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## **“Institutions and Inequality”**

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**Uppsats för licentiatexamen vid**

**Institutionen för nationalekonomi med statistik  
Handelshögskolan vid Göteborgs universitet**

**Göteborg**

**Juni 2008**

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# Social divisions and institutions: Considering cross-country institutional parameter heterogeneity

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## Abstract

This paper investigates the hypothesis that the association between property rights institutions and economic performance is weaker in countries with high social divisions, as measured in terms of ethnic fractionalisation and income inequality. The results of the empirical estimations support this hypothesis and indicate that it could have some relevance for explaining identified regional variation in the institutional parameter. Moreover, they point to the importance of carefully evaluating the extent to which the institutions measure used captures the institutional framework applying for a broad cross-section of the population.

**JEL classification:** O10, O17, P14, P26

**Keywords:** Institutions, social divisions, parameter heterogeneity

## 1 Introduction

By now the positive association between institutional quality and economic performance is well documented<sup>1</sup> and few would disagree with assertions like ‘institutions matter’. Aiming beyond this uncontroversial conclusion this paper examines whether the relation between institutions and economic performance differs systematically with country circumstances. More specifically it investigates the hypothesis that the association between institutional quality and economic performance is weaker in countries marked by social divisions. The results of the empirical estimations support this hypothesis and indicate that social divisions could have some relevance for explaining observed regional variation in the institutional parameter.

Several considerations motivate this focus. On a general level, there is a methodological debate pointing to the hazards of not accounting for parameter heterogeneity in empirical studies of economic performance, in particular when using cross-country analysis.<sup>2</sup> Parameter heterogeneity involves systematic and group-wise parameter variation in cross-section data (Zietz, 2005). If not taken into account it would thus constitute a form of regression misspecification.

In studies of the economic effects of institutions, concerns for parameter heterogeneity seem highly relevant. Although context-specific effects of institutions are rarely allowed for in the institutional literature, several authors acknowledge their existence. North (1994) argues that the same institutional setup will result in different performance in different countries due to variation in enforcement strategies and informal institutions, and similarly, Djankov et al. (2003), Mukand and Rodrik (2005) and Rodrik et al. (2004) claim that different institutions are appropriate in different contexts, and thus

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<sup>1</sup> See for example Acemoglu, Johnson and Robinson (2001), Hall and Jones (1999), Knack and Keefer (1995) or Rodrik et al. (2004).

<sup>2</sup> See Temple (2000) and Brock and Durlauf (2001) for a discussion of the problems involved in neglecting parameter heterogeneity in cross-country studies of economic performance.

that efficient institutional design depends on specific societal characteristics. With regard to the social division hypothesis advanced in this paper it seems reasonable to suggest that social divisions and the association between institutional quality and economic performance should be linked via the extent to which the institutional framework incorporates the different segments of economic actors in society. If social divisions tend to reduce the inclusiveness of the institutional framework, and we lack an institutional indicator that perfectly captures this inclusiveness, it seems plausible to argue that they should also have a negative influence on the strength of the identified positive association between institutional quality and economic performance. If so, it would be misleading to not account for institutional parameter variation along a social division dimension. Considering that commonly used institutional indicators tend to focus on the institutional protection of a narrow segment of economic actors only, this concern appears valid.

Against this background it is somewhat surprising that the empirical institutions literature using cross-country regressions contains so few examples of studies evaluating, or even allowing for, institutional parameter variation.<sup>3</sup> Mehlum et al. (2006),<sup>4</sup> investigating the resource curse, and Rodrik (1999), examining the hypothesis that when there are deep social divisions, and when the institutions of conflict management are weak, the growth effects of exogenous shocks are likely to be magnified by distributional conflicts, allow for institutional parameter variation, but the variation in the institutional coefficient is not their main focus.<sup>5</sup> In the papers by Eicher and Leukert (2006) and Cavalcanti and Novo (2005), on the other hand, variation in the institutional parameter is the main focus. Eicher and Leukert find a stronger institutional coefficient in non-OECD than in OECD countries, and similarly, using quantile regression methods, Cavalcanti and Novo find the payoffs from better institutions to be lower at the top of the conditional distribution of international incomes.

