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Ann-Sofie Isaksson, Annika Lindskog

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Authors: Ann-Sofie Isaksson, Annika Lindskog

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Preferences for redistribution
- A country comparison of fairness judgements*

Ann-Sofie Isaksson[a], and Annika Lindskog[b]

[a] Department of economics, University of Gothenburg, Box 640, 405 30 Göteborg, Sweden, Ann-Sofie.Isaksson@economics.gu.se
[b] Department of economics, University of Gothenburg, Box 640, 405 30 Göteborg, Sweden, Annika.Lindskog@economics.gu.se

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Abstract

This paper seeks to explain within- and between-country variation in redistributive preferences in terms of self-interest concerns and an input-based concept of fairness, which we examine by looking at the effects of beliefs regarding the causes of income differences. Results of estimations based on data for 25 countries indicate that both factors are indeed important determinants of redistribution support, in line with hypothesised patterns. We find that while differences in beliefs on what causes income differences seem to be important for explaining within-country variation in redistributive preferences, they do little to explain between-country differences. Differences in the *effects* of holding certain beliefs, however, are important for explaining between-country variation in redistributive preferences, suggesting considerable heterogeneity across societies in what is considered as fair.

JEL classification: D63, D31, D01
Keywords: Redistribution preferences; fairness.

1. Introduction

Rational economic self-interest fails to explain the wide spread in support for income redistribution.[1] Judging from standard economic reasoning, according to which individuals are motivated by self-interested utility maximization, this is puzzling. However, based on a vast experimental literature there is a growing consensus that people are motivated by forces other than self-interest, and particularly so by fairness considerations.[2]

One could in this context make a distinction between fairness concepts focusing only on outcomes, such as strict egalitarianism,[3] and those accounting for individual inputs contributing to those outcomes. The general idea that the fair distribution should depend on individual inputs is well established, both in the normative literature on justice and in positive analyses of what people consider to be just. According to equity theory dating back to social psychologist Adams (1965), people expect their outcome of some exchange to be correlated[4] to inputs seen as relevant for that exchange, such as effort, skills and talent. Which inputs are considered relevant and how correlated individuals wish these inputs to be to the outcome should according to Adams depend on societal norms that individuals learn by socialisation. Dworkin (1981a, b), and later Roemer (2002), distinguish between inputs for which the individual could be considered directly responsible – 'responsible inputs', and those that are beyond the individual's control – 'arbitrary inputs', and argue that fair distributions should be based on responsible inputs

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[1] See for example Fong et al. (2005).

[2] See for example Burrows and Loomes (1994), Cappelen et al. (2007) and Clark (1998).

[3] See also the influential inequality aversion model of Fehr and Schmidt (1999), or fairness concepts stressing basic needs. See Konow (2003) for a good discussion of different fairness ideals.

[4] Interpreting Adam's equity theory in a strict sense, outcomes should even be *proportional* to inputs. For experimental evidence on this theme, see for example Van Dijk and Wilke (1994) or Clark (1998).

only. If people in their fairness judgements actually distinguish between inputs in this fashion, then those who believe that income determinants to a greater degree are 'responsible' should consider the prevailing income distribution fairer and thus be less inclined to support redistribution, whereas those who to a larger extent view them as 'arbitrary' should see the existing income differences as more unfair and accordingly be more supportive of redistribution.[5]

With respect to empirical estimation of redistributive preferences, these arguments first of all motivate going beyond standard economic self-interest explanations. More specifically, they point to the importance of incorporating individual beliefs about the causes of income differences, and in particular beliefs on income determinants that could be seen as being under varying degrees of individual control. Second, they highlight the importance of studying preferences for redistribution in a country comparative framework. Whether or not due to actual variation in what determines final incomes, beliefs about the causes of income differences are likely to vary across societies.[6] This should create corresponding differences in redistribution support. Similarly, judgements on the extent to which perceived income determinants are under individual control are likely to vary among individuals and communities. This variation too could be due to differences in norms as well as in actual circumstances. Regardless of which, the implication is that the relationship between beliefs about the causes of income differences and redistributive preferences is likely to vary with context, and not the least across countries, thus highlighting the importance of allowing for cross-country parameter heterogeneity.[7]

Against this background, this paper seeks to explain within- and between-country variation in redistributive preferences in terms of both self-interest concerns and an input-based concept of fairness captured by beliefs about the causes of income differences, allowing the effect of beliefs to differ among countries. More specifically, we will address the following two hypotheses:

i. *Both economic self-interest and an input-based fairness concept, where individuals judge the fairness of income determinants according to their perceived degree of 'responsibility', matter for redistributive preferences.*

ii. *Differences in beliefs about income determinants and differences in the effects of these beliefs both contribute to explain the cross-country variation in preferences for redistribution.*

Several papers demonstrate reasons why a person's redistributive preferences do not necessarily correspond to his or her current pecuniary interest. Perceived prospects of future upward mobility and risks of future downward mobility may imply that a poor

[5] Cappelen and Tungodden (2006) add some nuance to this general claim, showing that if there are negative correlations between different non-responsibility (what we refer to as arbitrary) factors, one cannot expect a monotonic relationship between the responsibility assigned to people and the ideal level of redistribution. However, the general formulation put forward here should still hold.

[6] One reason for this variation could be differences in the redistributive policies pursued by the countries in question, in turn giving country variation in perceived and/or actual income earning possibilities (see for example the article on multiple welfare states equilibriums by Alesina and Angeletos, 2005). Whether country differences in beliefs about the causes of income differences are due to actual variation in what determines final incomes is an interesting question, but will not be addressed in this paper. Focus lies on the effect of these beliefs on redistribution support, rather than on their formation.

[7] The relationship between beliefs about the causes of income differences and redistributive preferences could vary between countries for several reasons, something which we get back to in section 3.2.2.

person sees redistribution as against her interest and that a rich person sees it as favouring her interests (Buchanon and Tullock, 1962; Piketty, 1995; Benabou and Ok, 2001; Ravallion and Lokshin, 2000). Views on the incentive costs of redistribution are also likely to influence preferences for redistribution (Piketty, 1995). Moreover, Corneo and Grüner (2000) show, theoretically and empirically, that social competition and status concerns can have important influences on preferences for redistribution, and make the middle class align with the higher class to limit redistribution.

Explicitly relating beliefs about the causes of income differences to redistributive preferences is, however, a relatively new approach in the economics literature. Out of the few previous investigations, our study mostly resembles that of Fong (2001), who to our knowledge is the only one to explicitly distinguish between responsible and arbitrary inputs.[8] She examines a US sample and finds beliefs about causes of income differences to be important (and working in the expected directions) for explaining redistributive preferences. A few other studies also lend support to the importance of an input-based concept of fairness for redistributive preferences. Alesina and La Ferrara (2005) and Piketty (1995), for example, both confirm that in the US, those who believe that society offers equal opportunities to people who put in effort are more averse to redistribution.

However, if there is country variation in beliefs about what causes income differences and in judgements of what income determinants could be considered under individual control one cannot necessarily expect these results to hold outside of the United States. In fact, related research efforts call attention to the need for cross-country comparative work in the area. Based on a comparison of former East and West Germany showing that former East Germans are more in favour of redistribution than West Germans, even when controlling for their lower incomes, Alesina and Fuchs-Schündeln (2007) argue that individuals' preferences concerning government welfare provision are shaped by the economic regime in which they live. Similarly, Alesina et al. (2001) dedicate an extensive article to the issue of why the US does not have the same type of welfare state as Europe, and their evaluation does not speak to the advantage of basing conclusions of general attitudes towards redistribution on US evidence only.

In spite of these concerns, the country-comparative material relating redistributive preferences to beliefs about the causes of income differences is meagre. To our knowledge, the only serious study in the area based on a more than one-country sample is the paper by Corneo and Grüner (2002), which looks at 12 countries. Their main focus is the effect of social rivalry and status concerns on preferences for redistribution.[9] However, they also consider, and find a significant effect of, beliefs about the importance of hard work for determining income, and that people in former socialist countries are more supportive of redistribution. However, they do not, as is done in this paper, include variables capturing beliefs on income determinants that could be seen as being under a varying degree of individual control, nor is their approach country comparative in the sense that it allows for cross-country parameter heterogeneity.

This paper thus contributes to the literature by explicitly relating redistributive preferences to beliefs about income determinants under a varying degree of individual responsibility, and by doing so in a country comparative framework seeking to explain both within-country and between-country variations.

2. Empirical framework

[8] She refers to them as exogenous and discretionary factors.

[9] Their key finding is that a person is more likely to favour redistribution if people that are either somewhat richer or somewhat poorer than them have a higher job status in relation to their own.

To investigate how preferences for redistribution vary within and between countries we use the ISSP Social Inequality III survey data set from 1999/2000 for 24 countries; Australia, Brazil, Canada, Chile, Cyprus, Czech Republic, Denmark, France, Germany, Hungary, Ireland, Japan, Latvia, New Zealand, Norway, Philippines, Poland, Portugal, Russia, Slovenia, Spain, Sweden, Switzerland, and USA.[10] Since preferences for redistribution have been shown to vary between former East and West Germany (Alesina and Fuchs-Schündeln, 2007), Germany has been divided into its former East and West German regions, giving us an effective sample of 25 countries. In most countries we have an estimation sample of 600 to 1000 observations. The smallest samples are those of eastern and western Germany, with 309 and 511 observations. The largest samples are the French and Brazilian ones, with 1396 and 1327 observations. In the total sample we have 20250 respondents.

Our dependent variable is the response to the statement, '*It is the responsibility of the government to reduce the difference in income between people with high incomes and those with low incomes'*, ranging from 1 for *strongly disagree* to 5 for *strongly agree*. In using this variable as our dependent, we have to make the assumption that the responses to the statement actually reflect the degree of redistribution that the respondents want, meaning that people who are more supportive of the statement also desire more redistribution. The fact that responses to this statement are highly correlated with responses to a question about the desired progressiveness or regressiveness of the tax system makes us more confident with regard to this assumption.[11] As can be seen in Figure 1, which gives the share of respondents agreeing or strongly agreeing with the redistributive statement in the country sub-samples, there is substantial country variation in support for redistribution. The share of respondents supporting the redistributive statement ranges from 34 percent in the US to around 91 percent in Brazil.

<<FIGURE 1 ABOUT HERE>>

Turning to our explanatory variables, these could be divided into three major categories: pecuniary self-interest variables, indicators on beliefs about the causes of income differences included to capture the potential influence of input-based fairness concerns, and control variables. With regard to the former, an individual should according to economic thinking want the level of redistribution that maximises the utility derived from his/her current and expected future income. With redistribution going from the 'rich' to the 'poor', support for redistribution should thus be decreasing in both current and expected future relative income. Moreover, it is possible to view redistribution as insurance against income risk. A more risk-averse person should then prefer more redistribution and vice versa, and similarly someone with a high perceived income risk should prefer more redistribution and vice versa. Due to data limitations, however, expected future income, risk aversion and perceived income risk are omitted; leaving us with relative income[12] to capture self-interest.

