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# Preferences for redistribution

## - A cross-country study on fairness

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### Abstract

This paper seeks to explain within as well as between country variation in preferences for redistribution in terms of self interest concerns, and an input based concept of fairness captured by the effects of beliefs about the causes of income differences. Results of estimations based on data for the US, Sweden, Germany and Hungary indicate that both of these factors are important determinants of general redistribution support, in line with hypothesised patterns. Furthermore it is found that not only do beliefs about causes of income differ widely between countries, but also the effects of these beliefs, suggesting considerable heterogeneity across societies in what is considered as fair.

**Keywords:** Redistribution, fairness,  
**JEL classification:** D63, D31, D01

## 1 Introduction

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

One could, in this context, make a distinction between fairness concepts emphasising outcomes only, such as egalitarianism<sup>3</sup>, and those which argue that fairness judgements should take into account individual inputs contributing to those outcomes. The general idea that the fair distribution should depend on individual inputs is quite established, both in the normative literature on justice and in positive

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<sup>1</sup> See for example Fong et al. (2005)

<sup>2</sup> See for example Burrows and Loomes (1994), Cappelen et. al. (2005), and Clark (1998)

<sup>3</sup> See also the influential inequality aversion model of Fehr and Schmidt's (1999), or fairness concepts stressing basic needs. See Konow (2003) for an excellent discussion of different fairness ideals.

analysis of what people consider being just<sup>4</sup>. According to equity theory, dating back to social psychologist Adams (1965), people expect their outcome of some exchange to be correlated<sup>5</sup> to inputs seen as relevant for that exchange. Examples of inputs that could be seen as relevant for determining the fair distribution include effort, skills, or 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 only. If people in their fairness judgements actually distinguish between inputs in this fashion, those who believe that income determinants are to a greater degree ‘responsible’ should consider the prevailing income distribution fairer and thus be less inclined to support redistribution, whereas those who view them to a larger extent ‘arbitrary’ should see existing income differences as more unfair and accordingly be more supportive of redistribution<sup>6</sup>.

With respect to empirical estimation of redistributive preferences these arguments first of all motivate going beyond standard economic self-interest explanations when seeking to explain preferences for redistribution. More specifically they point to the importance of incorporating variables capturing individual beliefs about the causes of income differences, and in particular beliefs on income determinants that could be seen as being under a varying degree of individual control. Second, they highlight the importance of studying preferences for redistribution in a comparative cross-country framework. Beliefs about the causes of income differences are likely to vary between societies<sup>7</sup>, and this in itself should create differences in redistribution support. Similarly, judgements on the extent to which perceived income determinants could be viewed as being under individual control are likely to vary between individuals as

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<sup>4</sup> For a good overview of scholars writing in this field, see Konow (2003).

<sup>5</sup> 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 the paper by Van Dijk and Wilke (1994) or that of Clark (1998)

<sup>6</sup> Cappelen and Tungodden (2005) 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, but the general formulation put forward here should still hold.

<sup>7</sup> Whether such differences in beliefs are due to actual differences in what determines final incomes or not is an interesting question but will not be dealt with in this paper.

well as between larger communities. This variation 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 preferences for redistribution is likely to vary with context, and not the least between countries, thus highlighting the importance of allowing for cross-country parameter heterogeneity.

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

- i. Both economic self-interest and an input based fairness concept, according to which individuals judge the fairness of income determinants according to their perceived degree of 'responsibility', will matter for preferences for redistribution.*
- ii. Differences in beliefs about income determinants, as well as differences in the effects of these beliefs, will both contribute to explain the cross-country variation in preferences for redistribution.*

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

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<sup>8</sup> She refers to them as exogenous and discretionary factors.

redistribution using Swiss data<sup>9</sup>, finds support for income redistribution, but less so among people who believe skills and effort to be important in determining income.

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 even when controlling for their lower incomes East Germans are more in favour of redistribution than West Germans, Alesina and Fuchs-Schündeln (2005) 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 human attitudes towards redistribution on US evidence only.

In spite of these concerns, the cross-country material relating redistributive preferences to beliefs about the causes of income differences is meagre. The only serious cross-country study in the area that we are aware of is that of Corneo and Grüner (2002) who in a sample of 12 countries find that people from former communist regimes are more supportive of redistribution, and that beliefs about the importance of hard work have a significant impact. However, they do not, as is done in this paper, include several variables capturing beliefs on income determinants that could be seen as being under a varying degree of individual control, nor is their approach cross-country comparative in the sense that it allows for parameter heterogeneity between countries.

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

## **2 Empirical framework**

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 the USA,

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<sup>9</sup> Obtained from the same data set as the one used in this paper, namely that of the International Social Survey Program (ISSP)

Sweden, Germany and Hungary<sup>10</sup>. We choose to include only four countries in the sample as we believe this allows for more in depth cross-country comparison. As the USA is the country most studied in related empirical research the choice to include the US seemed natural. When it comes to the remaining three countries we have deliberately chosen ones that we think represent different regimes in terms of redistributive attitudes, restricting our attention to Western democracies. In particular it has been suggested that welfare systems differ between Europe and the USA. We let the US represent the Anglo-Saxon countries, Sweden the Scandinavian countries, Germany continental Western Europe<sup>11</sup> and Hungary the former socialist regimes in Central- and Eastern Europe<sup>12</sup>.

Our main dependent variable is the answer 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 income*”, 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 this question actually reflect the degree of redistribution 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 on a question about the desired progressiveness or regressiveness of the tax system makes us more confident with regard to this assumption<sup>13</sup>. In figure 1 the variation in the responses to the redistributive statement is displayed with histograms for each country separately. As we can see there is large variation in expressed support for redistribution, not only within each country but also between countries, with Hungarians and Swedes seemingly being the most supportive of redistribution and Americans the least.

Turning to our explanatory variables, these could be divided into three major categories; self-interest variables, indicators on beliefs about the causes of income differences included to capture the potential influence of input based fairness concerns, and socio-demographic control variables. With regard to the former the

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<sup>10</sup> With 708 observations for the US, 520 for Germany, 747 for Sweden and 791 for Hungary, giving us a total sample of 2766 respondents.

<sup>11</sup> We have dropped observations from respondents living in regions that belonged to East Germany.

<sup>12</sup> At least the first three of these countries represent different so called welfare regimes; the liberal, the social democratic and the corporative; identified by the sociologist Esping-Andersen (1990).

<sup>13</sup> 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.

individual should according to standard economic thinking want the level of redistribution that maximises the utility derived from own current income as well as from expected future income (Piketty 1995, Benabou and Ok 2001). With redistribution going from the ‘rich’ to the ‘poor’, support for redistribution should thus be decreasing in both current relative income and expected future relative income. Moreover, it is possible to view redistribution as insurance against income risk (Buchanon and Tullock 1962). A more risk avert person should then prefer more redistribution than someone less risk avert, and similarly someone whose perceived income risks are higher should prefer more redistribution than someone with smaller perceived income risks. Because of data limitations, however, relative income<sup>14</sup> is our only self-interest indicator, and thus expected future income, risk aversion, and perceived income risk are omitted variables that need consideration. We will come back to this in the results section.

Other socio-demographic variables, such as class affiliation and higher education, could also be considered to capture self-interest, but might just as well capture differences to do 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 a more homogenous group of people should have more similar beliefs about how much an omitted ‘input’ contributes to income, as well as more similar norms on how much an input *should* contribute to income. This ambiguity makes it more suitable to view the socio-demographic indicators included 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 the individual’s levels of education, its father’s education, self-reported class belonging, sex and age. In addition, the pooled sample estimations include country dummies to capture unexplained country differences in support for redistribution.

To be able to evaluate the potential influence of an input based fairness concept, according to which individuals judge the fairness of income determinants according to their perceived degree of ‘responsibility’, we need to include variables capturing beliefs on the importance of income determinants that are arguably under a varying degree of individual control. As noted, the perceived degree of ‘responsibility’ over

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<sup>14</sup> Household income per adult equivalent divided by the country sample average. The difference between relative income and absolute income is important only in estimations with all four countries.

an input is likely to vary between individuals. Some inputs, however, are probably easier to classify than others. Effort, for example, is often put forward as being largely under individual control, whereas factors to do with birth conditions, such as family background, is seldom seen as something controllable by the individual. When it comes to inputs such as intelligence, skills, or talents there seem to be more controversy. Ideally then, in an empirical analysis of preferences for redistribution one should seek to include variables that capture beliefs on income determinants that occupy the more uncontroversial ends of the ‘responsibility spectra’, as well as beliefs on some income determinant that end up somewhere in the more disputable middle of this spectra<sup>15</sup>. In line with this reasoning we include three variables taken to capture beliefs about the importance of certain factors for determining income differences in society<sup>16</sup>. One looks at beliefs about the importance of effort (arguably a largely responsible factor) and another has to do with the importance of family background (arguably an arbitrary factor outside of individual control). The third belief variable captures the perceived importance of intelligence and skills. How to categorise this input in terms of ‘responsibility’ is less clear-cut<sup>17</sup> 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 more precise variable definitions see table 1 in the appendix.

To address our hypotheses we carry out a number of estimations. Since our dependent variable is discrete and inherently ordered these estimations are performed using ordered probit according to the benchmark setup given in equation 1:

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

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<sup>15</sup> Some authors make a clear distinction between arbitrary and responsible inputs (see for example Cappelen and Tungodden 2005, who refer to a strict ‘responsibility cut’). This might well simplify theoretical modelling, but we believe that speaking in terms of different *degrees* of responsibility over inputs, where completely arbitrary and entirely responsible occupy the two extremes, better reflect popular opinions in this context.

<sup>16</sup> As could be seen in the variable description in the appendix, the belief variables are based on questions asking how important the factor is ‘for getting ahead’, or on degree of agreement with a statement saying that the factor is ‘rewarded’ in society. 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.

<sup>17</sup> 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.

$PR_{ic}$  gives the unobserved preference for redistribution of individual  $i$  in country  $c$ ,  $\tilde{y}$  captures relative income,  $\mathbf{b}$  is the vector of belief variables,  $\mathbf{x}$  is the vector of socio-demographic variables and  $\varepsilon$  is a vector of standard normally distributed error term. Note that the parameters ( $\alpha_c, \beta_c$  and  $\delta_c$ ) are allowed to vary between countries.

