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ARTICLE

Social and environmental protection: the effects of social insurance generosity on the acceptance of material sacrifices for the sake of environmental protection

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Abstract

Studies on climate change mitigation and environmental degradation suggest that lifestyle changes in high-income countries can help promote environmental sustainability. Such changes may include material sacrifices on the part of the individual. Yet, accepting material sacrifices can be a challenging task for both individuals and countries. Can publicly provided economic protection facilitate the acceptance of such sacrifices? This study examines whether social insurance generosity is likely to make people more willing to accept material sacrifices for the sake of environmental protection. Using multilevel regression modelling to analyse data on social insurance programmes and attitudes towards material sacrifices in nineteen high-income countries, the results of the study suggest that social insurance generosity has a positive effect on attitudes towards accepting material sacrifices, with some variation across programmes and social groups.

Keywords: welfare state; social insurances; environmental attitudes; material sacrifices; environmental protection; welfare state generosity

Introduction

Climate change and biodiversity loss represent some of the great environmental challenges of the twenty-first century. Reports and studies on climate change mitigation and ecosystem vitality suggest that reductions in the consumption of fossil fuels and other natural resources in high-income countries can benefit environmental sustainability (Chan et al., 2019; Dubois et al., 2019; IPCC, 2023; Ivanova et al., 2020). Such reductions may include reducing consumption levels or living standards among the public in order to protect the environment. However, gaining support for policies that may require material sacrifices on the part of the individual, or is conceived of as a threat to the material welfare of the population, can be challenging. Recent experimental studies (Armingeon & Bürgisser, 2021; Beiser-McGrath & Bernauer, 2020) also suggest that, when environmental protection is pitted against economic concerns, individuals tend to prioritise the latter.

But what if the economic risks are managed? One of the main responsibilities of the welfare state is the managing of economic risks through the provision of social insurance programmes (Bonoli, 2005; Esping-Andersen, 1990; Korpi & Palme, 1998). With research suggesting that economic concerns shape attitudes towards environmental issues, it seems reasonable that the generosity of social insurance programmes may also affect environmental attitudes. Yet, the relationship between social insurances and environmental attitudes has only been sparsely explored in research. Focusing on issues such as economic development and the quality of government (Davidovic et al., 2020; Fairbrother, 2013; Gelissen, 2007; Harring, 2013; Lo, 2016), previous comparative research on attitudes towards material sacrifices for the sake of environmental protection has paid limited attention to specific welfare state policies in shaping attitudes. When welfare states have been analysed in relation to attitudes, it has mostly been done using broad country comparisons (Fritz & Koch, 2019; Marquart-Pyatt et al., 2019; Otto & Gugushvili, 2020; Sivonen & Kukkonen, 2021), and when social insurance schemes have been considered (Parth & Vlandas, 2022), it has been done using empirical indicators that cover limited aspects of the provision of social insurances, leaving the issue of how social insurance generosity effects attitudes towards material sacrifices largely unexplored.

This study addresses this gap by examining how social insurance generosity affects environmental attitudes using multidimensional and comprehensive empirical indicators on the provision of social insurances. The study's overarching research question is: *does social insurance generosity have a positive effect on attitudes towards accepting material sacrifices for the sake of environmental protection?*

The study tests the theory that the generosity of social insurance programmes has a positive effect on individual willingness to accept material sacrifices for the sake of environmental protection. The mechanism behind this can be referred to as the *assurance effect* of social insurances. By providing economic protection, social insurances provide assurance regarding material conditions. The assurance provided by social insurance system is likely to make individuals more willing to accept the risk involved in accepting material sacrifices for the sake of environmental protection. The degree of the assurance provided is likely to vary according to the generosity of the insurance programmes and extend beyond those who are directly in receipt of support.

The argument is tested by examining three specific social insurance programmes that are particularly relevant for the regulation of individual risks: unemployment insurance, sickness insurance, and pension insurance. They are regarded as key welfare state programmes (Bonoli, 2005; Esping-Andersen, 1990; Korpi & Palme, 1998) that cover large shares of the population and make up the bulk of social spending in developed democracies (Scruggs & Ramalho Tafoya, 2022). The analysis is carried out using individual-level data on attitudes from the International Social Survey Project (ISSP) and country-level social insurance data from the Comparative Welfare Entitlements Project (CWEP). Using multilevel modelling, the association between the combined generosity of all three social insurance programmes and the attitudes of the general public is analysed, and the association between the generosity of each individual insurance programme and the attitudes of the working population, the unemployed and retirees. Data used refers to the year

2010, with a total of 26,510 individual-level observations from nineteen high-income countries.

The results show that social insurance generosity is positively associated with attitudes towards accepting material sacrifices for the sake of environmental protection among the general public, the working population and the unemployed. The association is found across different social insurance systems and social groups, with the exception of pension and retirees. The results indicate that social insurance generosity does not have a stronger effect on the attitudes of low-income households compared to other households. The findings suggest that policies that require material sacrifices from the public in order to protect the environmental may have an easier time gaining acceptance if accompanied by policies of economic protection.

Using comprehensive and multidimensional empirical indicators to measure the generosity of key welfare state programmes, the study provides one of the first comprehensive accounts of the effects of welfare state generosity on environmental attitudes. Focusing on the interplay between social and environmental protection, the study contributes to the growing field of research examining the relationship between welfare state systems and environmental sustainability (Fritz & Koch, 2019; García-García et al., 2022; Hirvilammi et al., 2023; Koch & Fritz, 2014).

