

Dividing the pie in the eco-social state: Exploring the relationship between public support for environmental and welfare policies

Environment and Planning C: Politics and Space



0(0) 1–27

© The Author(s) 2017

Reprints and permissions:

sagepub.co.uk/journalsPermissions.nav

DOI: 10.1177/2399654417711448

journals.sagepub.com/home/epc



Niklas Jakobsson

NOVA Norwegian Social Research, Oslo and Akershus University College of Applied Sciences, Norway

Raya Muttarak

Wittgenstein Centre (IIASA, VID/ÖAW and WU), International Institute for Applied Systems Analysis, Austria and University of East Anglia, UK

Mi Ah Schoyen

NOVA Norwegian Social Research, Oslo and Akershus University College of Applied Sciences, Norway

Abstract

Recent theoretical literature in social policy argued that climate change posed a new risk to the states and called for transformation from a traditional welfare state to an ‘eco’ state. From a theoretical point of view, different welfare regimes may manage environmental/climate change risks in a similar way to social risks. However, not much has been done to explore the issue empirically. To this end, this paper aims to investigate public attitudes towards environmental and traditional welfare policies given that environmental change is a new social risk the welfare states have to address. Do individuals that care for one area also care for the other? That is, do the preferences in these two policy spheres complement or substitute one another? We test these hypotheses both at the individual- and country-level, using data from 14 countries included in all three waves (1993, 2000, and 2010) of the environmental module in the International Social Survey Programme. Specifically, we investigate the relationship between attitudes towards income redistribution (indicator of support for welfare policy) and willingness to pay for environmental protection (indicator of support for environmental policy). Our findings suggest that attitudes in the two areas are substitutes in the total sample, but that the relationship is very small and only statistically significant in some specifications. When we explore country differentials, we observe clear heterogeneity in the relationship, which can be explained by differences in political and historical contexts across countries.

Corresponding author:

Raya Muttarak, World Population Program, International Institute for Applied Systems Analysis (IIASA), Schlossplatz 1, A-2361 Laxenburg, Austria.

Email: muttarak@iiasa.ac.at

Keywords

Cross-national, environmental attitudes, welfare states, inequality, willingness to pay

Introduction

It has become evident that under a business-as-usual practice, greenhouse gas emissions will continue to rise and exceed the 2°C threshold where global warming becomes irreversible and catastrophic (IPCC, 2014). Thus, the reduction of global greenhouse gas emissions is urgent and at the heart of the climate talks among government representatives of over 190 nations in Paris in December 2015. The urgency of addressing climate change has been recognised not only among climate scientists but also in the social sciences. This is well-reflected in the introductory remark from a special issue of the *American Psychologist*, stating that ‘global climate change poses one of the greatest challenges facing humanity in this century’ (Swim et al., 2011).

Likewise, from a public policy perspective, the need to integrate climate change issues into public policy making has been readily acknowledged. Given that wealthier countries have greater capacity to afford the costs of carbon emissions cuts than poorer countries (Borghesi, 2001), governments in most high-income countries have recognised that they have a responsibility to act in order to reduce greenhouse gas emissions. However, such cuts will be costly, leading to the question of who should bear the costs. Different policy designs will have different winners and losers in terms of distributional outcomes. For instance, taxes on home energy use usually have regressive effects on low-income households because home energy behaves as a ‘necessity’ good, i.e. its income and price elasticities are small (Jamash and Meier, 2010). In other words, low-income households spend a relatively high proportion of their income on energy intensive activities such as heating and are unlikely to reduce energy consumption even if taxes are increased. Conversely, targeting emissions from personal transport has been shown to have progressive, inequality-reducing effects since poorer households fly less and are less likely to own a car (Büchs et al., 2011).¹ Public policies introduced to promote transition towards low-carbon and sustainable lifestyles, hence, need to address such inequalities and conflicts. This includes, for instance, designing complementary policies such as transfer payments or tax cuts that compensate the regressive nature of carbon taxes in which the tax burden falls disproportionately onto poorer households.

Whilst climate change is being recognised internationally as a ‘wicked’ or even ‘super wicked’ policy issue (Levin et al., 2012; Rittel and Webber, 1973), ‘traditional’ public policy issues like unemployment, income inequalities and poverty remain prominent at the national level. Over the past two decades, demographic change, a reduction in economic growth rates, increased economic and financial internationalisation and the global economic downturn have put great pressures on public finances. The shrinking work force, coupled with increasing life expectancy, translate into inevitably higher social spending on health care and pensions. Likewise, widening income inequalities in high income countries since the 1980s due to globalisation, technological change and shifts in family structures call for welfare state interventions (Ursanov and Chivot, 2015). With climate change being a source of new social risks on the one hand and ‘traditional’ social problems on the other, it can indeed be problematic for countries to maintain fiscal and environmental sustainability (Bailey, 2015). This raises a question of how the pie should be divided to achieve the best possible synergy between social and environmental policies.

Under the pressure of global environmental change, environmental management and climate change mitigation and adaptation have gradually become a core area of state responsibility. Following the modern environmental movement in the 1960s and the 1970s, sub-disciplines within the social sciences have increasingly addressed environmental issues. In political science the study of environmental governance covering the topics related to environmental politics, natural resource management and environmental policy is well-established (Meyer et al., 1997; Newell, 2008; Paterson, 2009). In particular, the issue of the intersection between economic growth and environmental sustainability has been a dominant research theme.

The findings of the Environmental Kuznets Curve (EKC) in which certain forms of air and water pollution decline as the level of national income increases, raises the puzzling question of why environmental quality improves as countries become wealthier and more industrialised (Cole et al., 1997; Dasgupta et al., 2001; Grossman and Krueger, 1995; but see Bagliani et al., 2008 for an alternative interpretation). Both citizen's increased demand for a better quality of life once the country is economically developed – the post-materialism theory proposed by Inglehart (1995) – and the capacity of wealthier countries to invest in infrastructure, technological development and pollution control, explain this inverted U-shaped curve (EKC) (Fiorino, 2011). Correspondingly, there is some evidence that individuals who hold higher post-materialist values, tend to be more politically engaged and mobilise more actively – for instance by signing a petition or taking part in a protest – to influence or change environmental policies (Kelly et al., 2007).²

The crucial role that public opinions play in environmental mobilisation, coupled with the new challenge of integrating climate policies into other policy areas make 'squaring the public policy circle' (Taylor-Gooby, 2011) an extremely demanding task for democratic governments. Since citizen's attitudes towards public policies are partially shaped by self-interest (Blekesaune and Quadagno, 2003), it is possible that public support for social and climate change policies may not go hand in hand. Which policy dimension should be given priorities pose challenges to governments in making costly policy solutions palatable to the public. Since citizens are the recipients of policy, their attitudes have implications for the legitimacy of these policies. In advanced democracies, the relationship between public opinions and policy may be linked to the quality of democracy.³ As Jacobs and Shapiro (1994) point out '[w]hen policies are habitually at odds with public opinion, this is considered undemocratic [...]'. Indeed, it has been found that public policy and institutional arrangements are correlated with public attitudes (e.g. Jacobs and Shapiro, 1994; Kumlin, 2004; Skocpol, 1994).

Therefore, under the threat of the changing climate, if we are to succeed in transforming modern democratic states into environmental welfare states or eco-social states, we need to understand what drives attitudes both in the environmental sphere and with regard to welfare policy. Ideally, we should uncover the extent to which the two spheres interact. Since it would give policymakers an indication as to what kind of policies are likely to be unpopular with voters and where there might be greater room for manoeuvre, such knowledge would have relevance for policymaking. However, public attitudes in the two policy fields have rarely been empirically analysed together. Analysis of these policy interactions remains a relatively young research field (Gough, 2010). This article makes another step towards closing this gap by investigating whether there is a relationship between developments in environmental attitudes and attitudes towards income redistribution, using three waves of the environmental modules of the International Social Survey Programme (ISSP).

Research questions and hypotheses

In this study, we ask whether public attitudes towards income redistribution are related to the willingness to pay to protect the environment. We look at two indicators that measure how willing an individual is to give up part of their wealth to reduce social inequalities and to improve the quality of the environment respectively. Here we examine two straightforward competing hypothesis: (1) *Crowding out*: Environmental and social concerns are *substitutes*, i.e. persons who attach a high priority to environmental protection are less concerned about governmental efforts to protect against social risks; and (2) *Double-worry*: Those concerned about 'traditional' social questions and who support redistribution through the welfare state also tend to worry about the environment and are willing to pay to protect the environment. We test the two hypotheses both at the individual- and country-level, using the ISSP data as described in Section 'Data and measurement'.

