Family income as a determinant of young people's school attendance in Mexico

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Date received: June 9, 2019.
Date accepted: January 6, 2020.

Abstract

This paper calculates the impact of family income on young people's school attendance in Mexico, in a longitudinal context. Based on the rotating panels of the National Occupation and Employment Survey (ENOE), a probit econometric model with fixed effects is used to determine the likelihood that a 14- to 18-year-old who lives with their parents and attends school will continue to attend in the following year; the model is controlled by the young person's characteristics, their family, the environment and various temporary changes. Evidence was found that the probability of a young person continuing to attend school increases with family income, and this positive effect is relatively more important in the first deciles of income.

Keywords: family income; young people; school attendance; secondary school; high school education.

1. INTRODUCTION

In recent decades, young people have become a vulnerable group that faces high rates of unemployment, informality and job insecurity, along with a lack of educational opportunities and access to social protection and health systems, among others (Beck, 1998; CEPAL, 2008; Gruber, 2009; IMJ, 2007; Miranda and Salvia, 1998; Mancha, 2011). However, this situation is not homogeneous. Young people face important intra-generational differences which differentiate those who have access to quality education, well-paid and high-value-added jobs, information and communication technologies (ICTs), health care, etc.—compared to those who do not (Hopenhayn, 2008). The greater the differences, the more individuals experience social polarization and exclusion from the same generation, and therefore the greater the social and economic costs for the country (OIT, 2005).

Studies such as the one carried out by De Gregorio and Lee (2002) find that with more—and more equitable—education, income distribution throughout life is more equitable. In the words of Formichella (2011, p.16), quoting Gasparini (2001) and Guadagni (2007), "educational equity can increase economic equity." According to Tilak (2002), various research done around the world indicates a positive correlation between higher schooling and higher income, and according to Tilly (2003), those who have more knowledge have more options for development.

Thus, education is seen as one way to reduce inequality and poverty. However, obtaining higher levels of education (measured in years of schooling) depends on a series of factors both internal and external to the individual, which lead to the formation of a gap between those who obtain more education and those who cannot (or do not want to) continue their educational path. In inequality theory, these aspects can be divided into factors over which one has control, like individual responsibility or personal effort, and predetermined factors over which one has no control such as race, gender, family conditions, cultural capital, inheritance, and family income, among others (Roemer, 1998).

The goal of the present work is to study how 14- to 18-year-old young people's school attendance is affected by a situation over which they have no control: family income—which, as indicated, is a determinant of unequal educational opportunities. The best way to carry out this type of analysis is by using longitudinal information, that is, databases that follow the individual's school attendance and family income over time. However, in many countries, as is the case of Mexico, there is no record of this type of information so research must use cross-sectional databases. Although cross-sectional data is easier to collect and process, it has the disadvantage of presenting observations for the same time period for all of the variables, which can introduce problems of endogeneity or double causality between family income and school attendance, thus forcing one to make important assumptions in the distribution of errors and the loss of estimators' efficiency.

This study contributes to analyses of school attendance by calculating a longitudinal micro-econometric model, taking advantage of the rotating panel structure of data from the National Survey of Occupation and Employment [Spanish acronym ENOE] of Mexico, and using the young person's family income with a year of lag as a determinant of school attendance. This rotating one-year panel and the lag in income allow for the isolation, at least partially, of the endogeneity of income in young people's school attendance in Mexico, and make it possible to obtain unbiased estimators of the effect family income has on the probability that young people attend school.

The estimates indicate that young people's access to and retention in school (measured by the fact that young people who are in school continue to attend the following year) is determined in part by family income, which suggests the existence of an intra-generational gap in education based on this factor.

The paper is organized as follows: the second section describes school attendance in Mexico; in the third, a literature review is developed; the fourth section discusses the methodology, variables and data. Finally, the fifth section presents the results, and the sixth concludes the paper.

2. SCHOOL ATTENDANCE IN MEXICO: SOME STYLIZED FACTS

In Mexico, young people between 14 and 18 years of age face unequal conditions, which affect their educational opportunities and contribute to increasing the schooling gap. For example, in 2015 there were 9,585,389 young people in this age range; of them, 7,669,472 attended school—that is, 20% of 14- to 18-year-olds did not attend school.

By breaking this down by age, it is possible to observe how the percentage of young people who do not attend school increases as they get older. As demonstrated in table 1, 14-year-olds who attend school represent 93% of the total; the remaining 7% do not attend. Meanwhile, at 18 years old only 64.68% attend school, and 35.32% do not.

