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Social preferences and political attitudes: An online experiment on a large heterogeneous sample☆

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ABSTRACT

This paper investigates in a large and heterogeneous sample the relationship between social preferences and political attitudes. Social preferences relate to political attitudes in a particular way: Selfish subjects are the extremists on the one side of the political spectrum – they are more likely to vote for a right-wing party, less inclined to favor redistribution, less likely to hold favorable views towards immigration and more likely to consider themselves right-wing than all other types. Inequality-averse, altruistic and maximin subjects, all characterized by benevolence in the domain of advantageous inequality, sit at the opposite end of the spectrum. Overall, our evidence indicates that political outcomes in various domains such as taxation, social security, the pension system or immigration cannot be fully understood without taking distributional preferences into account.

1. Introduction

Social – or distributional – preferences are an essential determinant of human behavior in different domains. They are correlated with donations to charities (Derin-Güre and Uler, 2010; Kamas and Preston, 2015), with bargaining behavior (Bolton, 1991; De Bruyn and Bolton, 2008), with contributions to public goods (Hedegaard et al., 2019; Offerman et al., 1996), with competitive behavior (Balafoutas et al., 2012), with bidding decisions in auctions (Bartling et al., 2017; Flynn et al., 2016), with provision behavior of experts in credence goods markets (Kerschbamer et al., 2017) and with economic behavior in many other areas. The present paper addresses several questions related to social preferences.[1]

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[1] The literature uses the terms *social preferences* and *distributional preferences* interchangeably for preferences that depend not only on the own material payoff but potentially also on the payoffs to others. We follow this convention throughout the paper. Later, we will also talk about *attitudes regarding redistribution* or *redistributional preferences*. When we use those terms, we mean preferences regarding the distribution of income or wealth in a society. A preference for redistribution that goes against the own material self-interest might be caused by distributional preferences, but there are many other potential causes for such preferences. We discuss the drivers of redistributional preferences in more detail in Section 2.

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First, it asks how social preferences are distributed in a large, heterogeneous sample of Germans. Second, it addresses the question how such preferences correlate with socioeconomic factors, like gender, age, income and education. Third – and most importantly – the paper investigates how social preferences relate to voting behavior, attitudes regarding redistribution, support for immigration and political self-assessment.

Specifically, the present paper investigates these questions by embedding the Equality Equivalence Test (*EET*) by Kerschbamer (2015) into the German Internet Panel (GIP). The EET is a theory-driven method for eliciting distributional preferences at the individual level. The test classifies subjects into mutually exclusive distributional types – like e.g. selfish, inequality-averse, maximin and altruistic – based on a series of binary allocation choices. The GIP, based at the University of Mannheim, is an online panel survey that reaches around 3500 subjects and routinely asks participants about socio-demographic variables and political preferences. By embedding the EET into the GIP we can address the question how social preferences are distributed in a large heterogeneous sample of Germans, how such preferences correlate with socioeconomic factors, and – most importantly – how social preferences relate to self-reported voting behavior, attitudes regarding redistribution, support for immigration and ideological self-assessment.

Our experiment delivers several insights. First, we find that a majority of participants reveal benevolence in the domain of advantageous inequality and malevolence in the domain of disadvantageous inequality and are hence classified as inequality-averse.[2] Moreover, more than 80% of our subjects can be classified as one of just four types: inequality-averse, selfish, maximin and altruistic (efficiency-seeking).

Second, distributional preferences vary systematically with gender, age, income and education: females tend to be more inequality-averse than do males; older subjects are more inequality-averse than are younger ones; richer subjects are less inequality-averse than are poorer subjects; and more educated participants tend to be more altruistic than do less educated ones.

Third, regarding our main research question, we find that selfish subjects are the extremists on the one side of the political spectrum – they are more likely to vote for a right-wing party, less likely to favor redistribution, less likely to hold favorable views towards immigration and more likely to classify themselves as right-wing than all other types. Except for the attitudes towards immigration, this statement holds even in the relationship to spiteful and envious subjects – who are non-benevolent per definition. Inequality-averse, altruistic and maximin subjects – all characterized by benevolence in the domain of advantageous inequality – sit at the opposite end of the spectrum. Our results not only survive the inclusion of a large range of covariates but also a battery of various robustness checks. Given the robustness of our results and the large time span covering the collection of the data, our evidence indicates that elicited social preferences are robustly correlated with self-reported political attitudes, and that social preferences are fairly stable across contexts and over longer periods of time.[3] Most importantly, our results highlight the fact that political outcomes in various domains such as taxation, social security or the pension system as well as attitudes towards immigration cannot be understood without taking distributional preferences into account.

The rest of the paper is organized as follows. Section 2 details the connection between our paper and the existing research. Section 3 describes the EET and the GIP and then gives information on the data on which our estimations are based. Section 4 presents our main results and Section 5 concludes. In the Appendix, we describe the details of our experiment and evaluate the robustness of our results in various ways.[4]

2. Literature review

Our study contributes to several debates in the literature. First, our result regarding the distribution of social preferences in a large heterogeneous sample is related to the large body of literature that studies the prevalence of social preferences and the much smaller body of literature that deals with the individual heterogeneity of these preferences. The pioneering papers in this tradition are Andreoni and Miller (2002), Charness and Rabin (2002), Engelmann and Strobel (2004) and Fisman et al. (2007). Recent studies investigating the heterogeneity of other-regarding preferences are Cappelen et al. (2007) and Bruhin et al. (2018). Furthermore, the works by Bellemare et al. (2008) and Almås et al. (2016) are related, because they study social preferences in representative samples of Dutchmen as well as Norwegians and US citizens. Unlike this literature, we use a theory-driven procedure to elicit social preferences and – most importantly — we relate the elicited social preferences with the answers to questions regarding voting behavior, attitudes towards redistribution, support for immigration and political self-assessment.

Second, our results regarding the correlation of distributional preferences with socioeconomic factors are linked to the discussion about subject pool effects. Our findings are also related to research addressing gender differences in social preferences and how education and income affect such preferences.[5] Moreover, Falk et al. (2013) ask whether self-selection into lab experiments based on prosociality leads to a biased sample and finds that laboratory samples do not misrepresent the importance of social preferences. Cappelen et al. (2015) study social preferences of students and of a representative sample and find significant differences in behavior across subject pools. Finally, Snowberg and Yariv (2018) address concerns about the external validity of student samples by comparing experimental behavior of students in a lab experiment, a representative sample of the US population as well participants at Amazon Mechanical Turk. They find that correlations between behaviors are similar across the different samples. Relative to this literature, we provide a detailed account of differences in distributional preferences across different socio-economic groups of the German population.

Third, regarding our main research question, namely the link between distributional preferences on the one hand and self-reported political attitudes on the other hand, the paper closest to ours is Fisman et al. (2017). The authors expose subjects to 50 downward-sloping budget sets à la Andreoni and Miller (2002). Based on the choices, Fisman et al. then estimate the two parameters of a constant elasticity of substitution (CES) utility function at the individual–level. The estimated preference parameters are then related to voting decisions made in the 2012 US presidential elections. The authors find that the convexity parameter ("the equity-efficiency trade-off"), but

[2] Benevolence in the domain of advantageous inequality combined with malevolence in the domain of disadvantageous inequality is an essential feature of the inequality aversion models proposed by Fehr and Schmidt (1999) and by Bolton and Ockenfels (2000).

[3] The data we employ in this study were collected between the years 2014 and 2018 in different waves of the German Internet Panel.

[4] Specifically, we first conduct an analysis in line with the suggestions of Gillen et al. (2015) to deal with potential measurement error problems; then, we demonstrate the robustness of our findings regarding different ways to assign subjects to social preference types. Next, we derive four different measures of choice consistency which we then use to either weight observations according to their reliability or to exclude participants who are judged to be inconsistent. Finally, we check the robustness of our results regarding alternative codings of the dependent variables and alternative estimation approaches. It turns out that our results survive all these robustness checks.

[5] The question how the distribution of social preferences in the population depends on the subject pool is addressed – among others – in Engelmann and Strobel (2004), Fehr et al. (2006) and Engelmann and Strobel (2006). Gender differences in social preferences are discussed in Andreoni and Vesterlund (2001), Engel (2011) and Balafoutas et al. (2012). The question how education and income affect social preferences is studied in Cappelen et al. (2016) and Andreoni et al. (2017).

not the benevolence parameter ("the degree of altruism"), is voting behavior. Compared to Fisman et al. (2017), our investigation i) elicits social preferences via a non-parametric test based on binary choices instead of estimating a parametric CES utility function on the basis of continuous dictator game choices; ii) allows subjects to reveal benevolence, neutrality or malevolence in the domain of advantageous and in the domain of disadvantageous inequality, while their elicitation procedure, based on choices on downward sloping budget lines, does not allow a differentiation to be made between neutrality (no willingness to pay to help or hurt the other person) and malevolence (willingness to give up own monetary payoff to reduce the payoff to the other person); iii) is based on a Continental European sample instead of a sample of US citizens; iv) estimates the correlation between distributional preferences and a broader set of political variables (turnout, past and future voting behavior, political left-right self-assessment, opinions regarding redistribution and support for immigration); and v) controls for a larger set of socioeconomic factors. While their main result, namely that equality-focused subjects are more likely to have voted for Barack Obama in 2012 and to be affiliated with the Democratic Party, has a counterpart in our European data (since inequality-averse subjects sit at the left-hand side of the political spectrum), we also present several new findings. Probably the most important finding is that the selfish subjects – and not the spiteful or the envious ones – are the extremists on the right-hand side of the political spectrum: They are more likely to vote for a right-wing party, less inclined to favor redistribution and more likely to self-assess themselves as right-wing than are all the other types.

Since we show that experimentally elicited distributional preferences are significantly related to preferences for (societal) redistribution, the current paper also links to the large body of literature that documents different correlates of those preferences. We define "distributional preferences" as preferences that not only take one's own income as argument, but also the income of other people. By "preferences for redistribution", on the other hand, we mean preferences that subjects hold concerning the extent of redistribution in a society. Many papers before us have studied determinants of preferences for redistribution. Among the factors identified as determinants of preferences for redistribution are perceptions of economic inequality (Kuziemko et al., 2015), self-interest and insurance motives (Durante et al., 2014), prospects for future income mobility, past experience of misfortune as well as beliefs about equality of opportunity (Alesina and Giuliano, 2011; Alesina and La Ferrara, 2005; Corneo and Grüner, 2002; Fong, 2001), growing up in a socialist regime (Alesina and Fuchs-Schündeln, 2007), immigration (Alesina et al., 2018a), beliefs about social mobility (Alesina et al., 2018b), culture (Luttmer and Singhal, 2011), ingroup bias (Luttmer, 2001), religion (Basten and Betz, 2013), employment status (Demel et al., 2018), as well as risk preferences (Gärtner et al., 2017). Alesina et al. (2001) provide a useful overview. Compared to this line of research, we correlate distributional preferences, revealed in an incentivized, theory-driven elicitation procedure, with preferences for redistribution. Moreover, we also address the question how social preferences correlate with political attitudes, voting behavior and support for immigration.

Also related to our results on the relationship between social preferences and political attitudes in a large non-student sample is the literature investigating the connection of laboratory behavior and political attitudes. Fosgaard et al. (2019) link political attitudes to framing effects in an online public good experiment. They find that contributions made by left- and right-wing voters differ only in the 'take', but not in the usual 'give' frame. Müller and Renes (2017) study the fairness views of *third-party spectators* and their relation to political attitudes. They find that egalitarian subjects are more likely to favor redistribution. Thomsson and Vostroknutov (2017) study differences in giving behavior of conservatives and liberals. They find that both groups give similar amounts, but that motives for giving differ. Dawes et al. (2011) find that efficiency-seeking subjects are more likely to participate in politics. Dawes et al. (2012) conduct a large-scale dictator game with a fixed amount of money in four different countries and find that participants who are more generous in the dictator game tend to support typical left-wing policies. Esarey et al. (2012) show that in a voting on redistribution experiment conservatives "tend to be more responsive to their self-interest". Cappelen et al. (2017) find in a laboratory experiment that the amount given in a dictator game is positively correlated with left-wing voting and self-reported charitable donations. Anderson et al. (2005) examine play of liberals versus conservatives in trust and public goods games. They do not find any evidence to show that behavior differs by political ideology. Müller (2017) finds – in a modified dictator game experiment with artificial group identities – that more right-leaning participants are more selfish, but do not make a different equity-efficiency trade-off than do more left-leaning participants. Related is also the work by Ortoleva and Snowberg (2015) who uncover another 'behavioral' source of ideological differences: overconfidence.

3. The EET, the GIP and the data

3.1. The Equality-Equivalence Test

The Equality-Equivalence Test (*EET*) is a method for eliciting social preferences in a two-person context. It starts with a small set of assumptions on the preferences of the decision maker (DM) in the *self-other* space and shows that this set of assumptions (i) naturally results in a distinction between nine archetypes of social preferences, and (ii) gives rise to a simple technique that discriminates between the nine archetypes according to core features of preferences rather than properties of specific modeling variants or functional forms.[6] As a by-product the EET yields a two-dimensional index of preference intensity – the (x,y) score.

The four primitive assumptions on which the EET is based are: i) ordering and continuity: the DM's preference relation on income allocations is complete, transitive and continuous; ii) strict m-monotonicity: holding the material payoff to the other person constant, the DM strictly prefers more own income to less own income; iii) piecewise o-monotonicity: the DM's general attitude towards the other person (i.e., whether she is benevolent, neutral, or malevolent to the other) depends only on whether the other person has more or less monetary payoff than the DM herself; iv) strict equal-material-payoff-monotonicity: preferred allocations are reached when the payoffs to each agent are increased along the 45°-line in the self-other space.

Delineation of distributional preference types in the EET is performed purely on the basis of the revealed benevolence, neutrality or malevolence of the DM in the domain of advantageous inequality and the domain of disadvantageous inequality. Benevolence (malevolence) means that the DM has a positive willingness to pay to increase (decrease) the material payoff to the other person while neutrality means the absence of such a willingness to pay. The domain of advantageous inequality is the domain in which the DM has more income than the other person, while in the domain of disadvantageous inequality she has less. Fig. 1 shows how distributional types are defined in the EET. In this figure, the material payoff to the DM is denoted by m (for "my") while the payoff to the other person is denoted by o (for "other") and the domain of advantageous inequality is the area below the 45°-line, whereas the domain of disadvantageous inequality is the area above this line. Benevolence

[6] The *self-other* space is a Euclidean plane with the material payoff to the DM on the horizontal axis and the material payoff to the other person on the vertical axis.