[10] Austria, Bulgaria, Great Britain, Israel, Netherlands, and Northern Ireland are excluded since key variables are missing.

[11] The reason why we do not use the tax question as our dependent variable is the much smaller variation over the five response categories for this question. Extremely few want high income earners to pay a smaller or much smaller share in taxes than low income earners, and these alternatives constitute two of the five response categories.

[12] Household income per adult equivalent divided by the country sample average. Note that the difference between relative income and absolute income is only relevant in pooled sample estimations including all four countries.

Other socio-demographic variables, such as class affiliation and higher education, could also be seen as considered to capturing self-interest, but might just as well capture differences associated with fairness concerns. Just as a more homogenous group is likely to be more equal in terms of omitted self-interest variables (such as expected future income), it seems reasonable that they also have more similar beliefs about how much an omitted 'input' does and should contribute to income. This ambiguity makes it more suitable to view the included socio-demographic indicators as controls for omitted variables rather than as factors in themselves capturing the influence of either fairness or self-interest concerns. The socio-demographic variables included on top of relative income are level of education, father's education, self-reported class belonging, sex and age.

Furthermore, we include a dummy controlling for potential concerns over incentives effects of redistribution (indicating whether the respondent agrees with the statement, *'Large differences in income are necessary for [country's] prosperity'*.[13] The pooled sample estimations also include country dummies to capture unexplained country differences in redistribution support.

To evaluate the potential influence of an input-based fairness concept where individuals judge the fairness of income determinants according to their perceived degree of 'responsibility', we need to include variables capturing beliefs about the importance of income determinants that are arguably under a varying degree of individual control.[14] As noted, views on the degree to which an input could be seen as 'responsible' are likely to differ among individuals. Some inputs, however, are easier to classify than others. Effort, for example, is often put forward as being largely under individual control, whereas factors associated with birth conditions, such as family background, could hardly be seen as something controllable by the individual. Inputs such as intelligence, skills or talents seem to be more controversial. We include three variables to capture beliefs about the importance of certain factors for determining income differences in society: one looks at beliefs about the importance of effort (arguably a responsible factor), another has to do with the importance of family background (arguably an arbitrary factor outside of individual control), and the third captures the perceived importance of intelligence and skills.[15] How to categorise the latter in terms of 'responsibility' is less clear-cut,[16] why the impact of this belief variable on redistributive preferences should be equally ambiguous and thereby occupy a middle position between the effects of the other two belief variables. For variable definitions see Table A1.

Since our dependent variable is discrete and inherently ordered, we use ordered probit for estimation according to the benchmark setup given in equation 1:

[13] It would be possible to follow Corneo and Grüner (2002) and control for the effect of status concerns on preferences for redistribution. Following their approach would, however, involve dropping observations from the richest and poorest income group, decreasing the representativeness of our sample and the variation in a key variable. Since status concerns is not our focus we choose not to do this.

[14] Some authors make a clear distinction between arbitrary and responsible inputs (see for example Cappelen and Tungodden 2006, who refer to a strict 'responsibility cut'). We believe that speaking in terms of different *degrees* of responsibility over inputs, where completely arbitrary and entirely responsible are the two extremes, better reflect popular opinions in this context.

[15] The belief variables are based on questions asking how important the factor is 'for getting ahead', or on agreement with a statement saying that the factor is 'rewarded' in society (see Table A1). Although these formulations could be interpreted in non-monetary terms, we still believe that the answers constitute good approximations of beliefs about factors underlying *monetary* success. Hence we speak of these variables as concerning beliefs about the causes of income/income differences.

[16] Adding to this ambiguity is the dubious nature of the variable formulation. The statement captures both intelligence *and* skills, and many might argue that these two characteristics vary in terms of the extent to which they are acquired through life and thereby in the degree to which they are under individual control.

$$(1) \qquad PR_{ic} = \alpha_c \tilde{y}_{ic} + \boldsymbol{\beta}_c' \mathbf{b}_{ic} + \boldsymbol{\delta}_c' \mathbf{x}_{ic} + \varepsilon_{ic}$$

PR_{ic} gives the unobserved redistributive preference of individual *i* in country *c*, $\tilde{y}_{ic}$ captures individual relative income, $\mathbf{b}_{ic}$ is the vector of belief variables, $\mathbf{x}_{ic}$ is the vector of control variables, and ε_{ic} is a standard normally distributed error term. The probability that individual *i* in country *c* chooses response alternative *k* is the probability that the value of the unobserved support for redistribution falls between the cut-points μ_{k-1} and μ_k. Assuming normally distributed error terms with mean zero and variance 1, and denoting the normal cumulative distribution function Φ, these are:

$$(2) \quad \begin{aligned} &\Pr(y_{ic}=1) = \Phi(\mu_1 - \alpha_c \tilde{y}_{ic} - \boldsymbol{\beta}_c' \mathbf{b}_{ic} - \boldsymbol{\delta}_c' \mathbf{x}_{ic}) \\ &\Pr(y_{ic}=k) = \Phi(\mu_k - \alpha_c \tilde{y}_{ic} - \boldsymbol{\beta}_c' \mathbf{b}_{ic} - \boldsymbol{\delta}_c' \mathbf{x}_{ic}) - \Phi(\mu_{k-1} - \alpha_c \tilde{y}_{ic} - \boldsymbol{\beta}_c' \mathbf{b}_{ic} - \boldsymbol{\delta}_c' \mathbf{x}_{ic}) \\ &\Pr(y_{ic}=5) = 1 - \Phi(\mu_4 - \alpha_c \tilde{y}_{ic} - \boldsymbol{\beta}_c' \mathbf{b}_{ic} - \boldsymbol{\delta}_c' \mathbf{x}_{ic}), \; k = 2,3,4. \end{aligned}$$

Regression coefficients and cut-points are estimated by the maximum likelihood estimator. When the coefficient is positive, a positive change in the independent variable decreases the probability of the lowest ranked outcome and increases the probability of the highest ranked outcome, but does not reveal the direction of change in probabilities of intermediate outcomes. To be able to say something about the direction of change for intermediate outcomes, as well as of magnitudes of changes, we present the effects of given discrete changes in the independent variables on the probabilities of observing the different outcomes on our dependent variable. For a dummy variable D this is simply calculated as $\Pr(y_{iC}=k)$ evaluated at $D=1$ minus $\Pr(y_{iC}=k)$ evaluated at $D=0$, keeping the remaining variables at their means. Analogously, for the effect of a given change in a continuous variable *X*, $\Pr(y_{iC}=k)$ is evaluated at two specified values of *X*.

3. Results

In this section we evaluate our two hypotheses empirically. We start by examining our first hypothesis, considering the extent to which economic self-interest considerations and input-based fairness concerns can help explain redistributive preferences. Then we turn to our second hypothesis, suggesting that both differences in beliefs about income determinants and differences in the effects of these beliefs contribute to explain the cross-country variation in redistributive preferences.

3.1 Explaining preferences for redistribution

Our first hypothesis can be evaluated by considering the results of the benchmark estimation given in equation 1, estimated separately for each country as well as for the full sample with country dummies. The first part of this hypothesis, stipulating that self-interest considerations should matter for redistributive preferences, implies that a higher relative income should give a lower support for redistribution, so that $\alpha_c < 0$. The analysis of the second part of the hypothesis, arguing that the effect of beliefs about the causes of income differences differs with the respective inputs' degree of responsibility, rests on accepting the suggested classification of effort as the most 'responsible' input out of the three considered, family background as the least responsible, and intelligence/skills

as a less clear-cut one located somewhere between the other two. Then with regard to believing that the concerned inputs are important for determining income, we should have $\beta_c^{effort} < \beta_c^{skills} < \beta_c^{family}$, $\beta_c^{effort} < 0$ and $\beta_c^{family} > 0$.

Table 1 presents the marginal effects from the pooled sample ordered probit estimation of equation 1. Figure 2-5 summarise the results of estimation of equation 1 for our 25 country sub-samples, focusing on the effects of movements in our key variables – the belief and relative income indicators.

<<TABLE 1 ABOUT HERE>>

Let us start by briefly commenting on the pooled sample effects of our control variables (Table 1). As noted in Section 2, omitted belief and self-interest variables makes the parameters of the socio-demographic controls somewhat difficult to interpret; do they reflect differences in norms and beliefs among different groups in society, or do they capture self-interest considerations? At any rate, a number of interesting patterns stand out. Respondents with higher education, respondents whose fathers have higher education, and respondents claiming to belong to the upper class all tend to be less supportive of redistribution (the reverse is true for those who claim to belong to the working class). This could reflect higher expected future relative incomes given current relative income for well-educated people with steeper age-earnings profiles, or that privileged classes have better professional connections and thus face smaller income risks, but could also depend on differences in norms between social groups. Similarly, the fact that women are more likely to support the redistributive statement could reflect a higher perceived income risk among women, a greater degree of risk-aversion or alternatively that women hold different norms regarding what is fair. Moreover, there is a positive age effect on support for the redistributive statement, perhaps reflecting a change over time in popular sentiments towards redistribution. In what follows these socio-demographic variables will be treated as controls for omitted self-interest and belief indicators. The estimation also includes 24 country dummies, where USA, the country with the least support for redistribution, is the reference category. The country effects, all statistically significant at the 1 percent level, are not presented in Table 1, but to get a feeling for their size see Figure 9, Specification 2. In short, the largest country effects are found in the former socialist countries (in line with the findings of Corneo and Grüner, 2002), in four countries with a recent history of right-wing authoritarian regimes – Brazil, Chile, Portugal, and Spain – and in France.[17] Finally, and as expected, people who claim inequality is needed for prosperity – a variable included to control for concerns about possible incentive effects of redistribution – are less supportive of redistribution.

Turning to our self-interest variable, the results of the pooled sample estimation indicate that, as expected, people with a higher relative income tend to be less supportive of redistribution. However, the effect is quite small. Conditional on our belief- and socio-demographic variables, an increase in relative income from one-half median absolute deviation below the median to one-half median absolute deviation above the median involves a one percentage point reduction in the probability of supporting the redistributive statement. Considering the relative income effects in the individual country sub-samples (Figure 2), in the great majority of countries a higher relative income is associated with a statistically significant smaller probability to support redistribution. The associations are far from homogenous, however. In Canada, the concerned relative

[17] Log-likelihood ratio tests show that the class variables, as well as the country dummies, are jointly important (the test statistics are 274.44 and 2533.11, giving p-values at 0.000).

income change involves a 7 percentage point smaller probability to support redistribution. In Hungary the equivalent reduction is around 1 percentage point, i.e. in line with our pooled sample estimate. In 8 countries the relative income effect is not statistically different from zero.