Table 1. Mexico. School attendance by age (14 to 18 years old) in 2015.
Absolute values and percentages

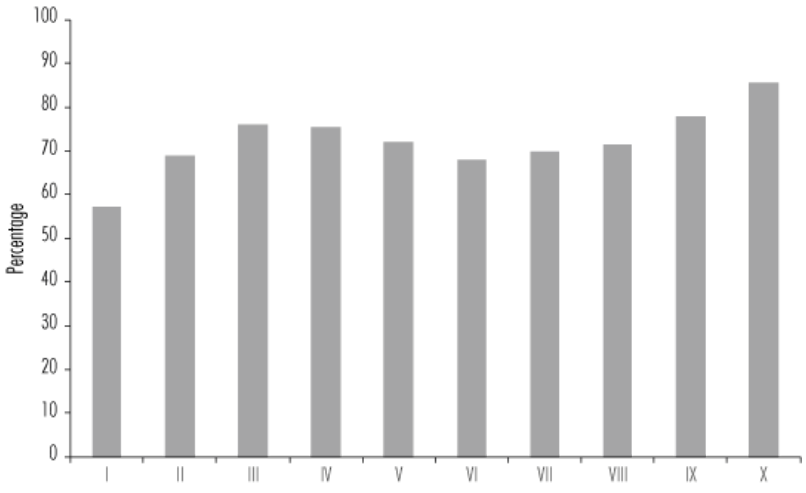
Age	Attend	Do no attend	Total	Attend	Do no attend	Total
	Absolute values			Percentages		
14	1 929 630	143 073	2 072 703	93.00	7.00	100
15	1 795 246	250 240	2 045 486	87.77	12.23	100
16	1 479 695	421 347	1 901 042	77.84	22.16	100
17	1 330 317	481 791	1 812 108	73.41	26.59	100
18	1 134 584	619 466	1 754 050	64.68	35.32	100
Total	7 669 472	1 915 917	9 585 389	80.00	20.00	100

Source: prepared by the authors with data from the 2005-2016 ENOE, INEGI (2016a).

In an international comparison with the Organization for Economic Cooperation and Development (OECD) countries and the G20, it can be observed that in 2015, in countries such as Ireland and Japan, 95 and 94% of young people between 15 and 19 years old went to school, respectively—while the average school attendance for OECD countries was 84%. Mexico ranks among the countries with the lowest school attendance percentages for the 15- to 19-year-old age range, with an attendance rate of 56% (OECD, 2016).

When broken down by income level, these differences are even more marked. Figure 1 shows the group of 14- to 18-year-olds' school attendance by income decile in Mexico, and it can be observed that 57% of young people in the age range of decile I attend school, compared to 85.7% of the youth in decile X. The lowest rate of attendance occurs among 18-year-old youth in decile I, where only 24.7% attend school.

Figure 1. Mexico. School attendance rate of young people between 14 and 18 years old by income decile in 2014



Source: prepared by the authors with data from the 2005-2016 ENOE, INEGI (2016a).

2. LITERATURE REVIEW

A brief theoretical perspective

According to Sen (1992), equity implies equality in one particular aspect, but not in all aspects. Hence, to become an equitable society, what variable or aspect must be equalized? To put it briefly, it can be said that there are three main approaches to answer this question, depending on whether equality occurs in: *i)* well-being, if one considers that the goal is to maximize the total sum of a society's utility; *ii)* assets or resources—for Rawls (1971) there must be equality in terms of primary goods (such as rights, freedoms and opportunities, as well as income and wealth), while for Dworkin (1981), equality must be achieved for resources, *i.e*., each individual should be satisfied with their endowment (or basket) of goods; or *iii)* opportunities, where the capacity-centered approach posited by Sen and Roemer's "level the playing field" (or "smooth the way") approach (Formichella, 2011) are considered, among others.

According to Sen's capacity focus, the aspect that should be equalized is the ability or freedom that people have to choose their own way of life, whereas in Roemer's approach, there must be equal opportunities. Here the results an individual obtains are considered to be a consequence of actions that they carry out, and are determined by two types of circumstances: those that the individual can control, and those that are beyond their control (Formichella, 2011). In this way, a distinction is made between inequality caused by individual responsibility or factors over which one has control—what Roemer (1998) calls "effort"—and inequality caused by predetermined circumstances over which the individual has no control, such as race, gender, family circumstances, cultural capital, inheritance, and family income, among others. Thus, unequal opportunities are related to conditions that are beyond a person's control (Paes *et al*., 2008).

Given its importance in an individual's development, a certain level of education is necessary to establish equal opportunities between individuals—but how is this level or equality of opportunities in education measured? According to López *et al*. (2017), the literature identifies two ways to measure educational inequality: unequal access to education (*e.g.* years of schooling), and academic achievement (*e.g.* student performance). While some empirical works study one of these aspects, others study both, since according to Gamboa and Waltenberg (2015), both aspects are important and interrelated, and as such they should be measured simultaneously.

