

# Acceptable Tradeoffs between Economic Growth and Environmental Protection

Hye-Sung Kim\* and Youngchae Lee†

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## Abstract

Is economic development a prerequisite for concern over environmental issues? Up through the 1980s, the prevailing wisdom on economic development and environmental protection was that people living in countries at low levels of economic development (developing countries) had little concern for environmental problems. At the time, individual-level surveys on attitudes toward environmental problems were implemented almost exclusively in developed (industrialized) countries, so this idea was largely accepted on faith. However, the 1990s saw an expansion of survey coverage to developing countries; studies that analyzed this data argued that there is a high level of concern about environmental issues amongst residents of developing countries. While a complete consensus is yet to be had on this issue, most researchers who use this survey data conclude that residents of developing countries are at least as, if not more, concerned about environmental problems compared to residents of developed countries.

We find two main weaknesses in the traditional survey research on this topic. First, the conclusions are likely to be biased due to social desirability bias and priming effects. Second, while people's levels of concern regarding environmental issues are likely to vary depending on how much they are affected by environmental damage, the heterogeneous effects of negative environmental costs are not addressed.

Our study addresses these two concerns by designing a survey experiment in Kenya, a developing economy that has seen moderate growth rates over the

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\*Winthrop University, Assistant Professor. email: kimh@winthrop.edu

†University of Rochester, PhD. email: youngchae.lee@rochester.edu

past decade, and a healthy inflow of FDI. Instead of directly asking respondents about their views on environmental issues, we randomize the potential environmental costs of FDI projects, and measure how these costs affect people's satisfaction with the projects. Furthermore, we design our experiment to measure people's satisfaction of an FDI project in a remote area, to take into account how distance from a problem can affect people's concerns about environmental costs.

Our data analysis finds that respondents' attitudes toward an FDI project in a distant area are not affected by knowledge of the environmental pollution caused by the project. This suggests that people's awareness and support for solving environmental problems are likely to depend on whether they are directly affected by the issue. Our findings suggest that in order to increase awareness and support for the addressing of environmental problems caused by rapid economic growth in developing countries, helping individuals internalize the costs of environmental damage originating in a remote area through information and training seems essential.

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# Introduction

The idea of an environmental Kuznets curve (EKC), which hypothesizes an inverted U-shaped relationship between economic development and environmental pollution, is a longstanding one. According to this hypothesis, environmental pollution increases as a country's economy grows and develops, but above a certain threshold of development, pollution starts decreasing. While this idea has not been immune to criticism, it has been used to describe the disparities in environmental quality between developed (industrialized) and developing countries.

Related to this idea of the EKC is the expectation that residents of developing countries would be relatively unconcerned about environmental problems compared to residents of developed countries, and that they would prioritize economic growth and security over environmental protection. This was long accepted as common wisdom, especially prior to the advent of widespread survey implementation in developing countries. However, when institutions such as Gallup started extending their survey coverage to developing countries in the 1990s, many researchers found significant concern about the environment amongst residents of developing countries. There still exists some disagreement on this issue, with a small number of researchers arguing that developing countries show lower levels of concern about the environment compared to developed countries. However, it is fair to say that most studies conclude that developing countries show a high degree of concern about the environment, at levels at least as high or even exceeding those of developed countries.

Our study examines these conclusions by questioning the validity of traditional survey data and the inferences that are drawn from them. Traditional cross-sectional and panel survey data are susceptible to a variety of methodological issues, which makes them liable to lead to misleading conclusions. In order to ameliorate these problems, we use an experimental survey approach. Our data analysis finds that when presented with the prospect of a foreign direct investment (FDI) project in a remote and distant area, respondents are not particularly influenced by the possibility of environmental pollution that would accompany said project. This challenges the prevailing wisdom that residents of developing countries are highly concerned with environmental problems and would be willing to sustain economic costs to prevent environmental damage.

In the following section, we survey the existing literature, discussing their findings and the methods they use to draw their conclusions. We follow that with a discussion of the shortcomings of traditional surveys, and put forth a theory as to why concern about environmental issues in developing countries might not be as high as was previously thought. We then discuss our survey experiment method and its findings.

