



Department of Economics Working Paper

Number 13-19 | September 2013

What do Environmental and Resource Economists Think? Results from a Survey of AERE Members

Timothy C. Haab
Ohio State University

John C. Whitehead
Appalachian State University

Department of Economics
Appalachian State University
Boone, NC 28608
Phone: (828) 262-2148
Fax: (828) 262-6105
www.business.appstate.edu/economics

What do Environmental and Resource Economists Think?

Results from a Survey of AERE Members¹

August 30, 2013

Timothy C. Haab, Ohio State University

John C. Whitehead, Appalachian State University

Abstract. In this paper we present results from an opinion survey of Association of Environmental and Resource Economists members concerning issues ranging from basic market failure propositions to current policy questions to environmental behavior. The topical issues considered span the discipline including air and water pollution, sustainability, fishery, forestry and energy economics. We use entropy analysis to determine issues where there is consensus and multivariate analysis of the determinants of opinions. We find that AERE members reach consensus on a number of items of opinion and there are a number of items for which consensus is more difficult to reach. We find that agreement with items of opinion is influenced by non-economic factors: concern about the environment and natural resources, political ideology, gender, the number of children in the household and United States residence.

¹ Some of the descriptive results of this paper appeared in the May issue of the AERE Newsletter. We thank Jill Caviglia-Harris, Paul Chambers, Chris Dumas, Sherry Larkin, Lynne Lewis, Shelley Norman, George Parsons, Dan Petrolia, Peter Schwarz and Will Wheeler for their reviews of the survey. We especially thank those AERE members who completed the survey.

Introduction

Are environmental and resource economists “one-handed”? In other words, are we able to provide consensus opinion on climate and other environmental policies without saying, as the famous joke goes, “on the other hand”? In order to begin to provide some sort of answer for this question we conducted a survey of Association of Environmental and Resource Economists (AERE) members in which we ask about opinions on a number of environmental and natural resource economic issues. These issues range from basic market failure propositions to current policy questions to environmental behavior opinions. Such surveys are important to the extent that they clarify the opinions of economists, determine when economists agree and disagree, and inform non-economists on issues of economic consensus and non-consensus.

The idea to conduct surveys of economists is not new. A large number of papers present the views of surveyed economists but the coverage of environmental and natural resource issues is scant. The first such survey may be Bell (1945), who, along with an American Economic Association (AEA) committee, asked AEA members to “indicate which of the following government activities you consider appropriate or suitable postwar functions of government and which ones you do not favor.” Of 43 potential government activities, only two dealt with environmental or natural resource problems. Fifty-four of 60 economists who responded were in favor of the Boulder and Grand Coulee Dams.

Another early survey of economists was motivated by an editorial in *Business Week* that observed, following the 1977 meeting of AEA members, that the economics profession was more concerned with abstract models relative to economic policies of importance to society.

Kearl et al. (1979) sent a mail questionnaire to a stratified random sample of 600 AEA members and achieved a 33% response rate.² The sample contained 100 economists from “seven leading graduate programs,” 200 other academic economists, 150 government economists and 150 private sector economists. They find that there is more agreement on microeconomic issues relative to macroeconomic issues and more agreement on positive, relative to normative, issues. Using factor analysis they find that ideology (“Chicago” vs. “Galbraithian”) explains some of the differences in the results. In terms of environmental opinions, Kearl et al. find that 50% of their respondents agree, 31% agree with provisions and 19% disagree with the statement “effluent taxes represent a better approach to pollution control than imposition of pollution ceilings.” Responses did not differ amongst academic, government and private sector economists. They conclude that economists had reached consensus on this environmental issue.

Alston, Kearl and Vaughan (1992) conducted a similar survey of AEA members in 1990. The response rate was 34% from a stratified random sample. This time the stratified random sample consisted of “200 economists in 10 leading graduate programs, 200 other AEA members, 150 government economists, 150 business economists, 500 economists teaching Principles of Economics at four-year colleges and universities and 150 evolutionary economists.” In general, consensus is found on dimensions similar to the findings of Kearl et al. They find that 56% agree, 23% agree with provisions and 21% disagree with the statement “pollution taxes or

² Interestingly, they “were concerned that hostility toward questionnaires among economists might limit the response.”

marketable pollution permits are a more economically efficient approach to pollution control than emission standards.” In response to the statement “reducing the regulatory power of the Environmental Protection Agency (EPA) would improve the economic efficiency of the U.S. Economy,” 11% agreed, 25% agreed with provisions and 62% disagreed.

Most recently, Fuller and Geide-Stevenson (2003) conducted another follow-up survey of AEA members and achieved a response rate of 31% from a random sample. Of their sample, 58% were academics, 16% were government economists and 21% were private sector economists. They find that there is more consensus about international economics propositions and less consensus about macroeconomic propositions. With regards to environmental issues, they find that 58% agree, 24% agree with provisions and 18% disagree with the statement “Pollution taxes or marketable pollution permits are a more economically efficient approach to pollution control than emission standards.” In response to the statement “Reducing the regulatory power of the Environmental Protection Agency (EPA) would improve the economic efficiency of the U.S. Economy” 12% agreed, 27% agreed with provisions and 59% disagreed.

The Kearl et al. and follow-up surveys³ have been used in a number of other studies. Frey et al. (1984) survey economists in Austria, France, Germany and Switzerland and compare their results to the Kearl et al. results. Block and Walker (1988) compare the Kearl et al. results to a sample of the members of the Canadian Economic Association. Anderson and Blandy (1992) and

³ Another follow-up survey was conducted by the same group of authors in 2011.

Anderson, Blandy, and Carne (1993) present results of the Kearn et al. survey tailored for Australian and East Asian economists. Ricketts and Shoesmith (1992) and Geach and Reekie (1991) present results from British and South African economists, respectively. Fuller, Alston and Vaughan (1995) and Fuller and Geide-Stevenson (2007) compare the AEA survey results to Democratic and Republican convention delegates.

Other studies survey economists with a different set of questions. Klein and Stern (2006) present the policy views of a random sample of AEA members. Amongst 18 propositions, 56% strongly support and 24% mildly support air and water regulation. Whaples (2009) surveyed a random sample of AEA members in 2007. He finds that 82% disagree that “the U.S. should ban genetically modified crops” and 58% disagree that “laws mandating municipal curbside recycling should be eliminated.”

Several studies have presented results of surveys tailored to special economist populations. Fuchs (1996) surveyed “50 leading health economists.” Fuchs, Krueger and Poterba (1998) survey labor and public economists “on the faculties of the universities with the 40 leading economics departments in the United States.” Whaples (1995), Whaples (1996), Moorhouse, Morriss and Whaples (1999) and Whaples and Heckelman (2005) survey members of the Economic History Association, AEA members who are labor economists, members of the American Law and Economics Association, American Political Science Association and the Public Choice Society, respectively.

Interest in the opinions of economists is still strong, including opinions toward environmental policies. A session at the 2012 Allied Social Science Association meetings titled

“What do economists think about major public policy issues?” featured two papers, both presenting results from a survey of the Chicago Economic Expert Panel which includes equal representation from the “top seven departments” (Gordon and Dahl 2013).⁴ Eighty-seven percent of the panel agrees with the statement: “The Brookings Institution recently described a US carbon tax of \$20 per ton, increasing at 4% per year, which would raise an estimated \$150 billion per year in federal revenues over the next decade. Given the negative externalities created by carbon dioxide emissions, a federal carbon tax at this rate would involve fewer harmful net distortions to the US economy than a tax increase that generated the same revenue by raising marginal tax rates on labor income across the board.” Ninety percent of the panel agreed with the statement: “A direct disincentive to emit carbon-dioxide, for example through a carbon tax or an emissions permit market, is more efficient than requiring the use of corn-based ethanol fuels.” Sapienza and Zingales (2013) compare these results to a survey of the general population.⁵

In this paper we present results from a survey of the population of AERE members. The purpose of this study is to fill a void in the literature given the scant attention to environmental

⁴ Results to the survey questions are available here: <http://www.igmchicago.org/igm-economic-experts-panel>.

⁵ Blendon et al. (1997) and Caplan (2002) also analyze surveys of economic opinion comparing the general population and economists. This sort of comparison was first suggested by Lansing (1946) in his comment on Bell (1945).

and resource economic issues and thin coverage of environmental and resource economists in previous surveys. In short, we are interested in what environmental and resource economists think about environmental and resource economic issues. The issues considered span the discipline including air and water pollution, sustainability, fishery, forestry and energy economics. Our analysis uses entropy and consensus analysis to determine issues where there is consensus and multivariate analysis of the determinants of opinions.

Data

On September 26, 2012 we sent an email to 996 AERE members with a link to an internet survey using SurveyMonkey. After a reminder email on October 8 and another on October 23 we received 405 responses, of which 352 completed the survey. After deleting 19 bounced email addresses, our response rate is 41% and completion rate is 36%.⁶ These rates are close to the upper bound of other surveys of economists.

As with any survey, there is concern about how representative the sample is of the population. We conducted a follow-up survey of nonrespondents. Unfortunately, the follow-up survey achieved less than a 10% response rate so we rely on a search of AERE member webpages that collected complete data on 943 respondents and nonrespondents about their

⁶ We offered a sweepstakes for a \$50 Amazon.com gift card as an incentive. One-hundred ninety three respondents registered for the sweepstakes.

research productivity, employment and country of residence. To measure research productivity we use Google Scholar citations. The average number of citations of respondents and nonrespondents is 329 and 525, respectively. The t-statistic for differences is 2.06 indicating that nonrespondents are more heavily cited than respondents. However, citations are not normally distributed. A Wilcoxon rank sum nonparametric test finds that respondents and nonrespondents are not statistically different in terms of citations. Breaking the sample into quartiles and conducting chi-square tests of differences in frequencies also finds no statistically significant differences.

