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Solidarity and Self-Interest: Using Mixture Modeling to Learn about Social Policy Preferences

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Abstract

This article addresses the problem of measuring social policy preferences in a valid and reliable way. Scholars have faced a number of challenges in measuring these preferences. First, it is not clear how exactly we should conceive of this domain. Second, the literature presents contradictory findings regarding the effect of contextual factors on policy preferences. Third, abstract preferences regarding the welfare state and information about its performance can affect each other, complicating the attempt to distinguish between the two. Finally, latent manifestations of these preferences might not be equivalent across countries. We develop an approach that validly and reliably measures attitudes about the role of government in addressing inequalities in the market distribution of resources. Mixture modeling and in particular latent class analysis enables us to take advantage of information for multiple countries and survey questions while doing justice to the characteristics of the survey data. Using three waves of the International Social Survey Programme's module on social inequality, we find that preferences towards the market and the role of government in the economy form four distinct clusters of individuals that we refer to as "moderate altruists", "moderate egoists", "extreme altruists", and "extreme egoists". These clusters tend to be homogenous with respect to both abstract notions of the role the government should play in the economy as well as about evaluations of actual performance. The exceptions are the last two survey waves, for which we find that one class exhibits a mixed profile of individuals: solidaristic with respect to some indicators, but self-interested with respect to others.

Keywords: solidarism, self interest, social policy preferences, latent class analysis, mixture modelling

A voluminous social science literature treats solidarism, or care about the well-being of others, as "unpredictable 'social noise'" (Dimick et al. 2018, p. 442). Our study explores how to conceive of this pre-disposition (Cavaillé & Trump 2015; Dimick et al. 2017; Fong 2001). We do this using a latent class modeling framework that considers not only individual and country level determinants of these preferences, but also the equivalence of latent constructs across countries. Our research builds on recent work using categorical variables to capture latent preferences, and provides an approach to deal with lack of independence among some indicators used to represent them. In so doing, we can reveal preferences in a valid and reliable way.

Using three waves of the International Social Survey Programme's module on social inequality, we find that preferences towards the market and the role of government in the economy form four distinct clusters of individuals that we refer to as "moderate altruists", "moderate egoists", "extreme altruists", and "extreme egoists". These clusters tend to be homogenous with respect to both abstract notions of the role the government should play in the economy as well as about evaluations of actual performance. The exceptions are the last two survey waves, for which we find that one class exhibits a mixed profile of individuals: solidaristic with respect to some indicators, but self-interested with respect to others.

The following section discusses the challenges inherent in accurately measuring social policy preferences. In section two, we introduce latent class analysis (a form of mixture modeling) and discuss its advantages over alternatives. We then apply this methodology to the task of revealing preferences in cross-national surveys. Section five examines how robust our results are to alternative classifications. We conclude with some observations for future research.

Measuring Preferences in Survey Research: Empirical Challenges

Scholars have faced a number of challenges in measuring social policy preferences. It is not clear, for example, how exactly we should conceive of this domain. Arts

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and Gelissen (2001) report that attitudes towards "solidaristic" policies cluster in one dimension, implying that individuals either support these policies or oppose them.[1] Alesina and Angeletos (2005) conceive of self-interest and solidarity as a variable that ranges from identifying most closely with a libertarian ideal of markets as natural, efficient, and fair, to believing that markets not always work this way and should not be the sole criterion used to make allocative decisions.

Other work implies that "other-regarding preferences" (Dimick et al. 2018) are not one-dimensional. Jensen and Petersen (2017, p. 68) claim for example that individuals see recipients of health care as deserving compared to recipients of unemployment compensation. Cavaillé and Trump (2015) similarly claim that redistribution can take on two meanings – taking from the rich and giving to the poor. Finally, Rehm et al. (2012, p. 390) find that when asked to evaluate social programs in the abstract, individuals tend to favor them due to loss aversion, the tendency to weigh potential losses in benefits more than potential increases in one's post-tax income.[2]

Scholars are also unsure what effects contextual factors have on policy preferences. Dimick et al. (2017, p. 386) find that "an increase in macro-inequality will lead to more support for redistribution", particularly among the rich.[3] Conversely, Kelly and Enns (2010) and Trump (2018) find that it reduces support (irrespective of income) for this policy (Cavaillé & Trump 2015, p. 157). These findings, however, are based either on experimental data from a few counties or on longitudinal evidence from the United States. Two studies with wide country-year coverage find no effect of country-level inequality on support for redistribution (Breznau and Hommerich 2019; VanHeuvelen 2017).

A final set of challenges concerns the potential for perceptions of how the welfare state is performing to prime abstract preferences about the desirability of social policies. As Trump (2018) notes, perceptions of inequality strongly predict whether individuals see income differences as legitimate. Gimpelson and Treisman (2018, p. 30) cite Niehues (2014) to the effect that "a correlation between perceived inequality and the belief that it" is "too high", as well as between perceived inequality and preferences for redistribution", exists.[4] More specifically, "perceived

1 In social science research, solidarity is defined as concern for one's group (Dimick et al. 2017, p. 387), whether the group is one's class, ethnicity, or nation. Following the literature, we see support for policies such as income redistribution as evidence of social solidarity because these policies can benefit others in addition to oneself or others at one's expense. Below, we also evaluate whether this relationship depends on one's personal income.

2 In Kahneman and Tversky's (1979, p. 279) words, "losses loom larger than gains" in people's minds.

3 See also Schmidt-Catran (2016).

4 Niehues derived these correlations using the same ISSP data for Wave IV that we use here. See Kim et al. (2018) also.

inequality rather than actual inequality significantly affects redistributive preferences" (Choi 2019, 4). The opposite, preferences affecting perceptions, also occurs, as "more anti-redistributive preferences predict believing taxes on high earners are too high." (Gingrich 2014, p. 578).

We need a methodological approach then that empirically allows for the possibility that abstract preferences regarding the welfare state and information about its performance can influence each other simultaneously. This would help us move beyond the current impasse in the literature between standard accounts favoring self-interest and more recent works that also expect individuals to care about others. Before this can happen, however, we need to put solidaristic attitudes on solid empirical ground.

The Latent Class Approach

Scholars study social policy preferences using either a single survey prompt or a latent variable framework. In the latter case, they typically rely on principal component or a similar factor analytic technique. Latent class analysis allows for more flexibility because "there is no need for normality assumptions as there is in factor analysis": "instead of assuming that" [indicator] "variables follow any particular distribution within the classes", "LCA lets the variables follow any distribution, as long as they are unrelated to each other (independent) within classes". (Oberski 2016, p. 7).