# Literature

## Existing Public Surveys on Environmental Issues

Public opinion surveys on environmental issues were initially only carried out in developed, industrialized countries. This changed in the 1990s when polling organizations started extending their coverage to developing countries. Methodologically, these surveys asked the same questions of all respondents without dividing them into control or treatment groups (in other words, the surveys were not run with an experimental structure). When presenting the data, they show the percentage of respondents in a country that gave a particular response to a given question. A small number of these studies also calculate correlations coefficients between responses and GDP per capita, or run linear regressions.

Substantively, there is a divide between scholars who think that wealth and affluence lead to a higher level of environmental concern, and those who argue that citizens of developing nations are more concerned about the environment due to their vulnerability to climate change and generally lower levels of environmental quality. Most studies fall into the latter category.

One of the earliest people to identify this tension was Inglehart (1995), who analyzed the 1990-93 World Values Survey (WVS), carried out in 43 countries. His main analysis is based on an index that reflects responses to 4 questions concerning environmental protection. In this study, the author advances two hypotheses. The first is that “mass support for environmental protection tends to be greatest in countries that have relatively severe objective problems (as indicated by levels of air pollution and water pollution)” (p. 57). He finds support for this hypothesis, saying that “public support for environmental protection in a given country tends to reflect that country’s objective circumstances: the more severely polluted, the greater the public concern” (p. 61). The second hypothesis is that “countries that have relatively postmaterialistic publics, rank relatively high in their readiness to make financial sacrifices for the sake of environmental protection” (p. 57). To test this, the author analyzes responses from advanced industrial societies, and groups the respondents according to the number of postmaterialist goals given high priority. The higher the number of goals, the larger the percentage of people classified as “high” on environmental protection. As Inglehart points out, these two models are at odds with each other, making it unclear whether developing countries will prioritize environmental problems more than developed countries. He declines to decide whether one factor might be decisively important over the other, saying that “the available evidence indicates that both of these factors are about equally important.” (p. 57)

While the World Values Survey analyzed by Inglehart was a significant grass-roots attempt to collect worldwide data that includes developing countries, there were concerns about its comparability and consistency across nations.<sup>1</sup> The “Health of the Planet” (HOP) survey administered by the George H. Gallup International Institute (Dunlap, Gallup Jr. and Gallup 1993) also gathered survey data from developing countries, but sidestepped many of the WVS’ shortcomings. For example, each Gallup affiliate translated the questionnaire into the local language, and then the Gallup institute “back-translated” them into English to ensure consistency. Problems of literacy were minimized by conducting in-home interviews in person. All the surveys were completed between January and April 1992, which reduced discrepancies due to time lags.

Gallup’s own analysis of the HOP data became the first of many studies to argue that citizens of developing countries had a strong interest in environmental protection. This study asked questions such as “*How concerned are you personally about environmental problems – would you say a great deal, a fair amount, not very much, or not at all?*” and gave the percentage of respondents that gave a particular answer (such as “*a great deal*”) for each country. The answers suggested that people in developing countries showed a level of concern for the environment that equalled, if not exceeded, that of people in developed countries.

Since then, many additional studies (Dunlap and Mertig 1995; Bloom 1995; Leiserowitz 2007; Sandvik 2008) have supported the conclusions of the HOP survey. Methodologically, most of the studies present the percentage of respondents who give a particular answer to a given question, and a few of them also use correlation coefficients. Overall, the authors suggest that their findings strongly refute previous assumptions about the preferences of people in developing countries. Dunlap and

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<sup>1</sup>The following explains clearly the drawbacks of the World Values Survey (WVS):

The WVS surveys represent a monumental effort at international collaboration, as they depend on a worldwide network of social scientists obtaining funding for the surveys within their own nations and then successfully implementing them. The 1990–1993 WVS was conducted in over 40 nations, the 1995–1998 WVS in over 50, and the 1999–2001 WVS in over 60, extraordinary accomplishments that yield unprecedented cross-national data on citizen attitudes, values, and behaviors on a range of issues. Yet, the voluntary collaborative nature of the WVS surveys creates inevitable problems, an obvious one being that (unlike the HOP survey) they are not implemented at the same time and in a few countries are conducted two or three years later than in the majority. Second, not all items are used in every nation, probably for cost reasons. Finally, it is difficult to find information on sampling procedures for each nation, raising further questions about comparability.

