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Kountouris, Yiannis; Remoundou, Kyriaki

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Cultural influence on preferences and attitudes for environmental quality[*]

Yiannis Kountouris[†] **Kyriaki Remoundou**[‡]

Abstract

We investigate national culture's influence on preferences and attitudes for environmental quality. We use the cultural diversity of immigrants in European countries to isolate the effect of culture from the confounding effect of the economic and institutional environment. Results suggest that culture is a significant determinant of migrants' individual environmental preferences and attitudes. Migrants from countries with higher levels of environmental preferences are more willing to tradeoff income for environmental quality when controlling for individual characteristics, country of residence, and country of origin macroeconomic and environmental conditions. Furthermore, culture significantly influences individual beliefs about limits to growth, the fragility of nature's balance and the likelihood of an ecological crisis. The result is robust to alternative definitions of the cultural proxy and points to the significance of accounting for cultural influences in the design of domestic and international environmental policy and the application of environmental valuation techniques.

Keywords: Culture, Environmental Quality, Preferences, Environmental Attitudes, Immigrants

JEL Classifications: Q50, Q51, Z10

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[†] Centre for Environmental Policy, Imperial College London. 14 Prince's Gardens, SW7 1NA, London, UK. Tel: +44(0)2075949316. Email: i.kountouris@imperial.ac.uk. Corresponding author

[‡] School of Management and Business, Aberystwyth University. Aberystwyth, SY23 3AL, UK. Tel: +44(0)1970622522. Email: kyr2@aber.ac.uk

1. Introduction

The design of effective national and international environmental policy requires understanding the determinants of environmental behavior and conditions, that vary significantly across countries. Results from international surveys reveal important differences in societies' responses to environmental questions and the degree to which the environment is prioritized over other social endeavors (Dunlap et al., 1993). At the macro level, negotiations on international environmental agreements are challenging, while differences in the degree of compliance are frequently observed (Mitchell, 2003; Enserink et al., 2007). Given the significant variation in preferences manifested in both the micro and macro levels, a large literature examines the determinants of environmental behavior and quality. Many studies point to the influence of country-specific macroeconomic conditions in shaping behavior and thus environmental outcomes (Selden and Song, 1994; Copeland and Taylor, 2004; Stern, 2004). Nevertheless, other collective characteristics and experiences that are important in shaping individuals' beliefs and preferences can affect aggregate outcomes (Schultz, 2002). National culture features prominently among those characteristics, as cultural differences imply different human-nature relationships which are projected in environmental preferences and attitudes (Brondizio et al., 2010).

This paper explores the importance of national culture[1] in determining individual preferences for environmental quality. While the cultural underpinnings of environmental preferences have been extensively discussed, identifying culture's influence on preferences is challenging given the confounding effect of the economic and institutional environments. In our empirical approach, we use the cultural diversity of immigrants in European countries to isolate the effect of culture on individual preferences. Since immigrants share the same macroeconomic and institutional environment of the destination country, the effect of their national culture can be identified. We employ data drawn from the 4th wave of the European Values Survey (EVS) conducted in 2008, and approximate environmental culture with the level of environmental preferences in the country of immigrant origin.

We find that national culture is a significant determinant of individual preferences for environmental quality. Migrants from countries with higher levels of environmental preferences are more willing to tradeoff income for environmental quality when controlling for individual characteristics, country of residence, and country of origin macroeconomic and environmental

[1] We apply the definition of culture from the Merriam Webster Dictionary: (a) the integrated pattern of human knowledge, belief, and behavior that depends upon the capacity for learning and transmitting knowledge to succeeding generations (b) the customary beliefs, social forms, and material traits of a racial, religious, or social group.

conditions. Furthermore, we find that individual environmental beliefs also depend on country-of-origin culture. Specifically, individual beliefs on limits to growth, ecosystem fragility, human adaptability and the likelihood of an ecological disaster are significantly influenced by the level of the respective beliefs in the country of origin. Even though income appears to be the primary driver of individual environmental preferences, culture has an economically sizable effect. While culture is an important determinant of environmental preferences, there is some evidence that its effect diminishes with the time from migration. The results are robust to the definition of the cultural proxy and to the inclusion of immigrants from more countries. The link between culture and environmental preferences can contribute to understanding the reasons underlying country-wide differences in environmental performance. Given our results, we would expect countries where the environment is an important determinant of people's cultural identity to attain relatively better environmental status as people would be more willing to accept policies aiming to improve environmental quality. Furthermore, our paper reaffirms the role of environmental education for promoting environmental quality, to the extent that culture can be influenced and transmitted by education. States aiming to maintain or improve environmental standards could add environmental education to their arsenal of policies as a means of influencing future consumer preferences. Similarly, our results point to the importance of accounting for a population's cultural heterogeneity prior to the introduction of environmental policies. The successful implementation of environmental policies depends critically on public compliance and demand for environmental quality. Both these factors can in turn depend on cultural predisposition regarding the environment. Since it has been suggested that the pressure for cultural assimilation is lower in more multicultural societies (Luttmer and Singhal, 2011), we would expect the cultural effect to be relatively stronger there. In this case, the design and implementation of environmental policy would have to account relatively more for cross-cultural preference heterogeneity, perhaps supporting flexible market-based instruments instead of rigid environmental regulation. The findings reported here also have implications for the practice of benefit transfer suggesting that cultural diversity between study and policy sites should be accounted for to improve the accuracy of value transfers. Finally, the cultural influence on environmental preferences adds to the evidence on the existence of cultural ecosystem values and the need to account for them in policy making.

A growing literature in environmental economics investigates the links between culture and environmental preferences and behavior. Schumacher (2013) develops an overlapping generations model with endogenous culture formation and finds that environmental culture leads to lower steady state income but higher environmental quality. Brondizio et al. (2010) acknowledge that preferences

for environmental goods along with values attached to nature are subject to influences from the ethical environment, social emotions and feelings which may differ between societies. Various empirical studies attribute differences in estimated willingness to pay (WTP) values for environmental goods and services among ethnic and social groups, to cultural heritage. Shultz et al. (1998), in a study valuing national parks in Costa Rica, were among the first to suggest that cultural biases may affect respondents' stated preferences for environmental goods in developing countries. Hoyos et al. (2009) find that self-identified Basques are willing to pay more for the conservation of a Natura 2000 site in Spain and attribute this to Basque culture's proximity to the environment. Pemberton et al. (2010) use contingent valuation to value a forest reserve threatened by copper mining in Dominica. They find significant differences in stated WTP between Caribs and other social groups which they attribute to Caribs' historical aggressiveness towards strangers and their beliefs about their rights on the natural resource. Hynes et al. (2013) acknowledge that cultural differences may influence stated preference valuation estimates and affect the validity of Benefits Transfer. They use the categorization of cultures by House (2004) to correct for cultural differences in international Benefits Transfer. Ehmke et al. (2008) use the classification of cultures in Hofstede (2001) along with real and hypothetical experiments in China, France, Indiana and Kansas to reveal the cultural underpinnings of hypothetical bias. Carlsson et al. (2012) conduct a survey on climate change beliefs and WTP to avoid its effects in the USA, China and Sweden and find significant cross-country differences. Carlsson et al. (2013) find that the effectiveness of an oath script to decrease hypothetical bias in stated preference valuation depends on country-specific instead of individual-specific characteristics. A similar approach to ours is followed in a contemporaneous paper by Litina et al. (2014). Even though multicountry valuation studies provide insights on the influence of culture on environmental preferences, differences in preferences and values across countries cannot be directly attributed to culture due to the confounding influence of local institutions and macroeconomic conditions. Our study adds to this line of research by employing an empirical approach that allows us to isolate the effect of culture from the influence of aggregate economic and institutional conditions. Furthermore, we use data from over 40 countries expanding the scope of the analysis.

A related literature investigates the cultural significance of ecosystems and the values implied by them (Daniel et al., 2012; Tengberg et al., 2012). Cultural services provided by ecosystems may relate to traditional ways of life, culturally significant landscape features, or more generally to the attachment people have for their natural environment. In the context of this rapidly expanding literature, Gee and Burkhard (2010) explore the importance of the landscape's cultural value for the acceptability of offshore wind farms, while van Berkel and Verburg (2014) quantify values embodied

in agricultural landscapes. The cultural underpinnings of valuation are also stressed by Kenter et al. (2015). The authors examine different dimensions of value and conclude that other-regarding values and social norms can significantly affect individual preferences and the public's willingness to pay for environmental projects.