Empirical literature

Some international researchers point out that predetermined circumstances play an important role in unequal educational and economic opportunities. Ferreira and Gignoux (2014) found that unequal opportunities due to predetermined circumstances explain up to 35% of differences seen in educational achievement and that gender, mother's education and father's occupation are variables that show robust results in explaining educational inequality. Along the same lines, Paes *et al*. (2008) found that mother's education and father's occupation are important causes of both educational inequality and income inequality for adults. Meanwhile Gamboa and Waltenberg (2012) consider that the education of parents and the type of school attended by 15-year-olds in six Latin American countries are important factors of inequality of opportunity, not gender.

Other international work addresses educational inequality conditioned by family history specifically (which are circumstances over which an individual has no control), and finds that family income is an important determinant of educational opportunities. Haveman and Wolfe (1995) indicate that the level of education a person reaches is determined by family income and the investment the family makes in education; they also show that the dropout rate of young people between 15 and 19 years of age is determined mainly by financial problems.

Papay *et al*. (2015) find large gaps in educational achievement between low and high-income students in Massachusetts, United States, and posit that these gaps are wider at higher levels of education, including higher secondary education (HSE) graduation rates and university enrollment. Reardon (2011) and Bailey and Dynarski (2011) also demonstrate that there are gaps in academic achievement between children and youth who grow up in low-income families, as opposed to those who grow up in higher-income families in the United States. Acemoglu and Pischke (2001) argue that family income has a substantial effect on university enrollment, specifically that an increase in family income of 10% is associated with an increase of 1.4 percentage points in the probability of attending university for four years.

Gasparini (2002) finds that higher disparities in household income are transformed into higher disparities in school elections in Argentina, while González *et al*. (2014) point out that low household income reduces the probability of demanding upper secondary or higher education in Colombia, and that young people who come from high-income households have a positive and increasing probability in terms of time in school.

Furthermore, Ibáñez *et al*. (2020) show that in Argentina, the older adolescents get, their being economically active and living in a home with a lower educational climate lowers the probability they will attend school. Meanwhile, the probability of attendance is higher among women, those who have health coverage and those whose parents work in the formal labor market.

Studies have been carried out in Mexico that analyze the problem of educational inequality using data from censuses (Martínez Rizo, 2002; Solís, 2010; Navarro and Favila, 2013), or from the National Household Income and Expense Survey (De la Luz and Díaz, 2010; Martínez *et al*., 2011; Rangel and Ramírez, 2011). Some of these works show an association between an individual's socioeconomic characteristics and the years of schooling completed (Martínez Rizzo, 2003; Solís 2010; Solís *et al*., 2013; Navarro and Favila, 2013), or between family income and school enrollment (De la Luz and Díaz, 2010). Specifically, Solís (2010) found that in Mexico, most of the variation seen in years of schooling can be explained by class origins (their family of origin's economic and cultural capital). De la Luz and Díaz (2010) indicate that income level is a determinant of the educational decisions taken by the

population group of 15- to 23-year-olds, and that a 10% increase in family income increases the probability of school enrollment by 2.6% (in 2000), 2.5% (in 2002) and 2.4% (in 2004).

Similarly, Solís *et al*. (2013) use the Federal District's Transition to Higher Secondary Education Survey to demonstrate that young people in the lower quartile of the Social Origin Index have a probability of 0.55 of continuing to study at the HSE level, compared to a probability of 0.85 for youth in the top quartile. Moreover, in the National Survey of Higher Secondary Education Dropouts [Spanish acronym ENDEMS] (SEP, 2012), it was found that among the main causes for leaving HSE are economic factors (lack of money in the household for supplies, transportation or enrollment)—in Mexico, household income does seem to be a determinant of whether or not a young person continues to study. For their part, Vargas and Valadez (2016) use data from the 2010 National Youth Survey and from Cox regression models, and find that the risk of dropping out of school is indirectly yet significantly associated with quality of education and the economic status of the young person.

Although the literature on the effect of family income on school attendance in Mexico is abundant, it appears that this relationship has not been studied using a one-year longitudinal panel—information that is more robust in dealing with probable simultaneity problems. In addition to this contribution, the present study reinforces the idea of an intra-generational gap based on family income, providing specific information that can help provide a focus for public policies in favor of education and the reduction of educational inequality.

4. METHODOLOGY, VARIABLES AND DATA

Calculation methodology: probit regression model

Statistically modeling school attendance presents the specificity that the response variable (attendance) is not continuous, but rather discrete; that is, one attends or does not attend. For this reason, it is not convenient to use traditional linear regression models given that they assume continuity in the dependent variable.

Therefore, regression methods are used for binary dependent variables and in this case the probit model was selected. The approach consists of modeling the probability that a young person between 14 and 18 years old who attended school during period t will continue to attend school one year later, that is, at $t + 1$, as a function of household income over period t and other control variables. This is performed using a normal cumulative probability distribution whose argument is a linear combination of the response variable determinants (Wooldridge, 2016).