There is a rich comparative literature on public attitudes on environmental issues (Franzen and Meyer, 2010; Franzen and Vogl, 2013; Gelissen, 2007) as well as on questions like redistribution and the responsibility of governments in providing social protection and care (Blekesaune and Quadagno, 2003; Kulin and Svallfors, 2013; Reeskens and Oorschot, 2013). Whilst these two streams of literature represent a natural starting point for exploring potential interactions between environmental and welfare attitudes, attitudes towards environmental issues and welfare state questions have rarely been explored together. A recent empirical study focusing on Australia by Spies-Butcher and Stebbing (2016) examines the relationship between prioritising environmental and global warming concerns and support for welfare state expansion and finds that there is a strong overlap in preferences towards the two issues. Still, their study does not explicitly investigate attitudes towards welfare and environmental policies. Moreover, looking only at a single country, it does not provide knowledge of differences (or similarities) across countries.

Recently, there has been emerging literature that explores the potential interactions of climate change and climate policies with social policy and welfare state issues (Fitzpatrick, 2014; Gough, 2010, 2013; Koch and Mont, 2016; Meadowcroft, 2008, 2005; Somestad, 2012). In particular, these scholars recognise ecological challenges such as climate change, deforestation and land degradation as sources of new social risks which have implications for social policy arrangements and may require new kinds of policy solutions (see e.g. Johansson et al., 2016; Schaffrin, 2014). In this sense, both welfare states and environmental states play a similar role in addressing negative market externalities.

Duit (2016: 71) uses the term 'environmental state' to describe a state that adopts a continuous focus on social–environmental interactions. This concept denotes real-world examples or approximations of an ideal-type green state (or ecological state) (e.g. Dryzek et al., 2003; Eckersley, 2004), conceived as a liberal democracy⁴ practicing 'ecologically responsible statehood' (Eckersley, 2004: 2). According to Duit (2016: 73) the environmental state comprises four basic resources that the state employs to deal with environmental externalities. These include: (1) environmental regulations, institutions and policies; (2) organisations and agencies for environmental public administration; (3) environmental taxes and spending for the redistribution of resources; and (4) production and dissemination of environmental knowledge through scientific studies and environmental monitoring programmes. In addition to these four policy instruments, one could also add decentralised 'network governance', which involve interactions between various agencies such as nongovernmental organisations, corporations, activists and public officials (Dryzek, 2013; Jordan et al., 2003). Whilst some of the alternative environmental policy instruments are market-based, other collaborative governance strategies include voluntary

agreements, for instance, between regulators and corporations. The state may share with industry the responsibility to address environmental challenges (see Jordan et al., 2003: 11). Sustainable development, following a path of ecological modernisation (a concept that we return to in the concluding discussion), necessitates broad partnerships, not only between government and business, but also scientific expertise and civil society pressure groups (see Dryzek, 2013: 170–177).

These environmental mandates and strategies may overlap with pre-existing economic and security arrangements which also require state intervention (Duit et al., 2016; Meadowcroft, 2005). Whilst characteristic forms and the instruments for reallocation of obligations and entitlements of the welfare state and the environmental state operate in separate departmental silos (Gough, 2016), they may compete for public resources in terms of funding as well as administrative capacity at the stage of policy implementation.

Subject to tight budgetary constraints, the welfare states are under pressure to ensure equity and justice of policy outcomes and fair distribution of costs and burdens between social groups. Modern states are subject to state ‘imperatives’ in which they are expected to ensure balance between economic prosperity, public services provision, security and environmental protection (Hunold and Dryzek, 2002). In this regard, both social protection and climate policy are rooted in the social justice discourse (Eckersley, 1992). This particularly concerns the issues of distributive justice, i.e. the fair distribution of socio-economic and natural resources. Environmental justice deals with equitable distribution of environmental benefits and risks. Environmentally hazardous sites such as waste disposal, manufacturing industry and energy production, for instance, are often located close to poor and/or minority-dominated residential areas. Such environmental discrimination paved way to environmental justice movements like the one in the southern United States in the 1980s (Bullard, 2000) and in South Africa in the 1990s (Khan, 2002).

Therefore, similar to the provision of public goods like public education, housing and health services to protect against market failure, climate policy, such as investment in cleaner energy production, is a strategy to counteract the effects of the market’s externalisation of environmental costs. Whilst the welfare state already has the institutions, processes and policies in place to accommodate environmental sustainability and climate goals (Duit, 2011), it is possible that climate policies might compete with social policy for resources and attention and weaken the traditional concerns of social justice. Consequently, in the future it will be important to design social policies that are able to mitigate the inequalities and conflicts that may emerge in the transition towards more eco-friendly welfare states as well as are attractive to electorate (Koch and Fritz, 2014).

Unlike the welfare state where class-based interests are at the centre, concerns about the environment which are the base of collective pressure on government, are more often expressed among more educated and affluent groups (Gough, 2016). Whether the public favour redistribution and/or environmental policies thus depends on both individual preferences and the national context. At the individual level, public attitudes towards certain policies are determined by elements of self-interest, ideology and political preferences. According to the self-interest argument, individuals who benefit from given welfare policies or are at risk of becoming financially dependent on the welfare state, are more likely to support such programmes (Hasenfeld and Rafferty, 1989). Hence, those who are socioeconomically vulnerable, e.g. have low income, education and occupational status, are more likely to favour a system in which incomes and wealth are evenly distributed (Blekesaune and Quadagno, 2003; Jæger, 2006). In this sense, whether individuals support only welfare policies or only environmental policies or both, depends on their self-interest.

Individuals from low-income households may, for example, be supportive of income redistribution but less sympathetic towards higher tax on home energy use.

Individual opinions towards public welfare provision and environmental policies are also rooted in systems of political orientations and ideological preferences. Empirical studies have documented that individuals' support for public responsibility for welfare provision are correlated with their subjective position on the left/right continuum, egalitarian ideology and beliefs about social justice and social mobility (Bean and Papadakis, 1998; Calzada et al., 2014; Linos and West, 2003). Whilst typical left and right parties were clearly divided on economic programmes, environmental or green issues were not straightforwardly accommodated in the traditional left/right framework. On the one hand, there are authors who argue that environmentalism represents an additional political dimension orthogonal to the traditional economic dimension (Carter, 2001). If this is the case, pro-welfare voters may not necessarily be pro-environment. On the other hand, some scholars have argued that environmentalism should follow the established left/right party alignment, especially within a leftist identity (Inglehart, 1990; Knutsen, 1995). There is evidence that political parties and individuals who are self-identified on the left of the political spectrum, are more likely to embrace pro-environmental positions including agreeing to pay higher taxes to prevent environmental damages and support publicly financed environmental protection programmes and climate policy (Neumayer, 2004; Torgler and García-Valiñas, 2007; Ziegler, 2017). In this regard, public support for welfare and environmental policies supposedly goes hand in hand.

At the same time, country-level characteristics also affect public attitudes towards social and environmental policies. The development of various regime types of welfare states has been attributed to the history of class coalitions with, for instance, the coalition between the middle classes and the working classes forming the social democratic regimes (Esping-Andersen, 1990). The institutional characteristics of the welfare regimes, in turn, can influence attitudes and opinions towards social programmes (Edlund, 1999). It is expected that social democratic welfare states should be in a better position to handle the intersection between welfare and environmental policies (Dryzek, 2008). Since these states rely on more extensive state intervention, in general, policymakers as well as citizens are likely to accept higher levels of taxation and market regulation (Svallfors, 2013). In such regimes, both environmental and economic values can be mutually reinforcing since both issues require state regulation and collective investment. In contrast, in liberal welfare regimes, welfare support for medium-income groups is comparatively weak resulting in high levels of poverty and social inequality. Hence, there are likely to be conflicts between public welfare and environmental policy since low-income households are less able to face higher energy costs or invest in energy saving measures (Schaffrin, 2014).

According to the literature on individual and country level determinants of public attitudes described above, public support for social and environmental policies can compete with one another (e.g. welfare recipients supporting redistribution programmes whilst people vulnerable to environmental change favour pro-environmental policies) or go hand in hand (e.g. believing in an active state in both spheres). Koch and Fritz (2014) is, to our knowledge, the only study that has empirically investigated the linkages between social and environmental policies. In particular, using a set of questions on environmental attitudes in the ISSP 2010 data, the study explores whether social democratic welfare states are more eco-friendly than conservative and liberal welfare states as measured by country-level ecological performances. They investigated whether individuals living in social democratic welfare states are more concerned about the environment than economic growth, more in favour of government intervention to protect the environment and more

willing to cut the standard of living to protect the environment. They find evidence neither of better ecological performances nor of greater support for environmental policies in social democratic welfare states. These findings suggest that there are no spillover effects from states that favour welfare policies tackling socioeconomic inequalities to green policies addressing environmental issues.

