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Environmental Awareness and Happiness

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Abstract- The focus of this paper is on the relationship between an individual's environmental attitudes (or awareness) and well-being. We use an ordered probit model to examine the relationship between individual measures of subjective well-being and environmental attitudes regarding ozone pollution and species extinction. Using data from the British Household Panel Survey we find a negative correlation between well-being and concern about ozone pollution and a positive correlation between well-being and concern about species extinction. These relationships hold when explanatory variables are included indicating whether or not the person lives in a polluted environment and whether or not the person engages in outdoor leisure activities. These relationships also hold when we control for individual psychological traits. Our results are an important step in clarifying some of the subtleties of the relationship between environmental quality and well-being. This research area is important in addressing the related issues of sustainability and environmental policy design.

Keywords: biodiversity, environmental attitudes, well-being, pollution.

I. Introduction

In the last few years, the economic literature has witnessed the emergence of a new research agenda that uses subjective questions to measure individual happiness¹. Researchers in the field advocate the use of subjective measures of well-being to examine a large number of interesting and relevant economic issues. Justification for using subjective well-being measures includes their widespread use by behavioral scientists, and their validation by a large number of experimental and neurobiological studies (Di Tella, MacCulloch and Oswald 2003). The subjective well-being literature is characterized by the use of an individual's self-reported satisfaction with life to understand the determinants of happiness and to link this with individual behavior. This is important not only to understanding the factors contributing to individual well-being but also to evaluate the impact of macroeconomics policies on individual satisfaction (Di Tella, MacCulloch and Oswald 2003). This approach can help clarify the necessary trade-offs between income and other variables, such as pollution, noise, health, and family characteristics, and use them in policy valuation. The connection between the environment and human needs has been studied for quite some time (Kellert and Wilson 1983) but the relationship between measures of subjective well-being and environmental attitudes is a relatively new area of research (Rangel 2003, Welsch 2002). This research is also relevant to the growing interest in the relationship between cultural attitudes about the environment and the sustainability of human societies (Diamond 2005).

In this paper we use the British Household Panel Survey to examine the correlation between subjective well-being and attitudes toward environmental pollution and species extinction. Section II describes the model used and the data set, Section III discusses the results showing the relationship between well-being and environmental attitudes, Section IV extends the model to control for (1) individual psychological traits, and (2) an individual's experience with his or her own environment, measured by the environmental quality of their neighborhood and their participation in outdoor activities, and Section V concludes.

¹ See, for example, Clark and Oswald (1994); DiTella, MacCulloch and Oswald (2001, 2003); Easterlin (2001); Ferrer-i-Carbonell (2005); Ferrer-i-Carbonell and Frijters (2004); Frijters et al. (2004); Frey and Stutzer (2002); Ng (1997); Oswald (1997); Pradhan and Ravallion (2000); van Praag and Ferrer-i-Carbonell (2004); van Praag, Frijters, and Ferrer-i-Carbonell (2003); Ravallion and Lokshin (2002).

II. Empirical approach

A. The Model

As in most of the studies in the literature, the present paper uses individuals' answers to the question: "How dissatisfied or satisfied are you with your life overall". The respondent can answer on a scale from 1 to 7, where 1 stands for not satisfied at all and 7 for completely satisfied. Individuals' answers are then explained according to the following model

$$SWB_n = \alpha + \beta X_{kn} + \gamma EA_n + \varepsilon, \quad (1)$$

where SWB is the answer to the satisfaction question, n represents the individual, X_k is a set of k explanatory variables, EA are the respondent's environmental attitudes as reported in the questionnaire, and ε represents the usual error term.

In this paper, Equation (1) is estimated by means of an Ordered Probit. This means that SWB is assumed to be a categorical variable and thus we cannot observe the exact level of happiness but only the range in which it lies. Second, it is assumed that the answer to the subjective well-being question provides an ordinal (and not cardinal) ranking. This means, for example, that an individual answering '6' is happier than one answering '3', but not necessarily twice as happy (Ferrer-i-Carbonell and Frijters, 2004).

B. The Data

This paper uses the British Household Panel Survey². The BHPS is a very large household survey covering about 10,000 individuals belonging to more than 5,000 British households. The BHPS is now available from 1991 to 2003. In the data set, all adult individuals (16 years or older) respond to an individual questionnaire, in which life satisfaction (happiness) and two environmental attitude questions are asked. Because the environmental attitudes questions are

² British Household Panel Survey. Institute for Social and Economic Research, Colchester: UK Data Archive (<http://www.iser.essex.ac.uk/bhps/doc/index.html>).

³ The data used in this paper were made available through the UK Data Archive. The data were originally collected by the ESRC Research Centre on Micro-social Change at the University of Essex, now incorporated within the Institute for Social and Economic Research. Neither the original collectors of the data nor the Archive bear any responsibility for the analyses or interpretations presented here.

only asked in 3 discontinuous years we cannot use of the panel structure of the data set. The paper uses data for 1996, the last year in which environmental attitude questions were asked. The total sample includes about 9,000 individuals.

