

# Does social trust promote behaviour aimed at mitigating climate change?

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## Abstract

Using international data from the Life in Transition Survey, I analyse the role of social trust on pro-environmental behaviours aimed at helping to fight climate change. Social trust might increase pro-environmental behaviour by reducing the free-rider problem, restraining opportunistic behaviour, and enhancing cooperation. The results suggest that social trust increases the probability of individuals taking personal actions aimed at helping to fight climate change; the results are robust to using different sets of control variables, and to controlling for country and region fixed effects. The results also indicate that social trust is positively and significantly associated with environmental actions that are time-consuming, but there is no significant relationship with environmental actions that impose monetary costs on individuals.

## KEYWORDS

climate change, pro-environmental behaviour, social trust

## JEL CLASSIFICATION

N50; Q54; Z10

## 1 | INTRODUCTION

Although some scientists and politicians neglect environmental issues, environmental degradation has reached hazardous levels. Most environmental problems, including projected climate change, are human-made. Although the world has experienced a significant increase in prosperity since the Industrial Revolution, our consumption habits and production methods have caused serious and sometimes irreversible damage to the environment. If we

do not take necessary steps immediately, we will bequeath a degraded world to future generations.

Since environmental problems are complex in that their causes and consequences have both local and global dimensions, we need not only domestic environmental policies such as Pigovian taxes and regulations but also multilateral agreements among all key countries. However, these policies and agreements are sometimes insufficient and, in some cases, cannot be implemented competently. Individuals and companies should, therefore, act in an environmentally conscious manner in their consumption and production decisions. This is all very well, but do we know which factors influence individuals' pro-environmental behaviours?

In this article, I analyse the role of social trust in promoting pro-environmental behaviours aimed at helping to fight climate change. Social trust, one of the most critical dimensions of social capital, might promote pro-environmental behaviour by reducing the free-rider problem, restraining opportunistic behaviour, and enhancing cooperation.<sup>1</sup> When individuals do not trust one another to take action in the fight against environmental problems, they lose motivation to protect the environment. Taking action to protect the environment (e.g. buying an environmentally friendly car, separating waste for recycling) is costly and time-consuming. Therefore, individuals must believe no free-rider problem or opportunistic behaviours will occur when doing something for the environment. Having some individuals shoulder the entire burden is not enough to protect the environment. Trusting others is also important to cooperating with them in taking collective actions against environmental degradation.

In her pioneering work, Elinor Ostrom (1990) argues that individuals can achieve cooperative outcomes in the management of local environmental resources if they trust each other and if trust can be maintained through mechanisms such as monitoring and sanctioning. It is easier to meet these conditions in the case of local environmental problems than in the case of global ones, such as climate change. Hence, one would not expect trust to have a beneficial effect on climate change mitigation. Nevertheless, a new stream of literature underlines that trust can also play a vital role in combating global environmental problems. Carattini, Baranzini, and Roca (2015) argue that, if a culture of cooperation guides people's behaviour, trust might have a positive effect on climate change mitigation as well. Consequently, I hypothesise that social trust can promote pro-environmental behaviours aimed at helping to fight climate change.

Using country-specific greenhouse gas emissions as a dependent variable, Carattini et al. (2015) and Carattini and Jo (2016) show that there is a negative relationship between trust and greenhouse gas emissions. The objective of this article is to provide micro-based support for the macro approaches of Carattini et al. (2015) and Carattini and Jo (2016).

I use the Life in Transition Survey (LiTS) of 39,000 households from 34 European and Asian countries to test whether social trust promotes pro-environmental behaviours. This article contributes to the literature in two ways. First, this is one of the few studies to examine the effect of trust on personal actions explicitly aimed at helping to fight climate change. Some articles examine the relationship between trust and pro-environmental behaviours (such as recycling waste or buying environmentally friendly products) but do not specifically focus on climate change. LiTS provides information on ten different personal actions aimed at fighting climate change. To the best of my knowledge, no other article in the literature examines the effect of social trust on pro-environmental behaviours with many different dimensions. Second, the empirical analysis covers 34 countries from different economic, political, and cultural backgrounds, enabling us to achieve more sound and generalisable results. Previous articles analyse either a single country (e.g. Irwin & Berigan, 2013) or a few countries with similar characteristics (e.g. Sønderskov, 2011).



