On the Causal Effect of Education on Civic Capital

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Abstract

This article, investigates the existence of a causal effect of extra years of parental education on their stock of civic capital, exploiting changes in compulsory schooling laws. We implement an instrumental variables strategy to disentangle if education has a "direct" effect on economic outcomes of the individuals. Furthermore, we apply the same strategy to analyze if there is an intergenerational transmission of education, "indirect" effect, and in particular if parental education has a causal effect on their offspring's civicness captured by social capital indicators such as perceptions of social trust, and membership, participation and voluntary work in civic organizations. The exogenous variation provided by education reforms addresses the concern that intergenerational educational estimates might not adequately account for the correlation of parental schooling with some unobserved characteristics that might affect children's educational attainments.We use data from seven waves of the European Social Survey (2002-2015) and we provide evidence for eleven European countries that cover the various regions of Europe.

1 Introduction

Many economists, educators and politicians argue that education creates private returns to individuals in terms of increased earnings (Card 2001, Oreopoulos 2006, Mocan 2014) and better health on the one hand (Cutler and LLeras-Muney 2010,Grossman 2008) and generates positive externalities through the association between schooling and civic outcomes on the other (Putnam 2001). There is a substantial consensus about this positive correlation between education and civic engagement but less is known about if this relationship is driven by causality. The main concern is to mitigate the endogeneity problem that arises from some unobservable characteristics that migth be jointly positive affecting schooling and civic attitudes.

Empirical research use an instrumental variable approach, exploiting the exogenous variation in schooling provided by changes in compulsory schooling laws, in order to identify the existence of a possible causal link between education and citizenship (Milligan, Moretti and Oreopoulos 2004, Siedler 2010). Furthermore, this IV strategy is used to explore causal effects of education and spillovers to subsequent generations (Oreopoulos, Page and Stevens 2006, Stella 2013).

The main contribution of this paper is the decomposition of the effect of education on various individuals' outcomes ("direct" effect) and the intergenerational transmission of education on their offspring's civic behavior ("indirect" effect). We implement the instrumental variables strategy, employing compulsory schooling laws, to disentangle both effects.

A growing literature shows that home environments and parental investments at different stages of childhood are very important for children cognitive and noncognitive skills development (Cunha, Heckman and Schennach 2010). This both type of skills are strong predictors of later life outcomes, such as education, labor market outcomes, health or criminality activities (Heckman, Stixrud and Urzua 2006). Measures of personality traits, like perseverance, self-control or social competence, that are known as "noncognitive skills", are even stronger predictors than cognitive traits for many later life-time outcomes and furthermore it has been shown that they are more easily malleable over the lyfe cycle compared to cognition (Almlund, Duckworth, Heckman and Kautz 2011). Also, Cunha and Heckman (2008) find that noncognitive skills promote the formation of cognitive traits, while causality reverse causality does not run.

Using data from seven waves of the European Social Survey (2002-2015) and providing evidence for eleven European countries that cover the various regions of Europe, the main results of this research are the following. First, we find existence of a causal effect of education on being employed but not on civic behavior and second, we identify the presence of causality in the process of transmission of schooling from parents to their children. However, extra years of mandatory education for the parents, due to a change in the law, have no a causal effect on the civic outcomes of their offspring.

2   A brief literature review

Several previous studies have attempted to measure the causal effect of education on labor market earnings, Card (2001) reviews studies that have used compulsory schooling laws as instrumental variables and reveals that the resulting estimates of the returns to schooling often exceed the corresponding ordinary least square estimates. Mocan (2014) demonstrate that an incresase in the mandatory education from 5 to 8 years in 1997 in Turkey resulted into large wage gains of about 14 percent per year of schooling, with these benefits limited to women. Cutler and Lleras-Muney (2010) using a variety of datasets in two countries find that better educated people have healthier behaviors, such as they are less likely to smoke, less likely to be obese or less likely to be heavy drinkers. According to Putnam (2001) human capital and social capital are closely related, education has a very strong effect on social trust and associational membership, as well as many other forms of social and political participation. On the one hand, Milligan, Moretti and Oreopoulos (2003) exploring the effect of extra schooling induced through compulsory schooling laws, find that educational achivement is related to several measures of political interest and involvement in the U.S. and the U.K. On the other hand, Siedler (2010) uses an exogenous increase in schooling through law changes in Germany and concludes that there is no evidence of a causal effect running from schooling to citizenship.