The latent class approach is especially useful given recent work demonstrating that the multidimensionality of welfare state attitudes cannot be adequately captured using only linear measurement models (Kulin et al. 2016; Roosma et al. 2013). As these works make clear, individuals vary not only in their preferences regarding what welfare states do, but also in their preferences about what welfare states should do.[5] This is because people are able to distinguish "the welfare state's goals and range" from "it's efficiency, effectiveness, and policy outcomes". (Roosma et al. 2013, p. 235). Accordingly, they could strongly favor the welfare state both con-

5 Individuals, in other words, vary on "the should and is aspects of welfare attitudes" (Roosma et al. 2014, p. 201). This is because "the public has both a relative preference for policy and an absolute preference" (Soroka and Wlezein 2010, p. 25). We don't necessarily see the relationship between the two mechanically, however, as Soroka and Wlezein's "thermostatic model" implies. In this model, the public's relative preference represents the difference between its "preferred level of policy…and the level it actually gets". In reality, individuals rely on heuristic shortcuts to form their views, particularly when demands on their cognitive capacity are high. They thus display what is known as "bounded rationality" (O'Grady 2017). This explains why "preferences for redistribution and social spending", once formed, only change in response to "large changes in economic circumstances" (O'Grady 2017).

cretely and in the abstract, oppose it on both grounds, embrace an ambitious role for social policy in the abstract while being critical about its outcomes, or approve of outcomes while being critical of stated goals. The four possible attitudinal profiles, moreover, can manifest themselves differently across countries.

If, as alluded to above, individuals' perceptions of how the welfare state performs affect their attitudes about what the welfare state should do and vice-versa, we need a methodology that can handle these "possible feedback effects" (Roosma et al. 2014, p. 201).[6] In latent class modeling, interactions between the latent variable and indicator variables, usually omitted, enables consideration of these effects. As noted above, it is usually assumed that the observed indicators are mutually independent (or uncorrelated) conditional on the latent variable (Oberski 2016, p. 11). This requires the omission of all interaction terms between the latent construct and indicator variables (hence the independence assumption). Relaxing this assumption enables consideration of feedback effects by specifying higher order interaction terms. (Magidson & Vermunt 2001, p. 226).

The model essentially asks how likely a subject is to belong to one of N categories in a nominal variable we dub *solidarity*. Individuals are then grouped into exclusive subpopulations "based on similar patterns of observed cross-sectional and/or longitudinal data." (Berlin et al. 2014, p. 175). The resulting classes are "characterized not by exact response patterns but by response *profiles* or typologies described by the relative frequencies of item endorsements" (Masyn 2013, p. 556). Predictor variables can be used to facilitate the placement of observations into classes, in which case the goal is to examine whether covariates can explain "mean differences in outcomes across latent classes" (Berlin et al. 2014, p. 175).

Studying multiple policies and countries can pose problems if latent constructs are non-invariant cross-nationally (Alemán & Woods 2016). To avoid problems with measurement invariance, researchers typically rely on dichotomized versions of survey indicators (VanHeuvelen 2017, p. 49). One advantage of LCA, which has not been widely used to explain social policy preferences, is that it provides a rigorous and systematic framework for investigating construct equivalence (Kankaraš & Moors 2009; Moors 2004). The approach, dubbed "multigroup latent class structure modeling", can easily diagnose and accommodate several forms of parameter heterogeneity.7

In sum, a latent class approach allows us to measure a construct that cannot be perfectly measured while doing justice to the data generating process (Oberski

6 Roosma et al. describe these different dimensions, but not their possible feedback effects.

7 Similar approaches such as multigroup confirmatory factor analysis (MCFA) exist for models with continuous indicator and latent variables. Multigroup latent class structure modeling, however, outperforms its counterparts (Kankaraš et al. 2011).

2016). We believe this method elicits preferences about social policy based on individual characteristics and exposure to varying contexts.

Data Sources and Variables

We use public opinion data from the International Social Survey Programme (hereafter ISSP) to examine whether individuals can be sorted into classes based on their attitudes towards the market allocation of resources and the role of government in molding this allocation. One advantage of the ISSP is that it has carried out periodic surveys of attitudes towards social inequality (the Social Inequality series). These questionnaires, administered in 1987, 1992, 1999, and 2009, target a variety of countries, mostly democracies. We are able to use all survey waves except the third one, which did not provide enough information to standardize the income or earnings of survey respondents. Despite the varying number of countries, years, and individuals surveyed, our goal is to find similarities in this heterogeneity.[8]

Table 1 presents a list of questions that can be used to assess social policy preferences, along with the year(s) the survey wave containing the question was administered. Our choice of questions was motivated by our desire to tap into preferences regarding the goals and capabilities of the welfare state, as well as to evoke assessments of government efforts in targeting particular groups (i.e., the unemployed, the poor, students, the middle class). One advantage of the ISSP is that all questions have the same ordinal ranking, with 1 usually implying strong agreement, 3 neutrality, and 5 strong disagreement. To facilitate analysis and interpretation, we recoded some variables so as to have higher values denote increasing social solidarity or progressivism.[9]

While there is much continuity in questions from survey to survey, some questions are missing from some of the waves.[10] We consider this an advantage since we are trying to estimate attitudes that are latent and as such, do not exhibit a perfect correspondence with our survey instruments.

Of the twelve questions displayed in Table 1, some clearly elicit general beliefs about the fairness of the market mechanism and the role that government plays in shaping it, while others evoke an evaluation of the status quo. We first selected

8 The number of countries in the analysis, which is based on data availability, ranges from five in 1992 to thirty-one in 2009. Appendix A contains a list of countries we studied, organized by wave.

9 Following standard practice, we excluded from the analysis respondents who are unsure or uncooperative.

10 We were able to use most questions fielded, except for those which contained more missing than complete observations – poor and unemployed in Wave II and university in Waves II, III, and IV. The percent of missing observations for unemployed in Wave II, for example, is 88.67, while for poor it is 88.77.

Table 1 Indicators of solidarity/self-interest

Question	Variable name	Years asked
It is the responsibility of the government to reduce differences in income between people with high incomes and people with low incomes[11]	government responsibility	1987, 1992, 2009
The government should provide a decent standard of living for the unemployed	unemployed	1987, 2009
The government should provide more chances for children from poor families to go to university	university	1987
The government should provide a job for everyone who wants one	job guarantee	1987, 1992
The government should provide everyone with a guaranteed basic income	basic income	1987, 1992
Is it just or unjust - right or wrong - that people with higher incomes can buy better health care than people with lower incomes?	private health care just	2009
Is it just or unjust - right or wrong - that people with higher incomes can buy better education for their children than people with lower incomes?	private education just	2009
The government should spend less on benefits for the poor	poor	1987, 2009
Differences in income in [respondent's country] are too large	income differences	1987, 1992, 2009
Generally, how would you describe taxes in [respondent's country] today for those with high incomes?	top taxes	1987, 1992, 2009
Do you think people with high incomes should pay a larger share of their income in taxes than those with low incomes?	progressive taxation	1987, 1992, 2009
Inequality continues to exist because it benefits the rich and powerful	inequality helps the rich	1987, 1992

questions that we thought tap abstract attitudes and perceptions, moving then to those that seem to elicit a comment on the status quo. The first seven questions evoke abstract beliefs about economic fairness while questions eight through ten are evaluative. Based solely on their phrasing, question eleven seems to probe abstract attitudes towards inequality and redistribution, while question twelve lends itself to both kinds of interpretation.