There are no differences between respondents and nonrespondents in terms of academic and nonacademic employment at the 10% level of confidence. Nine percent of the academic sample is housed in a college of arts and sciences. Twelve percent of the respondents and 7% of nonrespondents are from arts and sciences. This difference is significant at the 5% level. Respondents and nonrespondents are equally likely to be housed in colleges and schools of agriculture, business and other types (e.g., social sciences). There are no differences in the size of the academic institution, as measured by the number of students, between respondents and nonrespondents who work at academic institutions.

Among the population of AERE members, 79% are from the United States and 73% hold the PhD degree. Eighty three percent of the respondents reside in the United States and 76% of nonrespondents reside in the United States. This difference is significant at the 1% level of confidence. Seventy six percent of the respondents hold the PhD degree while 71% of nonrespondents hold the PhD degree. This difference is significant at the 10% level. We conclude that the sample is overrepresented by United States residents and PhD degree holders. Among

the academics, the sample is slightly underrepresented by those in colleges of arts and sciences. While this last difference indicates nonresponse bias, the subsamples are so small that we do not address it in our later analyses.

Twenty-five percent of the sample has worked between 1 and 5 years as an environmental or natural resource economist. Twenty-four percent has worked between 6 and 10 years, 17% between 11 and 15 years, 9% between 16 and 20 years, 7% between 20 and 25 years and 12% has worked for more than 25 years. About 5% of the sample is a student or has not worked as an environmental or natural resource economist. In terms of work activities 98% of the working sample engages in research, 73% teach, 32% conduct policy, 23% have administrative duties and 6% engage in extension.

Eighty-five percent of the sample reports that their field of study from *Journal of Economic Literature* classification codes is environmental economics (Q5), 43% has a field of renewable resources and conservation (Q2), 30% are energy economists (Q4), 22% are agricultural economists (Q1), 16% have a field in nonrenewable resources and conservation (Q3) and 14% report their field as general (Q0).

Seventy-eight percent of the sample works at an academic institution, 14% work for the government and 8% work in the private sector. Of those who work at an academic institution, 48% are at institutions with more than 20,000 students, 25% are at institutions with between 10,000 and 20,000 students, 15% are at institutions with between 3000 and 10,000 students and 12% are at institutions with less than 3000 students. Seventy percent of the respondents work in a department that offers the PhD degree, 14% offer masters degrees and 16% only offer

bachelor's degrees. Twenty five percent of these departments are in agricultural colleges, 24% are in business schools, 19% are in colleges of arts and sciences, 17% are in colleges of social sciences and 15% are in colleges of environment and/or natural resources.

Seventy-two percent of the sample is male and 87% is white. Forty-two percent are between the ages of 30 and 39, 23% are in their fifties, 21% are in their forties, 9% are in their twenties and 6% are 60 and older. Eighty-six percent of the sample self-reports that they have the doctoral degree. Household size is one for 16% of the sample, two for 32%, three for 20%, four for 25% and five or more for 7% of the sample. Fifty-three percent of the sample has zero children age 17 or younger living in the household, 20% have one child, 22% have two, 4% have three and less than 1% has more than three children.

Initial Discussion of Responses

We reviewed a number of economist surveys and surveys of the general public to collect a set of environmental opinion questions. We also wrote a set of questions that state some results from first principles (e.g., negative externalities, public goods, common property resources, Hotelling's rule). A draft survey was reviewed by a number of colleagues and revised in response to their suggestions. In the end, we developed a survey that posed thirty-six opinion questions that were randomly ordered in nine randomly assigned groups of mostly similar

questions (Table 1⁷). These questions were in the form: “Please indicate how much you agree or disagree with each of these statements” with Likert scale responses “disagree completely, disagree mostly, neither agree nor disagree, agree mostly and agree completely.” For each statement we have summed the percentage that agree and disagree to some extent (details of these results along with frequency tables of responses are presented in appendix Table A.1).

A group of three questions ([1]-[3]) presented statements that typically appear in a market failure section of the principles of microeconomics course: negative externalities, public goods and common pool resources. Seventy-eight percent of respondents disagree with the statement: “Unregulated markets provide optimal quantities of goods whose production and consumption generate negative externalities.” Almost all, 96%, respondents disagreed with the public goods statement “Unregulated markets provide public goods in optimal quantities.” Eighty-six percent agree that “Unregulated common-pool resources face the “tragedy of the commons” problem.” Included on another page was a statement ([5]) that embraced “free market environmentalism.” Sixty percent disagreed that “The free market, property rights, and tort law provide the best tools to preserve the health and sustainability of the environment.” In all, survey respondents feel that market outcomes are inefficient when confronted with inadequate property rights.

One of the major contributions of the field of environmental economics is incentive-

⁷ A set of tables supporting all other statistical results discussed in this paper can be found in the appendix.

based regulatory policy in response to the purported inefficiency of command and control regulation. Four statements addressed these issues ([10]-[13]). Surprising to us, only 56% agree that “emissions standards are rigid, and insensitive to geographical and technological differences.” Nevertheless, 86% agree that “emissions taxes or marketable emissions permits are a more economically efficient approach to pollution control than emissions standards.” Recall, 82% of the Fuller and Geide-Stevenson (2003) AEA sample agree with this statement. There is little agreement about the macroeconomic policy of incentive-based policy revenue. Forty-nine percent agree that “emissions tax or permit auction revenues should be returned to the public through dividends or lower income taxes.” Forty-seven percent of respondents have no opinion (“neither agree nor disagree”) about the statement “emissions tax or permit auction revenues should be used to reduce the national debt.”

Two sets of questions concerned renewable resource use. One group considered some of the basic tenets of forestry economics ([7]-[9]). The greatest agreement among respondents, 83%, was with the statement: “forests should be managed to provide multiple uses.” Two statements reinforce the principle of multiple use management. Sixty-four percent agree that “the optimal forest rotation is when the harvest generates the maximum economic yield of timber and nonmarket resources” while 63% disagree with the statement that “forests should be managed to achieve the maximum sustainable yield of timber resources.” These results suggest that AERE survey respondents feel that nonmarket economic values are important, in addition to market values.

The second group of renewable resource questions concerned fishery economics ([14]-[16]). No clear agreement arose concerning the appropriate management goals. Fifty-five percent

disagree that “ocean fisheries should be managed to achieve the maximum sustainable yield from commercial catch” while 46% agree that “ocean fisheries should be managed to achieve the maximum economic yield from commercial and recreational catch.” A property rights approach to fisheries management is preferred by most. Eighty-seven agree that “individual transferable quotas are a more economically efficient approach to fishery regulation than open access regulations.”

Our coverage of nonrenewable resource economics was limited to two questions ([6] and [22]). In response to our version of Hotelling’s Rule, 36% disagreed that “nonrenewable resource prices tend to rise at the rate of interest over time (adjusted for new discoveries, etc).” Eighty-four percent agree that “the U.S. should increase energy taxes.”

A few questions concerned economic growth and sustainability ([17]-[19]). In response to the sustainable development statement developed by the Bruntlandt Commission, “the management of resource use should aim to meet the needs of the present generation without compromising the ability of future generations to meet their own needs,” 83% agree. There is less agreement about other statements concerning economic growth. Seventy-eight percent disagree that “economic growth always harms the environment.” Seventy-five percent disagree that “some pollution is inevitable if we are going to continue to make improvements in our standard of living.” Forty-eight percent agree that “there exists a maximum level of economic growth that can be sustained without undermining the resource base upon which it depends.” Forty-six percent agree that “economic growth is needed in order to protect the environment.” Only 40% agree that “population growth inevitably degrades the environment.” One conclusion from these results is that there is little support for sustainable development that does not involve

economic growth.

We presented the two environmental policy statements from the Whaples (2009) survey ([21], [22]). Sixty-two percent of the AERE sample disagrees that “the U.S. should ban genetically modified crops.” This is lower than the AEA sample where 82% disagree. About the same percentage of AERE and AEA respondents, 66% compared to 58%, disagree that “laws mandating municipal curbside recycling should be eliminated.” Fifty-six percent of the AERE sample agrees that “local governments should provide more incentives for people to recycle” [35]. The second environmental question from the Fuller and Geide-Stevenson (2003) survey of AEA members was included ([23]). Eighty percent disagree with the statement: “reducing the regulatory power of the Environmental Protection Agency (EPA) would improve the economic efficiency of the U.S. economy.” Only 59% of the AEA sample disagreed.

Several questions addressed the role of environmental policy in the macroeconomy ([36], [24], [29]). Eight-eight percent disagree that “we should wait until the economy gets better before we make the environment a major policy priority.” Eighty-four percent disagree that “we worry too much about the future of the environment and not enough about prices and jobs today.” Seventy-three percent disagree that “if business is forced to spend a lot of money on environmental protection, it won’t be able to invest in research and development to keep us competitive in the international market.” Our sample of AERE members evidently does not feel that environmental policy is a drag on macroeconomic performance.

Two questions generated a most common response of ambivalence. Forty-five percent could neither agree nor disagree with “discussion of pollution in trade negotiations is likely to

lead to “green protectionism” by high-income countries” ([4]). Fifty-eight percent could neither agree nor disagree with “a manufacturer that voluntarily reduces the environmental impact of its production process and products is making a smart business decision” ([34]).

Several questions ventured outside the realm of positive and normative economic principles and considered environmental behavior ([27]-[33]). Sixty-three percent disagree with “I just don’t have the time to worry about how all of my actions affect the environment.” Forty-three percent agree with “I would be embarrassed if people I know caught me not recycling my trash.” Ninety percent disagree with “I am very confused about what’s good and what’s bad for the environment.” Eighty-six percent agree with “I feel good when I take steps to help the environment.” Forty-seven percent disagree that “New technologies will surely come along to solve environmental problems before they get out of hand.” These results suggest that AERE members are good environmental stewards, or, at least, attempt to be adequate stewards with some feeling of personal responsibility.

