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Environmental Politics

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/fenp20

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To cite this article: John Kenny (2020) Economic conditions and support for the prioritisation of environmental protection during the Great Recession, Environmental Politics, 29:6, 937-958, DOI: 10.1080/09644016.2019.1680074

To link to this article: https://doi.org/10.1080/09644016.2019.1680074

ENVIRONMENTAL POLITICS
2020, VOL. 29, NO. 6, 937–958
https://doi.org/10.1080/09644016.2019.1680074

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Economic conditions and support for the prioritisation of environmental protection during the Great Recession

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ABSTRACT

Evidence is presented of how the Great Recession affected prioritisation of environmental protection. World Values Survey data from both before the recession's onset and its aftermath shows that increases in unemployment rates had significant, negative effects upon prioritisation of environmental protection while changing growth rates or gross domestic product (GDP) had none. These results hold not only among advanced industrial democracies, but also generalise to Latin American countries. Additionally, the findings offer no evidence that the recession changed the way in which individual wealth relates to the prioritisation of environmental protection. As a strong environmental public opinion is an important factor in the successful implementation of environmental policy, the findings suggest that, if policymakers wish to maintain public support for implementing environmental protection measures, they should prioritise low unemployment over economic growth.

KEYWORDS Economic recession; environmental attitudes; unemployment; public opinion; World Values Survey

Introduction

The Great Recession of 2008 was unprecedented in both its suddenness and its scale. Comparable to the Great Depression (Almunia *et al.* 2010), it resulted in a dramatic decline in economic fortunes at both the individual and country levels creating a vicious circle in which reduced consumer demand and lower production went hand-in-hand and unemployment spiralled. This adversely affected not only those who lost their jobs – with the associated financial hardship reflected in rising poverty, debt and bankruptcy for many families – but also those who remained employed while facing

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Supplemental data for this paper can be accessed here.

higher levels of job insecurity and declining wages (United Nations Department of Economic and Social Affairs 2011). Not all countries were equally affected, however, and some saw improvements in their economic fortunes (Lane and Milesi-Ferretti 2011). With a large amount of variation in macro-economic conditions, the aftermath of the crisis provides the ideal opportunity to investigate how changes in economic conditions may affect the prioritisation of environmental protection.

Evidence suggests that the crisis may have affected individuals' environmental protection preferences with a notable decline in environmental concern and an increase in climate change scepticism in the final years of the decade (Ratter *et al.* 2012). Coinciding with the financial crisis, scholars have hypothesised that the two phenomena could be related. A special Eurobarometer (2009, p. 16) report states: 'it is again likely that the perceived seriousness of the economic downturn has led to a decline in the level of concern for climate change'. As individuals only have a limited amount of concern that they need to divide amongst competing priorities, increased insecurity may have caused a downwards shift in their prioritisation of environmental issues while they focused on the economic and financial needs of themselves and their country. Though some of this decline in pro-environment attitudes occurred prior to 2008 and could be unrelated to macro-economic circumstances, Nordhaus and Shellenberger (2009) remark that the global economic crisis appears to have exacerbated this.

Understanding this relationship further has important political implications. Public support for environmental protection is vital for facilitating legislative attention to address environmental problems as it lends environmental groups the credibility to claim they represent the public interest and acts as a resource for lobbying for new legislation or pressing for effective implementation of existing legislation (Dunlap 1991, p. 286). If leaders know that their electorate favour (environmental) policies, they are also more disposed to introduce them to increase their probability of retaining office (Anderson *et al.* 2017, p. 3). The converse is also true however as, given that governments cannot address all of the complex problems that societies face (Krosnick *et al.* 2006), they are unlikely to introduce environmental legislation in the absence of a strong pro-environment public opinion when there is no electoral incentive to do so. If governments go ahead with a top-down approach without bottom-up support, this is 'very likely to fail on grounds of both effectiveness and legitimacy' (Hurrell 2007, p. 237). Thus, by improving our understanding of how and under what circumstances economic conditions affect the prioritisation of the environment among the public, we can learn more about the contextual conditions that are conducive to developing environmental support, which then has important implications for the successful implementation of environmental policies.

Here, I make a number of advances to this literature. Firstly, analysis on the relationship between economic conditions and environmental protection

attitudes has predominantly focused on the US and Europe, but I expand it to include a broader array of countries to test the generalizability of the results. Secondly, while there is a considerable literature on the effects of the recession on public opinion on global warming and climate change, there is less research on its effect on environmental attitudes more broadly. This is important as both the topic of environmental protection used and the way in which environmental protection is expressed or measured in surveys can lead to very different conclusions on the state of environmental attitudes (Dunlap and Emmet Jones 2002).

I also investigate if changes in environmental attitudes are sensitive to different economic indicators. Economic indicators not only capture different economic phenomena, but individuals may also respond differently to changes in each. This literature, however, has a tendency to choose a particular economic indicator as capturing a broader 'state of the economy' without justifying theoretically why it is the most appropriate one to use or, where justifications are provided, to not empirically test whether they are correct. As such indicators are not functionally equivalent, this may lead to incorrect inferences on the effect of worsening economic conditions on environmental attitudes given the possibility that one may reach an alternative conclusion with a different indicator. I find that changes in unemployment rates are particularly important. Finally, I examine whether the changes in macro-economic conditions resulting from the 2008 recession affected the way in which individual financial circumstances relate to environmental protection preferences.