My results show that social trust increases the probability of individuals taking personal actions aimed at helping to fight climate change; the results are robust to using different sets of control variables and to controlling country and region (primary sampling unit [PSU]) fixed effects. LiTS enables us to unbundle environmental actions aimed at fighting climate change. When unbundling the broad cluster of environmental actions, we find that social trust promotes environmental actions that are time-consuming (such as separating waste for recycling and reducing consumption of disposable items), but there is no such effect on actions with high monetary costs (such as purchasing a more environmentally friendly car or installing equipment that generates renewable energy). While social trust encourages people to act in an environmentally sound manner in some respects, it is not a panacea. Individuals still need public incentives, enforcements, and guidance to take steps towards changed environmental practices that cost them money. In this respect, the results in this article indicate that social trust is a complement to environmental policies in supporting pro-environmental behaviours.

In this type of micro-level empirical analysis, readers should always bear in mind the endogeneity problem when interpreting the results. Although reverse causality may theoretically not be a serious problem in our case, omitted variable bias and measurement error pose a threat to arriving at reliable results. Instrumental variables can be used to address potential endogeneity problems. However, finding valid instrumental variables from these types of surveys is always very challenging. LiTS provides no variable that can be properly used as an instrumental variable for social trust. As no valid instrument for addressing any potential endogeneity problem exists, the results do not precisely imply causality. They correspond to conditional correlations, which, after controlling for many relevant factors, indicate that the effect of social trust on pro-environmental behaviours seems to be statistically significant.

Moreover, this causal estimation of social trust is likely for the following reasons. First, causality is theoretically expected to run from social trust to pro-environment behaviours. As social trust is quite stable over time (Uslaner, 2008), changes in the level of environmental degradation or pro-environmental behaviour are unlikely to affect individuals' level of social trust. Second, I use a rich set of control variables to capture the effect of social trust on pro-environmental behaviours. Third, I use not only country dummies but also regional (PSU) dummies to check for differences in institutional quality, economic performance, and social norms. Fourth, two different measures of trust are used to check whether different measures affect the main results and message.<sup>2</sup>

The remainder of the article is structured as follows. Section 2 provides a theoretical background and reviews the relevant literature. Section 3 describes the data and presents the methodology. Section 4 discusses the main results. Section 5 checks the robustness of the results. Section 6 provides further evidence, and section 7 concludes the article.

## 2 | THEORETICAL BACKGROUND

In many areas of life individuals face social dilemmas, situations in which a conflict exists between collective and individual interests. The dilemma of public goods is one of the most frequently encountered examples. Public goods are non-excludable and non-rivalrous in consumption (Hardin, 1982). Satisfying both criteria, the environment is shown as a classical example of a public good. The benefits obtained from a clean environment cannot be restricted exclusively to those who contribute to it. One person's enjoyment of a clean environment does not diminish

the possibility of others benefitting from the same environment. As a result, individuals are often inclined to overuse the environment and underinvest in it because of collective-action problems such as free-riding.

Overcoming these problems and encouraging people to behave in an environmentally friendly way are important for achieving sustainable development. But what factors encourage people to engage in pro-environmental behaviour? Trust can play a vital role in mitigating such problems, thus enhancing environmental consciousness (Ostrom, 1990; 2010).

Pro-environmental behaviour is often costly and time-consuming. For example, eco-friendly cars are usually more expensive than normal ones. Individuals who plan to buy eco-friendly cars might face a dilemma. They might pay more money for eco-friendly cars, but at the same time their efforts might not be enough to protect the environment when other individuals do not behave similarly. Therefore, if individuals do not trust others to pay regard to the environment when buying cars, they will not want to shoulder the extra burden. There is a similar issue with the case of recycling. Storing recyclable materials at home and then throwing them into recycling bins is time-consuming. If you think that others throw recyclables into the normal trash can, you may lose the motivation to make the effort.

More examples can be given to emphasise a common point: when an individual does not trust others to take responsibility for protecting the environment, this individual becomes less eager to engage in pro-environmental behaviours because the efforts are wasted when others do not contribute (Irwin, Edwards, & Tamburello, 2015).