Measuring Consensus

To more formally investigate the level of agreement (or disagreement) among AERE members, we turn to statistical consensus. Unfortunately, there is little consensus on methods for measuring consensus from a sample of responses to categorical Likert scale responses such as those used in this survey. Given the categorical/ordinal nature of the possible responses, any measure of consensus of responses will necessarily convert the ordinal responses into a cardinal measure. The average response—found by converting responses to a numerical value, for example, Agree Completely=1 and Disagree Completely=5—gives a measure of the intensity of

the response, and can be interpreted as a measure of consensus if the average falls near the extremes, the average loses the “consensus” interpretation in the middle range of responses. For example, if the average response across all respondents is close to either 1 or 5, it must be the case that there is little dispersion between responses—dispersion of responses would lead to averages nearer to the middle of the range. But an average response of 2 (Agree), could result from consensus among respondents such that they all answer 2, or it could result from a large number of respondents answering that they agree completely (response=1) and a smaller minority answering they disagree completely (response=5). The average itself cannot distinguish between these two cases.

As such, any discussion of consensus of responses to a particular question must include some measure of dispersion of those responses. One candidate measure is the standard deviation of responses based on the translation of categories to numerical responses. Although this translation is arbitrary and will be sensitive to the values chosen (there’s no reason why we couldn’t label the categories AC=25, AM=15, N=0, DM=-15, DC=-25, or some other arbitrary assignment), as long as the value assignments are consistent across questions, the standard deviation should provide a means of comparing response dispersion across questions.

The operations research/information theory literature has taken on the issue of deriving measures of dispersion/consensus from ordinal responses in a more rigorous fashion in an attempt to understand group decision making and consensus building. While the intent of this paper is not to build consensus, but rather describe the set of issues for which consensus seems to exist (or not exist) among environmental and resource economists, we borrow two additional measures of consensus from the operations research literature. Perhaps the better known of these

measures is Shannon Entropy. Formally, given a set of probabilities from an empirical distribution, p_1, p_2, \dots, p_5 (e.g. categorical response percentages from a sample of respondents), the Shannon Entropy (Shannon, 1948) is measured as $\text{Entropy} = -\sum_{i=1}^N p_i \log_2(p_i)$.

More recently, Tastle and Wierman (2007) propose a set of three rules that must be satisfied by a measure of consensus for Likert scale type responses. These three rules are (paraphrased and adapted to the current situation):

1. If the sample of respondents exactly divide themselves in half, with half responding Agree Completely and the other half responding Disagree Completely, the measure of consensus should be 0 (no consensus).
2. If all respondents give the same response, the measure of consensus should be 1 (complete consensus).
3. If respondents respond such that more than half of the respondents ($n/2 + 1$) choose the same response, the measure of consensus must be greater than 0.

Tastle and Wierman propose the following measure of consensus (labeled here TW Consensus)

that satisfies these three criterion, $\text{TW Consensus} = 1 + \sum_{i=1}^N p_i \log_2 \left(\frac{|X_i - \mu_X|}{d_X} \right)$,

where μ_X is the average response value for the sample, X_i is the response value (in our case, $X_i \in \{1, 2, 3, 4, 5\}$), and $d_X = X_{max} - X_{min}$.

While seemingly trivial, Tastle and Wierman go on to show that their measure of consensus satisfies the three rules for a measure of consensus but Shannon Entropy does not. Further, Tastle and Wierman argue against the use of standard deviation as a measure of ordinal

dispersion on the grounds that the standard deviation necessarily assumes strict cardinality of responses which is obviously violated in Likert-scale responses.

In Table 1, we present the average response value for each of the thirty-six questions presented to our sample calculated by assigning a value of 5 for Agree Completely, 4 for Agree Mostly, 3 for Neither Agree or Disagree, 2 for Disagree Mostly and 1 for Disagree Completely. In addition, we present the measures of Shannon Entropy (Entropy), Tastle and Wierman consensus (TW Consensus) and the standard deviation of the responses (Std Dev). Although we agree with Tastle and Wierman's argument against the use of standard deviation as a measure of consensus in principle, there is an extraordinary correlation between the Tastle and Wierman measure and the simple standard deviation ($\rho = -.975$). Likewise there is strong correlation between Shannon Entropy and TW Consensus ($\rho = -.853$) and between standard deviation and Shannon Entropy ($\rho = .883$). Because none of the consensus measures are perfect for our purposes, and all are highly correlated, we choose to present the 36 statements in Table 1 along with the average of the ranks of the three consensus measures.

From Table 1, two statements stand out in terms of consensus, in that both statements rank either first or second in all three measures of consensus, and they rank first and second in terms of "average consensus rank." "Unregulated markets provide public goods in optimal quantities," ranked first in lowest standard deviation and lowest Shannon Entropy and second in highest TW Consensus, and had an average response value of 1.36 meaning that (unsurprisingly) a large proportion of our sample disagrees completely with the statement. "I feel good when I take steps to help the environment," ranked first in TW Consensus and second in Entropy and standard deviation among the thirty-six questions. The average response was 4.15 meaning there

is consensus feel-good agreement when our respondents take steps to help the environment.

At the opposite end of the consensus spectrum, two statements consistently ranked at the bottom of all three measures of consensus. Surprising to us given that that the maximum sustainable yield ignores costs relative to the maximum economic yield, “Ocean fisheries should be managed to achieve the maximum sustainable yield from commercial catch,” ranked 36th in TW Consensus and standard deviation and 35th in Shannon Entropy. Without more information on how respondents interpreted the question, it is difficult to know what is causing the dispersion in responses to this statement; 26% of respondents agree (19%) or strongly agree (7%) while 54% disagree (32%) or strongly disagree (22%). The average response leans toward disagreement (average=2.57) but given the dispersion of responses, this is not a strong result.

It also appears that our sample of environmental and resource economists is varied on their level of shame if they were to be caught not recycling. “I would be embarrassed if people I know caught me not recycling my trash,” ranked 35th in TW Consensus and standard deviation and 36th in Shannon Entropy. The average response is almost exactly neutral (3.04) with 43% showing some level of shame and 36% shameless. Twenty-one percent of respondents are neutral.

Three other statements that generate the most consensus are “Forests should be managed to provide multiple uses,” “We worry too much about the future of the environment and not enough about prices and jobs today,” and “A manufacturer that voluntarily reduces the environmental impact of its production process and products is making a smart business decision.”

The three other statements that generate the least consensus are “Ocean fisheries should be managed to achieve the maximum economic yield from commercial and recreational catch,” “There exists a maximum level of economic growth that can be sustained without undermining the resource base upon which it depends,” and “I just don’t have the time to worry about how all of my actions affect the environment.”

Determinants of Opinion

We use ordered logistic regression analysis to estimate the determinants of opinion for the 36 statements. The sample size is 328 cases for which we have complete data for all of the independent variables. We use incomplete case analysis allowing for different sample sizes for each statement. The sample size for each regression ranges from 319 to 327 due to item nonresponse on the dependent variables. Complete case regression analysis would reduce the samples for each regression to 288. The independent variables include the aforementioned variables for Google Scholar research citations, indicators for PhD holders and United States residents and other variables from questions on the survey: environmental attitudes, ideology, work-related tasks, *Journal of Economic Literature* fields and demographic variables.

To assess general environmental attitudes, a series of questions considering concern about environmental problems was asked. Survey respondents are asked: “How concerned are you about these environmental and natural resource issues?” and given a Likert scale of responses: extremely concerned, very concerned, moderately concerned, slightly concerned and not at all concerned. By far, the most concerning issue is climate change. Seventy-three percent are very or extremely concerned about climate change. More than 50% are very or extremely

concerned about overfishing (65%), fish and wildlife habitat (61%), air quality (56%), groundwater (54%), surface water quality and renewable energy (52%). Less than 50% of the sample is very or extremely concerned about drinking water quality (48%), forest conservation (46%), land conservation (42%), food safety (40%), hazardous wastes (38%), mining impacts (38%), invasive species (34%) and solid waste (23%).

Factor analysis, a data reduction technique, is used with these measures of environmental concern to develop two variables that more parsimoniously measure environmental concern for use in regression analysis. The first variable, which we call “concern about the environment,” loads highly positively on drinking water quality, food safety, solid waste, surface water quality, air quality, hazardous waste, groundwater, and renewable energy. The other variables of concern have small positive or negative factor loadings. The second variable, which we call “concern about natural resources,” loads highly positively on overfishing, fish and wildlife habitat, invasive species, forest conservation, climate change, land conservation and mining impacts. The other variables of concern have small positive or negative factor loadings. The mean of these two variables is zero with a standard deviation of one and the correlation coefficient between these two variables is zero.

In addition to these two measures of environmental concern, 65% of the sample thinks that the “planet’s environment” has gotten slightly worse, somewhat worse or more since 2000 and 69% think that it will be slightly worse, somewhat worse or more in 2025. We asked respondents for their political views. Fifteen percent describe themselves as moderate, 30% as moderately liberal and 38% as somewhat or very liberal. The remaining 17% of the sample has political views that range from very conservative to somewhat conservative.

In estimating the determinants of response to each statement we include all of the independent variables described in this section and above except the dummy variables for the lowest quartile of Google Scholar citations, those respondents in their thirties those in the conservative to moderate political view category and work experience (due to its high correlation with age). Each of the models are weighted for the PhD degree and United States residence in order to be more representative of the AERE population. Each of the independent variables has explanatory power at the 5% significance level in at least one of the models. All told, only 11% of the 1044 regression coefficients are statistically significant at the 5% level, excluding the constants.⁸

To avoid burdening the reader with 1000+ coefficients, Table 1 includes the variables of significance (5%) for each model as well as the sign of the corresponding coefficient relative to agreement (i.e. for positive coefficients, increases in the variable value lead to a higher likelihood of agreement with the statement). There are no statistically significant coefficients in the model for statement “unregulated markets provide optimal quantities of goods whose

⁸ Several of the items of opinion resisted modeling efforts with model chi-square values that are not above the critical value for statistical significance at the 5% level. These are statements [1], [3], [6], [8], [11], [12], [13], [29], [30] and [34]. Considering the entropy measure of consensus, the models with little explanatory power are in the middle of the consensus rankings, ranging from the lowest sixth item to the highest twenty-ninth item.

production and consumption generate negative externalities.” Three independent variables are statistically significant at the 5% level when explaining agreement with “unregulated markets provide public goods in optimal quantities.” Respondents who are concerned about natural resources, who are moderately liberal and energy economists are less likely to agree.

