logit model: marginal and impact effects on high school completion using fixed effects by region

	<i>Dependent variable: Probability of high school completion</i>			
	2011		2017	
	(1)	(2)	(3)	(4)
Father's schooling	0.004* (0.002)		0.016*** (0.001)	
Mother's schooling	0.008*** (0.002)		0.003** (0.001)	
Father's HS certificate		0.041** (0.017)		0.153*** (0.019)
Mother's HS certificate		0.042** (0.020)		0.021 (0.021)
SES level 2	0.030 (0.041)	0.041 (0.027)	0.064*** (0.018)	0.096*** (0.017)
SES level 3	0.169*** (0.041)	0.171*** (0.027)	0.143*** (0.017)	0.176*** (0.017)
SES level 4	0.239*** (0.046)	0.309*** (0.031)	0.245*** (0.017)	0.305*** (0.017)
SES level 5	0.319*** (0.051)	0.368*** (0.035)	0.274*** (0.019)	0.348*** (0.019)
AMAI level 6	0.313*** (0.066)	0.440*** (0.041)		
Household size	-0.007** (0.003)	-0.008*** (0.002)	-0.027*** (0.003)	-0.027*** (0.003)
Child's sex	0.013 (0.013)	0.013 (0.010)	0.047*** (0.009)	0.045*** (0.010)
North-Center Region	0.140*** (0.022)	0.076*** (0.018)	-0.030** (0.012)	-0.057*** (0.013)
North Region	-0.005 (0.024)	-0.045** (0.019)	-0.077*** (0.014)	-0.084*** (0.015)
South Region	-0.018 (0.031)	-0.061*** (0.022)	0.003 (0.014)	0.005 (0.014)
Observations	4,877	7,435	10,823	9,721
Adjusted R ²	0.074	0.077	0.074	0.082
Log Likelihood	-2,845.164	-4,207.452	-6,808.012	-5,943.412
Akaike Inf. Crit.	5,716.328	8,440.905	13,640.020	11,910.830

*p<0.1; **p<0.05; ***p<0.01

Source: Own estimations with EMOVI data. Marginal effects of parents' schooling certificates represent a percentage change in enrollment probability (e.g., an increase of 2.2%). Columns 1 and 2 correspond to 2011 and columns 3 and 4 are from 2017. The socioeconomic level's omitted category is the first level, and the region's omitted variable is the Center region. Standard errors are in parentheses.

Table A2.3: Logit model: marginal and impact effects on enrollment to higher education using fixed effects by region

	<i>Dependent variable: Probability of higher education enrollment</i>			
	2011		2017	
	(1)	(2)	(3)	(4)
Father's schooling	0.005*** (0.001)		0.014*** (0.001)	
Mother's schooling	0.005*** (0.001)		0.004*** (0.001)	
Father's HEI certificate		0.041*** (0.018)		0.156*** (0.017)
Mother's HEI certificate		0.058*** (0.026)		0.003 (0.017)
SES level 2	0.064 (0.042)	0.044* (0.023)	0.068*** (0.019)	0.091*** (0.018)
SES level 3	0.155*** (0.045)	0.141*** (0.025)	0.131*** (0.020)	0.174*** (0.019)
SES level 4	0.230*** (0.062)	0.287*** (0.040)	0.251*** (0.022)	0.331*** (0.020)
SES level 5	0.366*** (0.079)	0.434*** (0.050)	0.279*** (0.024)	0.394*** (0.022)
AMAI level 6	0.354*** (0.093)	0.489*** (0.062)		
Household size	-0.005** (0.002)	-0.005*** (0.001)	-0.018*** (0.002)	-0.017*** (0.002)
Child's sex	0.022** (0.008)	0.019*** (0.006)	0.033*** (0.007)	0.032*** (0.007)
North-Center Region	-0.046*** (0.010)	-0.048*** (0.007)	-0.011 (0.009)	-0.004 (0.009)
North Region	-0.024** (0.011)	-0.027*** (0.008)	-0.028*** (0.010)	-0.029*** (0.009)
South Region	-0.002 (0.011)	0.006 (0.008)	0.031*** (0.011)	0.022** (0.010)
Observations	5,430	8,514	10,843	11,551
Adjusted R ²	0.090	0.087	0.114	0.109
Log Likelihood	-2,118.567	-3,097.851	-5,044.822	-5,208.404
Akaike Inf. Crit.	4,263.134	6,221.702	10,113.640	10,440.810