Although the work of Koch and Fritz (2014) provides some empirical insight into a possible synergy between welfare and environmental policies, they do not explicitly capture the potential budgetary tensions between the two policy choices. Indeed, social spending on welfare programmes such as pension and unemployment benefits may compete with expenditure for policies to protect the environment. There is evidence that changing governments' priorities towards pressing financial and social issues due to the economic recession have led to budget cuts in the green economy development such as investments in clean technology and renewable energy schemes (Obani and Gupta, 2016).

Data and measurement

Data

This study is based on the environmental module of the ISSP comprising three cross-national surveys conducted in 1993, 2000 and 2010. The ISSP is an ongoing cross-national collaboration covering topics of importance to the social sciences since 1984. The ISSP surveys employ a common sampling and methodological framework making the data comparable across countries and time. Although sampling procedures vary by country ranging from probability cluster sample, stratified random sample to random equal probability sample, they are designed to ensure national representativeness including at least 1000 respondents per country per year. Respondents were adults aged 18 years and older.

The environmental module includes numerous measures of attitudes towards environmental-related issues including respondents' behaviour and preferences regarding governmental measures on environmental protection. The data also contain basic demographic information such as age, sex, education and occupation. In order to track development over time, in this study we include the countries participating in all three waves of data collection (1993, 2000, and 2010). This gives a total of 50,516 respondents in 14 countries with valid responses to the attitudinal questions relevant for the present study.

Measurement

Dependent variable. We focus on the willingness to pay as an indicator of the propensity to act to protect the environment using two survey items: (1) 'How willing would you be to pay much higher prices in order to protect the environment?'; and (2) 'How willing would you be to pay much higher taxes in order to protect the environment?'. The respondents were asked to state if they were very willing or very unwilling to do this on a five point Likert-scale for each of the two survey items. We reversed the order of the two items, added them together and divided the answers by two to harmonise the scale between 1 and 5.

We focus on the questions related to the willingness to pay for the environment rather than the questions on environmental attitudes such as those indicating the perception towards humans' contribution in harming the natural environment. As argued by Kachi et al. (2015), it is the policy preferences rather than the risk

perception that is important for policy making. They further argue that individuals can be aware of environmental problems without supporting policies that tackle the issues. Moreover, in the discussion about proper measurement of environmental attitudes, Franzen and Vogl (2013) highlight the difference between having insights into environmental problems and being willing to do something about them. Unlike the survey items that capture environmental concern, willingness to pay offers a more precise measure of propensity to act for the environment. Furthermore, willingness to pay for environmental protection corresponds better with the item on redistribution preferences, which will be used as an indicator of welfare attitudes.

Explanatory variable. Whilst the ISSP environmental module is rich on items measuring environmental attitudes and concern, there is only one item related to welfare attitudes. Here we use the question that measures attitudes towards income redistribution: 'It is the responsibility of the government to reduce the differences in income between people with high incomes and those with low incomes.' The respondents were asked to state if they strongly agree or strongly disagree to this statement on a five point Likert-scale.

Attitudes towards income redistribution lie at the heart of welfare policies. Redistribution involves transfer of income or wealth from those who have more to those who have less. This means high income individuals have to, for instance, pay higher taxes in order to redistribute to others. Support for redistributive policies, hence, may not coincide with willingness to pay for environmental protection since the latter also requires individuals to give up part for their income for the environment. By using the survey items that capture willingness to pay for the environment and support for income redistribution, we are able to directly test our hypotheses.

Control variables. In addition to the main variables of interest, we also include a set of individual level control variables for the analysis considering the individual level (gender, age, age squared, education and employment), household level (household composition and income), and a set of country level control variables for the time series cross sectional (TSCS) analysis. These control variables are presented in Table A1 in the Appendix.

Descriptive results

Figures 1 and 2 present average willingness to pay for environmental protection and average redistribution attitudes by country and survey year, respectively. In the total sample, there is a negative trend in the willingness to pay for environmental protection ($F(2, 50513) = 754.59, p = 0.000$), and a positive trend in redistribution attitudes ($F(2, 50513) = 60.09, p = 0.000$). The downward trend for willingness to pay for the environment is present for almost all studied countries, not only for the total sample. Regarding redistribution attitudes the trend is slightly mixed for the individual countries but in general most of them have experienced an increase in support for income redistribution.

In Figure 3, we present how the attitudes regarding both the willingness to pay for environmental protection and attitudes towards redistribution vary by age in the three waves of data collection. There is a clear pattern showing that for all ages the willingness to pay is considerably smaller in 2010 than in 1993, similar to what shown previously in Figure 1. Thus, we see clear decreases in willingness to pay for environmental protection during the investigated period. As already noted by Franzen and Vogl (2013), for a broader measure of environmental concern, this negative trend takes place in a period where wealth has increased in most of the studied countries. As opposed to the trends in willingness to pay

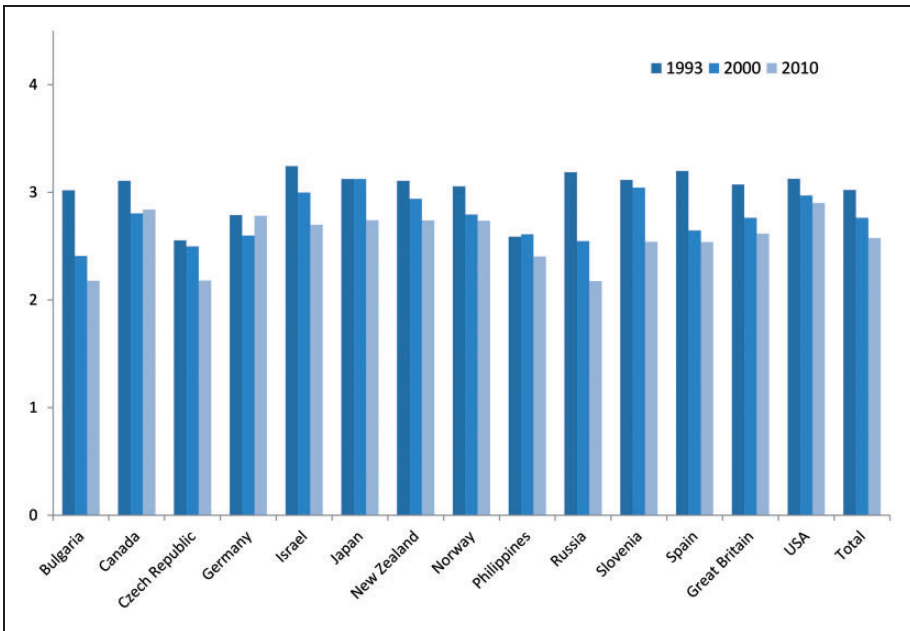


Figure 1. Willingness to pay for environmental protection by country and survey year.
 Note: Willingness to pay for environmental protection vary between 1 and 5 where a higher number implies higher willingness to pay.

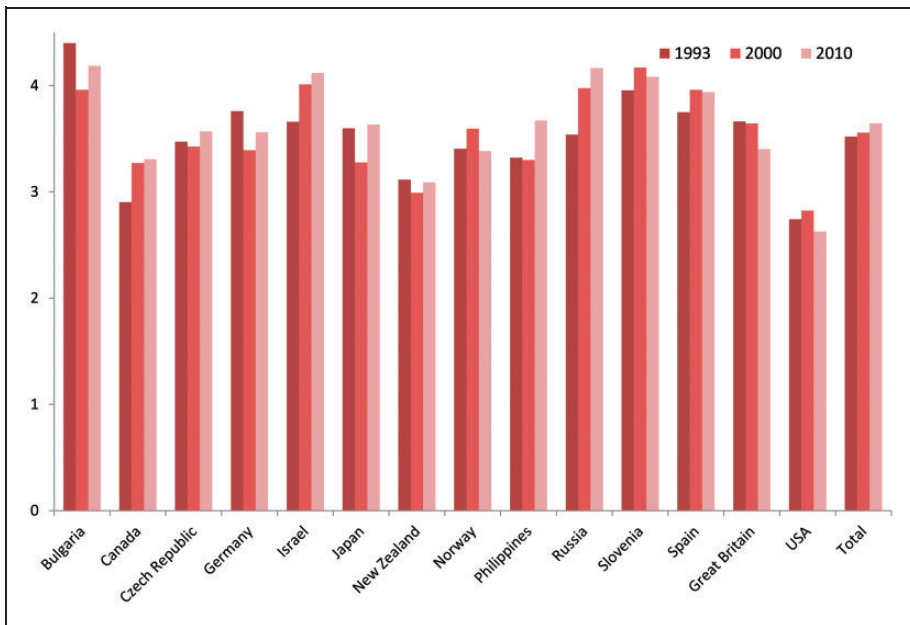


Figure 2. Support for income redistribution by country and survey year.
 Note: Redistribution attitudes vary between 1 and 5 where a higher number implies more positive attitudes.