In the context of a probit model, this can be represented as:

$$\Pr(E_{it+1} = 1 \; dado \; E_{it} = 1, X_{it}) = \Phi(X'_{it}\beta)$$

Where Pr denotes Probability, E_{it} ($E_{it} + 1$) is a binary indicator that takes the value of 1 if young person i attends school during period t ($t + 1$), Φ denotes the normal cumulative distribution, and X_{it} is a vector of specific characteristics of the young person and their family during period t, such that:

$$X'_{it}\beta = \beta_0 + \beta_1 x_{1t} + \beta_2 x_{2t} + \cdots + \beta_k x_{kt}$$

The change in the probability that a young person attends school when independent variable x_j changes —which is called the marginal response—is equal to:

$$\Delta \Pr(E_{it+1} = 1 \; dado \; E_{it} = 1, X_{it}) = [\phi(X'_{it}\beta)\beta_j]\Delta x_{jt}$$

Where ϕ is the density of the normal distribution. The coefficient calculated β_j and the marginal response are represented by the same symbol, but are not the same. In this sense, the coefficients do not have a direct interpretation, so it is important to evaluate the impact of the regressors through the marginal responses and determine whether they are significantly different from zero.

Two additional comments on the model: the dependent variable and regressors have a lag, and school attendance refers to period $t + 1$, while the regressors are dated to period t. This is convenient to break any possible simultaneity of the variables, especially as regards family income. By using the lagged family income—that of period t —it is already given at $t + 1$ such that it cannot be affected by school attendance at $t + 1$.

Finally, unlike cross-sectional studies, there may be changes over time in factors common to all individuals (*e.g.* an economic crisis or natural disaster) that affect the response variable. For this reason, it is pertinent to include dichotomous variables for the time periods to capture this type of fixed effect.

Variables

Although the goal here is to calculate the effect of family income on school attendance, other variables were also included that may be important in explaining young people's school attendance, such as the young person's characteristics, their family, their environment and the temporality of observations in the model. In this way, biases due to variable omissions are avoided and the goodness-of-fit is improved. The independent variables used in the model are described below.

Variables for the young person's characteristics: dichotomous variables were coded that take the value of 1 if the cited characteristic is fulfilled and 0 if it is not fulfilled; these variables are Male, Enters late (goes to school for one year less than they should), Secondary school, Work, Married and Migrant. Age in completed years was included.

Family variables: the following dichotomous variables were tested—Extended household (an additional relative lives in the household), Has older siblings, Has younger siblings, Has both parents, Mother works. The mother's education (years of study), the number of siblings and the per capita family income were included, the latter consisting of the income of all household members except the young person, expressed in 2016 pesos and in per capita terms.

Environment and time variables: 31 dichotomous variables were included by state and one for rural areas; 10 dummy variables for years and 3 dummy variables for quarters were also incorporated.

Data

This work uses data from the ENOE, from the first quarter of 2005 to the third quarter of 2016. The ENOE has a rotating panel structure in which interviews are conducted with the same households and individuals for five consecutive quarters, resetting each quarter at a fifth of the total sample (INEGI, 2016b).

International studies use data panels with an individual's history, including their school career and personal and family characteristics, to measure the effect of family income on children's school attendance. However, in Mexico there is no panel data of this type, so the ENOE—with its rotating panel structure—becomes the best available instrument, providing us with microdata disaggregated by age, state, gender, rural-urban conditions, individual characteristics, characteristics of the home, etc., for the same individual throughout a year of their life (five consecutive quarters). Only young people between 14 and 18 years old who were living with their parents at the time of the first interview are considered here. Thus, the sample includes 252,077 observations in total.

The database was organized as follows: individuals who are between 14 and 18 years old and live with their parents, who are in school and are participating in the interview for the first time are selected each quarter, and their individual and home characteristics are recorded; using a personal identifier, information from the first and fifth interviews of each selected young person are combined. Thus, the same observation includes the characteristics of the young person and their home, as reported in the initial interview (period *t*)—such as their age, gender, number of members of their home or their family income—as well as the young person's school attendance at the time of the final interview (period $t + 1$). Each quarter includes a different group of young people with information from their initial interview and with their attendance status as recorded in their final interview.

Table 2 shows the trends of young people's school attendance between their first and last interview. Of the total sample, 69.7% (175,798 youth) reported attending school at the time of the last interview. Of the total number of young people who reported being in school during their first interview, 86.5% continued studying one year later, while among those who reported not being in school in their first interview, 13.7% returned to school one year later.

Table 2. Trends of 14- to 18-year-old young people's school attendance

	Attends in final interview	*Does not attend in final interview*	*Total*
Attends in first interview	167 859 (86.5%)	26 088 (13.5%)	193 947 (100%)
Does not attend in first interview	7 939 (13.7%)	50 191 (86.3%)	58 130 (100%)
Total	175 798 (69.7%)	76 279 (30.3%)	252 077 (100%)

Source: prepared by the authors with data from the 2005-2016 ENOE, INEGI (2016a).