The probability that individual  $i$  in country  $c$  choose response alternative  $k$  is the probability that the value of the unobserved support for redistribution fall in between the cut-points  $\mu_{k-1}$  and  $\mu_k$ .

$$(2) \quad \Pr(y_{ic} = k) = \Pr(\mu_{k-1} < \alpha_c \tilde{y}_{ic} + \beta'_c \mathbf{b}_{ic} + \delta'_c \mathbf{x}_{ic} \leq \mu_k), \quad k = 1, \dots, 4$$

The sign of coefficients reveal the average direction of change in the value of the outcome caused by a positive change in the independent variable. To be able to say something about the magnitude of effects, however, we present the marginal effects on the probabilities of observing the different outcomes as these are easier to interpret.

### 3 Results

In this chapter we evaluate our two hypotheses empirically. In the first section we approach our first hypothesis, examining the extent to which economic self-interest considerations and input based fairness concerns can help explain preferences for redistribution. Thereafter we turn to our second hypothesis, suggesting that differences in beliefs about income determinants, as well as differences in the effects of these beliefs, will both contribute to explain the cross-country variation in preferences for redistribution.

#### 3.1 Explaining preferences for redistribution

Our first hypothesis could 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 preferences for redistribution, implies

that a higher relative income should give a lower support for redistribution, thus implying that we should have  $\alpha_c < 0$ . The analysis of the second part of the hypothesis, arguing that the effect of beliefs about the causes of income differences will differ with the respective inputs' degree of responsibility, rests on that we accept 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 case ending up somewhere between the other two factors. If so, 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  $\beta_c^{family} > 0$  (and vice versa in the case of believing that these inputs are *not* important for determining income). Table 2 presents the parameters of the first round of estimations, and table 3 presents marginal effects of our focus variables on the probability of a respondent choosing the different response categories to the redistributive statement.

### *3.1.1 Self-interest considerations and input based fairness concerns*

Let us first consider the relative income effect; from table 2 we can see that relative income has a negative and statistically significant effect on preferences for redistribution in all samples. People with a higher relative income are on average less supportive of redistribution. The marginal effect of going from a relative income of one half standard deviations below the mean to half a standard deviation above the mean is to reduce the probability of agreeing or strongly agreeing to the redistributive statement with around 5% in all samples.

Turning to the effects of holding certain beliefs about what causes income differences, in table 2 and 3 we can see that parameters and marginal effects, although not always statistically significant, tend to follow the hypothesised pattern. Believing effort to be rewarded in society has a statistically significant and negative impact on support for redistribution in the American, German and full sample, while not believing so has a positive impact in the Hungarian sample. The marginal effect of believing effort to be rewarded varies between countries, but in the full sample implies a 5.5 percentage point decrease in the probability of agreeing or strongly agreeing with the redistributive statement, matched by a corresponding increase in the probability of answering 'strongly disagree', 'disagree' or 'neither'. Believing effort

is rewarded thus seems to have a similar negative impact on the probability of supporting redistribution as do a one standard deviation increase in relative income. Moreover, believing family background to be important to get ahead is, as anticipated, associated with stronger support for redistribution (the effect is small and not statistically significant in the German sample, however). Again marginal effects differ between countries, but for the full sample believing family to be important for getting ahead implies a 10.5 percentage point increase in the probability of agreeing or strongly agreeing with the redistributive statement (with a 8.2 percentage point increase in the strongly agree alternative). Turning to the effect of believing that intelligence and skills are rewarded this is, as was stipulated, more ambiguous. In Germany the negative and statistically significant impact of the intelligence and skills variable closely resembles that of the effort variable, while in Sweden respondents who believe that intelligence and skills are rewarded tend to be more supportive of redistribution. In the American, Hungarian and full sample estimations believing intelligence and skills to be rewarded has no significant impact on redistributive preferences. In the terminology used here, this could be taken to suggest differences in the responsibility assigned to the intelligence and skills ‘input’.

In all samples the belief parameters fulfil the hypothesised pattern  $\beta_c^{effort} < \beta_c^{skills} < \beta_c^{family}$  (with the possible exception of Hungary where not believing effort to be rewarded has a positive effect instead of believing so to have a negative effect), and in all samples (with the possible exception of the Swedish)  $\beta_c^{effort} < 0$  while in all samples (with the possible exception of the German)  $\beta_c^{family} > 0$ . That  $\beta_c^{skills}$  is not statistically significant in the full sample, the US and the Hungarian samples adds support to our reasoning rather than weakens it considering that intelligence/skills was put forward as an input more difficult to classify in terms of responsibility. In general, the beliefs saying that the respective inputs are *not* important do not to the same extent have a statistically significant impact on redistributive preferences, but when they do they are of the expected signs. Hence, the pattern displayed by the belief parameters in large support the hypothesis that the effect of beliefs about the causes of income differences will differ with the degree of responsibility assigned to the inputs they concern, as suggested by the input based fairness concept.

We know from table 2 that relative income is a statistically significant determinant of support for redistribution. To formally test the joint importance of the beliefs variables, we performed log likelihood ratio tests where the unrestricted model includes them and the restricted model does not include them. The null-hypothesis, that the exclusion of the beliefs variables does not affect the explanatory power of the model, could be firmly rejected for all samples<sup>18</sup>. Hence it seems that both relative income and belief variables matter for explaining redistributive preferences.

### *3.1.2 Socio-demographic dividing lines*

With regard to the socio-demographic variables, as discussed in section 2 omitted belief- and self-interest variables make their parameters somewhat difficult to interpret; do they reflect differences in norms and beliefs among different groups in society, or do they capture self-interest considerations? Nevertheless, a number of interesting patterns stand out (see the parameters in table 2 and marginal effects in table 3). For example, in all countries except the USA people with higher education tend to be less supportive of redistribution. This could well reflect higher expected future relative incomes given current relative income for higher educated people with steeper age-earnings profiles, but could also be due to different norms among higher educated people. Similarly, that Americans and Swedes reporting that they belong to the upper class tend to be less positive towards the redistributive statement could partially be due to that people belonging to classes higher up the social ladder have better connections and thus face smaller income risks, but could also depend on differences in norms between social groups. The fact that women are more supportive of redistribution in Sweden, Germany, and Hungary could perhaps 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. Another interesting socio-demographic result is that there is a positive and significant age effect in Hungary, while in other countries we see no impact of age on support for redistribution. In line with the reasoning of Alesina and Fuchs-Schündeln (2005), who compares former East- and West Germany, this could depend on that older cohorts in

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<sup>18</sup> At the 1 % level of significance except for in Hungary where it could be rejected at the 1,24 % level.

Hungary have spent more time under a socialist regime, and that societal regimes influence preferences.

### *3.1.3 Dealing with omitted variables*

In interpreting these results one has to take account of the potential influence of omitted self-interest and beliefs variables on our key parameters. Variables that would seem important to consider in this context include the self-interest indicators expected future relative income, risk-aversion, and perceived income risks, and variables capturing beliefs on the importance of a wide range of inputs which could affect income, such as luck, honesty, ethnicity, and gender. Since patterns in omitted variables such as these ones are likely to vary between different groups in society, the included socio-demographic variables should partially capture the variation caused by them, thus helping to alleviate the problem. Nevertheless, the issue is potentially serious enough to deserve focus.

First, the relative income estimate may be biased by omitted self interest variables. Most obviously 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 the estimated relative income coefficient will be larger than its true effect, as it also captures some of the effects from expected future income. It will however be smaller than the true effect of the weighted relative income term, as current relative income could not be said to be a perfect indicator of expected future income. It is less clear in what direction the omission of risk aversion, and perceived income risks affect the relative income effect. As noted, however, the fact that self-interest indicators such as these ones are likely to vary between different groups in society probably makes the included socio-demographic variables pick up some of this influence.

Perhaps more worrying, there is a possibility that relative income does not only affect preferences for redistribution directly, but also via an influence on beliefs about the importance of an input to explain income differences, and on the assigned degree of responsibility over the input. If this is so, and if we are interested in isolating the effect of relative income that is due to direct self-interest concerns, the omission of relevant belief variables is problematic. Our strategy to deal with this relies on the assumption that relative income co-varies with omitted belief variables in a similar

manner as with the beliefs actually included. Table 4 to 9 show parameter and marginal effect results from estimations with the respective belief indicators as dependent variables and with relative income and the socio-demographic controls as independent variables. From these we can see that with the exception of Hungary, relative income does not seem to be an important determinant of beliefs in the different countries. If the same goes for omitted belief variables the influence of these should therefore not be a major problem. Alternatively, in the benchmark preference for redistribution setup, one could argue that the difference between a total relative income effect based on an estimation not including the belief variables, and the relative income effect when the beliefs variables are included, provides an indication of the seriousness of the problem. The estimations of the total relative income effect are presented in table 10, with the resulting effect of moving from a relative income of  $\frac{1}{2}$  standard deviation below the mean to one of  $\frac{1}{2}$  standard deviation above the mean presented in table 11. It turns out that in all samples the relative income effect without the belief variables is very similar to that observed when including the beliefs variables. Hence, even though we cannot expect the estimated relative income coefficient to reflect the true effect of current relative income on support for redistribution, or the importance of self-interest for redistributive preferences, these results seem to suggest that we can at least attribute the effect on preferences for redistribution that relative income actually captures to self-interest.

Just as omitted belief variables could bias the effect of relative income, omitted self-interest variables could bias the estimated effects of belief<sup>19</sup>. Particularly, it seems reasonable that people who tend to believe in equality of opportunity, in the sense that effort is rewarded and that being from a wealthy family is not very important, could have higher hopes to increase their relative income in the future. For people with comparatively low current relative incomes, the degree of redistribution that is perceived to be in their self interest might therefore be lower than what would be expected from simply observing their current relative income. If so, the current relative income effect on redistributive preferences should be weaker for people holding this belief. To get a picture of these potential influences we introduce interaction terms between the belief variables and relative income in the estimations

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<sup>19</sup> It might also be argued that omitted beliefs could bias the estimated effects of the included ones, which is certainly true, but we see this as less of a problem since at least then we can assign the effects of belief variables to fairness considerations rather than to self-interest concerns.

displayed in table 12. In the American and Hungarian sample no interaction terms are significant, and their inclusion never has any noteworthy effect on the belief and relative income parameters. In Germany and Sweden, however, the interaction term between relative income and believing it to be important to be from a wealthy family to get ahead has a statistically significant negative parameter, (the inclusion of which makes the negative relative income parameters slightly smaller and the concerned positive belief parameters substantially larger), indicating that the negative relative income effect on redistributive support is stronger among people who hold this belief<sup>20</sup>. The estimate of believing it to be important to be from a wealthy family could then to some extent be biased by self-interest motives in the Swedish and German samples.

