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AN APPROACH TO INTERGENERATIONAL PERSISTENCE IN EDUCATION

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An approach to Intergenerational Persistence in Education in Argentina: 1970-2010[1]

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Abstract
We explored whether individuals born to lower educated mothers/fathers were able to attain similar education as did those born to parents with higher education in Argentina during 1970-2010. Considering the estimate shown as a rough measure of intergenerational persistence of educational inequality, we conclude that it has declined among families, despite an increase observed between 1970 and 1980. Overall, the evidence presented suggests that differentials in schooling attained by children are observed early in life, when we distinguish by maternal or paternal education. In addition, the gap in educational attainment for individuals born to lower educated versus highly educated parents has narrowed over time.

Resumen
Exploramos si aquellos individuos nacidos de padres poco educados alcanzaron educación similar a la de aquellos nacidos de padres con mayor educación en Argentina, durante 1970-2010. Considerando la variable propuesta como aproximada a la persistencia intergeneracional de la desigualdad educativa, concluimos que la misma se ha reducido, a pesar del aumento entre 1970 y 1980. Las diferencias en la escolaridad alcanzada por los niños, se observan a temprana edad, cuando distinguimos por la educación materna o paterna. Además, la brecha en los logros educativos entre los individuos de padres poco educados y se ha reducido a través del tiempo.

Keywords: educational mobility, parental education, census data
JEL: I2, J6

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1. Introduction

The aim of this article is to explore the evolution of intergenerational educational mobility in Argentina over the period of 1970-2010. Studies on intergenerational transmission in Latin America are rare due to the lack of longitudinal data on education of children and their parents over time, and Argentina is not an exception. For this reason we only analyzed the correlation between children's schooling with maternal and paternal education levels. We attempt to answer the following inquiry: whether individuals born from lower educated parents were able to catch up those born from parents with higher education. In other words, whether differences in years of schooling completed fade away over time.

First of all, it is worth noting to say that educational mobility is a broader concept, which implies to consider the years of schooling achieved by parents when they were of the same age as were their son or daughter. To this end, we applied the educational correlation of people of different ages, so the indicator studied in this paper does not refer specifically to educational mobility. Despite this limitation, due to the type of data available, we hope this approach helps to provide an approximation of the evolution of educational mobility in Argentina over the past 5 decades.

The data for this paper comes primarily from the censuses done in Argentina in the years 1970, 1980, 1991, and 2001. Because the information collected in the 2010 Census is not yet available, we complemented the censuses data with the Permanent Household Survey (*Encuesta Permanente de Hogares*, EPH) for the last year. These sources allowed us to get a complete study for the whole population of the country over the period of 1970-2010.

Throughout the period considered, we also provide estimates on a rough measure of intergenerational persistence of educational inequality, which suggest that the intergenerational persistence of inequality has declined among Argentine families.

It seems important to clarify this paper is based on a section of a previous article written by Casal, Morales, Paz Terán (2011). In that paper, the authors explored educational inequality in Argentina over the period from 1970-2010, through the calculation of education Gini coefficients. Casal, Morales, Paz Terán (2011) also examined the role played by the mother's education in the academic achievement of her first-born child. In this work we extend that analysis by considering also fathers' education and the overall education of both parents.

The remainder of this paper is as follows: The next section describes previous literature in this subject. Then, we describe the methodology in section 3, while section 4 describes the data. Section 5 then discusses our findings on educational mobility behavior along the four decades. Lastly, section 6 provides concluding remarks.

2. Literature Review

It is important to highlight that there is no consensual view between the authors about which factors explain a child's success at school. On one side, many of them attribute to parent´s income as the main source of children's schooling success (nurture). On the other side, the genetic transmission of ability (nature) is considered the main cause. Haveman & Wolfe (1995) made a review of the literature on the intergenerational transmission of education, and they conclude that parent's education is the most important factor in explaining a child's success at school.

Two issues deserve attention: The first one is about which: "father," "mother" or "both parents," influence the educational attainment of their firstborn child. The second

is in which grade a parent influences his/her child's schooling. On one hand, although there is no consensus on whether fathers' or mothers' education—if any—is more important to schooling of their sons/daughters, most of the research on this subject suggests that mother's education is more important. When explaining children's schooling, it seems mother's presence tends to reduce the incidence of behavioral problems of the offspring. One of the pioneers is Leibowitz, A. (1974), reports a powerful role of mother's education on son's educational attainment. Heckman and Hotz (1986) using a sample of males as household heads from Panama find that especially the mother's education has a strong effect on male financial earnings. They observed that the correlation between a mother's education and her son is much higher than that between a father's education and his son. Nimubona and Vencatachellum D. (2007) found that the intergenerational education mobility in South Africa is higher for whites than for blacks- especially for black females who have higher intergenerational education mobility than males.

On the other hand, Oreopoulos and Page (2006) examined the influence of parental compulsory schooling on children's grade-for-age, using the 1960, 1970, and 1980 United State censuses, suggested that a 1-year increase in the education of *either parent* reduces the probability that a child repeats a grade by 2 to 4 percentage points. However, it is important to note that relatively recent studies do not find a significant effect of mother's schooling, after controlling for ability. Behrman and Rosenzweig (2002) using twin data came to the conclusion that the mother's schooling has little -if any- impact on the schooling of their child, holding everything else (including unobserved ability factors of either mother or father) constant. Plug (2004), using a sample of adopted children, finds also that the association between the mother's (but not fathers) and child's schooling disappears after controlling for the effect of inherited abilities.

In any way, we expected a significant positive association between the mother or father and the child's schooling in line with previous literature. In the case of developing countries, Behrman et al. (2001), for example, using around 100 household surveys conducted in Latin America, found that children generally surpassed the schooling attainment of their parents and that schooling attainment of children was highly correlated with that of their parents. Mare (2006) finds that in Indonesia, the educational attainments for both mothers and fathers have strong positive effects of approximately equal size on the attainment schooling of their children.

Finally, Checchi et al. (2008) concluded the degree of intergenerational mobility in educational attained has notably increased in Italy over the last century; and there is a reduction in the correlation coefficient between the father and child schooling levels over time.

3. Methodology

As was mention in the preceding section, although there is no absolute consensus, most of the literature has found that a mother's education is essential when explaining children's education. Since, as far as we know, there is no evidence from Argentina if a mother, father, or both parents is important in the level of schooling reached by the firstborn child, we extend the previous research by Casal, Morales, Paz Terán (2011) and consider not only mothers, but also fathers and both parents could influence in educational attainment of their firstborn offspring.

Taking advantage that each census wave and EPH from 2010 allow us to identify inter-familiar relationships to link mothers/fathers with the corresponding son/daughter, this article is intended to assess how the schooling correlation among either: mother, father or both parents and children schooling has evolved from 1970 to

2010. Unfortunately, as it is explained before, cross-sectional data basically allows us to relate parental education to that of the son/daughter. When mothers are compared to their children, we may be contrasting people of different ages and not of two generations, separated in time. Moreover, our data does not follow cohorts' records, so that do not allow us to know the years of schooling achieved by mothers when they were of the same age as their son or daughter. Nevertheless, we believe the analysis presented in this article is useful to examine in more detail the general picture of intergenerational educational mobility among Argentine families described so far, given the absence of panel data.