Various proposals have been put forward to protect the environment, both regionally and globally. Prakash and Potoski (2007) propose that voluntary environmental programmes might be effective in mitigating collective-action problems associated with free-riding and shirking. Without trust, though, it is really difficult to create voluntary programmes that work properly and efficiently. Pretty and Ward (2001) argue that participatory groups are crucial in providing equitable and sustainable solutions to local environmental issues. Trust is key not only for forming participatory groups but also for their interactions with other agents. Fisheries are a classic example of this solution. Sustainable fisheries require strong cooperation among fishermen, as well as between them and government agencies. Here, trust comes into play and promotes cooperation by nurturing ties within and across individuals and groups (Grafton, 2005).

Esty and Moffa (2012) argue that environmental problems caused by climate change cannot be solved without effective global environmental governance; this increases global cooperation and disciplines the free-rider problem. They propose that a global environmental governance body be set up. However, it should be underlined that the tendency to act collectively decreases with an increase in group membership (Olson, 1965). In a theoretical model, Carattini and Jo (2016) show that individuals living in a high-trust society are more inclined to cooperate with foreign partners, paving the way for strong cooperation on a global scale. Their empirical analysis shows that trust promotes global cooperation in addressing environmental problems, as measured by a rapid decline in carbon emissions over time.<sup>3</sup> In sum, all these proposals at the regional and global levels need trust to succeed.

The empirical literature shows that trust has a positive effect on pro-environmental behaviour. In one of the early works on the subject, Van Lange, Van Vugt, Meertens, and Ruiters (1998) find that individuals in the Netherlands with high levels of trust are more prone to exhibit preferences for public transportation than individuals with low levels of trust. Gupta and Ogden (2009) find highly trusting individuals to be more likely to buy environmentally friendly products. Using survey data involving four developed countries, Sønderskov (2011)



shows that individuals who exhibit high levels of trust are more likely to recycle waste. In a more recent study, using data from the British Household Panel Survey, Volland (2017) finds that trust is negatively associated with reported energy consumption.

Building on Yamagishi and Yamagishi (1994), who argue that social trust is stronger in individualistic cultures, Irwin and Berigan (2013) hypothesise that trust may not promote environmental protection in certain cultures. Using the General Social Survey (GSS), which is conducted regularly in the United States, they find that individuals with high trust levels are more willing to protect the environment than individuals with low trust levels in the non-southern regions of the US, where an individualistic culture is dominant. Meanwhile, social-trust level does not affect cooperative behaviour aimed at protecting the environment in southern regions of the US, where a collectivist culture is more prevalent.

Based on previous empirical studies showing women to be more sensitive to fear incentives in social dilemmas, Irwin et al. (2015) argue that trust plays a more critical role for women in pro-environmental behaviour, and use the GSS to test their hypothesis. Their empirical results show that social trust encourages women, but not men, to engage in environmental cooperation.

### 3 | DATA AND METHODOLOGY

To examine in this study the effect of social trust on pro-environmental behaviours at the micro level, I use LiTS,<sup>4</sup> a multi-country survey jointly conducted by the European Bank for Reconstruction and Development and the World Bank. The second wave of this survey (2010) includes questions on personal actions against climate change. LiTS was first designed to assess the behaviour and status of individuals and households in post-transition countries. The coverage of LiTS was expanded in the second wave, surveying 39,000 households in 34 countries<sup>5</sup> in late 2010. Respondents were drawn randomly using census enumeration areas as primary sampling units (PSUs).

The dependent variable is measured by using the following question: *'Have you personally taken actions aimed at helping to fight climate change?'* As such, my dependent variable is dichotomous (binary) and takes the value of 1 if the respondent has taken action and 0 otherwise. The data show 86.3 per cent of people in Sweden to have taken personal actions to fight climate change. The rate is only 1.72 per cent in Azerbaijan.

LiTS also asks whether the respondent has taken the following actions to fight climate change:

- purchased a car that consumes less fuel or is more environmentally friendly;
- reduced car use, for example by car-sharing or using a car more efficiently;
- chosen an environmentally friendly way of transportation;
- reduced energy consumption at home;
- reduced consumption of water at home;
- where possible, avoided taking short-haul flights;
- started separating most waste for recycling;
- reduced consumption of disposable items;
- bought seasonal and local products to avoid products that come from far away, and thus contribute to CO<sub>2</sub> emissions; and
- installed equipment at home that generates renewable energy.