Dunlap and York (2008)

Mertig (1995, p. 134), for example, say that “Our results not only challenge ‘lay’ wisdom, but also conventional social science analyses of environmentalism. The idea that environmental quality is a luxury affordable only by those who have enough economic security to pursue quality-of-life goals is inconsistent with the observed correlations, as well as with the overall high levels of environmental concern found among residents of the low-income nations in the HOP.”

While the majority of studies find that developing countries show at least as strong an interest in environmental protection as developed countries, we should point out that a few studies argue that developing countries are *less* concerned about the environment (Diekmann and Franzen 1999; Franzen 2003; Franzen and Meyer 2010), and some others find that the association between wealth and concern for the environment is empirically ambiguous (Dunlap and York 2008; Kvaløy, Finseraas and Listhaug 2012). In Table 4 in the appendix, we present a more detailed description of these studies, including wording of the relevant questions and their methodological approaches.

### **Shortcomings of Traditional Survey Approaches**

As we have seen in the previous literature, there have been no shortage of public opinion surveys on environmental issues, and recent decades have seen coverage increasingly extended to developing countries. However, we question the robustness of the authors’ inferences given the known problems of interpreting traditional survey data. As Gaines, Kuklinski and Quirk (2007) have pointed out, survey data is subject to “selection bias, spurious correlation, correlated measurement errors, censored data, the lack of true counterfactuals, and mutual causation... As a result, statistical analyses of cross-sectional survey data are notoriously subject to misleading findings” (p. 2).

In addition to these, there are two particular problems we are concerned about, the first of which is “social desirability bias.” This is the possibility of dissimulation by respondents because they feel the need to produce the socially desirable answer in order to present a flattering image of themselves (Kalton and Schuman 1982; Furnham 1986; Tourangeau and Yan 2007). This could be due to genuine self-deception, or a conscious decision to “fake” one’s response in order to gain social approval (Huang, Liao and Chang 1998; King and Bruner 2000; van de Mortel 2008). Survey respondents are, for example, likely to report having voted even when they haven’t, because voting is seen as the socially acceptable thing to do (Parry and Crossley 1950). This tendency which likely be amplified in face-to-face interviews, which is not anonymous like online surveys (Gallup’s widely-quoted “Health of the

Planet” survey was conducted through face-to-face interviews).

The second and related issue we are concerned about is “issue priming,” in which the questions that were asked earlier in a survey influence respondents’ answers to questions that appear subsequently in the survey. Studies have shown that the ordering of questions, as well as the content of previous questions and items, can affect responses later in the survey (Strack 1992; Lasorsa 2003). As an example, consider the following survey, in which respondents were asked whether American reporters should be allowed access in Soviet countries, and vice versa:

Respondents are more likely to allow Communist reporters into the United States after having answered a question about allowing American reporters into Communist countries, and they are less likely to want American reporters admitted to Communist countries after answering the question on letting Communist reporters into the United States. The obvious interpretation is that when either question is asked first, many respondents answer in terms of pro-American or anti-Communist sentiments, but when the second question is asked a norm of reciprocity is immediately made salient and a substantial number of respondents feel bound to follow that norm and provide an answer that is consistent with their previous response. (Schuman and Presser 1996, p. 28)

We are concerned that this “issue priming” may have been a significant problem that contaminated answers in previous environmental surveys. In Gallup’s 1992 “Health of the Planet” survey, one of the earlier questions is “*How concerned are you about environmental problems – would you say a great deal, a fair amount, not very much, or not at all?*” By implicitly describing environmental issues as a “problem” early on in the interaction, the survey designers could inadvertently have given respondents the impression that this is an issue over which it would be socially correct to display concern over. And having once stated concern about environmental issues, respondents would feel the need to produce consistent responses by answering that they would be willing to make economic sacrifices to protect the environment.