*p<0.1; **p<0.05; ***p<0.01

Source: Own estimations with EMOVI data. Marginal effects of parents' schooling certificates represent a percentage change in enrollment probability (e.g., an increase of 2.2%). Columns 1 and 2 correspond to 2011 and columns 3 and 4 are from 2017. The socioeconomic level's omitted category is the first level, and the region's omitted variable is the Center region. Standard errors are in parentheses.

Table A2.4: Logit model: marginal and impact effects on higher education completion using fixed effects by region

	<i>Dependent variable: Probability of higher education completion</i>			
	2011		2017	
	(1)	(2)	(3)	(4)
Father's schooling	0.002*** (0.000)		0.007*** (0.000)	
Mother's schooling	0.001 (0.000)		0.000 (0.000)	
Father's HEI certificate		0.029*** (0.011)		0.083*** (0.012)
Mother's HEI certificate		0.025* (0.013)		0.015 (0.012)
SES level 2	0.025 (0.033)	0.036* (0.021)	0.049*** (0.016)	0.054*** (0.014)
SES level 3	0.084** (0.042)	0.096*** (0.027)	0.080*** (0.017)	0.093*** (0.016)
SES level 4	0.194** (0.083)	0.258*** (0.064)	0.166*** (0.021)	0.203*** (0.020)
SES level 5	0.302** (0.124)	0.381*** (0.088)	0.197*** (0.025)	0.247*** (0.024)
AMAI level 6	0.263** (0.134)	0.363*** (0.102)		
Household size	-0.005*** (0.001)	-0.004*** (0.001)	-0.014*** (0.001)	-0.012*** (0.001)
Child's sex	0.004 (0.004)	0.004 (0.003)	0.009* (0.005)	0.007 (0.004)
North-Center Region	-0.021*** (0.005)	-0.023*** (0.004)	0.013* (0.007)	0.006 (0.006)
North Region	-0.022*** (0.005)	-0.020*** (0.004)	-0.016** (0.007)	-0.018*** (0.006)
South Region	-0.006 (0.006)	0.003 (0.004)	0.029*** (0.008)	0.025*** (0.008)
Observations	5,430	8,514	10,843	11,551
Adjusted R ²	0.110	0.114	0.091	0.093
Log Likelihood	-1,212.939	-1,749.971	-3,598.637	-3,659.969
Akaike Inf. Crit.	2,451.878	3,525.941	7,221.275	7,343.937

*p<0.1; **p<0.05; ***p<0.01

Source: Own estimations with EMOVI data. Marginal effects of parents' schooling certificates represent a percentage change in enrollment probability (e.g., an increase of 2.2%). Columns 1 and 2 correspond to 2011 and columns 3 and 4 are from 2017. The socioeconomic level's omitted category is the first level, and the region's omitted variable is the Center region. Standard errors are in parentheses.

A3. Heterogeneous effects

Table A3.1: Logit model: marginal and impact effects on enrollment to high school for lower socioeconomic levels

	<i>Dependent variable: Probability of high school enrollment for lower socioeconomic levels</i>							
	2011				2017			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Father's schooling	0.013*** (0.004)		0.013*** (0.001)		0.021*** (0.002)		0.020*** (0.011)	
Mother's schooling	0.019*** (0.004)		0.019*** (0.001)		0.014*** (0.002)		0.013*** (0.012)	
Father's HS certificate		0.164*** (0.057)		0.176*** (0.019)		0.153*** (0.051)		0.140*** (0.052)
Mother's HS certificate		0.148** (0.073)		0.152** (0.023)		0.230*** (0.058)		0.218*** (0.058)
SES level 2			0.033 (0.039)	0.061*** (0.025)			0.065*** (0.015)	0.090*** (0.014)
Household size			-0.008* (0.003)	-0.009*** (0.002)			-0.014*** (0.015)	-0.015*** (0.004)
Child's sex			0.006 (0.014)	0.003 (0.011)			0.028* (0.061)	0.030** (0.015)
Observations	1,822	3,285	1,821	3,284	3,981	4,229	3,981	4,229
Adjusted R ²	0.024	0.005	0.026	0.010	0.029	0.007	0.034	0.017
Log Likelihood	-1,031.165	-1,819.828	-1,028.550	-1,809.701	-2,611.715	-2,777.788	-2,596.746	-2,750.782
Akaike Inf. Crit.	2,068.331	3,645.657	2,069.099	3,631.403	5,229.430	5,561.575	5,205.492	5,513.563