Table 3 shows the averages for the total sample, for the individuals who continued attending school one year later and for those who did not continue. It is worth reiterating that the characteristics of the young person and their household at the time of the initial interview are used in this model. Given that this study is limited to those young people who were attending school during the initial interview, the sample size is reduced to 193,947 young people.

Table 3. Table of independent variable averages

Observations	*Total*	*Attends in final interview*	*Does not attend in final interview*			
	193 947	*167 859*	*26 088*			
	Average	*Average*	*Average*	*Min.*	*Max.*	*Statistical difference*
Male	51%	50%	53%	0	1	***
Age in years	15.7	15.6	16	14	18	***
Enters late	15%	13%	26%	0	1	***
Secondary education	40%	40%	42%	0	1	***
Works	14%	13%	22%	0	1	***
Married	3%	0%	1%	0	1	***
Migrant	11%	11%	10%	0	1	***
Rural	22%	20%	31%	0	1	***
Extended household	11%	11%	15%	0	1	***
Has older siblings	54%	53%	56%	0	1	***
Has younger siblings	65%	65%	69%	0	1	***
Number of siblings	3	3	3.3	1	14	***
Has both parents	83%	84%	81%	0	1	***
Mother's education	8.3	8.6	6.4	0	26	***
Mother works	47%	47%	43%	0	1	***
Per capita family income[a]	2.2	2.3	1.74	0.6	123.7	***

Note: [a] Income in thousands of 2016 pesos per month, per person in the household *p <0.10; **p <0.05; ***p <0.01
Source: prepared by the authors with data from the 2005-2016 ENOE, INEGI (2016a).

Although all simple comparisons of the averages for those who attended and did not attend school are significantly different from 0 to 1%, the differences are more notable for certain variables. In particular—compared to those who attended school in the final interview—those who were not see a higher incidence among those who are lagging in their school career, those who work, those who reside in rural areas, those with less educated mothers and those living in households with lower per capita real income. The differences are smaller, although appreciable, between males, those who are in secondary school, those who live in extended households and those who do not live with both parents.

At the time of the initial interview, the household per capita income for the homes of the young people in the sample was MXN $2,123 (in 2016 pesos) per month. For the group of young people who reported not attending school in the final interview, the household per capita income was on average MXN $1,745 per month, *i.e.*, MXN $468 less per person. Table 4 shows that the family per capita income of the sample average is between decile VI and VII, while the family per capita income for young people who stopped attending school falls between decile V and VI.

Table 4. Average household income per capita per month by decile and income percentile (Mexico, 2016) (MXN $)

Decile	*Average per capita income*	*Percentile*	*Average per capita income*
I	290.50	10	559.91
II	722.16	20	880.28
III	1 017.70	30	1 149.25
IV	1 300.43	40	1 464.51
V	1 623.78	50	1 781.51
VI	1 929.48	60	2 102.88
VII	2 348.00	70	2 591.05
VIII	2 864.97	80	3 199.39
IX	3 671.58	90	4 205.77
X	7 124.19	100	51 763.45

Source: prepared by the authors with data from the 2005-2016 ENOE, INEGI (2016a).

Table 5 breaks down the percentage of young people who reported attending school in the final interview—given that they also attended school in the initial interview—according to different characteristics. For example, of the males who attended school in the initial interview, 85% reported continuing to attend during the final interview, while this is the case for 87% of females.

Table 5. Percentage of 14- to 18-year-old young people who attended school in both the initial and final interviews

Man	85%	Woman	87%
16 years old or younger	89%	17 years old or more	79%
Secondary school	85%	High School	86%
Works	79%	Does not work	87%
Married	62%	Single	86%
Migrant	88%	Not a migrant	86%
Rural	80%	Urban	88%
Extended household		Nuclear family	86%
Has older siblings	85%	Does not have older siblings	86%
Has younger siblings	85%	Does not have younger siblings	87%
Two siblings or less	88%	Three or more siblings	84%
Has both parents	86%	Does not have a father or mother	84%
Mother with secondary school education or less	83%	Mother with high school education or higher	94%
Mother works	87%	Mother does not work	85%

Source: prepared by the authors with data from the 2005-2016 ENOE, INEGI (2016a).

Retention—the proportion of young people who attended school in the final interview and as well as in the first interview—tends to be higher among those under the age of 16, compared to those who are 17 or 18 years old (this difference is consistent with a very common result in the literature where dropping out increases with age); those who do not work; those who are single; those who live in a nuclear household (compared to an extended one); and those with mothers who have a high school education or higher.

It is also observed that the percentage of young people who attended school in the first interview increases across the years, rising from 72% in 2005 to 80% in 2015. Meanwhile, the percentage of young people who attended school in the second interview, as well as attending in the first interview, also increased—although to a lesser extent, going from 84 to 87% during the same period. Additionally, a breakdown of attendance by state indicates that Coahuila and Michoacán presented the lowest percentage of attendance during the first interview of young people between 14 and 18 years old, with 64% attendance on average. Mexico City reports the highest attendance rate with 85%. Regarding the retention percentage, that is, young people who

attended school in both interviews, Baja California Norte and Mexico City reported the highest rates, 90 and 89%, respectively, while Guanajuato has the lowest rate at 80%.