We attempt to remedy these possible shortcomings by implementing a survey experiment. Experimental survey research assigns respondents randomly to control and treatment conditions, and by doing so it is the most appropriate method to employ when the researchers want to draw causal conclusions. By manipulating the independent (explanatory) factor, experimental survey data avoids many of the inferential problems associated with traditional panel survey data, providing us with “firmly grounded inferences about real-world political attitudes and behavior” (Gaines, Kuklinski and Quirk 2007, p. 2). Our survey also embeds questions ref-

erencing the environment in a larger survey about politics, with no prior discussion about environmental issues, which helps us avoid any priming about the significance of environmental problems. Furthermore, by asking respondents to evaluate scenarios rather than asking them directly about the importance of environmental problems, our approach alleviates the “social desirability bias” by reducing the implicit pressure that respondents might feel to produce the “right” or socially acceptable answer.

## Theory

In the previous section, we suggested that there are reasons to think that previous surveys have overstated the level of environmental concern held by residents of developing countries. In our analysis, we use developing country residents’ attitudes toward foreign direct investment (FDI) projects (and the environmental damage caused by those projects) to show that people in developing countries are not concerned about the effects of environmental damage when those effects do not directly or immediately affect themselves. In other words, we believe that people in developing countries do not have the luxury of worrying about the consequences of economic projects that will either not affect them in the short-term or not affect them at all. Our argument is consistent with the thesis on postmaterialism and its effect on environmental attitudes put forth in Inglehart (1995). This gives us the following hypothesis:

***Hypothesis 1:** People’s attitudes toward an FDI project in a distant location will not be affected by exposure to information regarding the project’s negative effect on the environment.*

We also test whether the respondents show a similar level of disinterest in the job-creation aspect of FDI projects, when those jobs are not available for themselves. If people in developing countries are generally uninterested in the consequences of events that do not affect them directly, they should show a lack of interest in jobs created in other regions of the country.

***Hypothesis 2:** People’s attitudes toward an FDI project in a distant location will not be affected by exposure to information regarding the project’s positive effect on job-creation and employment.*



# Empirical Analysis

## Research Design

Condition/ Country of Origin	Chinese company in power-line project	UK company in oil exploration project
Control	(1) Description of the FDI project in Turkana where the investment comes from a Chinese company	(1) Description of the FDI project in Turkana where the investment comes from a British company
Positive Economic Effects	(1) Description of the FDI project in Turkana where the investment comes from a Chinese company; (2) Additional information on the economic benefits	(1) Description of the FDI project in Turkana where the investment comes from a British company; (2) Additional information on the economic benefits
Positive Economic Effects & Negative Environmental Effects	(1) Description of the FDI project in Turkana where the investment comes from a Chinese company; (2) Additional information on the economic benefits; (3) Additional information on the environmental costs	(1) Description of the FDI project in Turkana where the investment comes from a British company; (2) Additional information on the economic benefits; (3) Additional information on the environmental costs

Note: This table is reproduced from Kim (2018).

Table 1: Design of the Experiment

We fielded a survey experiment in Kenya, a sub-Saharan African country whose economy has been growing over 5% annually for the past 5 years. Kenya's FDI inflows were particularly large between 2007 and 2013, amounting to nearly of 3% of Kenya's GDP. We wanted to examine Kenyan residents' perceptions of FDI, when informed of the negative environmental effects of FDI projects that are implemented in a distant location. We use original survey experimental data that was embedded in a larger public opinion survey that was conducted between June 6th and 21st in Nairobi, Kenya.<sup>2</sup> The survey used multiple layers of random sampling strategy such as using

<sup>2</sup>The survey has been approved by the Institutional Review Board's human subject research

a stratified random sampling method to select a starting point using the 2017 general election polling stations as a master frame of sampling points and parliamentary constituency as strata, using a random walk pattern to select a household, and using a random selection of among adult household members, etc. See Kim (2018) for the detailed sampling strategy. 1,319 respondents completed the survey.

The survey data was collected in Nairobi, so the respondents of the survey were residents of Nairobi. The experimental section is designed to give descriptions about specific FDI projects in a remote location away from Nairobi.