*p<0.1; **p<0.05; ***p<0.01

Source: Own estimations with EMOVI data. Marginal effects of parents' schooling certificates represent a percentage change in enrollment probability (e.g., an increase of 2.2%). Columns 1 to 4 correspond to 2011 and columns 5 to 8 are from 2017. The regressions controlled by socioeconomic level, household size, and child's sex are in columns 3, 4, 7, and 8. The socioeconomic level's omitted category is the first level. Standard errors are in parentheses.

Table A3.2: Logit model: marginal and impact effects on high school completion for lower socioeconomic levels

	<i>Dependent variable: Probability of high school completion for lower socioeconomic levels</i>							
	2011				2017			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Father's schooling	0.010*** (0.003)		0.010*** (0.002)		0.014*** (0.002)		0.014*** (0.002)	
Mother's schooling	0.009** (0.003)		0.008** (0.002)		0.008*** (0.002)		0.007** (0.002)	
Father's HS certificate		0.121** (0.053)		0.130** (0.016)		0.154*** (0.049)		0.144*** (0.049)
Mother's HS certificate		0.060 (0.061)		0.065 (0.019)		0.116** (0.055)		0.105* (0.054)
SES level 2			0.032 (0.040)	0.040*** (0.025)			0.039*** (0.014)	0.060*** (0.013)
Household size			-0.006 (0.003)	-0.007*** (0.002)			-0.017*** (0.004)	-0.015*** (0.003)
Child's sex			0.002 (0.012)	-0.002 (0.010)			0.035** (0.014)	0.032** (0.013)
Observations	1,822	3,285	1,821	3,284	3,981	4,229	3,981	4,229
Adjusted R ²	0.013	0.003	0.015	0.007	0.018	0.005	0.024	0.014
Log Likelihood	-866.709	-1,515.635	-864.652	-1,508.628	-2,305.550	-2,384.238	-2,290.486	-2,362.941
Akaike Inf. Crit.	1,739.419	3,037.271	1,741.303	3,029.256	4,617.099	4,774.477	4,592.973	4,737.882

*p<0.1; **p<0.05; ***p<0.01

Source: Own estimations with EMOVI data. Marginal effects of parents' schooling certificates represent a percentage change in enrollment probability (e.g., an increase of 2.2%). Columns 1 to 4 correspond to 2011 and columns 5 to 8 are from 2017. The regressions controlled by socioeconomic level, household size, and child's sex are in columns 3, 4, 7, and 8. The socioeconomic level's omitted category is the first level. Standard errors are in parentheses.

Table A3.3: Logit model: marginal and impact effects on enrollment to high school for higher socioeconomic levels