Researchers in other disciplines have also explored the role of culture on preferences for environmental goods and services. Nassauer (1995) for example, notes the interactive relationship between culture and landscape while an extensive literature examines the cultural influence on the evaluation and appreciation of landscape characteristics (Kaplan and Herbert, 1987). This literature generally finds that preferences over landscape characteristics become increasingly dissimilar with increasing cultural heterogeneity (Zube and Pitt, 1981; Purcell et al., 1994; Le Lay et al., 2008).

This paper also adds to the expanding literature assessing cultural influence on economic activity (Guiso et al., 2006; Guiso et al., 2009; Tabellini, 2010). The empirical approach we use has been widely applied to estimate the influence of cultural traits on various aspects of economic behavior (Fernandez, 2010). The approach was first employed by Carroll et al. (1999) to identify the impact of culture on saving behavior. Fernandez and Fogli (2006) find significant cultural effect on fertility decisions while Fernandez and Fogli (2009) report cultural influence in women's' employment choices. Giuliano (2007) argues that culture has a major role for family living arrangements. Culture can also shape the political and institutional character of a state by influencing preferences for redistribution (Luttmer and Singhal, 2011) and political participation (Alesina and Giuliano, 2011). Examining the existence of a cultural component in tax morale, Kountouris and Remoundou (2013) find that migrants' tax morale is related to tax morale in their country of origin. The incidence of health-impairing habits can also be culturally determined as shown by Christopoulou and Lillard (2015). Ljunge (2014) uses data from children of immigrants and finds that ancestry is a significant determinant of reported trust. In a similar approach, Algan and Cahuc (2010) find that trust can be transmitted across generations and have significant influence on national income. Zhan (2015) shows that cultural attitudes towards monetary reward and prestige can affect occupation choice.

The next section discusses the empirical approach and data, while section 3 presents the results. Section 4 concludes.

2. Empirical approach and data

Identifying the influence of culture on environmental preferences is difficult due to the confounding effect of economic conditions and institutions. To overcome this, we use the cultural diversity of

immigrants (Fernandez, 2010). We assume that environmental preferences form part of national cultural heritage and individual cultural identity. Migrants transfer their culture to their destination, and their behavior there is influenced by their culture. Since immigrants face the same institutions and economic environment in the country of residence, the influence of their culture can be identified independently of the economic and institutional environment of their country of origin. Migrants may assimilate to their destination's culture and the influence of their national culture can be attenuated over time. Nevertheless, research has shown that cultural heritage decays at a slow rate and its effects are identifiable in the long run (Fernandez and Fogli, 2006; Luttmer and Singhal, 2011). To approximate culture we use the average level of natives' environmental preferences in the country of immigrant origin. This indicator is intended to capture preferences and beliefs about the natural environment that were developed in the country of origin given country-specific characteristics. Migrants' self-selection can cast doubts on the validity of this approach. If migrants' destination choice is determined by individual and destination's environmental preferences, we would expect migrants with high (low) environmental preferences to settle in countries with high (low) aggregate environmental preferences. Furthermore, migrants may not be representative of the population in the country of origin in terms of observable and unobservable characteristics, including culture (Borjas, 1987). For example, Feliciano (2005) finds some evidence that migrants in the US are more educated compared to the population in their country of origin. It can be argued then, that migrants are weaker carriers in of their national cultural traits. As a consequence of both issues, the estimated cultural effect will be biased downwards (Fernandez and Fogli, 2009; Luttmer and Singhal, 2011). In this respect, it is possible that the effect estimated here understates the actual influence of culture on environmental preferences.

We use data from the 4th wave of the European Values Survey (EVS) conducted in 2008 in 47 countries. Due to missing observations, the final dataset includes information from immigrants residing in 44 countries[2]. The EVS is composed of nationally representative surveys that collect social and economic indicators along with demographic data. Indicators on environmental preferences, beliefs and awareness were collected in all EVS waves, but information on respondents' country of birth, which is crucial for our empirical approach is not available for earlier waves.

We measure environmental preferences with the response to the following statement: “I would give part of my income if I were certain that the money would be used to prevent environmental pollution”. Available responses were: 1. Agree Strongly, 2. Agree, 3. Disagree 4. Disagree Strongly. In

[2] Countries of residence and immigrant origin are listed in the Appendix.

the subsequent analysis we reverse the scale so that higher ranking denotes greater environmental preferences. This statement attempts to derive respondents' willingness to tradeoff income for improved environmental quality. However, it is different from standard questions used to elicit environmental preferences in the stated preferences non-market valuation literature as it does not specify the payment, the reduction in pollution or the means to achieve the improvement (Hanemann, 1994). In this respect, the indicator is at disadvantage relative to an appropriately designed contingent valuation question, potentially increasing the incidence of hypothetical and yes-saying bias (Ajzen et al., 1996; Carson et al., 2001). Nevertheless, in this paper we do not attempt to derive respondents' Willingness to Pay for environmental quality. Instead, we interpret this indicator as an approximation of individual environmental preferences that may be coarse but can still provide useful insights on individuals' attitudes towards environmental quality. It is also encouraging that the indicator correlates predictably with socioeconomic characteristics known to influence environmental preferences. Similar indicators have been previously used to proxy environmental preferences by Israel and Levinson (2004) and Hersch and Viscusi (2006).

To estimate the influence of culture on environmental preferences we use the following equation: $EnvPref_{ijr} = \beta_1 \overline{EnvPref_j} + \beta_2 X_{ijr} + \beta_3 C_r + \varepsilon_{ijr}$ (1)

where $EnvPref_{ijr}$ are the environmental preferences of individual i, coming from country j and living in country r , $\overline{EnvPref_j}$ is the average level of environmental preferences in the country of origin, X_{ijr} is a matrix of individual characteristics, C_r are country of residence indicator variables and ε_{ijr} is the error term. The coefficient of interest β_1 captures the effect of the country of origin environmental culture on individual environmental preferences at the country of residence. Assuming that environmental culture in the country of origin is not related to unobserved characteristics that influence individual environmental preferences in the country of residence, the effect of culture can be identified. This assumption however, may be challenged as unobserved individual characteristics may vary systematically over countries of origin and also affect individual environmental preferences at the country of residence. For example, unobserved parental human capital or religion can be correlated with environmental culture in the country of origin and affect individual environmental preference in the country of residence (Luttmer and Singhal, 2011). This should be accounted for when interpreting our results. Furthermore, it is possible that unobserved country of residence characteristics are also correlated with environmental culture, but the inclusion of country of residence specific effects can to some extent alleviate this problem.

Beliefs on the relationship between humans and their natural environment may also be influenced by culture. The fourth wave of the EVS includes 6 questions taken from the New Ecological

Paradigm scale (Dunlap et al., 2000), that index respondents attitudes towards the natural environment. We use the responses to the following statements: (a) “We are approaching the limit of the number of people the earth can support”, (b) “When humans interfere with nature it often produces disastrous consequences”, (c) “Human ingenuity will insure that the earth remains fit to live in”, (d) “The balance of nature is strong enough to cope with the impacts of modern industrial nations”, (e) “Humans were meant to rule over the rest of nature”, (f) “If things continue on their present course, we will soon experience a major ecological catastrophe”. Responses, as in the case of environmental preferences, are on a 4-point scale ranging from “Agree Strongly” to “Disagree Strongly”. Statement (a) examines whether respondents ascribe to limits to growth arguments. Statements (b) and (d) elicit respondents' beliefs on the fragility of nature's balance. Statement (c) derives respondents' belief on human ability for adaptation while statement (e) examines respondents’ views on anthropocentricism. Finally, statement (f) assesses the perceived likelihood of an ecological crisis.

To examine the impact of culture on individual beliefs we estimate the following equation for each of the environmental belief indicators:

$$EnvInd_{ijr} = \gamma_1 \overline{EnvInd_j} + \gamma_2 X_{ijr} + \gamma_3 C_r + \varepsilon_{ijr} \quad (2)$$

Where $EnvInd_{ijr}$ represents the environmental beliefs indicator of an individual i, from country j, living in country r and $\overline{EnvInd_j}$ is the average value of the indicator in the country of origin. The coefficient of interest γ_2 captures the cultural influence of the country of origin on environmental beliefs.