For my analysis, I use data from waves 5 and 6 of the World Values Survey (WVS) (Inglehart. *et al.* 2015) covering the periods 2004–2007 and 2010–2014 respectively. Though this is a relatively short period of time, both economic conditions and environmental attitudes witnessed notable shifts between these periods, so it is an ideal timeframe to analyse the questions of interest. I limit the countries I use to those in Western Europe (Cyprus, Germany, Netherlands, Spain, Sweden), Eastern Europe (Poland, Romania, Slovenia, Ukraine), South America (Argentina, Brazil, Chile, Peru, Uruguay), North America (Mexico, United States), Australasia (Australia, New Zealand), plus a small number of Asian countries (Hong Kong, Japan, South Korea). These are countries where awareness of global warming and climate change is almost universal, which is not the case in Africa and most of Asia (Pugliese and Ray 2009, Lee *et al.* 2015); Rohrschneider *et al.* (2014) also demonstrated that increased affluence in traditionally low-income countries in the sample facilitated the emergence of a similar environmental attitudes structure between them which permits comparative analysis. Additionally, each of these countries has been included in both waves.

Literature review

Environmental protection is widely regarded as desirable and, in some respects, achieving a clean and healthy environment is a valence issue (Clarke *et al.* 2009, p. 5). At the same time, agreeing in principle with environmental protection does not necessarily equate to strong support especially when it is perceived to conflict with economic needs. While economic needs are important for individuals even during periods of regular economic activity, they are 'more likely to dominate other issue concerns under conditions of economic recession, volatility and economic underdevelopment' (Singer 2011, p. 284).

Some scholars have presented environmental protection as a 'luxury good' which may be attractive when the economy is doing well, but whose prioritisation is overshadowed by higher-order economic needs during times of economic instability (Abou-Chadi and Kayser 2017). Given that environmental degradation often occurs too slowly for individuals to notice change occurring and may be perceived as a non-immediate problem (Kollmuss and Agyeman 2002, p. 253), individuals may rationally calculate that society should deprioritise environmental protection to focus on the economy. The postmaterialist thesis of Inglehart (1983, 2008) also posits that recessions can have an adverse effect on postmaterialist values – of which he identifies environmentalism to be a component – as they may temporarily lead individuals to prioritise material concerns. Additionally, during economic contractions, the media are less likely to report on environmental issues due to increased coverage of economic issues, which may contribute towards explaining why individuals may be less concerned about the environment during recessions (Carmichael and Brulle 2017).

Following such theoretical expectations, a number of studies resulting from the 2008 crisis have examined the effect of changing economic conditions on attitudes toward environmental protection. US data suggest that an increase in unemployment has a negative effect on people's climate change concerns (Brulle *et al.* 2012) and prioritisation of government action on global warming (Kahn and Kotchen 2011). In Europe, studies find that increasing unemployment rates negatively affect belief in climate change (Scruggs and Benegal 2012) and decreasing economic growth rates negatively affect being worried about it (Shum 2012). Using data from the International Social Survey Programme (ISSP), Dalton and Rohrschneider (2015, p. 528) conclude that there are 'subtle signs that the economic recession has diminished support for environmentalism', though, on balance, other contributors to that special issue of *Environmental Politics* (24 [4] 2015) find that environmental concerns among the public were resilient – at least in Western Europe – as individuals' environmental preferences

continue to relate to their vote choice in a setting in which parties' environmental platforms remained largely unchanged.

In contrasting studies that use US data, Krosnick and MacInnis (2012, p. 15) find that 'no evidence supported the hypothesis that people living in states with economies that were struggling more[1] manifested larger declines in [global warming mitigation] policy endorsement'. Mildenberger and Leiserowitz (2017) find no evidence using panel data from 2008 and 2011 that changing individual economic fortunes or local economic conditions affected prioritisation of global warming and point instead to the effects of shifting political cues. Panel data analysis of New Zealand data from 2002 to 2008 also suggests that neither changing economic perceptions nor changing household financial circumstances account for the observed decline in environmental protection attitudes (Kenny 2018a). While challenging the previous literature, these papers do not eliminate the possibility that the recession could have played a role in diminishing environmental attitudes but suggest that – if it did – it may not have been through directly increasing feelings of economic insecurity *per se* but by altering public discourse so that environmental issues are crowded out (Downs 1972).

Finally, there are insights from papers using experimental data. Analysing US and German cross-sectional data, Kachi *et al.* (2015) find no effect of regional unemployment rates on various indicators of support for action on climate change in either country, however more positive economic perceptions have a small positive effect in the US though not in Germany. Their online survey experiment, which attempted to alter respondents' perceptions of the state of the US economy, found no effects of the treatment on their climate change indices, though they note that this may be due to the failure of their manipulation to work. A question-order survey experiment in Britain overcomes this by manipulating the salience of respondents' own economic perceptions and demonstrates a link between macro-economic perceptions and prioritising urgent action on climate change (Kenny 2018b).