Respondents who are concerned about natural resources, are U.S. residents and who have more children are more likely to agree with “unregulated common-pool resources face the ‘tragedy of the commons’ problem.” Agreement with “discussion of pollution in trade negotiations is likely to lead to ‘green protectionism’ by high-income countries” can be adequately explained by five independent variables. Respondents in the second and fourth quartiles of citations are more likely to agree, yet respondents who have research tasks at work are less likely to agree. Respondents with administrative tasks are more likely to agree. Males are less likely to agree.

Not surprisingly, those with a concern for natural resources, moderate and less moderate liberals are less likely to agree that “the free market, property rights, and tort law provide the best tools to preserve the health and sustainability of the environment.” Respondents in three JEL categories (general, renewable resources and energy economics) are more likely to agree. Respondents in their 50s are less likely to agree. Considering our summary of Hotelling’s Rule, “nonrenewable resource prices tend to rise at the rate of interest over time (adjusted for new discoveries, etc),” respondents with a PhD degree and United States residents are more likely to agree. Males and respondents in their 50s are less likely to agree.

Only a few regression coefficients are statistically significant when explaining the forestry related items. Males are more likely to agree, and those in their 40s are less likely to agree that “the optimal forest rotation is when the harvest generates the maximum economic

yield of timber and nonmarket resources.” Only concern about natural resources increases agreement with “forests should be managed to provide multiple uses.” Respondents who teach, have a PhD and are males are less likely to agree with “forests should be managed to achieve the maximum sustainable yield of timber resources” while respondents who do research and have higher concern for the environment are more likely to agree.

Only one of the models with emissions standards statements as dependent variables has much explanatory power. Respondents who are concerned about the environment, who think the environment will worsen in the future and who associate themselves with the agriculture JEL code are less likely to agree that “emissions standards are rigid, and insensitive to geographical and technological differences.” Respondents with citations in the second and fourth quartile, academics and those with more children are more likely to agree. Respondents with a PhD and more children are more likely to agree with “emissions taxes or marketable emissions permits are a more economically efficient approach to pollution control than emissions standards,” while those with concern for the environment are less likely to agree. Energy economists are more likely to agree with the revenue recycling statement: “emissions tax or permit auction revenues should be returned to the public through dividends or lower income taxes.” Concern about natural resources and being in their 20s increases agreement with “emissions tax or permit auction revenues should be used to reduce the national debt.” Concern about the environment decreases agreement.

Considering the three statements about fishery resources, respondents who are concerned about the environment and who conduct research are more likely to agree that “ocean fisheries should be managed to achieve the maximum sustainable yield from commercial catch.” Those

who teach, who have interests in the renewable resources and conservation JEL code, who have a PhD and are in their 20s are less likely to agree. Respondents who think that the environment will worsen in the future are less likely to agree that “ocean fisheries should be managed to achieve the maximum economic yield from commercial and recreational catch.” Respondents who teach, are in their 20s and who have more children are more likely to agree. Respondents who are concerned about the environment and those interested in nonrenewable resource economics are less likely to agree that “Individual transferable quotas are a more economically efficient approach to fishery regulation than open access regulations.” Males and respondents who have concern for natural resources are more likely to agree.

Considering sustainability, respondents who are concerned about natural resources are more likely to agree with “the management of resource use should aim to meet the needs of the present generation without compromising the ability of future generations to meet their own needs.” Respondents who teach and are in their 50s are less likely to agree. Respondents who think that the environment will worsen in the future and are somewhat or very liberal are more likely to agree with “population growth inevitably degrades the environment.” Respondents who work in administration and have more children are less likely to agree with this statement. United States residents, those who teach and those in their 50s are less likely to agree with “there exists a maximum level of economic growth that can be sustained without undermining the resource base upon which it depends.”

Four questions considered government policy. Environmental economists, according to the JEL category, are more likely to agree with “the U.S. should ban genetically modified crops.” Respondents in the upper two quartiles of citations, U.S. residents and, not surprisingly,

agricultural economists are less likely to agree. Respondents who are more concerned about the environment, somewhat or very liberal and those with more children are less likely to agree with “laws mandating municipal curbside recycling should be eliminated.” United States residents and those in their 40s are more likely to agree. Respondents with more concern about the environment, agricultural economists and renewable resources and conservation economists are less likely to agree that “the U.S. should increase energy taxes.” Respondents with more concern about natural resources, those who are moderately, somewhat and very liberal and policy economists are more likely to agree. Respondents with more concern about natural resources, and those who are moderately, somewhat and very liberal are less likely to agree that “reducing the regulatory power of the Environmental Protection Agency (EPA) would improve the economic efficiency of the U.S. economy.”

Considering economic growth and the environment, economists who are generalists, those in their 20s and those with more children are more likely to agree with “economic growth is needed in order to protect the environment.” Respondents who think that the environment will worsen in the future are less likely to agree. United States residence, which has a negative effect, is the only factor that helps explain variation in “economic growth always harms the environment.” Respondents with concern about natural resources and liberals are less likely to agree with “we worry too much about the future of the environment and not enough about prices and jobs today.” Academic economists are more likely to agree. Only concern for natural resources is significant at the 5% level when trying to explain “new technologies will surely come along to solve environmental problems before they get out of hand.” Respondents who think that the environment will worsen in the future and who are in their 60s are less likely to

agree that “some pollution is inevitable if we are going to continue to make improvements in our standard of living” Respondents who are in the second and third quartile of citations and males are more likely to agree. There are no variables that help explain variation in responses to “if business is forced to spend a lot of money on environmental protection, it won’t be able to invest in research and development to keep us competitive in the international market.”

Those who are more concerned about the environment are less likely to agree that “I just don’t have the time to worry about how all of my actions affect the environment.” Economists with a PhD degree are more likely to agree. A large number of explanatory factors are important when explaining “I would be embarrassed if people I know caught me not recycling my trash.” Respondents with more concern about natural resources and liberals are more likely to agree. Respondents who teach, live in the United States and males are less likely to agree. Respondents who are more concerned about natural resources and in their 40s are less likely to agree with “I am very confused about what’s good and what’s bad for the environment.” Those who think that the environment will worsen in the future, policy economists and those with a JEL field in nonrenewable resources are more likely to agree. Respondents with more concern about the environment and natural resources and those who think that the environment is worse than in the past are more likely to agree with “I feel good when I take steps to help the environment.”

Males are less likely to agree that “a manufacturer that voluntarily reduces the environmental impact of its production process and products is making a smart business decision.” Respondents with concern about the environment, and those who think the environment is worse since 2000 are more likely to agree with “local governments should provide more incentives for people to recycle.” Nonrenewable resources and energy economists

are less likely to agree. Also, residents of the United States are less likely to agree.

Considering these results by the most important factors, the variables that have the most explanatory power in terms of the number of items for which they are statistically significant are the environmental and natural resource concern variables. The factor that measures concern about natural resources is statistically significant in fourteen models. Concern about natural resources, which loads strongly on concern about overfishing, fish and wildlife habitat, invasive species, forest conservation and climate change, is a variable strongly related to a market failure paradigm. It is negatively related to agreement that free markets will provide public goods in optimal quantities, preserve the health and sustainability of the environment and efficiently solve the tragedy of the commons. Respondents with concern about natural resources agree that forests should be managed for multiple uses and have specific notions about environmental policy, agreeing that emissions tax or permit auction revenues should be used to pay down the national debt, individual transferable quotas are efficient, that energy taxes should be increased and disagree that the EPA makes the U.S. economy less efficient. Concern about natural resources is consistent with statements about the importance of sustainability, hope that technology will solve environmental problems and concern about the future of the environment, relative to current pressing economic issues. Concern about natural resources is also consistent with environmentalist behavior. Respondents would be embarrassed about not recycling, have little confusion about what is good and bad for the environment and feel good when their own behavior leads to environmental improvement.

The factor measuring concern about the environment is statistically significant in eleven models. Concern about the environment, which is negatively correlated with concern about

overfishing, increases agreement with maximum sustainable yield for commercial fisheries and timber as a policy goal. This suggests that there is some spurious correlation in some of these models, unless those who worry less about overfishing recognize that maximum sustainable yield may be less conservationist than maximum economic yield for fisheries. Concern about the environment increases agreement with a ban on genetically modified crops. This is consistent with its positive correlation with concern about food safety. Concern about the environment makes it more likely for respondents to prefer policies that tend to stray from incentive-based environmental and natural resource policy. Concern about the environment decreases agreement with the statement about the inefficiency of emissions standards and the relative efficiency of individual transferable quotas and makes it less likely for respondents to agree about eliminating recycling mandates and increasing energy taxes. Yet, respondents with more concern are more likely to agree that recycling incentives should be increased. Concern about the environment is a measure that the respondent is an environmentalist in their personal behavior. More concern is related to feeling good about environmental behavior and disagreement with not having enough time to worry about the environment.

