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The Willingness to Pay for Environmental Protection: Are Developing Economies Different?

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The Willingness to Pay for Environmental Protection: Are Developing Economies Different?

Michael Dorsch*

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Abstract

This paper explores the micro-foundations of public policy over environmental protection in developing economies by examining individual-level preferences for economically costly pollution abatement. The paper empirically investigates individuals' "marginal willingness to pay" (MWTP) for stronger environmental protection, analyzing nearly 24,000 survey responses, from 24 developing economies, to environmental questions from the 2005-2008 wave of the World Values Survey. I analyze the probability that an individual states she is WTP for further environmental protection depending on her individual-level characteristics and her country's characteristics. The main results to emerge from the analysis include: (i) perceived environmental problems that are local do not determine MWTP, where as perceived problems that are global do, (ii) self-identification as a "world citizen" is the strongest determinant of demand for greater environmental protection, indicating that motivation to contribute to a "global public good" is not a strictly post-material notion, and (iii) the primary determinants of MWTP are not qualitatively different from those among respondents in advanced economies. The results pose a challenge to the "objective problems, subjective values" response to the critique of the post-materialism hypothesis. It appears that the WTP for environmental protection in developing economies follows from subjective values that are universal, rather than from objective problems.

Keywords: Environmental protection policy, Political preferences, Global public goods, World Values Survey, Developing economies

JEL Codes: Q52, Q56, Q58

Alternative Title: Objective Problems, Universal Values: Willingness to Pay for Environmental Protection in Developing Economies.

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1 Introduction

One of the most cited notions in environmental economics is that environmental degradation is the price of industrialization. As societies move from agrarian to urbanized industrial economies, environmental damage increases. It is often argued that industrialization continues until the level where the society is rich enough to forgo further industrial development and begin to pay heed to the environment. The relation between environmental degradation and national income may follow an inverted-U pattern, as richer countries begin demanding environmental protection and transition to more service-oriented, post-industrial economies. The notion is the foundation of the Environmental Kuznets Curve literature.[1] Poor countries are willing to chose industrialization over environmental protection because they value higher incomes more than environmental quality on the margin; rich countries are willing to forgo further industrialization, either because they can afford it (due to larger budget sets and diminishing marginal utility of income/consumption) or because they have transitioned to a cleaner post-industrial economic structure.

Economists and sociologists have traditionally treated environmental protection as a normal good, the demand for which increases as income increases along the development path [Baumol and Oates (1979), Kahn and Matsusaka (1997), Diekmann and Franzen (1999), Franzen and Meyer (2010)]. Furthermore, as with most goods, there may be diminishing marginal utility to environmental protection [McConnell (1997), Israel and Levinson (2004)].

Rationalizing *why* environmental protection is a normal good has been more difficult. The post-materialist hypothesis, for example, posits that environmental protection is greater in advanced economies because individuals' budget constraints for necessary commodities are no longer binding. Freed from the grind of sustenance, individuals in richer economies can focus their attention on "post-material" pursuits, such as environmental protection [Ingelhart (1971), Ingelhart (1995), Martínez-Alier (1995)]. This view has been disputed due to the observation that concern for the environment is not limited to individuals in advanced economies. Depending on the measure, concern for the environment is often found to be stronger in developing economies. Indeed, environmentalism may be a "globalization phenomenon" [Brechin and Kempton (1994), Dunlap and Mertig (1995), Dunlap and Mertig (1997), Gelisson (2007)].

In response to the "globalization phenomenon" critique of the post-materialist hypothesis, Ingelhart (1997) puts forward the "subjective values, objective problems" hypothesis. In this view, demand for environmental protection in developing economies follows the necessity to

[1] Grossman and Krueger (1993) were the first to describe the inverted-U pattern as an "environmental Kuznets curve," due to the similar relation between income inequality and national pe capita income along the development path [citation needed]. See Dasgupta *et al.* (2002), Copeland and Taylor (2004), and Stern (2004) for reviews of this literature.

overcome objective local environmental problems, such as lack of access to adequate sanitation or lack of clean drinking water. The advanced economies, on the other hand, free from the burden of local environmental problems, must be demanding environmental protection for reasons justified by their subjective values.[2]

This paper challenges the notion that the WTP for environmental protection in developing countries is due to local "objective environmental problems". I examine local and global environmental determinants of the WTP for further environmental protection. If the objective problems explanation is correct, then local concerns should be a stronger determinant than global concerns, all else equal, since objectivity of the problem is directly related to the problem's relative locality. I find that this is not the case. The ideals described by the term "subjective values" drive MWTP in developing economies as well. Moreover, subjective values seem to be stronger determinants of MWTP than are objective problems. In this sense, developing economies are not qualitatively different than advanced economies.[3] Subjective values concerning the environment appeal to be universal, rather than post-material.

I consider individual-level survey responses from the 2005-2008 wave of the World Values Survey (WVS) [World Values Survey Association (2009)]. The question of paramount interest, which approximates the respondents' "willingness-to-pay" for greater environmental protection, was asked in 24 countries classified by the IMF as "developing economies", to nearly 26,000 respondents. The WVS also provides information on the respondents' relative incomes, education levels, attitudes about local and global environmental problems, attitudes about levels of citizenship, trust in government, and post-materialistic ideals. In addition, I have gathered various country-level characteristics from the myriad of data sources compiled in the Quality of Government database [Teorell *et al.* (2010)], including components of the Environmental Performance Index score [Etsy, D. et al. (2008)], national income per capita [United Nations Statistics Division, Economics Statistics Branch (2009)], and the widely-used *polity* score of democratic institutional quality [Marshall and Jaggers (2002)]. The sample pools individual-level WVS responses across countries and includes the aforementioned country-level effects.

The dependent variables in the regression analysis are converted into binary variables, so probit estimations are employed. The empirical analysis includes regressions on the full sam-

[2]In the developed world, there is evidence that willingness to pay of environmental protection is driven by values, rather than economics [Frey (1999)]. See Bornstein and Lanz (2008) for evidence from Switzerland. Elsewhere in the economics literature, see Tjernstöm and Tietenberg (2008) for a study of 26 developed economies, Torgler and Garcia-Valiñas (2007) for a focus on the Spanish data, and Vatn (2005) for an emphasis on the role of political institutions. More generally, see Sen (1977) and Meier (2006) on the role of pro-social motivations to voluntarily contribute to public goods.

[3]The magnitude of the effects of subjective values are in some cases smaller in developing economies than in advanced economies, however.

ple of 24 developing economies, as well as sub-sample regressions on the surveyed countries with the worst access to adequate sanitation.[4] Additionally, I include advanced economies in the pooled sample to test whether the determinants of MWTP are systematically different in developing economies. Furthermore, I have preformed within-country estimations for each of the 24 developing countries and analyze how the factors that determine willingness to pay for environmental protection differ depending on the development level of the economy and the quality of democratic institutions.

The paper proceeds in the following way. Section 2 introduces the data and gives an overview of the econometric methodology. Section 3 presents the econometric results and Section 4 concludes briefly.

2 Data description

2.1 Dependent variables

The three dependent variables I consider describe individuals' "marginal willingness to pay" (MWTP) for additional environmental protection in their country. In 24 countries classified by the IMF as developing economies[5], respondents from the 2005-2008 wave of the WVS were asked if they agree with the following statement:

> I would give part of my income if I were certain that the money would be used to prevent environmental pollution.

The responses were used to create a binary dependent variable, $wtpinc = 1$ if the respondent strongly agreed or agreed and $wtpinc = 0$ if the respondent disagreed or strongly disagreed with the statement.

Respondents were asked if they would support higher tax rates to finance environmental protection, i.e., if they agree with the following statement:

> I would agree to an increase in taxes if the extra money were used to prevent environmental pollution.

[4]The sub-sample includes the 12 countries where less than 75 percent of the population has access to adequate sanitation. Robustness checks will include running the regressions using linear probability models (done), running ordered probit estimations on the raw, ordinal data, and re-running the probit estimations with alternative binary dependent variables, constructed using different cut-off points for the binary dependent variables.

[5]Table 2 lists the 24 countries. Andorra and Cyprus, which are listed as the IMF as developing economies, were participants in the 2005-2008 wave of the WVS. These two countries are dropped from the pooled sample because they are substantially richer than the rest of the countries in the sample. Andorra and Cyprus had 2002 per capita GDP of 23581.01 and 13437.93, respectively, while the next richest country had 2002 per capita GDP of 6706.43, measured in 1990 U.S. dollars. The results are qualitatively similar if Andorra and Cyrpus are left in the pooled sample, and are available upon request.

The second binary dependent variable is similarly constructed, $wtptax = 1$ if the respondent strongly agreed or agreed and $wtptax = 0$ if the respondent disagreed or strongly disagreed with the statement.

Finally, respondents were asked which of the following statements is closer to their own point of view:

1. Protecting the environment should be given priority, even if it causes slower economic growth and some loss of jobs.
2. Economic growth and creating jobs should be the top priority, even if the environment suffers to some extent.