Using this information, I also generate binary-dependent variables for each action to make further analyses.

To measure social trust, I use the standard survey question: ‘*Generally speaking, would you say that most people can be trusted or that you can’t be too careful in dealing with people?*’ Answers to this question range from 1 (complete distrust) to 5 (complete trust). According to the data, the average level of trust is highest in Sweden and lowest in Armenia.

To generate an alternative measure of social trust, I rely on LiTS questions regarding a lost wallet: ‘*Suppose you lost your (purse/wallet) containing your address details, and it was found in the street by someone living in this neighborhood. How likely is it that it would be returned to you with nothing missing?*’ Answers are on a four-point scale, with 1 for very likely and 4 for not at all likely. I recode this variable for consistency with the original trust variable so that 4 denotes very likely. The lost wallet question has also been used in the literature to measure the level of social trust (see Sapienza, Toldra-Simats, & Zingales, 2013).

LiTS asks various questions about individuals’ characteristics. Following the previous literature on pro-environmental behaviour (Dietz, Stern, & Guagnano, 1998; Meyer, 2015; Morrison, Duncan, & Parton, 2015; Posas, 2007; Rice, 2006; Çarkoğlu & Kentmen-Çin, 2015; Sønderskov, 2011), I include the following variables in our regressions to control for other factors that might affect these behaviours: gender, education level, age, marital status, employment status, subjective well-being, religion, level of trust in government, and membership of environmental organisations.

To examine the effect of social trust on environmental consciousness, I first use the following regression model:

$$proenv_{ic} = \alpha + \beta trust_{ic} + \delta X_{ic} + \gamma CD + \varepsilon_{ic} \quad (1)$$

where  $proenv_{ic}$  is a dummy variable equal to 1 if the individual has taken actions aimed at helping to fight climate change; otherwise it equals 0. The variables  $i$  and  $c$  index individuals and country, respectively;  $trust_{ic}$  measures individual  $i$ ’s level of social trust;  $X_{ic}$  is a vector of individual control; and  $CD$  is a set of country dummies. To correct for any potential correlation of individual errors within the PSU, standard errors are adjusted for clustering at the PSU-level in all regressions.

I use the probit model to estimate equation (1). Using the ordinary least squares (OLS) technique to estimate a model that has a binary dependent variable can produce inefficient estimators (Greene, 2008; Wooldridge, 2009). First, the error term depends on the value of the independent variables. In other words, it has heteroskedasticity. Second, the error term is not normally distributed, which implies that the hypothesis tests might be invalid. Third, the predicted probabilities produced by the OLS can be less than 0 and greater than 1, which violates the fundamental law of probability. Therefore, to achieve more reliable results, my regressions are estimated by using the probit model.<sup>6</sup>

## 4 | MAIN RESULTS

In this section, I present the results from the empirical analysis. The main results are reported in Table 1. In column (1), only social trust is included as an independent variable. The estimated coefficient for social trust is positive and statistically significant at the 1 per cent level. The estimated effect of social trust on pro-environmental behaviours after controlling for

**TABLE 1** Main results of the effect of trust on pro-environmental behaviour

Variable	(1)	(2)	(3)
Trust	0.0730 <sup>***</sup> (0.0125)	0.0527 <sup>***</sup> (0.0110)	0.0348 <sup>***</sup> (0.0113)
Income Ladder			0.0161 <sup>**</sup> (0.0078)
Employed			0.1147 <sup>***</sup> (0.0206)
Married			0.0983 <sup>***</sup> (0.0187)
Female			0.0589 <sup>***</sup> (0.0175)
Primary			0.0150 (0.0628)
Secondary			0.3273 <sup>***</sup> (0.0582)
Bachelor			0.6059 <sup>***</sup> (0.0629)
Post-graduate			0.6586 <sup>***</sup> (0.0693)
Age 25–34			–0.0290 (0.0311)
Age 35–44			0.0113 (0.0330)
Age 45–54			0.0446 (0.0330)
Age 55–64			0.0665 <sup>+</sup> (0.0348)
Age 65+			–0.0337 (0.0369)
Muslim			–0.3456 <sup>***</sup> (0.0728)
Catholic			0.0846 <sup>+</sup> (0.0433)
Orthodox			–0.0402 (0.0539)
Protestant			0.1250 <sup>**</sup> (0.0490)
Jewish			0.0672 (0.1834)
Buddhist			0.0191 (0.0871)
Other Religions			0.0470 (0.0700)
Country dummies	NO	YES	YES
No. of obs.	36,241	36,241	34,808
Pseudo R <sup>2</sup>	0.0028	0.1731	0.1967

Notes: Standard errors in parentheses. Standard errors are clustered at PSU level.