The demographic variable of most importance are respondent gender, number of children, and United States residence. Males are less likely to be green protectionists, to agree with Hotelling's Rule, to agree about managing forests for maximum sustainable yield of timber, are less embarrassed about not recycling, and voluntary pollution reductions. Males are more likely to agree with managing forests for maximum economic yield, that individual transferable quotas are efficient, and that some pollution is inevitable for increasing standards of living. Increases in the number of children, perhaps not inexplicably, increases agreement with the

inevitability of the tragedy of the commons problem with unregulated common pool resources and decreases agreement with population growth as an environmental problem. A bit more inexplicably, however, an increasing number of children is associated with respondents who agree with the inefficiency of regulatory standards, the efficiency of incentive based policy, and the importance of recreational fisheries (take your kid fishing?). An increasing number of children is associated with support for mandatory recycling laws and economic growth as a prerequisite for environmental protection. United States residents are more likely to agree with the tragedy of the commons problem, Hotelling's Rule and elimination of mandatory recycling laws. United States residents are less likely to agree that there is a maximum level of economic growth consistent with a clean environment, that the U.S. should ban genetically modified crops, that economic growth always harms the environment and that local governments should encourage recycling. United States residents are less inclined to be embarrassed when caught not recycling.

Ideology is an important predictor of economic opinion. The somewhat/very liberal variable is significant in seven models and the moderately liberal variable is significant in six models. These results sometimes overlap, but not always. Liberals disagree about optimal public good provision without government intervention and the ability of the free market to preserve environmental health and sustainability. Liberals are less likely to worry about population growth and current prices and jobs, relative to the environment. Liberals are in favor of government activism with agreement about mandatory municipal recycling laws, increased energy taxes and the efficiency of the EPA. Liberals would be embarrassed if it was discovered that they were not recycling their trash.

Conclusions

At the beginning of this article we asked about whether environmental and resource economists are one-handed. In this paper we have presented results from a survey of AERE members. We find that AERE members reach consensus on a number of items of opinion and there are a number of items for which consensus is more difficult to reach. While past research finds that economists are more likely to agree with microeconomic statements relative to macroeconomic statements, and positive statements more than normative statements, we find no such dichotomies. This may be because environmental and resource economics is dominated by normative microeconomic questions. The economic opinion literature suggests that ideology, gender and research activity might play a role in explaining opinions. We find that agreement with environmental and resource economics statements are influenced by non-economic factors: concern about the environment and natural resources, political ideology, gender, the number of children and United States residence. Work-related tasks, research productivity and other variables have limited effects. Ultimately, we hope these results will encourage discussion between academics, policy makers and the general public. Understanding how environmental and resource economists feel about these issues could help avoid misperceptions in the media and in political debates.

References

- Alston, Richard, J. R. Kearl, and Michael Vaughan (1992) "Is There a Consensus among Economists in the 1990s?" *American Economic Association: Papers and Proceedings*, 82(2):203–209.
- Anderson, Malcolm and Richard Blandy (1992) "What Australian Economics Professors Think," *Australian Economic Review*, 25:17–40.
- Anderson, Malcolm, Richard Blandy, and Sarah Carne (1993) "Academic Economic Opinion in East Asia," *Australian Economic Review*, 26:5–19.
- Bell, James Washington (1945) "The Function of Government in Postwar American Economy: A Report on an Experiment by an Ad Hoc Consensus Committee," *American Economic Review Papers and Proceedings* 35(2):422-447.
- Blendon, Robert J., John M. Benson, Mollyann Brodie, Richard Morin, Drew E. Altman, Daniel Gitterman, Mario Brossard, and Matt James (1997) "Bridging the Gap Between the Public's and Economists' Views of the Economy," *Journal of Economic Perspectives* 11(3):105-118.
- Block, Walter, and Michael Walker (1988) "Entropy in the Canadian Economics Association: Sampling Consensus on the Major Issues," *Canadian Public Policy* XIV(2):137-150.

Caplan, Bryan (2002) “Systematically Biased Beliefs About Economics: Robust Evidence of Judgemental Anomalies from the Survey of Americans and Economists on the Economy,” *Economic Journal* 112(April):433-458.

Frey, Bruno S., Werner W. Pommerehne, Friedrich Schneider and Guy Gilbert (1984) “Consensus and Dissension Among Economists: An Empirical Inquiry,” *American Economic Review* 74(5):986-994.

Fuller, Dan A., Richard M. Alston and Michael B. Vaughan (1995) “The Split Between Political Parties on Economic Issues: A Survey of Republicans, Democrats and Economists,” *Eastern Economic Journal* 21(2):227-238.

Fuller, Dan and Doris Geide-Stevenson (2003) “Consensus among Economists: Revisited,” *Journal of Economic Education*, 34(4):369–387.

Fuller, Dan and Doris Geide-Stevenson (2007) “Consensus on Economic Issues: A Survey of Republicans, Democrats and Economists,” *Eastern Economic Journal* 33(1):81-94.

Fuchs, Victor R. (1996) “Economics, Values, and Health Care Reform,” *American Economic Review* 86(1):1-24.

Fuchs, Victor R., Alan B. Krueger and James M. Poterba (1998) “Economists’ Views about Parameters, Values, and Policies: Survey Results in Labor and Public Economics,” *Journal of Economic Literature*, 36(3):1387-1425.

- Geach, Stephanie, and Duncan Reekie (1991) "Entropy in South African Economics: A Survey of Consensus and Dissent." *South African Journal of Economic and Management Sciences* 5(2): 63-86.
- Gordon, Roger and Gordon B. Dahl (2013) "Views among Economists: Professional Consensus or Point-Counterpoint?" Paper presented at the 2013 ASSA meetings, NBER Working Paper No. 18728, <http://www.nber.org/papers/w18728>.
- Kearl, J. R., Clayne L. Pope, Gordon C. Whiting and Larry T. Wimmer (1979) "A Confusion of Economists," *American Economic Review: Papers and Proceedings*, 69:28-37.
- Klein, Daniel B., and Charlotta Stern (2006) "Economists' Policy Views and Voting," *Public Choice* 126:331-342.
- Klein, Daniel B., and Charlotta Stern (2007) "Is There a Free-Market Economist in the House? The Policy Views of American Economic Association Members," *American Journal of Economics and Sociology* 66(2):309-334.
- Lansing, John B. (1946) "Comments on the Economist's Opinion Survey," *American Economic Review* 36(1):143-146.
- Ricketts, Martin and Edward Shoemith (1992) "British Economic Opinion: Positive Science or Normative Judgment?" *American Economic Review Papers and Proceedings* 82(2):210-215.

Sapienza, Paola and Luigi Zingales (2013) "Economic Experts vs. Average Americans," Paper presented at the 2013 ASSA meetings.

Shannon, Claude E. (1948). "A Mathematical Theory of Communication". *Bell System Technical Journal* **27** (3): 379–423.

Tastle, William J., and Mark J. Wierman. "Consensus and dissent: A measure of ordinal dispersion." *International Journal of Approximate Reasoning* 45.3 (2007): 531-545.

Whaples, Robert (1995) "Where Is There Consensus among American Economic Historians? The Results of a Survey on Forty Propositions," *Journal of Economic History*, 55(1):139–154.

Whaples, Robert (1996) "Is There Consensus among American Labor Economists: Survey Results on Forty Propositions," *Journal of Labor Research*, 17(4):725–34.

Whaples, Robert (2009) "The policy views of American Economic Association members: The results of a new survey," *Econ Journal Watch*, 6(3):337-348.

Whaples, Robert and Jac C. Heckelman (2005) "Public Choice Economics: Where Is There Consensus?" *American Economist*, 49(1):66–78.

Table 1. Statements, Consensus and Determinants

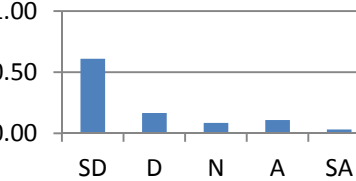
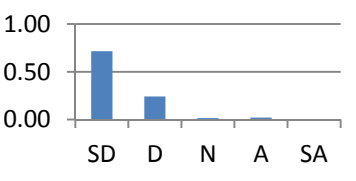
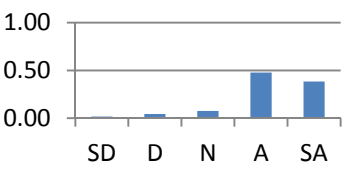
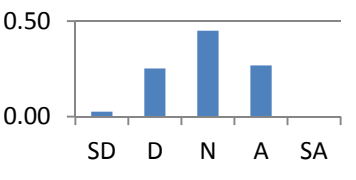
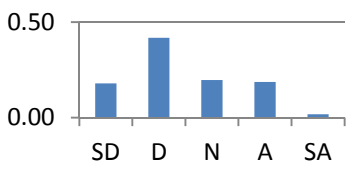
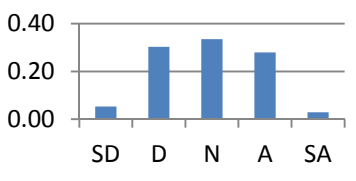
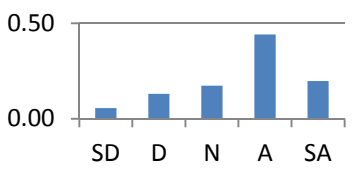
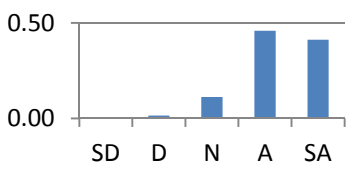
Statement	Descriptive Statistics / Measures of Consensus					Significant Determinants (95% significance)	
	Mean SD=1, SA=5	Standard Deviation	Entropy	Consensus	Average Consensus Rank	Determinant	Sign (agree)
[1] Unregulated markets provide optimal quantities of goods whose production and consumption generate negative externalities.	1.79	1.17	1.67	0.55	26	None	
[2] Unregulated markets provide public goods in optimal quantities.	1.36	0.67	1.09	0.78	1	Concern for natural resources Moderately liberal Energy economics	- - -
[3] Unregulated common-pool resources face the "tragedy of the commons" problem.	4.17	0.88	1.62	0.71	12	Concern for natural resources US resident Children	+ + +
[4] Discussion of pollution in trade negotiations is likely to lead to "green protectionism" by high-income countries.	2.97	0.80	1.69	0.75	10	Citations (2 nd quartile) Citations (4 th quartile) Research Administration Children	+ + - + -
[5] The free market, property rights, and tort law provide the best tools to preserve the health and sustainability of the environment.	2.45	1.04	1.99	0.61	26	Concern for natural resources Moderately liberal Liberal General economics Renewable resource economics Energy economics Age (50s)	- - - + + + -
[6] Nonrenewable resource prices tend to rise at the rate of interest over time (adjusted for new discoveries, etc).	2.93	0.95	1.94	0.67	22	Concern for the environment PhD US resident Age (50s) Male	+ + + - -
[7] The optimal forest rotation is when the harvest generates the maximum economic yield of timber and nonmarket resources.	3.59	1.11	2.04	0.59	31	Age (40s) Male	- +