The binary variable $wtpgrowth = 1$ if the respondent's own view is closer to the first statement and $wtpgrowth = 0$ if it is closer to the second statement. The three dependent variables get at *marginal* willingness to pay, since there is already some level of environmental protection present, in all countries. Assuming that utility is diminishing on the margin, the empirical results confirm that respondents are thinking in marginal terms. The proportion of respondents answering "yes" is lower in countries that have relatively higher levels of environmental protection, using components of the EPI to control for the level of environmental protection in place.

2.2 Independent variables

2.2.1 Individual-level explanatory variables

All individual-level explanatory variables are taken from the 2005-2008 wave of the World Values Survey. The responses to questions about perceived environmental problems are the main explanatory variables. They were constructed as binary variables, taking value 1 if the respondent felt the problem was "very serious". The first three are local environmental problems: $water_prob$ inquires about poor water quality, air_prob about poor air quality, and aas_prob about poor sewage and sanitation. The expected sign on the coefficients of all three of these variables is positive. The last three are regional/global environmental problems: bio_prob asks about loss of plant/animal biodiversity, $lake_prob$ about pollution of lakes and oceans, and $global_prob$ about global warming or the greenhouse effect. Again, the coefficients on all three of these variables is expected to be positive. Greater perception of environmental problems should be associated with a greater willingness to pay for environmental protection, all else equal. There is, however, an interesting caveat. If the "objective problems" characterization of the demand for environmental protection is correct, then we should observe that the

impacts of local environmental problems on WTP is stronger in magnitude than those of global environmental problems.

Second, there are two citizenship questions: $worldcit = 1$ if the respondent agreed or strongly agreed that they see themselves as a world citizen and $localcit =$ if the respondent strongly agreed that they see themselves as a citizen of their local community. Identification as a citizen at either level is expected to have a positive effect on the willingness to pay for environmental protection. Again, however, the caveat is that the "objective problems" hypothesis would require that the impact of identification as a local citizen is of a stronger magnitude than identification as a world citizen for individuals from developing countries.[6]

The analysis controls for several individual-level characteristics that are likely to affect MWTP. The first is a(n imperfect) measure of relative personal income within a country. The survey question in WVS asks respondents for their *perceived* income decile, which is reported as 1-10 in the variable $incdec$.[7] *Ex ante*, higher income deciles should, on average, be more willing to pay for environmental protection.[8] All regressions were ran with non-linear income decile effects, but no significant non-linear effects were found. Next, to control for education, I consider a formal measure, $education$ (highest degree attained), and whether or not the respondent gets information about the world from books ($books = 1$ if the respondent used a book to learn about the world in the week prior to the interview). I also control for whether or not the respondent trusts the national government ($trustgov = 1$ if the respondent has a "great deal" or "quite a lot" of trust in the national government) and the respondents propensity to support "post-material" objectives ($postmaterial$ is an index from 1-10 composed of ranking various national initiatives in order of importance).[9] *A priori*, I expect that willingness to pay for environmental protection is increasing in educational attainment, trust in the government, and revealed post-materialistic ideals.

2.2.2 Country-level explanatory variables

At the country level, I control for the level of environmental protection, per capita income, and the quality of democratic institutions. The Environmental Protection Index (EPI) measures "how well countries succeed in reducing environmental stress on human health and promoting

[6]Should consider using interaction terms for this part of the analysis.

[7]Respondents were shown an income distribution chart with the average incomes for each income decile in their country and asked in which decile their household income fell. There appears to be a systematic under-reporting of income decile or a sampling issue (cumulatively, most countries have less than 10% reporting to be in the top two deciles of the income distribution).

[8]A result derived in a theoretical companion paper [Dorsch (2011)] is that most-preferred levels of environmental protection are increasing in individual income levels due to the diminishing marginal utility of consumption. This is similar, in spirit, to Baumol and Oates (1979), who model environmental quality as a normal good.

[9]Give and example or a brief discussion of this.

ecosystem vitality and sound natural resource management." The index ranges between 0 and 100 and is increasing in environmental performance. I use specific components of the EPI to control for objective measurements of local environmental quality that correspond to the elements of environmental quality that respondents are asked about in the WVS. Specifically, $water_epi$ gives the percentage of the population that have access to clean drinking water, aas_epi is the percentage of the population that has access to adequate sanitation, ebd_epi is a measure of the population's susceptibility to environmentally-born diseases, and up_epi is a measure of urban air quality. Per capita GDP from 2002 is expressed in terms of PPP-adjusted 1990 US dollars, taken from the United Nations. $lgdpc$ is the natural logarithm of the UN per capita GDP data. Finally, $polity$ is the "revised combined polity score," a measure of democratic institutional quality, which ranges between -10 (strongly autocratic) and 10 (strongly democratic).[10] Summary statistics for all of the variables are provided in Table 1.

3 Empirical analysis

3.1 Preliminaries

To begin the analysis, I consider a series of plots, scattering country averages of the $wtpinc$ dependent variable against the primary country-level variables.[11] In this case, the $y-$axis measures the proportion of respondents that are WTP (part of income or higher taxes) for further environmental protection. In general, the scatter plots that follow indicate that there are important country-level variations that affect individuals' WTP.

Figure 1 plots the dependent variable averages against the log of per capita GDP. The downward slope indicates that higher income countries have fewer individuals that are WTP for further environmental protection, all else equal. The top right panel plots the dependent variable averages against the level of environmental protection that is already in place in the country, as measured by the composite Environmental Protection Index. The downward slope indicates that WTP for environmental protection is diminishing on the margin.[12] The bottom panels of Figure 1 scatter the dependent variable average against sub-components of the Environmental Protection Index. The bottom left panel considers the percentage of the population that has access to adequate sanitation. The negative slope again suggests that willingness to pay

[10]For the tax question, should also be considering average income tax rates and quality of fiscal institutions. I thank Zach Cleary for this suggestion.

[11]Recall that with binary variables, the mean for the sample is equivalent to the proportion of respondents that answered in the affirmative.

[12]In other words, the marginal utility from environmental protection may be diminishing, which would mean that willingness to pay for additional environmental protection should be lower for countries that have already achieved a high level of environmental quality [Baumol and Oates (1979)].

is diminishing on the margin, though the relation is notably weaker. The bottom right panel considers urban air pollution, measured by particles suspended in outdoor air in micro-grams per cubic meeter. Urban air pollution causes lower respiratory infections and cancer, so higher numbers indicate lower environmental quality for this measure.

Table 2 presents the proportion of respondents willing to pay for further environmental protection by country, where the countries are sorted in ascending order according to per capita GDP. The last column presents the composite Environmental Protection Index score.

3.2 Pooled sample probit analysis

I run probit specifications on the pooled sample of individual responses with country fixed effects for 24 developing countries to explain variation in the MWTP binary variables, controlling for the individual and country-level variables described above. The baseline specification that I consider is the following:

$$\text{prob}(wtp_{ij} = 1|\mathbf{X_i}, \mathbf{X_j}) = \Phi\left(\alpha'\mathbf{X_i} + \beta'\mathbf{X_j} + u_{ij}\right), \tag{1}$$

where $wtp_{ij} \in \{0, 1\}$ are the binary responses variable of individual i from country j, Φ represents the standard normal cumulative density function, $\mathbf{X_i}$ is a vector of individual-level explanatory variables, $\mathbf{X_j}$ is a vector of country-level explanatory variables, and α and β are vectors of coefficients to be estimated using probit. The regression output in Tables 3 - 5 report the average marginal effects for the $wtpinc$, $wtptax$, and $wtpgrowth$ variables. The first two columns of each table consider the full pooled sample while the last two columns consider a pool of only the 12 countries with the worst access to adequate sanitation (less than 75% of the population).[13] The first (second) and third (fourth) columns of each table estimate the WTP without (with) country fixed effects.

As measures of fit, the last two rows of each table report the pseudo$-R^2$ and the percentage of within-sample predictions that the specifications get correct.[14] As the tables indicate, at least 70% of responses to the $wtpinc$ question were correctly predicted, at least 63% of the $wtptax$ responses were correctly predicted, and at least 55% of the $wtpgrowth$ responses were correctly predicted, which gives support to the specifications, despite the relatively low pseudo$-R^2$ statistics. As a robustness check, I also estimated the $wtpinc$ specifications with linear probability models, which are presented in Table 6.

[13] In ascending order, according to aas_epi, these countries are: Burkina Faso (13%), Ethiopia (13%), Ghana (18%), India (33%), China (44%), Romania (51.5%), Indonesia (55%), Vietnam (61%), South Africa (65%), Moldova (68%), Egypt (70%), Morocco (73%).

[14] Generally speaking, the ability to predict more than half of the binary outcomes correctly is seen as support for the specification.