Recent empirical studies investigate the link between education of parents and their children. Is this link due to nature or nurture? Robert Haveman and Barbara Wolfe (1995) present a literature review and conclude that education of parents is likely to be the most important factor in explaining the child's success in school. Parents that are better educated tend to earn more, live in better neighborhoods, are more likely to have a computer or musical instrument

in the house and provide cultural endowment. Oreopoulos, Page and Stevens (2006) using data from U.S censuses find that a 1-year increase in the education of either parent reduces the probability that a child repeats a grade by between 2 and 4 percentage points. Stella (2013) employs the variation in compulsory schooling reforms accross nine European countries and shows some evidence of a causal relationship between parents' and children's education, an additional year of parental education raises the child's education by 0.44 of a year.

There is a growing literature strand that demonstrates the importance of both cognitive and noncognitive skills on schooling attainments and other later life outcomes such as crime, teenage pregnancy or adverse health conditions. Heckman, Stixrud and Urzua (2006) show that the same low-dimensional vector of abilities that explains schooling choices, wages, employment, work experience, and choice of occupation explains a wide variety of risky behaviors. Cunha and Heckman (2008) find that parental investments are generally more effective in raising noncognitive skills and using data from the National Longitudinal Survey of Youth, Cunha, Heckman and Schennach (2010) find much less evidence of malleability and substitutability for cognitive skills in later stages of a child's life cycle, while malleability for noncognitive skills is slightly greater at later ages.

3 Methodology and datasets

To analyze the effect of parents' education on their offspring's outcomes we propose the following regression model:

$$Y_{if} = \beta_0 + \beta_1 Efather_f + \beta_2 Emother_f + \beta_3 X_f + \varepsilon_{if}, \tag{1}$$

where the dependent variable Y_{if} denote a relevant outcome for child i with family f. $Efather_f$ and $Emother_f$ indicate the educational level of the child's father and mother. X_f is a vector of all the other family and school background characteristics that affect the child's outcome, and ε_{if} is an error term representing the effects of individual specific factors that are uncorrelated with family background. In fact the model estimated is more restrictive than equation (1) because we use the sum of the father's and mother's completed education as the key regressor, as in Oreopoulos, Page and Stevens (2006), allowing us to directly estimate the

effect of a 1-year increase in either parents' schooling level, given that models with multiple endogenous variables are hard to identify and the results can be difficult to interpret.

If we could observe everything that belongs in X_f, then estimates of β_1 and β_2 would be unbiased, but this is not possible. To address the omitted variables problem and identify the causal effect of parental education on children's outcomes we use an exogenous change provided by a reform in the years of compulsory schooling. Model (1) is estimated by two stage least squares (2SLS), where the first stage regression is given by:

$$Eparents_{if} = \gamma_0 + \gamma_1 reform_{if} + \gamma_3 X_{if} + v_{if}, \tag{2}$$

We use data from seven waves of the European Social Survey (2002-2015), it is conducted every two years on representative samples in many European countries. The questions in the survey cover a range of aspects including attitudes, beliefs and behavior. The ESS is designed and carried out to exceptionally high standards and it involves strict random probability sampling. All persons aged 15 and over resident within private households, regardless of their nationality, citizenship, language or legal status are eligible to participate in a face-to-face interview.

We provide evidence for eleven European countries, that cover the various regions of Europe, and implemented education reforms mostly in the 1960 and the 1970s. Based on their year of birth, there are some individuals that were exposed to these educational reforms and therefore received additional years of individuals while individuals of the same country were exempt from the mandate, because they were born before the cut-off date of the law.The selected reforms increased the minimum school leaving age by one year in Austria, Ireland, Poland, United Kingdom and Germany; by two years in Denmark, France, Hungary and Spain; by three years in Greece and by four years in Belgium. In the case of Germany and the United Kingdom, the timing of the introduction of the reform varied by region. The data on reforms corresponds to Mocan 2014, that collected them from several sources according to the restriction of the European Social Survey (ESS).

Table 1. Compulsory Schooling Reforms.

Country	Reform date	First cohort fully affected by the reform	Change in years of compulsory schooling	Change in minimum school
Austria	1966	1953	8 to 9	14 to 15
Belgium	1983	1970	8 to 12	14 to 18
Denmark	1971	1958	7 to 9	14 to 16
France	1967	1954	8 to 10	14 to 16
Greece	1976	1965	6 to 9	12 to 15
Hungary	1961	1948	8 to 10	14 to 16
Ireland	1972	1959	8 to 9	14 to 15
Poland	1961	1953	7 to 8	14 to 15
Spain	1970	1958	6 to 8	12 to 14
United Kingdom				
England and Wales	1972	1958	10 to 11	15 to 16
Scotland	1976	1959	10 to 11	15 to 16
N. Ireland	1972	1958	10 to 11	15 to 16
Germany				
DE Schleswig-Holstein	1956	1942	8 to 9	14 to 15
DE Niedersachsen	1962	1948	8 to 9	14 to 15
DE Bremen	1958	1944	8 to 9	14 to 15
DE Nordrhein-Westphalia	1967	1954	8 to 9	14 to 15
DE Hessen	1967	1954	8 to 9	14 to 15
DE Rheinland-Pfalz	1967	1954	8 to 9	14 to 15
DE Baden-Wurtenberg	1967	1954	8 to 9	14 to 15
DE Bayern	1969	1956	8 to 9	14 to 15
DE Saarland	1964	1950	8 to 9	14 to 15