Existing studies provide a mixed picture regarding the effects of demographic variables on social policy attitudes (Breznau 2010, p. 476). We control for these characteristics since they are standard in the public opinion literature. We also control for several country-level variables that have featured prominently in the literature.

Sex is a dichotomous variable taking the value of 1 for females and 0 for males. In the literature, men are generally shown to exhibit less solidarity than women.

Age ranges vary by survey wave but for the population as a whole it is a continuous variable ranging in value from 15 to 98.

Education. Competition from immigrants may cause workers with little education to oppose programs that could be construed as enhancing the labor market prospects of other similarly skilled workers (Alt & Iversen 2017, p. 21; Kunovich 2009, p. 575). An additional factor bearing on the preferences of dissimilarly educated workers is the extent to which education increases class solidarity. As Kunovich (2009, p. 575) notes, "[i]ndividuals with greater cognitive skills (i.e., more education) … can better imagine belonging to larger groups". This implies a positive correlation between education and solidaristic attitudes.

The literature on the link between labor market risks and welfare state attitudes, however, makes a convincing case that better-educated individuals have more skills, which could imply that they have more stable income streams, anticipate upward mobility more, and need social policies less (O'Grady 2017, p. 5). This raises the possibility that education increases self-interest and vice versa (Alesina & Giuliano 2011, p. 21; Breznau 2010, p. 461; Gimpelson & Treisman 2017, p. 19).

In Wave I, education is a categorical variable with nine categories ranging from "None, still at school" to "Complete University", with adjustments in the number of categories made for certain countries reflecting variation in educational systems around the world. In Wave II, education refers to years of schooling, which is a continuous variable. In Wave IV, education is a categorical variable with 'no formal qualification' as the first category followed by 2) lowest formal qualification; 3) above lowest qualification; 4) higher secondary level completed; 5) above higher secondary level; and 6) university degree completed.

Personal income. The median voter theory (Meltzer & Richard 1981), the bedrock of much political economy work, predicts a negative relationship between pretax and -transfer income and demand for redistribution. We thus expect that "the (relatively) poor support redistribution more than the (relatively) rich" (Dimick et al. 2017, p. 386).

11 According to Choi (2019, p. 15), this is "the most widely used measure of redistributive preferences in empirical studies."

The ISSP provides two measures of personal well-being, one labeled "family income" and the other "earnings". For some countries the measures refer to pre-tax and -transfer earnings and for others to net income. Whether individuals correctly perceive their income as being pre-tax and -transfer or net is questionable, but this is not likely to bias the results unless these perceptions are non-randomly distributed. In addition, in some countries individuals were asked to report monthly, in others yearly amounts. Finally, the precise amounts reported by survey participants in Waves I and II contains a lot of missing data.

We could use self-reported social class in lieu of a more objective measure of welfare. Subjective measures, however, "also capture psychological elements besides actual income" (Midtbø 2017, p. 6). This poses a problem if the two vary greatly or in ways that are unknown across countries. In all three survey waves we study, moreover, earnings and family income are moderately correlated, while subjective social class correlates weakly with both. A measure in Waves I and II that provides income and earning brackets for respondents to choose from is more complete. For these waves, we thus follow Dimick et al. (2018) in creating two variables using the robust Pareto midpoint estimator (von Hippel et al. 2016). These variables contain the midpoint yearly income and earnings corresponding to each reported category, "while the value for the final open-ended bin is imputed from a Pareto distribution" (Dimick et al. 2018, p. 452). Since the amounts reported are in local currencies, we calculated standard deviations from the country mean and used those in our models (Dion & Birchfield 2010, pp. 321-322; Rehm 2011, p. 279). For Wave IV, we are able to use the income and earnings figures individuals reported.[12]

Redistribution. Spending (of tax receipts) by governments on social programs accounts for much of the variation across democracies in "redistributive effort". "Spending questions [...however,] ask people about priorities relative to very different national baselines." (Rehm 2012, p. 399). What is needed then is a measure of relative redistribution, or absolute redistribution divided by market inequality. Our measure of income redistribution is thus the reduction in the Gini coefficient due to taxes and transfers as a ratio of this coefficient (Solt 2016).

GDP per capita. Individuals in less developed and highly unequal societies seem more concerned with the needs of others than their counterparts in more developed and egalitarian societies (Dion & Birchfield 2010; VanHeuvelen 2017). Fong (211, p. 242) similarly claims that perceived poverty increases support for redistribution among high-income earners. To assess the effect of development on attitudes towards social policy, we use a measure of real GDP in 2011 US dollars given in purchasing power parity (or PPP) terms. We divide this measure by a country's population to obtain per capita measures. The Penn World Table (Feenstra et al. 2015) is the source for these variables.

12 One benefit of having income and earnings data in local currencies is that this method of accounting minimizes errors.

Economic growth. Economic growth could facilitate solidaristic tendencies by making people better off. If a majority believe, however, "in insuring industrious people against bad luck, but not providing unconditional assistance to the poor if their condition is due to idleness" (Fong 2001, p. 242), individuals may be less likely to care for others when they regard the economic environment as good. We represent economic growth using a measure of inflation-adjusted growth in GDP per capita from the World Development Indicators (World Bank 2017).

Unemployment rate. Some have claimed that unemployment should increase support for welfare policies (Breznau 2010, p. 13; VanHeuvelen 2017, p. 45). Wehl (2018) however finds that unemployment does not significantly explain support for labor market policies. VanHeuvelen (2017) also found that unemployment does not significantly increase support for redistribution. Our variable refers to those who are unemployed in a given year as a share of the active labor force. This data, originally compiled by the International Labor Organization, was similarly derived from the WDI dataset.

Employment status. An important question is whether employed and unemployed respondents regard social policy in a similar fashion. Some have claimed that the employed, also known as insiders in countries with labor market dualities and high unemployment, favor government programs that insure or redistribute income if the beneficiaries are insiders like themselves and not the unemployed (Moene & Wallerstein 2001, 2003; Rueda 2007).

Church attendance. An important literature has claimed that religiosity makes individuals disapprove of social insurance even when they stand to benefit from it (De la O & Rodden 2008; Scheve & Stasavage 2006). Poor religious voters accordingly prioritize moral issues. This could make these individuals appear less solidaristic than secular ones.[13] Breznau (2010, p. 474) found, however, that church attendance had "little to no influence on [welfare] policy preferences". We evaluate these expectations using a question about the frequency of attending religious services. For Waves I and II, we use a categorical variable with six categories, whereas in Wave IV the same variable contains eight categories.