Summing up, problems of omitted variables make it difficult to pin down the exact magnitude of the effects found. Still, we can conclude that both relative income and beliefs about the causes of income differences seem to matter for explaining preferences for redistribution, 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 preferences for redistribution, as well as in coefficients of our main explanatory variables. In the next section we investigate this variation further.

### **3.2 Explaining cross-country variation in redistributive preferences**

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

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<sup>20</sup> Or that among richer people believing family background to be important to get ahead does not have an as strong positive impact on redistributive support, suggesting a difference in fairness ideals between income groups.

differences in beliefs and impacts of these beliefs could explain the cross-country variation in redistributive preferences.

### *3.2.1 Cross-country differences in beliefs about income determinants*

Let us start by looking at the distribution of beliefs about what causes income differences in the respective country samples. Figure 2, 3 and 4 present histograms over the distributions of beliefs concerning whether effort is rewarded in society, whether intelligence and skills are rewarded, and with regard to the importance of being from a wealthy family to get ahead. The belief distributions do by no means appear to be identical between countries. To formally test this we perform two-sample Kolmogorov-Smirnov tests of equal cumulative distribution functions<sup>21</sup>. Each country is compared with the remaining countries for the three belief variables. The null-hypothesis of equal cumulative distribution functions was firmly rejected in all cases but one; we could not reject that the cumulative distribution of beliefs about the importance of being from a wealthy family was any different in the German sample than in the Swedish sample. Overall it nevertheless seems fair to say that beliefs about the causes of income differences differ between countries.

To be more specific, and as revealed in figure 2, believing that effort is rewarded is most common in the US, followed by Germany, whereas the Hungarians are the ones most sceptical of the claim. The same pattern holds for the belief distributions presented in figure 3 concerning the rewards of intelligence and skills. Turning to the importance of family background for getting ahead we can see from figure 4 that compared to in the other country samples, Americans believe this to be relatively unimportant, whereas Hungarians are the ones who believe this factor to be most important.

Looking at country fixed effects in ordered probit regressions of the beliefs about the importance of effort, family background, and intelligence and skills on relative income and the other socio-demographic variables (for coefficients and selected marginal effects see tables 4-9) a similar picture emerges. With effort being classified

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<sup>21</sup> The Kolmogorov-Smirnoff test is non-parametric, which is an advantage considering that the beliefs distributions displayed in figures 2, 3 and 4 in many cases do not appear to be normally distributed. The null-hypothesis of the test is that the empirical cumulate distribution functions are the same in both samples. As opposed to a normal t-test, this test is sensitive to both differences in the location of the distribution and in the shape of the distribution.

as the most, and family background as the least, responsible input, the belief patterns displayed fairly well match the actual level of support for redistribution found between countries<sup>22</sup>. At this stage it thus seems as though cross-country differences in redistribution support could partly depend on differences in beliefs about income differences.

### 3.2.2 Cross-country differences in the effects of beliefs about income determinants

Turning to the second step; to evaluate possible cross-country heterogeneity in the *effects* of the belief variables on redistributive preferences, the results presented in table 2 (giving benchmark estimation parameters) and table 3 (displaying marginal effects of key variables) suggest such heterogeneity to be present. Believing effort to be rewarded implies a decrease in the probability of agreeing or strongly agreeing with the redistributive statement of slightly above 10 percentage points in the US and German and Hungarian samples while in Hungary *not* believing effort to be rewarded gives a 10.1 percentage point *increase* in the probability of strongly agreeing with the redistributive statement. In Sweden, however, the marginal effect of believing that effort is rewarded is very small and not statistically significant, perhaps indicating that Swedes do not to the same extent view effort as an input under individual control. Indeed, it is possible to imagine that depending on social background and other circumstances all individuals do not have the same choice set regarding how much effort to exert. This could be a more commonly held view in Sweden than in the other countries investigated. An alternative interpretation is that Swedes are more concerned about equal outcomes, independent of the degree of control they believe people have over important determinants of income.

When it comes to believing that it is important to be from a wealthy family to get ahead, this implies an increase in the probability of agreeing or strongly agreeing with the redistributive statement of about 15 percentage points in Sweden, the US and Hungary. But in Germany the effect is very small and not statistically significant. According to the reasoning put forward in this paper this fact could be interpreted as Germans 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

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<sup>22</sup> see figure 1

argument that someone who has succeeded in creating wealth should be able to pass this onto his/her children is not that uncommon. The degree of responsibility assigned to an input may in reality not depend only on perceived *individual* control over the input, but also on perceived control within a larger entity, such as the family<sup>23</sup>. An alternative interpretation could be that Germans are more libertarian in the sense that they believe you are entitled to the income you earn, irrespective of your degree of control over the inputs involved in earning that income.

As we have already seen, believing intelligence and skills to be rewarded, produces mixed results. In Sweden it implies a 7 percentage point increase in the probability of agreeing or strongly agreeing with the redistributive statement (significant at the 10% level), whereas in Germany it brings with it a 11.1 percentage point *decrease* in this same probability, suggesting a significant difference in the degree of responsibility assigned to this input between Germany and Sweden<sup>24</sup>. Again, an alternative interpretation is that there are differences between the countries in the very fairness ideals adhered to, with Germans being more libertarian and Swedes being more concerned with equal outcomes. Yet another alternative would be that Germans are the most, and Swedes the least, worried about potential incentive effects from income redistribution.

To formally test whether the effects of belief variables differ between countries we make use of log-likelihood ratio tests, presented in table 13 in the appendix. 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. The hypothesis of homogenous effects of family- and intelligence and skills beliefs can be safely rejected, but the hypothesis of homogenous effects of effort beliefs is only close to being rejected at the 10% level of significance. This suggests more agreement across countries on whether effort is a fair income determinant, than on whether the other inputs are so. The possibility that effects of beliefs about income differences on preferences for redistribution are more similar in some of the investigated countries,

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<sup>23</sup> In fact, reasoning along these lines is put forward in the article by Alesina and Angeletos (2005).

<sup>24</sup> In Sweden the marginal effect of not believing intelligence and skills to be rewarded is also positive and significant, suggesting differences within Sweden in judgements on whether intelligence and skills is a fair income determinant or not.

possibly because they share more common ideas about what is fair, is also investigated using a number of different log-likelihood ratio tests. In line with the above discussion, Germany seems to be the country standing out the most in terms of belief parameters.

Similarly, the effects of our socio-demographic variables, just as the effects of the belief variables, do not appear to be equal across countries. To test for this, we run a number of log-likelihood ratio tests of homogeneity in the parameters of the socio-demographic variables and our self-interest indicator relative income. For age and belonging to the working class cross-country parameter homogeneity can be strongly rejected, and for higher education parameter homogeneity can be rejected at the ten percent level. As already mentioned, age seems to matter for redistributive preferences in the Hungarian sample only. When it comes to the effect of being female or of self-reported belonging to the upper-class, however, the null hypothesis of parameter homogeneity between the countries cannot be rejected at the 10% level of significance. Turning to our self-interest variable relative income parameter homogeneity cannot be rejected at the 10% significance level. Put in relation to the heterogeneity in belief variable effects discussed above this last result is interesting as it might be taken to suggest that in terms of influence on preferences for redistribution self-interest is a more ‘fundamental’ driving force than fairness concerns in the sense that it is less susceptible to contextual influence.

To sum up, according to the reasoning in this paper respondents in the German sample are the ones viewing the included inputs as most ‘responsible’, followed by respondents in the US and Hungarian samples. Swedes, on the other hand, seem to be those most reluctant to classify the investigated inputs as being under individual control. Controlling for belief variables, relative income and other socio-demographic indicators, Hungary is the country most supportive of redistribution, followed by Sweden, Germany and the US (see table 2). The country pattern displayed by the belief parameters is in line with Swedes wanting more redistribution than Germans and Americans. Moreover, it corresponds with Hungarians desiring more redistribution than Germans and Americans, but considering the limited parameter variation between Hungary and the US it is unlikely that this could explain the large variation in redistributive support between these two countries. What this pattern is not in line with, however, is that Germans, despite their seeming tendency to view factors determining income as more responsible, still want more redistribution than

Americans, or why Sweden does not pass Hungary in terms of redistribution support. The next section discusses this issue further.

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

Let us now turn to the last stage, where we want to say something about the extent to which the identified differences in beliefs and impacts of these beliefs could explain the large cross-country variation observed in redistributive preferences. In previous literature it has been suggested that differences in the beliefs that people hold 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 beliefs to explain cross-country variation in preferences for redistribution, we evaluate how the marginal effect of belonging to a certain country changes as beliefs and beliefs-country interaction are added to the model. To be more specific we estimate the following three equations and focus on whether the parameters in  $\phi$  approach zero as we allow for differences in beliefs (2) and differences in the effects of these beliefs (3).

- 1  $PR_{ic} = \phi' \mathbf{country} + \varepsilon_{ic}$
- 2  $PR_{ic} = \phi' \mathbf{country} + \beta' \mathbf{b}_{ic} + \varepsilon_{ic}$
- 3  $PR_{ic} = \phi' \mathbf{country} + \beta' \mathbf{b}_{ic} + \gamma' \mathbf{b}_{ic} \times \mathbf{country} + \varepsilon_{ic}$

The results of these estimations are presented in table 14. Estimations are carried out for a model excluding the socio-demographic controls (estimations 1, 2, and 3), as well as for a model including them (estimation 4, 5, and 6). Adding the belief variables to the model somewhat reduces the size of all the marginal effects of being of a certain nationality, confirming that differences in beliefs can explain a small part of the cross-country variation in redistributive preferences. Allowing for heterogeneity in the effects of beliefs reduces the Swedish marginal effects substantially, the Hungarian marginal effects somewhat, and *increases* the German marginal effects, thus confirming the picture we got from simply comparing the country distributions in support for redistribution with their respective belief effects.

