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Analysis

Does education increase pro-environmental behavior? Evidence from Europe

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ABSTRACT

It is often observed that individuals with higher education levels tend to be more environmentally friendly. Yet, the causal evidence is lacking because there may well be omitted variables that cause individuals to attain more education and also cause individuals to be environmentally conscious. We implement a regression discontinuity design to estimate the increase in educational attainment due to changes in compulsory education laws in 20th century Europe. This allows us to overcome the identification problem of endogenous educational attainment. Using two waves of Eurobarometer surveys, we find a positive local average treatment effect for 7 of the 8 pro-environmental behaviors. An analysis of related questions on the survey supports the notion that education causes individuals to be more concerned with social welfare and to accordingly behave in a more environmentally friendly manner.

1. Introduction

Many studies find an association between higher education levels and concern for the environment (for example, Blomquist and Whitehead, 1998; Brecard et al., 2009; De Silva and Pownall, 2014; Klineberg et al., 1998; Torgler and García-Valiñas, 2007). However, it is not clear that this is a causal effect. That is, individuals choose how much education to attain and also choose how to behave in relation to the environment. Any omitted characteristic that is correlated with educational attainment and the extent of pro-environmental behavior will bias the estimated relationship between these variables in a standard regression framework. It could be that individuals who attain more education are different in unobservable ways which lead them to also care more about environmental issues. For example, personal responsibility, work ethic, or social conscience could affect the extent of educational attainment and could also determine one's extent of pro-environmental behavior. If we could adequately measure these variables and control for them in our analysis, there would be no issue. However, it is unlikely that we can adequately control for all of these personal characteristics that determine educational attainment and pro-environmental behavior.

Furthermore, from a public policy perspective, it is the causal relationship that is of highest interest rather than a descriptive relationship. A causal estimate can tell us what we would expect to happen in an alternative world where individuals attain higher levels of education. Thus, a causal estimate can give us a better idea of what would happen to the extent of pro-environmental behavior if we could, for example, reduce secondary school dropout rates. Existing literature informs only on the descriptive relationship between education and environmental behavior and not on the causal relationship. This is precisely our contribution; we provide the first individual level results on the causal effect of education on pro-environmental behavior.

How do we establish a causal relationship? We adopt an instrumental variables identification strategy that has been used elsewhere in studying the effects of education dating back to the seminal paper by Angrist and Krueger (1991); we instrument for education with changes in compulsory education laws. Changes in compulsory education laws serve as a natural experiment and provide the needed exogenous source of variation in educational attainment to uncover a causal relationship. Following Brunello et al. (2009) and Gathmann et al. (2015), we pool together data from multiple European countries to estimate the average effect of many reforms that were implemented in Europe throughout the twentieth century. The benefit of this multi-country approach is that we can utilize a large scale survey data source containing information on pro-environmental behavior. Limiting the analysis to one particular reform would not yield enough observations on pro-environmental behavior to establish whether or not education has

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a causal effect. Additionally, in a multi-country approach, there is less chance that we will find results that are peculiar to only one specific reform.

We analyze data from two Special Eurobarometer surveys, conducted in 2007 and 2011 on a representative EU sample. These surveys ask a group of questions concerning the recent pro-environmental behaviors of respondents. Additionally, the surveys collect demographic information including age, country of residence, and the age at which the respondent finished their education. Thus, we can identify individuals who were likely born in a country near the time of an educational reform that changed the number of years of required education. Differences in the educational attainment of individuals born shortly before and after the enacting of the reform can then be attributed to the reform, helping us to overcome the endogeneity of education. Consistent with previous studies utilizing European compulsory education reforms, we find that a reform is expected to increase educational attainment by approximately 0.3 to 0.5 years.

In our analysis of the causal effect, we find that an extra year of education is expected to increase the probability that an individual conducts seven out of the eight examined pro-environmental behaviors. The local average treatment effect is positive and significant for the following seven pro-environmental behaviors[1]: using environmentally friendly travel (0.024), reducing disposables (0.03), separating waste for recycling (0.066), reducing energy consumption (0.027), purchasing environmentally labeled products (0.061), purchasing local items (0.043), and reducing car usage (0.019). Thus, from a societal standpoint, there are benefits of education that have not been recognized in full. Furthermore, we provide an analysis of environmental opinion questions on the survey to explore potential explanations for why education increases pro-environmental behavior. This analysis suggests that education may increase the perceived importance of environmental issues. This is consistent with the explanation that education causes individuals to be more concerned with overall social welfare, including the external benefits of their actions.