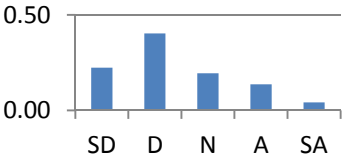
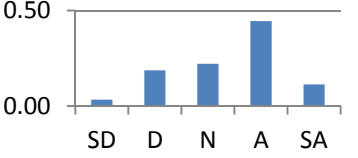
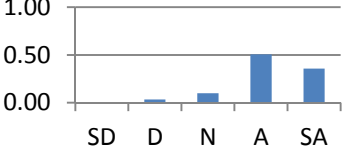
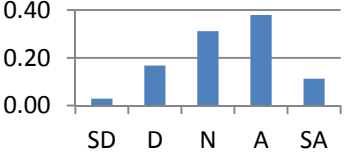
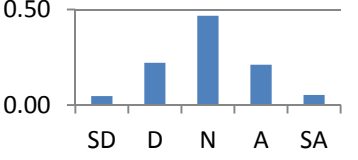
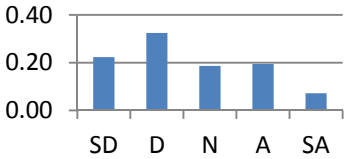
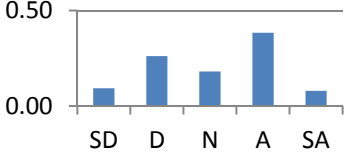
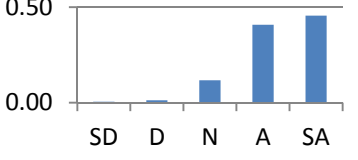
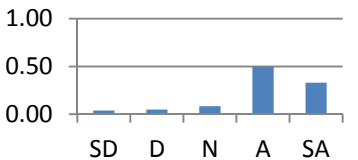
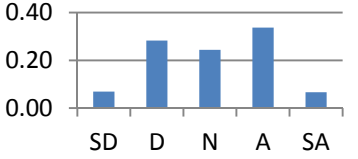
[8] Forests should be managed to provide multiple uses.	4.27	0.72	1.49	0.75	3	Concern for natural resources	+
[9] Forests should be managed to achieve the maximum sustainable yield of timber resources.	2.37	1.10	2.06	0.59	30	Concern for environment Teaching Research PhD Male	+ - + - -
[10] Emissions standards are rigid, and insensitive to geographical and technological differences.	3.42	1.03	1.98	0.62	25	Concern for environment Worse quality in 2025 Citations (2 nd quartile) Citations (4 th quartile) Agricultural economics Academic Children	- - + + - + +
[11] Emissions taxes or marketable emissions permits are a more economically efficient approach to pollution control than emissions standards.	4.18	0.77	1.55	0.75	6	Concern for environment PhD Children	- + +
[12] Emissions tax or permit auction revenues should be returned to the public through dividends or lower income taxes.	3.38	0.99	1.99	0.64	24	Energy economics	+
[13] Emissions tax or permit auction revenues should be used to reduce the national debt.	3.00	0.91	1.90	0.72	15	Concern for the environment Concern for natural resources Age (20s)	- + +
[14] Ocean fisheries should be managed to achieve the maximum sustainable yield from commercial catch.	2.57	1.23	2.19	0.52	36	Concern for the environment Teaching Research Renewable resource economics PhD Age (20s)	+ - + - - -
[15] Ocean fisheries should be managed to achieve the maximum economic yield from commercial and recreational catch.	3.10	1.15	2.09	0.56	34	Worse quality in 2025 Teaching Age (20s) Children	- + + +
[16] Individual transferable quotas are a more economically efficient approach to fishery regulation than open access regulations.	4.30	0.77	1.53	0.73	7	Concern for the environment Concern for natural resources Nonrenewable res. economics Male	- + - +
[17] The management of resource use should aim to meet the needs of the present generation without compromising the ability of future generations	4.03	0.98	1.73	0.70	18	Concern for natural resources Teaching	+ -

to meet their own needs.						Age (50s)	-
[18] Population growth inevitably degrades the environment.	3.05	1.08	2.07	0.60	29	Worse quality in 2025 Liberal Administration Children	+ + - -
[19] There exists a maximum level of economic growth that can be sustained without undermining the resource base upon which it depends.	3.25	1.14	2.15	0.56	33	US resident Age (50s)	- +
[20] The U.S. should ban genetically modified crops.	2.26	1.08	2.03	0.60	28	Concern for the environment Citations (3 rd quartile) Citations (4 th quartile) Agricultural economics US resident	+ - - - -
[21] Laws mandating municipal curbside recycling should be eliminated.	2.21	0.90	1.85	0.69	17	Concern for the environment Liberal US resident Age (40s) Children	- - + + -
[22] The U.S. should increase energy taxes.	4.18	0.89	1.67	0.70	13	Concern for the environment Concern for natural resources Moderately liberal Liberal Policy Agricultural economics Renewable resource economics	- + + + + - -
[23] Reducing the regulatory power of the Environmental Protection Agency (EPA) would improve the economic efficiency of the U.S. economy.	1.90	0.92	1.74	0.69	16	Concern for natural resources Moderately liberal Liberal	- - -
[24] Economic growth is needed in order to protect the environment.	3.21	0.97	1.93	0.65	23	Worse quality in 2025 General economics Age (20s) Children	- + + +
[25] Economic growth always harms the environment.	2.01	0.89	1.75	0.73	14	US resident	-
[26] We worry too much about the future of the environment and not enough about prices and jobs today.	1.87	0.73	1.54	0.77	3	Concern for natural resources Moderately liberal Liberal Academic	- - - +

[27] New technologies will surely come along to solve environmental problems before they get out of hand.	2.66	0.93	1.91	0.66	21	Concern for natural resources	-
[28] Some pollution is inevitable if we are going to continue to make improvements in our standard of living.	3.83	0.99	1.82	0.67	19	Worse quality in 2025 Citations (2 nd quartile) Citations (3 rd quartile) Age (60s) Male	- + + - +
[29] If business is forced to spend a lot of money on environmental protection, it won't be able to invest in research and development to keep us competitive in the international market.	2.17	0.82	1.69	0.74	11	None	
[30] I just don't have the time to worry about how all of my actions affect the environment.	2.41	1.12	2.01	0.58	31	Concern for the environment PhD	- +
[31] I would be embarrassed if people I know caught me not recycling my trash.	3.04	1.22	2.20	0.53	35	Concern for natural resources Moderately liberal Liberal Teaching US resident Male	+ + + - - -
[32] I am very confused about what's good and what's bad for the environment.	2.00	0.83	1.65	0.77	9	Concern for natural resources Worse quality in 2025 Policy Energy economics Age (40s)	- + + - -
[33] I feel good when I take steps to help the environment.	4.15	0.68	1.45	0.79	2	Concern for the environment Concern for natural resources Worse quality since 2000	+ + +
[34] A manufacturer that voluntarily reduces the environmental impact of its production process and products is making a smart business decision.	3.32	0.73	1.55	0.75	5	Male	-
[35] Local governments should provide more incentives for people to recycle.	3.55	0.94	1.91	0.66	19	Concern for the environment Worse quality since 2000 Nonrenewable res. economics Energy economics US resident	+ + - - -
[36] We should wait until the economy gets better before we make the environment a major policy priority.	1.74	0.78	1.54	0.73	8	None	

Appendix Table 1: Summary of Results

Statement	Frequency Distribution	
[1] Unregulated markets provide optimal quantities of goods whose production and consumption generate negative externalities.		78 % SD/D
[2] Unregulated markets provide public goods in optimal quantities.		96 % SD/D
[3] Unregulated common-pool resources face the "tragedy of the commons" problem.		86 % SA/A
[4] Discussion of pollution in trade negotiations is likely to lead to "green protectionism" by high-income countries.		45 % N
[5] The free market, property rights, and tort law provide the best tools to preserve the health and sustainability of the environment.		60 % SD/D
[6] Nonrenewable resource prices tend to rise at the rate of interest over time (adjusted for new discoveries, etc).		36 % SD/D
[7] The optimal forest rotation is when the harvest generates the maximum economic yield of timber and nonmarket resources.		64 % SA/A
[8] Forests should be managed to provide multiple uses.		83 % SA/A

[9] Forests should be managed to achieve the maximum sustainable yield of timber resources.		63 % SD/D
[10] Emissions standards are rigid, and insensitive to geographical and technological differences.		56 % SA/A
[11] Emissions taxes or marketable emissions permits are a more economically efficient approach to pollution control than emissions standards.		86 % SA/A
[12] Emissions tax or permit auction revenues should be returned to the public through dividends or lower income taxes.		49 % SA/A
[13] Emissions tax or permit auction revenues should be used to reduce the national debt.		47 % N
[14] Ocean fisheries should be managed to achieve the maximum sustainable yield from commercial catch.		55 % SD/D
[15] Ocean fisheries should be managed to achieve the maximum economic yield from commercial and recreational catch.		46 % SA/A
[16] Individual transferable quotas are a more economically efficient approach to fishery regulation than open access regulations.		87 % SA/A
[17] The management of resource use should aim to meet the needs of the present generation without compromising the ability of future generations to meet their own needs.		83 % SA/A
[18] Population growth inevitably degrades the environment.		40 % SA/A