<<FIGURE 2 ABOUT HERE>>

Turning to the effects of holding certain beliefs about what causes income differences, the pooled sample estimates (Table 1) indicate that the belief effects follow the hypothesised pattern. Believing that coming from a wealthy family is important to get ahead (the reference categories capture believing that the respective inputs are not important/rewarded, see Table A1) is, as anticipated, associated with stronger support for redistribution. In the pooled sample, it involves an 8 percentage point increase in the probability of supporting the redistributive statement, to be compared with the 1 percentage point reduction in the same probability associated with the relative income change. Also in line with our hypothesis, believing that effort is rewarded comes with a 6 percentage point lower probability to support the redistributive statement. Similarly, believing that intelligence/skills are rewarded involves a 2 percentage point lower probability to support the statement. Hence, the pooled sample belief effects vary according to the pattern ($\beta_c^{effort} < \beta_c^{skills} < \beta_c^{family}$), $\beta_c^{effort} < 0$ and $\beta_c^{family} > 0$ suggested by the respective inputs' degree of responsibility. However, looking at the individual country sub-samples reveals considerable heterogeneity.

<<FIGURE 3 ABOUT HERE>>

In the majority of our country sub-samples believing that coming from a wealthy family is important to get ahead is associated with a statistically significant higher probability to support redistribution (Figure 3). The size of the effect varies across countries, however; holding the belief involves a 4 percentage point higher probability to support redistribution in Portugal and a 22 percentage point higher probability to do so in Australia.

<<FIGURE 4 ABOUT HERE>>

The effects of believing effort is rewarded (Figure 4) are somewhat less clear-cut, but all statistically significant effects (seven countries) are negative – the decrease ranging from 4 percentage points in Portugal to 15 in the US.

<<FIGURE 5 ABOUT HERE>>

As hypothesised, the effects of beliefs on rewards to intelligence and skills are most ambiguous. As seen in Figure 5 believing that intelligence/skills is rewarded involves a statistically significant (2-14 percentage point) lower probability to support redistribution in Cyprus, Canada, Ireland and Brazil, and an 11 percentage point *higher* probability to do so in Denmark.

To formally test the joint importance of the belief variables, we perform log likelihood ratio tests where the unrestricted model includes them and the restricted model does not (See Table A2, Panel 1). The null-hypothesis, that excluding the belief variables does not affect the explanatory power of the model, can be firmly rejected in the absolute

majority of country sub-samples. Only in three countries (Chile, Slovenia and Switzerland) can we not reject the null.

To test not only if the belief variables matter, but if they do so in line with the pattern expected from the respective inputs degree of 'responsibility', we perform a number of one-sided tests to evaluate if the parameters follow the hypothesised pattern $\beta_c^{effort} < \beta_c^{skills} < \beta_c^{family}$, $\beta_c^{effort} < 0$ and $\beta_c^{family} > 0$ (see Table A3). The pooled sample tests confirm the hypothesised pattern. In the individual countries the picture is somewhat more mixed. Our hypothesis that the effect of believing family background to be rewarded has a positive effect on support for redistribution, and that this is larger than the effects of effort and intelligence/skills, is supported in the absolute majority of the country sub-samples. Our hypothesis that believing effort to be rewarded has a negative effect on redistribution support is confirmed in 12 of our country samples. For both family and effort, where we cannot reject the null we cannot reject the alternative hypothesis either. We find least support for the hypothesis that the intelligence/skills effect is larger than the effort effect, which is confirmed only in four countries. In two countries the test actually indicates the reverse, that the effort effect is larger than the intelligence/skills effect.[18]

3.1.1 Omitted variables

When interpreting the results one has to consider the potential influence of omitted self-interest and belief variables on our key parameters. Variables that appear important in this context include the self-interest indicators expected future relative income, risk-aversion and perceived income risks, and variables capturing beliefs regarding the importance of a wide range of inputs which could affect income, for example luck, ethnicity and gender. Since self-interest indicators and beliefs about the causes of income are likely to vary among social groups, the included socio-demographic variables should pick up much of this variation, thus helping to alleviate the problem. Nevertheless, the issue deserves some attention.

First, the relative income estimate may be biased by omitted self-interest variables. For example, expected future income should be positively correlated with current relative income. If we assume that support for redistribution depends on some weighted average of current and expected future income, then the estimated relative income coefficient will be larger than its true effect as it also captures some of the effects from expected future income.

Another potential concern is if omitted belief variables are correlated with relative income, which, if we are interested in isolating the effect of relative income that is due to direct self-interest concerns, could bias the estimated relative income effect. Similarly, omitted self-interest variables could bias the estimated effects of our belief variables.[19] Again, if omitted beliefs and self-interest variables vary across social groups the socio-demographic variables should pick up much of this unobserved variation. For what remains, we naturally cannot investigate the covariations between relative income and omitted belief variables, or between omitted self-interest variables and our belief variables. What we can do is to evaluate the correlation pattern between relative income and our included belief variables, hoping that the latter reveals something about the former; if there is little correlation between included belief variables and relative income

[18] The tests of the alternative hypotheses are not presented, but are available from the authors.

[19] Of course, omitted beliefs could also bias the estimated effects of the included beliefs. We see this as less of a problem, since then we can assign the effects of belief variables to fairness considerations rather than to self-interest concerns.

it seems less likely that we have a problem of correlation between omitted belief variables and relative income, or between omitted self interest variables and our included belief variables. As it turns out, there is very low correlation between our relative income indicator and our belief variables. In the pooled sample, correlation coefficients (in absolute terms) range between 0.001 and 0.047. Moreover, testing for multicollinearity of regressors using variance inflation factors and the condition index shows that neither in the pooled sample nor in the country sub-samples do we have a problem of multicollinearity (the variance inflation factors are in the order of 1-2 and the condition numbers range from 2-5).

Still, to get a picture of whether relative income affects the beliefs regarding income determinants we run ordered probit regressions with the belief indicators as dependent variables and with relative income and the socio-demographic controls as independent variables (see Tables A4-A6), for the pooled sample as well as the individual country sub-samples. In the pooled sample there is actually a relative income effect on our family and effort variables. However, the effect is very small; a relative income increase of one median absolute deviation around the median involves a 0.3 percentage point smaller probability to believe that coming from a wealthy family is very important or essential to get ahead, and a 0.2 percentage point smaller probability to agree or strongly agree that effort is rewarded. Moreover, in the absolute majority of country sub-samples the effect of relative income is far from statistically significant. For none of the belief variables more than 4 out of 25 countries have significant relative income effects, and for the ones that do, the effects are again small.[20] If we exclude the countries (Brazil, France, Hungary, Latvia and Russia) where a statistically significant relative income effect is found for two belief variables and run a restricted pooled sample estimation, the relative income effect is no longer there, suggesting that the associations identified in the original pooled sample estimation were driven by a small number of countries differing from the overall pattern rather than by increased precision following from more observations. Hence, with the exception of a few countries, we identify no effect of relative income on our belief variables. If the same goes for the omitted belief variables, then their influence should not be a major problem.

An alternative approach could be to argue that the stability of the relative income effect to the inclusion of the belief variables might indicate whether omitted belief variables constitute a problem. Estimating our benchmark model (equation 1) with and without the belief variables[21] it turns out that in the pooled sample as well as in all the country sub-samples the relative income parameter is very stable.

Summing up, problems of omitted variables make it difficult to pin down the exact magnitudes of the effects found. We can nevertheless conclude that on the whole, our relative income indicator appear to capture self interest considerations and our belief variables fairness concerns. Our estimations suggest that both relative income and beliefs about the causes of income differences are important to explain redistributive preferences, and that they do so according to the pattern suggested in Hypothesis 1. We can, at this stage, also note that there is substantial country variation in redistributive preferences, as well as in the effects of our main explanatory variables on these. In the next section we investigate this variation further.

3.2 Explaining country variation in redistributive preferences

[20] A relative income increase of one median absolute deviation around the median in most cases involves a smaller than one (and never more than 1.7) percentage point change in the probability to support the concerned statements.

[21] The results are available from the authors.

Our second hypothesis stipulates that differences in beliefs about the causes of income differences, as well as differences in the *effects* of these beliefs, contribute to explain the cross-country variation in redistributive preferences. We will evaluate this hypothesis in three steps. First, we consider whether beliefs about the causes of income differences differ across countries in a direction consistent with the country variation in redistributive support. Second, we examine whether there is cross-country heterogeneity in the effects of holding certain beliefs regarding what causes income differences on redistributive preferences. Finally, we bring the picture together by addressing the extent to which the discussed differences in beliefs and impacts of these beliefs can explain the observed country variation in redistributive preferences.

3.2.1 Country differences in beliefs about income determinants

Let us start by considering the country variation in beliefs about what causes income differences. Figures 6-8 give the country shares of respondents who believe that coming from a wealthy family is important to get ahead, or agree to that effort and intelligence/skills are rewarded in the country. As expected, there is substantial country variation in beliefs about income determinants. The share of respondents who believe that it is important to be from a wealthy family to get ahead ranges from 8 percent in Denmark to 62 percent in Poland. For the beliefs about whether effort and intelligence/skills are rewarded, the lowest shares of respondents believing so are found in Russia, where 8 and 10 percent agree with the respective statements, and the highest in the US, where the equivalent shares are 67 and 75 percent.

<<FIGURE 6 ABOUT HERE>>
<<FIGURE 7 ABOUT HERE>>
<<FIGURE 8 ABOUT HERE>>

The above shares give an overview of the country variation in beliefs about the causes of income differences, but do not inform us about the full variation in the belief distributions. To formally test whether the distributions of beliefs differ between countries we perform two-sample Kolmogorov-Smirnov tests of equal cumulative distribution functions.[22] We compare each country with the remaining countries for the three belief variables, resulting in 975 tests. The null-hypothesis of equal cumulative distribution functions was rejected at the five percent level of significance in 938 tests. To draw any conclusions about similarity of distributions in the special cases where we cannot reject the null of equal distributions, a test with an exact p-value would be necessary. Overall it seems fair to say that beliefs about the causes of income differences vary across countries.

With effort being classified as the most and family background as the least responsible input, one would predict that the countries that to a greater extent believe that effort is rewarded in society and that family background is not very important for getting ahead will also be the ones least supportive of redistribution (and vice versa). Inspection of Figure 1 and Figures 6-8 lends some support to this hypothesis. USA, the country where believing that effort is rewarded is most common (Figure 7), is also the country with the

[22] The Kolmogorov-Smirnov test is non-parametric and sensitive to differences in both the location of the distribution and the shape of the distribution. It is designed for testing the distribution of continuous variables, but has been demonstrated to be applicable to discrete random variables too, in which case it is conservative; i.e. for a given level of significance the null hypothesis of equal empirical distributions will be rejected less or as often as with the exact true test statistic (Conover, 1999; Goodman, 1954; Noether, 1963).

least support for redistribution (Figure 1). Other countries where the belief that effort is rewarded is common are the Philippines, Denmark, Australia, Germany (west) and Canada, all of which have comparatively low support for redistribution. Respondents in the former socialist countries in Central and Eastern Europe are generally very sceptical of the claim that effort is rewarded, while at the same time showing strong support for redistribution. A similar pattern can be observed for beliefs concerning the rewards to intelligence and skills (Figure 8).