The main independent variable is the cultural proxy. We construct the cultural proxy as the average level of natives' preferences in the country of origin. Similarly, the cultural proxy for each of the beliefs indicators is the natives' average belief in the country of origin. We use alternative definitions of the cultural proxy to check robustness. The choice of the additional controls is guided by the extensive literature on stated environmental preferences (Champ et al., 2012). In all models we control for gender, employment status, education level, household income, urbanization and religiosity. We expect employed individuals and those with higher household income to declare relatively higher preferences. Tertiary education is also often positively correlated with environmental preferences (Borger, 2013), while evidence on the influence of gender is mixed (Bateman and Munro, 2009). To account for country of residence specific influence on individual environmental preferences all models include country of residence dummies.

3. Results

We start by presenting some descriptive statistics for the variables used in the analysis in table 1. Columns 1,2 and 3 present the summary statistics for the sample of migrants from countries surveyed by the EVS, the sample of migrants from countries not surveyed by the EVS and the sample of native respondents respectively. The samples are similar with respect to these characteristics. For the sample on which most of the results presented in the paper are based (column 1), the mean of the environmental preferences indicator is 2.747, almost identical to that of the full sample. Approximately 30.1% of the respondents have tertiary education and 44.1% are in full time employment. About 41.8% of the respondents are male while 68.3% declare themselves to be religious. Finally 56.4% of the sample live in towns with population less than 50,000 people while 15.6% live in towns with population greater than 500,000. Table 2 reports means and standard deviations of natives' environmental preferences by country.

Table 1 here

Table 2 here

In table 3 we report migration flows in our sample[3] focusing on the numbers of incoming and outgoing immigrants by country surveyed by the EVS, as well as on the number of migrant destination countries. Rich economies of Western and Northern Europe are popular destinations for immigrants while individuals born in most rich economies are found across the entire continent. Germany for example, is destination for 57 immigrants from 17 countries, while 209 individuals born in Germany reside in 29 countries. Migration patterns for France, Austria, Sweden, Norway and the Netherlands are similar. To some extent, this reflects increased labor mobility resulting from EU regulations. Finally, for economies of former communist states and southern European economies, outgoing migration is stronger than incoming migration. The last column presents the full sample in each country after omitting individuals missing information for any of the variables used to estimate the models.

Table 3 here

To examine how environmental preferences, as captured by the EVS, depend on the demographic variables used later in the analysis, we estimate OLS models[4] for the full sample, the sample of immigrants originating from countries surveyed by the EVS, the sample of immigrants originating from countries not surveyed by the EVS and the native sample respectively (estimates are reported in table A1 in the Appendix). The results for the full sample suggest that socioeconomic

[3] We exclude individuals missing information for any of the variables used to estimate the model.

[4] Even though the dependent variable is ordinal, we report the OLS estimates to simplify interpretation. For later results we report both OLS and Ordered probit results.

characteristics correlate predictably with the environmental preferences indicator. In particular, tertiary education and higher income are positively correlated with environmental preferences. On the other hand, age appears to be negatively related.

The main result is illustrated in Figure 1, plotting the level of environmental preferences of immigrants from country i against natives' environmental preferences in country i. Migrants' preferences in the country of residence are positively correlated with natives' preferences in the country of origin. Environmental traditions, beliefs and behaviors that were formed in the origin country and are part of individual cultural ancestry appear to influence the preferences of migrants' living in different macroeconomic and institutional environments of the destination countries.

Figure 1 here

We report estimates of equation 1 in table 4. The first column reports OLS estimates, while subsequent columns report the results of an ordered probit model (column 2) and the marginal effects for each of the 4 categories of the ordered depended variable (columns 3-6). To simplify interpretation we first discuss the OLS estimates. The coefficient of the cultural proxy is positive and statistically significant at the 1% level, implying the existence of a link between environmental culture and environmental preferences. A unit increase in the level of the cultural proxy in the origin country increases individual environmental preferences in the residence country by 0.152 units on the 4-unit scale. To assess the quantitative impact of culture, we also estimate the model using standardized variables and find that an increase in the cultural proxy in the country of origin by 1 standard deviation, increases individual environmental preferences by 0.049 standard deviations. In comparison, an increase in income by 1 standard deviation increases individual environmental preferences by 0.092 standard deviations. Even though income is the primary factor driving individual environmental preferences, culture has substantial quantitative impact of environmental preferences. Among the remaining socioeconomic controls, having tertiary education is positively related to individual environmental preferences. Ordered probit estimates lead to similar conclusions in terms of the statistical and economic significance of environmental culture for the determination of preferences.

Table 4 here

Table 5 reports estimates of equation 2 for each of the environmental belief indicators. Estimates suggest that, five out of six beliefs indicators are significantly influenced by culture. In particular, a unit increase in the belief of limits to growth in the country of origin increases individual beliefs by 0.245 units in the 4-point scale (column 1). A unit increase in the country of origin perception of disastrous interaction between humans and the environment increases immigrant individual belief by 0.172 units (column 2), while the sign and magnitude of the coefficients is similar for the rest of the

indicators. Contrary to the case of environmental preferences, the relationship between income and beliefs does not appear significant. The positive relationship between belief indicators and culture illustrates how perceptions on the relationship between humans and their natural environment can propagate across generations. This stresses the importance of promoting the scientific understanding of the human-environment relationship aiming to dispel erroneous or promote accurate beliefs.

Table 5 here

To investigate whether migrants' assimilation to their destination weakens the cultural effect, we approximate assimilation with the years of tenure in the country of residence and the individual's citizenship status. Table 6 reports the estimates for those residing in the country for more than one generation[5] (column 1) and less than one generation (column 2). The coefficient on culture is significant only in the second case suggesting that assimilation attenuates the cultural effect. In contrast, the coefficient is significant for both citizens and non citizens (columns 3 and 4 respectively). This can be due to the large number of EU migrants in EU countries present in the sample. Since EU nationals enjoy the same rights as natives everywhere in the Union, their incentives to apply for citizenship are affected. This may impact on citizenship's validity as an indicator of assimilation.

Table 6 here

3.1. Robustness tests

The validity of the results depends on the ability of the survey to elicit latent environmental preferences accurately. It is possible however, that true environmental preferences can be better approximated by a different metric. It can be argued that only those who “Agree Strongly” with incurring financial cost for the sake of the environment declare credible environmental preferences. To test whether alternative definitions of the preference indicator affect the validity of the main result, we approximate individual environmental preferences with a binary variable equal to 1 when the respondent “Agrees Strongly” with the environmental preferences statement in the EVS. We also define the cultural proxy as the share of native respondents in the country of origin that state the highest level of environmental preference and repeat the analysis. The estimates of linear probability and probit models presented in table 7 are similar to earlier results, as culture remains a significant determinant of environmental preferences.

Table 7 here

[5] We assume that the distance between generations is 25 years. The results are similar when assuming generational distance of 20 years.

Using data exclusively from countries surveyed by the EVS to construct the cultural proxy restricts the analysis to the preferences of European migrants in European countries, potentially limiting the results' generality. To test the sensitivity of the result to the sample choice, we extend the sample to include migrants living in countries surveyed by the 4th wave of the EVS that come from countries not surveyed by the 4th wave of the EVS. To capture country of origin environmental preferences for these migrants we construct the cultural proxy using data from the integrated World Values and European Values surveys dataset. The environmental preferences question used so far in the analysis was fielded in the 1990, 2000 and 2005 waves of the WVS, and in the 1990, 1999 and 2008 waves of the EVS. Since the WVS and EVS prior to the 2008 wave do not record country of birth or immigration status, we cannot identify natives from immigrants. We therefore construct the cultural proxy using all residents in the country of origin and estimate equation 1. As earlier, the proxy is the average environmental preference in the country of origin, but this time we also average over the waves of EVS and WVS. The sample is composed of immigrants living in countries surveyed by the 4th wave of the EVS, migrating from countries surveyed either by the EVS or the WVS. This increases the sample by 445 individuals, coming from 37 additional countries. We report OLS estimates in the first column of table 8 and ordered probit estimates in table A2 of the Appendix. The estimates suggest that extending the sample to include migrants from countries not surveyed by the 4th wave of the EVS does not affect the main conclusion of the paper. In particular, a unit increase in the cultural proxy increases environmental preferences by 0.108 units. Estimating the model with standardized variables reveals that increasing the cultural proxy by one standard deviation increases environmental preferences by 0.027 standard deviations, when the corresponding increase from a change in income is 0.092 standard deviations. As earlier, it appears that income is the main driver of individual environmental preferences. Nevertheless, the quantitative influence of culture appears economically significant. Ordered probit results reported in table A2 of the Appendix are similar.