While a discussion of variation in the institutional parameter along a rich vs. poor country dimension can be revealing, it does not address the question of why the association between institutional quality and economic performance should work differently in, say, Africa. By investigating whether the association between institutional quality and economic performance is weaker in countries with deep social divisions, this paper examines a possible reason underlying regional variation in the institutional parameter and highlights the extent to which the previous neglect of institutional parameter heterogeneity along the social division dimension constitutes a concern.

The next section seeks to clarify the mechanisms through which social divisions may act to weaken the association between institutional quality and economic performance. Section 3 outlines the empirical strategy of the paper including basic econometric specification and choice of variables and data, Section 4 presents the results of the empirical estimations, Section 5 evaluates the sensitivity of the results, and finally Section 6 sums up the discussion.

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<sup>3</sup> In the general growth literature, on the other hand, there are a few examples of studies taking parameter heterogeneity seriously. Worth mentioning in this context are the papers of Block (2001), Canarella and Pollard (2004), Collier and Gunning (1999), Durlauf and Johnson (1995) Masanjala and Papageorgiou (2003a and 2003b).

<sup>4</sup> For similar analysis see also Boschini et al. (2003).

<sup>5</sup> See also the study of Balamoune-Lutz (2005), in which the author finds a positive interaction effect between measures of social capital and institutions when looking at African panel data.

## 2 The link between social divisions and institutional payoffs

Why should social divisions weaken the positive association between institutional quality and economic performance? In order to clarify the hypothesised links we first need to explain what we mean by ‘social divisions’ and ‘institutions’. Social divisions could refer to societal dividing lines along several potential dimensions, such as income, class, ethnicity and gender. This paper considers social divisions along an income dimension, proxied by measures of income inequality, and along an ethnic dimension, captured by ethnic fractionalisation indicators. Institutions, the other key term in this paper, could along the lines of North (1990) be defined as the formal and informal rules in society. However, economists usually interpret the concept more narrowly, with the quality of institutions taken to indicate how conducive these rules are to desirable economic behaviour (Rodrik et al., 2004). In practice this often translates into studying property rights institutions.<sup>6</sup> This paper follows in this tradition, so when referring to ‘institutions’ or ‘institutional quality’, the focus is on property rights institutions.

When speaking of property rights institutions and their effect on economic performance, an immediate question arises: property rights for whom? Rich and poor, men and women, people of different ethnic origins, large-scale corporations and small-scale peasants – are they all offered the same protection? Put differently, is there variation in property rights protection within as well as across countries? These questions relate to how well the property rights institutions incorporate the different segments of economic actors in society; what can be referred to as the inclusiveness of the institutional framework. Acemoglu et al. (2002) argue that good institutions should secure property rights for *a broad cross section of society*. The inclusiveness of institutions, which should not only depend on legal formulations, but also on factors like enforcement, or the lack thereof, thus has to do with the extent to which institutions live up to this criterion.

In this paper we argue that social divisions should have a negative effect on the inclusiveness of property rights institutions, which in turn should act to weaken the association between property rights institutions and economic performance via a coverage effect and a compliance effect. First of all, it seems reasonable to suggest that in a society marked by social divisions property rights institutions are more likely to protect, or to be perceived as protecting, some groups more than others. Put differently, social divisions should have a negative influence on the actual and/or perceived inclusiveness of the institutional framework. The *perceived* inclusiveness of the institutional framework should in this context be at least as important as its actual inclusiveness, considering that people’s perceptions are what influence their economic decisions. However, actual and perceived inclusiveness are likely to be highly related, and it seems plausible that social divisions should have a negative influence on both. Perceived lack of inclusiveness, whether founded in actual circumstances or not, should then arguably act to weaken the observed positive association between institutional quality and economic performance via two main mechanisms.<sup>7</sup>

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<sup>6</sup> See for example Acemoglu et al. (2001, 2002), and Knack and Keefer (1995).