Believing that it is important to be from a wealthy family to get ahead (Figure 6) is most common in Poland, Cyprus, Portugal and Spain, and at least Poland, Portugal and Spain display comparatively strong support for redistribution. Correspondingly, in countries where respondents do not believe that family background is very important for getting ahead - Denmark, Norway, France, Japan and Canada – the support for redistribution is comparatively low. At this stage it thus seems as though country differences in beliefs about income differences could have some relevance for explaining cross-country differences in redistribution support.

3.2.2 Country differences in the effects of beliefs about income determinants

Let us now turn to the second step, where we evaluate possible cross-country heterogeneity in the *effects* of the belief variables on redistributive preferences. Figures 3-5, presenting the effects of belief variables on redistribution support in the respective countries, suggest such heterogeneity to be present. As noted, believing it to be important to be from a wealthy family to get ahead is for the great majority of countries associated with a higher probability to support redistribution. The largest effects of holding this belief are found in the US, Australia, Denmark and Norway, where it implies an approximate 20 percentage point increase in the probability of supporting the redistributive statement. However, in a few countries – Brazil, Canada, Chile, Czech Republic, Germany (west), Slovenia, and Spain- the effect is comparatively small and statistically insignificant. According to the reasoning in this paper, this fact could be interpreted as people from these countries assigning some degree of individual responsibility over family background. While it is difficult to argue that people can affect which family they are born into, the argument that someone who has succeeded in creating wealth should be able to pass this on to his/her children is quite common. The degree of responsibility assigned to an input may not necessarily depend only on perceived *individual* control over that input; conceivably it could also depend on perceived control within a larger entity, such as the family.[23] An alternative interpretation could be that in these countries people are more libertarian in the sense that they believe a person is entitled to the income he/she earns, irrespective of his/her degree of control over the inputs involved in earning that income.

In the US, believing effort to be rewarded implies an approximate 15 percentage point decrease in the probability of supporting the redistributive statement. In other 'Neo-European' countries - Australia, New Zealand, and Canada – the decrease is of around 10 percentage points. In the Southern European countries Cyprus, Spain, France, and Portugal, in the two former socialist countries Hungary and Czech Republic, and in Japan there are also statistically significant negative effort effects on the probability of agreement with the redistributive statement (ranging from 4 to 10 percentage points).[24] In

[23] See for example the theoretical model in Alesina and Angeletos (2005).

[24] For Canada, Cyprus, France, Hungary, and Japan a negative effect was confirmed using the one-sided test in Table A3, though the effect can only almost be rejected to equal zero at the ten percent level of significance using a two sided test (Figure 4).

other countries – the Scandinavian countries Denmark, Norway and Sweden, eastern and western Germany and Switzerland, the remaining four former socialist countries, and in Brazil, Chile, Ireland and the Philippines - however, the effects of believing that effort is rewarded are not statistically significant and do not stand out as large. This could be taken to indicate that in these countries effort is not to the same extent viewed as an input under individual control. Indeed, it is conceivable that depending on social background and other circumstances, individuals do not all have the same choice set regarding how much effort to exert. An alternative interpretation is that people in these countries are more concerned about equal outcomes, regardless of the degree of control they believe people have over important income determinants.

Believing intelligence and skills to be rewarded produces mixed results; in Denmark it implies an 11 percentage point *increase* in the probability of agreeing or strongly agreeing with the redistributive statement, whereas in Brazil, Canada, Cyprus, Latvia and the Czech Republic[25] it comes with a *decrease* in the same probability in the range of 2 to 14 percentage points. This could be taken to suggest country differences in the degree of responsibility assigned to this input, but could also indicate that the countries differ in the fairness ideals adhered to, with Danes being more concerned with equal outcomes and Brazilians, Canadians, Cypriots, Latvians and Czechs being more libertarian. In other countries the effect of believing intelligence and skills to be rewarded is not statistically different from zero.

We formally test whether the effects of belief variables differ across countries using a number of log-likelihood ratio tests (see Table A2, Panel 2). First, a restricted model in which country differences are only allowed to affect the intercept is firmly rejected in favour of a model that allows different slopes of the belief parameters, thus confirming the suspected presence of cross-country heterogeneity in the belief effects. Next, we test if there is parameter heterogeneity with respect to the beliefs regarding each input separately. For all inputs, the hypothesis of homogenous effects can be safely rejected.

3.2.3 Can the differences in beliefs and the differences in effects of these beliefs help explain cross-country variation in redistribution support?

Let us now turn to the last stage where we address to what extent the identified differences in (1) beliefs and (2) the impacts of these beliefs can explain the large country variation observed in redistributive preferences. Previous literature suggests that differences in people's beliefs are central in this respect (Alesina and Angeletos, 2005). To get an idea of the relative importance of differences in beliefs and differences in the *effects* of these beliefs for explaining cross-country variation in preferences for redistribution, we evaluate how the effect of belonging to a certain country changes as beliefs and beliefs-country interaction terms are added to the model. USA, the country hitherto most studied with regard to preferences for redistribution, and the country with the least support for redistribution controlling for other variables, is the reference country. To be more specific, we estimate the following three equations and focus on whether the parameters in $\boldsymbol{\varphi}$ approach zero as we allow for differences in beliefs (2) and differences in the effects of these beliefs (3).

[25] In the Czech sample it cannot be rejected at the 10 percent level that the effect differs from zero using a two-sided test, but using a one-sided test it can be rejected that the effect is equal to or larger than zero at the 5.5 level of significance.

$$1 \qquad PR_{ic} = \boldsymbol{\varphi}'\mathbf{country}_{ic} + \boldsymbol{\delta}_c'\mathbf{x}_{ic} + \varepsilon_{ic}$$

$$2 \qquad PR_{ic} = \boldsymbol{\varphi}'\mathbf{country}_{ic} + \boldsymbol{\beta}'\mathbf{b}_{ic} + \boldsymbol{\delta}_c'\mathbf{x}_{ic} + \varepsilon_{ic}$$

$$3 \qquad PR_{ic} = \boldsymbol{\varphi}'\mathbf{country}_{ic} + \boldsymbol{\beta}'\mathbf{b}_{ic} + \boldsymbol{\gamma}'\mathbf{b}_{ic}\mathbf{country}_{ic} \times + \boldsymbol{\delta}_c'\mathbf{x}_{ic} + \varepsilon_{ic}\,.$$

Figure 9 shows the resulting country effects.

<< FIGURE 9 ABOUT HERE>>

Adding the belief variables to the model marginally reduces the effect of being of a certain nationality. [26] Furthermore, the country effect with beliefs (Specification 2) always falls within the 95 percent confidence interval around the country effect without beliefs (Specification 1).[27] Unexpectedly, differences in beliefs can thus, at most, explain a very small part of the cross-country variation in redistributive preferences.

Allowing for heterogeneity in the effects of beliefs reduces country effects quite substantially (the exceptions are eastern and western Germany where it increases the country effect marginally).[28] The effect of being Australian, Danish or Philippine (rather than American) almost disappears. The effect of being Canadian, Cypriot, Czech, Japanese, New Zealander, or Swedish is approximately halved. About one third of the effect of being Chilean, French, Irish, Latvian, Polish, or Swiss disappears, and roughly one fourth of that of being Hungarian, Portuguese, or Slovenian.[29] Hence, as it seems, a relatively large part of many countries' stronger support for redistribution (compared to the US) could be explained by people in these countries assigning a lower degree of responsibility to inputs believed to be important for income determination. However, for some countries, such as Brazil and Russia, different effects of holding certain beliefs about income determinants on preferences for redistribution does little to explain their stronger support for redistribution, and the stronger support for redistribution in Germany than in the US becomes, if anything, even more puzzling, considering that Germans seemingly assign a higher degree of responsibility to inputs believed to determine income.

The conclusion we can draw from this is that while differences in beliefs on what causes income differences seem to be important for explaining within-country variation in redistributive preferences, they do little to explain between-country differences. Differences in the effects of holding certain beliefs, however, seem to be important for explaining between-country variation in redistributive preferences.

4. Conclusions

[26] Comparing other countries with each other, the difference between their country effects (relative to the US) should not have been affected more than marginally either, since all changes in country effects are small and in the same direction.

[27] The estimated country effects and their 95 % confidence intervals are available from the authors.

[28] Comparing other countries with each other, the difference between their country effects (relative to the US) increases in some cases, but the fact remains that country effects decrease vis-à-vis the extreme low redistribution support case USA.

[29] For eleven countries (Australia, Chile, Cyprus, Czech Republic, Denmark, France, Japan, Philippines, Poland, Portugal and Sweden) the country effect with beliefs parameter heterogeneity (Specification 3) falls outside of the 95 percent confidence interval of country effects with homogenous (Specification 2) or no (Specification 1) beliefs. For four other countries (Hungary, Latvia, Russia, Slovenia) it falls outside of the confidence interval of the country effect with no beliefs and at the limit of the confidence interval of that with homogenous belief parameters, and for nine countries (Brazil, Canada, Germany (east), Germany (west), Ireland, New Zealand, Norway, Spain, Switzerland) the country effect falls within the confidence intervals of the prior country effects.

The objective of this study was to explain variation in redistributive preferences, within as well as between countries, in terms of self-interest concerns and an input-based concept of fairness. The latter was captured by the effect of beliefs abut the causes of income differences. We included beliefs about income determinants arguably under varying degrees of individual control, stipulating that believing a 'responsible' factor to be important for determining income would imply less support for redistribution, whereas believing an input outside individual control to be an important income determinant should bring with it more support for redistribution. Importantly, we argued that these beliefs, and their effects, should vary with context. The country-comparative perspective was therefore central; we aimed to explain not only within-country but also between-country variation in redistributive preferences. Two hypotheses were formulated and tested using data for 25 countries.

Our first hypothesis suggested that both economic self-interest and an input-based fairness concept, where individuals judge the fairness of income determinants according to their perceived degree of 'responsibility', matter for redistributive preferences. This was supported by the data. In the pooled sample, relative income had a negative, although quite modest, impact on preferences for redistribution, and the effects of the variables capturing beliefs about the causes of income differences followed the hypothesised pattern $\beta_c^{effort} < \beta_c^{skills} < \beta_c^{family}$, $\beta_c^{effort} < 0$ and $\beta_c^{family} > 0$. As stipulated, believing effort (a 'responsible input') to be rewarded in society had a negative impact on support for redistribution, whereas believing that family background (an 'arbitrary input') is important for getting ahead was associated with stronger support for redistribution. Also, and as expected, the effect of believing that intelligence/skills (the input arguably most difficult to classify in terms of 'responsibility') are rewarded fell in-between those of believing family or effort to be important income determinants.

On the whole, the country sub-sample estimations supported our hypothesis, but revealed considerable heterogeneity in terms of the magnitude and statistical significance of effects. A higher relative income was generally associated with less support for redistribution, but the size of the effect varied. In the countries where we found statistically significant belief effects, the family effects were positive and the effort effects negative, albeit varying considerably in magnitude. Moreover, and as hypothesised, the family effect was larger than the effort and intelligence/skills effects. Comparing the magnitudes of the effort and intelligence/skills effects, however, the results were mixed – we could not establish that the effect of believing the responsible input effort to be important is smaller than that of believing the more ambiguous input intelligence/skills to be so.