We also test the robustness of the result when using a different indicator to construct the cultural proxy. In particular we construct the cultural proxy using a question from previous waves of the EVS and the WVS asking for the level of agreement with the statement: "I would agree to an increase in taxes if the extra money is used to prevent environmental pollution". Possible answers are on a 4-point scale ranging from "Strongly Agree" to "Strongly Disagree". The question was fielded in the 1989, 1994, 1999 and 2005 waves of the WVS and the 1990 and 1999 waves of the EVS. As the question is asking for respondents' willingness to pay additional taxes for the environment, it can be considered more credible in deriving environmental preferences, resembling more to contingent valuation questions. OLS estimates, reported in columns 2 and 3 of table 8 for the original and the

extended samples respectively, suggest that the main result is not sensitive to the use of a different cultural indicator. Comparable to earlier models, ordered probit estimates reported in table A2 of the Appendix, suggest similar qualitative and quantitative effects. An interesting question is whether focusing on a sample composed exclusively of non-European migrants would affect the results. Unfortunately this is not possible to answer due to the limited number of observations. Nevertheless, given that our results remain robust to the inclusion of migrants from other origins, including non-Europeans, we speculate that focusing on non-European migrants would produce similar results to the extent that environmental culture is a component of an individual's cultural identity in their countries of origin.

Table 8 here

Following the practice in much of relevant literature (Fernandez and Fogli, 2006; Luttmer and Singhal, 2011), the analysis so far assumes that the cultural proxy remains constant over time implying that irrespective of migrants' generation, environmental culture can be approximated by the average environmental preferences in the country of origin as recorded in the 4th wave of the EVS. It is possible however, that this hypothesis cannot be maintained in the case of environmental preferences. Environmental attitudes, behaviors and the perception of the public regarding the relationship of humans with the natural environment has gone through a significant transformation over recent decades. In particular, the rise of the environmental movement to the mainstream and its increasing influence on policy making have increased the visibility of environmental concerns leading to substantial cultural shifts. An additional drawback of the cultural proxy relates to its inability to isolate national from global culture. In particular, as constructed, the proxy in addition to national environmental culture may also capture cross-national and cross-cultural influences that are shared across the globe. To allow for the possibility that culture varies across generations and to account for global perceptions that may reduce the validity of the cultural indicator, we construct the cultural proxy modifying the procedure suggested by Christopoulou and Lillard (2015). Specifically, we use data from the 1990, 1999 and 2008 EVS waves, to estimate models of environmental preference for each country's population[6]. To account for cultural changes across generations we allocate respondents to 5-year cohorts according to their year of birth. Then, for each country we estimate the following model:

$$EnvPref_{ict} = \delta_1 + \delta_2 \overline{EnvPrefWorld_{ct}} + \delta_3 SocEcon_{ict} + \varepsilon_{ict} \quad (3)$$

[6] Ideally we would estimate the models for the native population only. Nevertheless as mentioned we cannot identify migrants from natives prior to the 4th EVS wave.

where $EnvPref_{ict}$ is the environmental preference of individual i, belonging in cohort c interviewed in wave t, $SocEcon_{ict}$ includes individual specific characteristics[7] and $\overline{EnvPrefWorld_{ct}}$ is the average level of world environmental preference of cohort c interviewed in wave t. As in Christopoulou and Lillard (2015), we use the residuals of (3) to derive the cultural proxy for each country of origin. Specifically, we average residuals of (3) for each cohort and then we match the resulting value to the corresponding cohort of the migrant sample from the 2008 EVS wave. The estimates from equation (1) using this alternative cultural proxy are reported in table 9. The results are qualitatively similar to the ones reported in Table 4. The cultural indicator that accounts for migrants' birth cohort and global environmental attitudes is a significant determinant of individual environmental preferences. The quantitative effect on individual preferences appears to be somewhat larger compared to the base case: a one standard deviation increase in the cultural proxy is associated with a 0.1 standard deviation increase in individual preferences. In comparison, an increase in $\ln Income$ by a standard deviation increases preferences by 0.904 standard deviations. It appears then that accounting for global cultural influences and changing culture over time, leads to a cultural effect that is comparable to the influence of income.

Table 9 here

The estimated influence of country of origin environmental preferences can be biased if the cultural proxy is correlated with unobserved country-of-origin characteristics that also determine individual environmental preferences in the country of residence[8]. For example, it is possible that the cultural proxy is correlated with cultural, social, environmental and economic characteristics in the country of origin, which are also likely to affect migrants' individual environmental preferences. In an attempt to account for the confounding influence of other cultural characteristics of the origin country, we estimate models including controls for generalized trust and life satisfaction. Trust is an important component in Putnam's definition of social capital. Indicators of generalized trust have been shown to correlate with individual environmental preferences in stated preference studies (for example Halkos and Jones, 2012), indicating that environmental preferences may vary systematically with the level of trust. In the EVS individual generalized trust is elicited by the response to the following question “Generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people?". Possible responses were “Most people can be trusted” and “You can’t be too careful”. After defining individual generalized trust as a binary variable equal to one if the

[7] Individual specific characteristics include age, gender, employment status, marital status and income.
[8] We thank an anonymous referee for raising this point.

respondent states that “Most people can be trusted” and zero otherwise, we construct the aggregate trust variable as the share of native respondents in the country of immigrant origin that agree with the trust statement. In the EVS respondents are also asked to rate their satisfaction to life on a 10 point scale answering to “All things considered, how satisfied are you with your life as a whole these days?”. To build the life satisfaction variable we average self-reported life satisfaction of all native respondents in the country of origin. The estimates of the models including the country-of-origin cultural controls are reported in table 10. Column 1 controls for the level of trust, column 2 for the level of life satisfaction while column 3 includes both controls. The coefficient on the cultural proxy remains positive and statistically significant in all cases. Repeating the analysis with standardized variables to comment on the quantitative effect on individual preferences reveals that a 1-standard deviation increase in country of origin environmental preferences is associated with increasing individual environmental preferences by 0.060 standard deviations when controlling for trust, 0.049 standard deviations when controlling for life satisfaction and 0.061 standard deviations when controlling for both trust and life satisfaction. The corresponding changes associated to increasing income by 1 standard deviation are 0.067, 0.070 and 0.068 standard deviations. The inclusion of trust appears to be positively related with the quantitative influence of environmental culture which is now very close to that of individual income.

We also test the sensitivity of the estimated cultural influence to the inclusion of additional country of origin specific controls. Environmental conditions in the country of origin can influence the formation of individual environmental preferences and environmental culture. Ideally the model would account for environmental conditions in the country of origin at the time of migration, however, such an indicator is not available. As a result, we account for contemporary environmental conditions in the country of origin using the Yale Environmental Performance Index (EPI) (Hsu et al., 2014). In the fourth column of table 10 we report the estimates of a model controlling for contemporaneous EPI. It should be noted that the EPI is not available for all countries of migrant origin, resulting to a lower number of observations. Nevertheless, the coefficient of the main explanatory variable remains economically significant as a 1 standard deviation increase in the cultural proxy is associated with increasing individual preferences by 0.045 standard deviations. The final country-of origin specific control we add is GDP per capita at the time of migration. Aggregate economic conditions are known to affect individual environmental behavior and aggregate environmental outcomes (Selden and Song, 1994). It is therefore likely that economic conditions in the country of origin at the time of migration can shape migrants' preferences for environmental quality. We approximate respondents' year of migration using the years of residence in the destination country. The aggregate income data come

from version 8.0 of the Penn World Table (Feenstra et al., 2013). Controlling for national income at the time of migration decreases the sample by more than 1000 observations. This is because income data for ex-soviet countries are not available prior to 1989. Controlling for GDP per capita does not affect the main result (table 10, Column 4). The effect of culture remains positive and statistically significant but the effect of per capita income is insignificant.