*Naci Mocan (2014)

4   Results

First, we present some evidence of the "direct effects" of education on the respondents and on their parents. For the respondents we have four measures of civic capital (trust, fair, behave properly and civic participation). And for the job market outcomes, we use if the respondent was enrolled in paid work during the last 7 days previous to the interview and the parents' employment status when the respondent was 14 (employee or not working).

We find positive and significant correlations between years of education of the individuals interviewed and their civic and job market outcomes. But when we implement the instrumental variables strategy, the only effect that remains significant is the one between education and being employed (Table 2).

Table 2. OLS and IV Estimation of the Returns to Education (Respondents).

	trust	fair	behave properly	civic part.	work
Educ years	0.096*	0.053*	0.016*	0.073***	0.021***
OLS	(0.026)	(0.025)	(0.008)	(0.012)	(0.005)
Observ.	793	783	788	793	793
Educ years	0.234	0.194	0.088	0.216	0.317***
IV	(0.183)	(0.167)	(0.06)	(0.11)	(0.015)
Observ.	162	161	162	162	162

Notes: SE in parentheses *Significant at 10% **significant at 5% *** significant at 1%

Now we present some correlations between the education of each parent and it's respective labor outcomes. Having more years of education is positively and significantly correlated with the probability of being an employee for both parents while there is a significant and negative association between schooling and the probability of not having a job, but only for mothers (Table 3).

Table 3. OLS Estimation of the Returns to Education (Parents).

	employeef	notworkf	employeem	notworkm
Educ father	0.031***	-0.002		
	(0.005)	(0.002)		
Educ mother			0.065***	-0.046***
			(0.005)	(0.005)
Observ.	799	799	799	799

Notes: SE in parentheses *Significant at 10% **significant at 5% *** significant at 1%

When we use the IV strategy to disentangle if there is causality in the underlying relationship of parents' education and their employment status, we find that in the case that the mother is affected by the law and receive extra years of education, this appears to have an important impact on the probability of being an employee. When we aggregate both years of education and we instrument it, then the effect is positive and significant for both, being a bit higher for mother than fathers, results are similar when the reform at least affected one of the parents or when both are affected (Table 4).

Table 4. IV Estimation of the Returns to Education (Parents).

	employeef	employeem	Observ.
Educ. father	0.056		362
(years compf)	(0.045)		
Educ. mother		0.283**	
(years compm)		(0.104)	405
Educ. parents	0.097***	0.114***	
(reform at least 1)	(0.03)	(0.03)	799
Educ. parents	0.087**	0.098**	
(reform both parents)	(0.03)	(0.03)	799

Notes: SE in parentheses *Significant at 10% **significant at 5% *** significant at 1%

Finally, we present OLS and IV estimations to explore what are the effects on children's outcomes when their parents have more years of schooling. There are positive and significant correlations between all variables, except in fairness. But significance is lost when the instrumental variables strategy is implemented. We only find a positive and significant effect on the tranmission of education from parents to their offspring in the case that the reform affected both parents. When we analyse separate effects for each parent, we do not find any significant effect.

Table 4. OLS and IV Estimation of the Returns of Parents Education on their Children Outcomes.

	educ. years	trust	fair	behave properly	civic. part	work
Educ. parents	0.215***	0.032*	0.028	0.016***	0.034***	0.011***
OLS	(0.021)	(0.016)	(0.016)	(0.005)	(0.008)	(0.003)
Educ. parents	0.376*					
(reform both parents)	(0.16)					
Educ. father	0.35	0.143	-0.09	-0.18	0.098	0.04
(years compf)	(0.269)	(0.24)	(0.233)	(0.08)	(0.11)	(0.15)
Educ. mother	0.061	0.623	0.462	-0.135	0.094	0.204
(years compm)	(0.371)	(0.357)	(0.33)	(0.11)	(0.135)	(0.2)

Notes: SE in parentheses *Significant at 10% **significant at 5% *** significant at 1%

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