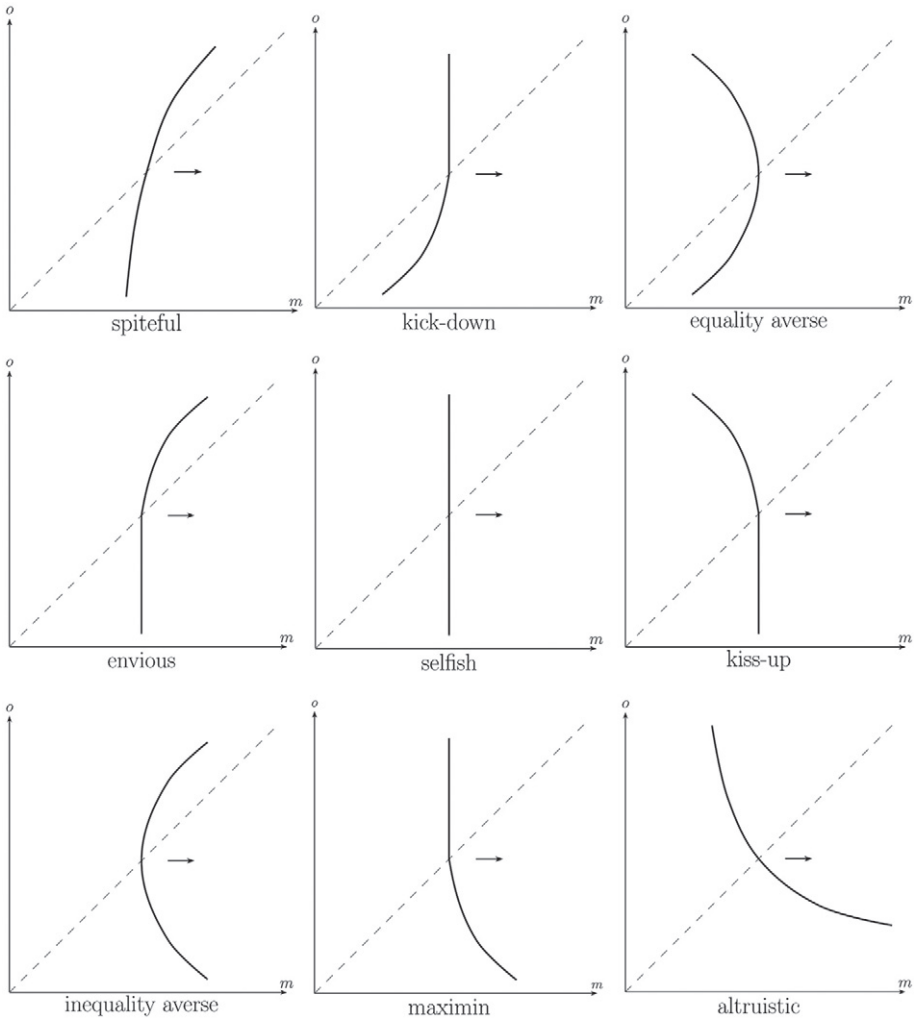

Fig. 1. Delineation of the nine social preference types in the EET via indifference curves in the *self-other* space. The material payoff *m* on the x-axis is the payoff to the decision maker, while the payoff *o* on the y-axis is the payoff to the other person. The EET defines the types according to the benevolence, neutrality or malevolence of the DM in two domains of inequality – the domain of advantageous inequality (area below the 45°-line) and the domain of disadvantageous inequality (area above the 45°-line). Benevolence (malevolence) is represented by a downward sloping (upward sloping) part of the indifference curve, while neutrality is represented by a vertical part. The convexity or concavity of the indifference curve is not part of the definition – it is there only to highlight the fact that the type delineation is not based on (piecewise–) linearity. Source: Kerschbamer (2015).

(malevolence) is represented by a downward (upward) sloping segment of the indifference curve, while neutrality implies a vertical segment. As shown in the figure, a DM who reveals benevolence in the domain of advantageous inequality and malevolence in the domain of disadvantageous inequality is classified as inequality-averse, without asking whether her preferences are more in line with the Fehr and Schmidt (1999) or the Bolton and Ockenfels (2000) model of inequality aversion. Similarly, a DM who reveals benevolence in both domains is classified as altruistic without addressing the question whether her preferences are more in line with the CES framework of Andreoni and Miller (2002), or with the piecewise linear model of Charness and Rabin (2002).

Note how the four basic assumptions on the preferences of the DM relate to the delineation of distributional types: ordering and continuity imply the existence and uniqueness of indifference curves through any point in the self-other space; strict m-monotonicity means that the upper contour set to a given indifference curve is to the right of the curve; piecewise o-monotonicity requires that the general attitude of the DM (i.e., whether she is benevolent, neutral or malevolent) changes at most once – and if it does so, then it does at equality; and strict equal-material-payoff-monotonicity excludes indifference curves that do not cross the 45°-line. Thus, given the four basic assumptions on preferences, there are exactly the nine distributional types, displayed in Fig. 1, and those types are well delineated, mutually exclusive and comprehensive.

The four assumptions also imply that a DM's social preference type can be determined by eliciting the sign of the slope of her indifference curve through a symmetric reference allocation above and below the 45°-line. In the EET this is done by exposing the DM to a series of binary choices. In each choice one of the two allocations is the recurring symmetric reference allocation. The second allocation is asymmetric, that is, it entails unequal payoffs for the two agents. In our study the recurring symmetric reference allocation yields 10 euros for each subject. In one of the binary choices subjects face, this reference allocation is compared to an asymmetric allocation where the DM receives 6 and the other person 13 euros. If the DM decides for this asymmetric allocation, then she reveals that she is willing to give up 4 euros of her own income in order to increase the material payoff to the other person by 3 euros. In this case the DM would be classified as benevolent in the domain of disadvantageous inequality. In the next choice, the material payoff to the DM in the asymmetric allocation is increased slightly, while all the other payoffs remain constant. Under

the assumption of strict m-monotonicity, a DM who already decided for the asymmetric allocation in the previous task will also decide for the asymmetric allocation in this task (since the own material payoff has increased while all the other payoffs remained unchanged), while a DM who decided for the symmetric allocation in the previous task might be inclined to decide for the asymmetric one in this task (for the same reason). In the next choice, the material payoff to the DM is again increased slightly while all the other payoffs remain constant.[7]

A set of binary choices that systematically decreases the price of giving by gradually increasing the material payoff to the DM in the asymmetric allocation while keeping all other payoffs constant is called a *choice list*. Important properties of a choice list are: (i) a DM whose preferences satisfy strict m-monotonicity will switch at most once from the symmetric to the asymmetric allocation (and never in the other direction) and (ii) the switching point of the DM can be used as a measure of her benevolence in the respective domain. Another important property of the choice lists in the EET is that they also contain tasks that allow the DM to reveal a willingness to pay in order to decrease the payoff to the other person (thereby expressing malevolence).

The basic version of the EET exposes subjects to two choice lists, one located in the domain of disadvantageous inequality and the other located in the domain of advantageous inequality. The two switching points of the DM are then used to construct an index that measures the pro-sociality of the DM separately for each domain. For the domain of disadvantageous inequality this index is called the *x score*and for the domain of advantageous inequality the *y score*. Both scores have in common that a positive (negative) score stands for benevolence (malevolence) and that a higher score means 'more benevolent'.

An innovative feature of the EET version implemented in the present study is that subjects were exposed to three choice lists in each domain. That is, instead of having the asymmetric allocations in a given domain located on a single horizontal line in the *self-other*space, we exposed each subject in each domain to choices located on three such lines. For the domain of advantageous inequality the lines were located at 3, 5 and 7 euros for the other subject, for the domain of disadvantageous inequality they were located at 13, 15 and 17 euros. Fig. 2 visualizes the allocations from the six choice lists in the *self-other* space. A second idiosyncratic feature of our test version was that subjects were not exposed to binary choices but instead were asked to indicate the first choice task where they prefer the asymmetric to the symmetric allocation. This 'radio button' version of the test forces subjects to be consistent *within* a given choice list. Every choice list was depicted on a different screen, but participants could also always click back and revise their previous choices – if desired. The order of the six lists was randomized for each participant.[8]

Given the three choice lists in each domain, our test version yields three *x*- and three *y* scores for each subject. In order to summarize these scores in one index, we conduct a principal component analysis (PCA) of the three scores.[9] It turns out that the correlation of the first principal component and the *average* individual score in each domain is virtually one. Hence, the PCA suggests that the most informative way to summarize behavior in each domain is the average score. Consequently, we use the average scores in everything that follows.[10]

Regarding material incentives, we informed subjects at the beginning that we expect roughly 3000 subjects to participate in the experiment and that exactly 500 of the participants would receive an actual payment from this experiment. Specifically, subjects learned that at the end of the experiment the computer would first randomly pick 250 participants whose choices would be relevant for actual payments and who would be paid for their role as the DM. Then, the computer would randomly pick a different set of 250 participants who would be paid for their role as the passive recipient. For the 250 subjects in the role of the DM, the program would next randomly select exactly one table and exactly one choice task in that table to be actually performed. The subject would then be paid as the DM in the chosen alternative, while one of the 250 other persons would receive the payment from the DM.

3.2. The German Internet Panel

The German Internet Panel (GIP) is an online survey based on a representative probability sample of the general German population aged 16 to 75 years.[11] The first recruitment for the GIP was done in face-to-face interviews in 2012 and resulted in a sample of 1603 registered persons. In 2014, a refresher sample of 3401 new persons was recruited in the same way. Since recruitment was offline, the resulting sample included persons without access to the internet or a computer. To enable such persons to participate in the online survey, they were given tablets with internet access.

GIP participants are invited to take part in an online interview every other month. The interviews include questions regarding attitudes towards reform policies, the welfare state, German and international politics, health, inequality, education and employment. Furthermore, the GIP collects and updates key socio-demographic information once per year. The data collected in the GIP is publicly available at the GESIS Institute for the Social Sciences.

3.3. The data

The EET was embedded in Wave 23 of the GIP, which was fielded in May 2016. In total, 2941 subjects participated in Wave 23. Of those persons, 61 decided not to participate in the experiment and several others completed only part of it. All in all, 2794 subjects indicated their preferred switching point in all six choice lists. Those 2794 subjects constitute our sample for the empirical analysis. We match the data obtained from the EET with the data generated in the other waves of the GIP available up until June 2017.

The socio-demographics we use mainly come from Wave 19 (fielded in December 2015) that asked subjects about their personal situation, age, gender and so on. In this wave, participants also declared their monthly income in 15 different brackets. We use the mid-points of these brackets as a proxy for income. Age is declared in 13 brackets – again we use the mid-point as a proxy for age. Education

[7] The tasks in the EET might seem similar to the range of questions included in Charness and Rabin (2002), and also similar to the types of binary choices used by Bartling et al. (2009). A major difference is the fact that the tasks in the EET are derived from a small set of basic assumptions on preferences that also guide the processing of the data. For instance, when working with an elicitation procedure that involves only four binary decisions, there are theoretically 16 different answer patterns to consider. In previous work this complexity is reduced by assigning types (like "behindness averse") to subjects based on the answers given to a subset of questions or the choices in a subset of tasks. A disadvantage of this procedure is that depending on how many types are considered and how they are defined, a subject might end up either in none of the categories or in multiple ones. An advantage of the EET in this respect is that it is theory-driven and that the assumptions of the test i) give a well-delineated and mutually exclusive definition of types and ii) classify each consistent subject in one and only one of the categories.

[8] A screenshot of the program, the precise monetary allocations used in each choice list and the instructions translated from German can be found in the Appendix.

[9] PCA is a technique that reduces the dimensionality of the data by projecting the data matrix into lower dimensions while minimizing the loss of information.

[10] In the Appendix, we extensively examine the robustness of our results towards alternative classification approaches. We find that our conclusions are unaffected by the particular classification employed.

[11] The GIP uses the same representative sampling procedure as the renowned German Socio-Economic Panel (GSOEP). The GIP is consequently not more or less representative than the GSOEP or any other professionally run state-of-the-art survey. See Blom et al. (2015) and Blom et al. (2016) for a detailed description of the survey.

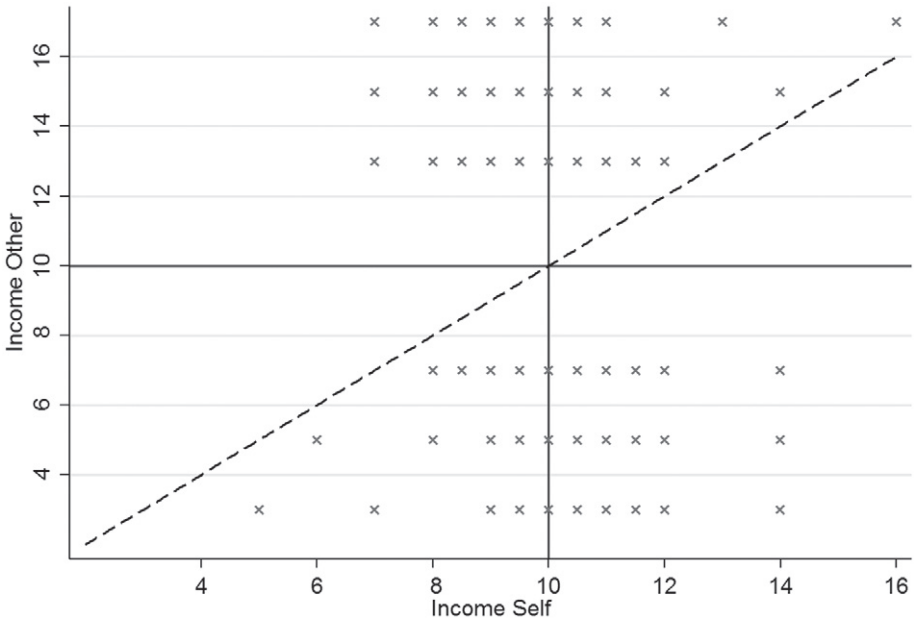

Fig. 2. The six choice lists in the *self-other* space. The horizontal lines above the 45°-line represent the three x lists, and the horizontal lines below the 45°-line represent the three y lists.

is elicited in seven categories: for our purposes, we classify educational achievement in four different categories from the lowest to the highest. Risk aversion and patience are elicited using un-incentivized questions, as behaviorally validated by Dohmen et al. (2011) and Vischer et al. (2013). The respective questions were asked in Wave 14 run in November 2014.