Previous research

The willingness to accept material sacrifices for environmental causes has been studied from different theoretical perspectives and operationalised in various ways. Among the more common ways of operationalising it are measures of attitudes towards accepting different economic costs, such as paying higher taxes, prices (e.g. Franzen & Vogl, 2013; Harring & Jagers, 2013; Davidovic et al., 2020), or accepting cuts to one's living standard for the sake of environmental protection (Harring, 2013). The following research overview will focus on studies that have examined the determinants behind such attitudes cross-country and comparatively.

Previous studies have analysed attitudes towards material sacrifices as part of a generalized 'environmental concern' (Dunlap & York, 2008; Fairbrother, 2013; Franzen & Meyer, 2010; Franzen & Vogl, 2013; Lo, 2016), drawing on Ronald Inglehart's post-materialism thesis to examine how environmental concern vary within and across countries. Inglehart (1995) argued that environmental attitudes are linked to a sense of existential security that arises from having physical and economical security. When provided with such security, individuals shift their attention from 'materialistic' concerns to 'post materialistic' concerns such as environmental sustainability (Inglehart, 1995, 2008). Economic development and the welfare state are key elements in this process. While economic development provide resources for economic security, the level of security provided in a society is mediated by the welfare state (Inglehart, 2008, pp. 132–133). Yet, when examining Inglehart's claim, researchers have commonly focused on the relationship between economic development and attitudes, analysing how country wealth, measured as gross domestic product (GDP) per capita, relate to attitudes towards accepting material sacrifices for environmental causes (Dunlap & York, 2008; Fairbrother, 2013; Franzen & Vogl, 2013; Lo, 2016). However, compared to welfare state generosity – the

degree of economic protection welfare states provide citizens with – GDP per capita is less suitable as an indicator of the level of economic security provided in a country, as welfare state generosity can be thought to impact citizens sense of economic security more directly than general levels of economic affluence (see Scruggs & Allan, 2006). Yet, so far, no study has examined how welfare state generosity affects attitudes towards accepting material sacrifices for the sake of the environment.

Another strand of the literature has emphasised the importance of political trust and the quality of state institutions in shaping attitudes. While people may value environmental protection, political distrust and poor quality of government are likely to make them less willing to make economic sacrifices in the form of paying higher taxes and prices (Harring, 2013; Davidovic et al., 2020; Fairbrother, 2022). Harring (2013) finds a positive individual-level effect of political trust on attitudes towards accepting material sacrifices for the sake of the environment and Fairbrother (2016) on attitudes both at the individual and country level. Davidovic et al. (2020) find that the quality of government moderates support for environmental taxes at the country level, with a greater willingness to pay higher taxes in countries with high levels of governmental quality. Yet, largely missing from the literature on political trust and attitudes towards accepting sacrifices is a consideration of the effects of welfare state generosity on attitudes. While empirical studies are limited, research suggest that welfare state generosity has a positive and causal effect on political trust (Kumlin & Haugsgjerd, 2017; Kumlin et al., 2018).

When welfare state characteristics have been examined in relation to environmental attitudes, it has often been done by comparing countries according to Esping-Andersen's (1990) welfare state regime typology. A common finding has been that people in countries associated with the social democratic welfare state regime are more willing to accept material sacrifices compared to people in liberal and conservative welfare states, either by paying for environmental protection (Jones et al., 2009), accepting higher taxes on fossil fuels (Marquart-Pyatt et al., 2019; Otto & Gugushvili, 2020; Sivonen & Kukkonen, 2021) or accepting cuts in their level of living standard (Koch & Fritz, 2014). However, by analysing countries according to welfare state regimes, studies have not provided detailed examinations of the effect of specific welfare state programmes on attitudes.

One study, by Parth and Vlandas (2022), has examined how variations in specific social policy measures relate to environmental attitudes. Referencing Inglehart, Parth, and Vlandas argue that generous welfare states make people safer by providing economic security and satisfying short-term material needs, which in turn enable individuals to focus on 'post-material' environmental concerns. However, they do not elaborate on the supposed mechanism behind this effect. Empirically, they examine 2019 Eurobarometer public opinion survey data and country-level indicators of welfare state generosity in 22 European countries. They operationalise pro-environmental behaviour using measures of individual considerations and actions regarding energy consumption, carbon footprint, waste recycling, and consumption. Welfare state generosity is operationalised as percentage of social expenditures of GDP and income replacements rates for unemployment and pension insurances. Parth and Vlandas find that welfare state generosity is positively associated with attitudes towards pro-environmental action among members of the working class. The opposite is found for the elderly, who are less likely to support

environmental action when pension generosity is high. However, their study provides only a limited assessment of welfare state generosity. As emphasized in the literature on comparative welfare state research (e.g. Esping-Andersen, 1990; Kangas & Palme, 2007; Scruggs, 2008; Sjöberg, 2010), a comprehensive assessment of welfare state generosity requires taking several aspects of the provision of welfare state support into account.[1] With regards to social insurances, this entails making a combined assessment of different insurance programme characteristics: in addition to income replacement levels, one also need to consider duration periods, programme coverage levels and eligibility criteria. A social insurance programme may well offer generous replacement rates, but if only provided to a small number of recipients or for a limited duration, the overall generosity may still be limited (Esping-Andersen, 1990, p. 49).

In addition to large scale survey studies, experimental studies have recently sought to examine the relationship between individual economic circumstances and attitudes. A study in Switzerland found that, when faced with the choice of supporting policies of either environmental protection or income redistribution, short-term individual economic interests was the main determinant of individual choice (Armingeon & Bürgisser, 2021). Similarly, a survey experiment on German and American respondents found that acceptance of carbon taxation was first and foremost determined by individual economic concerns (Beiser-McGrath & Bernauer, 2020). Such findings suggest that individual economic concerns play an important role in shaping attitudes towards environmental policies and material sacrifices. More generally, research also suggests that support for material sacrifices in the form of carbon taxation or increased fossil fuel costs may increase when revenues are recycled to benefit particularly exposed households or social groups (Beiser-McGrath & Bernauer, 2019; Gaikwad et al., 2022; Klenert et al., 2018).