Partisanship. A large literature has claimed that "Left-Right placement bundles together a variety of policy attitudes and value orientations … the strongest of which are attitudes connected to the extent of state involvement in the economy and the limits to redistribution" (Bosancianu 2017, p. 1592). We thus include in our models a measure of partisan affiliation that ranges from far-left to far-right and also includes choices for "Other, no specific party" and "No party preference".

13 Aversion to social insurance, however, should not be taken to imply that religious individuals cannot behave altruistically by, for example, donating money to their churches or other charities. Logically speaking, these individuals could be very altruistic in the private sphere, while opposing government social programs on principle and/or based on their performance.

Before reporting our findings, we note that for Waves I and IV, values are given for 1986 and 2008 respectively. For Wave II, because the year of fieldwork was in some cases 1993 and in one case 1991, values given for the variables are for 1992. Regarding our specifications, due to the ordered and categorical nature of our indicators, we use ordered logistic regression for the measurement portion of the model. The probability of placing in one of the classes is modeled using multinomial logistic regression. We use sampling weights to account for over- and under-sampled observations.[14]

Exploratory Analysis

We begin by noting that we follow a specific model development strategy before settling on our preferred specification (Vermunt & Magidson 2005, p. 43). First, we estimate unconditional models (or models without covariates) with 2, 3, and 4 latent clusters. We then add covariates to these models (conditional estimation) to improve model fit. At every step, we examine the log likelihood (LL) and the Bayesian Information Criterion (BIC) for information on parsimony and fit, respectively. Generally speaking, lower values for these statistics indicate a better fit.

For all three waves, a model with 4 clusters fits the data best, as evidenced especially by the BIC. Adding covariates also led to large reductions in this statistic, confirming their role in helping to measure the latent variable. For all waves, we also explored construct equivalence. As Nagelkerke et al. (2016) point out, the assumption of unit independence is automatically violated when observations are nested in groups, as in many studies featuring surveys conducted in multiple countries. In this case, it is important "to detect misfit that originates from the model not fitting particular groups as well as others." (Nagelkerke et al. 2016, p. 255). Nagelkerke et al. define a between-group bivariate residual that is calculated by using the grouping variable as a nominal covariate with its effect set equal to 0 (Vermunt & Magidson 2016, p. 121). The model is then estimated and residuals examined between pairs of indicator variables, pairs of covariates and indicators, and between the grouping variable and indicators. The latter in particular can be evaluated for evidence of parameter heterogeneity across countries.

> "[L]arge residuals indicate large direct effects of particular group variables…If…large residuals are associated with group variables, an appropriate strategy is to include the direct effects of the group variable with the largest residuals, re-estimate the model and check the updated residuals after this new model is estimated. This procedure can be repeated until all

14 The variables used for weighting are *v107*, *v176*, and weight respectively.

> of the residuals between group variables and response variables become small." (Moors 2004, p. 309).

In Wave I, all ten bivariate residuals between the grouping variable and indicators exceeded 3.84.[15] In Wave II's case, 4 out of 7 bivariate residuals exceeded this value. For Wave IV, the number is 8 out of 8. We thus concluded that there was significant country-level heterogeneity in parameters in all three specifications. Consequently, we proceeded to explore the possibility of modeling this heterogeneity using various kinds of random effects/multilevel models (Henry & Muthén 2010; Vermunt 2003). Once again, a multilevel model can be compared to a model without random effects using the LL and BIC test statistics.

The simplest random effects specification is a parametric model in which intercepts for the latent classes are allowed to vary randomly. In these models, the individual-level latent classes vary in size by country, but all other parameters are "fixed". The random effects themselves follow a continuous distribution of means across groups. There is also a non-parametric version of this model which conceives of countries not as continuous random means, but as belonging to a smaller set of discrete groups that in turn affect the intercepts of the individual classes (Henry & Muthén 2010). The grouping of countries in the varieties of capitalism literature offers an example of the ways in which countries could be modeled in the level 2 analysis (as liberal or coordinated market economies) (e.g., Larsen 2008). In this case, at least two country-level classes need to be specified. Figure 1 provides a visual summary of our 4-cluster solution for the indicator variables in Wave I.

As Figure 1 indicates, four classes are clearly delineated in the ten indicator variables used to measure attitudes towards social policy in Wave I. The cluster comprising the most members is Cluster 1, which appears to be composed of individuals who are moderately solidaristic. The second largest cluster is reserved for moderately self-interested individuals, with "extreme egoists" and "extreme altruists" a distant third and fourth places respectively. This plot confirms what scholars have recently observed, that the welfare state in advanced capitalist democracies is popular (Roosma et al. 2013) and that this is in part due to loss aversion (Rehm et al. 2012). The best fitting model for Wave I, it turns out, is a non-parametric estimation with two country-level latent classes affecting the intercepts for the individual level classes. It is not hard to see how this would occur in a model where *education* does not have a uniform number of categories across countries.

It is important to note that for the tables that follow, a positive coefficient implies that a particular variable is more likely to place/keep individuals in a certain class, whereas a negative one indicates that the variable is likely to place individuals in a different class. Table 2 presents the results for Wave I.

15 "For 1 degree of freedom effects, bivariate residuals larger than 3.84 indicate statistical significance at the .05 level. (Vermunt & Magidson 2005, p. 125).

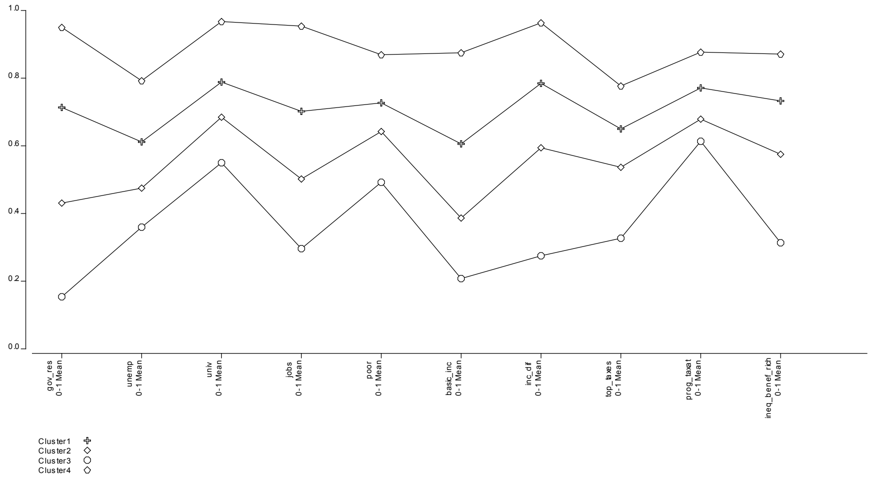

Figure 1 Profile plot of cluster solution for the latent class analysis of Wave I