Table 10 Here

As illustrated in table 2, some countries either contribute or host small numbers of the migrants in our sample. In order to test the stability of the result to the exclusion of countries hosting low numbers of migrants we estimate the model excluding countries with low numbers of incoming or outgoing migrants. Specifically we first exclude individuals living in countries hosting less than 20 migrants. Then we exclude individuals migrating from countries that contribute less than 20 migrants in the sample. Finally we omit individuals living in countries hosting less than 20 migrants, and migrants from countries contributing less than 20 migrants. In all cases, the results (reported in table A3 of the Appendix) do not change quantitatively or qualitatively as the cultural proxy remains a significant determinant of individual environmental preference. An increase of the cultural proxy by 1 standard deviation increases environmental preference by 0.043 standard deviations in the first case, 0.033 standard deviations in the second case and 0.031 standard deviations in the third case.

4. Conclusions

Using data from migrants in European countries, this paper demonstrates that national culture is a significant determinant of individual environmental preferences. This is in accordance with a significant literature in sociology and human ecology pointing to the importance of culture in shaping the human-nature relationship and forming people's preferences, beliefs and values. Our results suggests that countries with national cultures displaying greater attachment to the natural environment are more likely to realize better environmental outcomes. At the same time, the results confirm the importance of cultural ecosystem values. Although we cannot illustrate it with the data we have available, it is likely that national policy will show greater sensitivity for the conservation of ecosystems that are culturally important for the population. For example, a government in a country with strong cultural attachment to forest ecosystems that may be illustrated by traditions and folklore, could prioritize forest conservation not only because of the use values embodied in commercially traded forestry products, but also because of the cultural significance forests have for the population. The results presented here also have implications for international environmental policy. National

cultural differences on environmental preferences will project to national policy to the extent that environmental policy is affected by voters' preferences. If this is the case, outcomes of international environmental negotiations may depend critically on environmental culture in addition to macroeconomic and institutional characteristics. Perhaps unsurprisingly, we may observe closer cooperation in the realm of environmental policy across states that share cultural traits or with common historical origins. On the other hand, agreements may be more difficult to reach between states with different or competing cultures. This is a factor that could be taken into account by international institutions in order to facilitate the negotiation process and appraise the effectiveness of potential agreements. Finally, the results suggest that the design and implementation of national environmental policy should account for within country cultural heterogeneity supporting the use of flexible, market instruments instead of command and control policies.

While we acknowledge that the preference indicator used in this paper is not as refined as appropriately designed contingent valuation questions, the results presented here suggest that culture may influence the valuation of environmental goods and services. This has implications for the practice of stated preference valuation. Ignoring social or national groups when sampling for stated preference valuation may bias the results. Consequently, it is important for researchers to acknowledge cultural diversity in the design of their study and sample across all relevant groups in order to derive more accurate average values. Furthermore, the cultural sensitivity of environmental preferences demonstrated in this paper can have implications for international benefits transfer. Benefit transfers are widely used for policy purposes when budget and time constraints limit the potential for primary data collection. In summary, values are transferred from a study site to the policy site after correcting for income and other macroeconomic differences. Nevertheless, cultural differences between study and policy sites may affect the validity of benefits transfer. Accounting for cultural differences can therefore be important when transferring values (Hynes et al., 2013).

The result also points to the importance of nurturing environmental culture for conserving environmental quality in the long run. The socio-cultural construction of economic value is not static but co-evolves with changing environmental perceptions and realities (Brondizio et al., 2010). As a result, cultivating environmental culture using education as a major cultural transmission mechanism, can skew future preferences towards environmentally friendly behavior and steer future behavior towards environmental conservation.

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5. Figures and Tables

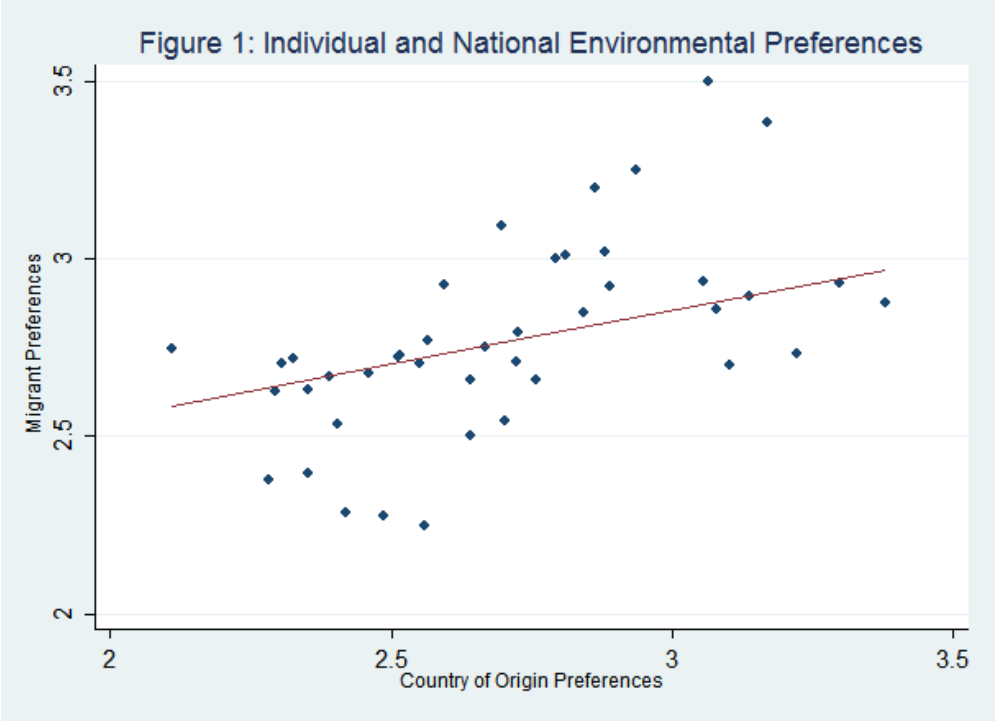

Table 1: Descriptive Statistics

	(1) Mean (St. Dev.)	(2) Mean (St. Dev.)	(3) Mean (St. Dev.)
Environmental Preferences	2.747	2.852	2.748
	(0.901)	(0.879)	(0.907)
Tertiary Education	0.301	0.316	0.250
	(0.459)	(0.465)	(0.433)
Full Time Employment	0.441	0.455	0.406
	(0.497)	(0.498)	(0.491)
Male	0.418	0.428	0.458
	(0.493)	(0.495)	(0.498)
Age	49.017	43.749	46.693
	(17.339)	(15.162)	(17.496)
Religious	0.683	0.748	0.708
	(0.465)	(0.434)	(0.455)
Town of residence pop.<50,000	0.564	0.513	0.624
	(0.496)	(0.500)	(0.484)
Town of residence pop>500,000	0.156	0.145	0.125
	(0.363)	(0.352)	(0.330)
$\ln Income$	9.351	9.544	9.034
	(1.300)	(1.157)	(1.263)
Observations	2570	858	41035

NOTES: The table presents means and standard deviations for the socioeconomic variables included in later regressions. Column 1 refers to the sample of immigrants originating from countries surveyed in the EVS, column 2 to the sample of immigrants originating from countries not surveyed in the EVS, column 3 to the sample of natives.

Table 2: Environmental Preferences of Natives by Country of Origin

Country	Mean	Std. Dev.	Country	Mean	Std. Dev.
Albania	2.882	0.921	Luxembourg	2.795	0.853
Azerbaijan	2.594	0.948	Moldova	3.056	0.811
Austria	2.283	0.963	Netherlands	2.551	0.793
Armenia	3.138	0.802	Norway	2.667	1.003
Belgium	2.564	0.846	Poland	2.354	0.796
Bosnia Herzegovina	2.810	0.885	Portugal	2.351	0.896
Bulgaria	2.937	0.780	Russian Federation	2.642	0.895
Belarus	2.727	0.811	Romania	2.723	0.949
Croatia	2.843	0.796	Slovak Republic	2.404	0.949
Cyprus	3.065	0.892	Slovenia	2.891	0.651
Czech Republic	2.512	0.885	Spain	2.487	0.886
Denmark	2.863	0.865	Sweden	2.703	0.844
Estonia	2.517	0.786	Switzerland	2.697	0.822
Finland	2.307	0.862	Turkey	3.221	0.720
France	2.461	0.929	Ukraine	3.080	0.857
Georgia	3.299	0.729	FYRO Macedonia	3.172	0.830
Germany	2.109	0.887	Great Britain	2.327	0.850
Greece	3.103	0.824	Kosovo	3.380	0.740
Hungary	2.419	0.916			
Iceland	2.561	0.766			
Ireland	2.391	0.911			
Italy	2.759	0.815			
Latvia	2.643	0.832			
Lithuania	2.294	0.811			

NOTES: This table presents the mean and standard deviation of natives' environmental preferences by country of origin.