3.3 The "objective environmental problems" explanation

One critique of the post-materialist hypothesis is that it predicts that the demand for environmental protection should be lower in poor countries, who "cannot afford" environmental protection due to more pressing materialistic expenditures. Ingelhart (1997) responds that individuals in developing economies are likely to also demand for environmental protection they face "objective environmental problems" and demand environmental protection to overcome their objective problems, rather than to satisfy a subjective post-materialist value. An empirical implication of the objective problems hypothesis is that individuals in developing economies should be more likely to contribute to a *local* public good than to a *global* one. In terms of the individual-level variables that I consider, the objective problems hypothesis implies that the strongest determinants of MWTP should be the perceived *local* environmental problems, such as access to clean water ($water_prob$), urban air pollution (air_prob), and access to adequate sanitation (aas_prob). Additionally, perceived environmental problems that are regional or global [bio_prob, $lake_prob$, and $global_prob$] should have a relatively weak effect on MWTP for environmental protection. In the three country pools considered, there is very little support that this is the case. [JOINT F-TEST NEEDED]

For all three dependent variables (Tables 3 - 5), the perception of local environmental problems are insignificant determinants of WTP for further environmental protection.[15] In fact, of the environmental problems considered, it is the perception that global warming is a serious problem that has a significantly positive impact on individuals' MWTP. Additionally, note that the (significant) coefficient estimates are quite similar between the whole sample and the sub-sample of countries that faced the worst objective environmental problems. The logic of the "objective problems" hypothesis would suggest that the countries with worse objective problems should, on average, have MWTP that is more responsive to local problems and less responsive to global problems.

When considering the significant variables in the probit output, the demand for environmental protection do not seem that different from rich country subjective values. Not only is the effect of identifying oneself as a world citizen greater than the effect of identification as a local citizen, but the effect of world citizenship has the largest magnitude of all the determinants of MWTP. For example, in model (2) from Table 3 [baseline model], a respondent who identified themselves as a world citizen was nearly 14 percentage points more likely to be WTP part of their income (13.5 percentage points more likely to be WTP higher taxes) on the margin. Furthermore, the coefficient on the post-materialistic ideals index is significantly positive across specifications, suggesting that poor people also demand environmental quality for

[15] The only exception is the access to adequate sanitation variable in the first column of Table 5, though this is insignificant once the country fixed effects are included.

post-materialistic reasons. Additionally, education (especially the informal measure, $books$) has a significantly positive impact on MWTP, indicating that subjective values are important (education should not be required for recognizing objective problems). The objective problems hypothesis, while intuitive, does not adequately explain the MWTP in these developing countries, which seem to be explained by subjective values to a greater extent than objective problems. Having established that subjective values are also important determinants of WTP in developing economies, the next subsection considers whether their effects differ significantly from advanced economies

The quality of institutions is also an important determinant of MWTP. In the baseline specification, respondents who trusted their national government were 5.5 percentage points more likely to be WTP part of income (not surprisingly, the coefficient was higher in the WTP higher taxes specification) on the margin. The effect is even stronger among the 12 worst-off countries at 10 percentage points.

As for the country-level effects, per capita GDP negatively affects MWTP. To the extent that *actual* environmental protection initiatives roughly follow the development path, this is consistent with a diminishing marginal utility for environmental protection. Referring to Table 4, Respondents from countries with lower access to adequate sanitation are more likely to be WTP higher taxes on the margin. The sign on the clean water variable is not as expected, however. Interestingly, respondents from countries with more democratic political institutions were less likely to be WTP part of their income. This could be rationalized in a similar way as the negative coefficient on GDP per capita. Along the development path for political institutions, environmental protection improves and marginal utility declines.

3.4 Are developing economies different?

To answer this question, I add to the sample pool 14 countries listed by the IMF as advanced economies, as well as Andorra and Cyprus, for a total of 40 countries.[16] I generate an indicator variable for whether the economy is developing ($IMFdeveloping$ and construct interaction terms with each of the individual-level variables considered in the previous subsection. Table 7 presents these linear probability model results.[17] First of all, note that respondents from developing countries were more likely to be WTP for further environmental protection, all else equal, than respondents from advanced economies. For example, respondents from developing countries were 28.66 percentage points more likely to be WTP part of their income (first column of

[16]The advanced economies that were asked the relevant questions in the 2005-2008 WVS were South Korea, Slovenia, Taiwan, Spain, Italy, Australia, Germany, Canada, Japan, the United States, Finland, Sweden, Switzerland, and Norway.

[17]Linear probability estimations are used due to the well-known problems with using interaction terms in non-linear models, such as probit. See Ai and Norton (2003), for example.

results from Table 7). The interaction terms indicate how the effect of the various explanatory variables differ for developing economies. For example, believing that global warming is a serious problem increases the probability that a respondent is WTP part of her income by 13 percentage points in the advanced economies (coefficient on $globalprob$), but by roughly 6 percentage points less in the developing economies (coefficient on $global_dev$). Similarly, the positive effect of education on WTP part of income is less in developing economies (roughly 0 on net). Moreover, there are not significant differences between the developing and advanced economies as concerns the effect for other "subjective values" variables. The effects of identifying as a world citizen and post-material ideals as determinants of WTP part of income are not significantly different for developing economies (the interaction terms are insignificant). Identification as a local citizen does, however, have a significantly stronger effect for developing economies. The post-materialist ideals variable does have a significantly lower effect in developing economies for the $wtptax$ and $wtpgrowth$ dependent variables, but note that the effect of post-materialism on these dependent variables is still positive on net. Finally, for the $wtpgrowth$ question, identification as a world citizen does have a significantly lower effect in developing economies. Overall, it seems that while one could not conclude that subjective values are unimportant in developing economies, it is reasonable to conclude that the effect of subjective values is of a lower magnitude in the developing world. As a robustness check, Table 8 repeats the exercise, but uses as the indicator variable whether the country is among the 12 worst in terms of access to adequate sanitation.

3.5 Comparison of within-country estimates

In addition to the pooled sample results, I have also preformed within-country probit estimations for each of the 24 IMF developing economies in which the WTP part of income for environmental protection question was asked in the 2005-2008 wave. The benefit of such an exercise is that we can learn how the magnitudes of the determinants of MWTP vary with country-level characteristics, such as income level, current environmental protection and institutional quality. To this end, estimates of the marginal effects (of individual-level variables) for each country are presented in Tables 9 and 10. In each table, if the coefficient estimate was not significant at the 10 percent level, it is recorded as zero. Table 9 provides the marginal effects estimates for the perceived environmental problems variables and the marginal effects estimates for the other variables are in Table 10. The final column of Table 10 provides the predicted probability that a respondent in the median income decile, with country average responses for all other variables, is WTP for further protection.

First of all, note that that the perceived environmental problems (Table 9) do not have

significant impacts on MWTP in most countries. It is the other variables in Table 10 that are significant determinants of MWTP in most countries. Figures 2 - 4 investigate how these coefficient estimates vary with country level characteristics. Figure 2 shows that the effect of identification as a world citizen are increasing in per capita income, level of environmental protection, and institutional quality. Figure 3 shows a similar pattern for the impact of trust in government. Figure 4 shows how the effect of post-materialistic ideals varies across countries. Consistent with the post-materialistic hypothesis, the effect is stronger in richer countries and in countries with better institutions. Perhaps surprisingly, there is no relation with level of environmental protection in place. This may indicate that utility emanating from post-materialistic motivations may not be diminishing on the margin, suggesting a "warm-glow" source of utility. [EXPAND ON THIS] Finally, Figure 5 scatters the predicted probability for the median income decile (other variables held at country average) on the same battery of country-level characteristics. Tables 11 - 13 regress the estimated country-level coefficients (on $worldcit$, $postmaterial$, and $trustgov$) on the local EPI components, controlling for development level and $polity$ score. In general, the regressions indicate that the magnitude of the effect of these post-materialist explanatory variables on WTP do not depend on local environmental conditions.

4 Conclusion

This is a work in progress.

Appendix: Tables and Figures

Table 1: Summary Statistics

Variable	*Observations*	*Mean*	*Std. Dev.*	*Minimum*	*Maximum*
Individual-Level Variables					
wtpinc	35532	0.659	0.474	0	1
wtptax	35347	0.569	0.495	0	1
wtpgrowth	34156	0.502	0.500	0	1
water_prob	37352	0 .526	0.499	0	1
air_prob	37234	0.483	0.500	0	1
aas_prob	36843	0.524	0.499	0	1
bio_prob	34738	0.549	0.498	0	1
lake_prob	35536	0.667	0.471	0	1
global_prob	33332	0.590	0.492	0	1
incdec	36097	4.524	2.190	1	10
worldcit	35336	0.766	0.423	0	1
localcit	36671	0.454	0.498	0	1
education	37850	4.876	2.526	1	9
books	36604	0.270	0.444	0	1
trustgov	33200	0.518	0.500	0	1
postmaterial	34492	1.798	1.112	0	5
Country-Level Variables					
aas_epi	38019	63.507	28/663	0	100
water_epi	38019	84.523	17.196	22	100
ebd_epi	38019	7.173	10.794	0	51
up_epi	38019	60.275	37.078	0	134.789
lgdpc	38019	7.178	0.916	5.241	8.811
polity	38019	4.282	5.965	-7	10

Notes: Calculations by the author.