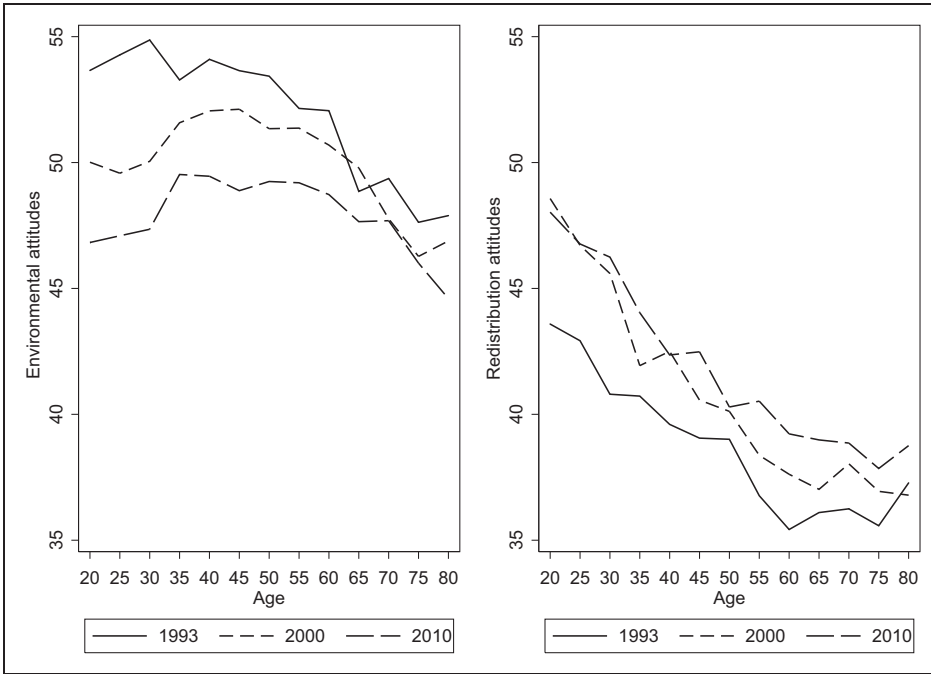


Figure 3. Willingness to pay and redistribution attitudes by age and survey year in 14 countries.

to protect the environment, people tend to be more supportive of redistribution in 2010 than in 1993, at least in the younger age groups.

Empirical strategies and results

The next step is to investigate whether these attitudes are in any way related. Do individuals that care for one of the areas also care for the other? That is, do they complement or substitute each other? Here we assess two competing hypotheses as described above: (1) *Crowding out*: persons who are willing to pay to protect the environment are less supportive of redistributive policies; and (2) *Double-worry*: persons who care about social inequalities and support for redistribution are also concerned about the environment and have greater willingness to pay for environmental policies.

Evidence at the country level

As a first step to investigate this issue, we use the country/year mean values in Tables 1 and 2 to study if country level changes in redistribution attitudes are associated with changes in willingness to pay. As a point of departure, we use the following empirical specification:

$$WTP_{i,t} = \alpha_0 + \beta_0 \text{Redistribution}_{i,t} + \beta_1 \mathbf{X}_{i,t} + c_i + e_{i,t} \quad (1)$$

where $WTP_{i,t}$ is the mean willingness to pay for environmental protection in country i , year t . $\text{Redistribution}_{i,t}$ is the mean redistribution attitudes in country i , year t , $\mathbf{X}_{i,t}$ is a vector of

Table 1. Country average WTP for environmental protection explained by redistribution attitudes.

	Model 1	Model 2	Model 3	Model 4
Redistribution	−0.236** (0.091)	−0.573 (0.363)	−0.245 (0.243)	−0.227 (0.208)
Controls	No	No	No	Yes
Wave FE	No	No	Yes	Yes
Country FE	No	Yes	Yes	Yes
Number of countries	14	14	14	14
Number of observations	42	42	42	42
R-squared	0.147	0.147	0.705	0.761

Note: All three models include 14 countries and 42 country/year observations. Control variables are population, GDP, and greenhouse gas emissions. Robust standard errors in parentheses. The full models are presented in Table A2 in the Appendix.

***p < 0.001, **p < 0.01, *p < 0.5.

Table 2. Individual willingness to pay for environmental protection explained by redistribution attitudes.

	Model 1	Model 2	Model 3	Model 4
Redistribution	−0.042*** (0.004)	−0.027*** (0.004)	−0.021*** (0.004)	0.008 (0.004)
Controls	No	No	No	Yes
Wave FE	No	No	Yes	Yes
Country FE	No	Yes	Yes	Yes
Observations	49,402	49,402	49,402	49,402
R-squared	0.002	0.028	0.055	0.092

Note: Robust standard errors in parentheses. Control variables are gender, age, age squared, education, household income, employment status and household composition. The full models are presented in Table A3 in the Appendix.

***p < 0.001, **p < 0.01, *p < 0.5.

control variables (population, GDP, and greenhouse gas emissions), c_i is an unobserved time invariant disturbance term (e.g. unobserved factors that may be important for the willingness to pay for environmental protection), and $e_{i,t}$ is an unobserved time variant disturbance term.

The results using equation (1) are presented in Table 1. Model 1 is a random effects model where country fixed effects and wave effects are not included. Model 2 includes country fixed effects whilst in model 3 wave effects are further added. Model 4 include control variables (population, GDP, and greenhouse gas emissions). The coefficient on redistribution is only statistically significant in the most basic model (Model 1) and indicates that as support for redistribution in a country increases by one unit, willingness to pay for environmental protection decreases by 0.236 units in that country. This observed small negative effect, however, is not statistically significant in Models 2–4. Once we include country fixed effects, wave fixed effects and control variables, the negative relationship between willingness to pay for environmental protection and support for redistribution disappears. At the country level, we thus find

no support for the double-worry hypothesis and only very limited support for the crowding out hypothesis.

Evidence at the individual level

Next, we move on to the individual level analysis. As a point of departure, we use the following empirical specification:

$$WTP_i = \alpha_0 + \beta_0 \text{Redistribution}_i + \beta_1 \mathbf{X}_i + e_i \quad (2)$$

where WTP_i is the willingness to pay for environmental protection for individual i . Redistribution_i is the redistribution attitudes of individual i , \mathbf{X}_i is a vector of individual control variables (gender, age, age squared, education, household income, employment status and household composition) and e_i is an unobserved error term.

In Table 2, we run individual level regressions with willingness to pay for environmental protection as a dependent variable and redistribution attitudes as an independent variable (equation (2)). As can be seen in the first three models, the relationship between willingness to pay and support for redistribution are negative but the magnitude of the coefficient is very small. In Model 4, we include a set of control variables (gender, age, age squared, education, household income, employment status and household composition) and here the coefficient is very close to zero and not statistically significant. Thus, our results at the individual level imply that there are some weak crowding out concerning attitudes towards social and environmental policies, i.e. individuals are more willing to pay to protect the environment tend to be less supportive of redistribution, even though the relationship is fairly small.

Country heterogeneity in individual level willingness to pay and support for distribution

As a final step, in Table 3, interaction terms between redistribution attitudes and country dummies are added as an extension from Model 4 in Table 2 to assess potential cross-country heterogeneity in the relationship between the willingness to pay for environmental protection and redistribution attitudes. Table 3 displays the relationship between willingness to pay for environmental protection and redistribution attitudes by country. As we can see, the redistribution coefficient of 0.008 in Model 4 in Table 2, in fact, varies considerably by country. In four countries (Bulgaria, Russia, Czech Republic, and Germany), we observe a statistically significant and negative relationship. In five countries (Slovenia, Israel, Japan, Spain, and Great Britain), the relationship is not different from zero. Finally, in five countries (Canada, New Zealand, Philippines, Norway, and USA), the relationship is positive and statistically significant.

Results for redistribution, by country. Estimation follows equation (2), includes country fixed effects and wave fixed effects. Control variables are gender, age, age squared, education, employment, and household composition. Robust standard errors are used. The full table is presented as in Appendix A Table A4.

Discussion

Using the environmental module of the three rounds of the ISSP surveys, we have empirically investigated the links between public attitudes towards the welfare and

Table 3. Relationship between WTP and redistribution attitudes by country.

Country	Redistribution
Bulgaria	-0.122*** (0.027)
Russia	-0.114*** (0.023)
Czech Republic	-0.083*** (0.021)
Germany	-0.054** (0.021)
Slovenia	-0.027 (0.027)
Israel	-0.017 (0.023)
Japan	-0.014 (0.022)
Spain	0.004 (0.016)
Great Britain	0.025 (0.023)
Canada	0.056* (0.022)
New Zealand	0.079*** (0.022)
Philippines	0.086** (0.026)
Norway	0.116*** (0.022)
USA	0.130*** (0.022)

Note: Robust standard errors in parentheses. Control variables are gender, age, age squared, education, household income, employment status and household composition. The full model is presented in Table A4 in the Appendix.