Hence, whereas the aggregate pattern suggested that individuals base their preferences for redistribution on self-interest considerations as well as input-based fairness concerns, the country comparison revealed that this pattern is not necessarily universal.

Our second hypothesis put forward that differences in both beliefs about income determinants, and in the effects of these beliefs, should contribute to explain the cross-country variation in redistributive preferences. We could establish that there is considerable country variation in beliefs about income determinants, and that this variation often follows a pattern that would be expected judging from our input-based fairness concept and the observed country variation in redistribution support. Somewhat surprisingly, however, our analysis suggested that country differences in beliefs about income determinants, at best, could explain very little of the country variation in redistributive support.

Turning to the *effects* of the belief variables, our results showed that these too vary significantly across countries. Believing that coming from a wealthy family is important

to get ahead in some countries had basically no effect while in others it involved an over 20 percentage point increase in the probability of supporting redistribution. The effect of believing effort to be an important income determinant varied from being statistically non-discernible from zero to decreasing the probability of supporting redistribution with around 15 percentage points. With respect to believing intelligence/skills to be rewarded the results were mixed, with both negative and positive but in most cases statistically insignificant effects. Furthermore, our results suggested that this heterogeneity in belief effects is important for explaining country differences in redistribution support. With a few exceptions (Germany, Brazil and to some extent Russia), a quite substantial share of countries' stronger support for redistribution relative to the US could be explained by people in these countries seemingly assigning a lower degree of responsibility to inputs believed to be important for income determination. So, while differences in beliefs on what causes income differences seem to be important for explaining within-country variation in redistributive preferences, they do little to explain between-country differences. Differences in the *effects* of holding certain beliefs, however, appear important for explaining between-country variation in redistributive preferences.

Summing up, our findings indicate that self-interest considerations as well as input-based fairness concerns contribute to explain redistributive preferences, but also that there is substantial country variation, in redistribution support, in key factors explaining redistribution support, as well as in the *effects* of these factors *on* redistribution support. In particular, looking at our results the country most studied in this field – the US – is quite an extreme case, displaying the lowest support for redistribution, the most positive views about the rewards to effort and intelligence/skills, and some of the strongest effects of our belief variables. This tells us that in trying to understand fairness-based and self-interested motivations behind preferences for redistribution we cannot focus on one country alone – we need to evaluate both within and between country variations.

Appendix

<<TABLE A1 ABOUT HERE>>

<< TABLE A2 ABOUT HERE>>

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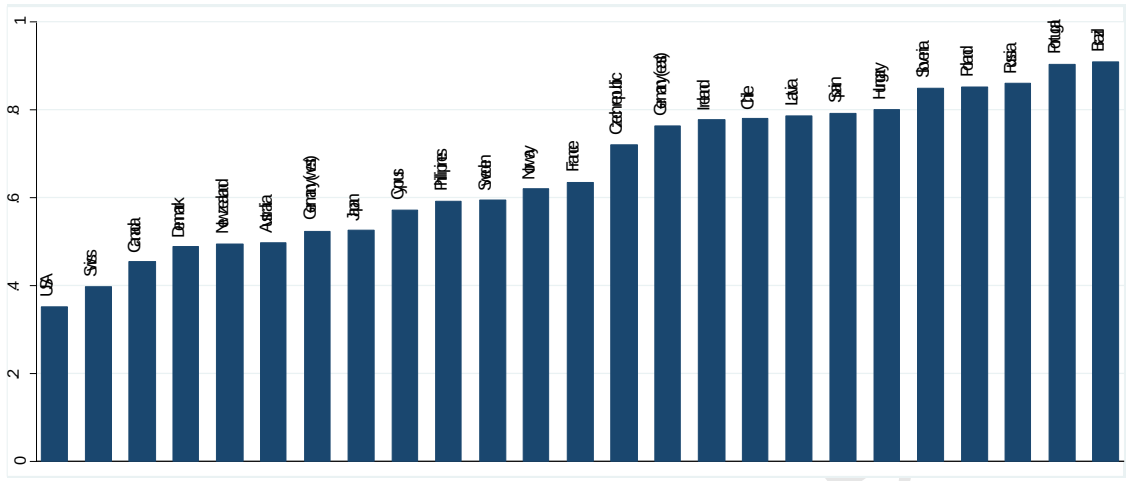
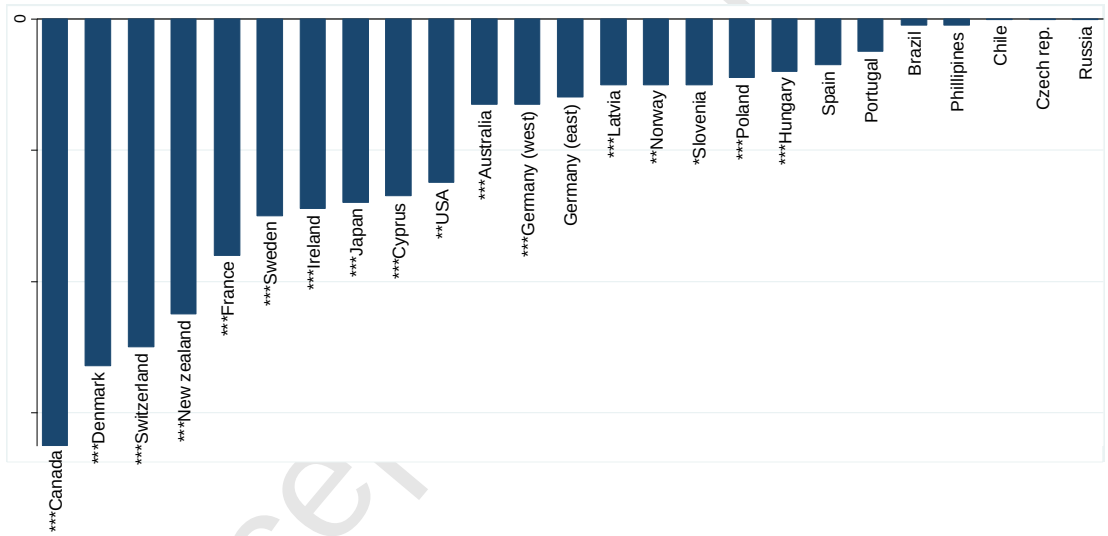
Figures

Figure 1: Share of respondents agreeing or strongly agreeing with the redistributive statement[1]



[1] '*It is the responsibility of the government to reduce the difference in income between people with high incomes and those with low incomes'*

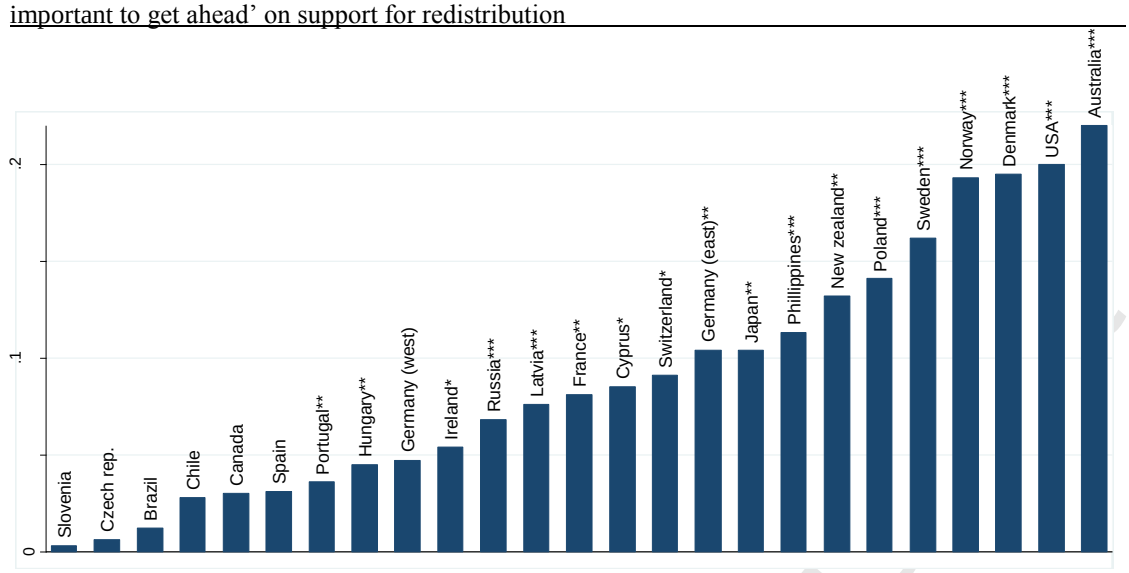
Figure 2: Country variation in the effects of a higher relative income on support for redistribution



Based on ordered probit estimation of equation 1 for the country sub-samples. Presents the effects of a one median absolute deviation increase around the median in relative income on the probability of agreeing or strongly agreeing with the statement, '*It is the responsibility of the government to reduce the difference in income between people with high incomes and those with low incomes'*.

*** indicates significance at the 1 % level, ** at 5 % and * at 10 % (in cases where the level of significance differed between the effect on the probability of agreeing and strongly agreeing with the redistributive statement, ***, ** and * refer to the significance level of the coefficient).

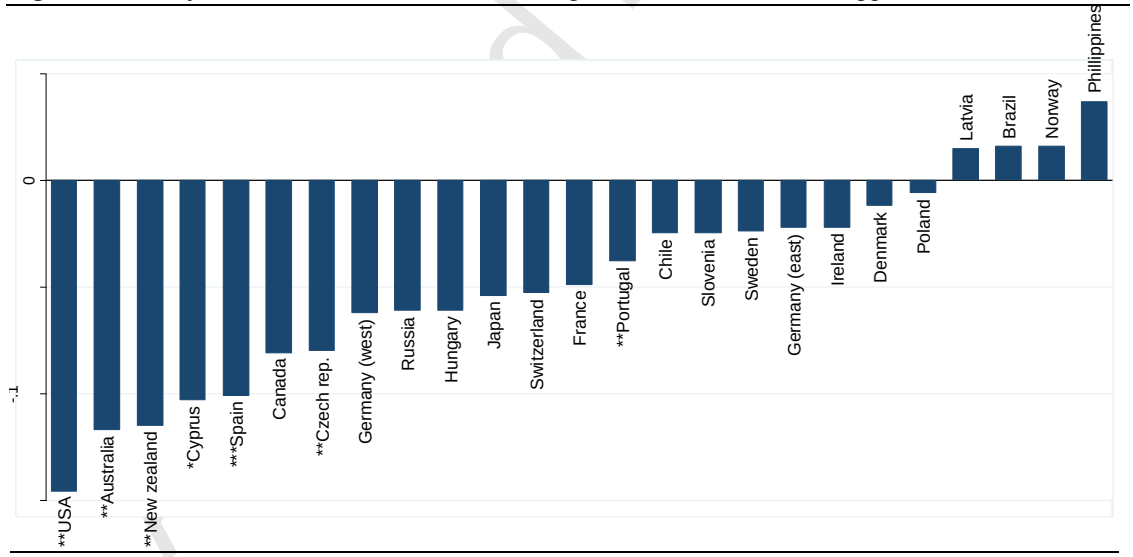
Figure 3: Country variation in the effects of holding the belief 'coming from a wealthy family is important to get ahead' on support for redistribution



Based on ordered probit estimation of equation 1 for the country sub-samples. Presents the effects of believing it to be 'essential' or 'very important', rather than 'not very important' or 'not important at all', to come from a wealthy family to get ahead on the probability of agreeing or strongly agreeing with statement, '*It is the responsibility of the government to reduce the difference in income between people with high incomes and those with low incomes'.*

*** indicates significance at the 1 % level, ** at 5 % and * at 10 % (in cases where the level of significance differed between the effect on the probability of agreeing and strongly agreeing with the redistributive statement, ***, ** and * refer to the significance level of the coefficient).