<sup>7</sup> Similarly, Glaeser et al. (2003), who present a theoretical model where they seek to illustrate how inequality could negatively affect economic performance by undermining institutions, argue that inequality can encourage institutional subversion in two ways. First, the ‘haves’ can redistribute from the ‘have-nots’ by subverting (by using bribes or political influence for example) legal, political and regulatory institutions to work in their favor. This should make the property rights of the less well off less secure, and thus hold back their investment, an argument that in spirit is similar to the coverage effect discussed here. Second, and parallel to the compliance effect put forward here, the have-nots can redistribute from the haves via illegal or legal means, something which should jeopardize property rights and deter investment by the rich.

First, there should be a direct coverage effect. Strong property rights institutions are usually argued to induce desirable economic behaviours such as investment and specialisation, and it seems reasonable that these behavioural effects should increase with perceived institutional coverage. In other words, if some segments of society feel, rightly or not, that the existing property rights institutions offer them no protection, then the effects of these institutions on economic behaviour should be less widespread. The findings of Hellman and Kaufmann (2002), who study firm behaviour and find that perceived inequality of influence is associated with a negative assessment of the fairness and impartiality of courts and of the enforceability of court decisions and with being less inclined to use courts to resolve business disputes, could be said to support this view. As pointed out by Acemoglu et al. (2002), if we only secure the property rights of a small elite, then much of the entrepreneurial capacity and investment opportunity will be among those without effective property rights protection. Simply put, if strong property rights institutions encourage investment, then the greater the number of people who feel they are protected by existing property rights institutions, the greater the number of people who end up investing.

Second, there should be a compliance effect; if citizens feel that the institutional framework does not protect their interests, there should be less compliance with its formal rules. For instance, if property rights institutions are seen as protecting the property of one group more than that of another, then the legitimacy of those institutions should be reduced in the eyes of the people who perceive themselves as disadvantaged. Reasonably, these people should as a result also be less willing to live by the regulations put forward. This argument too is supported by the results of Hellman and Kaufmann (2002), who find that perceived inequality of influence is associated with lower levels of tax compliance and with higher levels of bribery. A reactance effect of this type, which affects compliance with formal rules, could undermine the rules themselves and hence hinder society from fully experiencing their effects.

These two mechanisms, following from a lack of inclusiveness of the property rights institutions, should work in the same direction to weaken the association between economic performance and the strength of property rights institutions in a country marked by social divisions. Hence, unless we have a perfect property rights measure able to properly capture the strength of property rights for all segments of economic actors in society, the measured association between property rights institutions and economic performance should vary with the inclusiveness of the property rights institutions, which in turn should be influenced by the degree of societal divisions.

### 3 Empirical estimation

The empirical issue of whether the association between institutional quality and economic performance varies with social divisions can be approached by regressing the measure of economic performance on explanatory variables including an interaction term between our institutions indicator and the concerned social division measure. The OLS benchmark regression will thus take the form:

$$(1) \quad \log y_i = \alpha + \beta Inst_i + \gamma Socdiv_i + \delta Inst_i \cdot Socdiv_i + \varphi \mathbf{X}_i + \varepsilon_i$$

Where  $y_i$  is income per capita in country  $i$ ,  $Inst_i$  is our institutions indicator,  $Socdiv_i$  is the social division measure in focus,  $Inst_i \cdot Socdiv_i$  is the interaction term allowing the institutional parameter to vary with social divisions,  $\mathbf{X}_i$  is a vector of control variables,

and  $\varepsilon_i$  is the random error term. The existence of institutional parameter heterogeneity along the selected social division dimensions can be evaluated by interpreting the interaction term parameter, marginal effects and the results of various sample splits.