One of my contributions is to analyse the effect of changes in three different indicators given that there are reasons to expect that individuals' attitudes may respond differently to each: gross domestic product (at purchasing power parity) per capita (GDP PPP PC), growth rates, and unemployment rates. Firstly, the absolute level of growth in a country's per capita income may play a role with increasing levels of GDP being associated with increased prosperity and economic security which, in turn, may lead to changing societal values which put lower priority on economic needs (Inglehart 2008). Secondly, the change in the given rate, rather than the levels, of economic growth may also be important. If a country is experiencing high economic growth it may signal a healthy and buoyant economy and thus act as a heuristic for economic security. However, higher economic growth does not necessarily make the average citizen feel more economically

secure and may even increase economic insecurity if such growth comes at the expense of job security (Duch and Taylor 1993, p. 752). If the former is the case, one would expect increasing economic growth to correlate with an increase in environmental concern; if the latter, one would not expect such a relationship. Additionally, economic growth by itself is not necessarily good or bad; individuals when making evaluations may benchmark by comparing with rates over time as well as with rates in neighbouring countries (Kayser and Peress 2016, 90/91).

There are good reasons to believe that changes in environmental concerns would be particularly sensitive to changes in unemployment rates. Higher unemployment rates lead to heavier societal burdens in the forms of shrinking tax revenue and increased government expenditure on unemployment insurance and social programmes (Goldsmith *et al.* 1996, p. 333). They are also extremely important to the public as 'perhaps no single indicator carries as much weight in the public mind as the unemployment rate – monthly unemployment numbers provide a widely publicized and easily understood measure of how hard times are' (Borges *et al.* 2013, p. 398). Scruggs and Benegal (2012, p. 510) similarly advocate unemployment as the most appropriate economic indicator due to it being vital for household material well-being and happiness, whereas very small segments of the population – at least in the US – have disproportionally benefited from the positive effects of economic growth. Evidence from Britain in the aftermath of the recession also suggests that higher unemployment rates affect voter preferences, while growth and other economic attitudes may not (Clarke *et al.* 2016, 144/145).

I also investigate whether the crisis altered the relationship between individual characteristics and environmental attitudes, a question that has received little attention. There is a robust list of individual characteristics that correlate with an environmental disposition, including having a higher income, belonging to the middle or upper classes, being a woman and being highly educated (Gifford and Nilsson 2014).

It is possible that the crisis affected how individual characteristics relate to support for environmental attitudes, with prior literature giving reasons to believe that the relationship between income and prioritisation of the environment may be altered. As Figure 1 displays, macro-economic and micro-economic conditions are related, and evidence suggests that both may in turn affect environmental attitudes. However, what warrants further investigation in light of the 2008 financial crisis is the remaining arrow: whether changing macro-economic conditions alter the way in which micro-economic conditions affect environmental attitudes. As changing macro-economic circumstances may differentially affect different segments of society, it is plausible that individual-level characteristics that are related to environmental attitudes during regular economic circumstances may alter during a recession. Buttel (1975) hypothesises that the most vulnerable will be the first to

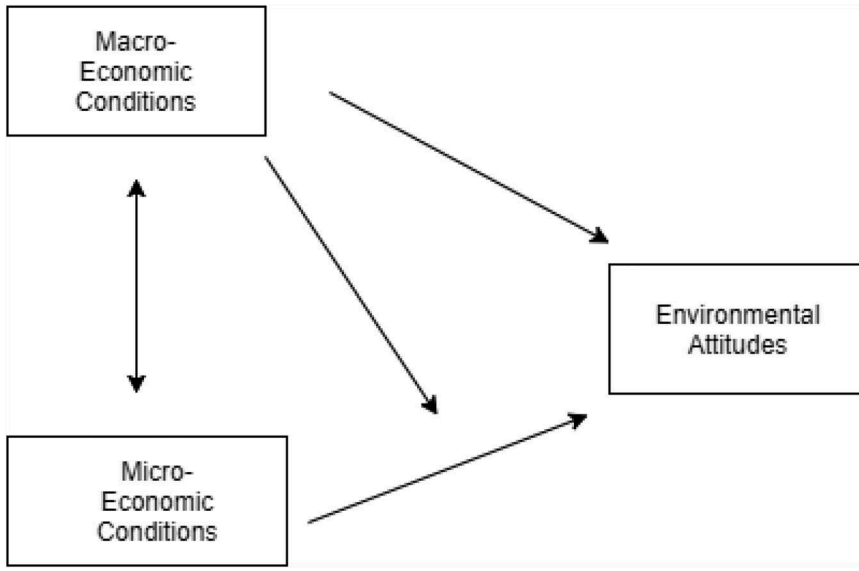

Figure 1. Environment attitudes and economic conditions.

deprioritise environmental protection when economic conditions worsen. Alternatively, during a recession higher-income individuals may see a larger relative drop in their resources and standard of living especially if there is a safety net of a welfare system for lower-income households. Cooper's (2014) qualitative study of Silicon Valley families during the recession provides for such a psychological effect: she found that better-off families were constantly worried that their plentiful resources may not provide them with enough security. From this, one might expect larger declines in environmental attitudes among these groups during the recession than during more regular times when they would be expected to be amongst the biggest proponents.

Of particular note is a study by Jones and Dunlap (1992) which, using annual surveys, examined whether the social determinants of support for environmental protection in the US changed from 1973–1990.[2] While most social determinants of support remained the same, contrary to their expectations they found that during the second oil crisis those higher on the socio-economic scale – measured by household income and occupational prestige – saw the direction of their coefficients change so that they were negatively associated, albeit at a statistically insignificant level, with environmental support. Following the end of the crisis, both these characteristics returned to being positively associated with environmental support until 1990, when their analysis ends. This points to the potential importance of a change in economic conditions rather than absolute levels for

environmental prioritisation and how an economic crisis may have differential effects on different segments of society. In particular, it provides an indication that higher income groups may show a greater reduction in their support for environmental protection during a severe economic crisis, but that they may update their priorities once the crisis dissipates.