	<i>Dependent variable: Probability of high school enrollment for higher socioeconomic levels</i>							
	2011				2017			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Father's schooling	0.018*** (0.002)		0.011*** (0.003)		0.021*** (0.001)		0.018*** (0.001)	
Mother's schooling	0.017*** (0.003)		0.014*** (0.003)		0.008*** (0.001)		0.005*** (0.002)	
Father's HS certificate		0.158*** (0.018)		0.090*** (0.020)		0.200*** (0.017)		0.162*** (0.018)
Mother's HS certificate		0.178*** (0.021)		0.100*** (0.024)		0.047** (0.022)		0.003 (0.024)
SES level 4			0.097*** (0.020)	0.175*** (0.016)			0.090*** (0.013)	0.122*** (0.014)
SES level 5			0.166*** (0.029)	0.241*** (0.023)			0.110*** (0.015)	0.166*** (0.016)
AMAI level 6			0.172*** (0.051)	0.297*** (0.036)				
Household size			-0.005 (0.004)	-0.003 (0.003)			-0.019*** (0.003)	-0.021*** (0.004)
Child's sex			0.036** (0.017)	0.033** (0.014)			0.032*** (0.011)	0.039*** (0.013)
Observations	3,610	5,147	3,609	5,146	6,862	5,508	6,862	5,508
Adjusted R ²	0.041	0.034	0.050	0.058	0.029	0.031	0.051	0.051
Log Likelihood	-2,397.362	-3,438.666	-2,374.076	-3,350.145	-4,304.296	-3,550.326	-4,255.721	-3,477.647
Akaike Inf. Crit.	4,800.724	6,883.332	4,764.151	6,716.290	8,614.593	7,106.652	8,525.443	6,969.294

*p<0.1; **p<0.05; ***p<0.01

Source: Own estimations with EMOVI data. Marginal effects of parents' schooling certificates represent a percentage change in enrollment probability (e.g., an increase of 2.2%). Columns 1 to 4 correspond to 2011 and columns 5 to 8 are from 2017. The regressions controlled by socioeconomic level, household size, and child's sex are in columns 3, 4, 7, and 8. The socioeconomic level's omitted category is the third level. Standard errors are in parentheses.

Table A3.4: Logit model: marginal and impact effects on high school completion for higher socioeconomic levels

Table 11: Logit model: marginal and impact effects on high school completion for higher socioeconomic levels

	<i>Dependent variable: Probability of high school completion for higher socioeconomic levels</i>							
	2011				2017			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Father's schooling	0.012*** (0.002)		0.005* (0.002)		0.021*** (0.001)		0.018*** (0.001)	
Mother's schooling	0.012*** (0.002)		0.008*** (0.003)		0.005** (0.002)		0.005*** (0.001)	
Father's HS certificate		0.097*** (0.018)		0.038** (0.015)		0.200*** (0.019)		0.162*** (0.018)
Mother's HS certificate		0.142*** (0.021)		0.070** (0.017)		0.058*** (0.022)		0.003 (0.024)
SES level 4			0.083*** (0.020)	0.142*** (0.014)			0.090*** (0.017)	0.122*** (0.014)
SES level 5			0.171*** (0.030)	0.212*** (0.024)			0.110*** (0.018)	0.166*** (0.016)
AMAI level 6			0.186*** (0.052)	0.293*** (0.041)				
Household size			-0.009** (0.004)	-0.008** (0.002)			-0.019*** (0.003)	-0.021*** (0.004)
Child's sex			0.034** (0.016)	0.031** (0.010)			0.039*** (0.009)	0.045*** (0.013)
Observations	3,610	5,147	3,609	5,146	6,862	5,508	6,862	5,508
Adjusted R ²	0.022	0.019	0.032	0.039	0.028	0.029	0.045	0.054
Log Likelihood	-2,349.508	-3,322.950	-2,325.422	-3,254.621	-4,622.166	-3,701.862	-4,541.089	-3,607.897
Akaike Inf. Crit.	4,705.016	6,651.900	4,666.844	6,525.243	9,250.332	7,409.724	9,096.178	7,229.795

*p<0.1; **p<0.05; ***p<0.01

Source: Own estimations with EMOVI data. Marginal effects of parents' schooling certificates represent a percentage change in enrollment probability (e.g., an increase of 2.2%). Columns 1 to 4 correspond to 2011 and columns 5 to 8 are from 2017. The regressions controlled by socioeconomic level, household size, and child's sex are in columns 3, 4, 7, and 8. The socioeconomic level's omitted category is the third level. Standard errors are in parentheses.