For our main research question, we use the answers to several questions in the GIP. First, we use the answers to the questions "Which party did you vote for in the last national election?" and "Which party would you vote for if there were a national election next Sunday?". These questions were asked in Wave 19 and answer categories included the eight largest political parties in Germany plus some other categories such as "I am not allowed to vote", or "other party". The "last election" question also included the category "did not vote", which we will use in our regressions regarding the correlation between social preference types and voter turnout. Note that these questions do not measure revealed, but instead stated voting behavior. In addition to the voting questions, we exploit the answers to a question that elicits an ideological left-right self-assessment on a 1 to 11 scale. This question was issued in Wave 20 (fielded in November 2015).[12]

We exploit four different variables in order to measure an individual's support for redistribution. These questions are (1): "Should the government mitigate income differences?" from Wave 21 (fielded in January 2016); (2): "Should people, who work more and consequently earn more, pay more or less in taxes than they currently do?" from Wave 17 (May 2015); (3): "The redistributive aspect of the public pension system should be strengthened even if that weakens the merit principle" from Wave 27 (January 2017); and (4): "Should the government also be responsible for ensuring an appropriate standard of living for the unemployed?" from Wave 27. All these questions have in common the fact that we would expect the answers to depend, among other things, on distributional preferences. Several remarks are appropriate here. First, question (1) was repeated several times in the GIP. We use the latest version, but the results do not change when we look at other waves. Second, question (3) was part of an information experiment. We include experimental treatment controls that, however, do nothing to change our results. Third, there are, to the best of our knowledge, no other useful redistributive questions in the GIP (as of July 2018) – that is we are not cherry-picking. In order to obtain a single index of attitudes towards redistribution, we use a principal component analysis (PCA) to summarize the answers to these four questions in one informative measure of redistributive attitudes, which we use in everything that follows.[13]

To measure an individual's attitude towards immigration, we searched for the terms "refugee" and "immigration" in the GIP documentation. This search delivered four different items that seem relevant in this regard. The (translated) statements read (1): "Germany should maintain its policy of admitting refugees from war zones"; (2): "Germany can master the challenges that arise from immigration of refugees"; (3): "The government should be generous when examining asylum applications"; and finally (4): "Refugees whose asylum applications were approved, should have the right to bring their close family members to Germany". The first two statements were asked in Wave 22 (March 2016), while statements (3) and (4) were part of Wave 33 (fielded in January 2018). In all four cases, the participants are asked to rate on a 5-point Likert scale (from "agree strongly" to "disagree strongly") how much they agree with the respective statement. Thus, in all cases, higher values mean stronger opposition to immigration. Again, we expect the attitudes held in connection with these statements depend at least partly on distributional preferences. This is so because in recent times Germany has experienced large inflows of overwhelmingly very poor refugees from developing countries (the so-called 'refugee crisis'). In a redistributive welfare state like Germany, this means that immigration is to a certain extent associated with redistribution from the wealthier locals to the poorer refugees. Consequently, we expect subjects who are benevolent when ahead to show more support for immigration. This expectation holds true

[12] This question was actually asked twice in the GIP. We use the version that was part of Wave 20, as this wave is chronologically closer to our experiment. The results do not change when we use the older version of this question.

[13] In particular, we use the first principal component which is also suggested by a comparison of the eigenvalues of each component. The first eigenvalue is the only value larger than 1 and is more than twice as large as the second highest value.

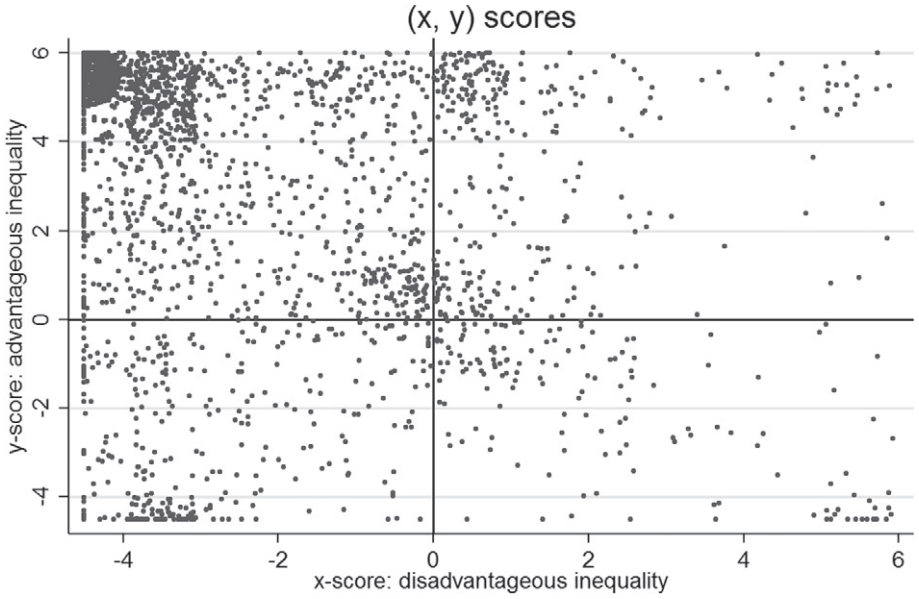

Fig. 3. Jittered scatterplot of (x, y) scores.

independently of whether participants view the effects of redistribution from immigration as taking place mainly at the national or the global level, that is, redistribution between people within the same country or between people from different countries. This is so because not only are immigrants on average poorer than the locals but also are the countries of origin of immigrants poorer than Germany.[14] For the purpose of the empirical analysis, we once more summarize the answers to these four statements using the first principal component (again, the eigenvalues strongly suggest using the first component only).

4. Results

4.1. Distribution and determinants of social preferences

Fig. 3 shows a (jittered) scatter plot in which each subject is represented by a point in the (x, y) space. While almost any area in the (x, y) space is populated by an individual, there are clearly visible masses of individuals at the center (selfishness), top-center (maximin), bottom-left (spitefulness) and in particular the top-left corner (inequality aversion). We note that the unconditional within-subject correlation of the two scores is negative and approximately -0.39 ($p < 0.00$).

The pattern displayed in Fig. 3 suggests that the empirically most frequent type in our sample is inequality-averse, which is confirmed by the frequencies listed in Table 1.[15] Almost two-thirds of our sample are classified as inequality-averse while only five to ten per cent of subjects in our sample are classified as maximin, selfish or spiteful.[16] All the other types have frequencies below 5%, with altruistic and envious subjects being more frequent than the more exotic types equality-averse, kick-down and kiss-up. We record this as:

Result 1 (Distribution of social preferences): *Almost two-thirds of our subjects display various degrees of inequality aversion, while only 5% to 10% of the sample are classified as maximin, selfish or spiteful. Altruistic and envious subjects are even less frequent and the other types are empirically irrelevant.*

Turning to Table 1 and comparing the type distribution of the whole sample with that of the sub-sample of students, we see that inequality aversion is clearly less frequent among students (only around half of the 144 students display inequality aversion). Instead, students are more inclined to be maximin and altruists. The other types are equally frequent in the two samples. The difference between males and females is less pronounced with the major difference being that males are less inclined to be inequality-averse than are females. This result is in line with similar findings in the literature – see, among others, Andreoni and Vesterlund (2001) and Kamas and Preston (2015).

Next, we address the question how social preferences correlate with socio-economic factors – like gender, age, income and education. For this purpose, we run regressions with the average x score and the average y score, as dependent variables and a range of covariates as right-hand side variables. Table 2 presents the results.[17] As can be seen from this table, male subjects display higher x scores and lower y scores relative to females. Thus, they are more benevolent when behind and less benevolent when ahead. This mirrors our previous finding that females tend to be more inequality-averse than males. The opposite is true the older subjects are, ceteris paribus. The coefficient for the income variable is less pronounced, but in general higher income seems to go along with less benevolence in the domain of advantageous inequality and more benevolence in the domain of disadvantageous inequality. The effect of education on the two scores is clearly significant in all specifications and the

[14] We are not aware of any research that studies at which level (i.e. local, national or international) people view the redistributive effects of immigration.

[15] More figures can be found in the Appendix: Fig. 7 displays the frequency of switching points for each list. Fig. 8 depicts histograms of the x- and the y score. Fig. 9 presents another scatter plot of the distribution of scores.

[16] The frequency of selfish subjects might seem rather low – compared to the findings in dictator game studies, for instance. The low frequency is due at least partially to the fact that our test version has a rather high resolution: subjects are classified as selfish if they are not willing to give up 20 cents to change the other subject's income by 1 euro. In a standard dictator game a subject is classified as selfish if it is not willing to give up 1 euro to increase the income of the recipient by 1 euro. If we employ this cruder definition of selfishness then the frequency of selfish subjects in our study increases drastically (to at least 52%; this frequency results if we classify all subjects as selfish that have a WTP for an increase in the income of the other subject of at most 80 cents).

[17] In this section, as in the rest of the paper, we present only results from Linear Least Squares regressions combined with robust standard errors. Logit and Ordered Logit estimations deliver virtually identical conclusions in terms of sign and statistical significance, but do not easily deliver useful marginal effect estimates and are hence not displayed here. Of course, marginal effects from OLS regressions are also useful only insofar as one is willing to interpret the relevant variables in a cardinal way.

Table 1
Frequency of distributional types.

Frequency	Whole sample	Students	Males	Females
Altruist	3.8%	9.0%	4.4%	3.2%
Envious	3.5%	2.1%	3.6%	3.3%
Equality-averse	2.9%	2.1%	3.3%	2.5%
Inequality-averse	64.8%	49.3%	61.0%	68.8%
Kick-Down	1.4%	1.4%	1.7%	1.1%
Kiss-up	1.7%	1.4%	2.3%	1.0%
Maximin	7.9%	19.4%	8.0%	7.8%
Selfish	5.0%	5.6%	5.8%	4.1%
Spiteful	9.0%	9.6%	9.8%	8.2%
N	2794	144	1440	1354

Table 2
Correlates of scores. Dependent variable is the standardized first principal component of the *y* score in column (1) and of the *x* score in column (2). OLS regression, robust standard errors in brackets. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

	y Score	x Score
Male	−0.077	0.123***
	(0.05)	(0.05)
Age	0.005***	−0.012***
	(0.00)	(0.00)
Income	−0.030	0.049**
	(0.02)	(0.02)
Educational	0.079***	0.066**
	(0.03)	(0.03)
East Germany	0.067	−0.060
	(0.05)	(0.05)
Trust Government	0.055**	0.008
	(0.03)	(0.02)
Risk	−0.026***	0.015
	(0.01)	(0.01)
Patience	0.006	0.002
	(0.01)	(0.01)
Constant	−0.344**	0.257*
	(0.14)	(0.13)
Observations	2013	2013
R^2	0.018	0.054

sign of the coefficients implies that highly educated individuals are, on average, more benevolent independently of the domain. Taken together, these findings suggest that male, younger, richer and more educated individuals hold different distributional preferences than do to their respective counterparts (female, older, poorer and less educated individuals).[18]

Result 2 (Determinants of social preferences): *Gender, age, income and education are correlated with social preferences: females tend to be more inequality-averse than do males, older subjects tend to be more inequality-averse than do younger subjects, richer subjects tend to be less inequality-averse than do poorer subjects, and more educated subjects are more altruistic than are less educated subjects.*

4.2. Distributional preferences and political attitudes

We now come to the main research question of the present paper: the relationship between revealed distributional preferences, on the one hand, and voting behavior, attitudes regarding redistribution, support for immigration and political self-assessment, on the other hand. To address this issue, we run several regressions with distributional types as explanatory variables, always taking selfish subjects as the reference category.[19] For the sake of clarity, we merge all preference types that describe less than 3% of our sample – equality-averse, kick-down and kiss-up – into a category *other*.[20] In Subsection 4.3, we extend the analysis using the scores as right-hand side variables.

Table 3
Turnout. Dependent variable is a binary indicator that is 1 if the subject declared (s)he did not vote in the last election. The excluded reference group is "selfish". OLS regression, robust standard errors in brackets. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

Turnout	(1)	(2)
Altruist	−0.011	0.032
	(0.04)	(0.05)
Inequality-Averse	−0.021	−0.020
	(0.03)	(0.03)
Maximin	−0.047	−0.039
	(0.04)	(0.04)
Envious	0.056	0.089
	(0.05)	(0.06)
Spiteful	−0.040	−0.048
	(0.04)	(0.04)
Other	0.029	0.030
	(0.04)	(0.05)
Constant	0.114***	0.527***
	(0.03)	(0.06)
Controls	No	Yes
Observations	2274	1660
R^2	0.006	0.084

We start by assessing the relation between social preferences and turnout in political elections. Table 3 presents regressions taking the answer category "I did not vote in the last national election" in the question "Which party did you vote for in the last national election?" as dependent variable. Subjects who chose the "did not vote" category are coded as 1, all other subjects are coded 0. No distributional type dummy is significant at conventional levels in any of the two regressions. On the other hand, several other variables such as age, income, education and trust in government are significant with coefficient sign in the expected direction. This suggests the conclusion:

Result 3 (Social preferences and voter turnout): *The propensity for turnout at national elections does not differ by distributional preference type.*

Next, we assess the relation between social preferences and political attitudes. Table 4 presents regressions related to voting behavior. Columns (1) and (2) use as the dependent variable the answer to the question "Which party did you vote for in the last national election?", while columns (3) and (4) use the answers to the question "Which party would you vote for if there were a national election next Sunday?". We use the same left-right coding of political parties in both cases, with higher values standing for more right-wing parties.[21]

The table highlights several findings. The most important result is that – except for two cases – the coefficients for the social preference types are all significant and all have a negative sign. This suggests that selfish subjects – our reference category – are the extremists

[18] Note, however, that the 'student' dummy per se is not significant once age and education are controlled for (result not reported here). Hence, it seems that it is not the student status per se, but age and education that make people hold different distributional preferences.

[19] In Subsection A.3.3 of the Appendix, we complement this analysis by running regressions with one of the other types, one at a time, as the omitted reference category.

[20] Our conclusions are not affected by this approach. The working paper version of this manuscript (Kerschbamer and Müller, 2017) provides results without the category *other*.

[21] In particular, we code from left to right: The Left, the Greens, Social Democrats, Pirates, FDP, CDU/CSU, AfD, NPD. The only somewhat controversial classification here is that of the "Pirates". The main policy topic of this party is the freedom of the internet. By now, however, this party has almost disappeared and is hence empirically not important. We decided to classify this party as being between the Social- and the Liberal-Democrats. In Subsection A.1.4 of the Appendix, we show that the results, as presented in Table 4, continue to hold if we employ expert left-right classifications of German parties that allow a cardinal interpretation of ideology.