With the severity of the 2008 economic crisis, it is reasonable to assume that, if an economic recession is going to impact upon environmental attitudes, it would occur here. Using data from the 2010 General Social Survey, Newman and Fernandes (2016) find that having a higher income has no impact on being willing to make environmental sacrifices. Using an environmental index combining indicators of concern, behaviour, agency and scientific advances from the 2010 ISSP, Franzen and Vogl (2013) find that individuals' equivalent income[3] within a country is positively and significantly associated with their environmental index score. While these studies at a particular moment in time are important, without comparing post-crisis data with equivalent data from before the crisis, one cannot ascertain the effect of the crisis itself. Conroy and Emerson (2014) investigate the interaction between macro-economic conditions and individual-level circumstances in the US from 1974–2012 and find that having higher incomes offsets the negative effect of recessions on preferences for environmental spending. However, there is a lack of cross-national research on this question in light of the 2008 recession. Given that the literature suggests that either lower or higher income individuals could see a disproportional decrease in their environmental attitudes with decreasing economic conditions, I create a hypothesis for each scenario.

Based on this literature, I test the following hypotheses:

H1a: As unemployment rates increase, support for the prioritisation of action to tackle environmental protection should decrease.

H1b: As economic growth decreases, support for the prioritisation of action to tackle environmental protection should decrease.

H1c: As GDP per capita decreases, support for the prioritisation of action to tackle environmental protection should decrease.

H2a: As economic conditions decline, individuals with lower incomes will see a greater decline in their prioritisation of environmental protection.

H2b: As economic conditions decline, individuals with higher incomes will see a greater decline in their prioritisation of environmental protection.

Data

I use data from waves 5 and 6 of the WVS (see Table 1 for the full list of countries). My dependent variable asks respondents to choose between prioritising protecting the environment even if it causes slower economic growth and some loss of jobs (1) or prioritising economic growth and job creation even if the environment suffers to some extent (0). Responses to this question recorded as 'missing', 'don't know', 'no response' or 'other' have been treated as missing variables. This is the only environmental question capturing a trade-off dimension to be included in both waves.

It is important to recognise that this is one particular dimension of environmental protection that taps into a distinct judgment and has integrity in its own right (Daniels *et al.* 2013), but it should not be taken to represent the whole of the multifaceted nature of environmental attitudes. In the context of previous waves of the WVS, scholars for instance have shown that the trade-off question between the environment and the economy behaves differently to questions capturing a willingness to make personal sacrifices for the environment (Dunlap and York 2008). Given that this trade-off question captures an extremely strong commitment to environmental protection, as it makes it clear in this hypothetical scenario that one cannot further both environmental protection and economic growth policies concurrently, I can make inferences on the prioritisation of environmental protection.

For independent variables, I utilise a mixture of individual and contextual level variables. The first individual-level variable is household income where individuals indicate which income decile – within their own country – their household income falls under on a scale from 1 (lowest) to 10 (highest). I use this as a continuous variable, recoding the responses 'don't know', 'missing' or 'no answer' as missing. There is a measurement issue here as respondents in some countries were given the specific values of the incomes associated with each bracket whereas in other countries respondents had to make a subjective self-placement for which income decile they thought they would be in (Donnelly and Pop-Eleches 2018). Thus, as a robustness test, I also ran the models using the related subjective social class variable which I coded in the analysis as 'lower/working', 'lower-middle' and 'upper-middle/upper'. Next, I include a number of demographic variables that have been shown to relate to environmental protection (Gifford and Nilsson 2014). These are: education, categorised as 'no formal education', 'elementary and below', 'incomplete secondary', 'complete secondary', 'incomplete university' and 'complete university'; age, categorised as 18–24, 25–34, 35–44, 45–54, 55–64 and 65+;[4] and gender, categorised as female (0) and male (1).[5] Finally, I add employment status with the categories: working full-time,

working part-time, self-employed, retired, housework, student, unemployed and other. I use three macro-economic variables which I take from the World Bank (2015) database: unemployment rates, GDP growth rates and GDP PPP PC.

Results

To start, I present descriptive statistics on how levels of environmental support changed across countries from before the recession to its aftermath. Table 1 shows the percentage of people in each country who would choose to prioritise the environment[6] in the pre-recession wave followed by the percentage point change from this baseline in the post-recession wave. In each case, the point estimates have confidence intervals of no more than ±3.5%.

While the country-mean level of prioritisation for environmental protection among those who expressed a priority[7] is 57% in the pre-recession wave, there is notable variation among countries, ranging from just over 40% in South Korea and Hong Kong to 77.5% in Argentina.

Table 1. Percentage and percentages point changes of respondents between waves 5 & 6 that would prioritise environmental protection over economic growth and job creation.