Hence it seems as though a relatively large part of the high support for redistribution in Sweden (as compared to the US) could be explained by Swedes assigning a lower degree of responsibility to inputs believed important for income determination. Variation in beliefs about what causes income differences, as well as differences in the effects of these beliefs, can explain parts of why Hungarians are more pro-redistribution (than Americans), while a large part remains unexplained. The higher support for redistribution in Germany than in USA, however, is even more puzzling when taking account of that Germans seemingly assigns a higher degree of responsibility to inputs seen as determining income.

The conclusion we can draw from this is that both differences in beliefs on what causes income differences, and differences in the effects of holding these beliefs, seem to be important for explaining within and between country variation in preferences for redistribution. At the same time, however, a large part of the variation is still left unexplained. A factor that could be important in this context is the influence of status quo on redistributive preferences. Our age effect in the Hungarian sample, as well as the findings of Alesina and Fuchs-Schündeln (2005), seem to suggest that path dependence could bear some relevance for redistribution support.

## **4 Conclusions**

The objective of this study was to explain variation in preferences for redistribution, within as well as between countries, in terms of self interest concerns and beliefs about the causes of income differences. We proposed an empirical framework where preferences for redistribution depend on self-interest considerations and fairness concerns. With regard to the latter, it was suggested that judgements on whether an outcome is fair are likely to take account of individual actions and traits contributing to that outcome, and that the more people view these inputs as under individual control, the more they consider that they should affect the income distribution. According to this input based fairness concept, whether the individual views prevailing income differences as fair, or whether she considers there is need for redistribution, should thus depend on what inputs she thinks the income differences are due to, as well as the extent to which she views these inputs as responsible in the sense that they are under individual control. To single these potential influences out

we included in our empirical setup beliefs about income determinants arguably under a varying degree of individual responsibility, stipulating that believing a factor seen as responsible to be important for determining income would imply less support for redistribution, whereas viewing an input outside individual control as crucial for income determination should bring with it more support for redistribution.

Furthermore, and very importantly, we argued that these beliefs, as well as their effects, should vary with context why the comparative cross-country perspective was central to our purposes to explain not only within country, but also between country, variation in redistributive preferences. Based on this set-up, and on data availability, two hypotheses were formulated and tested using data for the United States, Sweden, Germany and Hungary.

Our first hypothesis suggested that both economic self-interest and an input based fairness concept, according to which individuals judge the fairness of income determinants according to their perceived degree of ‘responsibility’, will matter for preferences for redistribution. This hypothesis was supported by the data. As anticipated, relative income had a negative and statistically significant impact on preferences for redistribution in all samples. With regard to the effects of variables capturing beliefs about the causes of income differences, although not always statistically significant, they tended to follow the hypothesised pattern. As stipulated, believing effort to be rewarded in society had a negative impact on support for redistribution, whereas believing family background to be important to get ahead was associated with stronger support for redistribution. And as was expected, the effect of believing that intelligence and skills, the input arguably most difficult to classify in terms of ‘responsibility’, to be rewarded was more ambiguous and produced mixed results. Although problems of omitted variables made it difficult to pin down the exact magnitude of the effects found, we could nevertheless conclude that both relative income and beliefs about the causes of income differences matter for explaining preferences for redistribution, and that they do so according to hypothesised patterns.

Our second hypothesis put forward that differences in beliefs about income determinants, as well as differences in the effects of these beliefs, both should contribute to explain the cross-country variation in preferences for redistribution. Our estimations supported this proposition, but at the same time demonstrated that much of the variation was left unexplained. First, we showed that there were country

differences in the beliefs about income determinants, and that these were consistent with country differences in support for redistribution. Second, we demonstrated that the effect of these belief variables on support for redistribution varied significantly between countries. Striking in this context was the difference between the Swedish and German parameters, seemingly indicating that Swedes are the ones most reluctant to classify the investigated inputs as ‘responsible’, while Germans on the other hand were those appearing most eager to do so. Looking at how well differences in beliefs, and differences in the effects of these beliefs, could explain cross-country variation in preferences for redistribution we concluded that the former could explain some of the variation but left much unexplained, and that the latter contributed to explaining why Sweden and Hungary were more pro-redistribution compared to the US, while it made the higher support for redistribution in Germany than in the US more of a puzzle.

Summing up, our findings seemed to indicate that self-interest considerations, as captured by the impact of relative income, as well as an input based fairness concept, as illustrated by the effects of beliefs about the causes of income, both contribute to explain preferences for redistribution. The large country variation in redistribution support, as well as the cross-country parameter heterogeneity displayed, demonstrated the importance of not only attempting to explain within country, but also between country variation in this context. Furthermore, the fact that a large part of this variation was left unexplained indicates that our framework for explaining redistributive preferences lacks some ingredient. One factor that we consider worth exploring in this respect, and which would serve as an interesting starting point for further research, is the impact of the status quo, or path dependence, on redistributive preferences. Another interesting result, not directly related to our main hypotheses, is that in contrast to the heterogeneity in the belief parameters we cannot reject cross-country *homogeneity* in the effect of relative income on support for redistribution. The problem of omitted variables makes it difficult to draw any definite conclusions from this finding, but it could be taken to suggest that self-interest motives are more ‘fundamental’ than fairness considerations in the sense that they are more independent of context. This too could provide an interesting opening for future research.

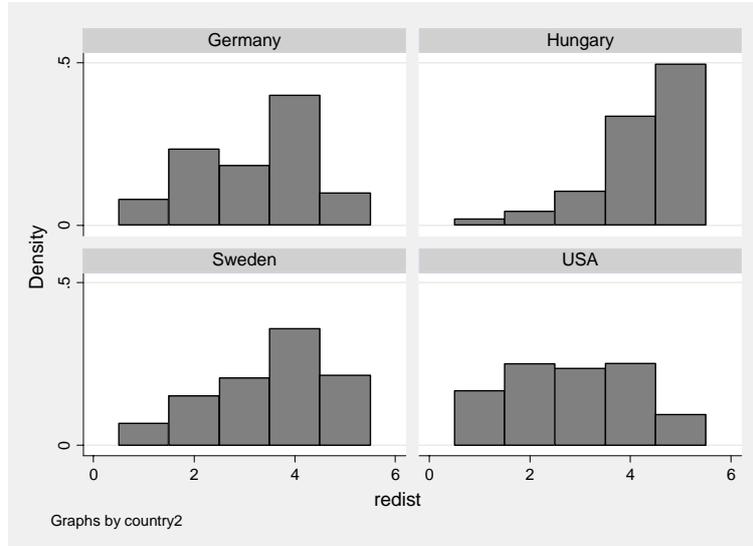
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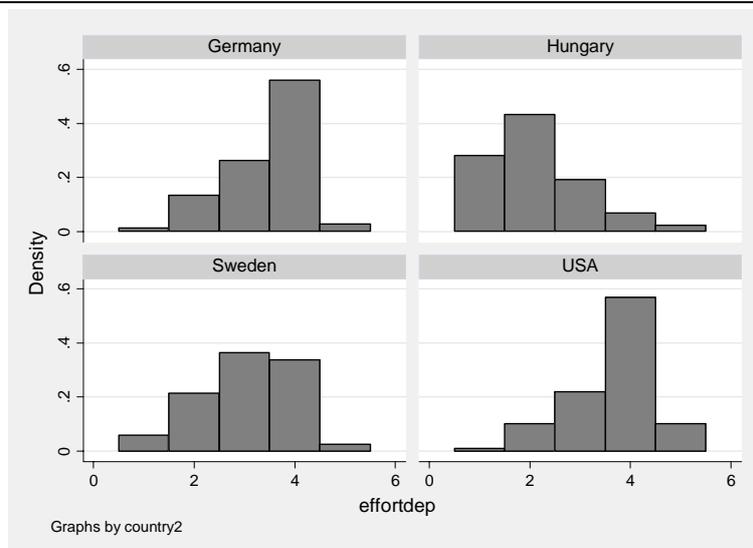
## A. Figures and tables

Figure 1: Distribution of support for government income redistribution



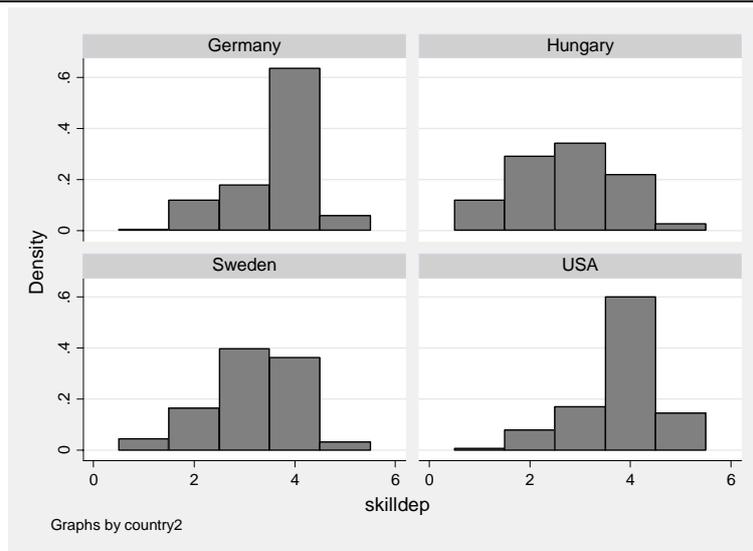
Support for redistribution is measured by the answer to the statement “it is the responsibility of the government to reduce the difference in income between people with high incomes and those with low income” ranging from 1 for *strongly disagree* to 5 for *strongly agree*.