Table A3.5: Logit model: marginal and impact effects on enrollment to higher education for lower socioeconomic levels

<i>Dependent variable: Probability of higher education enrollment for lower socioeconomic levels</i>								
	2011				2017			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Father's schooling	0.006*** (0.002)		0.006*** (0.001)		0.010*** (0.001)		0.010*** (0.001)	
Mother's schooling	0.005** (0.002)		0.005** (0.001)		0.005*** (0.001)		0.005*** (0.001)	
Father's HEI certificate		0.063 (0.117)		0.110 (0.154)		0.270*** (0.042)		0.254*** (0.062)
Mother's HEI certificate		-0.060*** (0.004)		-0.059*** (0.004)		-0.027 (0.043)		-0.031 (0.030)
SES level 2			0.021 (0.042)	0.019* (0.010)			0.025*** (0.019)	0.039*** (0.008)
Household size			-0.004* (0.002)	-0.004** (0.002)			-0.012*** (0.002)	-0.011*** (0.002)
Child's sex			-0.000 (0.008)	0.002 (0.008)			0.018** (0.007)	0.018** (0.008)
Observations	1,822	3,293	1,821	3,292	3,981	4,701	3,981	4,701
Adjusted R ²	0.013	0.000	0.015	0.006	0.034	0.012	0.059	0.029
Log Likelihood	-436.303	-753.633	-433.513	-748.958	-1,232.555	-1,420.329	-1,216.037	-1,395.313
Akaike Inf. Crit.	878.605	1,513.266	879.025	1,509.917	2,471.110	2,846.659	2,444.074	2,802.627

*p<0.1; **p<0.05; ***p<0.01

Source: Own estimations with EMOVI data. Marginal effects of parents' schooling certificates represent a percentage change in enrollment probability (e.g., an increase of 2.2%). Columns 1 to 4 correspond to 2011 and columns 5 to 8 are from 2017. The regressions controlled by socioeconomic level, household size, and child's sex are in columns 3, 4, 7, and 8. The socioeconomic level's omitted category is the first level. Standard errors are in parentheses.

Table A3.6: Logit model: marginal and impact effects on higher education completion for lower socioeconomic levels

<i>Dependent variable: Probability of higher education completion for lower socioeconomic levels</i>								
	2011				2017			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Father's schooling	-0.000 (0.001)		-0.000 (0.001)		-0.000 (0.001)		0.005*** (0.000)	
Mother's schooling	0.001 (0.001)		0.001 (0.001)		0.001 (0.001)		0.001 (0.001)	
Father's HEI certificate		-0.018 (0.024)		-0.017 (0.021)		0.270*** (0.063)		0.153*** (0.051)
Mother's HEI certificate		-0.018 (0.020)		-0.016 (0.034)		-0.027 (0.034)		-0.015 (0.020)
SES level 2			0.006 (0.007)	0.009 (0.022)			0.017*** (0.006)	0.021*** (0.005)
Household size			-0.002* (0.001)	-0.002 (0.005)			-0.007*** (0.001)	-0.006*** (0.001)
Child's sex			0.001 (0.005)	-0.002 (0.007)			0.005 (0.006)	0.006 (0.005)
Observations	1,821	3,293	1,821	3,292	3,981	4,701	3,981	4,701
Adjusted R ²	0.006	0.000	0.018	0.014	0.031	0.012	0.045	0.028
Log Likelihood	-161.973	-307.493	-161.973	-303.200	-790.375	-909.979	-779.604	-895.340
Akaike Inf. Crit.	335.946	620.986	335.946	618.400	1,586.750	1,825.958	1,571.207	1,802.680

*p<0.1; **p<0.05; ***p<0.01

Source: Own estimations with EMOVI data. Marginal effects of parents' schooling certificates represent a percentage change in enrollment probability (e.g., an increase of 2.2%). Columns 1 to 4 correspond to 2011 and columns 5 to 8 are from 2017. The regressions controlled by socioeconomic level, household size, and child's sex are in columns 3, 4, 7, and 8. The socioeconomic level's omitted category is the first level. Standard errors are in parentheses.