\*\*\*, \*\* and (\*) denote statistical significance at 1, [5], and (10) per cent levels, respectively.

country fixed effects is reported in column (2). The effect of social trust remains positive and statistically significant after adding country dummies. In column (3), individual characteristics are controlled for.

Some of the individual characteristics that are used as control variables fail to achieve significance at conventional levels. Previous studies show that women care more than men about environmental degradation, so they are expected to engage in more pro-environmental behaviours than men. However, the empirical results are mixed. Çarkoğlu and Kentmen-Çin (2015) show gender has no significant effect on willingness to pay more for environmental measures. Sønderskov (2011) finds that, while women are more likely to recycle waste in Sweden and Denmark, no gender effect exists in the UK or the US. To control for the effect of gender, I include a dummy variable (*Female*), which takes a value of 1 if the respondent is female. The results show women to be more likely to take personal actions aimed at

helping to fight climate change. A dummy variable for marital status (*Married*) is also included to check whether married individuals are more actively pro-environment. The sign of this dummy variable is positive and highly significant, indicating that married individuals appear to care more about climate change than single individuals. To control the effect of age on pro-environmental behaviours, I add five dummy variables (*Age\_25–34*, *Age\_35–44*, *Age\_45–54*, and *Age\_65+*) and use 'young adult' (18–24) as a reference category. The results show that individuals between the ages of 55 and 64 are more pro-environment than young adults.

Individuals with higher education levels are expected to be more sensitive to the environment. Many studies show education to be positively associated with environmental attitudes and behaviour (Dietz et al., 1998; Meyer, 2015; Çarkoğlu & Kentmen-Çin, 2015). To control for the effect of education level, four dummy variables (*Primary*, *Secondary*, *Bachelor*, and *Post-graduate*) are created. As expected, individuals with more education tend to behave more pro-environmentally.

To control for the effect of individuals' economic conditions, two variables are added: An income ladder with ten steps (*Income\_Ladder*) and a dummy variable for employment status (*Employed*). Individuals with better economic conditions are expected to be more likely to behave pro-environmentally since such behaviour may be costly. The results show individuals at the higher level of the income ladder to more likely take personal actions aimed at helping to fight climate change. The effect of *Income\_Ladder* is statistically significant at the 5 per cent level. The dummy coefficient of *Employment* is positive and statistically significant at the 1 per cent level, indicating that people in employment are more pro-environmental.

Some articles in the literature show that religion matters for pro-environmental behaviour (Rice, 2006; Posas, 2007; Morrison et al., 2015). I add six dummy variables (*Muslim*, *Catholic*, *Orthodox*, *Protestant*, *Jewish*, *Buddhist*, and *Other Religions*) to control for the effect of religion. While Catholics and Protestants are more pro-environmental, Muslims are less likely to take personal actions against climate change.

The results show social trust has a positive and statistically significant effect on pro-environmental behaviour, even after controlling for country fixed effects and individual characteristics. The results in column (3) indicate that a standard-deviation unit increase in social trust increases the probability of taking personal actions aimed at environmental improvement change by 4 per cent.

In addition to social trust, public trust in government might affect environmental behaviour. When individuals believe the government is implementing sensible policies, they are more eager to shoulder the responsibility of protecting the environment. To check this argument, I add the level of public trust in the government (*Gov\_Trust*) using the following question: 'To what extent do you trust the government/cabinet of ministers?' Column (1) of Table 2 shows that there is no statistically significant relationship between public trust in the government and pro-environmental behaviours. Including public trust in the government does not change the effect of social trust on pro-environmental behaviours.

Members of environmental organisations are expected to be more sensitive to environmental problems. Therefore, I also include a dummy variable for membership in environmental organisations (*Env\_Member*). Column (2) of Table 2 shows that individuals who are members of environmental organisations tend to behave more pro-environmentally. The estimated coefficient for social trust remains positive and statistically significant even after controlling for membership in environmental organisations.