Figure 2: Distribution of belief about whether effort is rewarded



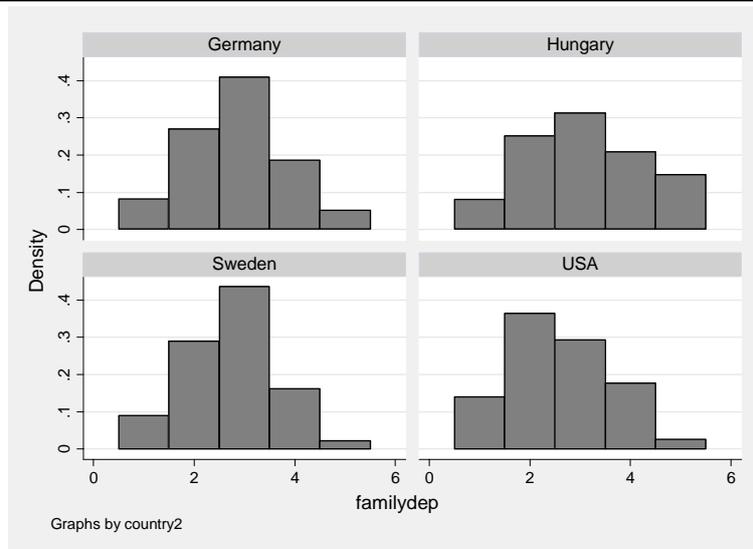
Belief about whether effort is rewarded is measured by the answer to the statement “in [country] people get rewarded for their effort” ranging from 1 for *strongly disagree* to 5 for *strongly agree*.

Figure 3: Distribution of belief about whether intelligence and skills is rewarded



Belief about whether intelligence and skills is rewarded is measured by the answer to the statement “in [country] people get rewarded for their intelligence and skills” ranging from 1 for *strongly disagree* to 5 for *strongly agree*.

Figure 4: Distribution of belief about the importance of family background



Belief about the importance of family background is measured by the answer to the statement “for getting ahead...how important is coming from a wealthy family” ranging from 1 for *not important at all* to 5 for *essential*.

Table 1: Variable description

| Variable  | Description   |
|---|---|
| Preferences for redistribution                  | the answer to the statement “ <i>it is the responsibility of the government to reduce the difference in income between people with high incomes and those with low income</i> ”, 1 if respondent chooses strongly disagree, 2 if respondent chooses disagree, 3 if respondent chooses neither agree nor disagree, 4 if respondent chooses agree, 5 if respondent chooses strongly agree |
| Believe family important                        | 1 if respondent choose <i>essential</i> or <i>very important</i> to the statement “for getting ahead...how important is coming from a wealthy family”, 0 otherwise.   |
| Believe family not important                    | 1 if respondent choose <i>not very important</i> or <i>not important at all</i> to the statement “for getting ahead...how important is coming from a wealthy family”, 0 otherwise.  |
| Believe family fairly important                 | 1 if respondent choose <i>fairly important</i> to the statement “for getting ahead...how important is coming from a wealthy family”, 0 otherwise. Used as omitted benchmark category in estimation.   |
| Believe intelligence and skills rewarded        | 1 if respondent choose <i>agree</i> or <i>strongly agree</i> to the statement “in [country] people get rewarded for their intelligence and skills”, 0 otherwise.  |
| Believe intelligence and skills not rewarded    | 1 if respondent choose <i>disagree</i> or <i>strongly disagree</i> to the statement “in [country] people get rewarded for their intelligence and skills”, 0 otherwise.  |
| No strong beliefs about intelligence and skills | 1 if respondent choice <i>neither agree nor disagree</i> to the statement “in [country] people get rewarded for their intelligence and skills”, 0 otherwise. Used as omitted benchmark category in estimation.  |
| Believe effort rewarded                         | 1 if respondent choose <i>agree</i> or <i>strongly agree</i> to the statement “in [country] people get rewarded for their effort”, 0 otherwise.   |
| Believe effort not rewarded                     | 1 if respondent choose <i>disagree</i> or <i>strongly disagree</i> to the statement “in [country] people get rewarded for their effort”, 0 otherwise.   |
| No strong beliefs about effort                  | 1 if respondent choice <i>neither agree nor disagree</i> to the statement “in [country] people get rewarded for their effort”, 0 otherwise. Used as omitted benchmark category in estimation.   |
| Relative income                                 | Household income per adult equivalent divided by the country sample average   |
| Age   | Age in years  |
| Female  | 1 if female<br>0 else   |
| Higher education                                | 1 if respondent has some post secondary school education<br>0 else  |
| Father has higher education                     | 1 if respondent’s father has completed secondary school<br>0 else   |
| Upper class                                     | 1 if respondent’s self reported class is <i>upper class</i> or <i>upper middle class</i><br>0 else  |
| Working class                                   | 1 if respondent’s self reported class is <i>working class</i> or <i>lower class</i><br>0 else   |
| Middle class                                    | 1 if respondent’s self reported class is <i>middle class</i><br>0 else  |
| Sweden  | 1 if respondent belong to the Swedish sample<br>0 else  |
| Germany   | 1 if respondent belong to the German sample<br>0 else   |
| Hungary   | 1 if respondent belong to the Hungarian sample<br>0 else  |

Table 2: Benchmark estimation of preferences for redistribution

| Parameters from ordered probit estimations                        |                      |                      |                      |                      |                      |
|---|----------------------|----------------------|----------------------|----------------------|----------------------|
| Dependent variable is preferences for redistribution <sup>1</sup> |                      |                      |                      |                      |                      |
|   | Full sample          | USA                  | Germany              | Sweden               | Hungary              |
| Believe family important <sup>2</sup>                             | 0.278***<br>(0.056)  | 0.368***<br>(0.117)  | 0.093<br>(0.124)     | 0.398***<br>(0.113)  | 0.270***<br>(0.102)  |
| Believe family not important                                      | -0.054<br>(0.047)    | -0.194**<br>(0.094)  | 0.056<br>(0.109)     | -0.031<br>(0.087)    | 0.030<br>(0.100)     |
| Believe intelligence and skills rewarded                          | 0.003<br>(0.058)     | -0.031<br>(0.121)    | -0.281**<br>(0.139)  | 0.182*<br>(0.108)    | -0.090<br>(0.113)    |
| Believe intelligence and skills not rewarded                      | 0.003<br>(0.065)     | -0.041<br>(0.176)    | -0.038<br>(0.185)    | 0.207<br>(0.136)     | -0.079<br>(0.097)    |
| Believe effort rewarded   | -0.140**<br>(0.059)  | -0.280***<br>(0.109) | -0.292**<br>(0.122)  | -0.036<br>(0.112)    | 0.026<br>(0.165)     |
| Believe effort not rewarded                                       | 0.139**<br>(0.063)   | 0.126<br>(0.159)     | -0.098<br>(0.165)    | 0.036<br>(0.127)     | 0.255**<br>(0.107)   |
| Relative income <sup>3</sup>                                      | -0.162***<br>(0.030) | -0.168***<br>(0.063) | -0.130***<br>(0.049) | -0.239***<br>(0.067) | -0.168**<br>(0.070)  |
| Age   | 0.002<br>(0.001)     | -0.002<br>(0.003)    | 0.001<br>(0.003)     | -0.003<br>(0.003)    | 0.010***<br>(0.002)  |
| Female  | 0.238***<br>(0.042)  | 0.117<br>(0.081)     | 0.320***<br>(0.097)  | 0.345***<br>(0.080)  | 0.156*<br>(0.082)    |
| Higher education  | -0.245***<br>(0.059) | -0.040<br>(0.107)    | -0.542***<br>(0.187) | -0.281***<br>(0.100) | -0.407***<br>(0.134) |
| Father has higher education                                       | -0.113*<br>(0.061)   | -0.144<br>(0.109)    | -0.111<br>(0.167)    | -0.109<br>(0.117)    | -0.171<br>(0.118)    |
| Upper class   | -0.371***<br>(0.080) | -0.564**<br>(0.234)  | -0.269<br>(0.167)    | -0.371***<br>(0.110) | 0.329<br>(0.333)     |
| Working class   | 0.245***<br>(0.047)  | 0.134<br>(0.088)     | 0.128<br>(0.107)     | 0.467***<br>(0.097)  | 0.170*<br>(0.093)    |
| Sweden  | 0.635***<br>(0.061)  |                      |                      |                      |                      |
| Germany   | 0.292***<br>(0.063)  |                      |                      |                      |                      |
| Hungary   | 1.138***<br>(0.069)  |                      |                      |                      |                      |
| Cut-point 1   | -1,035<br>(0,107)    | -1,483<br>(0,210)    | -1,828<br>(0,220)    | -1,757<br>(0,193)    | -1,574<br>(0,220)    |
| Cut-point 2   | -0,208<br>(0,103)    | -0,654<br>(0,204)    | -0,821<br>(0,207)    | -0,941<br>(0,183)    | -0,993<br>(0,206)    |
| Cut-point 3   | 0,401<br>(0,103)     | -0,007<br>(0,203)    | -0,295<br>(0,205)    | -0,270<br>(0,180)    | -0,369<br>(0,201)    |
| Cut-point 4   | 1,485<br>(0,106)     | 0,961<br>(0,208)     | 1,080<br>(0,212)     | 0,836<br>(0,183)     | 0,682<br>(0,201)     |
| Observations  | 2766                 | 708                  | 520                  | 747                  | 791                  |
| Log-likelihood  | -3737.382            | -1055.765            | -717.971             | -1029.9              | -874.902             |
| Pseudo R-square   | 0.110                | 0.042                | 0.049                | 0.077                | 0.023                |

Standard errors in parenthesis. \*\*\* indicates significance at the 1 % level, \*\* at the 5 % level and \* at the 10 % level.

<sup>1</sup> as measured by the answer 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 income*” which can take five possible values ranging from 1 for *strongly disagree* to 5 for *strongly agree*.

<sup>2</sup> For the beliefs variables the omitted benchmark categories are: ‘believe family fairly important’, ‘no strong beliefs about intelligence and skills’ and ‘no strong beliefs about effort’ (see table 1 for variable definitions).