As Table 2 indicates, specifying random effects is warranted – level-2 classes affect intercepts for individual-level clusters in a statistically significant way. In our discussion of these individual-level results, we speak primarily about Cluster 1, the largest class of individuals. As Table 2 indicates, all covariates significantly explain placement into a particular class. As expected, *females*, those with little education, the *unemployed*, those who lean left ideologically, and the less well-off tend to be more solidaristic than *males*, those who are more educated, the *employed*, the better off economically, and right of center individuals. Regarding the country level variables, *economic growth* and *redistribution* are negatively associated with social solidarity while *unemployment* has a positive association. Contrary to claims made recently regarding the effect of religiosity on preferences towards social policy (De la O & Rodden 2008; Scheve & Stasavage 2006), we find that more religious individuals exhibit more social solidarity than less religious ones. Finally, the *age* of the respondent is not predictably associated with a particular orientation across clusters.

Table 2 also provides a model for the indicators with an R^2 that captures how well the latent variable explains these. There is evidence that the latent variable is primarily picking up attitudes about income differences and what role the government should have, if any, in reducing them because *government responsibility* and *income differences* have the highest R^2s. *Government responsibility* elicits abstract preferences or attitudes about the welfare state, while *income differences* is a comment on the status quo.

Similar to Wave II, a model with four clusters is more parsimonious and fits the data best in the case of Wave II. This time, however, the addition of random parameters does not bring about an improvement over our baseline model. As a result, we retain a model with 4 clusters whose main difference with respect to Wave I is that there is now a group of individuals (Cluster 4) who exhibit a mixed attitudinal profile: they are rather self-interested in their conception of what the welfare state should do (reduce income differences and guarantee everyone a job and a basic income), but progressive in their evaluation of its results. Once again, "moderate altruists" lead in numbers, but "moderate egoists" do not make up the second most numerous class. Instead, Cluster 2 is composed of individuals who are very self-interested, followed by individuals who are very solidaristic (Cluster 3). Figure 2 provides a visual summary of the solution for Wave II.

Table 2 Multilevel LCA of attitudes towards social policy in seven countries (1987)

Model for Indicators	Wald	p-value	R^2
government responsibility	208.971	0.000	0.584
unemployed	17.147	0.001	0.200
university	187.976	0.000	0.243
jobs	195.038	0.000	0.379
poor	143.626	0.000	0.145
basic income	53.053	0.000	0.367
income differences	168.399	0.000	0.540
top taxes	50.525	0.000	0.189
progressive taxation	123.203	0.000	0.164
inequality benefits the rich	87.934	0.000	0.307

Model for Clusters Intercept	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Wald	p-value
N	1404	1318	450	321		
group class 1	3.009	0.651	-3.744	0.084	163.092	0.000
group class 2	2.351	1.086	-2.474	-0.963	144.747	0.000
Covariates						
sex						
male	-0.138	-0.059	0.311	-0.114	148.023	0.000
female	0.138	0.059	-0.311	0.114		
age	-0.008	-0.007	0.009	0.006	23.450	0.000

education						
none/still at school	0.816	-0.061	-1.432	0.677	109717.219	0.000
	0.579	0.030	-1.786	1.177		
	0.054	-0.067	-0.348	0.361		
	-0.060	0.125	0.162	-0.226		
	-0.248	0.068	0.433	-0.254		
	-0.127	0.156	0.319	-0.348		
	-0.413	0.042	0.772	-0.401		
	-0.329	-0.170	1.099	-0.600		
complete university	-0.273	-0.123	0.781	-0.385		
Model for Clusters						
Intercept	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Wald	p-value
GDP growth	-0.152	-0.539	-0.813	1.504	120.001	0.000
unemployment	0.011	0.084	0.161	-0.255	143.224	0.000
employment status						
unemployed	0.068	-0.025	-0.518	0.475	85.964	0.000
employed	-0.068	0.025	0.518	-0.475		
income	-0.077	0.121	0.320	-0.363	33.628	0.000
redistribution	-0.012	-0.021	0.001	0.032	52.767	0.000
GDP	0.000	0.000	0.000	0.000	28.592	0.000
partisanship						
far left	4.044	-3.865	-4.311	4.131	110428.720	0.000
left	1.094	0.412	-1.147	-0.359		
center	0.313	0.786	0.523	-1.621		
right	-0.032	0.763	1.256	-1.987		
far right	-6.586	1.949	3.586	1.051		
other, not specified	0.827	-0.392	0.095	-0.530		
no party preference	0.340	0.347	-0.003	-0.684		
church attendance						
once a week	0.114	0.003	-0.376	0.259	41109.523	0.000
1-3 times a month	0.247	0.167	-0.397	-0.017		
several times a year	-0.066	-0.096	0.504	-0.342		
once or twice a year	-0.183	0.088	-0.067	0.163		
less frequently	-0.051	0.027	0.375	-0.351		
never	-0.061	-0.190	-0.039	0.290		
Model for group classes						
Intercept	Class 1	Class 2	Wald	p-value		
	0.5152	-0.5152	1.584	0.21		
Overall N	3345.32					

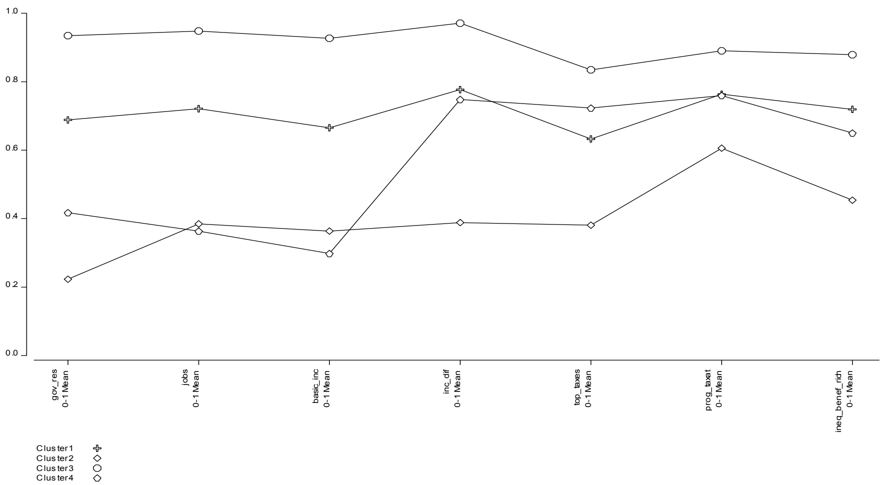

Figure 2 Profile plot of cluster solution for the latent class analysis of Wave II

Other differences between Waves 1 and 2, albeit minor, are that in the latter case an individual's employment status does not emerge as a statistically significant predictor of his/her attitudes about social policy. In addition, both *GDP growth* and personal *income* are associated with moderate social solidarity (they both increase the likelihood of placing in Cluster 1). Table 3 presents the results for this model.

