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Analysis

Green Returns to Education: Does Schooling Contribute to Pro-Environmental Behaviours? Evidence from Thailand

Thanyaporn Chankrajang [a,*], Raya Muttarak [b]

[a] Faculty of Economics, Chulalongkorn University, Phayathai Road, Bangkok 10330, Thailand
[b] Wittgenstein Centre for Demography and Global Human Capital (IIASA, VID/ÖAW, WU), Vienna Institute of Demography of the Austrian Academy of Sciences and International Institute for Applied Systems Analysis, Schlossplatz 1, A-2361 Laxenburg, Austria

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ABSTRACT

We investigate whether there are green returns to education, where formal education encourages pro-environmental behaviours using nationally representative surveys on environmental issues in Thailand. To establish the causal relationship between education and green behaviours, we exploit the instrumental variables strategy using the supply of state primary schooling i.e. the corresponding number of teachers per 1000 children, which varies over time and across regions as the instrument, while controlling for regional, cohort and income effects. We find that more years of schooling lead to a greater probability of taking knowledge-based environmentally-friendly actions a great deal, but not cost-saving pro-environmental actions. In addition, the paper finds no significant impact of formal education on concern about global warming nor the willingness to pay for environmental tax.

1. Introduction

This paper aims to investigate whether there are green returns to education, where formal education encourages pro-environmental behaviours after accounting for the potential endogeneity of education. While previous studies have shown a positive association between education and environmental actions, whether general formal education can have a causal impact on promoting attitudes and behaviours that help reduce negative externalities relating to the environment is not firmly established. The exception is a cross-national study of 14 European countries by Meyer (2015) using compulsory school reforms as an exogenous source of variation explaining educational attainment. As noted by Meyer (2015), the relationships between education and pro-environmental behaviours observed can suffer from endogeneity problems. Omitted variables such as ability, values, risk perception, social desirability and social responsibility could confound the effect of education. For example, individuals who exhibit temporal discounting (individuals who prefer a smaller, more immediate reward than a later, larger one) may be less likely to invest in education and pro-environmental behaviours since both the rewards from education and climate-friendly behaviours are not always tangible and immediate. If this is the case, then the observed effect of education is inconsistent and biased upwards.

Building upon Meyer (2015) who analyses such causality using evidence from the European experience, our study offers the first causal analysis in the context of developing economies based on nationally representative data on environmental attitudes and behaviour in Thailand. This study thus complements existing studies which mainly focus on developed countries. It is crucial to consider emerging economies in the climate mitigation discourse since through the process of economic development, the corresponding CO_2 emissions in these countries are increasingly not negligible. Indeed, Thailand is the second largest CO_2 emitter in Southeast Asia (Shrestha and Pradhan 2010). Despite the economic slump in 2008, its electricity demand from the household sector still rises steadily (APEC 2010), and it is estimated that in 2050 its greenhouse gas emission will amount to 1398.7 Mt of carbon dioxide equivalent (Chotichanathawewong and Thongplew 2012), which is comparable to the total emissions in India in the year 2008 (IEA 2010).

To investigate a causal relationship between formal education and various aspects of pro-environmental behaviours, the paper exploits the exogenous time and regional variations from the number of state primary school teachers per 1000 children as the instrumental variable for years of education whilst also controlling for regional, cohort and income effects. Our data are based on two nationally representative surveys of adults aged ≥15 years on perception towards global warming, natural disaster experience and pro-environmental behaviours collected in 2010 and 2013 in Thailand ($n = 3900$). Employing the instrumental variables strategy, indeed we find that there exist green returns to education but only in some types of pro-environmental actions,

* Corresponding author.
E-mail addresses: t.chankrajang@gmail.com, thanyaporn.c@chula.ac.th (T. Chankrajang), muttarak@iiasa.ac.at (R. Muttarak).

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particularly those that involve technical changes (e.g. using energy-efficient appliances) and behavioural changes (e.g. reducing the use of plastic bags). We however do not find a statistically significant relationship between schooling and the likelihood of adopting pro-environmental actions related to cost-saving (e.g. turning off unused lights) and willingness to pay for environmental tax.

The rest of the paper is organised as follows. Section 2 discusses the mechanisms through which education influences environmental behaviour and presents previous empirical evidence. Section 3 covers a brief account of primary schooling in Thailand, which is highly relevant to the validity of our instrumental variable. Section 4 explains the data and the main variables. Section 5 covers our empirical strategies – both the baseline and the instrumental variables strategies – as well as provides validity justification of our instrument. Section 6 illustrates the empirical results and discusses the findings. Section 7 concludes.

2. Education and Environmental Behaviour

Regarding why education influences environmental behaviours, this can be explained via direct and indirect channels. First, directly formal schooling is a primary way individuals acquire knowledge, skills and competencies that can influence their environmental attitudes and behaviours. Given that climate science involves complicated topics associated with largely unfamiliar scientific terms (e.g. solar vs. terrestrial radiation), achieving climate literacy requires skills and ability to acquire, accommodate and interpret complex issues — such skills commonly obtained through schooling. Furthermore, education enhances the acquisition of knowledge, values and priorities as well as the capacity to plan for the future and efficiency in allocation of resources (Cutler and Lleras-Muney 2010; Kenkel 1991). Indeed, not only does education increase access to sources and types of information, it can also lead to a better understanding of complex environmental messages such as climate change (Haron et al. 2005; McCright 2010). Accordingly, it is found that education has positive consequences on awareness of environmental issues and a deeper sense of responsibility (Bybee 2008).