Table 4
Voting. Dependent variable in columns (1) and (2) is the party the subject voted for in the last national election, and the dependent variable in columns (3) and (4) is the answer to the "next Sunday" question. The excluded reference group is "selfish". Higher values mean more right-wing. OLS regression, robust standard errors in brackets. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

	Voted last election		Vote next Sunday	
	(1)	(2)	(3)	(4)
Altruist	−0.887***	−0.978***	−1.000***	−0.995***
	(0.29)	(0.33)	(0.29)	(0.32)
Inequality-averse	−0.935***	−0.936***	−0.931***	−1.018***
	(0.21)	(0.23)	(0.21)	(0.22)
Maximin	−0.820***	−0.713**	−0.846***	−0.768***
	(0.25)	(0.28)	(0.26)	(0.28)
Envious	−0.453	−0.745**	−0.461	−0.607*
	(0.31)	(0.34)	(0.33)	(0.36)
Spiteful	−0.467*	−0.566**	−0.438*	−0.622**
	(0.25)	(0.28)	(0.26)	(0.28)
Other	−0.562**	−0.557*	−0.556*	−0.685**
	(0.28)	(0.31)	(0.28)	(0.31)
Constant	4.929***	4.749***	4.921***	5.106***
	(0.20)	(0.38)	(0.20)	(0.38)
Controls	No	Yes	No	Yes
Observations	1763	1438	1734	1400
R^2	0.016	0.045	0.015	0.047

Table 5
Redistributive attitudes. The dependent variable in columns (1) and (2) is the first principal component of the answers to the four redistributive questions that cover the topics of income taxation, redistribution in general and redistribution in the pension scheme and unemployment insurance. The dependent variable in columns (3) and (4) is the first principal component of the four items that measure support for immigration. The excluded reference group is "selfish". OLS regression, robust standard errors in brackets. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

	Redistributive attitudes		Attitudes towards immigration	
	(1)	(2)	(3)	(4)
Altruist	−0.602***	−0.663***	−0.834***	−0.711***
	(0.16)	(0.18)	(0.13)	(0.14)
Inequality-averse	−0.487***	−0.514***	−0.198**	−0.223**
	(0.11)	(0.11)	(0.10)	(0.09)
Maximin	−0.527***	−0.519***	−0.465***	−0.253**
	(0.13)	(0.13)	(0.12)	(0.11)
Envious	−0.338**	−0.398***	0.083	0.108
	(0.14)	(0.14)	(0.15)	(0.15)
Spiteful	−0.236*	−0.263**	0.094	0.066
	(0.13)	(0.13)	(0.12)	(0.11)
Other	−0.536***	−0.523***	0.202	0.086
	(0.14)	(0.15)	(0.13)	(0.13)
Constant	0.446***	0.691***	0.169*	2.049***
	(0.11)	(0.18)	(0.09)	(0.14)
Controls	No	Yes	No	Yes
Observations	1863	1500	1981	1580
R^2	0.017	0.094	0.041	0.259

on the right-hand side of the political spectrum, as these subjects are more inclined than all the other types to vote for a right-wing party. This statement holds even in relationship to spiteful and envious subjects, who are both non-benevolent per definition, and have both a large and statistically significantly negative coefficient, when including controls.

Inequality-averse, altruistic and maximin subjects – all benevolent in the domain of advantageous inequality – sit at the opposite end of the political spectrum: they display a large and statistically significant (at the 1% level) negative coefficient close to −1.[22] The inclusion of control variables does very little in all cases to change these findings. We therefore conclude:

Result 4 (Social preferences and voting behavior): *Selfish subjects are the extremists on the right-hand side of the political spectrum – they are more likely to vote for a right-wing party than are all other types. Inequality-averse, altruistic and maximin subjects – all benevolent in the domain of advantageous inequality – sit at the opposite end of the political spectrum.*

We continue by examining the empirical relation between social preferences, on the one hand, and attitudes towards redistribution and immigration, on the other hand. For this purpose, we conduct a PCA and condense the answers to the four redistribution questions as well as the agreement with the four statements about immigration into their (standardized) first principal component.[23] In both cases, higher values of the dependent variable imply more right-wing attitudes – that is, less support for redistribution and immigration. Table 5 presents the results, with and without the usual set of control variables. First, looking at redistributive attitudes in the first two columns, it turns out that the picture is very similar to that of voting behavior: Again, the coefficients on the social preference types are all significant and all exhibit the same sign. Thus, selfish subjects again appear as the extremists on one side of the political spectrum. Similar, but not as pronounced as for voting behavior, we find that inequality-averse, altruistic and maximin subjects constitute the opposite end of the political spectrum. It is noteworthy that people with higher income consistently express political attitudes supporting less redistribution, even after controlling for distributional types and other control variables (result not shown here).

Result 5 (Social preferences and attitudes towards redistribution): *The results for attitudes towards redistribution mirror those for voting behavior: Selfish subjects are the extremists on one side of the attitudinal spectrum – they are less likely than all the other types to favor redistribution. Again, inequality-averse subjects, altruists and maximin sit at the opposite end of the attitudinal spectrum.*

Turning to the attitudes towards immigration in columns (3) and (4), again, the three types that display benevolence in the domain of advantageous inequality, i.e. altruistic, maximin and inequality-averse subjects, express views towards immigration that on average are more favorable than those of the selfish reference group. What is different here is that the envious and spiteful subjects, as well as the category *other*, all have positive (although not significant) coefficients. In addition, younger and more educated subjects as well as subjects from West Germany and those with more trust in the government express more favorable views towards immigration. Income, gender, risk and time preferences are not related to the dependent variable. In columns (3) and (4), the coefficient for altruistic types is in absolute terms larger than any other coefficient, including all control variables (these results are not displayed here).

Result 6 (Social preferences and attitudes towards immigration): *The three types that display benevolence in the domain of advantageous inequality — i.e., altruistic, maximin and inequality-averse subjects — are at one end of the attitudinal spectrum: they express the most favorable views towards immigration. The selfish subjects together with the envious and the spiteful subjects sit at the other end of the spectrum.*

Finally, Table 6 uses political left-right self classification (on a 1- to 11-point scale) as dependent variable.[24] The coefficients for

[22] Since the voting dependent variables are coded as integers in {1,...,8}, a coefficient of that magnitude implies that, everything else equal, an inequality-averse subject, for example, votes 'one party' more left-wing than does a selfish subject.

[23] We also report results for each single redistributive question in Table 26 in Section A.3.1 of the Appendix.

[24] It is noteworthy that the correlations between our dependent variables are not close to 1. Specifically, the correlation between the "voting next Sunday" and the "voted last election" variable is 0.83 and the correlation coefficient between the left-right self-assessment (reported in Result 7) and the two voting variables are 0.54 and 0.52, respectively.

Table 6
Left-right Self-assessment. Dependent variables: political left-right self-assessment on a scale from 1 (left-wing) to 11 (right-wing). The excluded reference group is "selfish". OLS regression, robust standard errors in brackets. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

Left-right	(1)	(2)
Altruist	−0.855***	−1.008***
	(0.22)	(0.23)
Inequality-averse	−0.732***	−0.831***
	(0.17)	(0.18)
Maximin	−0.543***	−0.558***
	(0.20)	(0.21)
Envious	−0.798***	−0.811***
	(0.27)	(0.29)
Spiteful	−0.631***	−0.736***
	(0.20)	(0.22)
Other	−0.522**	−0.650**
	(0.23)	(0.25)
Constant	6.189***	6.525***
	(0.16)	(0.31)
Controls	No	Yes
Observations	2293	1827
R^2	0.009	0.047

the social preference types are all significant and all have the same sign. The largest coefficients are again those of inequality-averse and altruistic subjects. The control variables are, as before, mostly significant but they do very little to change the conclusions. We therefore conclude:

Result 7 (Social preferences and political ideology): *Selfish subjects are the extremists on the right-hand side of the political spectrum – they are more likely to declare themselves as right-wing than are all the other types. Again, inequality-averse and altruistic subjects seem to sit at the opposite end of the political spectrum. All other types are also significantly more left-wing than are the selfish ones.*

4.3. Results using scores as explanatory variables

The fact that inequality-averse, altruistic and maximin subjects – and in most regressions also the maximin ones – are furthest away from selfish subjects (together with the fact that these three types are all benevolent in the domain of advantageous inequality) suggests that a rougher and simpler classification according to the degree of benevolence in the two domains of inequality could already explain our results. And indeed, if we re-run the regressions presented in Tables 4, 5 and 6 with the x score (representing the subject's benevolence in the domain of disadvantageous inequality) and the y score (benevolence in the domain of advantageous inequality) instead of the social preference types as independent variables – then the y score turns out to be robustly significant in all regressions while the x score remains insignificant, see columns (1) and (3) in Tables 27, 28 and 29 in the Appendix.

However, this result is somewhat misleading since it would suggest that those types who are neutral when ahead (especially the envious ones) have the same right-wing inclination as the selfish subjects and that those who are malevolent when ahead (especially the spiteful subjects) have an even greater tendency to be right-wing, which is not the case according to the results reported earlier. A more thorough analysis reveals that the large and significant effect of the y score is an artifact of the fact that a large majority of subjects has a non-negative y score. Indeed, if, in addition to the x- and the y score, we include their squared values in the regressions – see columns (2) and (4) in Tables 27, 28 and 29 in the appendix – then the effect is mostly picked up by the squared y score. Consistent with our earlier findings, a notable exception is the case of support for immigration in columns (3) and (4) of Table 28, where both the x- and the y score continue to be significant and negative. Apart from this exception, this exercise confirms our main point: it is not the subjects who are benevolent in the domain of advantageous inequality who are different from the rest. Rather, there is essentially one type (the selfish one) that is different from the others.

5. Concluding remarks

This paper investigated in a large-scale online experiment the relationship between distributional preferences, on the one hand, and voting behavior, attitudes toward redistribution, support for immigration and political self-assessment on the other hand. Social preferences relate to political attitudes in a particular way: Selfish subjects are the extremists at one side of the political spectrum – they are more likely to vote for a right-wing party, less inclined to favor redistribution and more likely to consider themselves right-wing than all other types. This statement holds even in the relationship to spiteful and envious subjects and it is robust towards the inclusion of several control variables and a battery of robustness checks.

The instrument we have employed in this study for the elicitation of distributional preferences is the EET (Kerschbamer, 2015). This test has several advantages in comparison to other preference elicitation procedures. Important ones are that (i) the set of distributional types that is tested for is derived from basic assumptions on preferences and not predetermined by the experimenter; (ii) the discrimination between distributional preference types is based on core features of preferences rather than properties of the identification procedure or structural assumptions on the utility function; and (iii) the test delivers a two-dimensional measure of preference intensity.

The result showing that the political attitudes held by the selfish subjects are different from those held by the envious and the spiteful subjects suggests that an elicitation procedure that allows subjects to reveal benevolence, neutrality or malevolence in the domain of advantageous and the domain of disadvantageous inequality is needed to shine light on the fine nuances of the relationship between distributional preferences and political attitudes. Rougher and simpler classifications – like those based on choices in a standard dictator game or more generally those based on choices on downward-sloping budget lines would give rise to the misleading conclusion that those types that reveal benevolence in the domain of advantageous inequality differ from the rest. Our finer classification based on a theory-driven instrument – the EET – shows that (except for the support for immigration) it is not the subjects who are benevolent in the domain of advantageous inequality, who differ from the rest. Rather, there is essentially one type (the selfish one) that differs from the others.

Overall, our findings highlight the importance of distributional preferences in the political domain in a variety of different economically important areas such as taxation, unemployment benefits and the pension system, immigration as well as voting and political ideology in general. Hence, it is clear that neither theoretical nor empirical economic analyzes can meaningfully ignore distributional preferences.

In addition to presenting evidence regarding the relationship between distributional preferences and political attitudes, the present paper also contributes to the current debates in economics and psychology surrounding the external validity of social preferences. As Levitt and List (2007, p. 170) put it: "Perhaps the most fundamental question in experimental economics is whether findings from the lab are likely to provide reliable inferences outside of the laboratory." The present paper tackled this question by documenting a strong and robust relation between social preferences, as revealed in an incentivized, theory-driven elicitation procedure, and self-reported field behavior.

Appendix A

This appendix consists of three parts. Appendix A.1 evaluates the robustness of the main results in various ways. More specifically, Section A.1.1 deals with potential measurement error. In Section A.1.2, we estimate the two parameters of the piecewise linear Charness and Rabin (2002) function *at the individual-level*. We then classify subjects on the basis of the estimated parameter values into distributional types. Section A.1.3 concerns the consistency of subjects. We employ four different measures of choice consistency in order to evaluate whether the results might be driven by confusion, inattentiveness or errors. Moreover, Section A.1.4 assesses the robustness of our conclusions towards different codings of dependent variables. We find that in all cases the results hold remarkably well. Appendix A.2 shows the experimental instructions, some screenshots and also tables that summarize the allocation tasks. Finally, Appendix A.3 presents further results and figures displaying the distribution of scores and switching points in our sample. This section also reports results using the scores as independent variables, results varying the reference groups as well as results using the *individual* redistributive questions (i.e. not summarized using a PCA).[25]

A.1. Robustness

A.1.1. Dealing with measurement error - obviously related instrumental variables

The reason why most experimental studies neglect potential problems of measurement error may be the notion, known from standard econometric textbooks, that measurement error in right-hand side variables biases estimates downwards, thus making estimates more conservative. Recently however, Gillen et al. (2015) have shown that, somewhat counterintuitively, measurement error might also lead to the discovery of spurious "facts", that is, the incorrect finding of significant relationships between variables. Hence, it is important to account for measurement error. Gillen et al. (2015) propose an instrumental variable strategy to account for this issue which they call *Obviously Related Instrumental Variables* (ORIV). The basic idea is simple: if an experimenter makes repeated observations of the same quantity, one measurement can be used to instrument the other. The resulting IV estimator is consistent. Now the question arises whether to instrument the first measure with the second or vice versa, which in finite samples will in general yield different results. The ORIV exploits information from both estimations, resulting in a more efficient use of the data than traditional IV approaches. In particular, the ORIV estimator is the weighted average of the two IV estimates. Standard errors either need to be clustered or bootstrapped. The ORIV is easily extended to the case with more than two measurements of the same quantity. This estimator seems particularly suited for experimental data in which the researcher has control over how many measures of experimental variables are observed.