Basically, in every household we identify *mother(father)* as the partner/wife(husband) of a male(female) household head or the head of the household in the case of female(male)-headed households—those females(males) who do not have a husband(wife) or cohabiting partner in the household—having at least one child. We link every mother (father) with her first-born son or daughter (the eldest child) still living in the household. It is pertinent to clarify that micro data from the censuses allow us to link children with their mothers (father), though the approach is expected to have measurement error. Finally, as a robust test, we deal with households made up exclusively by married or joint couples having at least one child.

At this instance it seems appropriate to clarify that we focus our analysis on the first-born son or daughter because it is expected a priori that children born later in the family are likely to show different outcomes, given the evidence suggesting the role played by birth order in the intra-household investment of children. See, for example, Black et al. (2005), who find very large and robust effect of birth order on child education.

We turn now to the basic regression of parent's schooling on son's/daughter's schooling for individuals aged 25-40, as an attempt to examine a rough "intergenerational" correlation of education taking into account Checchi et al. (2008) methodology. We estimate the following model for years 1970, 1980, 1991, 2001, and 2010, using Ordinary least Square (OLS):

$$S_i^c = \alpha^g + \beta^g S_i^g + \mu_i^g \text{ for } i = 1,2,...,N \text{ and } g = m, f \quad (1)$$

Where S_i^c and S_i^g are years of schooling achieved by the first-born son/daughter (*c*) and the mother (*m*) or father (*f*), respectively; μ_i is the disturbance term.

The regression coefficient we obtain does not convey any message about causality, and that $\tilde{\beta}^g$ is given by:

$$\tilde{\beta}^g = \rho_{cg} \frac{\sigma_c}{\sigma_g} \qquad (2)$$

where σ_c and σ_g are the standard deviation of errors for the child, and the mother or father, and ρ_{cg} is the correlation coefficient between child´s and mother´s or father´s education. One could interpret a decreasing $\hat{\beta}^g$ as an indicator of decreased intergenerational educational mobility, but it might be due to a reduction in σ_c / σ_g. So that, in addition, we extend the estimation (1) after normalizing the variable years of schooling. The general equation in this case is:

$$\frac{S_i^c}{\sigma_c} = \alpha^g + \rho^g \frac{S_i^g}{\sigma_g} + \mu_i^g \quad (3)$$

As Checchi et al. (2008) indicate the evolution $\tilde{\rho}^g$ could be understand in terms of correlation of child's and parent's education, and essentially as a measure of inequality of circumstances, which are independent on child's effort. A high $\tilde{\rho}^g$ might show that son/daughter education is heavily influenced by parents' schooling while $\tilde{\rho}^g$ close to zero would indicate that children education is independent of family background. The key difference between the estimated coefficients $\hat{\beta}^g$ and $\tilde{\rho}^g$ is that ρ^g through taking into consideration the ratio of variances, considers also a change of inequality of educational outcomes in children and parents generations, giving a relative measure of intergenerational mobility. In the case of $\tilde{\rho}^g$, it could be seen as an absolute measure of intergenerational transmission since it does not take into account possible evolution of the distribution of educational attainments. Nevertheless we have to keep in mind our approach is an approximation since we do not have information about children and their parents across a period of time.

As a robust check, we also calculate a third equation taking into account both parents together:

$$S_i^c = \delta + \eta S_i^m + \phi S_i^f + \varepsilon_i \quad i = 1,2,...,N \quad (4)$$

where S_i^c , S_i^m and S_i^f are years of schooling achieved by the first-born son/daughter, the mother (*m*) and father (*f*), respectively; ε_i is the disturbance term.

Finally, we replicate equations (1) and (4) after controlling by other individual covariates of firstborn. More specifically we control for age, gender and regional dummies. We took into account in the estimation, the division of Argentina in six regions: Buenos Aires, Northwest (NOA), Northeast (NEA), Cuyo, Pampeana and Patagonia; as suggested by Checchi et al. (2008). Because of our focus on disparities in the distribution of education, we considered in our regressions those individuals who were between 25 and 40 years old, since considering that range of ages is assumed individuals have chosen and completed his studies

4. The Data

Strictly speaking, intergenerational transmission of education needs data sets that collect info on the education of children and their parents across time. But, due to the lack of longitudinal data in our country, that span a sufficient time interval, we focus on educational attainments based on children's recall of parental education.

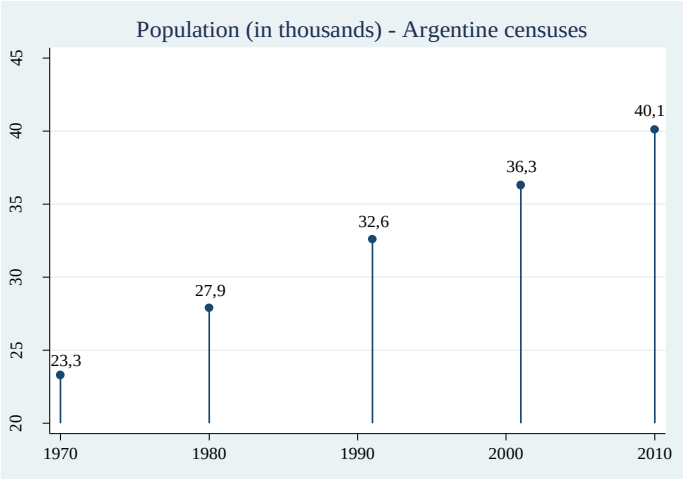
The data for this paper come primarily from the censuses done in Argentina in the years 1970, 1980, 1991, and 2001[2]. Given that the 2010 census is not available at this time, we have complemented the censuses data with data from the Permanent Household Survey (*Encuesta Permanente de Hogares*, EPH) for the year 2010. These sources allow us to have a complete study for the whole population of the

[2] The census data come from IPUMSI "Integrated Public Use Microdata Series – International".

country over the period 1970-2010. Both, the census and the survey are developed by the *Instituto Nacional de Estadísticas y Censos*: INDEC (National Statistics and Census Institute). Notice that the EPH covers only 32 metropolitan areas, while the census includes both urban and rural population. Regarding census data, we had access to a sample fraction (2%) of the 1970 Argentine census and 10% of the 1980, 1991, and 2001 censuses. In the case of the EPH (2010) the data correspond to the first quarter of the year, which was the last dataset published by INDEC by the moment this paper was written. The size of the census data set is an enormous advantage in terms of enabling us to obtain precise estimates, but we do not see the same results in the case of 2010 survey data set. The main disadvantage of the data available, and the reason why it has not been used for intergenerational mobility studies, is that it is a cross-sectional data set that contains little information on children's outcomes, except information on each individual's level of educational.

The measure proposed as an approach to intergenerational mobility of education was obtained for all states considering the whole population, and urban and rural areas[3]. **Graph 1** illustrates the population of Argentina over the period under study.