The BHPS data set also includes a large number of socio-economic and demographic variables that make reference to the individual and household situations, such as age, whether there are children living in the household, years of education, household income, and health of the respondent. Some of these variables are very useful in explaining well-being and may be related to environmental attitudes. We measure environmental attitudes by whether individuals express concern or not about “the destruction of the ozone layer” and “the extinction of many animal and plant species”.

III. The Relationship between Environmental Awareness and Well-being

Table 1: Subjective well-being and environmental attitudes, BHPS 1996

	No Env. Att.		With Env. Att.		Only Env. Att.	
	Coeff.	Z	Coeff.	Z	Coeff.	Z
Individual is unemployed	-0.247	-4.310	-0.245	-4.270		
Missing information for unemployment	-0.047	-0.170	-0.046	-0.160		
Ln(years of education)	-0.437	-3.510	-0.437	-3.510		
Missing information for education	-0.487	-3.460	-0.495	-3.520		
Individual works	0.178	2.160	0.183	2.220		
Individual is self-employed	0.000	0.010	-0.001	-0.020		
Ln(number of working hours)	-0.040	-1.870	-0.041	-1.890		
Ln(monthly family income)	0.072	4.290	0.072	4.310		
Ln(age)	-7.470	-13.570	-7.451	-13.490		
Ln ² (age)	1.066	13.940	1.062	13.850		
Minimum well-being reached at age:	33.278		33.325			
Individual is married or lives in partnership	0.300	10.510	0.299	10.450		
Individual has children	-0.112	-3.820	-0.111	-3.790		
Individual is a male	-0.037	-1.520	-0.040	-1.620		
Ind. has at least one sick. or handicap	-0.351	-14.610	-0.352	-14.620		
Dummy variable for occupation level	-----Included in these regressions-----					
Individual cares about ozone layer			-0.078	-2.480	-0.080	-2.580
Individual cares about animal extinction			0.080	2.320	0.081	2.390
Number of observations	8972		8945		9004	
Log likelihood	-14137		-14097		-14561	
Pseudo R ²	0.025		0.025		0.000	

Intercept terms are not shown in the Table

Table 1 shows that individuals who are concerned with the ozone layer show a negative correlation with subjective well-being, while the opposite is true for individuals who show concern about the threat to biodiversity. The rest of variables show the expected coefficients and will therefore not be discussed here. It is interesting, however, to notice that the coefficients of the other variables do not change when the environmental attitudes variables are included. Similarly, including only the environmental attitudes variables gives rise to the same coefficients as when we include them together with all the other variables.

The results presented in Table 1 indicate that environmental awareness strongly correlates with measures of subjective well-being. One could argue that this relationship is due to the fact that the two environmental attitudes correlate either with individual unobserved personal traits that in turn influence individual well-being or with excluded explanatory variables. In the first case, individuals who only care about the ozone layer, have certain psychological traits that relate negatively with well-being. The opposite is true for individuals who show concern only about nature and animal extinction. The *truly* environmentalist, individuals who are aware of the problems and thus show concern in both aspects, have almost zero effect from these concerns (-0.078 + 0.080). In this case, we cannot establish a causal relationship between environmental awareness and well-being, as we are faced with an endogeneity problem.⁴ Thus, we do not know whether individuals who care about the ozone layer become less happy by the awareness they have or whether individuals with low levels of happiness and a tendency to be depressed are the ones who worry about everything, including the ozone layer. Similarly, one could argue that individuals who care about species extinction are the ones who engage in outdoor activities which make them happy. Contrarily, one could argue that individuals who are happier also tend to engage more in outdoors activities. In order to address this problem, in the next section we include psychological measures in the regression analysis.

In the second case, it could be argued that individuals who care about the ozone layer suffer from the effects of pollution and that it is pollution that is negatively correlated with subjective well-being (Welsch 2002) and not the environmental awareness of the problem. Similarly, it could also be argued that individuals who express concern about species

⁴ The endogeneity comes from the fact that environmental awareness may be much correlated with individual's psychological traits and thus with the error term of the well-being equation.

extinction are those who enjoy nature the most and whose well-being increases with interacting with the environment (Kellert and Wilson 1983).⁵ In order to control for this, the next section introduces two objective variables that aim at capturing these two effects.

IV. Including Omitted Explanatory Variables and psychological traits

This section addresses the issues raised in Section 3. First, the regression analysis is expanded to include two objective variables omitted from the equation presented in Table 1. These are: a variable indicating whether the individual lives in a polluted environment, and one that captures whether the individuals enjoy nature. The two most adequate variables available in the data set were: “Does your accommodation have any of the following problems? Pollution, grime or other environmental problems”; and “We are interested in the things people do in their leisure time, I'm going to read out a list of some leisure activities. Please look at the card ... and tell me how frequently you do each one... Work in the garden”.

A dummy variable called “pollution” is created. This variable takes value one if the respondent answers affirmatively to the first question. This was indeed the case for almost 10% of the respondents. Similarly, a dummy variable “work often in the garden” was created. This dummy takes value 1 if the individual works “at least once a week” or “at least once a month” in the garden. It takes value 0 if the individual answers “several times a year”, “once a year or less”, or “never/almost never”. In the sample 48% of individuals indicated that they “work often in the garden”.