Table 2: Income, WTP, and EPI Scores for 24 IMF Developing Economies

Country	*2002 GDP per capita*	*Mean WTP Income*	*Mean WTP Tax*	*EPI*
Vietnam	188.80	0.963	0.908	73.91
Ethiopia	214.95	0.793	0.735	58.85
Moldova	391.66	0.648	0.552	70.74
Burkina Faso	461.76	0.805	0.753	44.34
Ghana	489.77	0.829	0.744	70.78
India	561.58	0.680	0.619	60.28
Georgia	762.03	0.781	0.470	82.18
Ukraine	932.78	0.472	0.472	74.10
Indonesia	946.63	0.722	0.590	66.19
Egypt	977.88	0.487	0.308	76.28
China	1017.73	0.824	0.737	65.08
Morocco	1323.47	0.446	0.388	72.09
Romania	1645.61	0.382	0.351	71.93
Thailand	2303.47	0.865	0.742	79.15
Bulgaria	2425.08	0.573	0.511	78.47
Poland	2505.23	0.528	0.467	80.49
Uruguay	2926.45	0.442	0.429	82.29
Turkey	3048.88	0.836	0.782	75.90
South Africa	3067.43	0.537	0.464	68.98
Brazil	3567.90	0.530	0.500	82.65
Mexico	3660.07	0.840	0.705	79.80
Malaysia	3966.54	0.619	0.533	83.98
Chile	4171.19	0.569	0.525	83.44
Trinidad	6706.43	0.747	0.593	70.36

Notes: GDP per capita is PPP-adjusted in 1990 US$, calculated by the United Nations Statistics Division. Willingness to Pay variables are from the 2005-2008 wave of the World Values Survey, and is the proportion of the population that agrees or strongly agrees they would pay part of their income or higher taxes to support environmental protection. Environmental Protection Index (EPI) ranges from 0 to 100, with higher values indicating better environmental protection.

Table 3: Dependent Variable: WTP Part of Income. Probit Average Marginal Effects

Variable	*24 Dev. Econ.*	*24 Dev. Econ.*	*12 Worst*	*12 Worst*
Individual-Level Explanatory Variables				
water_prob (d)	0.0207	0.0106	0.0086	0.0068
	(0.019)	(0.016)	(0.021)	(0.020)
air_prob (d)	0.0195	0.0107	0.0176	0.0083
	(0.015)	(0.014)	(0.018)	(0.011)
aas_prob (d)	0.0009	-0.0020	0.0198	0.0186
	(0.016)	(0.011)	(0.019)	(0.012)
bio_prob (d)	0.0260	0.0316*	0.0023	0.0037
	(0.020)	(0.018)	(0.017)	(0.015)
lake_prob (d)	-0.0349	-0.0179	-0.0073	0.0081
	(0.022)	(0.021)	(0.025)	(0.018)
global_prob (d)	0.0609***	0.0550***	0.0555***	0.0380**
	(0.015)	(0.015)	(0.015)	(0.016)
incdec	0.0089*	0.0090**	0.0075	0.0114***
	(0.005)	(0.004)	(0.006)	(0.004)
worldcit (d)	0.1504***	0.1397***	0.1813***	0.1328***
	(0.028)	(0.023)	(0.039)	(0.028)
localcit (d)	0.0437**	0.0372***	0.0287	0.0355**
	(0.018)	(0.014)	(0.018)	(0.015)
education	-0.0001	0.0022	-0.0064	0.0040
	(0.007)	(0.005)	(0.008)	(0.004)
books (d)	0.0573***	0.0547***	0.0766***	0.0530***
	(0.015)	(0.014)	(0.016)	(0.014)
trustgov (d)	0.0808***	0.0554***	0.1316***	0.1004***
	(0.031)	(0.017)	(0.044)	(0.011)
postmaterial	0.0213***	0.0235***	0.0252***	0.0195***
	(0.008)	(0.007)	(0.007)	(0.007)
Country-Level Explanatory Variables				
aas_epi		0.0002		-0.0013
		(0.001)		(0.001)
watsup_epi		0.0020		0.0019***
		(0.001)		(0.000)
ebd_epi		0.0016		0.0003
		(0.002)		(0.001)
up_epi		0.0014		0.0017***
		(0.001)		(0.001)
lgdpc		-0.0696**		-0.0872***
		(0.033)		(0.025)
polity		-0.0080		-0.0075*
		(0.006)		(0.004)
N	23626	23626	12009	12009
pseudo-R^2	0.040	0.073	0.058	0.133
% Correct	70.50	71.68	72.11	74.61

Notes: *, **, and *** indicate significance at 10, 5, and 1 % levels, respectively. Standard errors (in parentheses) are clustered at the country level. (d) for discrete change of dummy variable from 0 to 1. *12 Worst* refers to the 12 countries with the worst access to adequate sanitation among the 24 developing economies.

Table 4: Dependent Variable: WTP Higher Taxes. Probit Average Marginal Effects

Variable	*24 Dev. Econ.*	*24 Dev. Econ.*	*12 Worst*	*12 Worst*
Individual-Level Explanatory Variables				
water_prob (d)	0.0093	-0.0061	-0.0046	-0.0116
	(0.018)	(0.016)	(0.025)	(0.026)
air_prob (d)	0.0041	-0.0027	-0.0018	-0.0089
	(0.015)	(0.015)	(0.023)	(0.015)
aas_prob (d)	0.0042	-0.0041	0.0263	0.0252
	(0.017)	(0.013)	(0.025)	(0.021)
bio_prob (d)	0.0356**	0.0407***	0.0128	0.0165
	(0.017)	(0.015)	(0.025)	(0.021)
lake_prob (d)	-0.0094	0.0086	-0.0166	-0.0038
	(0.019)	(0.018)	(0.028)	(0.018)
global_prob (d)	0.0333	0.0285	0.0696***	0.0511**
	(0.021)	(0.022)	(0.021)	(0.022)
incdec	0.0132***	0.0131***	0.0098*	0.0130***
	(0.005)	(0.005)	(0.006)	(0.003)
worldcit (d)	0.1502***	0.1348***	0.1850***	0.1432***
	(0.022)	(0.021)	(0.036)	(0.019)
localcit (d)	0.0139	0.0045	0.0206	0.0220
	(0.018)	(0.015)	(0.019)	(0.019)
education	-0.0092*	-0.0065	-0.0145*	-0.0024
	(0.006)	(0.005)	(0.008)	(0.004)
books (d)	0.0691***	0.0671***	0.0907***	0.0669***
	(0.012)	(0.013)	(0.011)	(0.011)
trustgov (d)	0.0847***	0.0616***	0.1179***	0.1012***
	(0.029)	(0.014)	(0.046)	(0.017)
postmaterial	0.0139*	0.0170**	0.0140*	0.0078
	(0.007)	(0.007)	(0.008)	(0.008)
Country-Level Explanatory Variables				
aas_epi		-0.0007		-0.0020*
		(0.001)		(0.001)
watsup_epi		0.0023*		0.0013**
		(0.001)		(0.001)
ebd_epi		0.0022		0.0001
		(0.002)		(0.002)
up_epi		0.0012		0.0010
		(0.001)		(0.001)
lgdpc		-0.0626**		-0.0990***
		(0.027)		(0.031)
polity		-0.0057		-0.0058
		(0.006)		(0.005)
N	23568	23568	11986	11986
pseudo-R^2	0.030	0.054	0.046	0.103
% Correct	63.33	64.17	66.14	68.78

Notes: *, **, and *** indicate significance at 10, 5, and 1 % levels, respectively. Standard errors (in parentheses) are clustered at the country level. (d) for discrete change of dummy variable from 0 to 1. *12 Worst* refers to the 12 countries with the worst access to adequate sanitation among the 24 developing economies.