The survey experimental data we use (Kim 2018) is collected by using a 2 by 3 orthogonal experimental design, also known as a conjoint analysis with two attributes. Table 1, which is reproduced from (Kim 2018), summarizes the experimental design. There are two attributes: nationality of the foreign investor (2 levels) and the impact of the FDI project (3 conditions). The nationalities of the investors vary between two actual investments taking place in Turkana, where one is a pipeline project by Chinese companies, and the other is an oil production and delivery project by a British company. Information on the potential impact of the FDI project varies among three levels: in the control condition, the survey includes only a general description of the investment project in a newspaper article; in the first treatment condition, the information in the control condition is given, as well as the positive job creation effect the investment will have on Turkana’s economy; and in the second treatment condition, the information in the first treatment condition is given, as well as the negative environmental impacts of the investment.

The outcome variable we use is based on the answers to the question “How satisfied are you with the investments by [the Chinese companies / the British company] in Turkana?” (Kim 2018) The answers are coded as “Not all all,” “Little,” “Somewhat,” and “A lot,” so the dependent variable is an ordinal variable ranging from 1 (lowest satisfaction) to 4 (highest satisfaction).

## Empirical Results

Table 2 provides the estimation results that show the marginal effect of each treatment condition. The variable *China* indicates whether the respondent was given the description of Chinese firms’ investment in pipeline development, or the UK firm’s investment in oil exploration development. The variables *Job* and *Environment* indicate whether the respondent was given information on the positive job creation

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	(1)
<i>China</i>	0.0121 (0.0609)
<i>Job</i>	-0.00215 (0.0610)
<i>Environment</i>	-0.0453 (0.0595)
<i>Constant</i>	2.780*** (0.0490)
<i>N</i>	1373

Standard errors in parentheses  
 $*p < 0.05$ ,  $**p < 0.01$ ,  $***p < 0.001$

The dependent variable, *Satisfaction with FDI*, is an ordinal variable with four categories ranging from 1 to 4, where the larger numbers are associated with higher satisfaction levels with the FDI project.

Table 2: Nairobi Residents’ Satisfaction with the FDI Projects in Turkana

effects of the FDI project in Turkana, and whether the negative environmental effects of the project was also given. Respondents in the control group were not given either of these prompts, and were only provided with a general description of the FDI project in Turkana.

Nairobi respondents were in general fairly satisfied with both FDI projects in Turkana. This is indicated by the estimated satisfaction level being approximately 2.8 (“satisfied somewhat”) with regards to the baseline category, which is when the investment was made by a British company Tullow, and when only a general description about the FDI project from the newspaper article was given. Though the respondents’ satisfaction levels were fairly high for both projects, their satisfaction seems to reflect a generally positive attitude toward FDI, rather than an appreciation of the specific implications of the FDI projects in Turkana. Case in point, when information about the negative environmental impact of the FDI project is provided, the respondents’ level of satisfaction with the project is unaffected, as indicated by the statistically insignificant coefficient for *Environment*. Furthermore, the respondents’ level of satisfaction with an FDI project is also unaffected by information about the project’s job-creation effects, as indicated by the statistically insignificant

	(1)	(2)	(3)	(4)
<i>China</i>	-0.0516 (0.126)	0.0228 (0.0696)	0.0198 (0.0924)	0.0121 (0.0823)
<i>Job</i>	0.200 (0.126)	-0.0606 (0.0697)	0.0179 (0.0925)	-0.0216 (0.0824)
<i>Environment</i>	-0.0239 (0.118)	-0.0549 (0.0688)	0.00116 (0.0858)	-0.0833 (0.0826)
<i>Constant</i>	2.703*** (0.0968)	2.816*** (0.0568)	2.656*** (0.0702)	2.895*** (0.0665)
<i>N</i>	375	992	683	690

Standard errors in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

The dependent variable, *Satisfaction with FDI*, is an ordinal variable with four categories ranging from 1 to 4, where the larger numbers are associated with higher satisfaction levels with the FDI project. Column (1) uses the subsample of respondents without high school degrees; column (2) uses the subsample of respondents with high school degrees; column (3) uses the subsample of respondents who indicated that they had not previously seen the newspaper article describing the FDI project; column (4) uses the subsample of respondents who indicated that they had previously seen the newspaper article describing the FDI project.

Table 3: Education, Information and Satisfaction with FDI

coefficient for *Job*. That the marginal effects of both treatment conditions were not different from zero suggests that Nairobi residents' satisfaction levels with FDI projects in Turkana are not affected by the projects' potential consequences, be those positive or negative. This data is consistent with our argument that residents of developing countries will be relatively unconcerned about economic or environmental consequences that do not affect them directly or immediately.