Simultaneity in the income-institutions relation is certainly a concern in this setup. The aim of this paper, however, is not to test to what extent institutions affect income, or the other way around; i.e. the objective is not to establish the general degree to which institutions matter for economic development. That institutional quality is important for economic development is taken as given in this study,<sup>8</sup> why the theoretical discussion on why social divisions should contribute to institutional parameter heterogeneity contains references to variation in ‘impacts’ or ‘effects’. When discussing the specific findings of this paper, however, one should note that the focus is on variation in the *strength of the association* between institutional quality and economic performance. In keeping the analysis at this level we avoid blurring the results by invalid instruments, leaving at least a ‘clean’ correlation pattern for interpretation. There is a trade-off involved here, and being concerned with dimensions of cross-country *variation* in the institutional parameter rather than the coefficient as such makes the use of an invalid instrument seem potentially more problematic than the endogeneity issue itself. Hence, when interpreting the results the focus is on variation in the strength of the institutions-income relation along a social division dimension, and not on establishing the causal relationship between institutions and economic performance.

### ***3.1 Variables and data***

Our dependent variable is log GDP per capita (in PPP terms) in 2000 obtained from the World Development Indicators. Compared to growth, income provides a better indicator of development. Moreover, one could argue that the transitory nature of growth makes it an inappropriate measure to focus on when assessing the economic impact of ‘slow’ structures like institutions.<sup>9</sup>

To proxy for property rights institutions the measure of protection against risk of expropriation, developed by the International Country Risk Guides (ICRG), is used. This indicator is a subjective assessment of the risk to foreign investors of ‘outright confiscation and forced nationalisation’ of property, ranging from 1-10, with higher values meaning better protection against expropriation. Even though this measure focuses on risks to foreign investors it is commonly used to proxy for property rights institutions more generally.<sup>10</sup> For instance, although Acemoglu and his colleagues (2002) argue that good institutions should secure property rights for a broad cross section of society they use the ICRG variable that focuses on risks to foreign investors as one of their main indicators to capture institutional quality. Using an institutions measure that does not pick up the strength of property rights applying to a broad segment of society, their definition of what constitutes good institutions surely seems to imply that the measured economic effect of institutions should vary among countries depending on the institutions’ degree of inclusiveness in that particular setting. The fact that the ICRG measure has had a wide impact in the institutions literature, in spite of its seeming incapability to capture the degree of property rights protection for a broad cross-section of society, makes it

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<sup>8</sup> A vast number of studies, based on theoretical reasoning, strong correlation patterns and the quite diverse range of IV-based estimations, point in the same direction – institutions are important for determining economic performance.

<sup>9</sup> For reasoning on this issue see Hall and Jones (1999).

<sup>10</sup> See for example Knack and Keefer (1995), Hall and Jones (1999) and Acemoglu et al. (2001 and 2002).

interesting to study in this context. For sensitivity analysis, however, we will consider two alternative property rights measures.<sup>11</sup>

Turning to the social division indicators along which the institutional slope term will be allowed to vary, as noted we focus on ethnic fractionalisation and income inequality. The ethnic fractionalisation variable primarily used is the one put forward by Alesina et al. (2003), which gives the probability that two individuals selected randomly from the population belong to different groups.<sup>12</sup> The Gini index is the main measure used to capture income inequality. To evaluate the sensitivity of results, however, alternative ethnic fractionalisation and income inequality indicators are considered.<sup>13</sup> Moreover, to look for a combined influence of the selected social division variables on the institutional parameter we consider a composite social division indicator incorporating both the ethnic fractionalisation and the income inequality measures.

In addition to the proxies for institutional quality and social divisions (the constituent variables of our focus interaction terms), which in themselves constitute standard explanatory variables in this context, the benchmark sample estimations include controls for geographical influence<sup>14</sup> and international economic integration<sup>15</sup>. A variable capturing whether the country has been struck by civil war in the 1960-1999 period is included considering that a potential negative influence of social divisions on income could work via this mechanism. Moreover, for a restricted sample controls for colonial influence and political tradition,<sup>16</sup> policy<sup>17</sup> and the level of education<sup>18</sup> are included. To further limit the extent of unobserved cross-country heterogeneity all estimations include regional dummies.