<sup>3</sup> Household income per adult equivalent divided by the country sample average

Table 3: Marginal effects of movements in key variables<sup>1</sup> on probability of agreement 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 income*”

|                                      | Strongly disagree | Disagree  | Neither   | Agree     | Strongly agree |
|--------------------------------------|-------------------|-----------|-----------|-----------|----------------|
| <b>Pooled sample</b>                 |                   |           |           |           |                |
| Believe family important             | -0.024***         | -0.048*** | -0.033*** | 0.023***  | 0.082***       |
| Believe effort rewarded              | 0.014**           | 0.025**   | 0.015**   | -0.016**  | -0.039**       |
| Believe skills/intelligence rewarded | 0.000             | -0.001    | 0.000     | 0.000     | 0.001          |
| Believe family not important         | 0.005             | 0.010     | 0.006     | -0.006    | -0.015         |
| Believe effort not rewarded          | -0.013**          | -0.025**  | -0.016**  | 0.014**   | 0.039**        |
| Believe skill/intell. not rewarded   | 0.000             | -0.001    | 0.000     | 0.000     | 0.001          |
| Relative income                      | 0.014***          | 0.026***  | 0.018***  | -0.018*** | -0.039***      |
| <b>Sweden</b>                        |                   |           |           |           |                |
| Believe family important             | -0.031***         | -0.065*** | -0.053*** | 0.032***  | 0.118***       |
| Believe effort rewarded              | 0.003             | 0.006     | 0.004     | -0.004    | -0.009         |
| Believe skills/intelligence rewarded | -0.017*           | -0.032*   | -0.022    | 0.021*    | 0.049*         |
| Believe family not important         | 0.003             | 0.005     | 0.004     | -0.004    | -0.008         |
| Believe effort not rewarded          | -0.003            | -0.006    | -0.004    | 0.004     | 0.010          |
| Believe skill/intell. not rewarded   | -0.018*           | -0.035    | -0.027    | 0.021*    | 0.058          |
| Relative income                      | 0.014***          | 0.026***  | 0.018***  | -0.018*** | -0.039***      |
| <b>Germany</b>                       |                   |           |           |           |                |
| Believe family important             | -0.011            | -0.021    | -0.005    | 0.022     | 0.015          |
| Believe effort rewarded              | 0.035**           | 0.065**   | 0.016**   | -0.070**  | -0.047**       |
| Believe skills/intelligence rewarded | 0.032**           | 0.063**   | 0.017*    | -0.065**  | -0.046*        |
| Believe family not important         | -0.007            | -0.013    | -0.003    | 0.014     | 0.009          |
| Believe effort not rewarded          | 0.013             | 0.022     | 0.004     | -0.025    | -0.014         |
| Believe skill/intell. not rewarded   | 0.005             | 0.008     | 0.002     | -0.009    | -0.006         |
| Relative income                      | 0.016***          | 0.028***  | 0.006**   | -0.031*** | -0.019***      |
| <b>USA</b>                           |                   |           |           |           |                |
| Believe family important             | -0.076***         | -0.063*** | 0.000     | 0.075***  | 0.064***       |
| Believe effort rewarded              | 0.062***          | 0.046**   | -0.004    | -0.059*** | -0.045**       |
| Believe skills/intelligence rewarded | 0.007             | 0.005     | -0.001    | -0.007    | -0.005         |
| Believe family not important         | 0.045**           | 0.031**   | -0.005    | -0.041**  | -0.029**       |
| Believe effort not rewarded          | -0.028            | -0.021    | 0.002     | 0.027     | 0.020          |
| Believe skill/intell. not rewarded   | 0.010             | 0.006     | -0.001    | -0.009    | -0.006         |
| Relative income                      | 0.028***          | 0.019***  | -0.003*   | -0.026*** | -0.018***      |
| <b>Hungary</b>                       |                   |           |           |           |                |
| Believe family important             | -0.008**          | -0.018*** | -0.035*** | -0.046**  | 0.107***       |
| Believe effort rewarded              | -0.001            | -0.002    | -0.003    | -0.004    | 0.010          |
| Believe skills/intelligence rewarded | 0.003             | 0.006     | 0.012     | 0.014     | -0.036         |
| Believe family not important         | -0.001            | -0.002    | -0.004    | -0.005    | 0.012          |
| Believe effort not rewarded          | -0.010*           | -0.019**  | -0.035**  | -0.038*** | 0.101**        |
| Believe skill/intell. not rewarded   | 0.003             | 0.005     | 0.011     | 0.013     | -0.031         |
| Relative income                      | 0.003**           | 0.007**   | 0.014**   | 0.017**   | -0.042**       |

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

<sup>1</sup> Measures the marginal effect of scoring 1 on the belief dummies (for omitted benchmark categories, see table 1), and of moving from ½ a standard deviation below the mean to ½ a standard deviation above the mean relative income

Table 4: Explaining variation in beliefs about whether effort is rewarded in society

| Parameters from ordered probit estimations  |                      |                      |                      |                     |                    |
|---|----------------------|----------------------|----------------------|---------------------|--------------------|
| Dependent variable is belief about whether effort is rewarded in society <sup>1</sup> |                      |                      |                      |                     |                    |
|   | Full sample          | USA                  | Germany              | Sweden              | Hungary            |
| Relative income   | 0.085***<br>(0.030)  | 0.066<br>(0.066)     | 0.059<br>(0.056)     | 0.038<br>(0.067)    | 0.160**<br>(0.067) |
| Age   | 0.006***<br>(0.001)  | 0.003<br>(0.003)     | 0.007**<br>(0.003)   | 0.010***<br>(0.003) | 0.004<br>(0.002)   |
| Female  | -0.172***<br>(0.041) | -0.323***<br>(0.084) | -0.492***<br>(0.101) | 0.030<br>(0.079)    | -0.060<br>(0.077)  |
| Higher education  | -0.010<br>(0.060)    | 0.248**<br>(0.112)   | -0.290<br>(0.197)    | -0.211**<br>(0.100) | 0.073<br>(0.131)   |
| Father has higher education   | 0.074<br>(0.061)     | 0.097<br>(0.114)     | 0.075<br>(0.177)     | 0.078<br>(0.117)    | 0.005<br>(0.114)   |
| Upper class   | 0.122<br>(0.081)     | 0.395*<br>(0.237)    | 0.411**<br>(0.180)   | 0.144<br>(0.111)    | -0.219<br>(0.328)  |
| Working Class   | -0.169***<br>(0.046) | -0.211**<br>(0.092)  | -0.128<br>(0.111)    | -0.172*<br>(0.094)  | -0.153*<br>(0.086) |
| Sweden  | -0.780***<br>(0.059) |                      |                      |                     |                    |
| Germany   | -0.327***<br>(0.065) |                      |                      |                     |                    |
| Hungary   | -1.767***<br>(0.062) |                      |                      |                     |                    |
| Cut-point 1   | -2.166<br>(.095)     | -2.399<br>(.219)     | -2.162<br>(.227)     | -1.159<br>(.171)    | -0.356<br>(.153)   |
| Cut-point 2   | -1.073<br>(.089)     | -1.245<br>(.177)     | -0.942<br>(.177)     | -0.175<br>(.164)    | 0.805<br>(.155)    |
| Cut-point 3   | -0.225<br>(.088)     | -0.435<br>(.172)     | -0.085<br>(.174)     | 0.799<br>(.165)     | 1.565<br>(.161)    |
| Cut-point 4   | 1.450<br>(.093)      | 1.360<br>(.178)      | 2.146<br>(.207)      | 2.424<br>(.190)     | 2.223<br>(.177)    |
| Observations  | 2766                 | 708                  | 520                  | 747                 | 791                |
| Log-likelihood ratio  | -3440.919            | -797.620             | -556.362             | -976.671            | -1028.812          |
| Pseudo R-Square   | 0.130                | 0.031                | 0.033                | 0.013               | 0.008              |

Standard errors in parenthesis. \*\*\* indicates significance at the 1 % level, \*\* at the 5 % level and \* at the 10 % level.

<sup>1</sup>Measured by the answer to the statement “in [country] people get rewarded for their effort”

Table 5: Effects on probability of agreement with the statement “in [country] people get rewarded for their effort”

| The marginal effects are from the estimations presented in table 4. |                   |           |           |           |                |
|---|-------------------|-----------|-----------|-----------|----------------|
|   | Strongly disagree | Disagree  | Neither   | Agree     | Strongly agree |
| Effect of being German in full sample                               | 0.042***          | 0.077***  | -0.001    | -0.104*** | -0.014***      |
| Effect of being Swedish in full sample                              | 0.115***          | 0.173***  | -0.019*** | -0.237*** | -0.031***      |
| Effect of being Hungarian in full sample                            | 0.347***          | 0.272***  | -0.105*** | -0.447*** | -0.066***      |
| Relative income effect <sup>1</sup> in full sample                  | -0.007***         | -0.015*** | -0.002**  | 0.020***  | 0.003***       |
| Relative income effect <sup>1</sup> in US sample                    | -0.001            | -0.007    | -0.009    | 0.009     | 0.008          |
| Relative income effect <sup>1</sup> in German sample                | -0.002            | -0.011    | -0.010    | 0.019     | 0.003          |
| Relative income effect <sup>1</sup> in Swedish sample               | -0.003            | -0.005    | -0.001    | 0.007     | 0.001          |
| Relative income effect <sup>1</sup> in Hungarian sample             | -0.033**          | 0.000     | 0.017**   | 0.011**   | 0.005**        |

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

The relative income effect is measured with regard to a movement from ½ a standard deviation below the mean to ½ a standard deviation above the mean