**TABLE 2** Controlling for public trust in government and environmental organisation membership

Variable	(1)	(2)
Trust	0.0332 <sup>***</sup> (0.0115)	0.0336 <sup>***</sup> (0.0114)
Gov_Trust	0.0090 (0.0100)	
Env_Member		0.5147 <sup>***</sup> (0.0551)
Controls	YES	YES
Country dummies	YES	YES
No. of obs.	33,568	34,806
Pseudo R <sup>2</sup>	0.1961	0.1997

Notes: Standard errors in parentheses. Standard errors are clustered at PSU level.

\*\*\*, \*\* and (\*) denote statistical significance at 1, [5], and (10) per cent levels, respectively.

## 5 | ROBUSTNESS CHECKS

In this section some robustness checks are described. In the main results, I add country dummies to control for country-level heterogeneity and for whether countries' characteristics alter the effect of social trust on pro-environmental behaviour at the individual level. Factors such as culture and institutions differ not only between countries but also within countries. Therefore, regional effects might also affect individuals' behaviours. Following Denisova, Eller, Frye, and Zhuravskaya (2012), as a robustness check, PSU dummies are added to control for regional fixed effects. The findings herein are consistent with the core results obtained with using country fixed effects. As seen in column (1) of Table 3, social trust is still positively and significantly associated with pro-environmental behaviours.<sup>7</sup>

Following the literature, I use the standard trust question to measure social trust. Accurately measuring social trust is unfortunately not possible. Therefore, it might be subject to considerable measurement error.<sup>8</sup> The best way to solve the classical form of measurement error is to use instrumental variables for social trust; but LiTS unfortunately does not provide a valid candidate for one. To address the issue of measurement error, I therefore use an alternative measure of social trust in the form of the lost wallet question from the survey. Using an alternative measure of social trust does not change the main conclusion. Column (2) shows that social trust positively and significantly relates to pro-environmental behaviours. The magnitude of the effect is larger than previously measured.

The second wave of LiTS data includes countries from different cultural, political, and economic backgrounds. Included are 28 transition countries and six non-transition European countries (France, Germany, Italy, Sweden, Turkey, and the United Kingdom). Transition countries have a distinct institutional background. Although transition countries have enacted free-market economic reforms and have changed their institutional structure, the legacy of communism might still affect perceptions, attitudes, and behaviours in these countries. To test whether the effect of social trust is consistent among different country groups, regression analyses are run for two subsamples (transition countries and non-transition European countries). The effect of social trust is positive and statistically significant for both samples, but the effect is smaller for transition countries.

As the level of social trust and the tendency to behave pro-environmentally are highest in Sweden, I exclude Sweden, as a potential outlier country, from the sample as a robustness

**TABLE 3** Robustness check 1

Variable	(1)	(2)
Trust	0.0490 <sup>***</sup> (0.0115)	
Wallet_Trust		0.0770 <sup>***</sup> (0.0134)
Controls	YES	YES
Regional dummies	YES	NO
Country dummies	NO	YES
No. of obs.	24,655	35,240
Pseudo R <sup>2</sup>	0.2754	0.1963

Notes: Standard errors in parentheses. Standard errors are clustered at PSU level.

\*\*\*, [\*\*] and (\*) denote statistical significance at 1, [5], and (10) per cent levels, respectively.

**TABLE 4** Robustness check 2: Subsamples

Variable	(1)	(2)	(3)
Trust	0.0073 <sup>**</sup> (0.0032)	0.0204 <sup>**</sup> (0.0087)	0.0096 <sup>***</sup> (0.0030)
Controls	YES	YES	YES
Country dummies	YES	YES	YES
No of obs.	28,590	6,218	33,949
Pseudo R <sup>2</sup>	0.1655	0.1996	0.1949

Notes: Standard errors in parentheses. Standard errors are clustered at PSU level.

\*\*\*, [\*\*] and (ˆ) denote statistical significance at 1, [5], and (10) per cent levels, respectively.

check. The results in the column (3) of Table 4 show the coefficients of social trust to remain positive and statically significant even after excluding Sweden.