To sum up, while previous research has made considerable headway in understanding how attitudes towards material sacrifices for environmental protection are shaped, the importance of welfare state programmes, and social insurances in particular, have not been examined in-depth. When these institutions have been examined, analyses have relied on empirical measures that do not fully capture the multidimensional nature of social insurance generosity. Furthermore, previous research has not attempted to provide an elaborate theoretical account regarding the relationship between social insurance generosity and support for environmental protection. This study seeks to address these gaps in the following way. Firstly, it presents a theoretical argument regarding the effect of social insurance generosity on attitudes. Secondly, it analyses the effect of social insurance generosity on attitudes towards material sacrifices using comprehensive measures on the provision of social insurances.

Theory and hypotheses

Drawing on Inglehart's notion of existential security, I propose that social insurance generosity increases individual economic security, which in turn facilitates greater willingness to accept material sacrifices for the sake of environmental protection.[2] The mechanism behind this is risk reduction. Through the provision of income

insurances, welfare states reduce the risk of not being able to maintain a sufficiently high level of material living conditions, thereby making people more willing to accept material sacrifices for the sake of environmental protection.

Protection against social risks is a central theme in social policy theorising. Protection against risks such as unemployment, sickness, and old-age are considered key tasks of the welfare state (e.g. Bonoli, 2005; Esping-Andersen, 1990; Korpi & Palme, 1998). Esping-Andersen (1990) famously identified welfare state regimes according to the degree to which they granted citizens' social rights offering protection against such risks. By providing social insurance protection that allowed citizens to make their living standards independent of pure market forces, welfare states provided citizens with protection against social risks; a process which he called decommodification (Esping-Andersen, 1990, p. 3). According to Esping-Andersen (1990), the degree of protection offered in different welfare states in turn reflected different political histories and the balance of power between economic classes. As others have noted, this approach to analysing welfare states (Esping-Andersen, 1990; Korpi & Palme, 1998) essentially relies on a consideration of the generosity and universalism of social insurance programmes (Scruggs, 2007).

Social insurances play a central role in the regulation of individual risks. As insurances, they provide direct support to those in need, but also protection against economic uncertainty and assurance regarding future material conditions. As argued by Sjöberg (2010), social insurance systems have effects that extend beyond those who directly utilise them, providing assurance to those who currently may not be in receipt of support. The mere knowledge that public insurance systems exist and that they provide some degree of economic protection can provide assurance regarding future material conditions for a wider population: sickness and unemployment insurances provide assurance regarding economic conditions in case of unemployment or sickness, and pension insurances in case of old age or early retirement.

The assurance provided by social insurance schemes can also be thought to effect environmental attitudes. When the generosity of social insurance systems is low, individuals are more likely to consider their own material possessions as potential means of economic insurance in case of a loss of income. With no or low levels of income protection, individuals must rely mainly on private means, such as savings and other material possessions, to secure their subsistence following a loss of earnings. Under such circumstances, individuals are less likely to accept material sacrifices for environmental causes, as it poses a greater risk to their own means of subsistence in case of a loss of income.

Conversely, when generous economic protection is provided through social insurance systems, individuals are less likely to be concerned about securing their own means of economic protection following a loss of income. Knowing that one will not need to rely solely or mainly on private means, individuals are more likely to be willing to accept material sacrifices for environmental protection, as such sacrifices are less likely to be considered a risk to their future subsistence. Thus, by lessening the risks associated with the acceptance of material sacrifices, greater social insurance generosity is likely to make people more inclined to accept material sacrifices than they otherwise would be. This can be referred to as the *assurance effect* of social insurance generosity.

As protection is provided in the form of insurances, the assurance effect is likely to extend beyond those who are in direct receipt of support, with the overall level of social insurance generosity in a society having an effect on the attitudes of the general population.

- Hypothesis 1a: the overall level of social insurance generosity is positively associated with attitudes towards accepting material sacrifices for the sake of environmental protection among the general population.

Furthermore, the assurance effect of individual social insurance programmes can also be thought to affect the attitudes of social groups who are most likely to use them for support in case of a loss of earnings. For sickness insurance schemes, this concerns the working population. For unemployment insurance schemes, the working population and the unemployed.

- Hypothesis 1b: sickness insurance generosity is positively associated with attitudes towards accepting material sacrifices for the sake of environmental protection among the working population.
- Hypothesis 1c: unemployment insurance generosity is positively associated with attitudes towards accepting material sacrifices for the sake of environmental protection among the working population.
- Hypothesis 1d: unemployment insurance generosity is positively associated with attitudes towards accepting material sacrifices for the sake of environmental protection among the unemployed.

Another relevant social group are retirees. Many retirees are likely to be senior citizens. It is possible that they, because of their age, may be less inclined to accept material sacrifices for protecting the environment than others. Investments in environmental protection are generally paid for by currently living generations. Yet, the benefits of these investments may only arise many years into the future. Due to their shorter remaining life spans, senior citizens may profit less from these future benefits. It is therefore possible that retirees may value their own material conditions over environmental protection, regardless of the level of social insurance generosity provided to them. Yet, it is also possible that pension insurance generosity may affect the attitudes of retirees in the same way as it is thought to effect other social groups, namely by providing them with a form of assurance that make them more willing to accept sacrifices. Thus, in line with the general theoretical argument of the study, it is hypothesised that the generosity of pension insurances will have a positive effect on the attitudes of retirees.