Apart from the direct impacts, education may indirectly promote mitigation actions through many other means. Firstly, education improves socio-economic status as evident that education generally increases earnings. This allows individuals to have command over resources such as installing renewable energy sources at home or willingness to pay carbon taxes. Secondly, many empirical studies have shown that people with more years of formal education have access to more sources and types of information (Cotten and Gupta 2004; Neuenschwander et al. 2012; Wen et al. 2011). Knowing where to get information on how to reduce emissions or what adaptations to take allow individuals to change behaviour appropriately.

Indeed, there is considerable evidence at the individual level regarding the relationship between educational attainment and a wide range of pro-environmental behaviour including consumption, conservation and lifestyle. In terms of consumption, education is found to be associated with food choices that are less damaging to the environment. Consumers with a higher level of education are more likely to be willing to pay for eco-labelled seafood in China (Xu et al. 2012), purchase eco-labelled and organic food products (Blend and van Ravenswaay 1999; Lockie et al. 2004; Ngobo 2011) and eat less meat (De Backer and Hudders 2015; Graça et al. 2015). Likewise, highly educated individuals are also more likely to purchase eco-labelled, higher efficiency electrical appliances (Flamm 2009; Ma et al. 2013; Wijaya and Tezuka 2013) and adoption of fuel-efficient or alternative fuel vehicles (Mannberg et al. 2014; Potoglou and Kanaroglou 2007). Extant studies show that irrespective of income, individuals with more schooling are more likely to opt for energy-efficient behaviours as shown in the United States (Sharygin 2013), Italy (Pronello and Camusso 2011) and in developing countries like India (Farsi et al. 2007).

With respect to conservation and lifestyle, empirical studies based on self-reported environment related behaviour commonly found the positive relationship between education and pro-environmental behaviour. This includes recycling (Callan and Thomas 2006; Ferrara and Missios 2005; Fiorillo 2013; Hage et al. 2009; López-Mosquera et al. 2015; Zen et al. 2014), energy conserving practices (Mills and Schleich 2012), water saving behaviours (Clark and Finley 2007) and a wide range of carbon emission reduction actions e.g. reducing the use of cars, avoiding taking short-haul flights, reducing the consumption of disposable items and buying seasonal and local products (Ortega-Egea et al. 2014). Furthermore, similar to income, many studies reported a positive association between education and willingness to pay higher taxes or prices for environmental protection, emissions reduction policy and renewable energy (Bigerna and Polinori 2014; Franzen and Vogl 2013; Ivanova and Tranter 2008; Kotchen et al. 2013; Zhang and Wu 2012; Zorić and Hrovatin 2012).

As mentioned above, despite a relatively large literature on the association between education and pro-environmental behaviour, hardly any studies deal with the potential endogeneity of education. In the literature on returns to education, the method of instrumental variables (IV) has been used as a standard solution to the problem of causal inference. It has become common to employ various sources of exogenous variations such as compulsory schooling legislation, tuition costs and accessibility of schools to draw a causal impact of schooling on labour market earnings (Card 2001), health and health behaviour (Brunello et al. 2015; Spasojević 2010), mortality (Clark and Royer 2013; Lleras-Muney 2005), fertility (McCrary and Royer 2011) and crime (Lochner and Moretti 2004; Machin et al. 2011). Policy interventions and reforms of the educational system serve as natural experiments since they exogenously impact the educational attainment of the treated population. This allows the causal effect of education on the outcomes of interest to be identified. In this paper, we employ the normalised number of teachers in state primary school as our identification strategy.

3. Primary Education in Thailand: The Supply Side

Prior to the introduction of formal primary education in 1871, education was mainly supplied within the precinct of individual households. Occupational and life skills were passed on from generation to generation at home. In addition, some boys were sent to Buddhist monasteries to be taught reading, writing, and Buddhist preaching (Pachrapimon and Gamage 2010). Although, initially, formal education was aimed at training particular groups of children in public civil service, gradually schools for commoners had been established throughout the country — mostly within the temples. Three, four and seven years of compulsory education were implemented in 1921, 1936, and 1960, respectively. However, in practice, due to both low demand and low supply of schooling, sending children to schools was still unpopular among general households residing in rural areas (Sangnapaboworn 2007).

Several attempts to improve the institutional features of education on the supply side have been undertaken by the government. The examples of reforms include compulsory schooling laws, school lunch programme and school construction in rural areas. While mandatory education reform can potentially be used as an instrument variable, its nationwide implementation left us with little variation. However, as shown later in Fig. 1, compulsory schooling reform is closely associated with the increase in the number of primary schools and the corresponding increase in the number of teachers per 1000 children. The latter is used as an instrumental variable in this paper.

Despite several education reforms in Thailand, the major and most relevant reform to the supply of education and to the respondents of