Table A3.7: Logit model: marginal and impact effects on enrollment to higher education for higher socioeconomic levels

	<i>Dependent variable: Probability of higher education enrollment for higher socioeconomic levels</i>							
	2011				2017			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Father's schooling	0.012*** (0.002)		0.007*** (0.002)		0.022*** (0.001)		0.018*** (0.001)	
Mother's schooling	0.009*** (0.002)		0.007*** (0.002)		0.008*** (0.001)		0.004*** (0.001)	
Father's HS certificate		0.183*** (0.029)		0.063** (0.025)		0.241*** (0.019)		0.182*** (0.019)
Mother's HS certificate		0.122*** (0.038)		0.082** (0.034)		0.050* (0.027)		0.012 (0.025)
SES level 4			0.048*** (0.016)	0.093*** (0.014)			0.119*** (0.014)	0.147*** (0.014)
SES level 5			0.148*** (0.028)	0.206*** (0.025)			0.145*** (0.016)	0.200*** (0.016)
AMAI level 6			0.131*** (0.047)	0.245*** (0.045)				
Household size			-0.007** (0.003)	-0.007*** (0.002)			-0.021*** (0.003)	-0.022*** (0.003)
Child's sex			0.036*** (0.012)	0.031*** (0.010)			0.043*** (0.010)	0.043*** (0.010)
Observations	3,610	5,223	3,609	5,222	6,862	6,850	6,862	6,850
Adjusted R ²	0.043	0.024	0.056	0.050	0.051	0.033	0.069	0.062
Log Likelihood	-1,714.541	-2,436.951	-1,691.297	-2,370.659	-3,905.991	-3,939.992	-3,834.213	-3,819.136
Akaike Inf. Crit.	3,435.081	4,879.902	3,398.593	4,757.317	7,817.981	7,885.984	7,682.426	7,652.271

*p<0.1; **p<0.05; ***p<0.01

Source: Own estimations with EMOVI data. Marginal effects of parents' schooling certificates represent a percentage change in enrollment probability (e.g., an increase of 2.2%). Columns 1 to 4 correspond to 2011 and columns 5 to 8 are from 2017. The regressions controlled by socioeconomic level, household size, and child's sex are in columns 3, 4, 7, and 8. The socioeconomic level's omitted category is the third level. Standard errors are in parentheses.

Table A3.8: Logit model: marginal and impact effects on higher education completion for higher socioeconomic levels

	<i>Dependent variable: Probability of higher education completion for higher socioeconomic levels</i>							
	2011				2017			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Father's schooling	0.008*** (0.002)		0.005*** (0.002)		0.013*** (0.001)		0.010*** (0.001)	
Mother's schooling	0.003** (0.002)		0.001 (0.002)		0.002** (0.001)		0.000 (0.001)	
Father's HS certificate		0.139*** (0.025)		0.060*** (0.019)		0.156*** (0.017)		0.110*** (0.016)
Mother's HS certificate		0.061** (0.025)		0.045** (0.022)		0.052** (0.020)		0.028 (0.018)
SES level 4			0.059*** (0.016)	0.070*** (0.010)			0.079*** (0.012)	0.093*** (0.012)
SES level 5			0.106*** (0.028)	0.122*** (0.021)			0.100*** (0.014)	0.119*** (0.014)
AMAI level 6			0.068* (0.047)	0.094*** (0.032)				
Household size			-0.008*** (0.003)	-0.007*** (0.001)			-0.019*** (0.003)	-0.018*** (0.002)
Child's sex			0.008 (0.012)	0.010 (0.007)			0.012 (0.008)	0.010 (0.008)
Observations	3,610	5,223	3,609	5,222	6,862	6,850	6,862	6,850
Adjusted R ²	0.041	0.034	0.062	0.063	0.036	0.032	0.054	0.057
Log Likelihood	-1,084.193	-1,514.556	-1,060.495	-1,468.010	-2,886.747	-2,849.058	-2,830.770	-2,775.725
Akaike Inf. Crit.	2,174.386	3,035.113	2,136.990	2,952.020	5,779.494	5,704.116	5,675.540	5,565.449

*p<0.1; **p<0.05; ***p<0.01

Source: Own estimations with EMOVI data. Marginal effects of parents' schooling certificates represent a percentage change in enrollment probability (e.g., an increase of 2.2%). Columns 1 to 4 correspond to 2011 and columns 5 to 8 are from 2017. The regressions controlled by socioeconomic level, household size, and child's sex are in columns 3, 4, 7, and 8. The socioeconomic level's omitted category is the third level. Standard errors are in parentheses.