We also addressed the concern that our experimental design may not have resonated very well with our respondents, if they lacked understanding of FDI or the information presented to them. Table 3 presents the estimation results using four subsamples. First, we test whether education helps people understand FDI: column (1) shows the estimation results using the subsample of respondents who did not complete high school, and column (2) shows the results from respondents who did complete high school. We also test whether prior exposure to information about FDI helps people understand the implication of FDI projects: column (3) shows the

estimation results using the subsample of respondents who indicated they had never seen the newspaper article mentioned in the survey, and (4) shows the results from respondents who had previously seen the article. The estimation results suggest that neither education nor exposure to news about FDI influenced our main results. Regardless of the subsample used, the respondents' satisfaction with FDI in Turkana was affected neither by its negative environmental effects nor its positive job-creation effects.

## Discussion

Are people in developing countries less concerned about the environmental consequences of economic growth compared to people in developed countries? The extant literature has examined this question using public opinion research. The majority of public opinion research studying mass attitudes toward environmental damage finds that residents in developing countries are deeply concerned about the environmental consequences of economic development, albeit with significant variation in the content and magnitude of that concern. On the other hand, a few studies have found that residents of developing countries are less concerned about environmental issues than people in developed countries. We found two shortcomings of the existing literature that affects our confidence with these results. First, existing surveys are subject to social desirability bias and priming effects because they directly ask people (sometimes in an in-person interview) on their perception of socially important issues. Those who want to appear to be correct by showing interest about important social issues will be more likely to indicate concern about environmental problems. If people publicly inflate their levels of concern over the environmental consequences of economic growth, it becomes difficult to accurately measure the "true" level of concern about this issue. Second, the existing literature does not address the possibility that people's attitudes toward an issue may depend on whether the consequences of the issue will directly or immediately affect them. Focusing on FDI projects and their consequences on host economies and using an experimental design, our study has attempted to address these two concerns.

FDI is an important driver of economic growth in developing countries. Some effects of FDI, such as the creation of relatively high-paying jobs and the transfer of technologies to domestic firms, contribute positively to economic development and growth in host countries. However, host countries also often sustain environmental damage caused by FDI projects. Perceptions of these positive and negative effects of FDI are likely to depend on an individual's proximity to FDI. Specifically, the

residents of an area where an FDI project is made are the direct beneficiaries of local job creation, and also the direct victims of environmental damage such as air pollution or overuse of natural resources. However, people who live a significant distance from where the FDI project is implemented may not perceive the consequences of the project to be imminent or worthy of consideration. To address this gap, we have examined the question: “Are residents of developing countries concerned about environmental damage due to FDI projects, even when the environmental costs do not directly or imminently affect them?” To examine this question, we have used survey experimental data that was collected in Kenya, a developing country in sub-Saharan Africa with an active growth of inward FDI.

Our study differs from previous studies as it is designed to examine how distance from an FDI project affects people’s attitudes toward the project. That is, we measure people’s satisfaction with FDI projects in a remote area, and see how their attitudes change as they are exposed to information about the effects of the projects on the local community. By doing so, we address whether negative environmental consequences affect people’s perception of FDI projects (which are an important driver of growth), even when the costs do not directly or imminently affect them. We find that Nairobi residents’ satisfaction with FDI projects in a remote area (Turkana) were not affected by the environmental damage caused by the projects. Our findings suggest that in order for us to accurately measure the concerns that developing countries’ citizens have toward the environmental costs of economic growth, we need to address the heterogeneity in the perceived urgency of these problems. It could be that people are unconcerned about the effects of FDI projects that are implemented in distant areas (regardless of whether these effects are positive or negative), particularly if the project takes place in a remote place with low population density. We plan to implement additional surveys to confirm the robustness of these results.