Table 5: Dependent Variable: WTP Forgone Growth. Probit Average Marginal Effects

Variable	*24 Dev. Econ.*	*24 Dev. Econ.*	*12 Worst*	*12 Worst*
Individual-Level Explanatory Variables				
water_prob (d)	-0.0089	-0.0040	-0.0178	-0.0205
	(0.021)	(0.016)	(0.031)	(0.023)
air_prob (d)	-0.0052	-0.0052	-0.0301	-0.0212
	(0.022)	(0.021)	(0.034)	(0.030)
aas_prob (d)	-0.0335**	-0.0219	-0.0144	0.0067
	(0.015)	(0.015)	(0.020)	(0.022)
bio_prob (d)	0.0461**	0.0459**	0.0090	0.0059
	(0.021)	(0.019)	(0.029)	(0.023)
lake_prob (d)	0.0556***	0.0517***	0.0468*	0.0309
	(0.017)	(0.015)	(0.027)	(0.019)
global_prob (d)	0.0712***	0.0733***	0.0944***	0.0858***
	(0.017)	(0.017)	(0.023)	(0.021)
incdec	-0.0029	-0.0018	0.0014	0.0036
	(0.005)	(0.005)	(0.010)	(0.008)
worldcit (d)	0.0005	0.0038	-0.0124	-0.0062
	(0.020)	(0.017)	(0.038)	(0.034)
localcit (d)	-0.0247*	-0.0189	-0.0269	-0.0262
	(0.014)	(0.015)	(0.022)	(0.021)
education	0.0035	0.0018	-0.0033	0.0000
	(0.006)	(0.005)	(0.010)	(0.005)
books (d)	0.0168	0.0226*	0.0295	0.0363**
	(0.014)	(0.013)	(0.024)	(0.015)
trustgov (d)	0.0267	-0.0023	0.0470	-0.0049
	(0.026)	(0.021)	(0.046)	(0.020)
postmaterial	0.0207***	0.0218***	0.0082	0.0096
	(0.007)	(0.006)	(0.010)	(0.007)
Country-Level Explanatory Variables				
aas_epi		-0.0003		-0.0009
		(0.001)		(0.001)
watsup_epi		0.0039*		0.0048*
		(0.002)		(0.003)
ebd_epi		-0.0014		-0.0003
		(0.003)		(0.003)
up_epi		-0.0002		-0.0010
		(0.001)		(0.001)
lgdpc		-0.0106		-0.0515
		(0.026)		(0.036)
polity		-0.0085**		-0.0094*
		(0.004)		(0.005)
N	22948	22948	11688	11688
pseudo-R^2	0.016	0.028	0.012	0.039
% Correct	56.24	58.24	55.20	60.02

Notes: *, **, and *** indicate significance at 10, 5, and 1 % levels, respectively. Standard errors (in parentheses) are clustered at the country level. (d) for discrete change of dummy variable from 0 to 1. *12 Worst* refers to the 12 countries with the worst access to adequate sanitation among the 24 developing economies.

Table 6: Dependent Variable: WTP Part of Income. Linear Probability Model

Variable	*24 Dev. Econ.*	*24 Dev. Econ.*	*12 Worst*	*12 Worst*
Individual-Level Explanatory Variables				
water_prob (d)	0.0200	0.0121	0.0088	0.0082
	(0.019)	(0.016)	(0.021)	(0.020)
air_prob (d)	0.0184	0.0111	0.0166	0.0075
	(0.015)	(0.013)	(0.018)	(0.011)
aas_prob (d)	0.0010	-0.0021	0.0203	0.0199
	(0.015)	(0.011)	(0.019)	(0.012)
bio_prob (d)	0.0262	0.0296	0.0028	0.0012
	(0.020)	(0.018)	(0.016)	(0.013)
lake_prob (d)	-0.0352	-0.0195	-0.0085	0.0067
	(0.023)	(0.021)	(0.025)	(0.017)
global_prob (d)	0.0594***	0.0529***	0.0526***	0.0352**
	(0.015)	(0.015)	(0.014)	(0.015)
incdec	0.0084	0.0080*	0.0070	0.0100**
	(0.005)	(0.004)	(0.006)	(0.004)
worldcit (d)	0.1505***	0.1368***	0.1806***	0.1273***
	(0.028)	(0.023)	(0.038)	(0.027)
localcit (d)	0.0424**	0.0352**	0.0276	0.0315**
	(0.018)	(0.013)	(0.017)	(0.013)
education	-0.0000	0.0026	-0.0061	0.0037
	(0.006)	(0.005)	(0.008)	(0.004)
books (d)	0.0556***	0.0524***	0.0740***	0.0501***
	(0.014)	(0.014)	(0.016)	(0.014)
trustgov (d)	0.0782**	0.0524***	0.1271**	0.0927***
	(0.030)	(0.016)	(0.043)	(0.014)
postmaterial	0.0207**	0.0223***	0.0241***	0.0178**
	(0.008)	(0.007)	(0.007)	(0.007)
Country-Level Explanatory Variables				
aas_epi		0.0002		-0.0016
		(0.001)		(0.001)
watsup_epi		0.0017		0.0017**
		(0.001)		(0.001)
ebd_epi		0.0014		-0.0000
		(0.002)		(0.001)
up_epi		0.0014		0.0019***
		(0.001)		(0.001)
lgdpc		-0.0615**		-0.0789***
		(0.029)		(0.020)
polity		-0.0058		-0.0056*
		(0.005)		(0.003)
N	23626	23626	12009	12009
Adjusted-R^2	0.049	0.084	0.070	0.151

Notes: *, **, and *** indicate significance at 10, 5, and 1 % levels, respectively. Standard errors (in parentheses) are clustered at the country level. (d) for discrete change of dummy variable from 0 to 1. *12 Worst* refers to the 12 countries with the worst access to adequate sanitation among the 24 developing economies.

Table 7: Dependent Variable: Willingness To Pay. Linear Probability Model

Variable	*Part of Income*	*Higher Taxes*	*Lost Growth*
IMF_developing	0.2866***	0.3315***	0.2281***
	(0.097)	(0.085)	(0.080)
globalprob	0.1310***	0.1255***	0.1525***
	(0.017)	(0.013)	(0.015)
global_dev	-0.0623**	-0.0707**	-0.0378*
	(0.030)	(0.028)	(0.020)
incdec	0.0108***	0.0131***	0.0089
	(0.003)	(0.003)	(0.005)
incdec_dev	-0.0028	-0.0005	-0.0119
	(0.006)	(0.006)	(0.007)
worldcit	0.1325***	0.1116***	0.0754**
	(0.029)	(0.034)	(0.033)
world_dev	0.0208	0.0373	-0.0720*
	(0.040)	(0.040)	(0.038)
localcit	-0.0153	0.0033	-0.0004
	(0.015)	(0.020)	(0.021)
local_dev	0.0583**	0.0106	-0.0221
	(0.023)	(0.026)	(0.025)
education	0.0272***	0.0231***	0.0104
	(0.006)	(0.006)	(0.009)
educ_dev	-0.0273***	-0.0319***	-0.0072
	(0.009)	(0.008)	(0.011)
books	0.0410***	0.0308***	0.0228**
	(0.011)	(0.009)	(0.011)
books_dev	0.0161	0.0378**	-0.0057
	(0.018)	(0.015)	(0.018)
trustgov	0.0693***	0.1026***	0.0312
	(0.019)	(0.015)	(0.019)
trustgov_dev	0.0090	-0.0182	-0.0037
	(0.035)	(0.032)	(0.032)
postmaterial	0.0351***	0.0458***	0.0660***
	(0.008)	(0.008)	(0.011)
post_dev	-0.0150	-0.0324***	-0.0454***
	(0.012)	(0.011)	(0.014)
N	38822	38773	37850
Adjusted-R^2	0.084	0.061	0.048

Notes: *, **, and *** indicate significance at 10, 5, and 1 % levels, respectively. Standard errors (in parentheses) are clustered at the country level. (d) for discrete change of dummy variable from 0 to 1.

Table 8: Dependent Variable: Willingness to Pay. Linear Probability Model

Variable	*Part of Income*	*Higher Taxes*	*Lost Growth*
aas_12worst	0.1304	0.1689*	0.1606**
	(0.113)	(0.098)	(0.067)
globalprob	0.1053***	0.0861***	0.1403***
	(0.030)	(0.028)	(0.013)
global_12	-0.0390	-0.0134	-0.0349
	(0.035)	(0.037)	(0.022)
incdec	0.0097**	0.0141***	0.0034
	(0.004)	(0.005)	(0.004)
incdec_12	-0.0028	-0.0048	-0.0021
	(0.007)	(0.007)	(0.010)
worldcit	0.1436***	0.1251***	0.0532**
	(0.033)	(0.031)	(0.023)
world_12	0.0400	0.0573	-0.0649
	(0.050)	(0.047)	(0.042)
localcit	0.0186	0.0005	-0.0065
	(0.017)	(0.014)	(0.015)
local_12	0.0088	0.0208	-0.0149
	(0.023)	(0.022)	(0.027)
education	0.0145*	0.0084	0.0123**
	(0.008)	(0.006)	(0.006)
educ_12	-0.0211*	-0.0224**	-0.0151
	(0.011)	(0.009)	(0.012)
books	0.0403***	0.0393***	0.0166*
	(0.011)	(0.010)	(0.009)
books_12	0.0352*	0.0490***	0.0105
	(0.020)	(0.015)	(0.025)
trustgov	0.0515***	0.0771***	0.0217
	(0.018)	(0.016)	(0.016)
trustgov_12	0.0716	0.0371	0.0286
	(0.045)	(0.047)	(0.049)
postmaterial	0.0239***	0.0325***	0.0520***
	(0.008)	(0.008)	(0.008)
post_12	0.0002	-0.0195*	-0.0455***
	(0.010)	(0.011)	(0.013)
N	38822	38773	37850
Adjusted-R^2	0.065	0.058	0.049

Notes: *, **, and *** indicate significance at 10, 5, and 1 % levels, respectively. Standard errors (in parentheses) are clustered at the country level. (d) for discrete change of dummy variable from 0 to 1.