2. Previous literature

Many studies have addressed the returns from education, where the effect on earnings from increased education is the most researched area (Aakvik et al., 2010; Angrist and Krueger, 1991; Acemoglu and Angrist, 2001; Meghir and Palme, 2005; Oreopoulos, 2006a,b; among others). Additionally, there is a growing literature on the non-pecuniary benefits of education.[2] Health is often identified as one leading non-pecuniary benefit of education, although the evidence in this area is mixed. For example, some research finds that education improves health outcomes including mortality (Cipollone and Rosolia, 2011; Lleras-Muney, 2005; van Kippersluis et al., 2011) while others find no such reduction in mortality due to education (Albouy and Lequien, 2009; Clark and Royer, 2013). Other research finds that increases in compulsory education reduce teenage births (Black et al., 2008), reduce crime (Lochner and Moretti, 2004) and cause civic participation, including voting, to increase (Milligan et al., 2004). Using different data and a different empirical approach, Dee (2004) also finds that increased educational attainment increases political involvement.

There is an extensive literature on socioeconomic predictors of pro-environmental behavior. Torgler and García-Valiñas (2007) provide a thorough literature review on studies that have examined the factors related to environmental attitudes including age, gender, marital status, education, and economic status. Since we contribute to the literature on the environmental behavior effects of education, we concentrate here on examples of the studies that investigate the role of education in environmental attitudes and behavior.[3] Many papers find that education is positively correlated with pro-environmental behavior in a range of contexts. For example, multiple studies find that individuals with higher education are more likely to recycle (Callan and Thomas, 2006; Duggal et al., 1991; Ferrara and Missios, 2005; Reschovsky and Stone, 1994; Smith, 1995). Other research finds that education is correlated with food choices that affect the environment. For example, Blend and Van Ravenswaay (1999) find that higher levels of education increase the probability that a consumer would purchase eco-labeled apples. Several others find that education is associated with a higher probability of purchasing organics (Bellows et al., 2008; Monier et al., 2009; Zepeda and Li, 2007). Some studies have found that higher education levels are correlated with water saving behaviors (Berk et al., 1993; Gilg and Barr). Similarly, there is prior evidence that higher education levels are associated with energy saving behavior (Mundaca et al., 2010; Poortinga et al., 2004). Furthermore, there is evidence that education is associated with more pro-environmental attitudes. For example, Rowlands et al. (2003) find evidence that more educated individuals are willing to contribute more for green electricity. De Silva and Pownall (2014) find that college educated individuals are more likely to sacrifice financial well-being to improve environmental quality and Xiao et al. (2013) find that more highly educated Chinese citizens report higher levels of environmental concern. Torgler and García-Valiñas (2007) show that not only years of formal education matter for explaining pro-environmental attitudes, but also informal education which they proxy with measures of political interest.

However, the literature does not uniformly find a positive association between pro-environmental attitudes or behavior and education. Some studies find no evidence of an association or even that education is negatively associated with pro-environmental attitudes or behavior. Ek and Soderholm (2008) find little evidence that education levels explain the choice of green electricity. Likewise, Kriström and Kiran do not find evidence that education explains energy consumption. Ayalon et al. (2014) do not find an effect of education on recycling behavior. Wessells et al. (1999) find no evidence that more education is associated with consumers' willingness to purchase ecolabeled seafood and Millock and Nauges (2014) find no effect of education on organic food consumption. Teisl et al. (2008) find that more educated people are more likely to trust eco-labels and find eco-information more important but also are more likely to rate eco-labeled vehicles lower. This may help explain why Johnston et al. (2001) find that Norwegian survey respondents having at least a 4 year higher education degree are less likely to purchase ecolabeled seafood and why Thompson (1998) and Thompson and Kidwell (1998) conclude that individuals with advanced degrees may purchase less organics. Finally, Grafton (2014) finds a negative association between education level and water conservation. These studies all provide valuable information on how education can predict environmental behavior. However, the potential for omitted variables that are correlated with both educational attainment and environmental attitudes can make it difficult to infer causality from these findings.

Some descriptive analysis of the data from the Special Eurobarometer surveys is provided in the respective reports published as Special Eurobarometer 295 (2008) and Special Eurobarometer 365 (2011). For example, Special Eurobarometer 295 (2008) states that a person who tends to refrain from pro-environmental behaviors tends to also have less full-time education. Furthermore, Special Eurobarometer 365 finds that "73% of respondents who studied until the age of 20 or older say that they separate their waste for recycling, compared with 63% of those who finished school before the age of 16" (2011). The

[1] The size of the LATE, representing the average increase in the probability of a complier performing the behavior within the last month, is given in parentheses.

[2] For a recent review, see Oreopoulos and Salvanes (2011).

[3] Many papers related to environmental issues, especially stated-preference studies, include education as an explanatory variable. It is not feasible to review every one of these studies here but we attempt to include the studies that have demographic predictors of environmental attitudes or behaviors as their primary focus. We summarize these studies in Appendix A Table A1.