Graph 1: Population Argentina 1970-2010

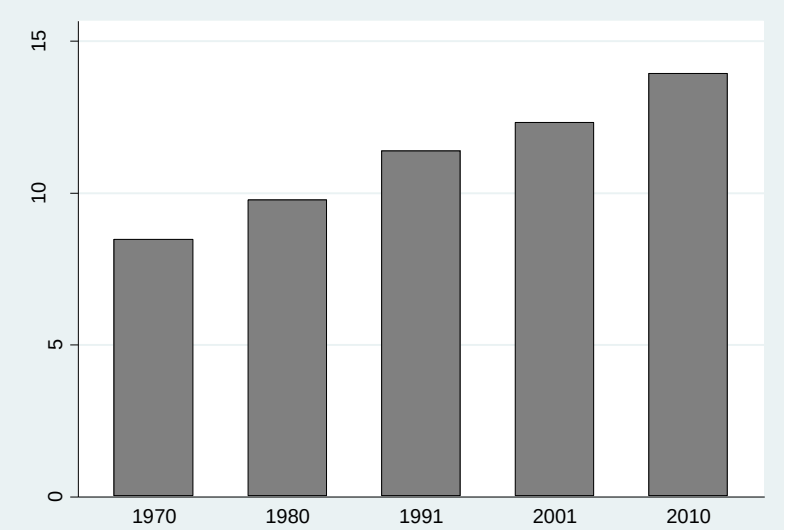


Source: Casal, Morales and Paz Teran (2011)

In the case of the census where there was a variable to indicate the highest grade or level of schooling the person had completed, in years, only formal schooling was counted. Considering the EPH survey, we generated the years of schooling variable. For that purpose we have used the questions "Do you attend school at this time?" and "What is the last year of formal education you have completed. In the following Graph 2 we can appreciate a clear upward trend in the average years of schooling for the whole country over the decades: From 6.60 in 1970 to 11.28 in 2010.

[3] There was no information for urban-rural in the 1970 census.

Graph 2. Years of Schooling Average in Argentina. 1970 - 2010



Source: Casal, Morales and Paz Teran (2011)

Table 1 shows the descriptive statistics of the years of schooling for son/daughter and mother. At first glance one could observe an increase trend in the average years of schooling by decade, not only for son/daughters, but also for mothers. In every decade, the average year of schooling for the child is higher than the one reached by the mother. But, across the decades the gap in average years of schooling between generations is narrowing. Concerning the standard deviation (SD), we observe that in the case of son/daughter, since 1980 SD shows a decrease across the decades until 2001. On the other side, since 1980 mother's SD present an increase along the period considered. The Pearson correlation coefficient shows a positive association (linear dependence) between maternal schooling and son/daughter's schooling but decreasing with the decades.

Table 1: Descriptive Statistics Variable Years of Schooling Mother and Son/Daughter

		MOTHER			
Year	**Correlation**	**Mean**		**Standard Deviation**	
		son/daughter	**mother**	**son/daughter**	**mother**
1970	0.5128	8.49	4.67	4.2683	3.0954
1980	0.5414	8.79	4.65	4.7763	3.3354
1991	0.4835	11.02	6.35	4.5099	3.7884
2001	0.4883	11.66	8.11	4.1785	3.8304
2010	0.2517	14.56	11.29	4.5068	5.8082

Source: Authors' calculation based on Argentine Census (1970 to 2001) and EPH (2010)

In Table 2 we observe the evolution of the average years of schooling for son/daughter and father across five decades. We can appreciate that the average years of schooling for son/daughter show a positive trend. The same behavior is observed for father. We also observe an increase in the average standard deviation of years of schooling of father. Finally the Pearson correlation coefficient shows a positive association between fathers' schooling and children's schooling, but also decreasing with the decades. Note it is very similar than the case of mothers.

Table 2: Descriptive Statistics Variable Years of Schooling Father and Son/Daughter

		FATHER			
Year	**Correlation**	**Mean**		**Standard Deviation**	
		son/daughter	**father**	**son/daughter**	**father**
1970	0.5017	8.51	5.12	4.2819	3.5786
1980	0.5327	8.75	5.05	4.7753	3.7460
1991	0.4803	11.06	6.89	4.5204	4.1951
2001	0.4904	11.66	8.20	3.8246	4.2606
2010	0.2445	14.69	10.93	4.4366	5.7512

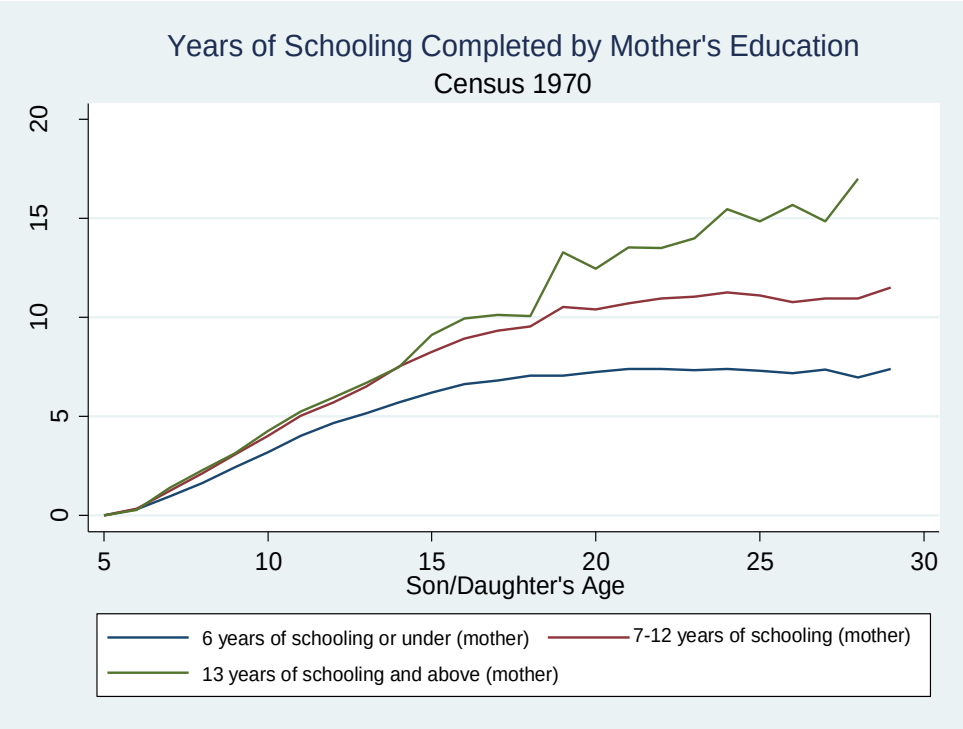
Source: Authors' calculation based on Argentine Census (1970 to 2001) and EPH (2010)