- Hypothesis 1e: pension insurance generosity is positively associated with attitudes towards accepting material sacrifices for the sake of environmental protection among retirees.

Furthermore, it is possible that the generosity of social insurance programmes has a distinct effect on the attitudes of low-income households. As low-income

households may experience a greater increase in their relative economic margins with higher levels of social insurance generosity, they may also experience a stronger sense of assurance compared to other households. Based on this, the following hypothesis if formulated.

- Hypothesis 2: social insurance generosity is positively associated with attitudes towards accepting material sacrifices for the sake of environmental protection, particularly among low-income households.

Data

The hypotheses presented above are tested with individual-level data from the ISSP 2010 Environment module III, data file version 3.0.0 (ISSP Research Group, 2019) and country-level data on social insurance programme generosity from CWEP, version 2022-01 (Scruggs, 2022a). The ISSP Environment module is a cross-national social survey focusing on individual-level attitudes towards environmental issues. Data is collected at the household level with adults as the target population. Data for the Environment module III was collected between 2010 and 2012 using self-completion questionnaires, face-to-face interviews, or both. Respondents were chosen using a systematic multistage random sampling procedure, with no two respondents from the same household in the same sample. The full sample contains 26,510 individual observations from nineteen countries (listed below in Table 1). Information on the number of individual-level observations per country can be found in Table S1 in Appendix. Survey data for the United Kingdom refers to the area of Great Britain. Although relatively dated, the ISSP Environment module III offers one of the most comprehensive international survey datasets on attitudes towards material sacrifices which also include extensive background information on respondents.

CWEP contains cross-country comparative information on the provision of rights-based national social insurance benefit programmes in advanced industrialised countries. It contains information on a variety of institutional characteristics related to the provision of social insurances, including multidimensional measures specifically designed to capture the generosity of insurance programmes. Originally developed to replicate the indicators on decommodification used by Esping-Andersen (1990), it is considered a primary source of data on quantified legislated social rights (Bolukbasi & Öktem, 2018; Scruggs, 2007; Scruggs & Ramalho Tafoya, 2022). It offers state-of-the-art tools for analysing social insurance characteristics and has been widely used in empirical research on social inequality and welfare states (CWED, 2017; Scruggs, 2022b; Scruggs & Ramalho Tafoya, 2022).

CWEP data with sufficient coverage and quality is available for the following nineteen countries: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Japan, the Netherlands, New Zealand, Norway, Portugal, South Korea, Spain, Sweden, Switzerland, the United Kingdom and the United States. Data refers to the year 2010. While the inclusion of additional countries in the analysis would be desirable, the given selection include high-income countries with high living standards and social insurance systems that vary in terms of generosity (see Figure 1), making them interesting and relevant cases to study.

Table 1. Willingness to accept cuts in one's living standard in order to protect the environment. Number of observations, mean value and standard deviation, per country. Variable values range from (min) 1 to (max) 5

	Observations	Mean value	Standard deviation
Australia	1,909	2.70	1.21
Austria	978	3.12	1.14
Belgium	1,092	2.84	1.09
Canada	963	2.91	1.15
Denmark	1,235	3.11	1.02
Finland	1,161	3.00	1.06
France	2,188	2.77	1.20
Germany	1,335	2.97	1.11
Japan	1,265	2.61	1.10
Korea (South)	1,559	2.97	1.20
Netherlands	1,406	3.12	1.17
New Zealand	1,138	2.78	1.15
Norway	1,328	2.99	1.07
Portugal	1,007	2.54	1.25
Spain	2,480	2.72	1.15
Sweden	1,142	3.06	1.11
Switzerland	1,206	3.49	0.95
United Kingdom	885	2.42	1.14
United States	1,374	2.73	1.26
Total	25,651	2.88	1.16

Source: ISSP Research Group (2019). Missing values not included.

The study also include data on country level economic conditions sourced from the World Bank database (World Bank, 2022), described below. Descriptive statistics for the variables included in the study can be found in Table S2 in Appendix.

Operationalisation of variables

Willingness to accept material sacrifices for environmental protection

Willingness to accept material sacrifices for the sake of environmental protection is measured using a survey item from the ISSP. The measure is constructed from the survey question: 'And how willing would you be to accept cuts in your standard of living in order to protect the environment?'. Responses are captured on a