	Wave 5 Pre-recession 2004-2007	Wave 6 – wave 5 Recession aftermath 2010-2014
Hong Kong	40.42%	+20.94%
Uruguay	50.53%	+20.17%
South Korea	40.08%	+16.12%
Germany	42.36%	+12.63%
Chile	68.53%	+4.13%
Peru	67.21%	+1.15%
Sweden	65.89%	+0.37%
Brazil	66.95%	−0.20%
Mexico	65.61%	−0.24%
Poland	43.65%	−1.26%
Ukraine	55.97%	−4.51%
Slovenia	56.78%	−5.76%
Australia	65.73%	−6.04%
Netherlands	51.72%	−6.51%
New Zealand	65.03%	−12.54%
Argentina	77.50%*	−14.23%
Romania	52.97%	−15.44%
Cyprus	65.44%	−15.56%
United States	54.12%	−15.93%
Japan	60.92%	−17.87%
Spain	65.82%	−28.00%
Mean	57.29%	−3.27%

* Argentina did not have the key question on household income asked in this wave, and so, while the country is included in the initial macro-level analysis presented in Figure 2, it cannot be included in the rest of the analysis.

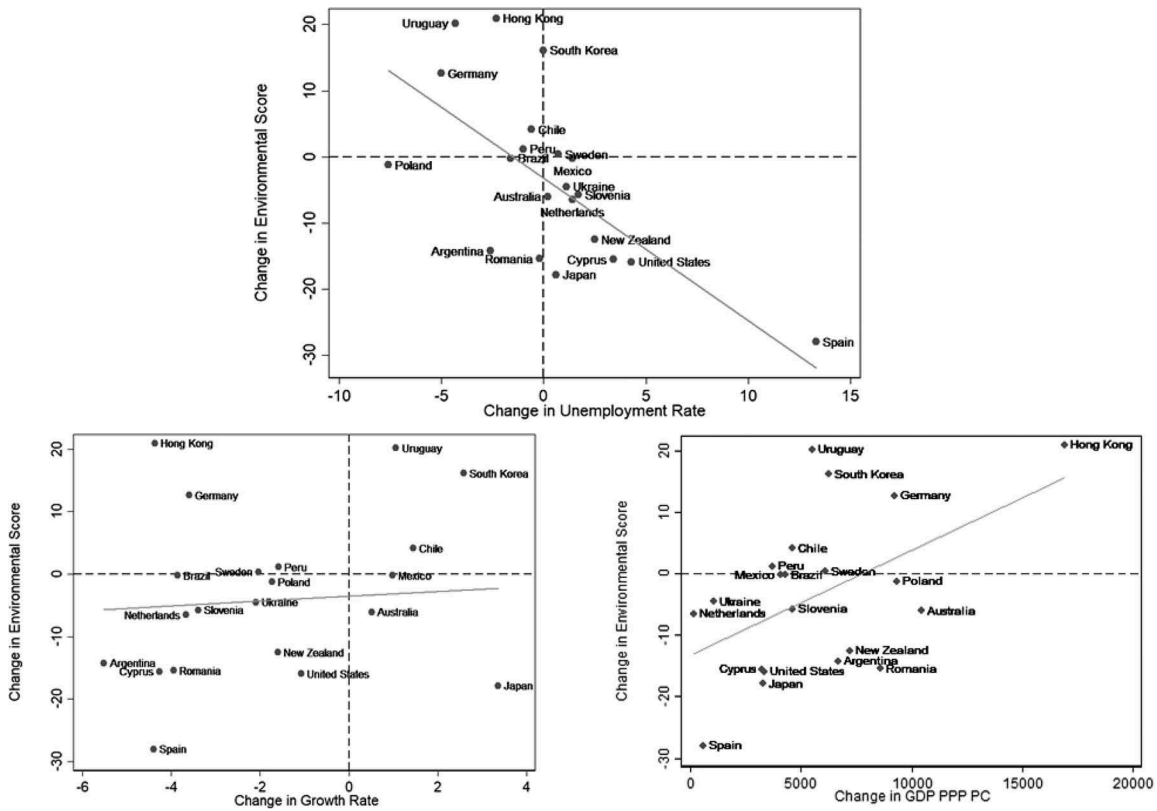

Figure 2. % point change in environmental scores x change in macro-economic indicators between waves 5 & 6 of the WVS.

I am primarily interested in the change in environmental prioritisation from the pre-recession wave to the post-recession wave. The change varies from country to country in both direction and magnitude. Prioritisation of environmental protection decreased in 14 countries and increased in seven, although in 5 of these the magnitude was less than two percentage points while another 3 cases recorded a change of more than 20 percentage points. The countries that saw the greatest increase are those that had a low baseline to begin with. So, while the overall direction of the change was downwards, there is visible cross-country variation.

Following the literature review, one would expect that this variation could be at least partly accounted for by being exposed to different economic conditions whereby countries that had experienced the greatest economic difficulties would have witnessed the biggest decrease in environmentalism. Figure 2 shows the change in environmental protection prioritisation in each country from the two waves plotted against the raw change in each county's unemployment rates, growth rates and GDP PPP PC, from the respective years in which the countries' survey data was collected.

The figure for the change in unemployment rates demonstrates a strong relationship. In countries where the unemployment rate increased most, individuals' environmental protection score decreased accordingly. No country saw an increase in unemployment rates accompanied by an increase in levels of prioritisation of environmental protection, and Argentina is the only country where a noticeable decrease in unemployment rates was accompanied by a decrease in environmental prioritisation. We could attribute this anomaly to the Argentinian statistics institute misreporting economic data (The Economist 2016). The line for unemployment itself is remarkable in both its slope and in almost passing through the point (0,0). One may wonder whether the extreme conditions witnessed in Spain have driven this, though when one removes Spain from the calculation of the fitted line the slope barely changes. While increases in a country's GDP PPP PC display a strong, positive correlation with increases in prioritisation of environmental protection, increases in the given growth rate are only weakly correlated. This descriptive analysis provides support for hypotheses H1a and H1c, though only very weak support for H1b.