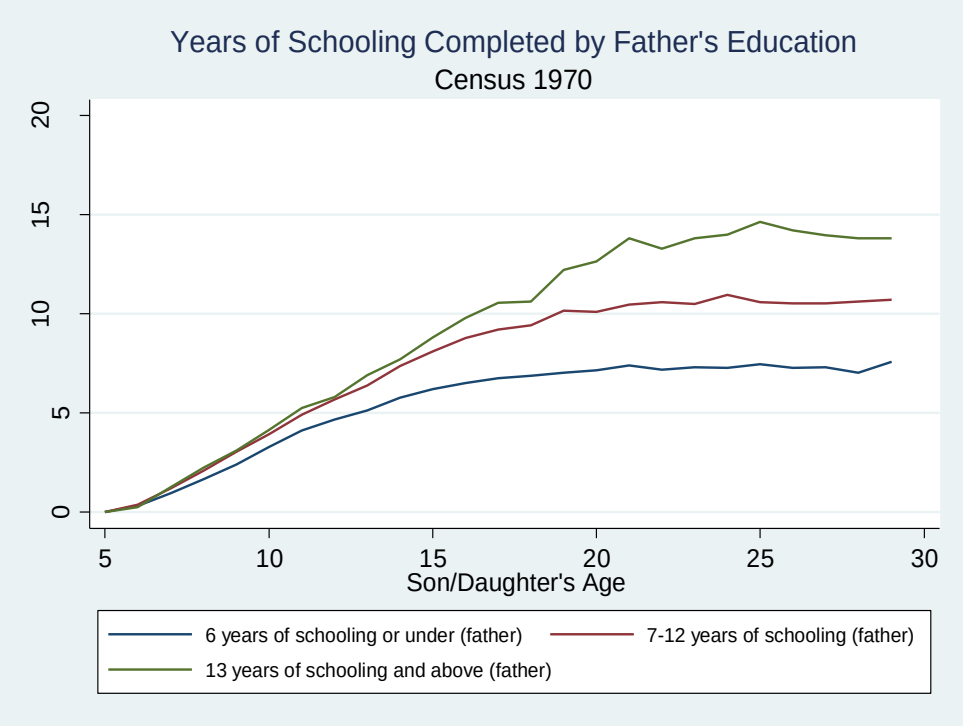
Graphs 3-12 plots the years of schooling completed as a function of age at different levels of maternal and paternal education in each decade. We differentiated mothers and fathers by their education: "6 years of schooling or under", "7-12 years of schooling", "13 years of schooling or above". Although the graphs presented shows son/daughter ages between 7 and 30 years old, the regression results presented below will consider the ages 25-40 to deal only with adults that have already made schooling decisions. Overall, the graphs suggest that more educated mothers have more educated daughters or sons; in addition, as expected, individuals increase their schooling attainment with age. The same behavior is observed when the comparison is between fathers and their firstborn. In line with the expansion in schooling described previously, we observe an increase in both maternal, paternal and children schooling over the 40-year period. Importantly, differentials in schooling of children are observed early in life; additionally, even though the gap among the three curves depicted has narrowed over time, differences in educational attainment still persist, suggesting that differences did not fade away completely with time. More pronounced differences are found between the schooling attainments of children with lowest educated mothers/fathers versus highest educated mothers/fathers, than between schooling attainments of children whose mothers/fathers have 7-12 vs. 13 and more years of schooling. Again, the fact that educational attainment for a given age has increased over time—regardless of the mother's/father's educational attainment—is consistent with the expansion in schooling already described in previous sections. This increase is substantial from 1970-1980 and 1980-1991, especially for individuals born from lower educated mothers/fathers.

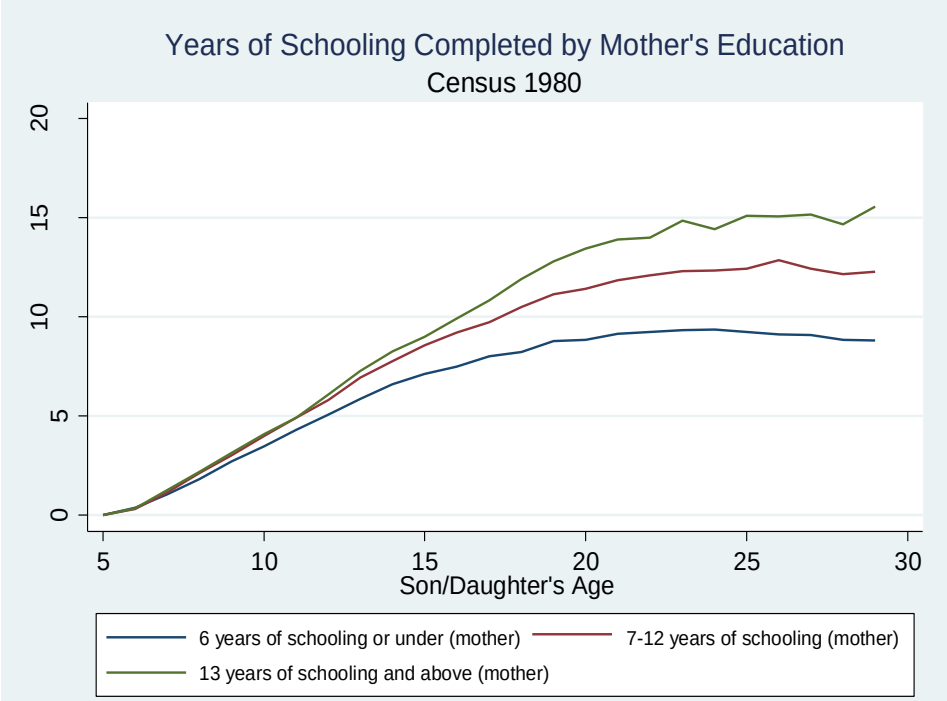
It is worth noting that the behavior described shows a particular aspect in 2010, just in coincidence with the change in the source of the data set used. Specifically in 2010 we can see that for the groups with less years of education, curves not only are closed, but also intersect sometimes the 7-12 group. We can also see in general the children' years of schooling increase compare to older decades, especially in the case of those children older than 20 years old. We suggest this phenomenon should be

taken with caution, as data consider in this case comes from a different source. It would be optimal to have the Census data base of 2010, not available at this moment, and thus the comparison of the data can be homogeneous.

Graphs 3-12. Average years of schooling by maternal and paternal education, Argentina 1970-2010






Years of Schooling Completed by Mother's Education
Census 1980
0
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10
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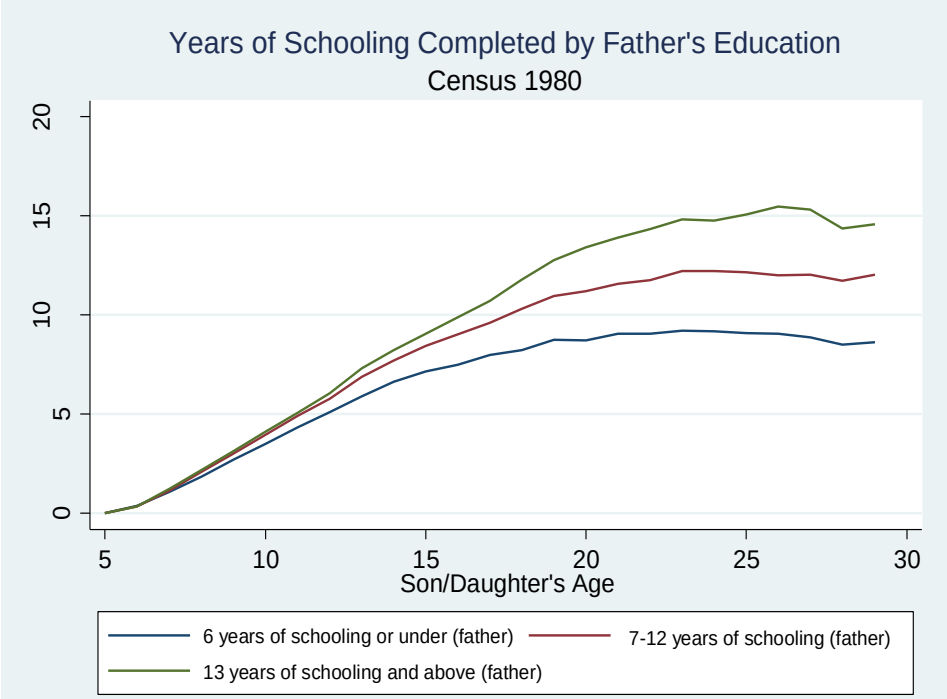
Son/Daughter's Age
6 years of schooling or under (mother)
7-12 years of schooling (mother)
13 years of schooling and above (mother)