***p < 0.001, **p < 0.01, *p < 0.5.

environmental responsibilities of the state. More specifically, we asked whether individuals that care for one of the areas also care for the other. That is, do the two dimensions complement or substitute one another? We tested these hypotheses both at the individual- and country-level, using OLS and panel data models. Our findings suggest that attitudes towards welfare and environmental policies, if anything, are substitutes (*crowding out*), but the relationship is rather small and only statistically significant in some specifications.

This finding is consistent with that of Koch and Fritz (2014) who reported no evidence that social-democratic welfare states (where inequalities are low and support for redistributive policies is high) are in a better position to develop as a 'green' or 'eco' state. Duit's (2016) comprehensive study of different types of environmental governance regimes further supported this finding. The latter concludes that there is no evidence that environmental states overlap with the type of welfare states that are likely to be environmentally progressive. In other words, environmental performance of a country with redistributive policies is not necessarily better than other countries with high levels of inequalities. Similarly, in our case, at both the country and individual levels, after controlling for relevant characteristics, we did not find any significant relationship between willingness to pay for the environment and support for income redistribution. Whilst this may be considered as good news for policy makers in that public endorsement of environmental policies do not compete with support for welfare policies, the absence of connection also implies that there is no intersection between the two policy spheres.

At the theoretical level, it has been argued that policies to address the risks posed by climate change – the most global and pressing environmental threat of this century – share similarities with conventional social policies (Gough, 2016). Both the consequences of climate policy and the impacts of climate change are not distributed evenly across socioeconomic groups (van Ruijven et al., 2015). Consequently, Meadowcroft (2005, 2008) highlighted that both environmental and redistributive issues require political

responses to long-term societal change that cannot be satisfactorily addressed by markets and voluntary actions. We may situate this view within the approach known as ecological modernisation, which suggests potential compatibility between environmental and economic values in capitalist and democratic political economies (Dryzek et al., 2003: 11). The reconciliation of values in the two spheres requires ‘conscious and coordinated intervention’ through a holistic process (Dryzek, 2013: 170). Importantly, ecological modernisation – even in its strong form – does not prescribe that governments abandon capitalism as an economic system, but it demands comprehensive political and intervention (Christoff, 1996). As Dryzek (2013: 170) puts it, one cannot put faith in ‘any supposed “invisible hand” operating in market systems to promote good environmental outcomes (of the sort Prometheans stress).’

Climate change and environmental problems are related to distribution of resources and should be absorbed as part of the collective responsibilities of governments. For instance, taxes on private energy consumption are likely to represent a disproportionate cost for the poor, for whom it is more difficult to reduce their (already low) level of consumption. It is, thus, proposed that carbon or energy taxes should be accompanied by social benefits, tax credits or investments in energy efficiency in low-income households through energy tax revenues (Gough et al., 2008). At least in theory, this shows that a synergy between income redistribution, a traditional welfare policy and carbon pricing policy is, in fact, possible. Whether this relationship exists also in practice, remains an empirical question, which needs to be studied at the level of policy as well as with regards to individual attitudes. The present article does the latter.

Our empirical analysis on differentials between countries depicted clear heterogeneity in the relationships between support for redistributive policy and willingness to pay for environmental protection. In Canada, New Zealand, the Philippines, Norway and the United States, individuals who are willing to pay for the environment are also in favour of income redistribution. Correspondingly, in these countries (except for the Philippines where there seems to be no study on the topic), environmental attitudes have been found to be clearly divided by political ideology and party preference. Individuals with more liberal, egalitarian attitudes and less conservative are more inclined to believe in man-made global warming and seriousness of climate change than are conservatives in Canada (Lachapelle et al., 2012), New Zealand (Milfont, 2012), Norway (Tranter and Booth, 2015) and the United States (Dunlap and McCright, 2008; McCright and Dunlap, 2011).

In contrast, in former communist countries including Bulgaria, Russia and the Czech Republic, the relationship between willingness to pay for the environment and support for income redistribution is negative. One plausible explanation for this finding is that post-communist countries were less democratic and a series of evidence shows that generally less democratic countries perform worse in environmental protection than democratic ones (Farzin and Bond, 2006; Li and Reuveny, 2006; Neumayer, 2002). Meanwhile, post-communist countries, especially central and eastern European states have maintained a strong welfare commitment despite economic liberalisation (Kuitto, 2016). The contrasting environmental performance and welfare policies in these countries may explain our finding of the negative relationship between support for paying for the environment and support for income redistribution. Another explanation is related to the nature of public attitudes in post-communist countries. In fact, the issues of climate change and the environment are less salient in the former communist countries of Eastern Europe as compared to Western European countries (McCright et al., 2016). Not only were post-communist respondents less active in taking measures to protect the environment (Marquart-Pyatt, 2012), they were also more likely to give priority to personal economic

security over environmental protection (De Bardeleben, 1997). Furthermore, unlike in Western Europe, the distinctions between the left and the right with respect to the issues of social and economic equality are much weaker in former communist countries (Tavits and Letki, 2009). The *crowding out* pattern found, thus, implies that citizens of these countries perceive environmental and social welfare policies as substitutes.

Note that we also observe a negative relationship in Germany but the effect is rather small. This is possibly due to the similarity between former East Germany and former Communist countries. In fact, the negative relationship between willingness to pay for environmental protection and support for income redistribution for Germany disappears when focusing the analysis only on the more recent 2010 ISSP survey. For other countries, namely, Slovenia, Israel, Japan, Spain and Great Britain, we found no significant relationship between the two spheres of policies. These countries are diverse in socio-economic and political contexts, but it is beyond the scope of this study to analyse why this is the case.

In fact, it is not an easy task to explain similarities and differences between countries. Whilst it is possible to group countries into different environmental governance regimes based on governments' environmental strategies such as regulations, taxation and organisations, it is not clear why the countries have evolved into different paths in environmental management (Duit, 2016). Countries classified as environmental states such as the UK and the Netherlands – the so-called liberal welfare state – display similarly strong environmentally-related administrative and redistributive practices and regulations as Sweden, Finland and Denmark – the so-called social democratic welfare state. Likewise, environmental governance regime types do not follow established classification schemes such as capitalism classifications or majoritarian-consensual democracy dimension either (Hall and Soskice, 2001). A comprehensive review of factors associated with national environmental performance by Fiorino (2011) concludes that there is no clear-cut institutional pattern to explain national disparities in climate policies and environmental performance. Duit (2016: 87) noted that the lack of correlation with established classification schemes is possibly due to the abstract level of analysis employed in his study. Correspondingly, our analysis based on public opinions may not reflect the actual eco-social policies in a country.

Our study has two main limitations that should be recognised. Firstly, our indicators of support for social and environmental policy are based on self-reported information. This type of attitudes questions is susceptible to social desirability bias if respondents of certain characteristics systematically answer what is 'correct' or socially acceptable. Secondly, although we have employed the questions that involve opinions towards sacrificing one's wealth/income to reduce social inequality or for environmental protection, by nature of the data, we are not able to measure actual behaviour. Still, since public disapproval can undermine policy development, seeking to understand public opinion is worthwhile even if it is not directly related to behaviour (Corner et al., 2011).

The main contribution of this study lies in our attempt to empirically investigate the potential synergy between social and environmental policies. It was not until recently that social policy scholars began to address climate change and environmental issues as new challenges to the traditional welfare policies (Gough et al., 2008). Most of the extant literature on the topic, however, is at the theoretical level with the exception of the study by Koch and Fritz (2014). Even so, they did not directly compare two potentially competing policy directions like ours in which individuals were obliged to envisage giving up part of their income or wealth for environmental protection or reducing social inequality. In this study, we are able to explore whether supports for social and environmental policy *crowd out* or result in *double-worry* patterns.

Conclusion

Although there is substantial country variation, in sum, we found no evidence of a *double-worry* or synergy between support for environmental and welfare policies in the total sample. One interpretation of our findings is that there are different drivers behind preferences for preserving the environment and preferences for income redistribution. Despite the fact that both environmental and welfare policies address the issue of market externalities, the scale and time horizon may differ. Income redistribution is mainly a domestic issue and may yield a direct benefit to an individual whilst the benefits from paying for the environment such as carbon tax can extend beyond the national boundary and to future generations. Therefore, we cannot expect that positive attitudes towards income redistribution will enhance the willingness to pay for policies that benefit the environment.