## 6 | FURTHER EVIDENCE

Irwin et al. (2015) argue that because women are less trusting and respond to fear incentives in social dilemmas, they need more trust than men do to overcome their risk aversion to exploitation and thus become involved in pro-environmental behaviours. They use the GSS to test this hypothesis. Their results show that the effect of social trust on pro-environmental behaviour is stronger for women than for men. To check whether the result found for the United States is valid for a multi-country analysis, I add an interaction term between social trust and the dummy variable for gender. Column (1) of Table 5 shows that the coefficient on this interaction term is negative but statistically insignificant, indicating that the effect of social trust on pro-environmental behaviour does not differ between women and men.

As discussed above, Irwin and Berigan (2013) find that social trust promotes pro-environmental behaviour only in regions of the United States where individualistic culture is dominant. To test whether the interaction between individualistic culture and social trust is a significant predictor of pro-environmental behaviour in our multi-country sample, I add an interaction term between social trust and individualism. I use a proxy for individualism from Geert Hofstede's data set.<sup>9</sup> The results show that the effect of social trust does not significant differ with the level of individualism.

**TABLE 5** Interaction effects

Variable	(1)	(2)
Trust	0.0452 <sup>***</sup> (0.0151)	0.0091 (0.0315)
Trust*Female	-0.0173 (0.0158)	
Trust*Individualism		0.0005 (0.0005)
Controls	YES	YES
Country dummies	YES	YES
No of obs.	34,808	21,636
Pseudo R <sup>2</sup>	0.1967	

Notes: Standard errors in parentheses. Standard errors are clustered at PSU level.

\*\*\*, [\*\*] and (\*) denote statistical significance at 1, [5], and (10) per cent levels, respectively.

**TABLE 6** Unbundling environmental actions

Variable	(1)	(2)	(3)	(4)	(5)
Trust	-0.0111 (0.0144)	0.0172 (0.0141)	0.0359 <sup>**</sup> (0.0139)	0.0257 <sup>**</sup> (0.0122)	0.0252 <sup>**</sup> (0.0122)
Controls	YES	YES	YES	YES	YES
Country dummies	YES	YES	YES	YES	YES
No of obs.	34,333	33,348	34,318	35,303	35,303
Pseudo R <sup>2</sup>	0.1864	0.1813	0.1549	0.1988	0.1428
Variable	(6)	(7)	(8)	(9)	(10)
Trust	-0.0091 (0.0178)	0.0292 <sup>**</sup> (0.0115)	0.0222 <sup>*</sup> (0.0121)	0.0222 <sup>*</sup> (0.0133)	0.0036 (0.0245)
Controls	YES	YES	YES	YES	YES
Country dummies	YES	YES	YES	YES	YES
No of obs.	34,333	35,333	35,303	35,303	30,827
Pseudo R <sup>2</sup>	0.1868	0.2957	0.1949	0.1758	0.1853

Notes: Standard errors in parentheses. Standard errors are clustered at PSU level.

\*\*\*, [\*\*] and (\*) denote statistical significance at 1, [5], and (10) per cent levels, respectively.

Dependent variable in column (1) is a binary variable on whether the respondent purchased a car that consumes less fuel or is more environmentally.

Dependent variable in column (2) is a binary variable on whether the respondent reduced the use of my car, for example by car-sharing or using my car more efficiently friendly.

Dependent variable in column (3) is a binary variable on whether the respondent chosen an environmentally friendly way of transportation.

Dependent variable in column (4) is a binary variable on whether the respondent reduced energy consumption at home.

Dependent variable in column (5) is a binary variable on whether the respondent (5) reduced consumption of water at home.

Dependent variable in column (6) is a binary variable on whether the respondent where possible, avoids taking short-haul flights.

Dependent variable in column (7) is a binary variable on whether the respondent has started separating most of my waste for recycling.

Dependent variable in column (8) is a binary variable on whether the respondent reduced consumption of disposable items.

Dependent variable in column (9) is a binary variable on whether the respondent bought seasonal and local products to avoid products that come from far away, and thus contribute to CO<sub>2</sub> emissions.

Dependent variable in column (10) is a binary variable on whether the respondent (10) installed equipment in my own home that generates renewable energy.