Table 9: Meta Analysis of Country-Level Probit Marginal Effects – Local and Global Environmental Problems

Country	*water*	*air*	*aas*	*bio*	*lakes*	*globe*
Burkina Faso	0	-0.064	0	0	0	0
Ethiopia	0	0.067	0	-0.092	0.089	0
Ghana	0	0	0	0	0	0
India	0	0.084	0	-0.102	0.075	0
China	0	0	0	0	0	0
Romania	0	0	0.089	0	0	0
Indonesia	0	0	0	0	0	0
Vietnam	0.022	0.023	0	0	0	0
South Africa	0.059	0	0	0	0	0
Moldova	0	0	0	0	0.162	0
Egypt	-0.115	0.223	-0.135	0.122	-0.170	-0.093
Morocco	-0.249	0.200	0	0	-0.119	0
Brazil	0	-0.073	0	0.146	0	0
Mexico	0	0	0	0	0	0
Poland	0	0	0.104	0	0.142	0
Turkey	0	0	0	0.090	0	0.112
Chili	0.107	0	-0.097	0	0	0
Georgia	0	0	0	0	0	0
Malaysia	0	0	0	0	-0.092	0.132
Ukraine	0	0	0	0.098	0.136	0
Bulgaria	0	0	0	0	0	0.119
Thailand	0	0	0	-0.071	0	0.062
Trinidad	0	0	0	0.083	0	0.124
Uruguay	0	0	0	0	0	0
Significant Positive	3/24	5/24	2/24	5/24	5/24	5/24
Significant Negative	2/24	2/24	2/24	3/24	3/24	1/24

Notes: Estimated marginal effects from country-level probit regressions, with heteroskedasticity robust standard errors. Non-zero estimates are significant with at least 10 per cent significance. Details of country-level probit regressions are available on request.

Table 10: Meta Analysis of Country-Level Probit Marginal Effects – Other Characteristics and Predicted Fit for Median Income Decile

Country	*incdec*	*world*	*local*	*educ*	*trust*	*post*	*fit*
Burkina Faso	0	0	0	0	0	0.025	0.871
Ethiopia	0	-0.090	0.058	-0.017	0	-0.026	0.858
Ghana	0	0.071	-0.042	0	0	0	0.859
India	0	0.112	0	0.016	0.110	0	0.818
China	0	0	0	0	0.116	0	0.915
Romania	0.014	0.097	0.097	0.023	0	0.040	0.409
Indonesia	-0.013	0	0.062	0	0.093	0.043	0.780
Vietnam	0	0	0	0	0	0	0.977
South Africa	0.018	0.158	0	0	0.126	0.035	0.578
Moldova	0.019	0.071	0.087	0	0	0.034	0.670
Egypt	0.030	-0.052	0	0.023	n/a	0.023	0.517
Morocco	0.040	0.306	-0.124	0.027	0	0	0.525
Brazil	0	0.108	0.086	0	0.077	0.035	0.523
Mexico	0	0.072	0	0.011	0.041	0	0.858
Poland	0	0	0	0	0.201	0	0.562
Turkey	0.013	0	0	0	0	0	0.866
Chili	0.030	0.205	0	0	0.067	0.052	0.618
Georgia	0	0.100	0	0	0	0.024	0.818
Malaysia	0	0.163	-0.081	0	-0.066	0.072	0.627
Ukraine	0.043	0.108	0	0	0.111	0.037	0.466
Bulgaria	0.050	0.114	0	0	0.116	0.057	0.670
Thailand	0	0.131	0	0	0.050	0	0.888
Trinidad	0	0.094	-0.056	0.022	0.067	0.068	0.784
Uruguay	0	0	0	0	0.113	0	0.447
Significant Positive	9/24	15/24	5/24	6/24	13/23	13/24	
Significant Negative	1/24	2/24	4/24	1/24	1/23	1/24	
Greater than 0.5							21/24

Notes: Estimated marginal effects from country-level probit regressions, with heteroskedasticity robust standard errors. Non-zero estimates are significant with at least 10 per cent significance. The $trustgov$ question was not asked in the Egyptian survey, so it was not included as a regressor in the Egyptian case. The *fit* column is the predicted probability that a respondent agrees with the WTP income question assuming median income decile and country average values for all other questions. Details of country-level probit regressions are available on request.

Table 11: META ANALYSIS OF COUNTRY-LEVEL PROBIT MARGINAL EFFECTS. DEPENDENT VARIABLE: *worldcit* COEFFICIENT ESTIMATES – REGRESSION ANALYSIS

Variable	(1)	(2)	(3)	(4)	(5)
lgdpc	0.0325	0.0289	0.0304	0.0329	0.0389**
	(0.024)	(0.027)	(0.025)	(0.023)	(0.017)
polity	-0.0006	-0.0006	-0.0005	-0.0006	-0.0018
	(0.004)	(0.004)	(0.004)	(0.004)	(0.003)
epi_epi	0.0011				
	(0.002)				
aas_epi		0.0005			
		(0.001)			
watsup_epi			0.0008		
			(0.001)		
ebd_epi				-0.0010	
				(0.002)	
up_epi					-0.0014***
					(0.000)
constant	-0.2399	-0.1662	-0.2092	-0.1542	-0.1170
	(0.164)	(0.157)	(0.144)	(0.166)	(0.121)
N	24	24	24	24	24
Adjusted R^2	0.060	0.064	0.068	0.065	0.375
Joint Sig. $p-$value	0.248	0.239	0.230	0.237	0.006

Notes: Dependent variable is the estimated marginal effects from country-level probit regressions, with heteroskedasticity robust standard errors. Estimates not significant with at least 10 per cent significance are entered as zero. Details of country-level probit regressions are available on request.

Table 12: Meta Analysis of Country-Level Probit Marginal Effects. Dependent Variable: *postmaterial* coefficient estimates – Regression Analysis

Variable	(1)	(2)	(3)	(4)	(5)
lgdpc	0.0136	0.0094	0.0019	0.0031	0.0064
	(0.018)	(0.020)	(0.018)	(0.017)	(0.016)
polity	0.0029	0.0028	0.0027	0.0027	0.0028
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
epi_epi	-0.0014				
	(0.002)				
aas_epi		-0.0002			
		(0.001)			
watsup_epi			0.0005		
			(0.001)		
ebd_epi				-0.0006	
				(0.001)	
up_epi					-0.0000
					(0.000)
constant	0.0353	-0.0240	-0.0182	0.0155	-0.0126
	(0.123)	(0.119)	(0.109)	(0.125)	(0.114)
N	23	23	23	23	23
Adjusted R^2	-0.013	-0.044	-0.034	-0.035	-0.047
Joint Sig. $p-$value	0.456	0.568	0.531	0.536	0.580

Notes: Dependent variable is the estimated marginal effects from country-level probit regressions, with heteroskedasticity robust standard errors. Estimates not significant with at least 10 per cent significance are entered as zero. Details of country-level probit regressions are available on request.

Table 13: Meta Analysis of Country-Level Probit Marginal Effects. Dependent Variable: *trustgov* coefficient estimates – Regression Analysis

Variable	(1)	(2)	(3)	(4)	(5)
lgdpc	0.0122*	0.0081	0.0096	0.0107	0.0112*
	(0.007)	(0.008)	(0.007)	(0.007)	(0.006)
polity	0.0003	0.0003	0.0003	0.0003	0.0003
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
epi_epi	-0.0002				
	(0.001)				
aas_epi		0.0002			
		(0.000)			
watsup_epi			0.0002		
			(0.000)		
ebd_epi				-0.0001	
				(0.001)	
up_epi					-0.0000
					(0.000)
constant	-0.0546	-0.0492	-0.0623	-0.0564	-0.0597
	(0.047)	(0.045)	(0.041)	(0.048)	(0.042)
N	24	24	24	24	24
Adjusted R^2	0.108	0.123	0.113	0.106	0.106
Joint Sig. $p-$value	0.157	0.136	0.150	0.160	0.161

Notes: Dependent variable is the estimated marginal effects from country-level probit regressions, with heteroskedasticity robust standard errors. Estimates not significant with at least 10 per cent significance are entered as zero. Details of country-level probit regressions are available on request.

Figure 1: Proportion of individuals willing to pay part of income for further environmental protection scattered against country-level measurements for 24 developing economies. Top left: log of per capita GDP ($R^2 = 0.135$); top right: Environmental Protection Index ($R^2 = 0.083$); bottom left: percentage with access to adequate sanitation ($R^2 = 0.067$); bottom right: measure of urban air pollution ($R^2 = 0.045$).