The benchmark sample consists of 93 countries from all over the world, and is only limited by data availability. For variable definitions and data sources, descriptive statistics for the benchmark sample, and for some summary statistics of key variables, see Tables 1-3 in the appendix.

## 4 Results

In this section the institutional parameter is allowed to vary with the measures included to capture social divisions: i.e. ethnic fractionalisation, income inequality, and the composite social division indicator capturing both ethnic fractionalisation and income

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<sup>11</sup> See section 5.

<sup>12</sup> It differs from the measure of Easterly and Levine (1997) in that it to a greater extent distinguishes between groups based on ethnic origins (as opposed to linguistic distinctions), and has the advantage that it is available for a greater number of observations.

<sup>13</sup> See section 5.

<sup>14</sup> Studies arguing for the importance of geography (e.g. Gallup et al., 1998; or Sachs, 2003) point to growth effects of factors such as climate, natural resource endowments, disease burden, transport costs and agglomeration benefits. I include controls for latitude, being located in the tropics, and for being landlocked.

<sup>15</sup> Literature highlighting the role of international trade (e.g. Sachs and Warner, 1995; Frankel and Romer, 1999; and Dollar and Kraay, 2003) views market integration as a driver of productivity and as fostering economic convergence. As a control variable I include a measure capturing a country's exports and imports relative to its GDP, averaged over the 1990s. In addition, (but unfortunately only for a restricted sample) I include the openness measure of Sachs and Warner (1995) and the geographically predicted trade share of Frankel and Romer (1999). The openness measure of Sachs and Warner is interesting since it could be taken to capture policy (it does not look only at direct trade policy but also incorporates estimations of the black market premium, existence of socialist rule etc.).

<sup>16</sup> Using a dummy for being an ex-colony and dummies for being of French, British, German, Socialist, or Scandinavian legal origin.

<sup>17</sup> Using the openness measure of Sachs and Warner (1995) discussed above.

<sup>18</sup> Considering gross secondary school enrollment (%).

inequality. This should help us evaluate the social division hypothesis postulating a weaker association between institutional quality and economic performance in countries marked by social divisions. The final sub-section examines whether the social division hypothesis could have some relevance for explaining regional variation in the institutional parameter, considering in particular the institutional coefficient of the African and European sub-samples.

#### *4.1 Ethnic fractionalisation, income inequality and the institutional parameter*

Tables 5 and 6 present the results of regressions allowing the institutional coefficient to be conditional on the level of ethnic fractionalisation and income inequality, respectively. Starting with the former, we can first of all note that the coefficient of our variable of main interest, the interaction term between the institutions indicator and the measure of ethnic fractionalisation, is negative and statistically significant throughout.<sup>19</sup> Furthermore, we can note that the institutional parameter is positive and statistically significant in all estimations and that the coefficient of the ethnic indicator, which in the presence of the interaction term is positive, is statistically significant in Regression 4 and 5 (in Regression 6, where a squared ethnic term is included to allow for a possible non-linear relationship between ethnic fractionalisation and income,<sup>20</sup> it does not retain this significance). Similarly, and as can be seen in Table 6, the coefficient of the interaction term between the institutions variable and the Gini indicator is consistently statistically significant and negative.<sup>21</sup> In this round of regressions too the institutional parameter is consistently positive and statistically significant. Furthermore, when included in combination with the interaction term the Gini parameter is positive and statistically significant.<sup>22</sup>

First of all, and as was postulated by the social division hypothesis, the negative and statistically significant parameters of the interaction terms between the institutions indicator and the measures for ethnic fractionalisation and income inequality respectively seem to suggest that the association between institutional quality and economic performance is weaker in societies with high levels of social divisions. More generally, the fact that we get statistically significant interaction term parameters indicate that the impact of each of the two constituent variables (institutions and ethnic fractionalisation,

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<sup>19</sup> In addition to the controls included in the benchmark sample regressions, a number of restricted sample estimations also include controls for colonial influence and political tradition, policy, and level of education. The interaction term parameter remains negative and statistically significant around the 5-10 percent level in the face of these additional controls.