LiTS asks whether individuals have taken personal actions aimed at fighting climate change in ten different areas, as listed above in section 3. As shown in Table 6, social trust increases the

probability of taking environmental actions that are time-consuming. On the other hand, social trust has no significant effect on environmental actions that impose monetary costs on individuals. Purchasing an environmentally friendly car and installing renewable energy equipment in a home are costly, so not everyone can afford to do so. Due to time constraints and the availability of alternative modes of transportation, the lack of effect on individuals' decisions to take a flight even for a short distance and to reduce car use is not surprising. For the remaining six actions, the effect of social trust is positive and significant.<sup>10</sup>

## 7 | CONCLUSIONS

Nudging individuals to behave pro-environmentally is critical for sustainable development. Taxes, regulations, incentives, and agreements have been used as instruments to achieve this goal. Unfortunately, these policy instruments are often inadequate to tackle environmental problems. Strengthening the sense of trust between people is as important as environmental policies in terms of shaping people's behaviour to be environmentally friendly. Behaving more pro-environmentally is both costly and time-consuming. If most individuals shape their behaviours without taking into account the environment, the steps one takes individually will be insufficient to prevent environmental degradation. As such, people who fight against environmental degradation may sink into apathy or despair and give up shouldering the burden. So trust is expected to affect pro-environmental behaviour positively.

The results in this study show that social trust has a positive and significant effect on pro-environmental behaviour. Thanks to the rich range of questions in LiTS, environmental actions can be unbundled. The results show that social trust is positively and significantly associated with environmental actions that are time-consuming, but there is no significant relationship with environmental actions that impose monetary costs on individuals.

Policies in areas from education to civil society which foster social trust can in principle lead individuals towards more pro-environmental behaviours and thus overcome certain environmental market failures. In a high-trust society, individuals are more willing to incur some private time costs but not monetary costs to create positive environmental externalities. Even though increasing social trust in a society takes time, governments should work more on policies that address that goal. The results set out in this article also imply that social trust is a complement to environmental policies. Implementing environmental policies properly is more difficult without building social trust.

In this type of micro-level empirical analysis, causality is always difficult to establish and the methods employed here are not necessarily adequate. Future research could better address endogeneity problems by conducting surveys which enable the use of the instrumental variable technique and by implementing experimental designs.

## NOTES

<sup>1</sup> Although it is not a theoretical mechanism that is testable within the framework of this article, social trust might also affect environmental actions by ensuring the enforceability of environmental rules and regulations. I want to thank the anonymous reviewer for raising this issue.

<sup>2</sup> Although using different proxies does not adequately address the measurement error problem, obtaining significant results from different proxies gives a signal in terms of the reliability of our results.

<sup>3</sup> In an earlier article Carattini, Baranzini, and Roca (2015) find that trust has a negative effect on greenhouse gas emissions.



- <sup>4</sup> See <https://www.ebrd.com/what-we-do/economic-research-and-data/data/lits.html> (accessed 21 December 2019). LiTS has been used by many articles so far, including Aghion, Algan, Cahuc, and Shleifer (2010), Denisova, Eller, Frye, and Zhuravskaya (2012), Grosjean and Senik (2011), and Gur, Boyaci, and Ozcan (2015).
- <sup>5</sup> Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, France, Georgia, Germany, United Kingdom, Hungary, Italy, Kazakhstan, Kyrgyz Republic, Latvia, Lithuania, FYR Macedonia, Moldova, Poland, Romania, Russia, Serbia, Slovak Republic, Slovenia, Sweden, Tajikistan, Turkey, Ukraine, Uzbekistan, Kosovo, and Montenegro.
- <sup>6</sup> The results are robust to using the logit fixed effect model. Results are available upon request.
- <sup>7</sup> The number of observations falls when region (PSU) dummies are used because for some regions the dependent variable does not vary and therefore those regions do not contribute to the estimation of the parameters.
- <sup>8</sup> In the case of classical form, measurement error will bias the coefficient for social trust towards zero, meaning that the effect of social trust might be underestimated (an attenuated bias).
- <sup>9</sup> I use the latest version of this data set from Hofstede, Hofstede, and Minkov (2010). I lose around 13,000 observations because an individualism index is not available for some countries in our sample.
- <sup>10</sup> When control variables are not added, social trust is significantly associated with all pro-environmental behaviours except avoiding short-haul flights when possible. These results are available upon request.

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