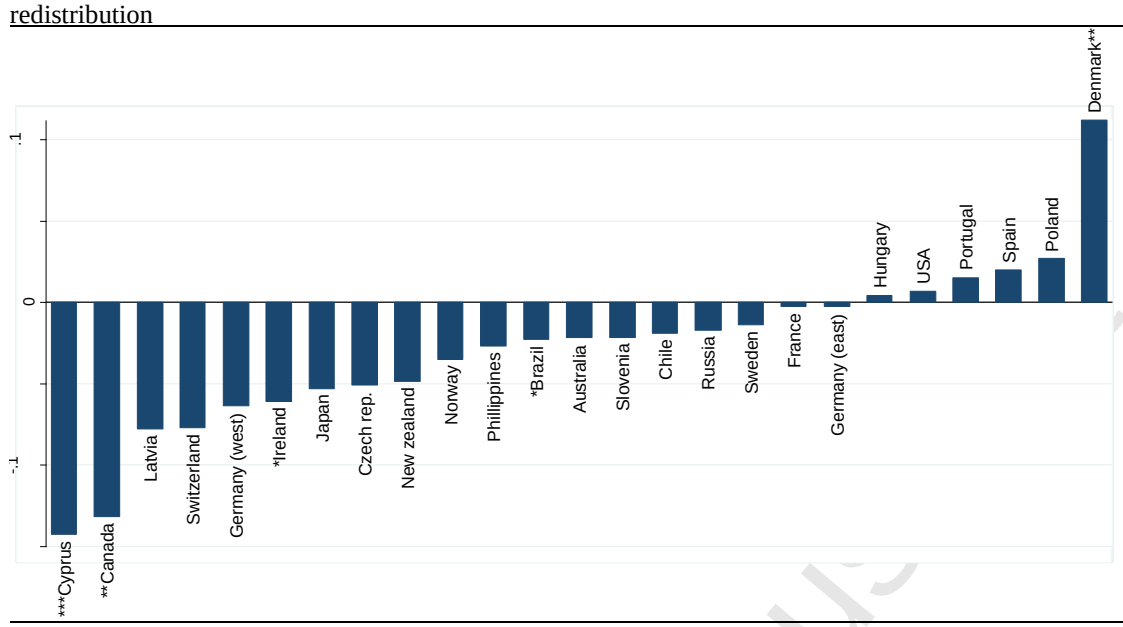
Figure 4: Country variation in the effects of believing 'effort is rewarded' on support for redistribution



Based on ordered probit estimation of equation 1 for the country sub-samples. Presents the effects of agreeing or strongly agreeing rather than disagreeing or strongly disagreeing to the statement *'In [country] people get rewarded for their effort*' on the probability of agreeing or strongly agreeing with statement, '*It is the responsibility of the government to reduce the difference in income between people with high incomes and those with low incomes'.*

*** indicates significance at the 1 % level, ** at 5 % and * at 10 % (in cases where the level of significance differed between the effect on the probability of agreeing and strongly agreeing with the redistributive statement, ***, ** and * refer to the significance level of the coefficient).

Figure 5: Country variation in the effects of believing 'intelligence/skills is rewarded' on support for redistribution



Based on ordered probit estimation of equation 1 for the country sub-samples. Presents the effects of agreeing or strongly agreeing rather than disagreeing or strongly disagreeing to the statement *'In [country] people get rewarded for their intelligence and skills*' on the probability of agreeing or strongly agreeing with statement, '*It is the responsibility of the government to reduce the difference in income between people with high incomes and those with low incomes'*.

*** indicates significance at the 1 % level, ** at 5 % and * at 10 % (in cases where the level of significance differed between the effect on the probability of agreeing and strongly agreeing with the redistributive statement, ***, ** and * refer to the significance level of the coefficient).

Figure 6: Share of respondents believing that it is essential or very important to be from a wealthy family to get ahead.

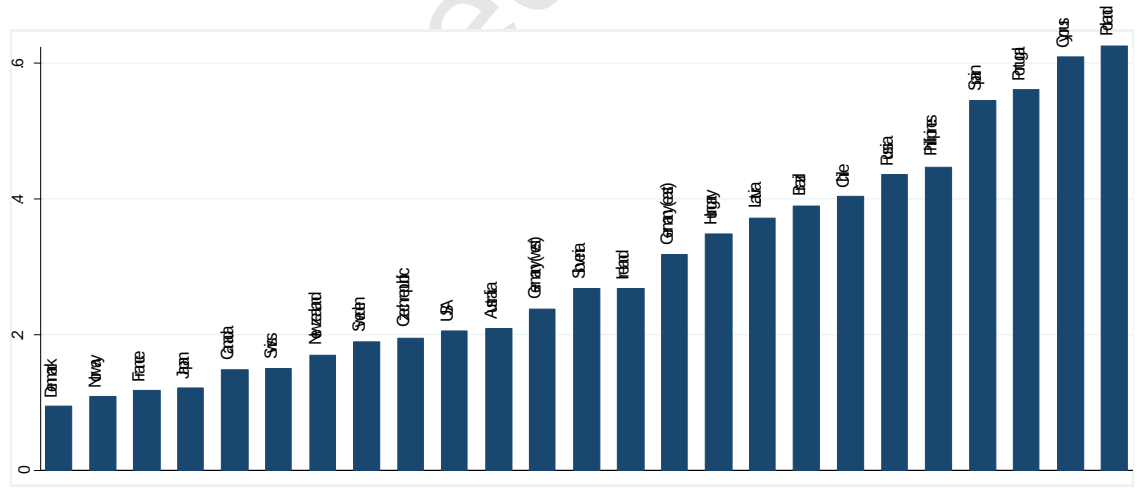


Figure 7: Share of respondents agreeing or strongly agreeing to the statement 'In [country] people get rewarded for their effort'

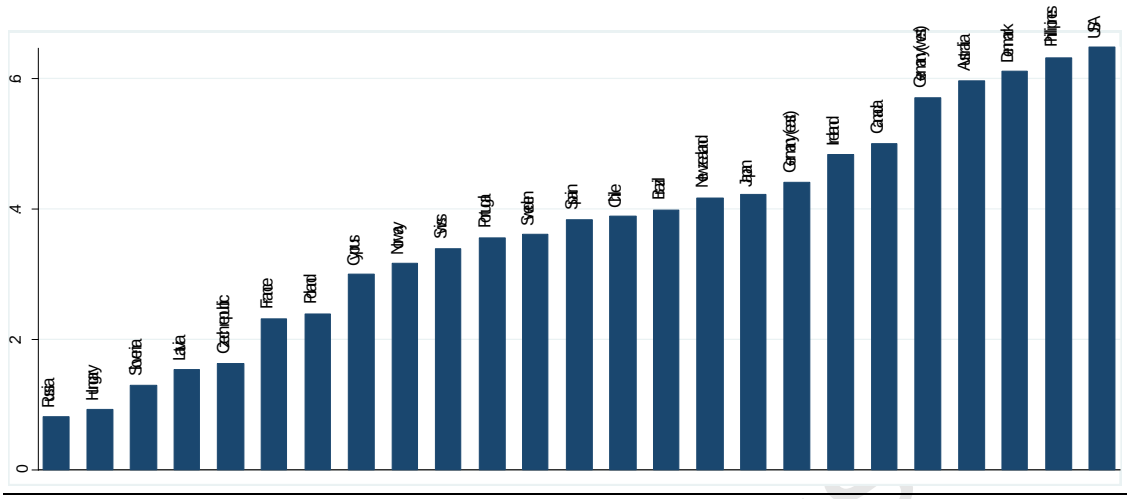


Figure 8: Share of respondents agreeing or strongly agreeing to the statement 'In [country] people get rewarded for intelligence and skills'.