Years of Schooling Completed by Father's Education
Census 1980
0
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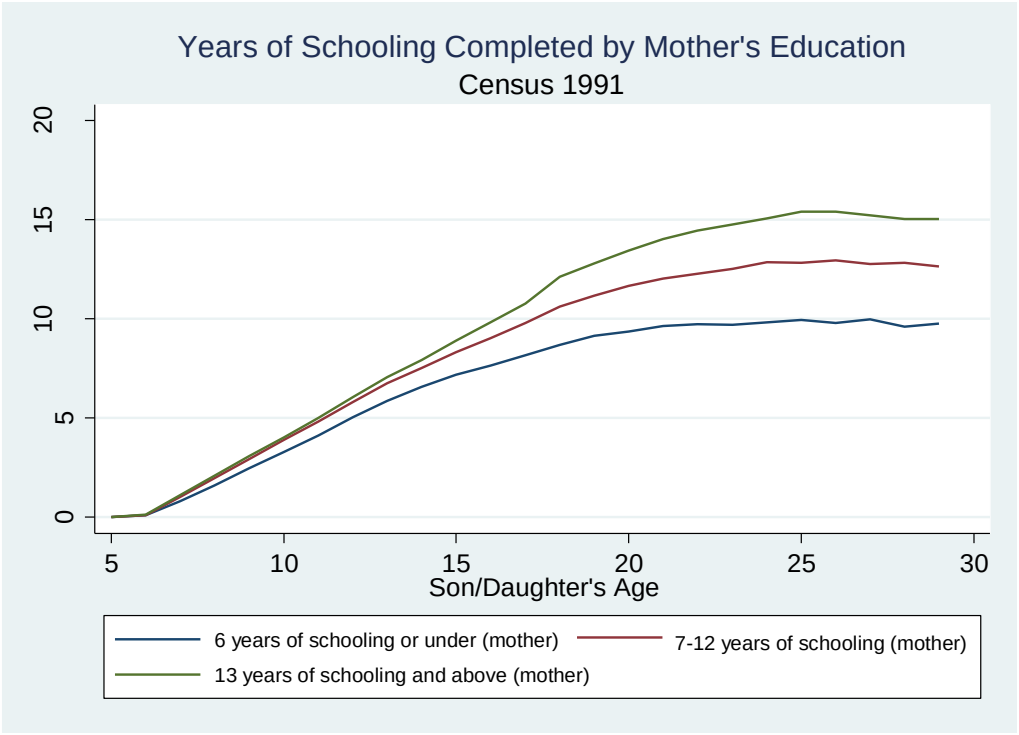
Son/Daughter's Age
6 years of schooling or under (father)
7-12 years of schooling (father)
13 years of schooling and above (father)


Years of Schooling Completed by Mother's Education
Census 1991
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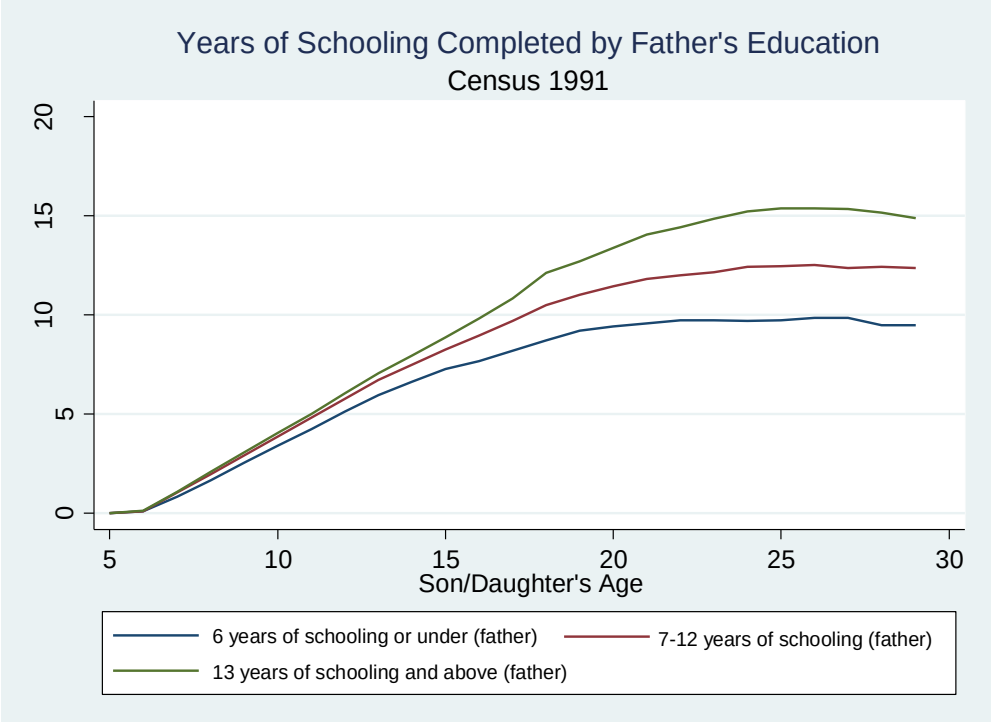
Son/Daughter's Age
6 years of schooling or under (mother)
7-12 years of schooling (mother)
13 years of schooling and above (mother)


Years of Schooling Completed by Father's Education
Census 1991
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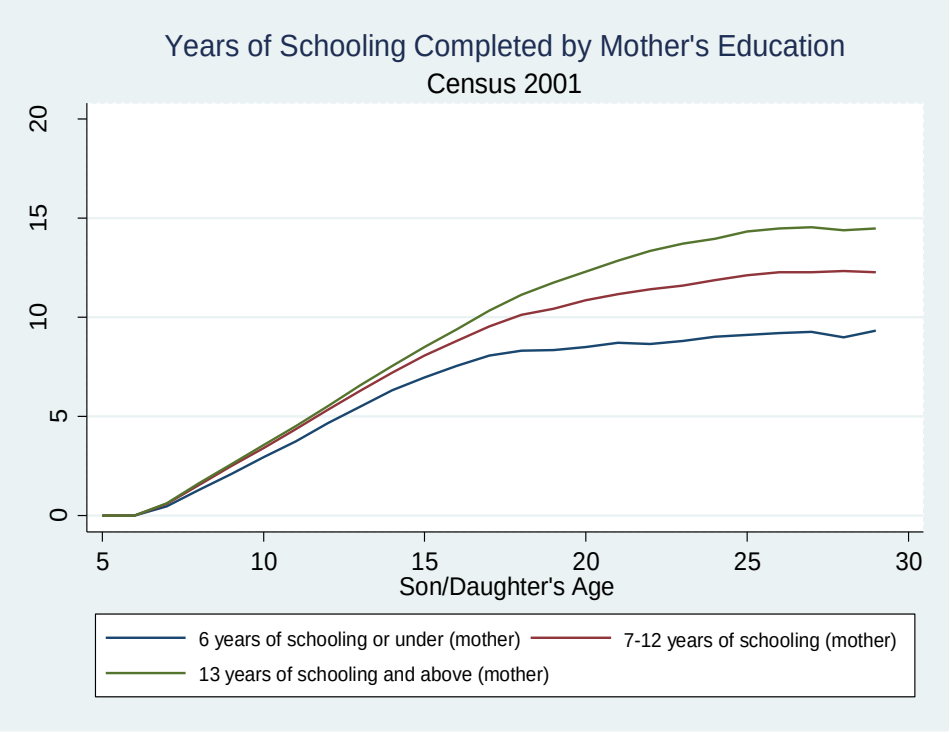
Son/Daughter's Age
6 years of schooling or under (father)
7-12 years of schooling (father)
13 years of schooling and above (father)