Table 3 Multilevel LCA of attitudes towards social policy in five countries (1992)

Model for Indicators	Wald	p-value	R^2
government responsibility	346.311	0.000	0.559
jobs	402.222	0.000	0.462
basic income	444.764	0.000	0.433
income differences	617.964	0.000	0.498
top taxes	401.919	0.000	0.262
progressive taxation	358.124	0.000	0.208
inequality benefits the rich	321.064	0.000	0.234

Model for Clusters Intercept	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Wald	p-value
N	2872	921	808	753		
	10.567	11.894	-7.418	-15.044	71.550	0.000
Covariates						
sex						
male	-0.125	0.183	-0.163	0.105	37.134	0.000
female	0.125	-0.183	0.163	-0.105		
age	-0.010	-0.005	0.000	0.014	22.072	0.000
education	-0.073	0.122	-0.100	0.051	105.759	0.000
GDP growth	0.834	1.088	0.498	-2.419	107.419	0.000
unemployment	0.163	0.420	0.068	-0.651	30.871	0.000
employment status						
unemployed	0.050	-0.005	0.033	-0.079	3.124	0.370
employed	-0.050	0.005	-0.033	0.079		
income	0.157	0.475	-1.023	0.391	48.010	0.000
redistribution	-0.053	-0.164	0.146	0.071	71.414	0.000
GDP	0.000	0.000	0.000	0.001	146.580	0.000
partisanship						
far left	1.495	-4.760	2.228	1.037	309.598	0.000
left	0.291	0.142	-0.093	-0.340		
center	-0.078	0.849	-0.598	-0.173		
right	-0.553	1.774	-1.028	-0.193		
far right	-0.125	0.641	-0.450	-0.066		
other, not specified	-0.783	0.629	0.261	-0.107		
no party preference	-0.248	0.727	-0.321	-0.158		
church attendance						
once a week	0.101	-0.225	-0.144	0.268	55.588	0.000
1-3 times a month	0.165	-0.244	0.059	0.019		
several times a year	0.049	0.210	-0.176	-0.084		
once or twice a year	-0.032	0.155	-0.151	0.029		
less frequently	-0.138	0.083	-0.032	0.087		
never	-0.145	0.021	0.443	-0.319		
Overall N	5354					

We turn now to Wave IV, which also yields four clusters. Figure 3 provides a visual summary of this solution.

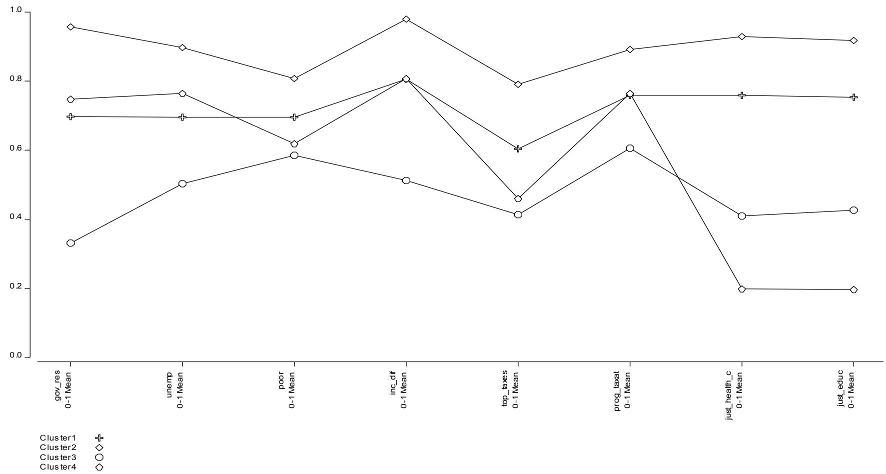

Figure 3 Profile plot of cluster solution for the latent class analysis of Wave IV

Figure 3 indicates that once again, the most numerous class is composed of individuals who are moderately solidaristic (Cluster 1). As with Wave II, there is also a class of individuals that has a mixed profile of attitudes, and together they make up the second largest group (Cluster 4). The third largest group is composed of individuals who are moderately self-interested (Cluster 3). The least numerous class (Cluster 2) groups individuals who are very solidaristic. Table 4 presents full results for this model.

The most notable differences that emerged with respect to previous results are as follows. First, the *unemployment* rate is now associated with a significant decrease and *redistribution* with a significant increase in solidaristic attitudes. Second, being *employed* is now associated with a positive and being *unemployed* with a negative propensity for moderate solidarism, although these coefficients are not highly significant statistically. Third, far-left partisanship and attending religious services several times per week are negatively associated with moderate solidarity, although the association of far-left partisanship with extreme solidarity is positive. Fourth, the indicators that are best explained by the latent variable are the ones unique to this wave asking how just it is that people with higher incomes can buy better health care and education than people with more modest means. Finally, we found that the Wald test statistic and its associated p-value cannot be computed for *GDP per capita*.

Table 4 LCA of attitudes towards social policy in thirty-one countries (2009)

Model for Indicators	Wald	p-value	R^2			
government responsibility	1651.472	0.000	0.449			
unemployed	1041.153	0.000	0.226			
poor	568.812	0.000	0.064			
income differences	1351.697	0.000	0.351			
top taxes	1229.374	0.000	0.220			
progressive taxation	1463.533	0.000	0.207			
private health care just	1625.358	0.000	0.605			
private education just	1567.072	0.000	0.581			
Model for Clusters						
Intercept	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Wald	p-value
	0.095	-0.839	-0.412	1.157	93.127	0.000
N	14637	2698	2718	3087		
Covariates						
sex						
male	-0.088	-0.114	0.156	0.046	106.709	0.000
female	0.088	0.114	-0.156	-0.046		
age	-0.001	0.010	-0.007	-0.002	77.039	0.000
education						
no formal qualification	0.048	-0.279	0.100	0.131	167.936	0.000
lowest formal qualification	0.041	0.093	-0.278	0.144		
above lowest qualification	0.152	0.272	-0.482	0.058		
higher secondary completed	-0.011	0.046	-0.005	-0.031		
above higher secondary level, other qualification	-0.080	-0.011	0.297	-0.207		
university degree completed	-0.151	-0.122	0.368	-0.095		
GDP growth	0.061	0.000	-0.009	-0.051	65.469	0.000
unemployment	-0.004	-0.027	-0.019	0.049	66.280	0.000
employment status						
unemployed	-0.001	0.015	-0.072	0.058	10.479	0.015
employed	0.001	-0.015	0.072	-0.058		
income	-0.025	-0.277	0.279	0.022	186.518	0.000
redistribution	0.003	0.048	-0.019	-0.032	646.900	0.000
GDP	0.000	0.000	0.000	0.000	.	.