<p>[19] There exists a maximum level of economic growth that can be sustained without undermining the resource base upon which it depends.</p>		<p>48 % SA/A</p>
<p>[20] The U.S. should ban genetically modified crops.</p>		<p>62 % SD/D</p>
<p>[21] Laws mandating municipal curbside recycling should be eliminated.</p>		<p>66 % SD/D</p>
<p>[22] The U.S. should increase energy taxes.</p>		<p>84 % SA/A</p>
<p>[23] Reducing the regulatory power of the Environmental Protection Agency (EPA) would improve the economic efficiency of the U.S.</p>		<p>80 % SD/D</p>

<p>economy.</p>		
<p>[24] Economic growth is needed in order to protect the environment.</p>		<p>46 % SA/A</p>
<p>[25] Economic growth always harms the environment.</p>		<p>78 % SD/D</p>
<p>[26] We worry too much about the future of the environment and not enough about prices and jobs today.</p>		<p>84 % SD/D</p>
<p>[27] New technologies will surely come along to solve environmental problems before they get out of hand.</p>		<p>47 % SD/D</p>
<p>[28] Some pollution is inevitable if we are going to continue to make improvements in our standard of living.</p>		<p>75 % SA/A</p>

<p>[29] If business is forced to spend a lot of money on environmental protection, it won't be able to invest in research and development to keep us competitive in the international market.</p>		<p>73 % SD/D</p>
<p>[30] I just don't have the time to worry about how all of my actions affect the environment.</p>		<p>63 % SD/D</p>
<p>[31] I would be embarrassed if people I know caught me not recycling my trash.</p>		<p>43 % SA/A</p>
<p>[32] I am very confused about what's good and what's bad for the environment.</p>		<p>90 % SD/D</p>
<p>[33] I feel good when I take steps to help the environment.</p>		<p>86 % SA/A</p>

<p>[34] A manufacturer that voluntarily reduces the environmental impact of its production process and products is making a smart business decision.</p>		<p>58 % N</p>
<p>[35] Local governments should provide more incentives for people to recycle.</p>		<p>56 % SA/A</p>
<p>[36] We should wait until the economy gets better before we make the environment a major policy priority.</p>		<p>88 % SD/D</p>

Appendix Table 2. Independent Variables in Regression Analysis

Name	Label	Cases	Mean	Std Dev	Min	Max
Factor1	Factor measuring concern about environmental problems	328	0.00	1.00	-3.31	2.32
Factor2	Factor measuring concern about natural resource problems	328	0.00	1.00	-3.01	2.39
worse1	1 if environment is worse than in 2000	328	0.65	0.48	0	1
worse2	1 if environment will be worse in 2025	328	0.69	0.46	0	1
modlib	1 if political views are moderately liberal	328	0.30	0.46	0	1
liberal	1 if political views are somewhat or very liberal	328	0.38	0.49	0	1
research1	1 if Google Scholar citations in 1st Quartile	328	0.22	0.41	0	1
research2	1 if Google Scholar citations in 2nd Quartile	328	0.27	0.45	0	1
research3	1 if Google Scholar citations in 3rd Quartile	328	0.28	0.45	0	1
research4	1 if Google Scholar citations in 4th Quartile	328	0.23	0.42	0	1
Teaching	1 if work involves teaching	328	0.67	0.47	0	1
Research	1 if work involves research	328	0.91	0.28	0	1
Policy	1 if work involves policy	328	0.31	0.46	0	1
admin	1 if work involves administration	328	0.23	0.42	0	1
q0gen	1 if JEL category General	328	0.14	0.35	0	1
q1ag	1 if JEL category Agriculture	328	0.20	0.40	0	1
q2r	1 if JEL category Renewable Resources and Conservation	328	0.41	0.49	0	1
q3n	1 if JEL category Nonrenewable Resources and Conservation	328	0.15	0.36	0	1
q4en	1 if JEL category Energy	328	0.28	0.45	0	1
q5env	1 if JEL category Environmental Economics	328	0.80	0.40	0	1
Academic	1 if works at an academic insitution	328	0.79	0.41	0	1
PhD	1 if holds the PhD degree	328	0.75	0.43	0	1
USA	1 if United States Resident	328	0.83	0.37	0	1
age20s	1 if age in the 20s	328	0.08	0.28	0	1

age30s	1 if age in the 30s	328	0.42	0.49	0	1
age40s	1 if age in the 40s	328	0.21	0.41	0	1
age50s	1 if age in the 50s	328	0.23	0.42	0	1
age60s	1 if age in the 60s	328	0.05	0.23	0	1
Children	Number of children	328	1.80	1.00	1	7
Male	1 if male	328	0.72	0.45	0	1

Appendix Table 3. Logistic Regression Coefficient Estimates: Determinants of Agreement

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
Intercept_5	-2.68	-5.64	-0.63	.	-3.15	-3.30	-1.63	0.11	-2.16	-3.22	-1.32	-2.31
Intercept_4	-1.04	-3.99	1.76	0.94	-0.49	-0.56	0.48	2.45	-0.24	-0.73	1.53	-0.06
Intercept_3	-0.45	-3.39	2.60	3.09	0.67	1.00	1.44	4.52	0.87	0.46	2.95	1.56
Intercept_2	0.38	-0.58	3.83	5.87	3.08	3.45	2.94	.	2.95	2.64	5.33	4.29
Factor1	0.06	0.17	0.15	0.17	0.04	0.04	-0.02	0.03	0.25*	-0.26*	-0.29*	-0.14
Factor2	-0.23	-0.47*	0.42*	-0.04	-0.28*	0.14	-0.03	0.27*	-0.19	-0.01	0.22	0.13
worse1	-0.28	-0.08	-0.34	-0.16	-0.30	-0.47	-0.09	0.07	-0.15	0.44	0.29	0.06
worse2	0.13	-0.12	0.31	-0.41	-0.07	0.12	-0.45	-0.27	-0.07	-0.55*	0.06	-0.27
modlib	-0.03	-0.80*	0.40	-0.10	-0.73*	-0.12	0.26	0.37	0.18	0.27	0.05	-0.41
liberal	0.15	-0.34	-0.10	-0.36	-0.68*	-0.13	-0.22	0.03	0.05	-0.33	-0.10	-0.32
research2	-0.28	-0.21	0.10	0.79*	-0.48	-0.04	0.56	0.34	-0.28	0.72*	0.26	0.26
research3	-0.28	-0.13	-0.19	0.53	-0.26	0.13	0.55	0.56	-0.27	0.60	0.15	0.36
research4	0.17	0.15	-0.13	1.00*	0.22	-0.06	0.34	0.18	-0.09	0.85*	-0.13	0.35
Teaching	-0.60	-0.57	-0.19	-0.26	0.18	0.11	0.32	-0.06	-1.04*	0.03	0.32	-0.42
Research	-0.04	1.02	-0.50	-1.21*	-0.72	-0.39	-0.87	-0.19	1.12*	-0.43	-0.30	0.01
Policy	-0.38	-0.26	-0.19	0.12	-0.23	-0.32	0.19	-0.10	-0.47	-0.25	-0.30	-0.06
admin	-0.59	0.00	0.42	0.80*	-0.11	0.03	0.00	0.29	-0.09	0.06	-0.28	0.26
q0gen	-0.02	0.22	0.07	0.28	0.65*	0.03	-0.09	0.13	-0.03	-0.33	-0.10	-0.29
q1ag	0.12	-0.05	-0.06	0.28	0.38	0.26	-0.05	-0.01	-0.10	-0.62*	0.07	-0.49
q2r	0.11	0.26	-0.35	0.11	0.81*	0.05	0.45	-0.14	-0.44	0.26	-0.25	-0.08
q3n	-0.09	0.32	0.05	-0.47	-0.45	-0.10	-0.38	0.24	0.30	0.07	-0.02	0.13
q4en	-0.48	-0.89*	0.30	-0.40	0.61*	0.06	-0.31	0.04	0.01	0.05	0.50	0.54*
q5env	0.32	-0.40	-0.25	-0.38	0.49	-0.21	-0.19	0.05	0.16	0.06	-0.18	0.06
Academic	-0.05	0.03	-0.18	0.49	-0.41	-1.05	-0.50	-0.07	-0.21	0.75*	-0.63	-0.11
PhD	-0.28	-0.38	0.50	-0.03	0.51	1.09*	0.43	-0.17	-0.57*	0.04	0.68*	0.46
USA	0.00	0.50	0.59*	-0.37	-0.47	0.15*	0.11	-0.24	-0.21	0.04	-0.02	-0.30
age20s	0.43	0.21	-0.54	-0.28	0.47	0.80	0.73	0.32	-0.56	0.24	0.63	-0.01

age40s	0.27	0.06	-0.24	-0.36	-0.57	-0.62	-0.73*	0.34	-0.03	-0.07	-0.28	-0.18
age50s	0.08	-0.02	-0.42	-0.42	-0.95*	-0.38*	-0.44	-0.17	-0.50	0.13	-0.19	-0.46
age60s	0.04	0.01	0.33	0.67	-0.15	0.08	-0.15	-0.42	0.25	0.61	0.15	-0.18
Children	-0.02	-0.17	0.26*	-0.29	0.00	0.32	0.15	-0.19	0.01	0.28*	0.36*	0.18
Male	-0.24	-0.04	-0.05	-0.06*	-0.11	-0.24*	0.95*	0.07	-0.67*	-0.38	0.15	0.27
LNLIKE	-338.14	-199.67	-356.72	-343.60	-407.23	-408.74	-429.41	-328.55	-422.72	-417.06	-314.67	-413.53