## Appendix: Overview of Previous Surveys

Authors & Surveys	Survey Questions	Methods and Findings
<p>Inglehart (1995): World Values Survey 1990-93</p>	<p>Respondents are classified as “high” on support for environmental protection if they “agree” or “strongly agree” that: (1) <i>“I would be willing to give part of my income if I were sure that the money would be used to prevent environmental pollution”</i> AND (2) <i>“I would agree to an increase in taxes if the extra money is used to prevent environmental pollution”</i>; AND who “disagree” or “strongly disagree” with these statements: (1) <i>“The government should reduce environmental pollution, but it should not cost me any money”</i>; and (2) <i>“Protecting the environment and fighting pollution is less urgent than often suggested.”</i></p>	<p>The author presents the percentages of respondents classified as “high” for the countries that were surveyed. On balance, he says that vulnerability to environmental damage and postmaterialism are both important to determining public attitudes on the environment, and that it is not clear whether developing countries are more (or less) concerned about the environment than developed countries.</p>

<p>Dunlap, Gallup Jr. and Gallup (1993):</p> <p>Gallup 1992 “Health of the Planet” (HOP)</p>	<p><i>“What do you think is the most important problem facing our nation today?”</i></p> <p><i>“I’m going to read a list of issues and problems currently facing many countries. For each one, please tell me how serious a problem you consider it to be in our nation – very serious, somewhat serious, not very serious, or not at all serious?”</i></p> <p><i>“How concerned are you personally about environmental problems – would you say a great deal, a fair amount, not very much, or not at all?”</i></p> <p><i>“Overall, how would you rate the quality of the environment (a.) in our nation, (b.) here in your local community, (c.) of the world as a whole? Very good, fairly good, fairly bad, or very bad?”</i></p> <p>(continued on next page)</p>	<p>The authors present the percentage of respondents who give a particular answer to a given question. The results show considerable variation amongst countries, but overall, respondents in developing countries show significant concern for the environment.</p>
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<p>Dunlap, Gallup Jr. and Gallup (1993):</p> <p>Gallup 1992 “Health of the Planet” (HOP)</p>	<p>(continued)</p> <p><i>“How much, if at all, do you believe environmental problems (a.) now affect your health, (b.) affected your health in the past – say 10 years ago, (c.) will affect the health of our children and grandchildren – say over the next 25 years? A great deal, a fair amount, not very much, or not at all?”</i></p> <p><i>“With which of these statements about the environment and the economy do you most agree: protecting the environment and the economy do you most agree: protecting the environment should be given priority, even at the risk of slowing down economic growth, [or] economic growth should be given priority, even if the environment suffers to some extent?”</i></p> <p><i>“Increased efforts by business and industry to improve environmental quality might lead to higher prices for the things you buy. Would you be willing to pay higher prices so that industry could better protect the environment or not?”</i></p> <p><i>“Which one of these do you believe should have the primary responsibility for protecting the environment in our nation – the government, business and industry, or individual citizens and citizens groups?”</i></p> <p style="text-align: center;">15</p> <p><i>“In your opinion, how much of an effect can individual citizens and citizens groups have on solving our environmental problems?”</i></p>	<p>The authors present the percentage of respondents who give a particular answer to a given question. The results show considerable variation amongst countries, but overall, respondents in developing countries show significant concern for the environment.</p>
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<p>Dunlap and Mertig (1995):</p> <p>Gallup 1992 "Health of the Planet" (HOP)</p>	<p>See above.</p>	<p>The authors correlate responses with GDP per capita. They do this by creating "national-level aggregate scores for every nation by computing the national mean of all responses" for each of the fourteen questions in the survey. Then for each of these scores, the authors computed Pearson's correlation coefficients with per capita GDP. The results support those discussed in Dunlap, Gallup Jr. and Gallup (1993).</p>
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<p>Bloom (1995):</p> <p>Gallup 1992 “Health of the Planet” (HOP)</p> <p>Louis Harris and Associates 1988-89 survey</p>	<p><i>“How would you rate the quality of the environment in this country?”</i> (Harris)</p> <p><i>“Do you feel the environment where you live has become better or worse or stayed the same in the last 10 years?”</i> (Harris)</p> <p>See above for Gallup’s HOP survey questions.</p>	<p>The author uses cross-country population weighted averages, and compares the difference in percentages between developing and industrialized countries, for an answer to a given question. He writes, “First, people in both developing and industrial countries perceive that environmental quality has been and is continuing to worsen, and express substantial concern about environmental quality overall and about a range of specific environmental issues. Second, in assigning responsibility for the world’s environmental problems, the data indicate a remarkable willingness to accept responsibility rather than exclusively to blame others. Finally, people generally recognize the government’s natural role in addressing local and national environmental issues and the equally natural role of strong international agencies in addressing transnational issues.” (p. 12-13)</p>
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<p>Leiserowitz (2007):</p> <p>GlobeScan 1998-2001 surveys</p>	<p><i>“How serious a problem do you consider climate change or global warming, due to the greenhouse effect?”</i></p> <p><i>“Climate change will pose a direct threat to me and my family over the next decade.”</i></p> <p><i>“Air emissions from richer countries have had the most impact on the Earth’s climate, however, emissions are growing more quickly in poorer countries with large populations. As a result, there is a debate about when these poorer countries should join richer countries in taking significant action to reduce human impacts on climate. Do you think these poorer countries should...?”</i></p>	<p>This study presented the percentage of respondents in each country that gave a particular answer to a given question. Many developing countries viewed climate change as a more serious risk than most developed countries, and respondents from developing countries were generally more convinced that climate change would be a direct threat, compared to respondents from developed countries. Furthermore, the majority of respondents in developing countries answered that <i>“poorer countries should be required to take significant action [to reduce human impact on climate] immediately along with richer countries.”</i></p>
<p>Sandvik (2008):</p> <p>Nielsen Company 2007 online survey</p>	<p><i>“... respondents from 46 different countries were asked how serious a problem (on a scale from 1 to 5) they thought global warming was.” (p. 334)</i></p>	<p>The author conducted analysis of covariance and found that GDP per capita was negatively associated with concern for global warming.</p>