With this in mind, it becomes clear that each choice in one list in our experiment can be instrumented by the other two choices in the same domain.[26] We then compute the ORIV estimate by instrumenting each choice by the other two and taking the weighted average of all three estimates. Table 7 reports the results in which the y score is instrumented, while at the same controlling for the x score and the usual set of controls. As can be seen there, in all five columns, the ORIV estimator on the y score is negative and significant at the 1% level. The x score on the other hand is only significant in column (4), where the first principal component of the four immigration questions is the dependent variable. Table 8 in turn, reports the same results only instrumenting the x score while controlling for the y score (and the other controls). Again, it turns out, the instrumented x score is only significantly different from zero in the immigration regression. Also, the (un-instrumented) y score is significant in all cases.

Taken together this exercise demonstrates that our results are unlikely to be driven by measurement error, and are thus not 'spurious' findings.

Table 7
ORIV estimation in which the y score is instrumented. The dependent variable is in column (1) the party the subject voted for in the last national election; in column (2) the answer to the "next Sunday" question; in column (3) the first principal component of the four redistributive questions; in column (4) the first principal component of the four immigration questions; and finally, in column (5) the ideological left-right classification. In all cases, higher values imply more right-wing attitudes. OLS regression, standard errors clustered at the individual-level in brackets. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively. Controls are included in all cases.

ORIV	Vote-last	Vote Sunday	Redistribution	Immigration	Left-right
	(1)	(2)	(3)	(4)	(5)
IV - y score	−0.109***	−0.123***	−0.146***	−0.203***	−0.076**
	(0.03)	(0.04)	(0.03)	(0.03)	(0.03)
x score	0.016	0.015	−0.015	−0.033***	0.017
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Controls	Yes	Yes	Yes	Yes	Yes
Observations	4314	4200	4500	4740	5481

[25] In the working paper version (Kerschbamer and Müller, 2017), we also conducted a pooled maximum-likelihood estimation of a piecewise-linear utility function in a random utility framework. There we found that, not surprisingly, the representative agent in our data is inequality-averse. Moreover, in the same working paper we also conducted extensive Monte-Carlo simulations in which we randomly drew *one* x- and *one* y-list in order to classify each subject. It turned out that the results were unaffected by this exercise. We do not report these results here anymore.

[26] Note however that, while measuring the same behavioral trait, there is no reason to expect the scores in each domain to have *exactly* the same value. The main restriction on scores is that they should have the same sign within a domain.

Table 8
ORIV estimation in which the x score is instrumented. The dependent variable is in column (1) the party the subject voted for in the last national election; in column (2) the answer to the "next Sunday" question; in column (3) the first principal component of the four redistributive questions; in column (4) the first principal component of the four immigration questions; and finally, in column (5) the ideological left-right classification. In all cases, higher values imply more right-wing attitudes. OLS regression, standard errors clustered at the individual-level in brackets. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively. Controls are included in all cases.

ORIV	Vote-last	Vote Sunday	Redistribution	Immigration	Left-right
	(1)	(2)	(3)	(4)	(5)
y score	−0.029***	−0.033***	−0.040***	−0.056***	−0.020**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
IV - x score	0.048	0.048	−0.035	−0.083***	0.049*
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Controls	Yes	Yes	Yes	Yes	Yes
Observations	4314	4200	4500	4740	5481

A.1.2. Individual Charness-Rabin utility functions

In the main part of the paper, we have assigned to each subject a social preference type on the basis of the average score in the domain of advantageous and the domain of disadvantageous inequality. In this section, we complement our previous analysis by estimating for each individual the two parameters of the piecewise-linear Charness-Rabin Charness and Rabin (2002) utility function. For the two-person case the utility function reads $U(m,o) = (1-\sigma)m + \sigma o$ for $m \leq o$ and $U(m,o) = (1-\rho)m + \rho o$ for $m > o$, where m and o stand (as before) for the material payoffs of the DM (decision-maker) and the PS (passive subject). Note that this functional form implies piecewise constant willingness to pay (WTP) of the DM for income increases (or decreases) of the PS. In the domain of disadvantageous inequality, we have $WTP^d = \frac{\sigma}{1-\sigma}$. If $\sigma \geq 0$, then this term gives the amount of money the DM is willing to give up in the domain of disadvantageous inequality in order to increase the PS's material payoff by a single unit; symmetrically, if $\sigma < 0$ then $\frac{-\sigma}{(1-\sigma)}$ gives the own-money amount the DM is willing to give up in the domain of disadvantageous inequality in order to decrease the PS's material payoff by a single unit. The willingness to pay for the domain of advantageous inequality, WTP^a, is calculated in the same way from the second parameter of the utility function and has a similar interpretation.

In order to classify a subject into a social preference type, we first estimate the two parameters of the utility function, ρ and σ, for each subject. Then, we take the convention that neutrality in a given domain means that the DM is not willing to give up 5 cents to change the material payoff of the PS by a euro. Using this convention we can classify each subject into one of the nine social preference types, which in turn allows us to run the same set of regressions as in the main part of the paper.

To estimate the two parameters of the Charness-Rabin function for a given subject we first construct three points of indifference for each of the two domains of inequality based on the choices of the subject in the experiment.[27] The Charness-Rabin model of social preferences assumes linear indifference curves in each of the two domains of inequality, but allows for a kink at equality. We consequently go on by fitting a straight line through the three points of indifference in each domain of inequality, constraining the regression line to run through the symmetric reference point (10,10). In fitting the two straight lines we minimize the sum of the squared *horizontal* distances.[28] The resulting slope estimates, s^a and s^d, are then used to calculate the two parameters of the Charness-Rabin function and the implied values of WTP^a and WTP^d. Fig. 4 presents histograms of WTP^a and WTP^d and Fig. 5 presents a jittered scatterplot in which each subject is represented as a point in an Euclidean space with WTP^a on the vertical axis and WTP^d on the horizontal axis.

Table 9 lists the frequencies of the nine social preference types, once classified using the scores (as shown before) and once calculated using the Charness-Rabin regressions. As can be seen there, the differences are minor with each single difference being smaller than one percentage point.

We now continue by using the "Charness-Rabin types" as explanatory variables in the same set of regression specifications as in the previous section. The results – shown in Tables 10, 11 and 12 – robustly underline the points made in the previous section: selfish subjects are the extremists on one side of the political spectrum – they are more likely to vote for a right-wing party, they are less likely to favor redistribution and they are more inclined to self-assess themselves as right-wing. Inequality-averse subjects, altruists and maximin seem to sit at the opposite end of the spectrum, while all the other types behave less systematically and in a less extreme fashion.

[27] To do so, we take the arithmetic mean between the asymmetric allocation in the last choice task where the subject decided for the symmetric allocation and the asymmetric allocation in the first choice task where the subject decided for the asymmetric allocation as assumed point of indifference. Assume, for example, a subject prefers (10,10) over (11,3) but (11.5,3) over (10,10). Then we assume that the point of indifference to (10, 10) is (11.25, 3). We use a similar convention for subjects who always decide for the symmetric allocation or always decide for the asymmetric allocation.

[28] Note that the standard approach of minimizing the squared vertical distances would not produce sensible results in the present context in which subjects implicitly choose points of indifference on horizontal lines.

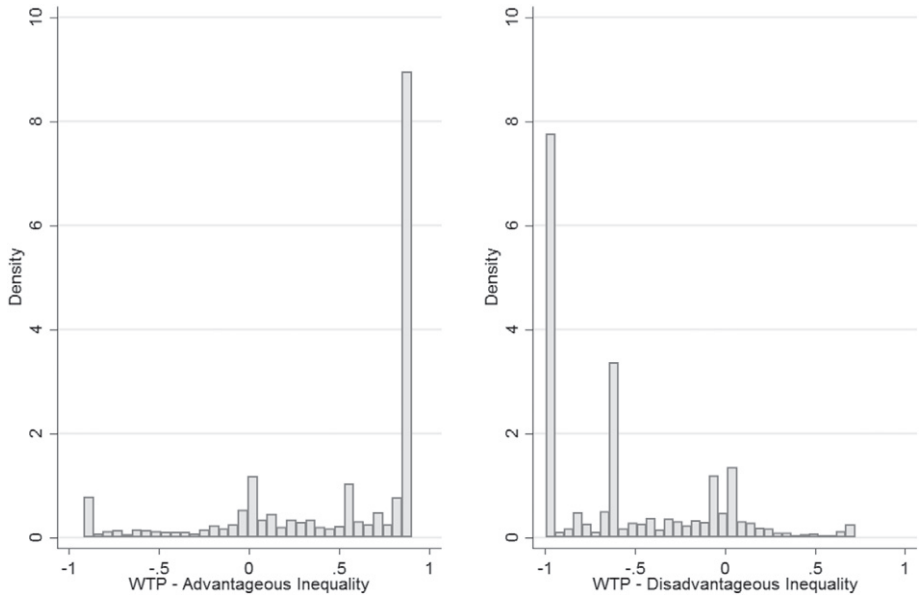

Fig. 4. Histogram of implied willingness to pay in order to increase the other person's income.

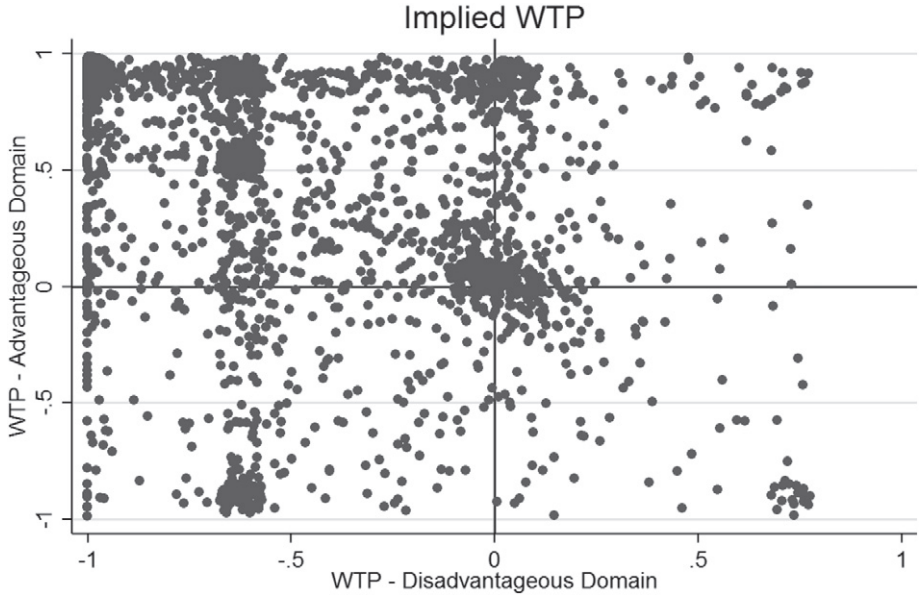

Fig. 5. Jittered scattterplot in which each subject is represented as a point in an Euclidean space with WTP^a on the vertical axis and WTP^d on the horizontal axis.

Table 9
Frequency of distributional preference types calculated using scores (left column) and via Charness-Rabin regressions (right column).

	Scores	Charness-Rabin
Altruist	3.8%	3.9%
Envious	3.5%	3.3%
Equality-averse	2.9%	3.1%
Inequality-averse	64.8%	65.3%
Kick-down	1.4%	1.2%
Kiss-up	1.7%	1.2%
Maximin	7.9%	7.8%
Selfish	5.0%	4.4%
Spiteful	9.0%	9.7%
N	2794	2794

Table 10
Voting. Robustness check: Charness-Rabin types. Dependent variable in columns (1) and (2) is the party the subject voted for in the last national election, and dependent variable in columns (3) and (4) is the answer to the "next Sunday" question. The excluded reference group is "selfish". Higher values mean more right-wing. OLS regression, robust standard errors in brackets. *, ** and *** indicate significance at the 10%, 5% and 1% level, respectively.

	Voted last election		Vote next Sunday	
	(1)	(2)	(3)	(4)
Altruist	−0.874***	−1.046***	−0.864***	−0.930***
	(0.30)	(0.35)	(0.30)	(0.32)
Inequality-averse	−0.863***	−0.837***	−0.868***	−0.943***
	(0.22)	(0.25)	(0.22)	(0.24)
Maximin	−0.711***	−0.579**	−0.837***	−0.734**
	(0.26)	(0.29)	(0.27)	(0.29)
Envious	−0.221	−0.407	−0.085	−0.198
	(0.32)	(0.35)	(0.33)	(0.36)
Spiteful	−0.429	−0.538*	−0.537**	−0.700**
	(0.26)	(0.29)	(0.27)	(0.29)
Other	−0.445	−0.423	−0.385	−0.556*
	(0.29)	(0.32)	(0.30)	(0.32)
Constant	4.859***	4.683***	4.864***	5.073***
	(0.22)	(0.40)	(0.21)	(0.39)
Controls	No	Yes	No	Yes
Observations	1763	1438	1734	1400
R^2	0.015	0.044	0.015	0.046

Table 11
Redistributive attitudes. Robustness check: Charness-Rabin types. The dependent variable in columns (1) and (2) is the first principal component of the answers to four different redistributive questions that cover the topics of income taxation, redistribution in general and redistribution in the pension scheme and unemployment insurance. The dependent variable in columns (3) and (4) is the first principal component of four different items that measure support for immigration. The excluded reference group is "selfish". OLS regression, robust standard errors in brackets. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

	Redistributive attitudes		Attitudes towards immigration	
	(1)	(2)	(3)	(4)
Altruist	−0.645***	−0.747***	−0.833***	−0.669***
	(0.17)	(0.18)	(0.14)	(0.15)
Inequality-averse	−0.509***	−0.542***	−0.202**	−0.218**
	(0.12)	(0.12)	(0.10)	(0.09)
Maximin	−0.515***	−0.550***	−0.488***	−0.291**
	(0.14)	(0.14)	(0.12)	(0.12)
Envious	−0.308**	−0.386**	0.176	0.171
	(0.15)	(0.15)	(0.15)	(0.15)
Spiteful	−0.309**	−0.345**	0.085	0.043
	(0.13)	(0.14)	(0.12)	(0.11)
Other	−0.579***	−0.533***	0.147	0.053
	(0.15)	(0.16)	(0.14)	(0.13)
Constant	0.469***	0.725***	0.176*	2.057***
	(0.11)	(0.19)	(0.10)	(0.14)
Controls	No	Yes	No	Yes
Observations	1863	1500	1981	1580
R^2	0.017	0.094	0.042	0.258

Table 12
Left-right self-assessment. Robustness check: Charness-Rabin types. Dependent variables: political left-right self assessment on a scale from 1 (left) to 11 (right-wing). The excluded reference group is "selfish". OLS regression, robust standard errors in brackets. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

Left-right	(1)	(2)
Altruist	−0.828***	−1.061***
	(0.23)	(0.24)
Inequality-averse	−0.706***	−0.806***
	(0.18)	(0.20)
Maximin	−0.531**	−0.508**
	(0.22)	(0.23)
Envious	−0.473*	−0.471*
	(0.27)	(0.29)
Spiteful	−0.663***	−0.757***
	(0.22)	(0.24)
Other	−0.522**	−0.633**
	(0.24)	(0.27)
Constant	6.165***	6.528***
	(0.17)	(0.33)
Controls	No	Yes
Observations	2293	1827
R^2	0.007	0.047

A.1.3. Excluding inconsistent subjects

While we consider the large and representative nature of the GIP a distinct advantage of our experiment, it might come at the cost that people's behavior displays more noise than conventional laboratory studies for example, because subjects might be more easily distracted at home than in the lab. It seems therefore important to check whether some of our results are driven by inconsistently deciding subjects.[29] In this subsection, we check the robustness of our results in this regard in four different ways.