Years of Schooling Completed by Mother's Education
Census 2001
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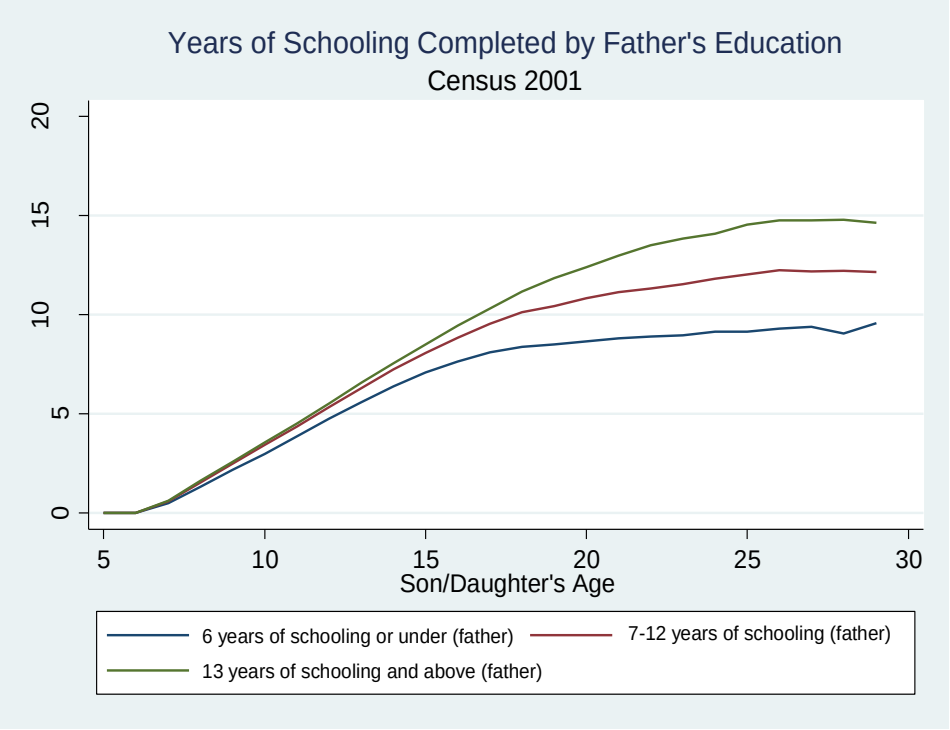
Son/Daughter's Age
6 years of schooling or under (mother)
7-12 years of schooling (mother)
13 years of schooling and above (mother)


Years of Schooling Completed by Father's Education
Census 2001
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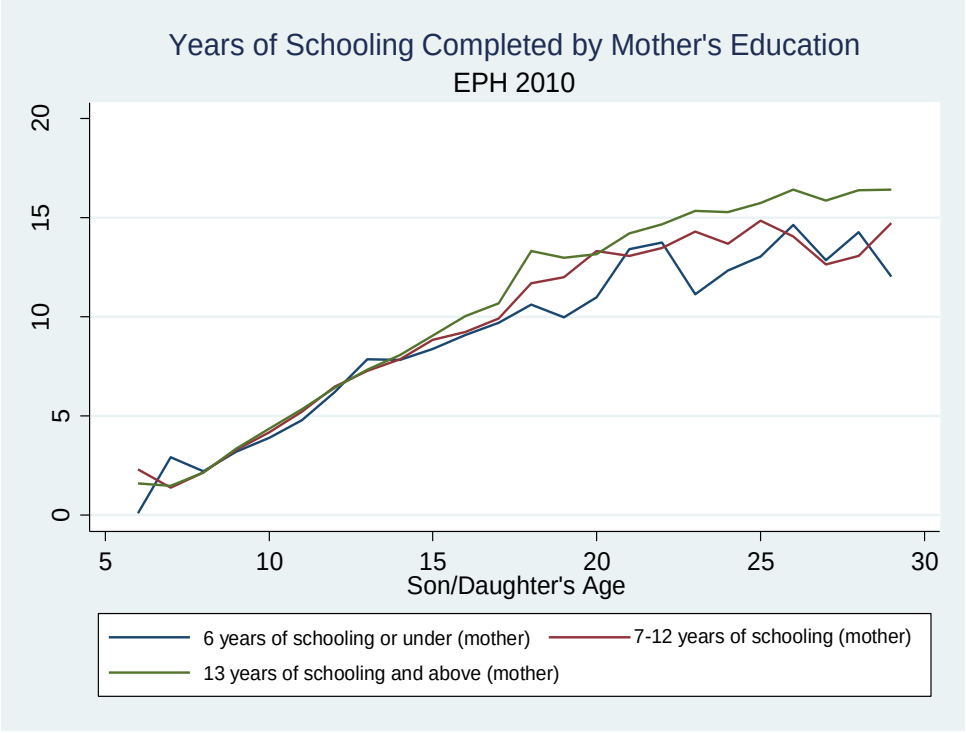
Son/Daughter's Age
6 years of schooling or under (father)
7-12 years of schooling (father)
13 years of schooling and above (father)


Years of Schooling Completed by Mother's Education
EPH 2010
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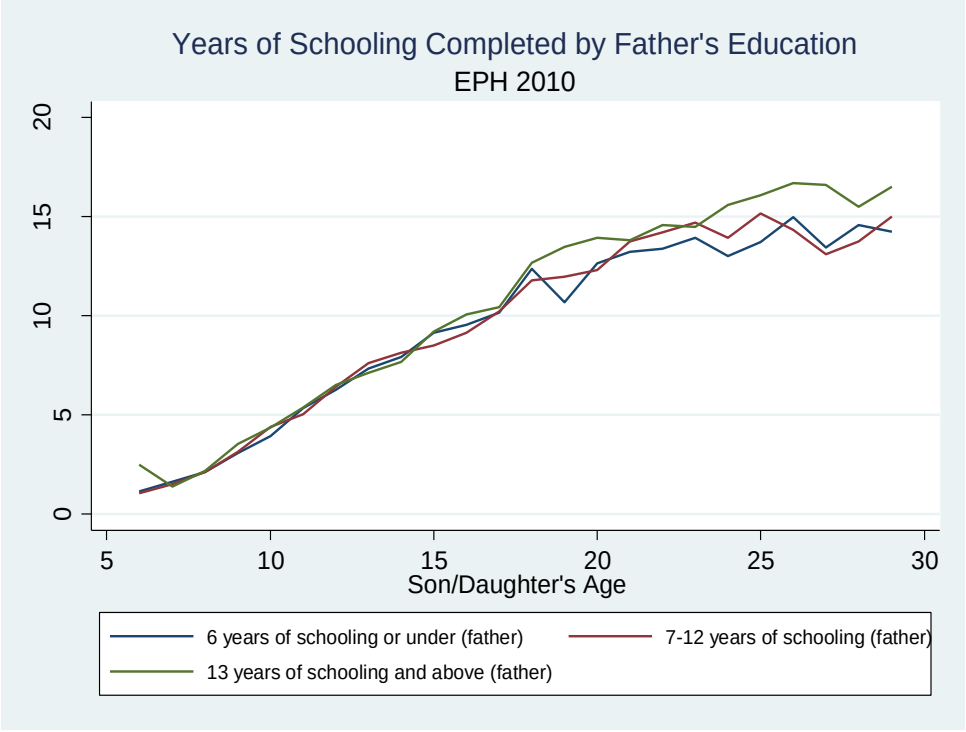
Son/Daughter's Age
6 years of schooling or under (mother)
7-12 years of schooling (mother)
13 years of schooling and above (mother)