partisanship						
far left	-0.036	0.900	-0.760	-0.105	909.720	0.000
left	0.156	0.449	-0.701	0.095		
center	0.059	-0.170	0.113	-0.002		
right	-0.092	-0.771	0.937	-0.074		
far right	-0.058	-0.398	0.429	0.026		
other, not specified	-0.008	0.104	-0.175	0.079		
no party preference	-0.022	-0.114	0.156	-0.019		
church attendance						
several times per week	-0.194	-0.173	0.161	0.206	208.831	0.000
once a week	0.032	-0.214	0.166	0.015		
2 or 3 times a month	-0.033	-0.160	0.286	-0.093		
Once a month	-0.040	-0.158	0.051	0.147		
Several times a year	0.051	0.277	-0.338	0.010		
Once a year	0.048	0.068	-0.155	0.039		
less than once a year	0.117	-0.024	0.074	-0.166		
never	0.019	0.383	-0.245	-0.157		
Overall N	23,426					

Robustness Checks

We look for possible deviations from the assumption that indicator variables are conditionally independent (that is, unrelated to each other within classes) and re-specify our models. In so doing, we retain the most parsimonious model possible (i.e., the one with the smallest number of additional parameters), while improving model fit.

Conditional independence can be examined by looking at the correlation of indicator variables by class both before and after observations have been grouped into classes. We found that some of the indicator variables in Waves I and II had moderately significant correlations prior to observations being sorted into classes. After being sorted into classes, however, these pairwise correlations became statistically insignificant and/or very slight. Results for Wave IV indicated, however, that the variables referring to the right to pay privately for better health care and education do correlate very highly before the analysis (r=0.775; p=0.000). Class clustering is able to moderate this correlation, but the bivariate residual for this pair in the model reported in Table 4 is still 1681.840.

To see how these correlations affect the results, we reexamine the model we previously estimated. We restrict the four highest bivariate residuals (the residual for the *private healthcare just* and *private education just* pair and three others) to 0 and re-estimate the model. The resulting specification relaxes the assumption of conditional independence, possibly changing the relationship between the latent variable and indicators, and between covariates and indicators. Table 5 presents the results for our modified latent class analysis of Wave IV.

Table 5 Modified LCA of attitudes towards social policy in thirty-one countries (2009)

Model for Indicators			
	Wald	p-value	R^2
government responsibility	2447.846	0.000	0.511
unemployment	770.994	0.000	0.254
poor	272.998	0.000	0.095
income differences	2143.097	0.000	0.392
top taxes	1120.467	0.000	0.258
progressive taxation	1079.735	0.000	0.183
private healthcare just	418.947	0.000	0.247
private education just	145.986	0.000	0.222

Model for Clusters						
Intercept	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Wald	p-value
	-2.207	-2.547	-5.376	10.130	114.620	0.000
N	16093	2312	2370	2365		
Covariates						
sex						
male	-0.069	-0.080	0.204	-0.055	79.287	0.000
female	0.069	0.080	-0.204	0.055		
age	0.000	0.011	-0.006	-0.005	65.249	0.000
education						
no formal qualification	0.043	-0.265	0.340	-0.119	237.110	0.000
lowest formal qualification	0.048	0.171	-0.636	0.417		
above lowest qualification	0.180	0.334	-0.678	0.164		
higher secondary completed	-0.078	-0.062	0.004	0.135		
above higher secondary level, other qualification	-0.104	-0.064	0.415	-0.247		
university degree completed	-0.090	-0.113	0.555	-0.351		
GDP growth	0.313	0.254	0.217	-0.783	40.373	0.000
unemployment	0.001	-0.030	0.042	-0.013	15.175	0.002

employment status						
unemployed	0.003	0.011	-0.044	0.030	1.970	0.580
employed	-0.003	-0.011	0.044	-0.030		
income	-0.026	-0.272	0.343	-0.046	194.407	0.000
relative redistribution	0.071	0.107	0.063	-0.240	238.113	0.000
GDP	0.000	0.000	0.000	0.000	154.670	0.000
partisanship						
far left	-0.037	0.746	-1.201	0.492	736.296	0.000
left	0.333	0.586	-0.556	-0.363		
center	0.073	-0.049	0.207	-0.231		
right	0.056	-0.508	1.214	-0.761		
far right	0.154	-0.096	0.751	-0.809		
other, not specified	-0.745	-0.666	-0.776	2.187		
no party preference	0.166	-0.012	0.361	-0.516		
church attendance						
several times per week	-0.255	-0.068	-0.209	0.533	120.067	0.000
Once a week	0.145	-0.010	0.285	-0.421		
2 or 3 times a month	0.115	-0.069	0.303	-0.349		
Once a month	0.052	-0.199	0.017	0.130		
Several times a year	-0.016	0.143	-0.227	0.100		
Once a year	-0.004	-0.002	-0.118	0.124		
less than once a year	0.079	-0.037	0.103	-0.145		
never	-0.115	0.242	-0.154	0.028		
Overall N	23,426					

As Table 5 indicates, our software is now able to compute the Wald test statistic and its associated p-value for *GDP per capita*. Coefficients for *age*, *unemployment* and *unemployed* status have also turned positive, while the coefficient for *employed* is now negative. While *employed* and *unemployed* display the same signs as in the previous two waves, *employment status* overall has lost its statistical significance. Perhaps more importantly, R^2s for *private healthcare just* and *private education just* have significantly decreased, while *government responsibility* and *income differences* emerge once again as the indicators with the highest R^2s. This indicates that in its configuration, the latent class model for Wave IV is similar to the models for Waves I and II once the most glaring forms of conditional dependence have been properly handled.

With a refined model the number of observations by cluster can change, as Table 5 makes clear. Just as importantly, however, the BIC has declined in value. Having added one parameter (or restriction) to the model, researchers should check bivariate residuals again for additional parameters to restrict until all residuals exhibit acceptable values. As more residuals are set to 0 and the ones left unrestricted decrease in value, we obtain diminishing increases in model fit (as judged by progressively lower BIC values), and more stability in parameters (the size of indicator and covariate coefficients and their signs). Due to space constraints, we do not report these checks here.[16]

We re-estimated our models with earnings instead of family income and obtained similar results except for Wave I, which exhibits a four-cluster profile somewhat different from the one we had originally obtained. Most likely, this is because data on earnings is not available for the Netherlands, and the country thus drops out of the estimation. We also experimented with a slightly modified form of latent class analysis, latent class factor analysis (Magidson & Vermunt 2001). LCFA is a form of exploratory factor analysis that conceives of attributes (self-interest and solidarism for example) as dichotomous latent factors rather than distinct classes. Instead of four latent classes, we would speak then of two dichotomous latent factors "with fixed and equidistant category scores" (Kankaraš et al. 2011, p. 284). While this allows individuals to have a position on each factor, LCFA achieves identification by omitting higher order interactions of the sort used previously. We thus found that our latent class models, judging by their lower BICs, fit the data better.