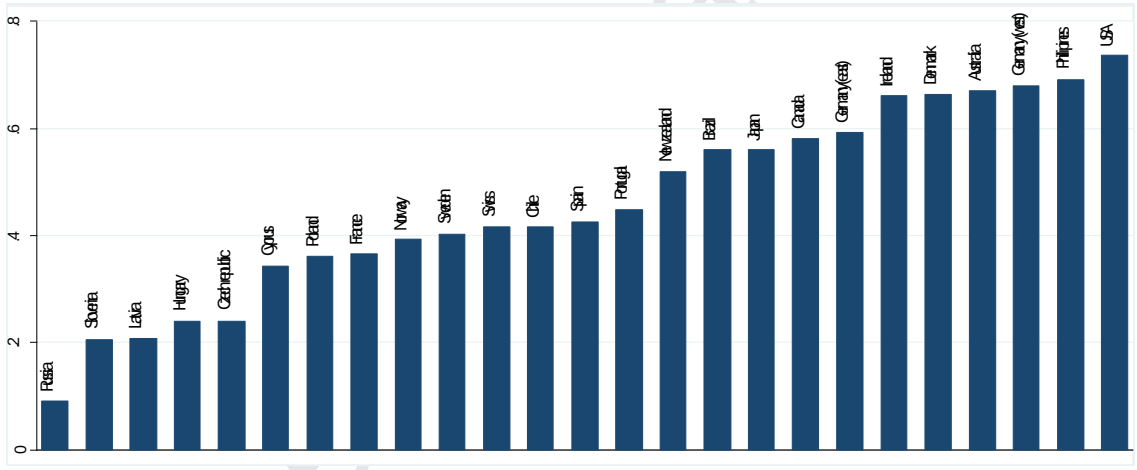
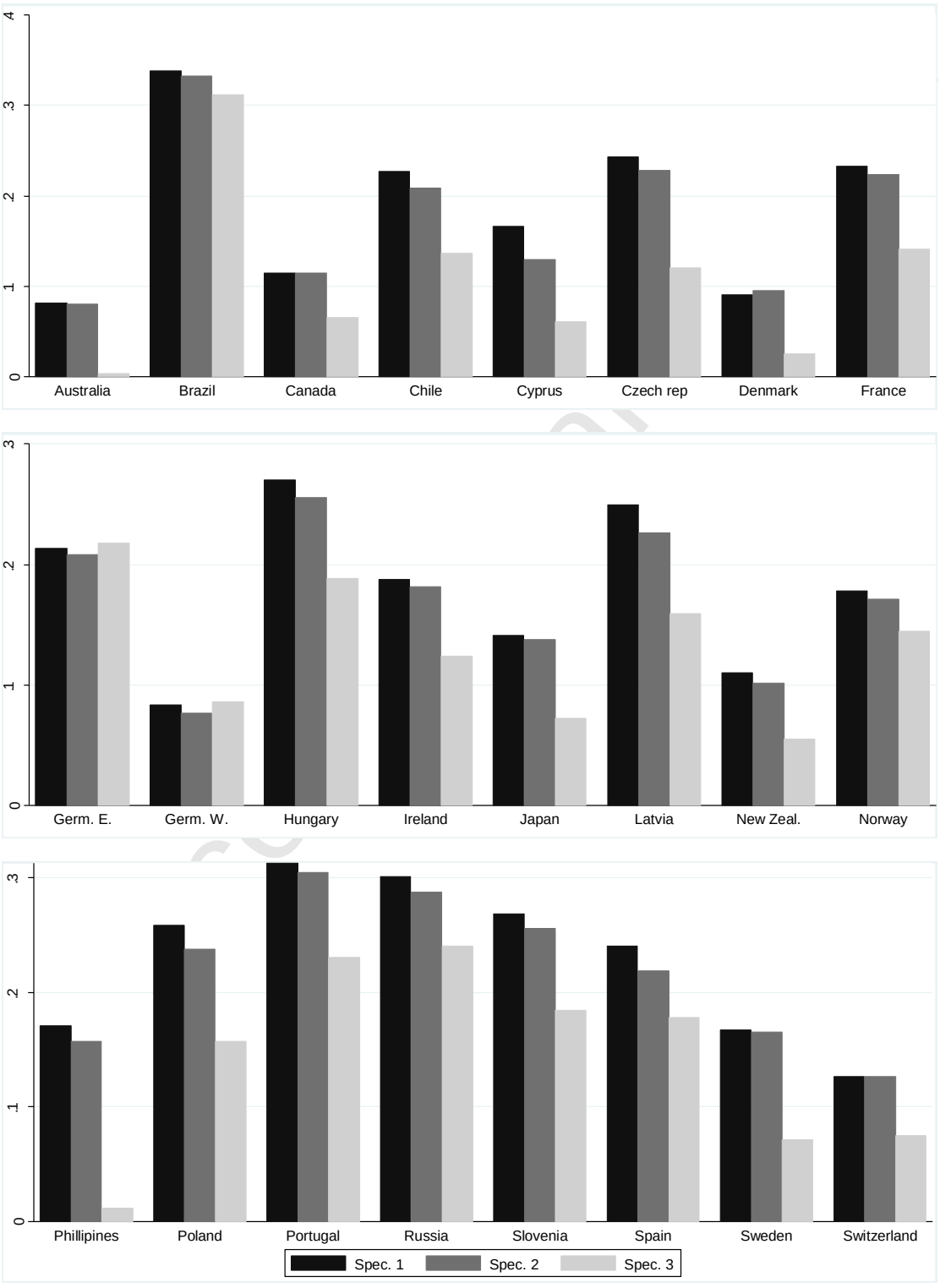


Figure 9: Explaining country variation in redistributive preferences with differences in beliefs and differences in effects of beliefs.

Country dummy effects on the probability to agree or strongly agree with the redistributive statement, from ordered probit estimations with the following explanatory variables (see Table A1 for more detail):
Spec. 1: country dummies + other controls
Spec. 2: country dummies + other controls + belief variables
Spec. 3: country dummies + other controls + belief variables + belief*country



Tables

Table 1: Pooled sample marginal effects[1] on probability of agreeing with the redistributive statement[2]

Marginal effect on choosing response category:	Strongly disagree	Disagree	Neither	Agree	Strongly agree
Believe wealthy family important	-0.018***	-0,035***	-0,029***	-0,003***	0,086***
	0.001	0,003	0,003	0,001	0,007
No strong family belief	-0.002	-0,004	-0,003	0,000	0,009
	0.001	0,003	0,002	0,000	0,006
Believe effort rewarded	0.013***	0,024***	0,019***	-0,002***	-0,054***
	0.002	0,004	0,003	0,001	0,008
No strong effort belief	0.011***	0,019***	0,015***	-0,002***	-0,043***
	0.002	0,004	0,003	0,001	0,008
Believe intell./skills rewarded	0.006***	0,011***	0,008***	0,000	-0,024***
	0.002	0,003	0,003	0,000	0,008
No strong intell./skill belief	0.005**	0,009**	0,007**	-0,001	-0,020**
	0.002	0,004	0,003	0,000	0,008
Relative income	0.002***	0,004***	0,003***	0,000	-0,008***
	(0.000)	(0,000)	(0,000)	(0,000)	(0,001)
Age	-0.001***	-0,002***	-0,002***	0,000	0,006***
	(0.000)	(0,000)	(0,000)	(0,000)	(0,002)
Female	-0.012***	-0,022***	-0,017***	0,000	0,051***
	(0.001)	(0,002)	(0,002)	(0,000)	(0,005)
Higher education	0.012***	0,022***	0,017***	-0,002***	-0,048***
	(0.002)	(0,003)	(0,002)	(0,001)	(0,007)
Father has higher education	0.010***	0,018***	0,014***	-0,002***	-0,041***
	(0.002)	(0,003)	(0,002)	(0,001)	(0,007)
Upper class	0.027***	0,043***	0,031***	-0,011***	-0,090***
	(0.003)	(0,004)	(0,003)	(0,002)	(0,008)
Working class	-0.016***	-0,030***	-0,025***	-0,002**	0,074***
	(0.001)	(0,003)	(0,002)	(0,001)	(0,007)
Inequality necessary for prosperity	0.015***	0,026***	0,020***	-0,003***	-0,058***
	(0.002)	(0,003)	(0,002)	(0,001)	(0,006)
The estimation also includes 24 country dummies.					
Observations	20250				

*** indicates significance at the 1 % level, ** at 5 % and * at 10 %.

[1] Dummy variable effects (all except for relative income and age) are for a discrete 0-1 change (for reference categories, see Table A1). The relative income effect is for a one median absolute deviation increase around the median, and the age effect is for an increase from 40 to 50 (approximately equivalent to a one standard deviation change around the mean).

[2] '*It is the responsibility of the government to reduce the difference in income between people with high incomes and those with low incomes'.*

APPENDIX

Table A1: Variable description

Variable	Description
Preferences for redistribution	The response to the statement, '*It is the responsibility of the government to reduce the difference in income between people with high incomes and those with low incomes'*; 1 if respondent chooses strongly disagree, 2 if respondent chooses disagree, 3 if respondent chooses neither agree nor disagree, 4 if respondent chooses agree and 5 if respondent chooses strongly agree.
Belief variables	
Believe wealthy family important	1 if respondent answers *essential* or *very important* to the question, '*For getting ahead, how important is coming from a wealthy family?*'; 0 otherwise.
No strong family belief	1 if respondent answers *fairly important* to the question, *'For getting ahead, how important is coming from a wealthy family?*'; 0 otherwise.
Believe family not important	1 if respondent answers *not very important* or *not important at all* to the question, *'For getting ahead, how important is coming from a wealthy family?*'; 0 otherwise. Used as reference category in estimation.
Believe intelligence and skills rewarded	1 if respondent responds *agree* or *strongly agree* to the statement, *'In [country] people get rewarded for their intelligence and skills*'; 0 otherwise.
No strong intelligence/ skills belief	1 if respondent responds *neither agree nor disagree* to the statement, *"In [country] people get rewarded for their intelligence and skills*'; 0 otherwise.
Believe intelligence and skills not rewarded	1 if respondent responds *disagree* or *strongly disagree* to the statement, '*In [country] people get rewarded for their intelligence and skills*'; 0 otherwise. Used as reference category in estimation.
Believe effort rewarded	1 if respondent responds *agree* or *strongly agree* to the statement, *'In [country] people get rewarded for their effort*'; 0 otherwise.
No strong effort belief	1 if respondent responds *neither agree nor disagree* to the statement, *"In [country] people get rewarded for their effort*'; 0 otherwise.
Believe effort not rewarded	1 if respondent responds *disagree* or *strongly disagree* to the statement, *"In [country] people get rewarded for their effort'*; 0 otherwise. Used as reference category in estimation.
Self-interest variable	
Relative income	Household income per adult equivalent divided by the country sample average. A common country average was used for eastern and western Germany.
Control variables	
Age	Age in years
Female	1 if female; 0 else
Higher education	1 if respondent has some post secondary school education; 0 else
Father has higher education	1 if respondent's father has completed secondary school; 0 else
Upper class	1 if respondent's self reported class is *upper class* or *upper middle class*; 0 else
Working class	1 if respondent's self reported class is *working class* or *lower class*; 0 else
Middle class	1 if respondent's self reported class is *middle class*; 0 else. Used as reference category in estimation.
Inequality necessary for prosperity	1 if respondent respond *agree* or *strongly agree* to the statement, *'Large differences in income are necessary for [country's] prosperity'; O otherwise*
Country dummies	1 if respondent belongs to the country in question; 0 else USA used as reference category in estimations.

Table A2: Log-likelihood ratio tests

Panel 1: Joint importance of belief variables			
Restricted model	Unrestricted model	LR chi-sq.	p-value
Pooled, excluding belief vars.	Pooled sample benchmark	295.80	0.000
Australia, excluding belief vars.	Australia benchmark	36.99	0.000
Brazil, excluding belief vars.	Brazil benchmark	17.54	0.008
Canada ,excluding belief vars.	Canada benchmark	22.39	0.001
Chile, excluding belief vars.	Chile benchmark	8.97	0.175
Cyprus, excluding belief vars.	Cyprus benchmark	51.27	0.000
Czech Rep., excluding belief vars.	Czech Rep. benchmark	28.52	0.000
Denmark, excluding belief vars.	Denmark benchmark	21.27	0.002
France, excluding belief vars.	France benchmark	15.84	0.015
Germany (west) , excluding belief vars.	Germany (west) benchmark	15.21	0.019
Germany (east) , excluding belief vars.	Germany (east) benchmark	16.92	0.010
Hungary, excluding belief vars.	Hungary benchmark	15.96	0.014
Ireland, excluding belief vars.	Ireland benchmark	11.97	0.063
Japan, excluding belief vars.	Japan benchmark	12.37	0.054
Latvia, excluding belief vars.	Latvia benchmark	19.10	0.004
New Zealand, excluding belief vars.	New Zealand benchmark	20.86	0.002
Norway, excluding belief vars.	Norway benchmark	20.21	0.003
Philippines, excluding belief vars.	Philippines benchmark	26.03	0.000
Poland, excluding belief vars.	Poland benchmark	35.35	0.000
Portugal, excluding belief vars.	Portugal benchmark	21.00	0.002
Russia, excluding belief vars.	Russia benchmark	21.14	0.002
Slovenia, excluding belief vars.	Slovenia	7.43	0.283
Spain, excluding belief vars.	Spain benchmark	20.21	0.003
Sweden, excluding belief vars.	Sweden benchmark	17.73	0.007
Switzerland, excluding belief vars.	Switzerland benchmark	9.44	0.150
USA, excluding belief vars.	USA benchmark	38.95	0.000
Panel 2: Tests of parameter homogeneity			
Pooled sample benchmark	Allow belief parameters to vary for each belief and each country	247.03	0.000
Pooled sample benchmark	Allow family belief parameters to vary for each country	76.78	0.005
Pooled sample benchmark	Allow effort belief parameters to vary for each country	108.77	0.000
Pooled sample benchmark	Allow intelligence and skills belief parameters to vary for each country	98.55	0.000

Based on ordered probit estimations where the dependent variable is the answers to the statement, *'It is the responsibility of the government to reduce the difference in income between people with high incomes and those with low incomes',* ranging from 1 for *strongly disagree* to 5 for *strongly agree.* The belief variables are responses to whether effort and intelligence/skills are rewarded, and to whether it is important to be from a wealthy family to get ahead. These and other explanatory variables in the benchmark model are described in Table A1.