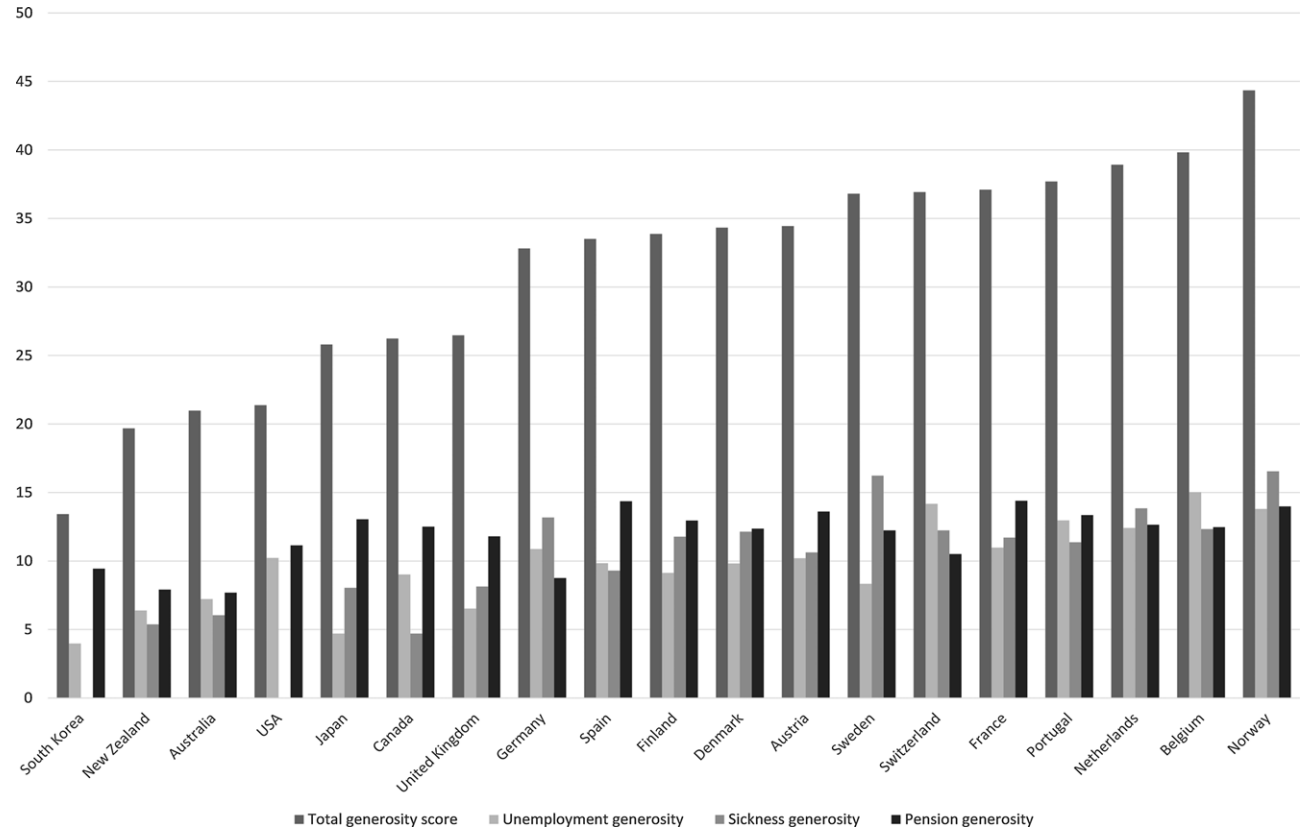

Figure 1. Social insurance generosity index values for countries included in the study.
Source: Scruggs (2022a)

five-point Likert scale with values ranging from 1 to 5: (1) very willing, (2) fairly willing, (3) neither willing nor unwilling, (4) fairly unwilling, and (5) very unwilling. The original values have been reversed so that a higher value indicates a greater willingness. Table 1 shows descriptive statistics for the dependent variable.

Prior studies on attitudes towards material sacrifices have mainly focused on attitudes towards accepting higher taxes or consumer prices for environmental protection (e.g. Fairbrother, 2013, 2016, see also Fairbrother, 2022; Davidovic et al., 2020). Less is known about attitudes towards other forms of sacrifices, including reductions in living standards. Still, the survey item has been used in previous research as an indicator on willingness to accept economic or material sacrifices for the sake of environmental protection (e.g. Harring, 2013; Lo, 2016; Franzen & Meyer, 2010). Admittedly, the measure is problematic as an indicator on the willingness to accept material sacrifices; the survey question does not make clear if 'standard of living' concerns solely material aspects, and respondents may interpret it as referencing also intangible aspects. Furthermore, the nature and the size of the cuts are not specified, leaving it up to the respondent to make their own assumptions as to what it may entail. Moreover, the survey question does not make explicit if it involves coercive or voluntary measures. Yet, as the question contains no reference to legislative or other regulatory measure, it seems likely that respondents will primarily consider it voluntary in nature. This distinguishes it from other forms of sacrifices, such as environmental taxes, which impose specific and compulsory regulation and imply high levels of state intervention (see Jones et al., 2009).

Social insurance generosity

Social insurance generosity is measured using information from CWEP (Scruggs, 2022a) on the provision and structure of three social insurance cash benefit programmes, provided at the country level: unemployment insurance, sick pay insurance, and pension insurance. The generosity of the three social insurance programmes is measured in the form of cross-country comparative indices: the unemployment insurance generosity index, the sick pay insurance generosity index, and the pension insurance generosity index. The indices combine information on payment levels, duration periods, qualifications criteria, and the share of the population covered by the different insurance programmes in each country, respectively.

In addition to providing programme specific indices, CWEP also provides a cross-country comparative index measuring the total social insurance generosity of each country, the total social insurance generosity index. The total social insurance generosity index is produced by adding together the values of each of the three programme specific indices for each country. All four indices will be used in this study as indicators on social insurance generosity. The total social insurance generosity index will be used as a measure of overall social insurance generosity. For all indices, a higher value indicates greater generosity. For additional information on the indices and CWEP data, see Table S3 and Notes on CWEP data in Appendix. Figure 1 shows the generosity index values for the countries included in the study.

The insurance programmes in this study have considerable reach: they constitute the bulk of welfare spending in developed democracies and their beneficiaries represent the more than 75% of the eligible population (Scruggs & Ramalho Tafoya, 2022). However, it should be noted that other types of welfare state support may also be of importance for people's sense of assurance, including social assistance, family benefits and various non-cash benefits and services (Jensen, 2008; Kautto, 2002).