This suggests that policymakers are confronted with a considerable challenge in getting the public on-board in the move towards the eco-social state. That is, if we are to succeed in transforming modern democratic states into environmentally friendly welfare states or eco-social states, policymakers have to work on two separate fronts. In conceptual terms, the empirical findings we have presented arguably lend some support to the ecological modernisation approach – particularly in the strong form (Dryzek, 2013: 176–177). We need broad-based intervention and partnerships not only between government and industry, but also other non-governmental actors, including the citizenry itself. This approach is fundamental to the takeoff of the institutional, economic and cultural changes necessary to create environmental states that come close to the ideal green state.

The upshot of strong ecological modernisation is that to see long-lasting changes in patterns of individual behaviour, it is necessary to get popular opinions on-board.⁵ That is, if the public do not care or disagree with current measures to protect the climate and the environment, they are unlikely to start behaving in a more environmentally friendly way. For this to happen, we need a better understanding of how attitudes are formed and influenced with regard to redistributive *as well as* environmental policy. This article has addressed this issue making use of the best data currently available. However, as a final note, it is worth pointing out that the study would have benefitted from access to better data. We would like to see the development of richer datasets that allow for more detailed comparisons of attitudes towards the welfare state and different aspects of environmental protection, including climate change mitigation.

Acknowledgements

We are grateful to the two anonymous reviewers for their constructive comments, which helped us improve the manuscript. We would also like to thank Bjørn Hvinden, Max Koch and Ian Gough for useful comments and suggestions. Niklas Jakobsson would like to thank FBK-IRVAPP in Trento, Italy, for hosting his research stay whilst finalising the manuscript.

Author contribution

All authors contributed equally to this work and author names are listed alphabetically. N.J., R.M. and M.S. jointly conceived the study. N.J. and R.M. prepared and analysed data. N.J., R.M. and M.S. wrote the paper. R.M. and M.S. revised the paper.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: Funding for this work was made possible by the research programme Welfare, Working Life and Migration (VAM) of the Research Council of Norway, 'Sustainable European welfare societies: Assessing linkages between social and environmental policy' (Project no.: 236930/H20).

Notes

1. Note, however, that in countries like Australia and the United States, rising fuel prices increase economic vulnerability of low-income households since they are more likely to live in outer suburban locations with longer commuting time, poor public transportation and consequently high levels of car dependence (Dodson and Sipe, 2008).
2. Nevertheless, note that at the local scale, there are also examples of grassroots protest movements in less developed and poorer sector of the societies such as the tree-hugging Chipko and Appiko movements in India (Fisher, 1993).
3. Note, however, that we do not suggest that the quality of democracy can be measured only based on the extent to which it manages to fulfil the preferences of the majority. Advanced democracies also have institutional arrangements and civil rights in place to protect minorities.
4. In other words, this school of thought are founded on the ideas of ecological modernization which differs from the view that an ecological state demands authoritarian government (for an extreme version of the latter view, see Heilbroner, 1974).
5. Although as pointed out above, we do not suggest that people's opinions are a direct measure of actual behaviour.

References

- Bagliani M, Bravo G and Dalmazzone S (2008) A consumption-based approach to environmental Kuznets curves using the ecological footprint indicator. *Ecological Economics* 65(3): 650–661.
- Bailey D (2015) The environmental paradox of the welfare state: The dynamics of sustainability. *New Political Economy* 20(6): 793–811.
- Bean C and Papadakis E (1998) A comparison of mass attitudes towards the welfare state in different institutional regimes, 1985–1990. *International Journal of Public Opinion Research* 10(3): 211–236.
- Blekesaune M and Quadagno J (2003) Public attitudes toward welfare state policies: A comparative analysis of 24 nations. *European Sociological Review* 19(5): 415–427.
- Borghesi S (2001) The environmental Kuznets curve: A critical survey. In: Franzini M and Nicita A (eds) *Economic Institutions and Environmental Policy*. Surrey: Ashgate.
- Büchs M, Bardsley N and Duwe S (2011) Who bears the brunt? Distributional effects of climate change mitigation policies. *Critical Social Policy* 31(2): 285–307.
- Bullard RD (2000) *Dumping In Dixie: Race, Class, And Environmental Quality, Third Edition*. Boulder, Colorado: Westview Press.
- Calzada I, Gómez-Garrido M, Moreno L, et al. (2014) It is not only about equality. A study on the (other) values that ground attitudes to the welfare state. *International Journal of Public Opinion Research* 26(2): 178–201.
- Carter N (2001) *The Politics of the Environment: Ideas, Activism, Policy*. Cambridge: Cambridge University Press.
- Christoff P (1996) Ecological modernisation, ecological modernities. *Environmental Politics* 5(3): 476–500.
- Cole MA, Rayner AJ and Bates JM (1997) The environmental Kuznets curve: An empirical analysis. *Environment and Development Economics* 2(4): 401–416.
- Corner A, Venables D, Spence A, et al. (2011) Nuclear power, climate change and energy security: Exploring British public attitudes. *Energy Policy* 39(9): 4823–4833.

- Dasgupta S, Mody A, Roy S, et al. (2001) Environmental regulation and development: A cross-country empirical analysis. *Oxford Development Studies* 29(2): 173–187.
- De Bardeleben J (1997) Environmental consciousness and economic development: Some East–West comparisons. In: Frizzell A and Pammett JH (eds) *Shades of Green: Environmental Attitudes in Canada and Around the World*. International Social Survey Programme (ISSP) series. Ottawa: Carleton University Press, pp.147–168.
- Dodson J and Sipe N (2008) Shocking the Suburbs: Urban location, homeownership and oil vulnerability in the Australian City. *Housing Studies* 23(3): 377–401.
- Dryzek J (2013) *The Politics of the Earth*. *Environmental Discourses*, 3rd ed. Oxford: Oxford University Press.
- Dryzek JS (2008) The ecological crisis of the welfare state. In: Gough I, Meadowcroft J, Dryzek J, et al. (eds) *JESP Symposium: Climate Change and Social Policy*. *Journal of European Social Policy*. p. 325.
- Dryzek J, Downs, Hernes H-K, et al. (2003) *Green States and Social Movements: Environmentalism in the United States, United Kingdom, Germany, and Norway*. New York: Oxford University Press.
- Duit A (2011) Adaptive capacity and the ecostate. In: Boyd E and Folke C (eds) *Adapting Institutions*. Cambridge: Cambridge University Press, pp. 127–147.
- Duit A (2016) The four faces of the environmental state: Environmental governance regimes in 28 countries. *Environmental Politics* 25(1): 69–91.
- Duit A, Feindt PH and Meadowcroft J (2016) Greening Leviathan: The rise of the environmental state? *Environmental Politics* 25(1): 1–23.
- Dunlap RE and McCright AM (2008) A widening gap: Republican and democratic views on climate change. *Environment: Science and Policy for Sustainable Development* 50(5): 26–35.
- Eckersley R (1992) *Environmentalism and Political Theory: Toward an Ecocentric Approach*. New York: SUNY Press.
- Eckersley R (2004) *The Green State: Rethinking Democracy and Sovereignty*. Cambridge, MA and London: MIT Press.
- Edlund J (1999) Trust in government and welfare regimes: Attitudes to redistribution and financial cheating in the USA and Norway. *European Journal of Political Research* 35(3): 341–370.
- Esping-Andersen G (1990) *The Three Worlds of Welfare Capitalism*. Princeton, NJ: Princeton University Press.
- Farzin YH and Bond CA (2006) Democracy and environmental quality. *Journal of Development Economics* 81(1): 213–235.
- Fiorino DJ (2011) Explaining national environmental performance: Approaches, evidence, and implications. *Policy Sciences* 44(4): 367.
- Fisher J (1993) *The Road From Rio: Sustainable Development and the Nongovernmental Movement in the Third World*, Second Printing edition. Westport, CT: Praeger.
- Fitzpatrick T (ed.) (2014) *International Handbook on Social Policy and the Environment*. Cheltenham, UK & Northampton, MA, USA: Edward Elgar.
- Franzen A and Meyer R (2010) Environmental attitudes in cross-national perspective: A multilevel analysis of the ISSP 1993 and 2000. *European Sociological Review* 26(2): 219–234.
- Franzen A and Vogl D (2013) Two decades of measuring environmental attitudes: A comparative analysis of 33 countries. *Global Environmental Change* 23(5): 1001–1008.
- Gelissen J (2007) Explaining popular support for environmental protection: A multilevel analysis of 50 nations. *Environment and Behavior* 39(3): 392–415.
- Gough I (2010) Economic crisis, climate change and the future of welfare states. *Twenty-First Century Society* 5(1): 51–64.
- Gough I (2013) Climate change, social policy, and global governance. *Journal of International and Comparative Social Policy* 29(3): 185–203.
- Gough I (2016) Welfare states and environmental states: A comparative analysis. *Environmental Politics* 25(1): 24–47.
- Gough I, Meadowcroft I, Dryzek J, et al. (2008) JESP symposium: Climate change and social policy. *Journal of European Social Policy* 18: 325–344.
- Grossman GM and Krueger AB (1995) Economic growth and the environment. *The Quarterly Journal of Economics* 110(2): 353–377.