There are primarily two different methods available for the main data analysis: the first is a country fixed-effects logistic regression using a country dummy variable where the standard errors are clustered at the country level; the second involves using multilevel modelling techniques for logistic dependent variables in which the country is used as the higher-order variable allowing for random-effects due to shared common country-level factors and country fixed-effects for the independent variables. I have undertaken both and there is little substantial difference between them. I have chosen to report only the multilevel models given space constraints.[8]

Table 2. MLM models for prioritisation of environmental protection.

Variables	(1)		(2)		(3)		(4)	
Individual variables								
Male	−0.08**	(0.04)	…	…	−0.09**	(0.04)	−0.09**	(0.04)
Education (elementary or less)								
No formal	−0.03	(0.09)	…	…	−0.02	(0.09)	−0.02	(0.09)
Incomplete secondary	0.07	(0.05)	…	…	0.09*	(0.05)	0.09*	(0.05)
Complete secondary	0.22***	(0.04)	…	…	0.22***	(0.04)	0.22***	(0.04)
Incomplete university	0.50***	(0.07)	…	…	0.52***	(0.06)	0.52***	(0.06)
Complete university	0.64***	(0.07)	…	…	0.65***	(0.07)	0.65***	(0.07)
Age (18–24)								
25–34	0.04	(0.06)	…	…	0.05	(0.06)	0.05	(0.06)
35–44	0.09	(0.07)	…	…	0.10	(0.06)	0.10	(0.07)
45–54	0.04	(0.08)	…	…	0.05	(0.08)	0.05	(0.08)
55–64	−0.00	(0.10)	…	…	−0.00	(0.10)	0.00	(0.10)
65+	−0.06	(0.13)	…	…	−0.05	(0.13)	−0.05	(0.13)
Employment status (full time employed)								
Part-time employed	0.05	(0.06)	…	…	0.05	(0.06)	0.05	(0.06)
Self-employed	0.05	(0.07)	…	…	0.05	(0.07)	0.06	(0.07)
Retired	−0.05	(0.07)	…	…	−0.04	(0.07)	−0.04	(0.07)
Housework	−0.05	(0.05)	…	…	−0.04	(0.05)	−0.04	(0.05)
Student	0.09*	(0.05)	…	…	0.11**	(0.05)	0.10*	(0.05)
Unemployed	−0.20***	(0.04)	…	…	−0.13***	(0.04)	−0.14***	(0.04)
Other	0.01	(0.08)	…	…	0.02	(0.08)	0.01	(0.08)
Income	0.00	(0.01)	…	…	−0.00	(0.01)	0.05	(0.05)
Macro-economic variables:								
Unemployment	…	…	−0.08***	(0.02)	−0.08***	(0.03)	−0.07**	(0.03)
Unemployment*income	…	…	…	…	…	…	−0.00	(0.00)
GDP growth	…	…	0.02	(0.04)	0.03	(0.04)	0.03	(0.06)
GDP growth*income	…	…	…	…	…	…	−0.00	(0.01)
GDP PPP PC (Per 1000)	…	…	0.02	(0.03)	0.01	(0.03)	0.02	(0.03)
GDP PPP PC *Income	…	…	…	…	…	…	−0.00	(0.00)
Wave 6	−0.14	(0.13)	−0.13	(0.21)	−0.14	(0.19)	−0.14	(0.19)
Constant (individual)	0.10	(0.13)	0.37	(0.96)	0.17	(0.84)	−0.10	(0.85)
Country-level variance	0.12	(0.03)	0.21	(0.27)	0.23	(0.23)	0.24	(0.24)
Observations	44,315		44,315		44,315		44,315	
Number of groups	20		20		20		20	
Log likelihood	−20,118		−20,213		−19,995		−19,991	

Robust standard errors in parentheses; *** p < 0.01, ** p < 0.05, * p < 0.1

For Gender, education, age and unemployment status, those who responded 'don't know', 'missing' 'no answer' or 'not applicable' have been grouped together and included as a standalone category, though their coefficients are not displayed.

These models are presented in Table 2. Model 1 has the environmental prioritisation question regressed on gender, education, age, employment status, income and a wave dummy. Model 2 contains only the three macro-economic indicators and a wave dummy. Model 3 includes all of these variables in the one model while model 4 includes interactions between the macroeconomic indicators and income.

The consistency in the results from the individual-level variables across the models is noteworthy. Being female and having a higher level of education are significantly related to being more willing to prioritise environmental protection, while being 65+ is correlated with a lower willingness to

prioritise environmental protection, though this is not statistically significant. The unemployed are far less likely than those in full-time employment to prioritise environmental protection at the $p < 0.01$ level, and there is some indication that students are the most environmentally disposed. Income levels have no effect, which challenges the idea that changing individual wealth can explain environmental protection preferences.