Table 3: Incoming and outgoing migrants by country in the 2008 EVS

	Outgoing		Incoming		Sample Size		Outgoing		Incoming		Sample Size
Country	**Migrants**	**Destinations**	**Migrants**	**Origins**		**Country**	**Migrants**	**Destinations**	**Migrants**	**Origins**	
Albania	55	4	2	2	889	Lithuania	24	10	38	6	967
Azerbaijan	53	7	58	5	1,437	Luxembourg	2	1	438	26	1,115
Austria	16	7	61	16	1,112	Malta	0	0	5	2	394
Armenia	48	6	84	7	1,220	Moldova	15	5	59	5	1,211
Belgium	78	7	85	16	1,332	Montenegro	0	0	45	8	1,042
Bosnia Herzegovina	197	12	15	5	1,041	Netherlands	34	8	31	12	1,243
Bulgaria	20	10	5	4	1,060	Norway	12	5	48	18	984
Belarus	73	10	128	10	1,173	Poland	63	20	8	4	979
Croatia	85	13	109	8	1,137	Portugal	155	7	7	4	650
Cyprus	6	1	31	9	700	Romania	65	17	0	0	1,040
Czech Republic	36	10	35	4	1,151	Russian Federation	524	22	37	11	1,076
Denmark	15	4	32	19	958	Serbia	0	0	73	7	1,075
Estonia	11	8	204	8	1,216	Slovak Republic	43	6	33	4	871
Finland	27	7	7	3	794	Slovenia	26	7	49	8	741
France	124	13	38	13	1,331	Spain	29	9	30	12	865
Georgia	43	8	5	3	1,130	Sweden	24	8	75	24	852
Germany	209	29	57	17	1,579	Switzerland	11	7	150	20	874
Greece	20	9	95	16	1,238	Turkey	56	13	6	4	1,312
Hungary	21	10	18	5	1,192	Ukraine	139	19	131	12	1,150
Iceland	4	3	0	0		FYR Macedonia	13	9	16	8	1,153
Ireland	12	5	17	4	310	Great Britain	64	15	18	8	602
Italy	88	12	6	4	833	Northern Ireland	0	0	12	2	171
Latvia	14	7	162	9	1,098	Kosovo	16	7	7	4	1,205

NOTES: This table presents the migration flows for the sample. For each country, the table reports the number of outgoing migrants, the number of destination countries of outgoing migrants, the number of incoming migrants and the number of origin countries of incoming migrants

Table 4: Environmental Preferences and Culture: OLS, Ordered Probit and Marginal Effects

	(1)	(2)	(3)	(4)	(5)	(6)
Cultural Proxy	0.152***	0.202***	0.053***	0.017**	-0.033***	-0.037***
	(0.054)	(0.070)	(0.019)	(0.007)	(0.012)	(0.012)
Tertiary Education	0.140***	0.174***	0.047***	0.012***	-0.029***	-0.030***
	(0.042)	(0.050)	(0.014)	(0.004)	(0.009)	(0.009)
Full Time Employment	0.030	0.044	0.012	0.004	-0.007	-0.008
	(0.039)	(0.047)	(0.013)	(0.004)	(0.008)	(0.008)
Male	-0.002	0.003	0.0007	0.0002	-0.0004	-0.0005
	(0.031)	(0.040)	(0.011)	(0.003)	(0.007)	(0.007)
Age	-0.001	-0.001	-0.0002	-0.00007	0.0001	0.0002
	(0.001)	(0.001)	(0.0003)	(0.0001)	(0.0002)	(0.0002)
Religious	0.031	0.052	0.014	0.004	-0.009	-0.010
	(0.054)	(0.066)	(0.017)	(0.006)	(0.011)	(0.012)
Town of residence pop.<50,000	-0.091**	-0.110**	-0.029*	-0.009**	0.018**	0.020**
	(0.045)	(0.056)	(0.015)	(0.004)	(0.009)	(0.010)
Town of residence pop>500,000	-0.121*	-0.143	-0.036*	-0.014	0.023	0.027
	(0.068)	(0.088)	(0.020)	(0.012)	(0.015)	(0.018)
$\ln Income$	0.064**	0.070**	0.019**	0.006*	-0.012**	-0.013**
	(0.025)	(0.032)	(0.008)	(0.003)	(0.006)	(0.006)
Constant	1.167***					
	(0.302)					
Thresholds						
κ_1		0.631*				
		(0.378)				
κ_2		1.471***				
		(0.405)				
κ_3		2.804***				
		(0.409)				
R^2 and Pseudo R^2	0.089	0.037				
Log Likelihood		-3120.82				
Observations	2570	2570	2570	2570	2570	2570

NOTES: The table presents the estimates of equation 1. Column 1 reports OLS estimates while column 2 presents the results from an ordered probit model. Columns 3, 4, 5 and 6 report the marginal effects for the ordered probit model for categories 4, 3, 2 and 1 respectively. Standard errors are clustered at the level of countries of origin. All models include country of residence dummies $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$

Table 5: Culture and environmental beliefs

	(1)	(2)	(3)	(4)	(5)	(6)
Cultural Proxy	0.245*	0.172**	0.036	0.221**	0.351***	0.223***
	(0.134)	(0.076)	(0.092)	(0.083)	(0.076)	(0.042)
Tertiary Education	-0.033	0.0004	0.013	-0.107***	-0.004	-0.043
	(0.032)	(0.034)	(0.032)	(0.037)	(0.030)	(0.038)
Full Time Employment	-0.115***	0.054	-0.040	-0.007	0.005	0.0004
	(0.033)	(0.036)	(0.043)	(0.035)	(0.042)	(0.027)
Male	-0.009	-0.038	0.015	0.031	0.130***	-0.079***
	(0.031)	(0.030)	(0.036)	(0.035)	(0.037)	(0.024)
Age	0.003**	0.003***	0.002	0.003**	0.001	-0.002*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Religious	-0.075**	0.065*	-0.019	0.060	0.120**	-0.055
	(0.037)	(0.034)	(0.034)	(0.036)	(0.046)	(0.037)
Town of residence pop.<50,000	0.043	0.019	-0.015	0.005	0.033	-0.009
	(0.046)	(0.043)	(0.040)	(0.043)	(0.047)	(0.036)
Town of residence pop>500,000	-0.043	-0.015	0.043	0.135**	0.036	-0.109**
	(0.073)	(0.051)	(0.061)	(0.062)	(0.055)	(0.051)
$\ln Income$	-0.014	-0.026	-0.009	-0.005	-0.087***	-0.006
	(0.023)	(0.018)	(0.023)	(0.028)	(0.022)	(0.022)
Constant	2.291***	2.953***	2.455***	1.373***	1.696***	2.410***
	(0.453)	(0.274)	0.373	0.394	0.347	0.263
R^2	0.064	0.096	0.059	0.089	0.077	0.1004
Observations	2355	2544	2387	2447	2544	2537

NOTES: OLS results. Dependent variables are the levels of agreement with: "We are approaching the limit of the number of people the earth can support" (Column 1), "When humans interfere with nature it often produces disastrous consequences" (Column 2), "Human ingenuity will insure that the earth remains fit to live in" (Column 3), "The balance of nature is strong enough to cope with the impacts of modern industrial nations" (Column 4), "Humans were meant to rule over the rest of nature" (Column 5), "If things continue on their present course, we will soon experience a major ecological catastrophe" (Column 6). All models include country of residence dummies. Standard errors clustered at the level of countries of origin in parentheses. $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 6: Cultural Influence by years in the country of residence and citizenship