5. RESULTS

Table 6 shows the marginal effects of the probit regression, where seven specific characteristics of the young person, seven characteristics of their household, including family per capita income, and two specific characteristics of the young person's mother are considered.[1] As control variables, 31 dummy variables for state, 10 dummy variables for years and 3 dummy variables quarters were included in the regression; the marginal effects of the control variables are not presented in the table.

Table 6. Marginal effects of the probit model. Effect of individual and household characteristics on the probability that a young person between 14 and 18 years old who lives at home and attended school at t, will continue attending school at t + 1

Man (d)	-0.0110	***
Age at t	-0.0549	***
Enters late at t (d)	-0.0217	***
Secondary school or less at t (d)	-0.0826	***
Works at t (d)	-0.0362	***
Married at t (d)	-0.1218	***
Migrant at t (d)	0.0078	
Rural conditions at t (d)	-0.0344	***
Extended household at t (d)	-0.0140	***
Has older siblings (d)	0.0078	**
Has younger siblings (d)	0.0061	*
Number of siblings	-0.0113	***
Lives with both parents at t (d)	0.0105	***
Mother's years of education	0.0093	***
Mother works at t (d)	-0.0032	
Family income pc at t	0.0102	***
N	155 623	
Wald Chi²	4 839.17	
McFadden's R^2	0.0872	
Count R^2	0.8610	

Notes: Marginal effects. (d) for dummy variables. *p <0.10; **p <0.05; ***p <0.01; income in 2016 pesos. The sample is limited to young people between 14 and 18 years old who live with their family, who attended school during the first interview (t) and who report family income.

Source: prepared by the authors with data from the 2005-2016 ENOE, INEGI (2016a).

Overall, a McFadden R^2 of 0.0872 and a Count R^2 of 0.8610 were obtained. All of the variables analyzed are significant at least to 95% confidence, with the exception of the variables for the young person having younger siblings (90% confidence), being a migrant and having a mother who works (not significant).

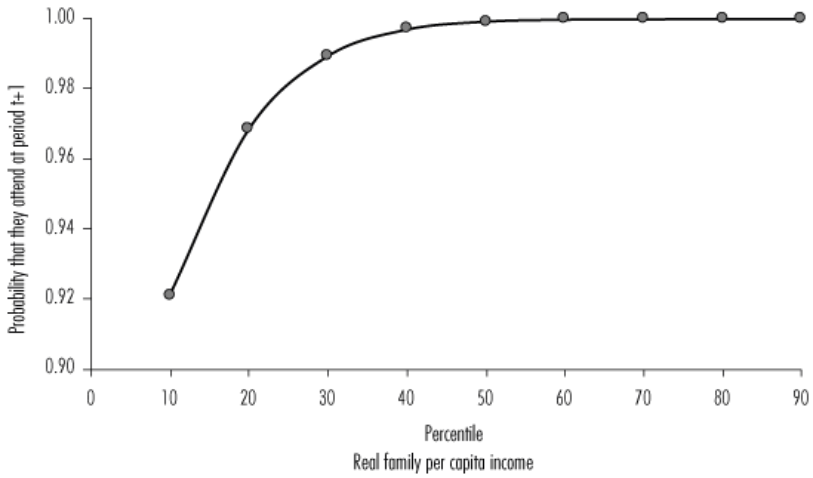
Following the results shown in Table 6, it can be observed that males have an average probability 1.10 percentage point lower than females of continuing to attend school one year later. For its part, each additional year of age reduces the probability of the young person continuing to attend school by 5.5 percentage points, and being in secondary school during the initial interview reduces it by 8.3 percentage points. Being in a lower grade than appropriate to their age, working, or being married also reduce young people's likelihood of continuing to attend school one year later. Of the household characteristics, those which reduce the probability of continuing to attend the school a year later include rural conditions, living in an

extended household (with relatives besides parents and siblings), and the number of siblings; meanwhile, having older or younger siblings and living with both parents increase this probability. The mother's education level also increases the young person's probability of continuing to attend school, while the mother's employment status has no effect on this probability.[2]

The variable most relevant to this research—family income—has a positive effect of 1 percentage point. In other words, an increase of MXN$1,000 per month in family per capita income, evaluated according to the average (MXN$2,123 per capita), increases the probability that the young person will continue to attend school one year later by 1 percentage point. If evaluated on average, this effect seems small; however, when calculating the marginal effect for income percentiles 10, 20, 30, up to 90, it is possible to observe important positive effects of income on the probability of continuing to study among youth who are less fortunate, economically speaking.