Turning to the macroeconomic variables, an increase in unemployment rates is associated with lower support for environmental protection with a $p < 0.01$ in models 2 and 3 with a coefficient of −0.08. As a very visible economic indicator, this provides support for the adverse effect of harsh economic circumstances on prioritising environmental protection. However, while changes in growth rates and GDP PPP PC are, as hypothesised, positively associated with the dependent variable, this relationship is not statistically significant. Given the steep line found in Figure 2, one may wonder why this is not replicated here. Table A3 in the online appendix sheds more light on this, depicting models excluding the unemployment variable. In these models, the GDP PPP PC variable appears as statistically significant with a higher magnitude, though both the wave dummy variable and the individual constant are also statistically significant. Thus, the initial appearance of a relationship appears to be spurious due to omitted variable bias. Such findings mirror the results at the individual level with both individual- and macro-level unemployment being significant predictors, whereas individual-level incomes and macro-level growth rates are not. Thus, I accept H1a while rejecting H1b and H1c. Finally, in model 4 none of the macro-economic and individual income interactions are statistically significant, and thus I reject H2a and H2b.

To indicate the magnitude of these effects, and based on model 3 in the previous table, Figure 3 displays the predicated probabilities for prioritising environmental protection under different unemployment rates keeping all other variables at their mean values. Under an unemployment rate of 3.5%, there is a 62% probability of prioritising environmental protection, whereas, when the unemployment rate is at 12.5%, the probability drops to 45% and the confidence intervals between these two estimates have stopped overlapping. While the probabilities further decrease at unemployment rates of 17.5% and 21.5%, the confidence intervals around these estimates are quite large.

Robustness

I carried out a number of robustness tests. Firstly, I ran models 3 and 4 from Table 2 multiple times in which each country from the sample was omitted once to check whether one specific country may be driving the macro-level results. At the macro-level, changing growth rates and GDP PPP PC remain statistically non-significant at the $p < 0.05$ level in each case. Unemployment

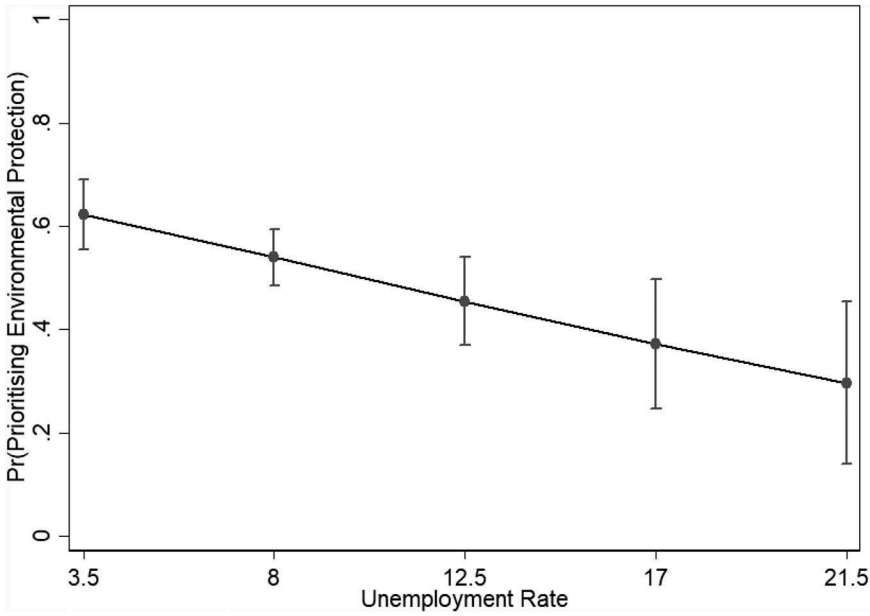

Figure 3. Predicted probabilities with 95% confidence intervals for prioritisation of environmental protection under different unemployment rates.

retains its statistical significance in each case, though when Spain is excluded, the significance level changes from $p < 0.01$ to $p < 0.05$ albeit with the magnitude of the coefficient increasing to −0.10. As for the individual level variables, Spain appears to be suppressing the impact of being a student on support for environmental protection as when Spain is excluded – relative to the baseline of those in fulltime employment – the significance levels changes from $p < 0.10$ to $p < 0.01$ with the magnitude of the coefficient increasing to 0.12. Using this procedure for model 4 in which interaction effects are introduced, the only notable difference is when Spain is removed from the model: the unemployment-income interaction term becomes significant at the $p < 0.05$ level with a magnitude of −0.01. However, such significance is not robust to removing a sizeable number of countries in addition to Spain and thus a null result for this interaction term would appear to be best and most robust conclusion.

I next examined whether the effect of income may be non-linear by using income quintiles as a categorical variable instead of using income deciles as a continuous variable. As can be seen in Table A4 in the online appendix, the effect of income remains statistically non-significant. Relatedly, due to the measurement issue with the income variable, in Table A5 in the online appendix I instead use subjective social class – having to drop both Mexico and New Zealand as for neither country was this question asked in wave 5.

The lower/working class are less likely to prioritise the environment than the other classes, though at a statistically non-significant level. Table A6 in the online appendix adds in the percentage of government members who are members of left parties as a test of elite cues.[9] However, the macro-economic variables behave the same and the variable is not statistically significant. Finally, in the main analysis I had coded 'don't know', 'no response' or 'other' responses for the dependent variable in the analysis as missing. As an additional check, I ran the models from Table 2 where the dependent variable was still coded 1 if individuals prioritised environment protection, but the 0 category was recoded so that it included all those who did not explicitly choose to prioritise environmental protection.[10] These results are shown in Table A7 in the online appendix. Apart from gender, which is statistically non-significant, using this alternative iteration of the dependent variables does not substantially change anything.