Table A3: One sided tests of coefficients from ordered probit estimation[1] of the probability to agree with the redistributive statement[2]

Sample	P-value of testing the null hypothesis:				
	FAM[3] <=0	EFF[4] >=0	SKI [5]>= FAM	EFF >= SKI	EFF >= FAM
Pooled	0.000	0.000	0.000	0.063	0.000

Australia	0.000	0.019	0.001	0.182	0.000
Brazil	0.098	0.880	0.014	0.957	0.507
Canada	0.270	0.064	0.011	0.704	0.055
Chile	0.124	0.200	0.126	0.457	0.080
Cyprus	0.035	0.036	0.001	0.646	0.005
Czech rep.	0.386	0.011	0.086	0.309	0.023
Denmark	0.000	0.385	0.131	0.045	0.001
France	0.009	0.070	0.032	0.207	0.003
Germany (west)	0.176	0.173	0.094	0.504	0.091
Germany (east)	0.012	0.359	0.069	0.470	0.048
Hungary	0.023	0.054	0.122	0.112	0.008
Ireland	0.030	0.243	0.004	0.772	0.075
Japan	0.013	0.097	0.009	0.495	0.005
Latvia	0.002	0.681	0.000	0.936	0.085
New Zealand	0.012	0.020	0.013	0.262	0.000
Norway	0.000	0.658	0.000	0.768	0.001
Philippines	0.000	0.837	0.004	0.830	0.057
Poland	0.000	0.452	0.006	0.245	0.000
Portugal	0.008	0.016	0.175	0.043	0.001
Russia	0.001	0.224	0.033	0.389	0.017
Slovenia	0.450	0.269	0.270	0.490	0.280
Spain	0.145	0.001	0.391	0.017	0.001
Sweden	0.001	0.541	0.013	0.590	0.024
Switzerland	0.038	0.223	0.021	0.589	0.052
USA	0.000	0.006	0.005	0.068	0.000

[1] Based on estimation of equation 1.
[2] *'It is the responsibility of the government to reduce the difference in income between people with high incomes and those with low incomes'*
[3] FAM=coefficient of 'Believe wealthy family important'
[4] EFF=coefficient of 'Believe effort rewarded'
[5] SKI=coefficient of 'Believe intelligence and skills rewarded'

Table A4: Relative income effects[1] on the probability of different responses to the question *'For getting ahead, how important is coming from a wealthy family?'*

Sample	Not at all important	Not very important	Fairly important	Very important	Essential
Pooled (25 countries)	0.001***	0.001***	0.000***	-0.002***	-0.001***
Pooled (20 countries)[2]	0.000	0.001	0.000	-0.001	-0.000
Australia	0.003	0.004	-0.002	-0.004	-0.001
Brazil	0.001	0.000	0.000	0.000	-0.001
Canada	-0.009	-0.005	0.006	0.006	0.002
Chile	-0.000	-0.000	0.000	0.000	0.000
Cyprus	-0.000	-0.000	-0.001	0.000	0.001
Czech rep.	-0.001	-0.001	0.001	0.001	0.001
Denmark	0.003	0.002	-0.003	-0.002	-0.001
France	-0.003	-0.002	0.002	0.002	0.000
Germany (west)	0.000	0.000	-0.000	-0.000	-0.000
Germany (east)	-0.004	-0.006	-0.000	0.007	0.003
Hungary	0.004**	0.006**	0.000	-0.004**	-0.006**
Ireland	0.002	0.003	-0.001	-0.004	-0.001

Japan	-0.001	-0.001	0.001	0.001	0.000
Latvia	0.004**	0.003**	0.001*	-0.005**	-0.004**
New Zealand	-0.000	-0.000	0.000	0.000	0.000
Norway	0.002	0.003	-0.003	-0.002	-0.000
Philippines	0.001	0.001	0.000	-0.001	-0.001
Poland	0.001	0.002	0.004	-0.002	-0.005
Portugal	-0.003	-0.005	-0.002	0.003	0.007
Russia	0.003*	0.003*	0.001*	-0.002*	-0.004*
Slovenia	-0.004	-0.004	0.001	0.004	0.002
Spain	0.002	0.003	0.002	-0.005	-0.003
Sweden	0.002	0.003	-0.002	-0.003	-0.001
Switzerland	-0.006	-0.007	0.005	0.005	0.003
USA	0.007	0.005	-0.004	-0.007	-0.002

The effects are from ordered probit estimations where the dependent variable is the answer to the question *'For getting ahead, how important is coming from a wealthy family?'*, and the explanatory variables included are: relative income, age, female, higher education, father has higher education, upper class, working class, inequality necessary for prosperity, and country dummies.

*** indicates significance at the 1 % level, ** at 5 % and * at 10 %.

[1] Measures the effects of a relative income increase of one median absolute deviation increase around the median.

[2] Brazil, France, Hungary, Latvia, and Russia excluded.

Table A5: Relative income effects[1] on the probability of agreeing with the statement, *'In [country] people get rewarded for their effort'.*

Sample	Strongly disagree	Disagree	Neither	Agree	Strongly agree
Pooled (25 countries)	0.001**	0.001**	0.000**	-0.001**	-0.001**
Pooled (20 countries)[2]	0.000	0.000	0.000	-0.000	-0.000
Australia	-0.000	-0.003	-0.002	0.004	0.001
Brazil	0.011***	0.001***	-0.001***	-0.003***	-0.008***
Canada	-0.001	-0.004	-0.002	0.006	0.001
Chile	0.001	0.002	0.000	-0.002	-0.001
Cyprus	0.002	0.003	-0.001	-0.003	-0.001
Czech rep,	-0.001	0.000	0.000	0.000	0.000
Denmark	-0.001	-0.001	0.000	0.001	0.001
France	-0.008***	-0.011***	0.005***	0.012***	0.002**
Germany (west)	-0.000	-0.002	-0.002	0.004	0.000
Germany (east)	-0.001	-0.002	-0.001	0.003	0.000
Hungary	-0.010**	0.000	0.005**	0.003**	0.002**
Ireland	0.001	0.005	0.001	-0.006	-0.001
Japan	0.003	0.002	0.001	-0.004	-0.003
Latvia	0.002	0.000	-0.001	-0.001	-0.000
New Zealand	-0.002	-0.008	-0.001	0.008	0.003
Norway	0.002	0.004	-0.001	-0.005	-0.001
Philippines	0.000	0.000	0.000	-0.000	-0.000
Poland	-0.002	-0.003	0.001	0.003	0.001
Portugal	-0.002	-0.001	0.000	0.002	0.001
Russia	-0.007*	0.003*	0.002*	0.001*	0.001*
Slovenia	0.006	0.003	-0.004	-0.003	-0.001
Spain	-0.008**	-0.010**	0.001	0.014**	0.003**
Sweden	-0.001	-0.002	-0.001	0.003	0.001
Switzerland	-0.001	-0.002	-0.002	0.003	0.001
USA	-0.001	-0.005	-0.005	0.006	0.005

The effects are from ordered probit estimations where the dependent variable is the answer to the question *'In [country] people get rewarded for their effort'*, and the explanatory variables included are:

relative income, age, female, higher education, father has higher education, upper class, working class, inequality necessary for prosperity, and country dummies.

*** indicates significance at the 1 % level, ** at 5 % and * at 10 %.
[1] Measures the effects of a relative income increase of one median absolute deviation increase around the median.
[2] Brazil, France, Hungary, Latvia, and Russia are excluded.

Table A6: Relative income effects[1] on the probability of agreeing with the statement, *'In [country] people get rewarded for their intelligence and skills'.*

Estimation sample	Strongly disagree	Disagree	Neither	Agree	Strongly agree
Pooled (25 countries)	0,000	0,000	0,000	-0,000	-0,000
Pooled (20 countries) [2]	0,000	0,001	0,000	-0,001	-0,000
Australia	0,000	0,003	0,002	-0,004	-0,002
Brazil	0,003*	0,001*	0,000	-0,001*	-0,003*
Canada	-0,002	-0,008	-0,005	0,011	0,004
Chile	0,001	0,001	0,000	-0,001	-0,001
Cyprus	0,001	0,001	-0,000	-0,001	-0,000
Czech rep,	-0,001	0,000	0,000	0,000	0,000
Denmark	0,002	0,003	0,003	-0,003	-0,005
France	-0,004*	-0,009*	0,000	0,011**	0,002*
Germany (west)	-0,000	-0,001	-0,000	0,001	0,000
Germany (east)	0,000	0,002	0,002	-0,003	-0,001
Hungary	-0,001	-0,001	0,000	0,001	0,000
Ireland	0,002*	0,013*	0,006*	-0,015*	-0,006*
Japan	0,002	0,002	0,003	-0,003	-0,004
Latvia	-0,007**	-0,002**	0,003**	0,005**	0,001**
New Zealand	0,000	0,001	0,001	-0,002	-0,001
Norway	0,003**	0,009**	0,001*	-0,012**	-0,002**
Philippines	-0,001*	-0,002*	-0,002*	0,001*	0,004*
Poland	-0,002	-0,003	0,001	0,003	0,001
Portugal	0,006	0,004	0,000	-0,006	-0,004
Russia	-0,007**	0,002**	0,002**	0,002**	0,001*
Slovenia	0,001	0,001	-0,000	-0,001	-0,000
Spain	-0,000	-0,000	-0,000	0,000	0,000
Sweden	0,000	0,000	0,000	-0,000	-0,000
Switzerland	-0,001	-0,004	-0,008	0,010	0,003
USA	-0,001	-0,005	-0,006	0,004	0,008

The effects are from ordered probit estimations where the dependent variable is the answer to the question *'In [country] people get rewarded for their effort'*, and the explanatory variables included are: relative income, age, female, higher education, father has higher education, upper class, working class, inequality necessary for prosperity, and country dummies.

*** indicates significance at the 1 % level, ** at 5 % and * at 10 %.
[1] Measures the effects of a relative income increase of one median absolute deviation increase around the median.
[2]Brazil, France, Hungary, Latvia, and Russia are excluded.