Years of Schooling Completed by Father's Education
EPH 2010
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Son/Daughter's Age
6 years of schooling or under (father)
7-12 years of schooling (father)
13 years of schooling and above (father)

5. Empirical Results

We turn now to the basic regression of either mother's, father´s or parent's schooling on son's/daughter's schooling for those individuals aged 25-40 as an attempt to examine a rough "intergenerational" correlation of education. Table 3 reports the results of the estimation of equation model (1) and (3). We can see a positive beta coefficient decreasing over time. For example in the case of mothers without controls the estimated coefficient starts is 0.707 in 1970 to 0.447 by 2001—note the increase observed between the years 1970-1980. We can observe that the beta is smaller when we include covariates such as age, gender and region where the child lives. Trying to analyze how different are the regression when we take into account only fathers, we see the same patterns than in the case of mothers. Moreover, the coefficient is smaller than the one find in the case of mothers- especially during the first three decades and the year 2001. Like in the case of "mothers", we observe an increase in beta between the years 1970-1980.

The beta estimate from the 2010 household survey yields 0.223 for mothers and 0.189 for fathers without controls; and the figures are almost the same after controls. Though we need to recall that the data come from urban areas and the number of observations is much smaller for this year. If we consider this beta estimates as a measure of relative intergenerational persistence of educational inequality, we would conclude that it has decreased substantially over the 40-year period.

Table 3 also shows the results after normalizing the variables of the first regression without controls. We can see that rho coefficient is decreased but the value is not too different from one decade to another between 1970 and 2001, changing from 0.542 for mothers and 0.502 for fathers in 1970 to 0.489 and 0.49 in 2001 for mothers and fathers, respectively . The value of rho continues dropping in 2010, and it is 0.287 for mothers and 0.245 for fathers.

If we consider the estimated rho as an absolute measure of intergenerational correlation of education –without forgetting this is not a longitudinal data set and is only an approach- we can see that the estimates of beta and rho are both decreasing across time- except between 1970 and 1981 but beta decreases the most due to the decreasing ratio of the standard deviations. Nevertheless, considering the whole picture, the reduction in the beta & rho coefficients could be an indicator of higher intergenerational education mobility across the decades and there is no major changes considering mothers or fathers separately.

In order to provide greater robustness to the analysis, we estimate a proxy of intergenerational mobility in education, taking into also both parents' education in households where both parents cohabitate. The results in Table 4 show that both: mother and father education are important and influence educational attainment reached by the firstborn. Considering the regressions without controls and the case of mothers' beta coefficient, it changes from 0.441 in 1970 to 0.224 by 2001—note like in Table 2 the increase observed between the years 1970-1980. In the case of fathers beta is 0.349 in 1970 and decrease to 0.223 in 2001. When we add the control variables, the values are a little smaller but the signs and the time evolution is the same. While initially the mother's education seemed to be the most heavily weighted in the final education achieved by the firstborn. Over time, the educational level of both parents is significant and both reflect a very similar role since the estimated coefficients tend to show a closer value with the decades

Interesting, considering the estimates obtained in after normalization during each decade we can appreciate that the educational level of both: father and mother, seem to have a similar role and the estimated rho coefficients tends to be practically the same each year.

A special mention is deserved of the record estimates in 2010, that should be taken with caution because the reduction in the sample is huge in comparison with the census data and we are essentially comparing a very different sample. It seems evident that the beta and rho estimated coefficients continue decreasing and show the lowest values of the decade.

Table 3: Regressions Intergenerational Persistence in Education. Mother and Father

	MOTHER			FATHER		
Year	Without Controls	With Controls	Normalizing	Without Controls	With Controls	Normalizing
1970	0.7071***	0.6572***	0.5421***	0.6003***	0.5518***	0.5017***
	(0.0142)	(0.0146)	(0.0109)	(0.0139)	(0.0143)	(0.0116)
Observations	7,167	7,167	7,167	5,989	5,989	5,989
R-squared	0.2630	0.2884	0.2630	0.2517	0.2839	0.2517
1980	0.7753***	0.6845***	0.5414***	0.6790***	0.5963***	0.5327***
	(0.0065)	(0.0066)	(0.0045)	(0.0062)	(0.0063)	(0.0048)
Observations	34,514	34,514	34,514	29,914	29,914	29,914
R-squared	0.2932	0.3477	0.2932	0.2837	0.3387	0.2837
1991	0.5756***	0.5411***	0.4835***	0.5175***	0.4869***	0.4803***
	(0.0037)	(0.0037)	(0.0031)	(0.0035)	(0.0035)	(0.0032)
Observations	73,025	73,025	73,025	62,762	62,762	62,762
R-squared	0.2338	0.2709	0.2338	0.2307	0.2633	0.2307
2001	0.4476***	0.4276***	0.4883***	0.4402***	0.4180***	0.4904***
	(0.0028)	(0.0028)	(0.0030)	(0.0029)	(0.0029)	(0.0032)
Observations	82,566	82,566	82,566	71,643	71,643	71,643
R-squared	0.2384	0.2786	0.2384	0.2405	0.2826	0.2405
2010	0.2226***	0.2238***	0.2870***	0.1886***	0.1890***	0.2449***
	(0.0150)	(0.0152)	(0.0193)	(0.0177)	(0.0179)	(0.0230)
Observations	2,436	2,436	2,436	1,734	1,734	1,734
R-squared	0.0823	0.0920	0.0823	0.0598	0.0725	0.0598

Notes:
(1) The standard errors are listed below the estimates in parentheses
(2) *** p<0.01, ** p<0.05, * p<0.1
(3) The regression with controls include: age, gender, and 5 regional dummies (Buenos Aires, Patagonia, Pampa, Cuyo and NOA).
(4) The base category is a daughter who lives in NEA region

Source: Authors' calculation based on Argentine Census (1970 to 2001) and EPH (2010)