The probability that a young person between 14 and 18 years old continues to study, given that they are in the 10th percentile of income, is 92%; the probability of continuing to study for a young person from the 20th percentile increases to 97%; for youth of the 30th percentile it is almost 99%; and for the rest, it is very close to 100% (see figure 2). That is, the lower the income of a young person's family, the effect of income on the probability that they will continue to attend school is more significant. Thus, if the average per capita income of a young person's family could be raised from the 10th percentile to the average per capita income of a family in the 20th percentile, the young person's probability of continuing in school would increase by 5 percentage points. And if the average per capita income of this young person in the 10th percentile increased to the level of the 30th percentile's average per capita income, the probability that they would continue to attend school would increase by 7 percentage points.

Figure 2. Probability that a young person between 14 and 18 years old who attended school at t continues to attend at t + 1 according to family income percentile

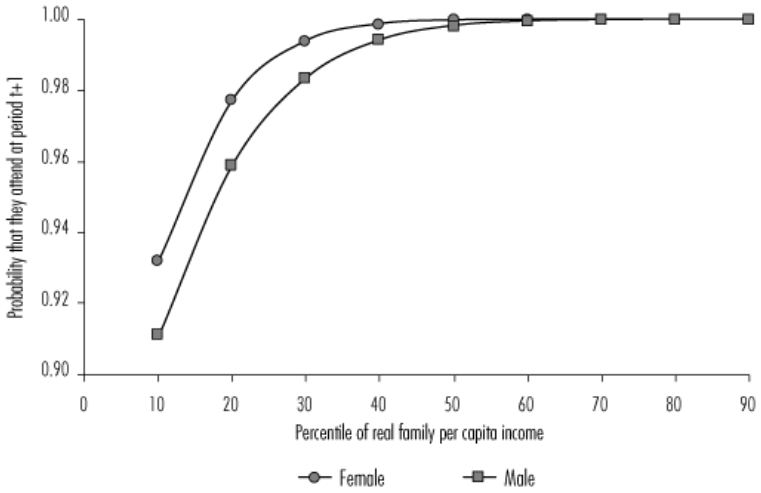


Source: prepared by the authors with data from the 2005-2016 ENOE, INEGI (2016a).

The average per capita income of a family in the 10th percentile is MXN$559.91, while in the 20th percentile it is MXN$880.28 and in the 30th percentile it is MXN$1,149.25 (see table 4). Therefore, increasing the probability by 5 percentage points that youth between 14 and 18 years in the 10th percentile will continue to attend school would require an increase in their monthly family income of MXN$320.37 per capita; increasing the probability by 2 more percentage points would require an additional increase of MXN$268.97 per capita.

Figure 3 shows the interaction between gender and per capita income by percentile. As can be seen, the probability of continuing to attend school for 14- to 18-year-old males is less than for females, primarily in the first 5 income percentiles. This gap closes as the family's per capita income increases. Thus, while in the 10th and 20th percentiles the gap between females and males is 2 percentage points, in the 40th percentile it is less than 1 percentage point.

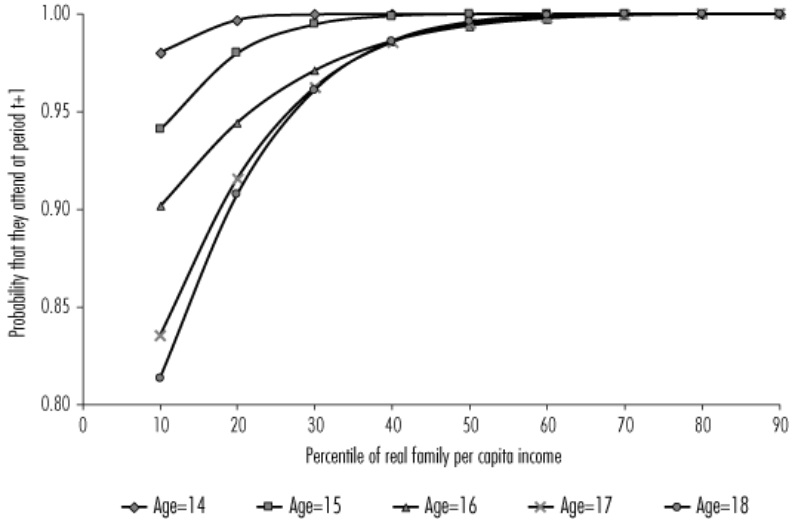
Figure 3. Probability that a young person between 14 and 18 years old who attended school at t continues to attend at t + 1 by gender, according to family income percentile



Source: prepared by the authors with data from the 2005-2016 ENOE, INEGI (2016a).

Figure 4 presents the relationship between income and age by percentile; note that in the lowest income percentiles there is a wide gap in the probability of continuing to attend school that increases with age. The probability of continuing to attend school for a 14-year-old from the 10th percentile is 98%, while for an 18-year-old from the same percentile it is 81%, which represents a difference of 17 percentage points. The effect of age practically disappears from the 60th percentile of income on.