As described in the section on prior research, measuring the generosity of social insurance programmes requires a combined assessment of income replacement levels, duration periods, programme coverage levels, and eligibility criteria. The CWEP indices are highly suitable for this purpose. Yet, as aggregate measures, the indices do not provide information on the effect specific programme characteristics may have on attitudes. This should be kept in mind.

Working, unemployed, and retirees

In order to assess the relationship between social insurance programmes and the attitudes of specific segments of the population, I divide the sample into subpopulations based on respondent's self-reported labour market status in the ISSP data: working, unemployed or retired.[3]

Household income

The ISSP contains information on respondent's net household *income* reported in country specific currency. In order to obtain a cross-country comparative measure of income, the income measure has been transformed in the following ways. First, the income measure has been adjusted to account for the number of household members by dividing each observation by the square root of the number of household members, providing a representative measure of net household income adjusted for household size. Second, the measure has been z-standardised. Z-standardisation produces a series of z-scores that describe a respondent's income position relative to the country mean income, thereby providing a cross-country comparable measure of the respondent's relative income. Third, since z-standardisation produces negative values for respondents whose income fall below the country mean, the standardised values have been transformed into positive values (leaving the relative differences in income levels intact), allowing for the values to be logarithmised. Fourth, the income values have been logarithmised to account for outliers. Lastly, the income measure has been divided into quintiles. The first income quintile, the 20% of the households with the lowest income, are considered low-income households in the analysis.

Control variables

I control for *country level economic conditions* using two measures (see Gelissen, 2007; Harring, 2013) – GDP per capita in 2010 (in constant 2017 international dollars), and the average annual GDP per capita growth for the five preceding years (2004–2009). I control for economic growth because perceptions of general economic conditions are likely to be effected by economic trends (De Vries et al., 2018; Okolikj & Hooghe, 2022). The measure of GDP per capita has been

logarithmised. Data on GDP per capita for 2010 and average annual GDP per capita growth for 2004–2009 have been sourced from the World Bank database (World Bank, 2022).

According to the literature, gender, age, and education are likely to be relevant individual-level control variables (Gelissen, 2007; Harring, 2013; Jones et al., 2009). I control for these using ISSP data. *Gender* is coded as either (0) male or (1) female. *Age* is measured in years, with the sample restricted to individuals 18 years of age or older.[4] I also include a measure of age as a squared variable. *Education* is measured by the respondent's highest educational degree, values ranging from 1 to 4: (1) no formal education or still in school, (2) primary education, (3) secondary education, and (4) university education.

Method

I test the study's hypotheses using multilevel regression analysis (Gelman & Hill, 2006), examining the association between social insurance generosity and attitudes towards accepting material sacrifices for the sake of environmental protection across different social groups.

As a method, multilevel regression modelling has the advantage of allowing regression parameters to vary across countries, making it possible to assume that countries have different mean values when it comes to the willingness to accept material sacrifices for environmental protection (random intercepts) and that the effects of different predictors (the generosity of social insurance systems) may vary cross-nationally (random slopes). I use cross-level interactions to analyse the association between the generosity of social insurance programmes (at the country level) and the attitudes of low-income households (at the individual level). Design weight and weights intended to adjust for non-response bias provided in the ISSP data file has been applied in the analysis in order to make country samples more representative.

See Notes on method in Appendix for additional methodological information.

Results

The results of the regression analysis are presented in Tables 2 and 3. Model 1 in Table 2 shows the results for the association between total social insurance generosity and the attitudes of the total population towards accepting material sacrifices for the sake of environmental protection. According to the study's hypothesis 1a, we should expect to find a positive association between total insurance generosity and the attitudes of the general public. And this is also what the results show: there is a statistically significant and positive association between generosity levels and attitudes ($p < 0.05$, model 1) towards accepting material sacrifices for environmental protection. The estimate implies that the difference between a country with the lowest (13.4, South Korea) and the highest (44.3, Norway) level of total social insurance generosity equals a change in 0.4 units on the dependent variable, whose values range from 1 (very unwilling) to 5 (very willing). This may be compared to the estimated association between education and attitudes towards accepting material sacrifices (Model 2, Table S4 in Appendix). Moving

Table 2. Willingness to accept material sacrifices for the sake of environmental protection. Total social insurance generosity, sickness insurance generosity, and unemployment insurance generosity; total and working population. Weighted data

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Population	Total	Total	Working	Working	Working	Working
Total Social Insurance Generosity Index	0.013* (0.0053)	0.014* (0.0059)				
Low-income household X Total Social Insurance Generosity Index		−0.0073 (0.0049)				
Sickness Insurance Generosity Index			0.024*** (0.0062)	0.025*** (0.0062)		
Low-income household X Sickness Insurance Generosity Index				−0.0093 (0.015)		
Unemployment Insurance Generosity Index					0.031* (0.016)	0.028∼ (0.016)
Low-income household X Unemployment Insurance Generosity Index						0.021** (0.0074)
Low-income household	−0.045 (0.043)	0.18 (0.17)	−0.0064 (0.049)	0.077 (0.17)	−0.0080 (0.049)	−0.21** (0.079)
Controls added	✓	✓	✓	✓	✓	✓
Constant	−4.35∼ (2.48)	−4.32∼ (2.53)	−4.09 (2.86)	−4.04 (2.89)	−3.66 (2.64)	−3.64 (2.60)
Var (Constant)	0.026*** (0.0038)	0.026*** (0.0038)	0.026*** (0.0041)	0.027*** (0.0042)	0.029*** (0.0036)	0.029*** (0.0036)
Var (Residual)	1.29*** (0.022)	1.29*** (0.022)	1.24*** (0.024)	1.24*** (0.024)	1.24*** (0.024)	1.24*** (0.024)
Countries	19	19	19	19	19	19
Individuals	20,412	20,412	12,068	12,068	12,068	12,068
Degrees of freedom	8	9	8	9	8	9
ICC	0.020	0.020	0.021	0.021	0.023	0.023
AIC	63,149.6	63,143.6	36,877.4	36,877.5	36,878.9	36,876.3
BIC	63,236.8	63,238.7	36,958.8	36,966.3	36,960.3	36,965.0
Log likelihood	−31,563.8	−31,559.8	−18,427.7	−18,426.7	−18,428.5	−18,426.1

Standard errors in parentheses. Dependent variable: willingness to accept cuts to one's level of living standard in order to protect the environment (0-5).
$\sim p < 0.10$, $^{*}\ p < 0.05$, $^{**}\ p < 0.01$, $^{***}\ p < 0.001$.