	(1) Tenure≥ 25	(2) Tenure<25	(3) Citizen	(4) Not a Citizen
Cultural Proxy	0.019	0.249**	0.149**	0.180**
	(0.084)	(0.096)	(0.059)	(0.079)
Tertiary Education	0.138***	0.172***	0.094**	0.203***
	(0.048)	(0.063)	(0.043)	(0.068)
Full Time Employment	0.023	0.035	0.103*	-0.033
	(0.065)	(0.046)	(0.060)	(0.061)
Male	0.079**	-0.098**	0.041	-0.054
	(0.033)	(0.048)	(0.047)	(0.046)
Age	-0.001	-0.0002	-0.0004	-0.002
	(0.002)	(0.002)	(0.002)	(0.002)
Religious	0.063	-0.016	0.040	0.017
	(0.078)	(0.067)	(0.067)	(0.065)
Town of residence pop.<50,000	-0.100	-0.091	-0.093	-0.074
	(0.059)	(0.060)	(0.057)	(0.060)
Town of residence pop>500,000	-0.186**	0.014	-0.098	-0.129
	(0.074)	(0.110)	(0.074)	(0.125)
$\ln Income$	0.082***	0.036	0.045	0.091**
	(0.027)	(0.043)	(0.035)	(0.045)
Constant	1.109	1.482***	1.415***	0.805*
	(0.393)	(0.393)	(0.447)	(0.462)
R^2	0.130	0.087	0.117	0.080
Observations	1448	1122	1449	1112

NOTES: The table reports OLS estimates of equation 1 for immigrants resident to the destination country for more than 25 years (Column 1), immigrants resident to the destination country for less than 25 years (Column 2), immigrants with citizenship of the country of residence (Column 3), and immigrants without citizenship of the country of residence. Standard errors clustered at the level of countries of origin in parentheses. All models include country of residence dummies * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 7: Culture and environmental preferences with binary environmental preferences indicator

	(1)	**(2)**	**(3)**
Cultural Proxy	0.002***	0.008***	0.002***
	(0.0006)	(0.002)	(0.0006)
$R^2$and Pseudo R^2	0.067	0.067	
Log Likelihood		-1191.581	
Observations	2542	2542	2542

NOTES: OLS (Column 1), Probit (Column 2), and Marginal Effect (Column 3) estimates. Dependent variable is individual environmental preferences, defined as a binary variable. All models include socioeconomic controls described in the main text and country of residence dummies. Due to multicolinearity immigrants residing in Albania, Finland, Northern Ireland and Portugal are removed from the sample. Standard errors clustered at the level of countries of origin in parentheses. $^{*}p<0.1$, $^{**}p<0.05$, $^{***}p<0.01$

Table 8: Environmental Preferences and Culture using cultural proxies constructed from other surveys and different samples

	(1)	**(2)**	**(3)**
Cultural Proxy	0.108*	0.205**	0.149*
	(0.059)	(0.095)	(0.075)
Tertiary Education	0.147***	0.144***	0.145***
	(0.037)	(0.041)	(0.036)
Full Time Employment	0.022	0.026	0.009
	(0.034)	(0.038)	(0.035)
Male	-0.0008	0.0005	0.003
	(0.029)	(0.032)	(0.028)
Age	-0.0009	-0.0009	-0.001
	(0.0009)	(0.001)	(0.0009)
Religious	0.037	0.031	0.032
	(0.047)	(0.056)	(0.047)
Town of residence pop.<50,000	-0.063	-0.092**	-0.063
	(0.039)	(0.045)	(0.039)
Town of residence pop>500,000	-0.080	-0.122*	-0.081
	(0.066)	(0.068)	(0.065)
$\ln Income$	0.065***	0.067**	0.074***
	(0.021)	(0.025)	(0.021)
Constant	1.241***	1.015***	1.091***
	(0.276)	(0.355)	(0.299)
R^2	0.096	0.088	0.097
Observations	3015	2554	3027

NOTE: OLS Results. All models control for country of residence. Cultural proxy for the model in column 1 is constructed from the question "I would give part of my income if I were certain that the money would be used to prevent environmental pollution" using data from the combined EVS and WVS survey. Equation 1 is estimated on the sample of immigrants from countries surveyed by the 2008 wave of the EVS and immigrants originating from countries not surveyed by the 2008 wave of the EVS, for which the cultural proxy can be constructed using information in earlier WVS or EVS waves. Cultural proxy for the models in columns 2 and 3 is constructed using the question "I would agree to an increase in taxes if the extra money is used to prevent environmental pollution". The sample in column 2 are immigrants originating from countries surveyed by the 2008 EVS wave. The sample in column 3 are immigrants from countries surveyed by the 2008 wave of the EVS and immigrants originating from countries not surveyed by the 2008 wave of the EVS for which the cultural proxy can be constructed using information available in earlier WVS or EVS waves. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$

Table 9: Culture and environmental preferences with cultural proxy varying across cohorts within countries

	(1)	(2)	(3)	(4)	(5)	(6)
Cultural Proxy	0.934***	1.234***	0.324***	0.101***	-0.203***	-0.222***
	(0.140)	(0.205)	(0.050)	(0.032)	(0.041)	(0.034)
Tertiary Education	0.134***	0.167***	0.045***	0.012***	-0.028***	-0.029***
	(0.042)	(0.050)	(0.014)	(0.004)	(0.009)	(0.009)
Full Time Employment	0.021	0.031	0.008	0.003	-0.005	-0.006
	(0.039)	(0.047)	(0.013)	(0.004)	(0.008)	(0.008)
Male	0.004	0.011	0.003	0.001	-0.002	-0.002
	(0.032)	(0.042)	(0.011)	(0.003)	(0.007)	(0.007)
Age	-0.002	-0.002	-0.001	-0.0002	0.0003	0.0003
	(0.001)	(0.001)	(0.0003)	(0.0001)	(0.0002)	(0.0003)
Religious	0.042	0.066	0.017	0.006	-0.011	-0.012
	(0.052)	(0.063)	(0.016)	(0.006)	(0.010)	(0.011)
Town of residence pop.<50,000	-0.099**	-0.121**	-0.032**	-0.010**	0.020**	0.022**
	(0.045)	(0.056)	(0.016)	(0.004)	(0.009)	(0.010)
Town of residence pop>500,000	-0.112	-0.133	-0.034	-0.013	0.021	0.025
	(0.071)	(0.092)	(0.021)	(0.012)	(0.015)	(0.018)
$\ln Income$	0.063**	0.069**	0.018**	0.006*	-0.011**	-0.012**
	(0.024)	(0.032)	(0.008)	(0.003)	(0.006)	(0.006)
Constant	1.640***					
	(0.265)					
Thresholds						
κ_1		0.001				
		(0.326)				
κ_2		0.845**				
		(0.352)				
κ_3		2.187***				
		(0.350)				
R^2 and Pseudo R^2	0.097	0.041				
Log Likelihood		-3108.35				
Observations	2570	2570	2570	2570	2570	2570

NOTES: The table presents estimates of equation 1. Column 1 reports OLS estimates while column 2 presents the results from an ordered probit model. Columns 3, 4, 5 and 6 report the marginal effects for the ordered probit model for categories 4, 3, 2 and 1 respectively. Standard errors are clustered at the level of countries of origin. All models include country of residence dummies * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 10: Culture and environmental preferences including additional cultural traits, macroeconomic and environmental conditions for the country of immigrant origin

	(1)	**(2)**	**(3)**	**(4)**	**(5)**
Cultural Proxy	0.187***	0.151**	0.191***	0.139**	0.195**
	(0.057)	(0.056)	(0.053)	(0.058)	(0.080)
Trust	0.279*		0.402*	0.402**	0.539*
	(0.149)		(0.201)	(0.198)	(0.291)
Life Satisfaction		-0.003	-0.058	-0.052	-0.125*
		(0.043)	(0.052)	(0.051)	(0.068)
EPI				-0.006*	-0.008
				(0.003)	(0.005)
$\ln GDP$					0.047
					(0.043)
R^2	0.090	0.089	0.090	0.090	0.071
Observations	2570	2570	2570	2554	1366

NOTES: OLS results. Presents estimates from models controlling for additional cultural traits (trust, life satisfaction), macroeconomic and environmental conditions in the country of origin. Dependent variable is individual environmental preference. Trust is the average of natives' responses to "Generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people?" in the country of origin. Life satisfaction is the average of natives' responses to "All things considered, how satisfied are you with your life as a whole these days?" in the country of origin. EPI is the Yale Environmental Performance Index Standard errors clustered at the level of country of origin in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

A. Appendix

Residence countries: Albania, Azerbaijan, Austria, Armenia, Belgium, Bosnia Herzegovina, Bulgaria, Belarus, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Moldova, Montenegro, Netherlands, Norway, Poland, Portugal, Russian Federation, Serbia, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, FYRO Macedonia, Great Britain, Northern Ireland, Kosovo (44).