First, a natural definition of consistency is that the three scores in each domain should all lie in the same area as defined by Kerschbamer (2015). We define a subject as consistent according to this definition if either i) all three scores in one domain are smaller than 1, ii) all scores in one domain are larger than −1 or iii) all scores in one domain are between −1 and +1. We find that 437 participants, or 15% of the sample, are not consistent according to this definition. If we exclude these subjects and run the same set of regressions as in Section 4, the main results remain qualitatively unaffected. Tables 13, 14 and 15 present the results.

Second, an alternative requirement for rationality – or choice-consistency – is that indifference curves 'do not bend back' to the symmetric reference allocation. We consequently say a decision-maker behaves inconsistently in the y-domain if the score in the y-list right below the line $o = 10$ is positive (negative) and any of the other two scores is smaller (larger) than the score(s) in the list(s) above. Similarly, choice consistency in the x-domain requires according to this definition that if the score in the x-list right above the symmetric reference point is positive (negative) then the score in any list further above should not be smaller (larger) than the score(s) at the list(s) below. Defining consistency in this way, we find that 1734 subjects (62% of our sample) are fully consistent in their choices in both domains. If we run regressions based exclusively on those 1734 subjects our main conclusions remain once more unchanged, see Tables 16, 17 and 18.

A third way to define choice consistency is to use the sum of the standard deviations of the three scores in each domain as an (inverse) measure of consistency. The idea is that a consistent DM should not have very different scores in the three lists in each domain. The standard deviation of the individual scores in each list then provides a measure of consistency of decision-making. If we exclude all observations with a standard deviation larger than one (30.5% of all observations) the results (available upon request) are again very similar to those reported in Section 4.[30]

Lastly, to the extent that decision-time is correlated with decision-making quality, the time a subject spends filling out the survey is an indicator of how 'serious' decisions were made in the survey. We conjecture that subjects who spend very little time with the experiment might not make well-deliberated choices. Taking an unusually long time to complete the experiment, on the other hand, might indicate a lack of understanding of the instructions or a lack of care. Consequently, we run all regressions again, this time excluding (i) all subjects who took less than 30 s, ii) all subjects who took less than 60 s, iii) all subjects who took less than 120 s or iv) all subjects who took more than 20 min to complete the experiment (dropping 42, 209, 698 and 28 subjects, respectively). The results – available from the authors upon request – are virtually unchanged by those exclusions. Taken together, these robustness checks suggest that our main conclusions are not driven by inconsistent subjects.

Table 13
Voting. Robustness I: All scores in the same area. The dependent variable is the party voted for in last election, columns (1) and (2), and party one plans to vote for if election were next Sunday, columns (3) and (4). Higher values mean more right-wing. The excluded reference group is "selfish". OLS regression, robust standard errors in brackets. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

	Voted last election		Vote next Sunday	
	(1)	(2)	(3)	(4)
Altruist	−0.604*	−0.739*	−0.688**	−0.793**
	(0.33)	(0.38)	(0.33)	(0.36)
Inequality-averse	−0.818***	−0.836***	−0.831***	−0.949***
	(0.23)	(0.25)	(0.22)	(0.24)
Maximin	−0.744***	−0.639**	−0.843***	−0.791***
	(0.28)	(0.30)	(0.28)	(0.30)
Envious	−0.472	−0.754*	−0.329	−0.478
	(0.42)	(0.45)	(0.44)	(0.48)
Spiteful	−0.341	−0.438	−0.368	−0.567*
	(0.29)	(0.31)	(0.29)	(0.32)
Other	−0.346	−0.442	−0.394	−0.607
	(0.33)	(0.38)	(0.35)	(0.39)
Constant	4.817***	4.615***	4.811***	5.074***
	(0.22)	(0.43)	(0.21)	(0.43)
Controls	No	Yes	No	Yes
Observations	1494	1225	1454	1182
R^2	0.013	0.039	0.013	0.041

[29] Although, there is evidence that heterogeneous online samples do not necessarily display higher degrees of choice inconsistencies comes from Beranek et al.'s (2015). In an experiment based on modified dictator tasks a la Blanco et al. (2011) the authors find that subjects hired via Amazon Mechanical Turk (MTurk) are more consistent in their decisions than students from the UK and Turkey.

[30] There is a significant positive correlation between this measure and the individual-level R^2 from the Charness-Rabin regressions within a domain. There is also a significant positive correlation of consistency across the two domains, indicating that subjects who are consistent in one domain are also more likely to be consistent in the other domain.

Table 14
Redistributive attitudes. Robustness I: All scores in the same area. The dependent variable in columns (1) and (2) is the first principal component of the answers to four different redistributive questions that cover the topics of income taxation, redistribution in general and redistribution in the pension scheme and unemployment insurance. The dependent variable in columns (3) and (4) is the first principal component of four different items that measure support for immigration. The excluded reference group is "selfish". OLS regression, robust standard errors in brackets. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

	Redistributive attitudes		Attitudes towards immigration	
	(1)	(2)	(3)	(4)
Altruist	−0.783***	−0.843***	−0.789***	−0.590***
	(0.20)	(0.21)	(0.13)	(0.14)
Inequality-averse	−0.575***	−0.596***	−0.125	−0.202**
	(0.13)	(0.13)	(0.11)	(0.10)
Maximin	−0.612***	−0.617***	−0.469***	−0.311**
	(0.15)	(0.15)	(0.13)	(0.12)
Envious	−0.356**	−0.438**	0.115	0.084
	(0.17)	(0.20)	(0.18)	(0.19)
Spiteful	−0.335**	−0.363**	0.182	0.080
	(0.14)	(0.15)	(0.13)	(0.11)
Other	−0.673***	−0.645***	0.248	0.104
	(0.18)	(0.20)	(0.16)	(0.16)
Constant	0.515***	0.805***	0.078	1.952***
	(0.12)	(0.21)	(0.10)	(0.15)
Controls	No	Yes	No	Yes
Observations	1575	1269	1679	1338
R^2	0.022	0.095	0.038	0.248

Table 15
Left-right self-assessment. Robustness I: All scores in the same area. Dependent variables: political left-right self assessment on a scale from 1 (left) to 11 (right-wing). The excluded reference group is "selfish". OLS regression, robust standard errors in brackets. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

Left-right	(1)	(2)
Altruist	−0.878***	−1.010***
	(0.26)	(0.27)
Inequality-averse	−0.757***	−0.853***
	(0.19)	(0.21)
Maximin	−0.726***	−0.725***
	(0.23)	(0.24)
Envious	−0.939***	−0.880**
	(0.34)	(0.37)
Spiteful	−0.757***	−0.879***
	(0.23)	(0.26)
Other	−0.629**	−0.726**
	(0.28)	(0.31)
Constant	6.216***	6.295***
	(0.18)	(0.36)
Controls	No	Yes
Observations	1934	1538
R^2	0.008	0.039

Table 16
Voting. Robustness II: indifference curves do not bend backwards. The dependent variable is the party voted for in last election, columns (1) and (2), and party one plans to vote for if election were next Sunday, columns (4) and (4). The excluded reference group is "selfish". Higher values mean more right-wing. OLS regression, robust standard errors in brackets. *, ** and *** indicate significance at the 10%, 5% and 1% levels respectively.

	Voted last election		Vote next Sunday	
	(1)	(2)	(3)	(4)
Altruist	−0.502	−0.551	−0.397	−0.654
	(0.43)	(0.48)	(0.41)	(0.44)
Inequality-averse	−0.942***	−0.981***	−0.772***	−0.984***
	(0.26)	(0.29)	(0.26)	(0.28)
Maximin	−0.670**	−0.480	−0.705**	−0.672*
	(0.32)	(0.35)	(0.32)	(0.35)
Envious	−0.673	−0.879	−0.339	−0.634
	(0.58)	(0.58)	(0.62)	(0.61)
Spiteful	−0.475	−0.616*	−0.467	−0.754*
	(0.33)	(0.37)	(0.36)	(0.40)
Other	−0.373	−0.444	−0.064	−0.283
	(0.45)	(0.50)	(0.45)	(0.51)
Constant	4.873***	4.516***	4.672***	4.785***
	(0.25)	(0.51)	(0.25)	(0.52)
Controls	No	Yes	No	Yes
Observations	1104	899	1074	869
R^2	0.016	0.043	0.011	0.040

Table 17
Redistributive attitudes. Robustness II: indifference curves do not bend backwards. The dependent variable in columns (1) and (2) is the first principal component of the answers to four different redistributive questions that cover the topics of income taxation, redistribution in general and redistribution in the pension scheme and unemployment insurance. The dependent variable in columns (3) and (4) is the first principal component of four different items that measure support for immigration. The excluded reference group is "selfish". OLS regression, robust standard errors in brackets. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

	Redistributive attitudes		Attitudes towards immigration	
	(1)	(2)	(3)	(4)
Altruist	−0.656**	−0.872***	−0.814***	−0.698***
	(0.26)	(0.27)	(0.15)	(0.16)
Inequality-averse	−0.630***	−0.670***	−0.040	−0.175*
	(0.15)	(0.15)	(0.12)	(0.10)
Maximin	−0.634***	−0.634***	−0.402***	−0.278**
	(0.18)	(0.18)	(0.15)	(0.14)
Envious	−0.128	−0.323	0.253	0.361
	(0.26)	(0.32)	(0.22)	(0.26)
Spiteful	−0.308*	−0.316*	0.297*	0.138
	(0.17)	(0.17)	(0.15)	(0.14)
Other	−0.535*	−0.375	0.192	0.134
	(0.28)	(0.27)	(0.22)	(0.27)
Constant	0.542***	0.809***	−0.030	1.842***
	(0.14)	(0.25)	(0.11)	(0.18)
Controls	No	Yes	No	Yes
Observations	1134	916	1215	971
R^2	0.027	0.115	0.036	0.252

Table 18
Left-right self-assessment. Robustness II: indifference curves do not bend backwards. Dependent variables: political left-right self assessment on a scale from 1 (left) to 11 (right-wing). The excluded reference group is "selfish". OLS regression, robust standard errors in brackets. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

Left-right	(1)	(2)
Altruist	−0.700**	−0.884***
	(0.32)	(0.32)
Inequality-averse	−0.679***	−0.833***
	(0.22)	(0.23)
Maximin	−0.665**	−0.673**
	(0.26)	(0.28)
Envious	−0.386	−0.504
	(0.45)	(0.50)
Spiteful	−0.693**	−0.928***
	(0.27)	(0.31)
Other	−0.486	−0.713
	(0.37)	(0.47)
Constant	6.053***	6.094***
	(0.21)	(0.42)
Controls	No	Yes
Observations	1415	1119
R^2	0.007	0.044

A.1.4. Alternative codings of variables and estimation methods

Finally, we also assess whether our qualitative conclusions are sensitive (i) to the estimation procedure used and ii) to the coding of political variables. Regarding i), using OLS entails the implicit assumption that the difference between two values of the dependent variable is meaningful. This is not necessarily the case in the present context, in particular in thos estimations in which the party a participant voted for (or plans to vote for) is the dependent variable. Ordered Logit models relax this assumption and allow us to evaluate whether the statistical significant differences in behavior between selfish subjects on the one hand and altruistic, inequality-averse and maximin subjects on the other hand is an artifact of this empirical assumption. Our results (available upon request) indicate that this is clearly not the case.

In order to address ii), we collapse the answers to the questions "Which party would you vote for if there were elections next Sunday?", "Which party did you vote for at the last election?" and the answer to the political left-right self-assessment on the one-to-eleven scale into three distinct values (i.e. left - center - right).[31] Moreover, we also drop the center category and run the regressions using only a binary left-right outcome variable. We find that our results robustly survive those re-codings of variables (all these results are again available upon request). Finally, we make use of an external ideological classification of parties by 377 political scientists specialized in European political parties. This dataset is known as the *2014 Chapel Hill expert survey* (Polk et al., 2017) and contains ideological left-right classification of the major national parties in European countries. This classification in particular allows for a cardinal interpretation of ideological distances of parties within and across countries. The variable is measured on a scale from zero to ten. As can be seen in Table 19, the results are almost identical both in terms of statistical significance as well as marginal effects compared to previously presented results.

[31] In particular, we code the Left and the Greens as left, the AfD and the NPD as right and the remaining four parties as center, which seems to be a fair summary of the German political landscape. The political self-assessment on the other hand is coded such that left, right and center approximately form three equally large groups: a person is classified as left if the answer to this question is between 1 and 4, as center of the answer is between 5 and 7, and as right if the answer is between 8 and 11.

Table 19
Voting. Chapel Hill expert survey used for ideological classification of parties. The dependent variable in columns (1) and (2) is the party the subject voted for in the last national election, and the dependent variable in columns (3) and (4) is the answer to the "vote next Sunday" question. The excluded reference group is again "selfish". Higher values mean more right-wing. OLS regression, robust standard errors in brackets. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

	Voted last election		Vote next Sunday	
	(1)	(2)	(3)	(4)
Altruist	−0.895***	−0.861***	−1.134***	−1.015***
	(0.30)	(0.33)	(0.29)	(0.32)
Inequality-averse	−0.919***	−0.890***	−1.008***	−1.003***
	(0.22)	(0.24)	(0.22)	(0.23)
Maximin	−0.788***	−0.638**	−0.880***	−0.722**
	(0.26)	(0.28)	(0.27)	(0.29)
Envious	−0.472	−0.726**	−0.486	−0.494
	(0.32)	(0.35)	(0.35)	(0.39)
Spiteful	−0.450*	−0.534*	−0.509*	−0.602**
	(0.27)	(0.29)	(0.28)	(0.31)
Other	−0.479	−0.406	−0.453	−0.521
	(0.30)	(0.34)	(0.31)	(0.34)
Constant	5.805***	5.678***	5.866***	6.349***
	(0.21)	(0.41)	(0.21)	(0.42)
Controls	No	Yes	No	Yes
Observations	1763	1438	1734	1400
R^2	0.014	0.045	0.017	0.044

A.2. The experiment

A.2.1. Translated instructions

Dear participant of "Gesellschaft im Wandel",

In the following, we would like to ask you to distribute money between you and another anonymous participant of "Gesellschaft im Wandel". We will call the other randomly chosen participant your recipient. The distributional decisions concern real money; some randomly chosen decisions will actually be paid to the participants.