Table 4: Regresions Intergenerational Persistence in Education. Both Parents

		BOTH PARENTS		
Year		**Without Controls**	**With Controls**	**Normalizing**
1970	**Mother' education**	0.4413***	0.4057***	0.3157***
		(0.0223)	(0.0223)	(0.0160)
	Father' education	0.3491***	0.3330***	0.2932***
		(0.0189)	(0.0188)	(0.0159)
Observations		5,100	5,100	5,100
R-squared		0.2991	0.3196	0.2991
1980	**Mother' education**	0.4768***	0.4292***	0.3298***
		(0.0102)	(0.0100)	(0.0070)
	Father' education	0.3948***	0.3554***	0.3120***
		(0.0089)	(0.0087)	(0.0070)
Observations		24,349	24,349	24,349
R-squared		0.3393	0.3797	0.3393
1991	**Mother' education**	0.3394***	0.3229***	0.3035***
		(0.0058)	(0.0058)	(0.0052)
	Father' education	0.3079***	0.2929***	0.2997***
		(0.0051)	(0.0050)	(0.0050)
Observations		51,420	51,420	51,420
R-squared		0.2720	0.3027	0.2720
2001	**Mother' education**	0.2243***	0.2137***	0.2705***
		(0.0042)	(0.0041)	(0.0050)
	Father' education	0.2238***	0.2156***	0.2795***
		(0.0040)	(0.0039)	(0.0050)
Observations		58,690	58,690	58,690
R-squared		0.2578	0.2957	0.2578
2010	**Mother' education**	0.1555**	0.1675***	0.1834**
		(0.0613)	(0.0610)	(0.0723)
	Father' education	0.1353**	0.1393**	0.1573**
		(0.0651)	(0.0646)	(0.0757)
Observations		196	196	196
R-squared		0.0840	0.1282	0.0840

Notes:
(1) The standard errors are listed below the estimates in parentheses
(2) *** p<0.01, ** p<0.05, * p<0.1
(3) The regression with controls include: age, gender, and 5 regional dummies (Buenos Aires, Patagonia, Pampa, Cuyo and NOA).
(4) The base category is a daughter who lives in NEA region

Source: Authors' calculation based on Argentine Census (1970 to 2001) and EPH (2010)

6. Concluding Remarks

With this paper, we try to provide evidence about the mother´s and father´s schooling in the educational attainment reached by their firstborn across the period from 1970-2010. Using census data from Argentina and the 2010 EPH survey, we examined the evolution of intergenerational educational mobility over the period 1970-2010. For that purpose we estimate a rough measure of intergenerational persistence in education, and explore the role played by mother's, father's, and both parent's education in the schooling of first-born child.

In line with the visible expansion in years of schooling observed in Argentina (6.60 average years in 1970 to 11.28 in 2010) we show an increase in maternal, paternal and children schooling over the 5 decades. Important differences in the schooling of children are observed early in life. Additionally, differences in educational attainment still persist, suggesting that disparities did not fade away completely with time. More pronounced differences are found between the schooling attainments of children with the lowest educated mothers/fathers versus the highest educated mothers/fathers, than between schooling attainments of children whose mothers/fathers have 7 to 12 years of schooling versus 13 and more years of schooling. This increase is substantial from 1970-1980 and 1980-1991, especially for individuals born from low educated mothers/fathers.

We can appreciate that average years of schooling for son/daughter show a positive trend starting from 8.49 years of education in 1970 and reaching 14.56 average years of education in 2010. The same behavior is observed for mother and father with 4.67 and 5.12 years in 1970 and achieving in 2010 11.29 and 10.93, respectively

Then we turn to the basic regression of either the mother's, father's, or parent's schooling on the son's/daughter's schooling for those individuals aged 25-40 as an attempt to examine a rough "intergenerational" correlation of education. In the case of mothers the estimated coefficient beta is positive and decreasing with the years. Trying to analyze how different are the regression when we take into account only fathers, we see the same patterns than in the case of mothers. Moreover, the coefficient is smaller than the one find in the case of mothers- especially during the first three decades. The only exception is between the years 1970-1980 since beta mother or father increases.

As a robust check, we have also estimated a proxy of intergenerational mobility in education, taking into account not only mothers or fathers separately but also both parents' education in households where both cohabitate. Considering the educational level of both parents together, the estimated coefficients are positive and tend to show a closer value with the decades. We can conclude the coefficient associated to intergenerational educational transmission concept (beta or rho) shows a declining trend along the 40 years considered. Special attention is deserved of the results estimates in 2010, given that the data comes from another source, and the size is highly reduced. However, in any case the coefficients also show a reduction in 2010 confirming the continuation of the previous findings.

Jointly, it is important to point out the principal difficulties involved. In brief, neither census data nor the urban household survey provides retrospective information about parental education. As mentioned, though we can identify the years of schooling of children and parents (and actually of every household member), we cannot know the years of schooling achieved by parents when they were of the same age as their child. Behrman et al. (2001) and Checchi et al. (2008), for example, have used retrospective information to assess the intergenerational correlation of education. As mentioned before, when parents are compared to children, we may be comparing people of different ages and not of two generations absolutely separated in time. In addition, we

are dealing with two different data bases, so that the estimated results for 2010 should be taken into account in a carefully way.

Furthermore, years of schooling as a proxy of income or socioeconomic success to examine inequality has its limitations. There are different factors—different from schooling—that could explain the fact that more highly educated mothers have more highly educated children (transmission of ability, the contribution of genetics, the fact that women with higher education tends to marry men with higher education, etc). "Schooling does not capture all possible channels through which family background affects socioeconomic success. Family connections, for example, can make all the difference when children enter the labor force" (Dahan and Gaviria, 2001). But, in spite of the limitations, we believe the estimations provide a general picture on how mother's /father's schooling is related to the schooling level of their first-born son or daughter over the 40-year period under study. As a line of future research we would like to extend the findings to 2010 once Census data is available.

7. References

Behrman, J., Gaviria, A. and Szekely, M. (2001): "Intergenerational Mobility in Latin America," IDB Working Paper 452, Washington, DC.

Behrman, J. and Rosenzweig, M. (2002): "Does Increasing Women's Schooling Raise the Schooling of the Next Generation?," American Economic Review 92(1): 323-334.

Black, S., Devereux, P., Salvanes, K. (2005): "The More the Merrier? The Effect of Family Size and Birth Order on Children's Education," Quarterly Journal of Economics 120(2):669-700.

Casal M.P., Morales, M and Paz Terán, C (2011): "Educational Inequality in Argentina: 1970-2010", XLVI Reunión Annual de la Asociación Argentina de Economía Política.

Checchi, D., Fiorio, C. and Leonardi, M. (2008): "Intergenerational Persistence in Educational Attainment in Italy," IZA Working Paper 3622.

Dahan, M. and Gaviria, A. (2001): "Sibling Correlations and Intergenerational Mobility in Latin America," Economic Development and Cultural Change 49(3): 537-554.

Haveman, R. and B. Wolfe (1995). "The determinants of children attainments: A review of methods and Findings." Journal of Economic Literature 33(4):1829-78.

Heckman, J. and Hotz, V. (1986): "An Investigation of the Labor Market Earnings of Panamanian Males Evaluating the Sources of Inequality," Journal of Human Resources 21(4): 507-542.

Leibowitz, A. 1974. "Home Investments in Children." In Economics of the Family, ed. T. W. Schultz. Chicago: University of Chicago Press.

Mare, R. and Maralani, V. (2006) "The Intergenerational Effects of Changes in Women's Educational." American Sociological Review, 71(4): 542-564

Nimubona, A. D. and Vencatachellum D. (2007): "Intergenerational education mobility of black and white South Africans'". Journal of Population Economics, 20(1):149-182

Oreopoulos, P. and Page, M (2006): "The Intergenerational Effects of Compulsory Schooling," Journal of Labor Economics 24(4): 729-760.

Plug, Erik (2004): "Estimating the Effect of Mother's Schooling on Children's Schooling Using a Sample of Adoptees," American Economic Review 94(1): 358-368.