Table 3. Willingness to accept material sacrifices for the sake of environmental protection among unemployed and retirees. Unemployment insurance generosity and pension insurance generosity; unemployed population and retired population. Weighted data

	Model 1	Model 2	Model 3	Model 4
Population	Unemployed	Unemployed	Retirees	Retirees
Unemployment Insurance Generosity Index	0.0390~ (0.0202)	0.0719* (0.0283)		
Low-income household X Unemployment Insurance Generosity Index		−0.0663* (0.0292)		
Pension Insurance Generosity Index			0.0410 (0.0252)	0.0298 (0.0324)
Low-income household X Pension Insurance Generosity Index				0.0421 (0.0341)
Low-income household	−0.00678 (0.0915)	0.659* (0.302)	−0.0707 (0.0724)	−0.592 (0.425)
Controls added	✓	✓	✓	✓
Constant	−0.551 (2.214)	−0.735 (2.253)	−9.341** (3.275)	−9.088** (3.307)
Var (Constant)	0.00396*** (0.00277)	0.00377*** (0.00281)	0.0297*** (0.00542)	0.0321*** (0.00614)
Var (Residual)	1.470*** (0.0325)	1.464*** (0.0317)	1.264*** (0.0209)	1.262*** (0.0207)
Countries	19	19	19	19
Individuals	923	923	4248	4248
Degrees of freedom	8	9	8	9
ICC	0.00269	0.00257	0.0230	0.0248
AIC	2999.4	2997.6	13,104.6	13,103.1
BIC	3052.5	3055.5	13,174.5	13,179.3
Log likelihood	−1488.7	−1486.8	−6541.3	−6539.5

Standard errors in parentheses. Dependent variable: willingness to accept cuts to one's level of living standard in order to protect the environment (0-5).
~ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

from the lowest level of education to the highest level of education is associated with an increase in 0.48 units on the dependent variable. In other words, a move between the endpoints of total social insurance generosity corresponds to a change in the dependent variable of similar magnitude as a shift between the endpoints in education.

Similar results are also found for other insurance programmes, confirming the study's hypotheses 1a–1d. There is a positive association between the generosity of sickness ($p < 0.01$, model 3) and unemployment insurances ($p < 0.05$, model 5) on the attitudes of the working population. Moreover, there is also a positive association between the generosity of the unemployment insurance and the attitudes of the unemployed ($p < 0.10$, Table 3, model 1). The estimate suggests that

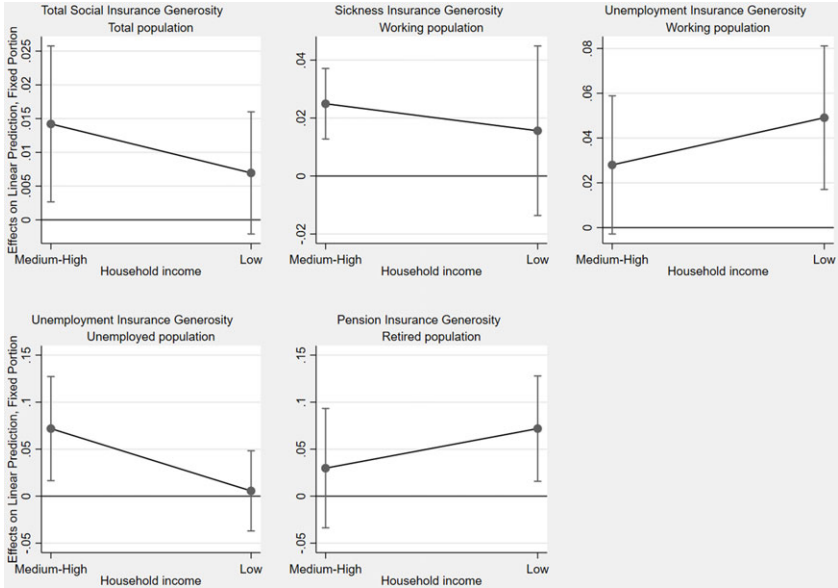

Figure 2. Average marginal effects of social insurance generosity for medium-high- and low-income households, with 95% CI.

the average difference in attitude for a worker in a country with the lowest level of sickness insurance generosity compared the highest level is about 0.4 units on the dependent variable. For unemployment insurance the difference is slightly smaller for the same population, about 0.35 units on the dependent variable. Taken together, these results suggest that there is a positive effect of the total level of social insurance generosity in a society on the attitudes of the general population, and of the generosity of sickness and unemployment insurance programmes on the attitudes of workers and the unemployed.