Conclusion

I set out to examine the effects of the Great Recession on the prioritisation of environmental protection. Namely, I sought to test not only whether dramatically worsening economic circumstances may have been responsible for a deterioration in environmental protections preferences – and, if so, which economic indicator they were most sensitive to – but also whether the recession altered the way in which income levels relate to support for environmental protection.

There is no compelling evidence to suggest that the recession changed the way in which individual wealth relates to prioritisation of environmental protection, but measurement issues with the income variable could influence this finding. While the results demonstrate a lack of an effect between changing growth levels or GDP PPP PC and environmental protection prioritisation, they show an extremely strong and robust relationship at the aggregate level between decreases in such support and increasing unemployment levels. Given the spread of countries across different world regions in this study, including both countries where unemployment rates increased and others where they decreased during this period, this makes a key contribution to the literature: support for the prioritisation of environmental protection increased when unemployment rates went down and decreased when unemployment rates went up.

This finding on the relationship between environmental protection and unemployment rates follows the same pattern that researchers found when examining the impact of the recession on attitudes to climate change/global warming. It also provides empirical evidence to suggest that Scruggs and Benegal (2012) were correct to prioritise using unemployment rates instead of economic growth in their models. The null effect of growth contrasts with

the findings of Shum (2012), but there are possible explanations for this. Firstly, the environmental topic differed as Shum was investigating climate change, but the expression also differed as he looked at how worried respondents were about the issue rather than their prioritisation of it. Additionally, given my finding here that not including unemployment rates may lead to omitted variable bias and the mistaken attribution of significance to other macro-economic indicators, it is possible that Shum's results may have been affected by his using economic growth as his only macro-economic indicator and not controlling for changing unemployment rates.

A final comparison is with the results of the individual-level panel data studies that found null relationships between changing economic conditions and environmental indicators (Mildenberger and Leiserowitz 2017, Kenny 2018a). While my contribution demonstrates the strong relationship between changing unemployment rates and prioritisation of environmental protection, its design cannot investigate the mechanism behind this. It is possible that this is an indirect relationship that works through altering the content of elite discourse and media content in such a way that crowds out environmental issues which then, in turn, affects environmental attitudes.

Learning from these findings, future research should pay greater attention to justifying the economic indicators used to tackle this and related questions. In particular, the results suggest that the unemployment rate is the most relevant indicator, but more work is required to investigate the mechanism through which higher unemployment rates affects the prioritisation of environmental protection. As the required solutions to tackling environmental problems have traditionally required trade-offs with economic activity, these findings present a challenge for maintaining support for action on environmental issues during periods of serious economic difficulties when unemployment rates are rising. While the increasing cost-efficiency of renewable energies may lessen the perceived tension between economic stability and environmental protection, such a perceived tension may still take some time to lessen. There are already indications from Sweden that this is possible and that the increased prevalence of ecological modernisation discourse can alter this relationship (Harring *et al.* 2011). In the absence of such a delinking, my results point to the importance of tackling environmental protection during periods of low unemployment when public support for such initiatives is likely to be highest. This builds on previous research that also points to the importance of the timing of environmental policy initiatives (Benegal and Scruggs 2016). Furthermore, if policymakers wish to manage the economic costs of environmental protection without losing public support, these results also suggest that they should prioritise keeping unemployment rates low over increasing economic growth.

Notes

1. Calculated using unemployment rates.
2. Surveys available for each year in this period except 1979 and 1981.
3. Calculated by dividing household income by the number of individuals living in the household.
4. Those who are under 18 have been excluded for comparative purposes as they are present in some countries in some waves but not present in all countries in all waves.
5. For all of the individual-level variables, other than household income, responses that are coded as 'don't know', 'missing' 'no answer' or 'not applicable' have been grouped together and included as a standalone category. This prevents the decrease in sample size that would happen if I treated these as missing. While included in the analysis, I do not display them in the tables.
6. Utilising weights provided that weight the data to be nationally representative within each country and applying additional weights to ensure that each country is counted as having the same overall number of respondents in the comparative analysis. I used such weights in all subsequent analysis.
7. Some countries allowed 'don't know' and/or 'other' responses, whereas others did not. For measuring within country change, some countries also allowed such responses in one wave but not the other, though this may also reflect different coding practices on what coders should record when respondents do not choose a priority. This is why I have chosen this coding. Table A1 in the online appendix displays the responses to this question by country and wave when all of these categories are included.
8. Table A2 in the online appendix provides the results with the alternative approach.
9. This analysis involved a subset of 16 of the countries for which this data was available.
10. With the exception of the eight people in the dataset for which data is coded as 'missing' as one does not know the reason why this data is missing.

Acknowledgments

I thank Michael Biggs, Geoff Evans, Stephen Fisher, Rob Johns and James Tilley as well as three anonymous reviewers for providing helpful feedback on previous drafts that greatly improved this work. Previous versions were presented at the 2017 annual conference of the European Political Science Association and the 2018 annual conference of the American Political Science Association and I am very grateful for feedback received at these meetings.

Disclosure statement

No potential conflict of interest was reported by the author.

Funding

This work was supported by the Economic and Social Research Council [ES/J500112/1].

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