Table 6: Explaining variation in beliefs about importance to be from a wealthy family to get ahead

| Parameters from ordered probit estimations   |                      |                     |                    |                     |                     |
|--|----------------------|---------------------|--------------------|---------------------|---------------------|
| Dependent variable is belief about importance of family background to get ahead <sup>1</sup> |                      |                     |                    |                     |                     |
|  | Full sample          | USA                 | Germany            | Sweden              | Hungary             |
| Relative income  | -0.050*<br>(0.029)   | -0.084<br>(0.063)   | 0.009<br>(0.049)   | -0.058<br>(0.067)   | -0.138**<br>(0.067) |
| Age  | 0.002*<br>(0.001)    | 0.000<br>(0.003)    | -0.003<br>(0.003)  | 0.006**<br>(0.003)  | 0.003<br>(0.002)    |
| Female   | -0.128***<br>(0.040) | -0.203**<br>(0.080) | -0.059<br>(0.093)  | -0.169**<br>(0.078) | -0.074<br>(0.075)   |
| Higher education   | -0.017<br>(0.059)    | -0.087<br>(0.106)   | -0.161<br>(0.183)  | 0.049<br>(0.100)    | 0.072<br>(0.129)    |
| Father has higher education  | -0.068<br>(0.060)    | 0.091<br>(0.108)    | -0.268<br>(0.164)  | -0.156<br>(0.117)   | -0.037<br>(0.112)   |
| Upper class  | 0.003<br>(0.078)     | 0.143<br>(0.219)    | 0.025<br>(0.165)   | 0.055<br>(0.110)    | -0.080<br>(0.322)   |
| Working Class  | 0.081*<br>(0.045)    | -0.089<br>(0.088)   | 0.229**<br>(0.105) | 0.201**<br>(0.094)  | 0.062<br>(0.084)    |
| Sweden   | 0.172***<br>(0.057)  |                     |                    |                     |                     |
| Germany  | 0.281***<br>(0.063)  |                     |                    |                     |                     |
| Hungary  | 0.503***<br>(0.056)  |                     |                    |                     |                     |
| Cut-point 1  | -1.064<br>(.870)     | -1.294<br>(.169)    | -1.515<br>(.174)   | -1.148<br>(.169)    | -1.414<br>(.156)    |
| Cut-point 2  | -0.032<br>(.085)     | -0.190<br>(.164)    | -0.506<br>(.163)   | -0.110<br>(.163)    | -0.442<br>(.150)    |
| Cut-point 3  | 0.941<br>(.086)      | 0.624<br>(.166)     | 0.606<br>(.163)    | 1.126<br>(.168)     | 0.370<br>(.150)     |
| Cut-point 4  | 1.812<br>(.091)      | 1.735<br>(.184)     | 1.545<br>(.179)    | 2.270<br>(.191)     | 1.056<br>(.153)     |
| Observations   | 2766                 | 708                 | 520                | 747                 | 791                 |
| Log-likelihood ratio   | -3936.477            | -990.642            | -717.228           | -972.508            | -1198.713           |
| Pseudo R-Square  | 0.015                | 0.005               | 0.009              | 0.012               | 0.005               |

Standard errors in parenthesis. \*\*\* indicates significance at the 1 % level, \*\* at the 5 % level and \* at the 10 % level.

Measured by the answer to the statement “for getting ahead...how important is coming from a wealthy family”

Table 7: Effects on probability of answers to the question “for getting ahead...how important is coming from a wealthy family”

| The marginal effects are from the estimations presented in table 6. |                      |                    |                  |                |           |
|---|----------------------|--------------------|------------------|----------------|-----------|
|   | Not at all important | Not very important | Fairly important | Very important | Essential |
| Effect of being German in full sample                               | -0.042***            | -0.062***          | 0.011***         | 0.055***       | 0.038***  |
| Effect of being Swedish in full sample                              | -0.028***            | -0.038***          | 0.010***         | 0.034***       | 0.022***  |
| Effect of being Hungarian in full sample                            | -0.074***            | -0.111***          | 0.016***         | 0.098***       | 0.070***  |
| Relative income effect <sup>1</sup> in full sample                  | 0.006*               | 0.008*             | -0.003*          | -0.007*        | -0.004*   |
| Relative income effect <sup>1</sup> in US sample                    | 0.014                | 0.011              | -0.007           | -0.014         | -0.004    |
| Relative income effect <sup>1</sup> in German sample                | -0.001               | -0.002             | 0.001            | 0.002          | 0.001     |
| Relative income effect <sup>1</sup> in Swedish sample               | 0.006                | 0.008              | -0.004           | -0.008         | -0.002    |
| Relative income effect <sup>1</sup> in Hungarian sample             | 0.013**              | 0.018**            | 0.001            | -0.012**       | -0.019**  |

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

The relative income effect is measured with regard to a movement from ½ a standard deviation below the mean to ½ a standard deviation above the mean

Table 8: Explaining variation in beliefs about whether intelligence and skills are rewarded in society

| Parameters from ordered probit estimations  |                      |                      |                      |                    |                     |
|---|----------------------|----------------------|----------------------|--------------------|---------------------|
| Dependent variable is belief about whether intelligence and skills are rewarded in society <sup>1</sup> |                      |                      |                      |                    |                     |
|   | Full sample          | USA                  | Germany              | Sweden             | Hungary             |
| Relative income   | 0.042<br>(0.031)     | 0.095<br>(0.067)     | 0.011<br>(0.055)     | 0.022<br>(0.067)   | 0.025<br>(0.067)    |
| Age   | 0.005***<br>(0.001)  | 0.000<br>(0.003)     | 0.008**<br>(0.003)   | 0.006**<br>(0.003) | 0.004**<br>(0.002)  |
| Female  | -0.194***<br>(0.041) | -0.285***<br>(0.085) | -0.360***<br>(0.102) | -0.042<br>(0.079)  | -0.164**<br>(0.076) |
| Higher education  | -0.042<br>(0.060)    | 0.185*<br>(0.112)    | -0.338*<br>(0.197)   | -0.185*<br>(0.101) | -0.138<br>(0.130)   |
| Father has higher education   | -0.027<br>(0.061)    | 0.048<br>(0.115)     | 0.150<br>(0.179)     | -0.040<br>(0.118)  | -0.175<br>(0.113)   |
| Upper class   | 0.031<br>(0.081)     | 0.588**<br>(0.240)   | -0.003<br>(0.178)    | -0.042<br>(0.111)  | -0.056<br>(0.324)   |
| Working Class   | 0.001<br>(0.046)     | -0.110<br>(0.093)    | -0.050<br>(0.113)    | -0.145<br>(0.094)  | 0.177**<br>(0.085)  |
| Sweden  | -0.828***<br>(0.060) |                      |                      |                    |                     |
| Germany   | -0.286***<br>(0.066) |                      |                      |                    |                     |
| Hungary   | -1.299***<br>(0.060) |                      |                      |                    |                     |
| Cut-point 1   | -2.353<br>(.097)     | -2.567<br>(.233)     | -2.393<br>(.263)     | -1.556<br>(.176)   | -0.998<br>(.153)    |
| Cut-point 2   | -1.370<br>(.090)     | -1.454<br>(.180)     | -1.014<br>(.180)     | -0.651<br>(.166)   | -0.033<br>(.151)    |
| Cut-point 3   | -0.484<br>(.088)     | -0.725<br>(.175)     | -0.362<br>(.176)     | 0.439<br>(.165)    | 0.896<br>(.153)     |
| Cut-point 4   | 1.225<br>(.091)      | 1.061<br>(.177)      | 1.768<br>(.193)      | 2.037<br>(.184)    | 2.170<br>(.174)     |
| Observations  | 2766                 | 708                  | 520                  | 747                | 791                 |
| Log-likelihood ratio  | -3425.253            | -773.551             | -534.360             | -949.078           | -1102.373           |
| Pseudo R-Square   | 0.079                | 0.025                | 0.018                | 0.007              | 0.012               |

Standard errors in parenthesis. \*\*\* indicates significance at the 1 % level, \*\* at the 5 % level and \* at the 10 % level.

<sup>1</sup>Measured by the answer to the statement “in [country] people get rewarded for their intelligence and skills”

Table 9: Effects on probability of agreement with the statement “in [country] people get rewarded for their intelligence and skills”

| The marginal effects are from the estimations presented in table 8. |                   |          |          |           |                |
|---|-------------------|----------|----------|-----------|----------------|
|   | Strongly disagree | Disagree | Neither  | Agree     | Strongly agree |
| Effect of being German in full sample                               | 0.024***          | 0.059*** | 0.030*** | -0.091*** | -0.023***      |
| Effect of being Swedish in full sample                              | 0.085***          | 0.171*** | 0.060*** | -0.258*** | -0.058***      |
| Effect of being Hungarian in full sample                            | 0.161***          | 0.252*** | 0.055*** | -0.382*** | -0.086***      |
| Relative income effect <sup>1</sup> in full sample                  | -0.002            | -0.006   | -0.004   | 0.009     | 0.003          |
| Relative income effect <sup>1</sup> in US sample                    | -0.001            | -0.009   | -0.012   | 0.007     | 0.015          |
| Relative income effect <sup>1</sup> in German sample                | 0.000             | -0.002   | -0.002   | 0.003     | 0.001          |
| Relative income effect <sup>1</sup> in Swedish sample               | -0.001            | -0.003   | -0.001   | 0.004     | 0.001          |
| Relative income effect <sup>1</sup> in Hungarian sample             | -0.003            | -0.003   | 0.001    | 0.004     | 0.001          |

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

The relative income effect is measured with regard to a movement from ½ a standard deviation below the mean to ½ a standard deviation above the mean

Table 10: Estimation of preferences for redistribution with only relative income and socio-demographic variables as explanatory

| Parameters from ordered probit estimations                        |                      |                      |                      |                      |                      |
|---|----------------------|----------------------|----------------------|----------------------|----------------------|
| Dependent variable is preferences for redistribution <sup>1</sup> |                      |                      |                      |                      |                      |
|   | Full sample          | USA                  | Germany              | Sweden               | Hungary              |
| Relative income <sup>3</sup>                                      | -0.175***<br>(0.030) | -0.189***<br>(0.063) | -0.137***<br>(0.049) | -0.249***<br>(0.067) | -0.200***<br>(0.069) |
| Age   | 0.001<br>(0.001)     | -0.002<br>(0.003)    | 0.000<br>(0.003)     | -0.003<br>(0.003)    | 0.009***<br>(0.002)  |
| Female  | 0.237***<br>(0.041)  | 0.120<br>(0.080)     | 0.380***<br>(0.094)  | 0.311***<br>(0.079)  | 0.158**<br>(0.082)   |
| Higher education  | -0.247***<br>(0.059) | -0.093<br>(0.106)    | -0.466**<br>(0.185)  | -0.243**<br>(0.100)  | -0.423***<br>(0.134) |
| Father has higher education                                       | -0.130**<br>(0.061)  | -0.146<br>(0.108)    | -0.130<br>(0.166)    | -0.126<br>(0.117)    | -0.166<br>(0.157)    |
| Upper class   | -0.379***<br>(0.079) | -0.560**<br>(0.232)  | -0.302*<br>(0.166)   | -0.366***<br>(0.110) | 0.322<br>(0.330)     |
| Working class   | 0.278***<br>(0.046)  | 0.148*<br>(0.088)    | 0.147<br>(0.105)     | 0.505***<br>(0.096)  | 0.205**<br>(0.092)   |
| Sweden  | 0.699***<br>(0.058)  |                      |                      |                      |                      |
| Germany   | 0.328***<br>(0.063)  |                      |                      |                      |                      |
| Hungary   | 1.333***<br>(0.059)  |                      |                      |                      |                      |
| Observations  | 2766                 | 708                  | 520                  | 747                  | 791                  |
| Log-likelihood  | -3769                | -1078                | -729                 | -1041                | -883                 |
| Pseudo R-square   | 0.103                | 0.002                | 0.035                | 0.067                | 0.044                |

Standard errors in parenthesis. \*\*\* indicates significance at the 1 % level, \*\* at the 5 % level and \* at the 10 % level.