You will now successively see six tables. The two *left* columns in the table always show a distribution where you and your recipient are getting the same amount of money. The two *right* columns in the table always show a distribution where your recipient always receives the same amount of money, whilst your amount of money increases from one row to the next. All in all, this implies that the distribution on the left hand side always stays the same, whilst the one on the right hand side becomes more favorable for you, because you receive more money the further you go down in the table.

We would thus expect that participants prefer the left distribution at the beginning and then want to switch to the right distribution at some point. However, there might be participants who always prefer one distribution over the other. We want you to indicate in which row you would like to switch from the left distribution to the right distribution, i.e. from which row onwards you prefer the right distribution. On the following page, we will explain these tables with an example.

Later, the computer will randomly choose 250 participants among those who completed six tables. Each of these 250 chosen participants will receive actual money according to one row in one of the tables completed by them. The decisions made by the participants in these particular tables will then determine whether the left or right distribution will be paid.

In addition, 250 other participants of the survey will be assigned to the decision of one of the chosen participants and receives the money in their role as passive recipient. The money will then be transferred to the accounts of all selected participants. No participant can be picked more than once. We expect around 3000 participants in this survey.

To sum up: In this part of the survey, you are taking decisions in tables in which you are asked to indicate the line in which row you for the first time prefer the right over the left distribution. Besides your chance to receive money as a selected decision maker, you also have the chance to receive money as a passive recipient.

You can see in this table that you and the recipient both receive 20 euros in each row in the left distribution. In the right distribution, your amount of money increases from row to row while the passive recipient always receives 15 euros.

You are now supposed to choose the row in which you for the first time prefer the right over the left distribution. For example, if you for the first time prefer the right over the left distribution in the penultimate row, meaning you would rather receive 22 euro and the recipient 15 euros (right distribution) than both of you receiving 20 euros (left distribution) and you preferred the left distribution in all prior rows, then you should indicate the penultimate row as the one where you first preferred the right distribution over the left one.

We would now like to ask you to choose the row in which you would like to change from the left to the right distribution. In order to do so, please click on the row that you choose. After you have marked the row, the rest of the table will be completed automatically. For example, if you mark the first row, this implies that you always prefer the right distribution over the left one. Please control your decision one more time before you click on *Continue*.

Please select the row from which you prefer the right distribution over the left distribution. All numbers are in euro.

A.2.2. Screenshots

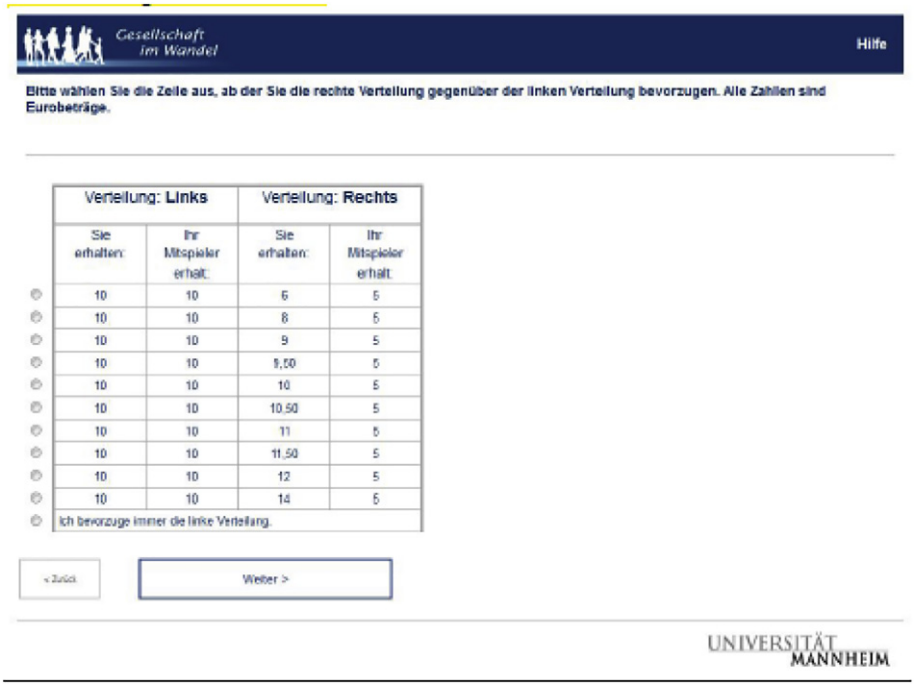

Fig. 6. Screenshot online experiment GIP.

A.2.3. Allocation tasks

Table 20
List 1.

	Allocation: Left		Allocation: Right	
	You get	The recipient gets	You get	The recipient gets
1 O	10	10	5	3
2 O	10	10	7	3
3 O	10	10	9	3
4 O	10	10	9.50	3
5 O	10	10	10	3
6 O	10	10	10.50	3
7 O	10	10	11	3
8 O	10	10	11.50	3
9 O	10	10	12	3
10 O	10	10	14	3
11 O		I always prefer the left allocation.		

Table 21
List 2.

	Allocation: Left		Allocation: Right	
	You get	The recipient gets	You get	The recipient gets
1 O	10	10	6	5
2 O	10	10	8	5
3 O	10	10	9	5
4 O	10	10	9.50	5
5 O	10	10	10	5
6 O	10	10	10.50	5
7 O	10	10	11	5
8 O	10	10	11.50	5
9 O	10	10	12	5
10 O	10	10	14	5
11 O		I always prefer the left allocation.		

Table 22
List 3.

	Allocation: Left		Allocation: Right	
	You get	The recipient gets	You get	The recipient gets
1 O	10	10	8	7
2 O	10	10	8.50	7
3 O	10	10	9	7
4 O	10	10	9.50	7
5 O	10	10	10	7
6 O	10	10	10.50	7
7 O	10	10	11	7
8 O	10	10	11.50	7
9 O	10	10	12	7
10 O	10	10	14	7
11 O		I always prefer the left allocation.		

Table 23
List 4.

	Allocation: Left		Allocation: Right	
	You get	The recipient gets	You get	The recipient gets
1 O	10	10	7	13
2 O	10	10	8	13
3 O	10	10	8.50	13
4 O	10	10	9	13
5 O	10	10	9.50	13
6 O	10	10	10	13
7 O	10	10	10.50	13
8 O	10	10	11	13
9 O	10	10	11.50	13
10 O	10	10	12	13
11 O		I always prefer the left allocation.		

Table 24
List 5.

	Allocation: Left		Allocation: Right	
	You get	The recipient gets	You get	The recipient gets
1 O	10	10	7	15
2 O	10	10	8	15
3 O	10	10	8.50	15
4 O	10	10	9	15
5 O	10	10	9.50	15
6 O	10	10	10	15
7 O	10	10	10.50	15
8 O	10	10	11	15
9 O	10	10	12	15
10 O	10	10	14	15
11 O		I always prefer the left allocation.		

Table 25
List 6.

	Allocation: Left		Allocation: Right	
	You get	The recipient gets	You get	The recipient gets
1 O	10	10	7	17
2 O	10	10	8	17
3 O	10	10	8.5	17
4 O	10	10	9	17
5 O	10	10	9.5	17
6 O	10	10	10	17
7 O	10	10	10.5	17
8 O	10	10	11	17
9 O	10	10	13	17
10 O	10	10	16	17
11 O		I always prefer the left allocation.		

A.3. More results: redistributive variables, scores, switching points and varying reference groups

A.3.1. Redistribution variables

Table 26
Redistribution. Dependent variables: (1): "Should the government mitigate income differences?"; lower values mean 'agree'. (2): "Should people who work more and consequently earn more, pay more or less taxes than they do currently?"; lower values mean 'should pay more taxes'. (3): "The redistributive aspect of the public pension system should be strengthened even if that weakens the merit principle" (information experiment; experimental treatment controls included but not displayed here); 1: agree, .. 5: reject. (4): "Should the government be responsible to secure an appropriate standard of living for the unemployed?"; 0: fully responsible ,,, 10: not at all. The excluded reference group is "selfish". OLS regression, robust standard errors in brackets. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

Redistribution	(1)	(2)	(3)	(4)
Altruist	−0.536***	−0.297**	−0.574***	−0.902***
	(0.18)	(0.12)	(0.18)	(0.35)
Inequality-averse	−0.443***	−0.168**	−0.459***	−0.599**
	(0.12)	(0.07)	(0.12)	(0.24)
Maximin	−0.424***	−0.101	−0.455***	−0.934***
	(0.15)	(0.09)	(0.14)	(0.29)
Envious	−0.161	−0.202*	−0.350*	−0.429
	(0.18)	(0.10)	(0.18)	(0.37)
Spiteful	−0.246*	−0.136	−0.251*	−0.081
	(0.14)	(0.09)	(0.14)	(0.28)
Other	−0.366**	−0.156	−0.522***	−0.711**
	(0.17)	(0.12)	(0.15)	(0.33)
Constant	2.985***	3.192***	3.310***	6.300***
	(0.18)	(0.12)	(0.18)	(0.36)
Controls	Yes	Yes	Yes	Yes
Observations	1895	1942	1597	1868
R^2	0.068	0.044	0.084	0.035

A.3.2. Using scores as independent variables

Table 27
Voting. The dependent variable in columns (1) and (2) is the party the subject voted for in the last national election, and the dependent variable in columns (3) and (4) is the answer to the "next Sunday" question. The excluded reference group is "selfish". Higher values mean more right-wing. OLS regression, robust standard errors in brackets. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

	Voted last election		Vote next Sunday	
	(1)	(2)	(3)	(4)
x Score	0.034	0.007	0.035	0.010
	(0.02)	(0.03)	(0.02)	(0.03)
y Score	−0.058***	−0.020	−0.068***	0.012
	(0.02)	(0.03)	(0.02)	(0.03)
x Score * x score	–	−0.007	–	−0.001
		(0.01)		(0.01)
y Score * y score	–	−0.014*	–	−0.029***
		(0.01)		(0.01)
Constant	4.231***	4.379***	4.526***	4.740***
	(0.33)	(0.33)	(0.34)	(0.35)
Controls	Yes	Yes	Yes	Yes
Observations	1438	1438	1400	1400
R^2	0.043	0.048	0.045	0.058

Table 28
Redistributive attitudes. The dependent variable in columns (1) and (2) is the first principal component of the answers to four different redistributive questions that cover the topics of income taxation, redistribution in general and redistribution in the pension scheme and unemployment insurance. The dependent variable in columns (3) and (4) is the first principal component of four different items that measure support for immigration. The excluded reference group is "selfish". OLS regression, robust standard errors in brackets. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

	Redistributive attitudes		Attitudes towards immigration	
	(1)	(2)	(3)	(4)
x Score	−0.013	−0.027*	−0.030***	−0.036***
	(0.01)	(0.02)	(0.01)	(0.01)
y Score	−0.040***	−0.014	−0.055***	−0.019*
	(0.01)	(0.01)	(0.01)	(0.01)
x Score * x score	–	−0.003	–	0.004
		(0.00)		(0.00)
y Score * y score	–	−0.009***	–	−0.014***
		(0.00)		(0.00)
Constant	0.294**	0.374**	1.968***	2.053***
	(0.15)	(0.15)	(0.12)	(0.12)
Controls	Yes	Yes	Yes	Yes
Observations	1500	1500	1580	1580
R^2	0.088	0.095	0.259	0.270

Table 29
Left-right self-assessment. Dependent variables: political left-right self-assessment on a scale from 1 (left-wing) to 11 (right-wing). OLS regression, robust standard errors in brackets. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

Left-right	(1)	(2)	(3)	(4)
x Score	0.026	−0.001	0.034*	−0.001
	(0.02)	(0.02)	(0.02)	(0.02)
y Score	−0.039***	0.042**	−0.039**	0.049**
	(0.01)	(0.02)	(0.02)	(0.02)
x Score * x score	–	−0.001	–	−0.003
		(0.01)		(0.01)
y Score * y score	–	−0.030***	–	−0.032***
		(0.01)		(0.01)
Constant	5.720***	5.991***	5.964***	6.191***
	(0.06)	(0.08)	(0.27)	(0.27)
Controls	No	No	Yes	Yes
Observations	2293	2293	1827	1827
R^2	0.006	0.023	0.043	0.060

A.3.3. Varying reference groups

In this section, we elaborate on the previous findings by presenting regressions in which we vary the omitted type across columns. Specifically, we present the results on past and future voting and on political self-assessment – see Tables 30, 31 and 34 – as well as the results on redistributive preferences and attitudes towards immigration, see Tables 32 and 33. In all tables, the inequality-averse, the altruists and the maximin types are first, the envious, spiteful and *other* are next and the selfish types are in the last line. With this ordering of types, with very few exceptions, all the values below the diagonal are positive. This observation suggests that the ordering of types in the tables roughly corresponds to their ordering in the political left-right spectrum.

Table 30
Voted last election. The dependent variable is the party the subject voted for in the last national election. Higher values mean more right-wing. OLS regression, robust standard errors in brackets. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively. Controls are included in all cases.