Figure 4. Probability that a young person between 14 and 18 years old who attended school at t continues to attend at t + 1 by age, according to family income percentile

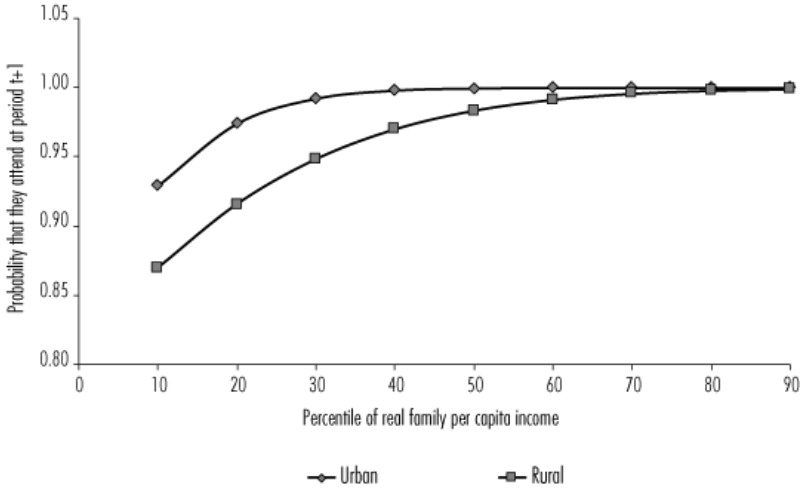


Source: prepared by the authors with data from the 2005-2016 ENOE, INEGI (2016a).

Even without considering income percentiles, the effect of age is very important. This is demonstrated by the fact that while the probability of continuing to attend school for a 14-year-old is 93%, for an 18-year-old it is 70.5%—a difference of 22.5 percentage points.

Finally, figure 5 presents the interaction between income and rural-urban conditions, by percentile. As can be observed, the probability of continuing to attend school for a 14- to 18-year-old young person who lives in a rural area is lower than for one who lives in the city; it is not until 90th percentile that this gap closes. Again, the gap is wider in the first deciles of income— a 14- to 18-year-old young person in the 10th or 20th percentile, who lives in a rural area, is 6 percentage points less likely to continue studying than a young person of the same income percentile who lives in an urban area. If differences in income distribution are not considered, on average a young person between 14 and 18 years of age in a rural area is 4 percentage points less likely to continue studying than a young person in an urban area.

Figure 5. Probability that a young person between 14 and 18 years old who attended school at t continues to attend at t + 1 by rural-urban conditions, according to family income percentile



Source: prepared by the authors with data from the 2005-2016 ENOE, INEGI (2016a).

6. CONCLUSIONS

Using the ENOE from 2005 to 2016, this study examines whether family per capita income has an impact on the probability that young people between 14 and 18 years old who live with their parents and attend school will continue to do so one year later. To correct the bias in calculations caused by the double causality between family income and young people's school attendance, the structure of the ENOE rotating panel is used, and the characteristics of the young person and their household are incorporated—including family income—with a lag of one year.

The results obtained indicate that in Mexico, family income predicts the probability that a young person will continue attending school. Specifically, after controlling for other characteristics of the young person and their family, the probability that a young person continues to attend school is greater the higher their family's income. Furthermore, this positive effect of family income on the probability of continuing to attend school is relatively important in the first deciles of income. In other words, a money transfer increases the probability of continuing to attend school more if it is given to young people with more disadvantaged families, compared to those from more prosperous households.

The presence of a positive effect of family income on young people's school attendance reinforces the idea of unequal educational opportunities and the existence of an intra-generational gap in education based on family income in Mexico. The results of this study show us that young people between 14 and 18 years of age in the lowest income deciles—especially if they are men or live in rural areas—are the least likely to continue attending school. Along the same lines, the gap in the probability of school attendance between men and women and between rural and urban youth is wider in the lowest income deciles, and closes as family per capita income increases.

Given that unequal opportunities are related to circumstances that are beyond a person's control (Paes *et al*., 2008), and to the extent that inequality is due to factors that individuals do not control such as unequal family economic circumstances, it is fair that public authorities try to reduce, as much as possible, such unequal conditions (Piketty, 2014). In this sense, unequal opportunities justify public intervention through the design of public policies aimed at "leveling the playing field" (Roemer, 1998) using actions and resources that allow everyone to live under the same conditions—particularly for the groups of young people in the lowest income deciles, in rural conditions, who are male, and who are older.

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[1] Because in 17% of the cases there is no information about the father, and in order not to lose these observations, variables that indicate the schooling or work status of the father are not included and only the information concerning the mother is considered.

[2] To reduce the wordiness of the text, it is not mentioned that in the interpretation of each marginal effect, to avoid the problem of double causality between income and school attendance, the independent variables are measured in the initial period (t) while the dependent variable is measured one year later, in the final period ($t + 1$).