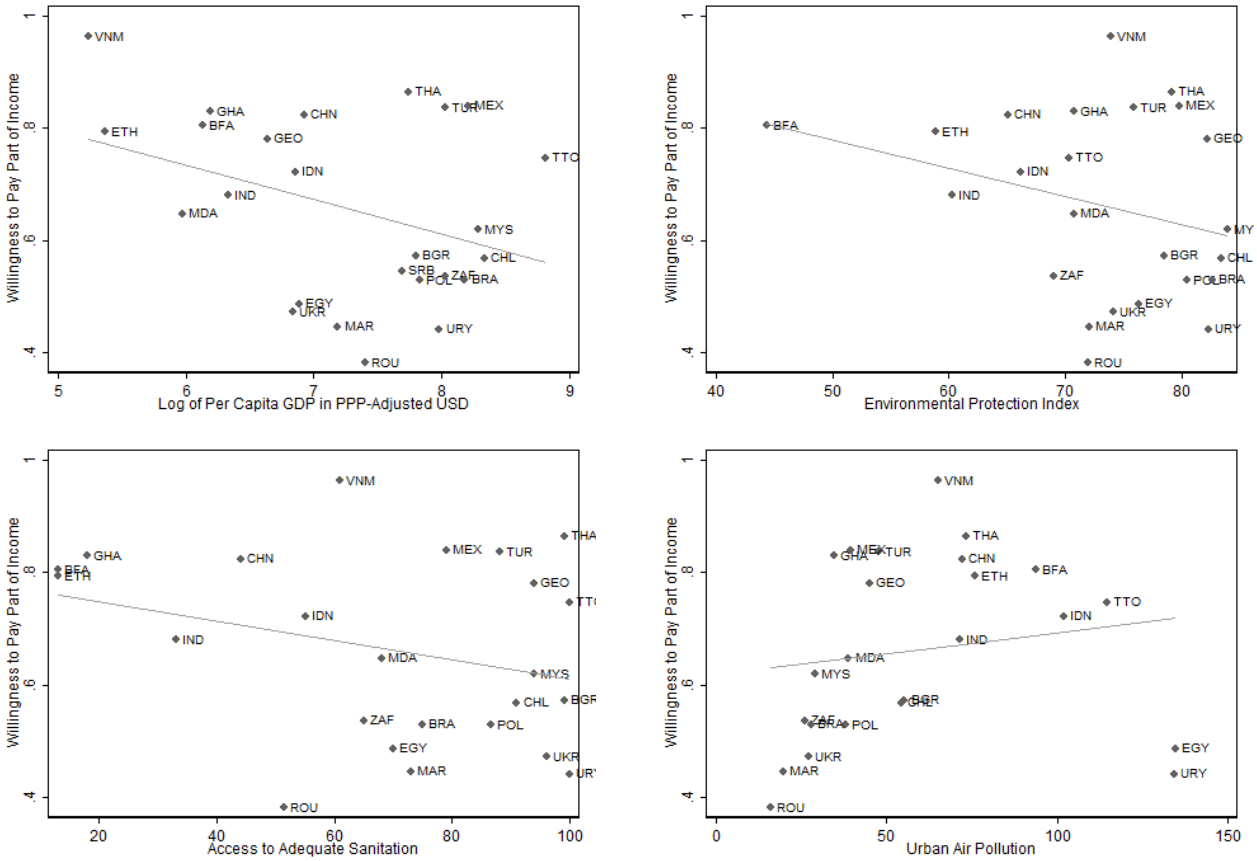


Figure 2: Estimated Coefficient on World Citizenship Identifier scattered against (i) Log of Per Capita Income ($R^2 = 0.172$), (ii) Environmental Protection Index ($R^2 = 0.101$), (iii) Polity Score ($R^2 = 0.035$), and (iv) Functioning of Government Score ($R^2 = 0.057$).

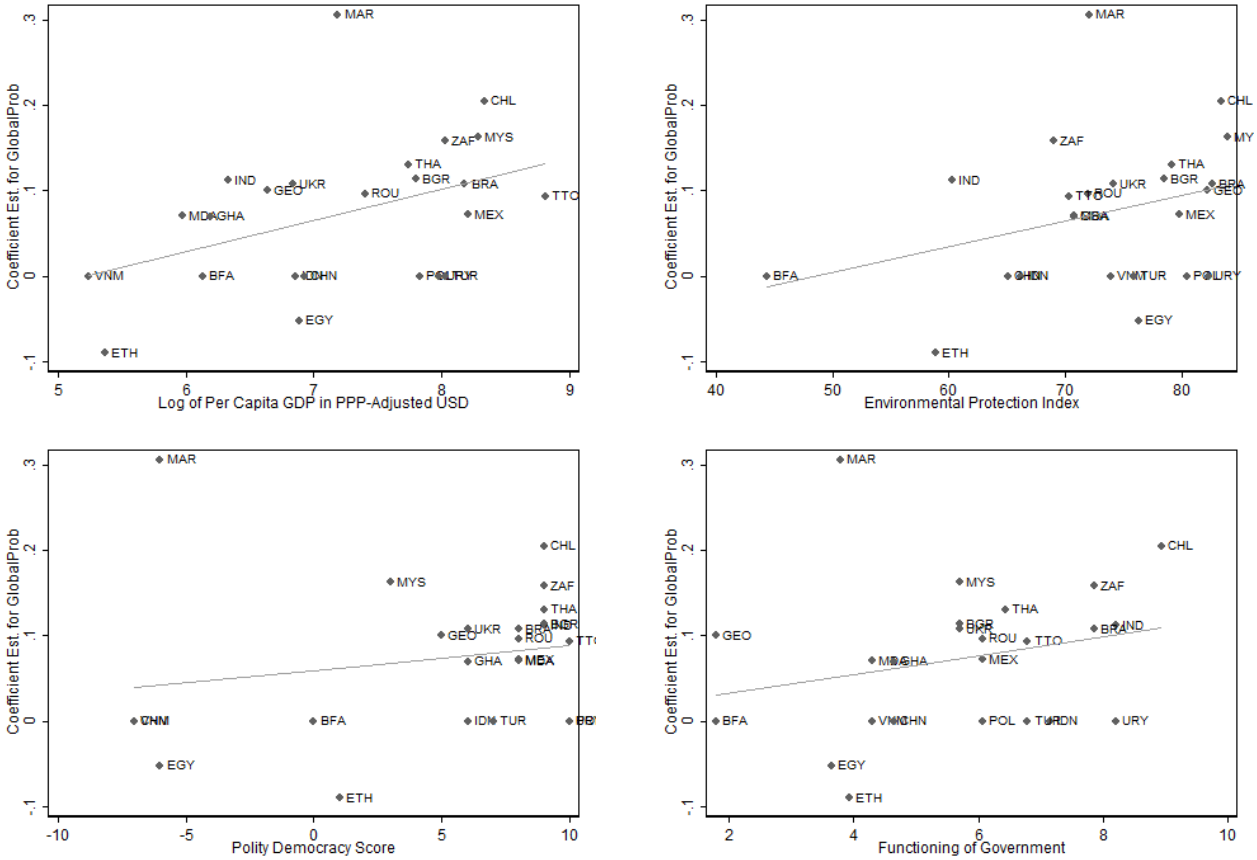


Figure 3: Estimated Coefficient on Trust in Government Indicator scattered against (i) Log of Per Capita Income ($R^2 = 0.218$), (ii) Environmental Protection Index ($R^2 = 0.049$), (iii) Polity Score ($R^2 = 0.087$), and (iv) Functioning of Government Score ($R^2 = 0.044$).