<p>Diekmann and Franzen (1999);  Franzen (2003);  Franzen and Meyer (2010):</p> <p>International Social Survey Programme 1993 &amp; 2000</p>	<p><i>“How willing would you be to pay much higher prices in order to protect the environment?”</i></p> <p><i>“How willing would you be to pay much higher taxes in order to protect the environment?”</i></p> <p><i>“How willing would you be to accept cuts in your standard of living in order to protect the environment?”</i></p> <p><i>“I do what is right for the environment, even when it costs more money or takes more time.”</i></p> <p><i>“Modern science will solve our environmental problems with little change to our way of living.”</i></p> <p><i>“We worry too much about the future of the environment and not enough about prices and jobs.”</i></p> <p><i>“People worry too much about human progress harming the environment.”</i></p> <p><i>“In order to protect the environment the country needs economic growth.”</i></p> <p><i>“It is just too difficult for someone like me to do much about the environment.”</i></p>	<p>In Franzen and Meyer (2010), the authors took the answers from nine questions in the survey, each coded on a scale of 1-5 (with higher numbers corresponding to higher levels of concern), and constructed an additive index for each individual. Results from a linear regression show that GDP per capita (adjusted for purchasing power) has a statistically significant positive effect on concern for the environment.</p>
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<p>Dunlap and York (2008): World Values Survey 1995-1998</p>	<p><i>“I would agree to an increase in taxes if the extra money were used to prevent environmental damage.”</i></p> <p><i>“I would buy things at 20 percent higher than usual prices if it would help protect the environment.”</i></p> <p><i>“Here are two statements people sometimes make when discussing the environment and economic growth. Which of them comes closer to your own point of view? (a) Protecting the environment should be given priority, even if it causes slower economic growth and loss of some jobs. (b) Economic growth and creating jobs should be given the top priority, even if the environment suffers to some extent.”</i></p>	<p>Using correlation coefficients between GDP per capita and survey answers, the authors find no statistically significant relationship between the two.</p>
<p>Kvaløy, Finseraas and Listhaug (2012): World Values Survey 2005</p>	<p><i>“Now let’s consider the environmental problems in the world as a whole. Please tell me how serious you consider [global warming or the greenhouse effect] to be for the world as a whole. Is it very serious, somewhat serious, not very serious, or not serious at all?”</i></p>	<p>Using a multilevel linear regression, the authors find that GDP per capita does not have a statistically significant effect on survey responses.</p>

Table 4: Literature Summary

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