<sup>20</sup> See for example Montalvo and Reynal-Querol (2005), who argue that the relationship between ethnic diversity and conflict should be non-linear, with less conflict in highly homogenous and highly heterogeneous societies and the highest risk of conflict occurring in the middle range of ethnic diversity, or Collier (2001), who suggests that ethnic fractionalisation should be less problematic for economic performance than a situation of ethnic dominance, where one group constitutes the majority. These arguments suggest that one should not necessarily expect a monotonic relationship between the number of ethnic groups and economic performance, and that factors such as group size and distance between groups also need to be taken into account.

<sup>21</sup> Again, in addition to the controls included in the benchmark sample regressions, a number of restricted sample estimations also include controls for colonial influence and political tradition, policy, and level of education. The interaction term parameter remains negative and statistically significant around the 5 percent level in all of these estimations.

<sup>22</sup> Except in Regression 6 where we include a squared Gini term in line with the hypothesis that the relationship between income and income inequality is characterised by an inverted U-shape. Here the interaction term parameter retains its statistical significance, but neither the coefficient of the Gini variable nor that of its square term comes out statistically significant.



and institutions and income inequality, respectively) depends on the value of the other, and hence that they cannot be interpreted in isolation.<sup>23</sup> To get a picture of the marginal effect of a change in institutions predicted by the model one thus has to consider both the institutional parameter, the parameter of the interaction term, and the level of the other component (ethnic fractionalisation or income inequality) in the interaction term:  $\Delta \log y = \Delta inst [\beta_{inst} + \delta_{Inst-socdiv} \cdot Socdiv]$ .

So, let us consider the magnitude of change in the institutions-income relation resulting from differences in the degree of ethnic fractionalisation or in the level of income inequality. Based on Regression 5 in Table 5 we can see that with ethnic fractionalisation at its mean level, the model predicts a one unit improvement in the institutions index to be associated with a 45 percent increase in income per capita. If ethnic fractionalisation instead were at a level one standard deviation above its mean, the same institutional improvement would instead be associated with a 27 percent increase in income per capita. And correspondingly, with ethnic fractionalisation at a level one standard deviation *below* its mean, the institutional improvement is predicted to involve an increase in income of about 64 percent. Similarly, based on Regression 5 in Table 6 we can see that with the Gini index at its mean level a one unit improvement in the institutions index is predicted to be associated with a 46 percent improvement in income per capita. With a Gini score one standard deviation below the mean, on the other hand, the same institutional improvement is instead predicted to be associated with a 68 percent increase in income, whereas with a Gini score one standard deviation above the mean it should ‘only’ be associated with a 28 percent income increase.<sup>24</sup>

In terms of magnitudes we can note that at the mean level of our social division indicators, the change in income associated with an improvement in institutional quality (here having a ratio of approximately 4.5 to 1) is in line with the results of Hall and Jones (1999).<sup>25</sup> More notably, however, we see substantial variation in this ratio; the lower the degree of ethnic fractionalisation or income inequality the greater the predicted income increase associated with a given institutional improvement.

We cannot be sure, however, that the negative interaction term parameter is driven by a weaker association between institutional quality and economic performance in countries with strong social divisions. It might well be that it is a varying association between *social divisions* and economic performance at different levels of *institutional quality* that drives the result. To approach this issue, let us consider a number of sample splits.

If we split the sample at the mean ethnic fractionalisation score and run separate regressions for the resulting sub-samples, the institutional parameter in the less fractionalised group is more than twice the size of that in the more fractionalised group.<sup>26</sup> If we, for the purpose of comparison, instead split the sample at the mean level in the *institutions index*, the parameter of the ethnic fractionalisation variable is far from statistically significant in both sub-samples.<sup>27</sup> Since this seems to indicate that the

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<sup>23</sup> In fact, in the presence of a significant interaction effect the respective parameters of the component variables do not depict general effects but rather tell us the impact of a change in one variable when the other indicator equals zero. See the reasoning of Braumoeller (2004).