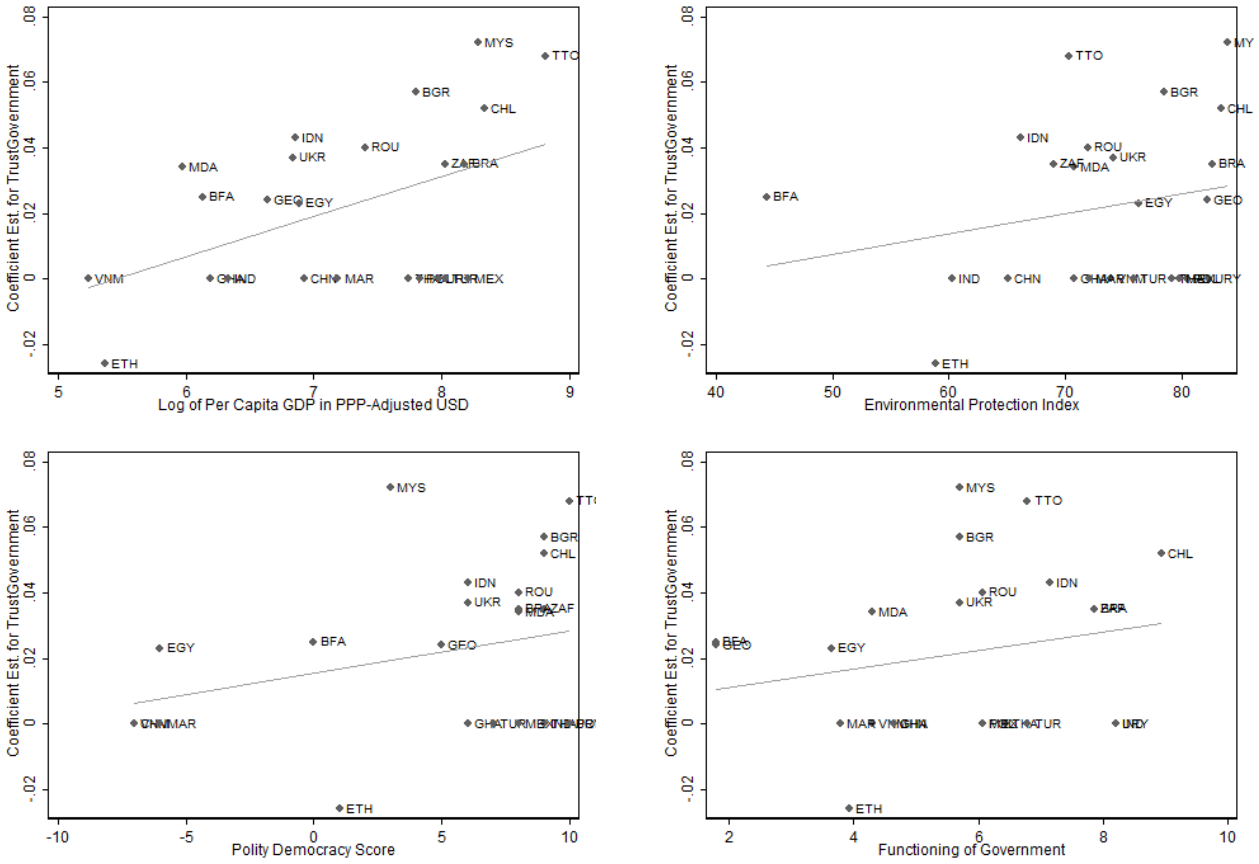


Figure 4: Estimated Coefficient on Post Materialism Index scattered against (i) Log of Per Capita Income ($R^2 = 0.087$), (ii) Environmental Protection Index ($R^2 = 0.000$), (iii) Polity Score ($R^2 = 0.088$), and (iv) Functioning of Government Score ($R^2 = 0.162$).

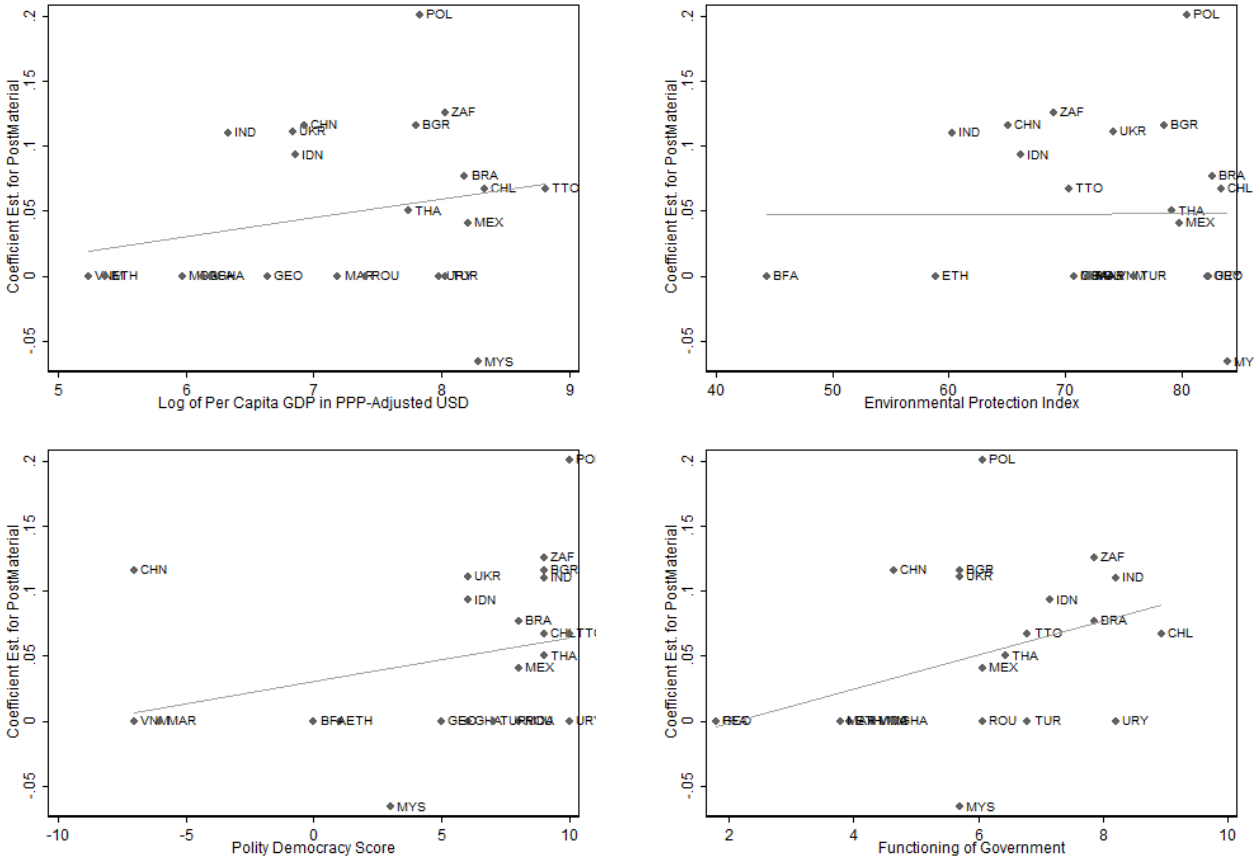
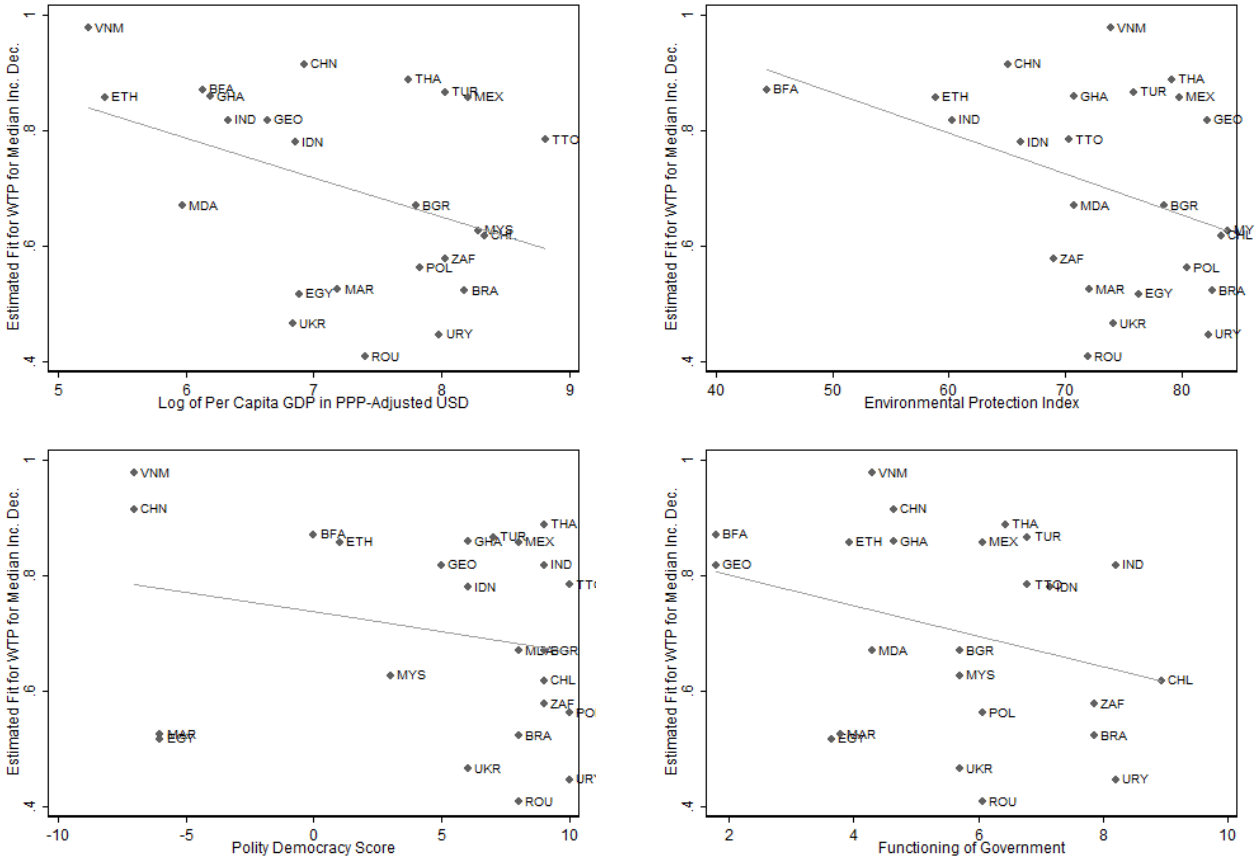


Figure 5: Estimated Fit for WTP Income for the Median Income Decile scattered against (i) Log of Per Capita Income ($R^2 = 0.153$), (ii) Environmental Protection Index ($R^2 = 0.147$), (iii) Polity Score ($R^2 = 0.052$), and (iv) Functioning of Government Score ($R^2 = 0.089$).



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