However, not all results are in line with the study's expectations; hypotheses 1e and 2 are not supported by the results. The results show no significant association between the generosity of the pension insurance and attitudes of retirees (Table 3, model 3). Additionally, in general, there does not appear to be a stronger positive effect of insurance generosity on the attitudes of low-income households. Although the results show a stronger positive association between unemployment insurance generosity and the attitudes of low-income working households compared to medium-high income households (Table 2, model 6), this result is not found for other measures of insurance generosity (Table 2, models 2 and 4; Table 3, model 4).[5] Figure 2 show the marginal effects of social insurance generosity on the attitudes of medium-high- and low-income households. As seen there, the differences in effect size across households are small.

What might explain these results? As previously suggested, it is possible that retirees value their own material conditions over environmental protection regardless of the level of social insurance generosity provided to them. Yet, the results for both retirees and low-income households might also be explained by the conditionality of

social insurance programmes and the role they play for different groups. The qualifying criteria for most insurance programmes are tied to employment history, and benefits are often provided at rates below that of the insureds' previous income. Sickness and unemployment insurances mainly function as temporary sources of income for people who are out of work. However, for many retirees, pension benefits are likely to serve as a permanent source of income, yet with benefits provided at a rate below that of their pre-retirement earnings level. Combined with the limited prospects of supplementing pension benefits with additional labour income, pension insurances may not provide retirees with a sense of assurance strong enough to affect their willingness to accept material sacrifices. Similarly, the results for low-income households might also be explained by the conditions pertaining to social insurance programmes. For households with irregular or low income, social insurances may not provide sufficiently high levels of economic protection to provide them with a particularly strong sense of assurance compared to other households.

When applying appropriate tests, there are no evident problems of multi-collinearity.[6] Additional analysis using unweighted data and logarithmised household income as a control variable confirm the results for the main effects in Tables 2 and 3.[7]

Concluding discussion

By and large, the results of this study suggest that publicly provided social insurance can promote the acceptance of material sacrifices for the sake of environmental protection among citizens in high-income countries. The study's analysis reveals a positive association between the overall level of social insurance generosity and the attitudes of the general public towards accepting material sacrifice, as well as between the generosity of specific social insurance programmes and the attitudes of workers and the unemployed. However, the findings also suggest that the effect of social insurance generosity on attitudes vary across social groups and insurance programmes. The generosity of the pension insurance does not appear to have an effect on the attitudes of retirees, nor does the generosity of insurance programmes appear to have a distinct positive effect on the attitudes of low-income households in general.

In comparison to previous research on the relationship between welfare state generosity and environmental attitudes (Parth & Vlandas, 2022), this study has provided comprehensive indicators on the provision of major social insurance programmes to measure welfare state generosity. Within comparative social policy research, this is widely considered an ideal approach for studying welfare state generosity (Scruggs, 2008). Moreover, while previous studies have examined attitudes towards environmentally friendly behaviour in general (Parth & Vlandas, 2022), this study has focused on attitudes towards accepting personal costs to protect the environment. By doing so, the study provides one of the first comprehensive accounts of the effects of welfare state generosity on attitudes towards accepting individual costs for environmental protection.

The analysis provided in this study is closely related to the concept of decommodification (Esping-Andersen, 1990), and the results suggest that

decommodification may facilitate the acceptance of material sacrifices for environmental causes. This is a potentially important finding for policy making; the results indicate that environmental policies requiring material sacrifice may have an easier time gaining acceptance if accompanied by policies of decommodification. By focusing on the interplay between social and environmental protection, the study contributes to the growing field of research examining the relationship between welfare state systems and environmental sustainability (Fritz & Koch, 2019; García-García et al., 2022; Hirvilammi et al., 2023; Koch & Fritz, 2014).

The study has some limitations. First, it is uncertain how respondents interpret the survey question used as the dependent variable regarding accepting cuts to one's level of living standard. Second, the study uses cross-sectional data fielded at one particular point in time and from a limited number of countries. This limits the possibility of empirically assessing the causal relationship between welfare state generosity and attitudes. Future research may want to explore the relationship using longitudinal data and larger sets of cases. Scholars may also want to consider using alternative methods, such as qualitative interviews or survey experiments, to further investigate the connection between assurance and the willingness to accept sacrifices. Moreover, the argument presented in this study represent an attempt at formulating a theory on the relationship between welfare state generosity and attitudes towards material sacrifices for environmental causes. I encourage other scholars to engage with the argument presented in this paper in order to further establish its validity.

Supplementary material. To view supplementary material for this article, please visit https://doi.org/10.1017/S004727942300065X

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Notes

1 As described by Scruggs (2008) public spending data reveal little about the level of social protection provided against social risks. When social spending is measured in relation to the size of the economy (e.g. as portion of GDP), such measures typically do not account for the size of the dependent population, which risks obscuring the extent and level of the protection provided.

2 According to Inglehart, so called post materialistic values have gradually replaced materialistic values in advanced industrial societies (Inglehart, 2008). The aim of this article is not to evaluate Inglehart's argument regarding value change, and space does not allow for a review of empirical research dealing with Inglehart's claim.

3 Working refer to respondents who reported being in paid work as an employee, self-employed, or working for his/her own family's business. Unemployed refer to respondents who reported being unemployed and looking for a job. Respondents who at the time of the survey were temporarily not working because of temporary illness/parental leave/vacation/strike etc., were instructed to report their normal work situation.

4 The sample population has been restricted to respondents age 18 or older (n younger than 18 = 119).

5 Contrary to expectations, the association between unemployment insurance generosity and the attitudes of low-income unemployed households is negative (Table 3, model 2).
6 Except for age and age square, all variables have variance inflation factor (VIF) values below 5. Apart from age and age square, the variable with the highest VIF value is the unemployment insurance generosity index, which has a value of 1.82.
7 See tables S6, S7, S8 and S9 in Appendix.

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