- Hall PA and Soskice D (2001) *Varieties of Capitalism*. Oxford: Oxford University Press.
- Hasenfeld Y and Rafferty JA (1989) The determinants of public attitudes toward the welfare state. *Social Forces* 67(4): 1027–1048.
- Heilbroner R (1974) *An Inquiry Into the Human Prospect*. New York: W.W. Norton.
- Hunold C and Dryzek JS (2002) Green political theory and the state: Context is everything. *Global Environmental Politics* 2(3): 17–39.
- Inglehart R (1990) *Culture Shift in Advanced Industrial Society*. Princeton, NJ: Princeton University Press.
- Inglehart R (1995) Public support for environmental protection: Objective problems and subjective values in 43 societies. *PS: Political Science & Politics* 28(01): 57–72.
- IPCC (2014) In: Edenhofer O, Pichs-Madruga R, Sokona Y, et al. (eds) *Climate Change 2014: Mitigation of Climate Change: Working Group III Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. New York, NY: Cambridge University Press.
- Jacobs LR and Shapiro RY (1994) Studying substantive democracy. *PS: Political Science and Politics* 27(1): 9–17.
- Jæger MM (2006) What makes people support public responsibility for welfare provision: Self-interest or political ideology? A longitudinal approach. *Acta Sociologica* 49(3): 321–338.
- Jamasb T and Meier H (2010) *Household Energy Expenditure and Income Groups: Evidence from Great Britain*. Cambridge: Electricity Policy Research Group, University of Cambridge.
- Johansson H, Khan J and Hildingsson R (2016) Climate change and the welfare state. Do we see a new generation of social risks emerging? In: Koch M and Mont O (eds) *Sustainability and the Political Economy of Welfare* New York: Routledge.
- Jordan A, Wurzel RKW and Zito AR (2003) ‘New’ instruments of environmental governance: Patterns and pathways of change. *Environmental Politics* 12(1): 1–24.
- Kachi A, Bernauer T and Gampfer R (2015) Climate policy in hard times: Are the pessimists right? *Ecological Economics* 114: 227–241.
- Kelly M, Tovey H and Faughnan P (2007) *Environmental Attitudes, Values and Behaviour in Ireland*. Wexford: Environmental Protection Agency.
- Khan F (2002) The roots of environmental racism and the rise of environmental justice in the 1990s. In: McDonald DA (ed.) *Environmental Justice in South Africa*, 1st ed. Athens; Cape Town: Ohio University Press, pp. 15–48.
- Knutsen O (1995) Value orientations, political conflicts and left-right identification: A comparative study. *European Journal of Political Research* 28(1): 63–93.
- Koch M and Fritz M (2014) Building the eco-social state: Do welfare regimes matter? *Journal of Social Policy* 43(04): 679–703.
- Koch M and Mont O (eds) (2016) *Sustainability and the Political Economy of Welfare*. New York: Routledge.
- Kuitto K (2016) *Post-Communist Welfare States in European Context: Patterns of Welfare Policies in Central and Eastern Europe*. Cheltenham, UK; Northampton, MA: Edward Elgar Publishing.
- Kulin J and Svallfors S (2013) Class, values, and attitudes towards redistribution: A European comparison. *European Sociological Review* 29(2): 155–167.
- Kumlin S (2004) *The Personal and the Political. How Personal Welfare State Experiences Affect Political Trust and Ideology*. New York: Palgrave Macmillan.
- Lachapelle E, Borick CP and Rabe B (2012) Public attitudes toward climate science and climate policy in federal systems: Canada and the United States compared. *Review of Policy Research* 29(3): 334–357.
- Levin K, Cashore B, Bernstein S, et al. (2012) Overcoming the tragedy of super wicked problems: Constraining our future selves to ameliorate global climate change. *Policy Sciences* 45(2): 123–152.
- Li Q and Reuveny R (2006) Democracy and environmental degradation. *International Studies Quarterly* 50(4): 935–956.
- Linos K and West M (2003) Self-interest, social beliefs, and attitudes to redistribution. Re-addressing the issue of cross-national variation. *European Sociological Review* 19(4): 393–409.

- McCright AM and Dunlap RE (2011) The politicization of climate change and polarization in the American public's views of global warming, 2001–2010. *Sociological Quarterly* 52(2): 155–194.
- McCright AM, Dunlap RE and Marquart-Pyatt ST (2016) Political ideology and views about climate change in the European Union. *Environmental Politics* 25(2): 338–358.
- Marquart-Pyatt ST (2012) Explaining environmental activism across countries. *Society & Natural Resources* 25(7): 683–699.
- Meadowcroft J (2005) From welfare state to ecostate. In: Barry J and Eckersley R (eds) *The State and the Global Ecological Crisis*. Cambridge, MA: The MIT Press, pp. 3–24.
- Meadowcroft J (2008) From welfare state to environmental state? In: Gough I, Meadowcroft J, Dryzek J, et al. (eds) *JESP Symposium: Climate Change and Social Policy Journal of European Social Policy*. p. 331.
- Meyer JW, Frank DJ, Hironaka A, et al. (1997) The structuring of a world environmental regime, 1870–1990. *International Organization* 51(04): 623–651.
- Milfont TL (2012) The interplay between knowledge, perceived efficacy, and concern about global warming and climate change: A one-year longitudinal study. *Risk Analysis* 32(6): 1003–1020.
- Neumayer E (2002) Do democracies exhibit stronger international environmental commitment? A cross-country analysis. *Journal of Peace Research* 39(2): 139–164.
- Neumayer E (2004) The environment, left-wing political orientation and ecological economics. *Ecological Economics* 51(3–4): 167–175.
- Newell P (2008) The political economy of global environmental governance. *Review of International Studies* 34(3): 507–529.
- Obani PC and Gupta J (2016) The impact of economic recession on climate change: Eight trends. *Climate and Development* 8(3): 211–223.
- Paterson M (2009) Global governance for sustainable capitalism? The political economy of global environmental governance. In: Adger WN and Jordan A (eds) *Governing Sustainability*. Cambridge: Cambridge University Press, pp. 99–122.
- Reeskens T and van Oorschot W (2013) Equity, equality, or need? A study of popular preferences for welfare redistribution principles across 24 European countries. *Journal of European Public Policy* 20(8): 1174–1195.
- Rittel HWJ and Webber MM (1973) Dilemmas in a general theory of planning. *Policy Sciences* 4(2): 155–169.
- van Ruijven BJ, O'Neill BC and Chateau J (2015) Methods for including income distribution in global CGE models for long-term climate change research. *Energy Economics* 51: 530–543.
- Schaffrin Y (2014) The new social risks and opportunities of climate change. In: Fitzpatrick T (ed.) *International Handbook on Social Policy and the Environment*. Cheltenham, UK; Northampton, MA: Edward Elgar Publishing, pp. 3–61.
- Skopecol T (1994) From social security to health security? Opinion and rhetoric in U. S. social policy making. *PS: Political Science and Politics* 27(1): 21–25.
- Somestad L (2012) Climate policy and the social investment approach: Towards a European model for sustainable development. In: Morel N, Palier B and Palme J (eds) *Towards a Social Investment Welfare State? Ideas, Policies and Challenges*. Bristol: Policy Press.
- Spies-Butcher B and Stebbing A (2016) Climate change and the welfare state? Exploring Australian attitudes to climate and social policy. *Journal of Sociology* 52(4): 741–758.
- Svallfors S (2013) Government quality, egalitarianism, and attitudes to taxes and social spending: A European comparison. *European Political Science Review* 5(03): 363–380.
- Swim JK, Stern PC, Doherty TJ, et al. (2011) Psychology's contributions to understanding and addressing global climate change. *American Psychologist* 66(4): 241–250.
- Tavits M and Letki N (2009) When left is right: Party ideology and policy in Post-Communist Europe. *The American Political Science Review* 103(4): 555–569.
- Taylor-Gooby P (2011) *Squaring the Public Policy Circle: Managing a Mismatch between Demands and Resources*. London: British Academy.
- Torgler B and García-Valiñas MA (2007) The determinants of individuals' attitudes towards preventing environmental damage. *Ecological Economics* 63(2–3): 536–552.

Tranter B and Booth K (2015) Scepticism in a changing climate: A cross-national study. *Global Environmental Change* 33: 154–164.

Ursanov A and Chivot E (2015) *Beyond the Welfare State*. The Hague: The Hague Centre for Strategic Studies.

Ziegler A (2017) Political orientation, environmental values, and climate change beliefs and attitudes: An empirical cross country analysis. *Energy Economics* 63: 144–153.