<sup>1</sup> as measured by the answer 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 income*” which can take five possible values ranging from 1 for *strongly disagree* to 5 for *strongly agree*.

<sup>3</sup>Household income per adult equivalent divided by the country sample average

Table 11: The total relative income effect on probability of agreement 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 income*”

| The marginal effects are from the estimations presented in table 10. |                   |          |          |           |                |
|--|-------------------|----------|----------|-----------|----------------|
|  | Strongly disagree | Disagree | Neither  | Agree     | Strongly agree |
| In the full sample   | 0.013***          | 0.023*** | 0.014*** | -0.014*** | -0.036***      |
| In the US sample   | 0.033***          | 0.021*** | -0.003*  | -0.028*** | -0.022***      |
| In the German sample   | 0.017***          | 0.029*** | 0.006**  | -0.032*** | -0.021***      |
| In the Swedish sample  | 0.015***          | 0.027*** | 0.018*** | -0.019*** | -0.042***      |
| In the Hungarian sample  | 0.004***          | 0.009*** | 0.017**  | -0.020*** | -0.050***      |

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

The relative income effect is measured with regard to a movement from  $\frac{1}{2}$  a standard deviation below the mean to  $\frac{1}{2}$  a standard deviation above the mean

Table 12: Estimations where relative income is interacted with belief variables

The dependent variable is redistributive preferences<sup>1</sup>  
The basic model is that of the benchmark estimations presented in table 2.

| Estimations where relative income is interacted with |                  | Effort rewarded      | Intelligence and skills rewarded | Family important     |
|--|------------------|----------------------|----------------------------------|----------------------|
| Pooled sample  | Interaction term | -0.062<br>(0.058)    | 0.093*<br>(0.059)                | -0.155*<br>(0.085)   |
|  | Belief           | -0.202**<br>(0.083)  | -0.088<br>(0.059)                | 0.423***<br>(0.097)  |
|  | Relative income  | -0.201***<br>(0.047) | -0.223***<br>(0.049)             | -0.144***<br>(0.031) |
| US sample  | Interaction term | -0.095<br>(0.132)    | 0.028<br>(0.150)                 | -0.045<br>(0.147)    |
|  | Belief           | -0.188<br>(0.168)    | -0.056<br>(0.181)                | 0.410**<br>(0.179)   |
|  | Relative income  | -0.096<br>(0.118)    | -0.191<br>(0.139)                | -0.161**<br>(0.067)  |
| German sample  | Interaction term | 0.063<br>(0.172)     | 0.104<br>(0.168)                 | -0.420**<br>(0.181)  |
|  | Belief           | -0.353*<br>(0.207)   | -0.392*<br>(0.228)               | 0.515**<br>(0.220)   |
|  | Relative income  | -0.188<br>(0.167)    | -0.226<br>(0.162)                | -0.100**<br>(0.051)  |
| Swedish sample                                       | Interaction term | 0.071<br>(0.168)     | 0.129<br>(0.128)                 | -0.403**<br>(0.187)  |
|  | Belief           | -0.105<br>(0.168)    | 0.056<br>(0.732)                 | 0.775***<br>(0.208)  |
|  | Relative income  | -0.269***<br>(0.087) | -0.296***<br>(0.088)             | -0.182**<br>(0.072)  |
| Hungarian sample                                     | Interaction term | -0.018<br>(0.191)    | -0.113<br>(0.162)                | 0.187<br>(0.198)     |
|  | Belief           | 0.045<br>(0.256)     | 0.014<br>(0.187)                 | 0.097<br>(0.209)     |
|  | Relative income  | -0.165**<br>(0.075)  | 0.146*<br>(0.077)                | -0.190***<br>(0.074) |

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

<sup>1</sup>Support for redistribution is measured by the answer 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 income*” ranging from 1 for *strongly disagree* to 5 for *strongly agree*.

Table 13: Log-likelihood ratio tests of parameter homogeneity

The dependent variable is redistributive preferences <sup>1</sup>  
 Belief variables are responses to whether effort, and intelligence and skills, is rewarded or not, and to whether it is important to be from a wealthy family to get ahead. See table 1.  
 Socio-demographic controls are included in all models

| Restricted model   | Unrestricted model   | LR-test p-value |
|--|--|-----------------|
| Full sample benchmark  | Allow belief parameters to vary for each belief and each country         | 0.008           |
| Full sample benchmark  | Allow effort belief parameters to vary for each country                  | 0.117           |
| Full sample benchmark  | Allow family belief parameters to vary for each country                  | 0.022           |
| Full sample benchmark  | Allow intelligence and skills belief parameters to vary for each country | 0.035           |
| Full sample benchmark  | Allow different belief parameters for USA                                | 0.105           |
| Full sample benchmark  | Allow different belief parameters for Germany                            | 0.005           |
| Full sample benchmark  | Allow different belief parameters for Sweden                             | 0.035           |
| Full sample benchmark  | Allow different belief parameters for Hungary                            | 0.470           |
| Restrict belief parameters to be the same in USA and Germany     | Allow belief parameters to vary for each belief and each country         | 0.014           |
| Restrict belief parameters to be the same in USA and Sweden      | Allow belief parameters to vary for each belief and each country         | 0.168           |
| Restrict belief parameters to be the same in USA and Hungary     | Allow belief parameters to vary for each belief and each country         | 0.218           |
| Restrict belief parameters to be the same in Germany and Sweden  | Allow belief parameters to vary for each belief and each country         | 0.003           |
| Restrict belief parameters to be the same in Germany and Hungary | Allow belief parameters to vary for each belief and each country         | 0.114           |
| Restrict belief parameters to be the same in Sweden and Hungary  | Allow belief parameters to vary for each belief and each country         | 0.356           |
| Full sample benchmark  | Allow relative income effect to vary for each country                    | 0.156           |
| Full sample benchmark  | Allow age effect to vary for each country                                | 0.001           |
| Full sample benchmark  | Allow female effect to vary for each country                             | 0.159           |
| Full sample benchmark  | Allow higher education effect to vary for each country                   | 0.084           |
| Full sample benchmark  | Allow working class belonging effect to vary for each country            | 0.005           |
| Full sample benchmark  | Allow upper class belonging effect to vary for each country              | 0.156           |

<sup>1</sup>Support for redistribution is measured by the answer 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 income*” ranging from 1 for *strongly disagree* to 5 for *strongly agree*.

Table 14: Explaining country variation in redistributive preferences with different beliefs<sup>1</sup> and different effects of beliefs

| Dependent variable is redistributive preferences <sup>2</sup> |               |  |           |           |           |                |  |
|---|---------------|--|-----------|-----------|-----------|----------------|--|
|   | Country dummy | Marginal effects of being from a country on the probability to |           |           |           |                | Explanatory variables in addition to country dummies |
|   |               | Strongly disagree  | Disagree  | Neither   | Agree     | Strongly agree |  |
| 1   | Germany       | -0.030***  | -0.047*** | -0.031*** | 0.019***  | 0.088***       | None   |
|   | Sweden        | -0.055***  | -0.090*** | -0.061*** | 0.028***  | 0.178***       |  |
|   | Hungary       | -0.114***  | -0.185    | -0.142*** | -0.003*** | 0.444***       |  |
| 2   | Germany       | -0.025***  | -0.042*** | -0.028*** | 0.018***  | 0.077***       | Beliefs  |
|   | Sweden        | -0.047***  | -0.080*** | -0.055*** | 0.029***  | 0.153***       |  |
|   | Hungary       | -0.093***  | -0.161*   | -0.122*** | 0.017***  | 0.359***       |  |
| 3   | Germany       | -0.027   | -0.046**  | -0.031    | 0.019     | 0.084*         | Beliefs  |
|   | Sweden        | -0.019   | -0.031    | -0.020    | 0.016     | 0.054          | Beliefs*country                                      |
|   | Hungary       | -0.065***  | -0.116*** | -0.083*** | 0.032***  | 0.232***       |  |
| 4   | Germany       | -0.028***  | -0.056*** | -0.039*** | 0.023***  | 0.100***       | Socio-demographic                                    |
|   | Sweden        | -0.056***  | -0.113*** | -0.084*** | 0.034***  | 0.220***       |  |
|   | Hungary       | -0.097***  | -0.191    | -0.153*** | 0.006***  | 0.435***       |  |
| 5   | Germany       | -0.025***  | -0.050*** | -0.035*** | 0.022***  | 0.088***       | Beliefs  |
|   | Sweden        | -0.050***  | -0.104*** | -0.077*** | 0.035***  | 0.197***       | Sociodemographic                                     |
|   | Hungary       | -0.082***  | -0.170**  | -0.136*** | 0.022***  | 0.366***       |  |
| 6   | Germany       | -0.035**   | -0.076*** | -0.057**  | 0.027***  | 0.141***       | Beliefs  |
|   | Sweden        | -0.029**   | -0.059*** | -0.041**  | 0.028**   | 0.100**        | Beliefs*country                                      |
|   | Hungary       | -0.067***  | -0.144*** | -0.112*** | 0.035***  | 0.288***       | Socio-demographic                                    |

Standard errors in parenthesis. \*\*\* indicates significance at the 1 % level, \*\* at the 5 % level and \* at the 10 % level.

<sup>1</sup> Beliefs variables are responses to whether effort, and intelligence and skills, is rewarded or not, and to whether it is important to be from a wealthy family to get ahead. See table 1 for a more detailed description.

<sup>2</sup> Support for redistribution is measured by the answer 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 income*” ranging from 1 for *strongly disagree* to 5 for *strongly agree*.