	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22	Q23	Q24
Intercept_5	-3.45	-2.05	-4.14	-1.61	-0.05	-4.00	-1.80	-2.56	-6.15	-2.05	.	-3.44
Intercept_4	-1.52	-0.24	-1.53	0.80	2.55	-1.18	0.13	-0.93	-4.03	0.40	-2.82	-0.36
Intercept_3	0.70	0.70	-0.70	2.84	3.41	-0.06	1.20	0.64	-2.05	2.34	-1.52	1.18
Intercept_2	2.98	2.37	1.13	3.89	4.33	2.24	2.83	2.27	0.33	3.34	0.58	3.34
Factor1	-0.29*	0.28*	-0.02	-0.33*	0.19	0.01	0.17	0.33	-0.43*	-0.35*	0.16	-0.07
Factor2	0.24*	-0.22	-0.03	0.22*	0.48*	0.16	0.01	0.09	-0.23	0.42*	-0.47*	-0.17
worse1	-0.12	-0.29	0.40	0.10	0.26	-0.02	-0.14	0.21	0.01	0.04	0.41	0.13
worse2	0.01	0.06	-0.75*	0.19	-0.16	1.14*	0.15	0.16	-0.31	0.15	-0.10	-0.67*
modlib	0.52	0.20	0.02	0.33	0.31	0.15	0.18	-0.26	-0.53	0.89*	-0.64*	-0.09
liberal	0.24	0.25	-0.20	-0.11	-0.18	0.95	0.13	0.26	-0.96*	0.91*	-0.93*	-0.51
research2	0.34	0.01	0.35	0.61	-0.50	0.44	0.27	-0.58	0.21	0.19	-0.25	0.61
research3	0.31	-0.29	-0.22	0.35	-0.33	-0.07	-0.25	-0.90*	0.67	0.17	0.05	0.54
research4	0.27	-0.17	0.13	0.19	-0.30	0.15	-0.21	-0.87*	0.39	0.47	-0.11	0.42
Teaching	0.18	-1.02*	0.64*	-0.09	-0.93*	-0.58	-0.63*	0.01	-0.29	0.25	-0.51	-0.24
Research	-0.42	1.12*	0.35	-0.48	0.42	0.02	0.52	0.38	0.47	-0.25	0.36	0.06
Policy	-0.46	-0.44	-0.13	0.54	-0.45	-0.20	-0.31	-0.33	0.18	0.72*	0.09	-0.33
admin	0.13	0.12	0.45	0.05	0.19	-0.73*	-0.40	-0.10	0.10	0.53	-0.40	-0.36
q0gen	0.12	0.24	0.27	0.25	-0.01	0.59	0.37	-0.03	0.07	-0.37	0.60	0.68*
q1ag	0.12	-0.26	0.33	-0.51	0.35	-0.27	0.27	-0.71*	0.17	-0.86*	0.38	-0.11
q2r	0.28	-0.63*	0.35	0.82	0.13	0.10	0.07	0.04	0.27	-0.52*	0.23	-0.11
q3n	0.18	0.51	-0.46	-0.18*	-0.35	0.09	0.21	-0.03	-0.14	0.18	0.08	-0.06

q4en	0.40	0.26	0.10	0.20	0.33	0.02	-0.08	0.08	-0.03	0.34	0.10	0.24
q5env	0.47	0.00	-0.23	-0.21	-0.18	0.27	-0.09	0.59*	0.16	0.10	0.04	-0.16
Academic	-0.55	0.30	-0.49	0.30	0.35	0.54	0.65	-0.60	0.43	-0.04	-0.03	-0.18
PhD	0.00	-0.86*	0.46	0.48	0.10	-0.21	-0.54	-0.07	0.47	0.27	0.41	0.07
USA	-0.01	0.04	0.07	-0.19	-0.14	-0.46	-0.60*	-0.58*	0.67*	0.43	-0.37	0.26
age20s	0.88*	-1.23*	1.21*	0.59	-0.30	0.14	-0.10	-0.77	0.88	0.35	-0.23	1.14*
age40s	-0.14	-0.02	-0.35	0.11	-0.22	0.32	0.42	-0.02	0.68*	-0.25	0.06	0.40
age50s	-0.49	-0.46	0.02	-0.34	-1.07*	0.51	0.82*	-0.01	-0.16	0.09	-0.15	0.55
age60s	0.05	0.38	0.56	-0.04	-0.83	0.25	0.69	-0.84	-0.99	-0.79	0.58	0.98
Children	0.05	-0.08	0.30*	0.30	0.03	-0.33*	-0.13	-0.16	-0.32*	0.08	0.00	0.25*
Male	0.15	-0.26	0.38	0.15*	-0.23	0.15	0.09	-0.24	0.37	0.12	0.18	-0.38
LNLIKE	-400.48	-449.86	-432.44	-304.52	-362.13	-421.33	-467.96	-419.22	-368.82	-321.38	-353.54	-404.97

	Q25	Q26	Q27	Q28	Q29	Q30	Q31	Q32	Q33	Q34	Q35	Q36
Intercept_5	-3.79	.	-4.74	-2.47	-4.46	-4.31	-2.60	-5.20	-0.51	-1.01	-1.15	-5.12
Intercept_4	-2.19	-4.36	-0.82	0.19	-1.34	-1.66	-0.42	-2.97	2.68	1.18	1.70	-4.00
Intercept_3	-0.55	-1.82	0.89	1.04	0.45	-1.01	0.50	-1.51	5.63	4.57	3.83	-2.54
Intercept_2	1.82	1.05	3.33	3.43	3.11	0.99	2.11	1.36	6.74	6.83	5.48	0.14
Factor1	0.22	-0.14	-0.09	0.04	-0.17	-0.32*	0.13	0.07	0.41*	0.22	0.73*	-0.21
Factor2	0.10	-0.32*	-0.35*	0.16	-0.10	-0.19	0.25*	-0.27*	0.36*	0.01	0.18	-0.21
worse1	0.20	0.19	-0.13	-0.38	-0.49	-0.11	0.32	-0.45	0.59*	-0.07	0.57*	-0.26
worse2	0.49	-0.50	-0.48	-0.66*	-0.22	0.21	-0.08	0.82*	-0.47	-0.10	-0.06	-0.22
modlib	-0.13	-0.95*	-0.17	-0.07	-0.35	-0.41	0.86*	-0.15	0.24	-0.43	-0.28	-0.15
liberal	0.06	-0.79*	-0.50	-0.38	-0.50	-0.21	0.94*	-0.06	0.11	-0.21	-0.26	-0.54
research2	-0.04	0.50	0.32	0.72*	-0.22	-0.07	0.03	-0.05	0.10	-0.26	0.21	0.32
research3	-0.19	0.30	0.17	0.71*	-0.14	0.03	-0.02	0.32	0.25	-0.24	0.03	-0.21
research4	0.49	0.04	0.24	0.49	-0.57	-0.22	0.08	-0.07	0.43	-0.17	0.37	0.13
Teaching	-0.29	-0.67	-0.28	0.00	0.14	0.19	-0.81*	-0.29	0.06	-0.17	-0.49	-0.14
Research	-0.28	-0.05	-0.34	0.09	-0.26	0.01	0.38	0.00	-0.56	-0.55	-0.34	0.46

Policy	-0.25	-0.04	-0.24	0.16	-0.20	-0.01	-0.03	0.63*	0.19	0.06	-0.40	-0.12
admin	-0.07	-0.02	-0.15	0.03	0.20	0.25	0.05	-0.02	0.16	-0.11	-0.13	0.06
q0gen	0.28	0.61	0.39	-0.11	0.49	-0.21	-0.01	0.58	0.18	-0.25	-0.19	0.51
q1ag	-0.42	0.31	0.47	-0.19	0.16	0.23	-0.22	0.28	0.15	0.23	0.16	-0.16
q2r	0.46	0.22	0.25	-0.43	0.27	-0.13	-0.01	0.04	-0.05	-0.18	0.15	0.20
q3n	-0.50	0.44	0.36	0.28	0.07	-0.48	-0.43	0.04*	-0.21	0.22	-0.93*	0.27
q4en	0.35	0.04	0.00	-0.04	-0.09	0.24	0.28	-0.63	-0.22	-0.12	-0.53*	0.33
q5env	-0.12	0.10	0.34	0.22	-0.37	-0.13	0.22	-0.39	0.13	0.21	0.17	-0.42
Academic	0.39	0.86*	-0.08	0.35	-0.48	0.23	0.29	0.58	-0.68	-0.23	0.40	0.69
PhD	-0.36	0.38	0.09	0.51	0.29	0.57*	-0.34	0.28	-0.29	0.06	-0.50	-0.20
USA	-0.61*	-0.30	-0.45	0.55	-0.04	0.07	-0.91*	-0.34	0.15	-0.48	-0.74*	-0.23
age20s	-0.87	-0.27	-0.06	0.38	0.04	0.25	0.64	0.03	0.54	-0.69	-0.28	0.09
age40s	0.00	-0.15	0.57	0.47	-0.22	-0.56	0.14	-0.73*	-0.05	0.35	-0.01	-0.28
age50s	0.25	0.02	-0.48	-0.33	-0.30	-0.39	0.59	-0.45	0.34	0.29	-0.23	0.30
age60s	-0.07	-0.03	-0.25	-1.42*	-0.04	-0.36	0.45	-0.78	-0.62	0.29	-0.47	0.47
Children	-0.05	-0.14	-0.02	-0.14	0.02	-0.06	0.14	-0.07	0.17	0.03	0.16	0.11
Male	-0.46	0.17	0.18	0.74*	-0.09	0.26	-0.49*	0.03	-0.38	-0.76*	-0.46	0.10
LNLIKE	-369.39	-309.37	-394.43	-374.43	-359.89	-425.87	-462.45	-341.50	-287.66	-327.77	-367.57	-318.60

Note: * p = .05