Niklas Jakobsson is an Associate Professor (Docent) in Economics at Karlstad University, Sweden and a senior researcher at NOVA Norwegian Social Research, Oslo and Akershus University College of Applied Sciences, Norway. His research interests include comparative welfare state research, discrimination, gender issues, laws, attitudes and public policy.

Raya Muttarak is a senior lecturer at the School of International Development, University of East Anglia (UK) and a research scholar at the International Institute for Applied Systems Analysis (IIASA) (Austria). She leads the research group Population, Environment and Sustainable Development at the Wittgenstein Centre for Demography and Global Human Capital (IIASA, VID/ÖAW and WU). Her research interests include population and global environmental change, differential vulnerability, environmental attitudes and behaviour, health behaviour, migration and immigrants' integration.

Mi Ah Schoyen is a senior researcher at NOVA Norwegian Social Research, Oslo and Akershus University College of Applied Sciences, Norway. Her research interests include comparative welfare state/social policy research, public policy, welfare mixes, public pension systems and Nordic welfare states.

Appendix

Table A1. Data description.

	Description	Source
Individual level variables		
Gender	Male = 0, Female = 1	ISSP
Age	Age in years	ISSP
Education	No qualification = 0 (excluded category) Primary = 1 Intermediate = 2 Higher secondary = 3 University degree = 4	ISSP
Employment	Full time = 1 (excluded category) Part time = 2 Unemployed = 3 In education = 4 Retired = 5 Housewife/man = 6 Disabled = 7 Other = 8	ISSP

(continued)

Table A1. Continued.

	Description	Source
Household composition	Single = 0 (excluded category) Single with children = 1 Only adults = 2 Adults with children = 3 Other = 4 Missing = 5	ISSP
Household income	First quintile = 1 (excluded category) Second quintile = 2 Third quintile = 3 Fourth quintile = 4 Fifth quintile = 5 Missing = 6	ISSP
Country level variables		
Population	Number of inhabitants	World Bank: World Development Indicators
GDP	Gross Domestic Product GDP (PPP), million international dollars	World Bank: World Development Indicators
Greenhouse gas emissions	Total GHG Emissions Including Land-Use Change and Forestry (MtCO ₂ e)	Carbon Dioxide Information Analysis Center

Table A2. Country average WTP for environmental protection explained by redistribution attitudes.

	Model 1	Model 2	Model 3	Model 4
Redistribution	-0.236*** (0.091)	-0.573 (0.363)	-0.245 (0.243)	-0.227 (0.208)
Population				1.24e-08*** (3.49e-09)
GDP				-9.45e-08 (5.55e-08)
Greenhouse gas emissions				0.0002 (0.0003)
Wave 2			-0.244*** (0.060)	-0.254*** (0.062)
Wave 3			-0.418*** (0.075)	-0.438*** (0.089)
Constant	3.631*** (0.321)	4.832*** (1.295)	3.882*** (0.854)	3.006*** (0.816)
Observations	42	42	42	42
R-squared	0.147	0.147	0.705	0.761
Number of countries	14	14	14	14

Note: Robust standard errors in parentheses.

***p < 0.001, **p < 0.01, *p < 0.5.

Table A3. Individual willingness to pay for environmental protection explained by redistribution attitudes.

	Model 1	Model 2	Model 3	Model 4
Redistribution	−0.042*** (0.004)	−0.027*** (0.004)	−0.021*** (0.004)	0.008 (0.004)
Gender				−0.042*** (0.010)
Age				0.002 (0.002)
Age ²				0.000 (0.000)
Education				
Primary				0.054* (0.023)
Intermediate				0.221*** (0.024)
Higher secondary				0.297*** (0.025)
University degree				0.592*** (0.026)
Employment				
Part time				0.084*** (0.017)
Unemployed				−0.058** (0.023)
In education				0.234*** (0.025)
Retired				−0.071*** (0.020)
Housewife/man				−0.014 (0.019)
Disabled				−0.109** (0.038)
Other				−0.050 (0.038)
Household composition				
Single				−0.029 (0.034)
Single with children				0.032 (0.018)
Only adults				−0.025 (0.019)
Adults with children				0.047 (0.053)
Missing				0.041* (0.021)
Household income				
Second quintile				0.043* (0.020)
Third quintile				0.128*** (0.020)

(continued)

Table A3. Continued.

	Model 1	Model 2	Model 3	Model 4
Fourth quintile				0.153*** (0.021)
Fifth quintile				0.236*** (0.022)
Missing				0.048** (0.018)
Canada		0.356*** (0.032)	0.353*** (0.031)	0.341*** (0.031)
Czech Republic		-0.185** (0.030)	-0.146** (0.029)	-0.083** (0.029)
Germany		0.161*** (0.029)	0.134*** (0.029)	0.243*** (0.029)
Israel		0.421*** (0.030)	0.432*** (0.029)	0.411*** (0.030)
Japan		0.409*** (0.030)	0.424*** (0.029)	0.424*** (0.030)
New Zealand		0.352*** (0.031)	0.350*** (0.030)	0.369*** (0.030)
Norway		0.297*** (0.030)	0.307*** (0.029)	0.271*** (0.029)
Philippines		-0.037 (0.032)	-0.030 (0.031)	0.077* (0.032)
Russia		0.087** (0.031)	0.090** (0.030)	0.100** (0.030)
Slovenia		0.330*** (0.032)	0.349*** (0.031)	0.381*** (0.032)
Spain		0.168*** (0.029)	0.240*** (0.028)	0.355*** (0.028)
Great Britain		0.306*** (0.030)	0.261*** (0.029)	0.338*** (0.029)
USA		0.413*** (0.031)	0.420*** (0.031)	0.426*** (0.030)
Wave 2 (2000)			-0.253*** (0.012)	-0.223*** (0.014)
Wave 3 (2010)			-0.446*** (0.012)	-0.533*** (0.014)
Constant	2.935*** (0.016)	2.665*** (0.031)	2.868*** (0.031)	2.374*** (0.058)
Number of observations	49,402	49,402	49,402	49,402
R-squared	0.002	0.028	0.055	0.092

Note: Robust standard errors in parentheses.

***p < 0.001, **p < 0.01, *p < 0.5.

Table A4. Relationship between WTP and redistribution attitudes, by country.

	Model 1
Redistribution	0.004 (0.016)
Gender	-0.042*** (0.010)
Age	0.003 (0.002)
Age ²	0.000
Education	(0.000)
Primary	0.051* (0.023)
Intermediate	0.221*** (0.024)
Higher secondary	0.301*** (0.025)
University degree	0.588*** (0.026)
Employment	
Part time	0.080*** (0.017)
Unemployed	-0.053* (0.023)
In education	0.232*** (0.024)
Retired	-0.063** (0.020)
Housewife/man	-0.016 (0.018)
Disabled	-0.115** (0.037)
Other	-0.058 (0.038)
Household composition	
Single	-0.023 (0.034)
Single with children	0.031 (0.018)
Only adults	-0.022 (0.019)
Adults with children	0.042 (0.0531)
Missing	0.034 (0.021)
Household income	
Second quintile	0.044* (0.020)
Third quintile	0.134*** (0.020)

(continued)

Table A4. Continued.

	Model 1
Fourth quintile	0.162*** (0.021)
Fifth quintile	0.249*** (0.022)
Missing	0.057** (0.018)
Wave 2 (2000)	-0.231*** (0.014)
Wave 3 (2010)	-0.534*** (0.014)
Bulgaria	0.156 (0.115)
Canada	-0.192* (0.083)
Czech Republic	-0.147 (0.082)
Germany	0.084 (0.081)
Israel	0.130 (0.090)
Japan	0.124 (0.084)
New Zealand	-0.226** (0.080)
Norway	-0.486*** (0.085)
Philippines	-0.574*** (0.097)
Russia	0.192* (0.093)
Slovenia	0.142 (0.110)
Great Britain	-0.103 (0.086)
USA	-0.287*** (0.079)
Interaction: Country dummy × Redistribution	
Bulgaria	-0.122*** (0.027)
Canada	0.056* (0.022)
Czech Republic	-0.083*** (0.021)
Germany	-0.054* (0.021)
Israel	-0.018 (0.023)
Japan	-0.015 (0.022)

(continued)

Table A4. Continued.

	Model I
New Zealand	0.079*** (0.022)
Norway	0.116*** (0.022)
Philippines	0.086** (0.026)
Russia	-0.114*** (0.023)
Slovenia	-0.027 (0.027)
Great Britain	0.025 (0.023)
USA	0.130*** (0.022)
Constant	2.716*** (0.080)
Number of observations	49,402
R-squared	0.099

Note: Robust standard errors in parentheses.

***p < 0.001, **p < 0.01, *p < 0.5.