As a final check on our results, we estimated a model with data for all waves pooled into a single analysis. Since there are only four indicators common to all waves – *government responsibility, income differences, top taxes, and progressive taxation* – these are the only variables available to proxy for the latent construct. As before, we estimate models with 2, 3, and 4 latent classes. This time, we are able to work with thirty-two countries containing 32,678 observations.[17] Once again, a model with 4 classes fits the data best, judging by the BIC test statistic. As expected, the resulting class profile falls somewhere between the profiles for waves II and IV, with a class of individuals displaying a mixed set of attitudes.

We repeated the analyses with ISSP data from the Role of Government module. This questionnaire has the advantage of offering questions similar to the ones used here, in addition to questions on whether it should be the government's responsibility to provide decent housing for all and to care for seniors. Although we observed four classes underlying responses to these indicators, we were unable to obtain results similar to the ones just reported. The reason is most likely that the Role of Government module did not include questions asking people about their

16 Because bivariate residuals are smaller in the case of Waves I and II, we refrain from presenting refined versions of those models here.

17 Due to space constraints, we do not report details for this exercise here, but results are available upon request.

assessment of the status quo.[18] Because those questions prime answers to questions about absolute preferences, they cannot be separated empirically from indicators about abstract attitudes.

Putting all three waves together, we find that for two of the waves (Wave I and IV), the coefficient on income is negative, as one would expect, but for Wave II it is positive. We also see that signs for some macro-level variable coefficients are not stable across waves. Income redistribution and economic growth are sometimes associated with less (more) solidarism and unemployment with more (less) solidarism. These findings raise an important question: why are the effects of some variables inconsistent across waves? Rather than attempt to generalize when such generalizations are not warranted, we conclude that there is much about the relationship between personal/family income and macro-level variables that we still do not understand, particularly for developing and/or newer democracies such as those surveyed in Wave IV.

Dimick et al. (2017, p. 386) found evidence that "an increase in macro-inequality will lead to a larger increase in support for redistribution from the rich than from the poor". This occurs, they posit, because "an increase in redistribution aimed at reducing inequality is less costly (in welfare terms) to a richer person than to a poorer person" (i.e., the wealthy value an additional dollar of consumption less than the poor).[19] Haggard et al. (2013, p. 113) found, however, that in the developing world, "inequality has limited effects on demands for redistribution and may even dampen them." Others relate support for redistribution to its visibility (Gingrich 2014). Finally, some point out that spending on benefits locks some recipients into coalitions in favor of continued benefits (e.g. Timmons 2005).

Contradicting claims may reflect the reality that some variables, income in particular, are measured with error. Another possibility is that the effects of macro-level variables on attitudes differ between the more settled environments of developed countries and the more fluid situation we find in less developed ones. More generally, we believe that if people were fully informed, they would have no problems grasping the "inter-temporal trade-off between current and future income" that social policies entail (Barber et al. 2013, p. 1157). The cross-sectional nature of our research does not allow us to explore how stable over time the effects of these variables are, but it does allow us to realize that when care has been taken to specify the proper model, the relationship between covariates and the latent variable may not be the same across countries and/or waves.

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18 There is no prompt in any of the surveys querying respondents about pro-poor policies specifically. These policies figure prominently in the welfare states of all advanced democratic nations.

19 See also Dimick et al. (2018).

Conclusion

This article has made a major contribution to the comparative political economy literature. As stated at the outset, solidarism, or care about the well-being of others, is usually treated as any attitude that cannot be explained using standard assumptions about self-interest. We have shown that this is not the case. Our empirical model provides strong support for the notion that solidarism is a coherent orientation among certain members of the public and it may or may not stem from "objective" indicators of wellbeing such as (relative) income, employment status, and education. Specifically, the model allowed us to measure these attitudes, thus helping overcome the by now stale divide between scholars who emphasize self-interested considerations over solidaristic behavior or vice-versa. We were able to do this while acknowledging the complexity of the relationship between contextual variables such as income redistribution and individual attitudes.

In addition to putting solidarism on a firmer empirical footing, this article made three other important contributions to the literature. First, we established some conceptual clarity regarding social policy preferences and how to measure them in a valid and reliable way. Second, we sorted through the thicket of how abstract preferences regarding the welfare state and information about its performance can affect each other. Finally, we showed how latent manifestations of these preferences might not be equivalent across countries.

We applied mixture modeling (LCA) to three waves of the International Social Survey Programme's module on social inequality. Our key findings are that preferences towards the market and the role of government in the economy form four distinct clusters of individuals that we refer to as "moderate altruists", "moderate egoists", "extreme altruists", and "extreme egoists". These clusters tend to be homogenous with respect to both abstract notions of the role of government in the economy as well as about evaluations of actual performance. We do find, however, one notable exception in the last two survey waves, as one class consists of individuals who are solidaristic with respect to some indicators, but self-interested with respect to others.

Looking at differences in results between waves, it appears as if attitudinal classes are context specific. We would expect the particular countries and indicator variables we study to affect class configurations. Our pooled analysis revealed, however, a configuration of classes across waves that is similar to the configurations found within them despite the smaller number of indicators used and heterogeneity introduced by pooling countries. There is something to be gained then from seeing latent classes as capturing four distinct types of attitudes that are fundamentally similar across units of analysis.

In future work, scholars should provide better accounts of why certain variables differ in their effects on attitudes across countries. The literature abounds with claims about the relationship between variables such as inequality and redistributive preferences, but these works usually presume that effects are uniform across units while leaving direct country effects unexamined. As we have shown, even with an appropriate specification, such assumptions leave much to be explained. It is our hope that in the future, scholars not only measure attitudes more accurately, but also explain them better.

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Appendix A. Countries used in the analysis

Wave I	Wave II	Wave IV
Australia	Australia	Argentina
Austria	Austria	Australia
Germany	Germany	Austria
Netherlands	Norway	Belgium
Switzerland	United States	Bulgaria
United Kingdom		Czech Republic
United States		Denmark
		Estonia
		Finland
		France
		Germany
		Iceland
		Italy
		Japan
		Korea (South)
		Latvia
		New Zealand
		Norway
		Philippines
		Poland
		Portugal
		Slovakia
		Slovenia
		South Africa
		Spain
		Sweden
		Switzerland
		Ukraine
		United Kingdom
		United States
		Venezuela