Origin countries, **initial sample:** Albania, Azerbaijan, Austria, Armenia, Belgium, Bosnia and Herzegovina, Bulgaria, Belarus, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxemburg, Moldova, Netherlands, Norway, Poland, Portugal, Romania, Russia, Slovak, Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, FYRO Macedonia, Great Britain, Kosovo (42).

Origin countries, **extended sample:** Albania, Andorra, Argentina, Armenia, Australia, Austria, Azerbaijan, Bangladesh, Belarus, Belgium, Bosnia and Herzegovina, Brazil, Bulgaria, Canada, Chile, China, Croatia, Cyprus, Czech Republic, Denmark, Egypt, Estonia, Ethiopia, Finland, France, Georgia, Germany, Ghana, Great Britain, Greece, Hong Kong, Hungary, Iceland, India, Indonesia, Iran, Ireland, Italy, Japan, Kosovo, Kyrgyzstan, Latvia, Lithuania, Luxemburg, Macedonia, Mexico, Moldova, Morocco, Netherlands, New Zealand, Nigeria, Norway, Peru, Philippines, Poland, Portugal, Puerto Rico, Romania, Russian Federation, Serbia, Singapore, Slovak Republic, Slovenia, South Africa, South Korea, Spain, Sweden, Switzerland, Taiwan, Tanzania, Thailand, Turkey, Uganda, Ukraine, United States, Uruguay, Vietnam, Zambia, Zimbabwe (79).

Table A.1: Determinants of environmental preferences

	(1)	(2)	(3)	(4)
Tertiary education	0.174***	0.139***	0.144**	0.176***
	(0.010)	(0.041)	(0.066)	(0.010)
In full time employment	-0.0004	0.026	-0.127*	0.001
	(0.009)	(0.039)	(0.067)	(0.010)
Male	0.030***	0.003	-0.004	0.032***
	(0.008)	(0.037)	(0.062)	(0.009)
Age	-0.001***	-0.001	-0.001	-0.001***
	(0.0003)	(0.001)	(0.002)	(0.0003)
Religious	0.089***	0.037	-0.008	0.092***
	(0.010)	(0.040)	(0.070)	(0.011)
Town of residence pop.<50,000	-0.014	-0.093**	0.056	-0.010
	(0.010)	(0.042)	(0.068)	(0.010)
Town of residence pop.>500,000	0.007	-0.120**	0.156*	0.010
	(0.014)	(0.061)	(0.094)	(0.015)
$\ln Income$	0.039***	0.062**	0.083**	0.038***
	(0.006)	(0.025)	(0.038)	(0.006)
Constant	1.714***	1.600***	1.198***	1.713***
	0.064	0.291	0.443	0.066
R^2	0.137	0.087	0.154	0.142
Observations	44463	2570	858	41035

NOTES: OLS results. This table estimates the relationship between individual environmental preferences and various socioeconomic characteristics for the full sample (Column 1), the sample of immigrants from countries surveyed by the EVS (Column 2), the sample of immigrants from countries not surveyed by the EVS (Column 3) and the sample of natives (Column 4). All models include country of residence dummies. "Lives in a Medium sized town" is the omitted category from countries surveyed by the EVS. Standard errors clustered at the level of country of origin in parentheses. *p<0.1, **p<0.05, ***p<0.01

Table A.2: Alternative cultural proxies and samples: Ordered Probit and Marginal Effects

	(1) Ordered Probit	(2) Marginal Effects	(3) Ordered Probit	(4) Marginal Effects	(5) Ordered Probit	(6) Marginal Effects
Cultural Proxy	0.146*	0.039*	0.268**	0.071**	0.193**	0.052**
	(0.075)	(0.021)	(0.119)	(0.033)	(0.094)	(0.026)
Thresholds						
κ_1	0.588*		0.818*		0.758**	
	(0.349)		(0.454)		(0.378)	
κ_2	1.418***		1.657***		1.587***	
	(0.367)		(0.466)		(0.392)	
κ_3	2.776***		2.990***		2.947***	
	(0.365)		(0.468)		(0.390)	
Pseudo R^2	0.040		0.037		0.041	
Log Likelihood	-3623.42		-3102.75		-3637.24	
Observations	3015	3015	2554	2554	3027	3027

NOTES: Ordered probit and marginal effect estimates for the highest category of environmental preferences. All models control for tertiary education, full time employment, income, gender, religiosity, urbanization and country of residence. Cultural proxy for the model in column 1 is constructed using the question "I would give part of my income if I were certain that the money would be used to prevent environmental pollution" using data from the combined EVS and WVS survey. The equation is estimated on the sample of immigrants from countries surveyed by the 2008 wave of the EVS and immigrants originating from countries not surveyed by the 2008 wave of the EVS, for which country of origin environmental preferences can be derived from earlier WVS or EVS waves. Column 2 reports marginal effects for the highest category of environmental preferences for this model. Cultural proxy for the models in columns 3 and 5 is constructed using the question "I would agree to an increase in taxes if the extra money is used to prevent environmental pollution". The sample in column 3 are immigrants originating from countries surveyed by the 2008 EVS wave. The sample in column 5 are immigrants from countries surveyed by the 2008 wave of the EVS and immigrants originating from countries not surveyed by the 2008 wave of the EVS for which country of origin environmental preferences can be derived from earlier WVS or EVS waves. Columns 4 and 6 report the marginal effects for the highest category of environmental preferences for the models in columns 3 and 5 respectively. *p<0.1, **p<0.05, ***p<0.01

Table A.3: Cultural influence on environmental preferences, removing countries hosting or contributing low numbers of immigrants to the sample

	(1)	**(2)**	**(3)**
Cultural proxy	0.133**	0.106**	0.097*
	(0.057)	(0.048)	(0.049)
Tertiary education	0.127***	0.135***	0.121***
	(0.042)	(0.044)	(0.043)
Full time employment	0.026	0.031	0.029
	(0.044)	(0.040)	(0.046)
Male	0.009	0.0006	0.011
	(0.033)	(0.030)	(0.033)
Age	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)
Religious	0.040	0.040	0.049
	(0.053)	(0.056)	(0.054)
Town of residence pop.<50,000	-0.097*	-0.086*	-0.093*
	(0.049)	(0.046)	(0.050)
Town of residence pop.>500,000	-0.121*	-0.113	-0.118
	(0.067)	(0.072)	(0.070)
$\ln Income$	0.073***	0.077***	0.082***
	(0.026)	(0.025)	(0.026)
Constant	1.126***	1.162***	1.130***
	(0.293)	(0.304)	(0.298)
R^2	0.082	0.088	0.083
Observations	2416	2423	2285

NOTES: OLS estimates. Dependent variable is individual environmental preferences. Column 1 reports estimates of equation 1 for the sample of migrants residing in countries hosting more than 20 immigrants. Excluded are immigrants living in: Albania, Bosnia Herzegovina, Bulgaria, Finland, Georgia, Hungary, Iceland, Ireland, Italy, Malta, Poland, Portugal, Romania, Turkey, FYRO Macedonia, Great Britain, Northern Ireland, Kosovo. Column 2 reports estimates of equation 1 for the sample of migrants originating from countries contributing more than 20 immigrants. Excluded are immigrants originating from: Cyprus, Iceland, Luxembourg, Serbia, Austria, Denmark, Estonia, Ireland, Latvia, Moldova, Montenegro, Norway, Switzerland, FYRO Macedonia, Kosovo. Column 3 reports estimates of equation 1 for the sample of migrants residing in countries hosting more than 20 immigrants and originating from countries contributing more than 20 immigrants. Clustered standard errors reported in parentheses. *p<0.1, **p<0.05, ***p<0.01.