These regression results are presented in Table 2. Table 2 clearly indicates that including the two new variables has the expected sign but does not appreciably change the coefficients and significance of the environmental attitudes.

Next, we investigate whether the relationship between well-being and environmental attitudes is related (exclusively) to psychological traits. To this end, the regression analysis includes a set of 11 individual self-reported mental health characteristics. The BHPS includes a set of 12 questions developed as a screening instrument for psychiatric illness. These

⁵ A Probit regression analysis indicates that ‘environmental quality’ has a positive significant effect on ‘individual cares about the ozone layer’; and ‘often working in the garden’ also has a positive significant effect on “individual cares about animal extinction”.

questions ask individuals whether they have recently:been able to concentrate, lost much sleep over worry, felt that you were playing a useful part in things, felt capable of making decisions about things, felt constantly under strain, felt you couldn't overcome your difficulties, been able to enjoy your normal day-to- day activities, been able to face up to problems, been feeling unhappy or depressed, been losing confidence in yourself, and been thinking of yourself as a worthless person. The last question, which asks individuals whether they have recently been feeling reasonably happy, all things considered is not used in the regression, as it is very similar to the dependent variable. These 11 variables can take 4 values, where 1 stands for 'more so than usual', 2 for 'same as usual', 3 for 'less so than usual', and 4 for 'much less than usual'.

Table 2: Including objective indicators to measure environmental quality, BHPS 1996

	Objective measures		Psychological traits	
	Coeff.	Z	Coeff.	Z
Individual is unemployed	-0.246	-4.270	-0.170	-2.920
Missing information for unemployment	-0.017	-0.060	-0.154	-0.540
Ln(years of education)	-0.425	-3.400	-0.537	-4.240
Missing information for education	-0.472	-3.340	-0.514	-3.590
Individual works	0.170	2.070	0.071	0.840
Individual is self-employed	0.005	0.110	-0.012	-0.260
Ln(number of working hours)	-0.038	-1.750	-0.038	-1.720
Ln(monthly family income)	0.077	4.500	0.040	2.350
Ln(age)	-7.733	-13.920	-5.562	-9.830
Ln ² (age)	1.096	14.210	0.800	10.170
<i>Minimum well-being reached at age:</i>		<i>34.080</i>		<i>32.278</i>
Individual is married or lives in partnership	0.280	9.700	0.279	9.560
Individual has children	-0.118	-4.000	-0.078	-2.610
Individual is a male	-0.049	-1.990	-0.201	-7.960
Ind. has at least one sick. or handicap	-0.341	-14.130	-0.195	-7.890
Dummy variable for occupation level				
Individual cares about ozone layer	-0.082	-2.600	-0.062	-1.940
Individual cares about animal extinction	0.067	1.930	0.098	2.820
Ind. works often in the garden	0.136	5.630		
House has pollution, grime, other environmental problems	-0.157	-4.250		
Concentration			-0.015	-0.590
Loss of sleep			-0.064	-3.490
Playing a useful role			-0.184	-7.890
Capable of making decisions			0.010	0.370

Constantly under strain	-0.226	-11.090
Problem overcoming difficulties	-0.185	-8.680
Enjoy day-to-day activities	-0.210	-8.840
Ability to face problems	-0.016	-0.550
Unhappy or depressed	-0.139	-6.320
Losing confidence	-0.289	-12.220
Believe in self-worth		
Number of observations	8910	8848
Log likelihood	-14009	-12632
Pseudo R2	0.027	0.116

Intercept terms are not shown in the Table

Table 2 shows the results when these 11 proxy variables for psychological traits are included. These variables have the negative expected sign, although 3 of them do not show a statistically significant coefficient.

The main result is that including and controlling for psychological traits do not change the previous conclusions, i.e. being concerned about the ozone layer correlates negatively with well-being and caring about animal extinction correlates positively with well-being. This means that the relationship between environmental awareness and well-being is not (only) due to the correlation between psychological traits and environmental awareness. Concern about the ozone layer confirms other studies showing a negative relationship between pollution and measures of subjective well-being (Welsch 2002). The positive relationship between well-being and concern about species extinction lends support to those who argue that humans receive positive psychological benefits from caring about other species (Kellert and Wilson 1993).

V. Conclusions

In this paper we examine the relationship between reported well-being and attitudes toward pollution and species loss. We find a negative relationship between well-being and concern about the ozone layer. We find a positive relationship between well-being and concern about biodiversity loss. These relationships hold when variables are added that capture reported pollution problems and reported contact with nature. We also tested the hypothesis that concern towards nature may be linked to internal (learned or inherited) psychological traits rather than being dependent upon external circumstances. We found, however, that including

additional explanatory variables to control for psychological traits does not change the sign and significance of the environmental awareness coefficients.

Thus our results provide further evidence for the direct importance of environmental awareness to human well-being. Further analysis of this relationship is critical to designing policies and incentives to protect features of the environment. Such policies have the potential to not only improve the condition of the environment they can also contribute to the subjective well-being of the human population.

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