Voted last election	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Altruist		−0.042	−0.265	−0.233	−0.412	−0.421	−0.978***
		(0.25)	(0.29)	(0.35)	(0.30)	(0.33)	(0.33)
Inequality-averse	0.042		−0.223	−0.191	−0.370**	−0.379*	−0.936***
	(0.25)		(0.18)	(0.27)	(0.18)	(0.23)	(0.23)
Maximin	0.265	0.223		0.032	−0.147	−0.156	−0.713**
	(0.29)	(0.18)		(0.31)	(0.24)	(0.27)	(0.28)
Envious	0.233	0.191	−0.032		−0.179	−0.188	−0.745**
	(0.35)	(0.27)	(0.31)		(0.31)	(0.34)	(0.34)
Spiteful	0.412	0.370**	0.147	0.179		−0.009	−0.566**
	(0.30)	(0.18)	(0.24)	(0.31)		(0.28)	(0.28)
Others	0.421	0.379*	0.156	0.188	0.009		−0.557*
	(0.33)	(0.23)	(0.27)	(0.34)	(0.28)		(0.31)
Selfish	0.978***	0.936***	0.713**	0.745**	0.566**	0.557*	
	(0.33)	(0.23)	(0.28)	(0.34)	(0.28)	(0.31)	
Constant	3.771***	3.813***	4.036***	4.004***	4.183***	4.192***	4.749***
	(0.41)	(0.33)	(0.36)	(0.41)	(0.37)	(0.37)	(0.38)
Observations	1438	1438	1438	1438	1438	1438	1438
R^2	0.045	0.045	0.045	0.045	0.045	0.045	0.045

Table 31
Voting next Sunday. The dependent variable is the answer to the "vote next Sunday" question. Higher values mean more right-wing. OLS regression, robust standard errors in brackets. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively. Controls are included in all cases.

Vote next Sunday	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Altruist		0.023	−0.227	−0.388	−0.373	−0.309	−0.995***
		(0.25)	(0.30)	(0.38)	(0.31)	(0.33)	(0.32)
Inequality-averse	−0.023		−0.250	−0.411	−0.396*	−0.332	−1.018***
	(0.25)		(0.20)	(0.30)	(0.20)	(0.24)	(0.22)
Maximin	0.227	0.250		−0.161	−0.146	−0.082	−0.768***
	(0.30)	(0.20)		(0.35)	(0.27)	(0.30)	(0.28)
Envious	0.388	0.411	0.161		0.014	0.078	−0.607*
	(0.38)	(0.30)	(0.35)		(0.35)	(0.37)	(0.36)
Spiteful	0.373	0.396*	0.146	−0.014		0.064	−0.622**
	(0.31)	(0.20)	(0.27)	(0.35)		(0.30)	(0.28)
Others	0.309	0.332	0.082	−0.078	−0.064		−0.685**
	(0.33)	(0.24)	(0.30)	(0.37)	(0.30)		(0.31)
Selfish	0.995***	1.018***	0.768***	0.607*	0.622**	0.685**	
	(0.32)	(0.22)	(0.28)	(0.36)	(0.28)	(0.31)	
Constant	4.112***	4.089***	4.339***	4.499***	4.485***	4.421***	5.106***
	(0.41)	(0.34)	(0.38)	(0.46)	(0.39)	(0.40)	(0.38)
Observations	1400	1400	1400	1400	1400	1400	1400
R^2	0.047	0.047	0.047	0.047	0.047	0.047	0.047

Table 32
Redistributive preferences. The dependent variable is the answer first principal component of the answer to four different redistributive questions. OLS regression, robust standard errors in brackets. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively. Controls are included in all cases.

Redistribution	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Altruist		−0.148	−0.144	−0.264	−0.399**	−0.140	−0.663***
		(0.15)	(0.16)	(0.17)	(0.16)	(0.18)	(0.18)
Inequality-averse	0.148		0.004	−0.116	−0.251***	0.008	−0.514***
	(0.15)		(0.08)	(0.10)	(0.08)	(0.11)	(0.11)
Maximin	0.144	−0.004		−0.120	−0.255**	0.004	−0.519***
	(0.16)	(0.08)		(0.13)	(0.11)	(0.13)	(0.13)
Envious	0.264	0.116	0.120		−0.135	0.124	−0.398***
	(0.17)	(0.10)	(0.13)		(0.12)	(0.14)	(0.14)
Spiteful	0.399**	0.251***	0.255**	0.135		0.259**	−0.263**
	(0.16)	(0.08)	(0.11)	(0.12)		(0.13)	(0.13)
Other	0.140	−0.008	−0.004	−0.124	−0.259**		−0.523***
	(0.18)	(0.11)	(0.13)	(0.14)	(0.13)		(0.15)
Selfish	0.663***	0.514***	0.519***	0.398***	0.263**	0.523***	
	(0.18)	(0.11)	(0.13)	(0.14)	(0.13)	(0.15)	
Constant	0.028	0.176	0.172	0.292*	0.427***	0.168	0.691***
	(0.20)	(0.15)	(0.16)	(0.18)	(0.16)	(0.17)	(0.18)
Observations	1500	1500	1500	1500	1500	1500	1500
R^2	0.094	0.094	0.094	0.094	0.094	0.094	0.094

Table 33
Attitudes toward immigration. The dependent variable is the first principal component of the support for four different statements about immigration. OLS regression, robust standard errors in brackets. *, ** and *** indicate significance at the 10%, 5% and 1% level, respectively. Controls are included in all cases.

Immigration	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Altruist		−0.487***	−0.457***	−0.818***	−0.776***	−0.797***	−0.711***
		(0.11)	(0.13)	(0.16)	(0.13)	(0.15)	(0.14)
Inequality-averse	0.487***		0.030	−0.331***	−0.289***	−0.309***	−0.223**
	(0.11)		(0.09)	(0.12)	(0.07)	(0.10)	(0.09)
Maximin	0.457***	−0.030		−0.361**	−0.319***	−0.339***	−0.253**
	(0.13)	(0.09)		(0.14)	(0.10)	(0.12)	(0.11)
Envious	0.818***	0.331***	0.361**		0.042	0.022	0.108
	(0.16)	(0.12)	(0.14)		(0.14)	(0.15)	(0.15)
Spiteful	0.776***	0.289***	0.319***	−0.042		−0.020	0.066
	(0.13)	(0.07)	(0.10)	(0.14)		(0.11)	(0.11)
Other	0.797***	0.309***	0.339***	−0.022	0.020		0.086
	(0.15)	(0.10)	(0.12)	(0.15)	(0.11)		(0.13)
Selfish	0.711***	0.223**	0.253**	−0.108	−0.066	−0.086	
	(0.14)	(0.09)	(0.11)	(0.15)	(0.11)	(0.13)	
Constant	1.339***	1.826***	1.796***	2.157***	2.115***	2.135***	2.049***
	(0.16)	(0.12)	(0.15)	(0.18)	(0.13)	(0.15)	(0.14)
Observations	1580	1580	1580	1580	1580	1580	1580
R^2	0.259	0.259	0.259	0.259	0.259	0.259	0.259

Table 34
Left-right Self-assessment. Dependent variable: political left-right self-assessment on a scale from 1 (left) to 11 (right-wing). OLS regression, robust standard errors in brackets. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively. Controls are included in all cases.

Left-right	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Altruist		−0.177	−0.450**	−0.197	−0.272	−0.358	−1.008***
		(0.17)	(0.20)	(0.29)	(0.22)	(0.25)	(0.23)
Inequality-averse	0.177		−0.273*	−0.020	−0.095	−0.181	−0.831***
	(0.17)		(0.14)	(0.24)	(0.16)	(0.20)	(0.18)
Maximin	0.450**	0.273*		0.253	0.178	0.092	−0.558***
	(0.20)	(0.14)		(0.27)	(0.20)	(0.23)	(0.21)
Envious	0.197	0.020	−0.253		−0.075	−0.161	−0.811***
	(0.29)	(0.24)	(0.27)		(0.28)	(0.30)	(0.29)
Spiteful	0.272	0.095	−0.178	0.075		−0.086	−0.736***
	(0.22)	(0.16)	(0.20)	(0.28)		(0.24)	(0.22)
Others	0.358	0.181	−0.092	0.161	0.086		−0.650**
	(0.25)	(0.20)	(0.23)	(0.30)	(0.24)		(0.25)
Selfish	1.008***	0.831***	0.558***	0.811***	0.736***	0.650**	
	(0.23)	(0.18)	(0.21)	(0.29)	(0.22)	(0.25)	
Constant	5.517***	5.694***	5.967***	5.714***	5.789***	5.875***	6.525***
	(0.30)	(0.27)	(0.30)	(0.36)	(0.30)	(0.31)	(0.31)
Observations	1827	1827	1827	1827	1827	1827	1827
R^2	0.047	0.047	0.047	0.047	0.047	0.047	0.047

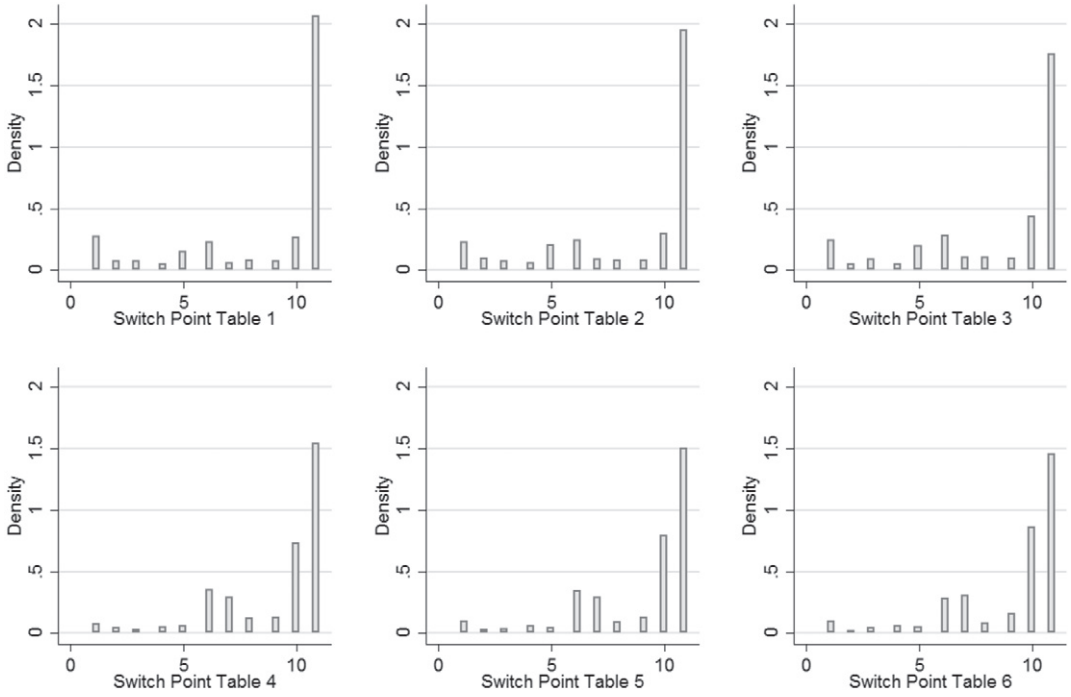

Fig. 7. Histogram of switching points from symmetric to asymmetric allocation by table. The symmetric reference allocation is always (10,10). The income of the passive subject in the asymmetric allocation is 3, 5, 7, 13, 15 and 17 in panels 1 to 6, respectively. 11 means 'always prefer equal allocation'.

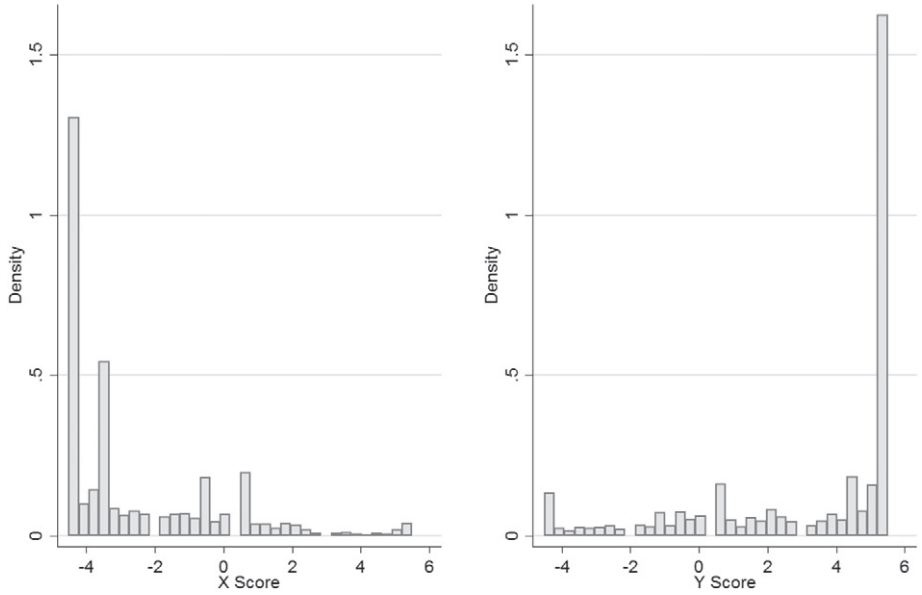

Fig. 8. Histogram of x- and y scores.

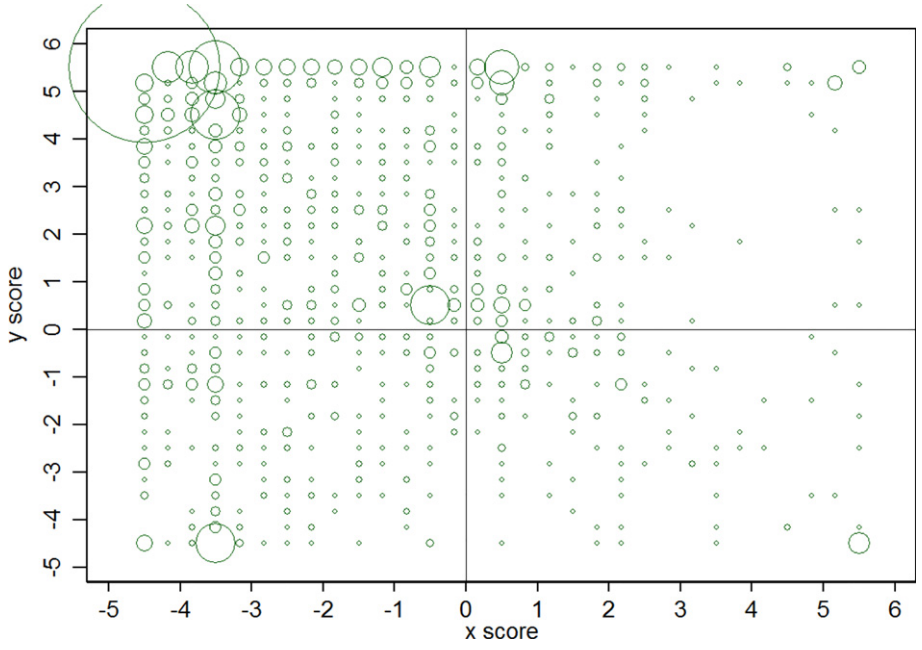

Fig. 9. Distribution of (x, y) scores. $N = 2794$.

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