<sup>24</sup> All the marginal effects are statistically significant at the one percent level.

<sup>25</sup> Using a wider institutional measure – what they refer to as ‘social infrastructure’ – they find that a difference of one percent in their institutional indicator is associated with a five percent difference in output per worker.

<sup>26</sup> 0.53 (standard error 0.09) in the low ethnic fractionalisation group and 0.24 (standard error 0.08) in the high, both estimates being statistically significant at the one percent level but having confidence intervals overlapping slightly.

<sup>27</sup> The coefficient of the ethnic fractionalisation variable is -0.62 (standard error 0.60) in the ‘good’ institutions group, and -0.02 (standard error 0.45) in the ‘bad’ institutions group.

identified negative interaction term parameter is *not* driven by a varying association between ethnic fractionalisation and economic performance at different levels of institutional quality it adds support to the story of a weaker association between institutional quality and economic performance in countries with high ethnic fractionalisation.

In a similar fashion, if we split the sample at the mean Gini score and run separate regressions for the resulting sub-samples, it turns out that the statistically significant institutional parameter in the low inequality group is almost four times the size of that in the high inequality sample,<sup>28</sup> which is not statistically significant. If we instead split the sample at the mean level in the institutions index and run regressions separately for countries with ‘good’ and ‘bad’ institutions, the parameter of the Gini indicator is 0.03 and statistically significant in the ‘bad institutions’ group, whereas in the ‘good institutions’ group the estimate is -0.01 but far from statistically significant.<sup>29</sup> While this split sample estimation offers some indication that the association between income inequality and economic performance could vary with the level of institutional quality,<sup>30</sup> the marked difference in institutional parameters observed between the low and high inequality samples should rule out that the interaction effect is driven solely by that. In addition, the fact that the high social division groups have weaker institutional parameters than the low social division groups seems to suggest that the said institutional parameter variation is robust to allowing all slope terms in the model to vary between the sub-samples. Hence, in line with the social division hypothesis, the results indicate that the positive association between institutional quality and income is weaker in countries with more social divisions.

#### ***4.2 Considering a composite social division indicator***

We have suggested that social divisions are associated with a weaker institutional parameter. So far, however, we have considered the different dimensions of social divisions separately. Using a composite social division indicator incorporating both ethnic fractionalisation and income inequality, we can look for a combined influence of these aspects of social divisions on the institutional parameter. Forming a principal component between our social division variables, i.e. a weighted average where weights are chosen to make the composite variable reflect the maximum possible proportion of the total variation in the set,<sup>31</sup> allows us to do this while at the same time reducing the number of dimensions in the regression, thus helping to make multicollinearity less of an issue. Table 7 presents regressions where the institutions indicator is allowed to vary with the composite social division indicator.

As exemplified in Regression 1 (the same pattern holds when including a number of alternative combinations of controls), before including the interaction term between the social division composite variable and our institutions indicator, the parameter of the social division variable is small and far from statistically significant. However, when including the interaction term as in Regressions 2-6, the social division parameter comes

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<sup>28</sup> 0.56 (standard error 0.07) versus 0.15 (standard error 0.10); the 95% confidence intervals of these estimates do not overlap.

<sup>29</sup> With standard errors 0.01 and 0.02 respectively.

<sup>30</sup> The robustness of this result could be interesting to investigate further but lies outside the scope of this paper.

<sup>31</sup> See Kumaranayake and Vyas (2006) or Smith (2002) for an overview of Principal Component Analysis (PCA).

out positive and the interaction term parameter negative – both statistically significant.<sup>32</sup> Hence, neither the social division parameter nor the coefficient of the interaction term between the social division variable and the institutions indicator should be interpreted in isolation.<sup>33</sup> As it seems, ethnic fractionalisation and income inequality share a common feature, perhaps that they represent what this paper refers to as social divisions, which appears to affect the institutional parameter.

Let us consider the magnitude of variation in the institutions-income relation resulting from differences in the score on the composite social division indicator. Based on Regression 5 we can see that with high social divisions (a level of social divisions that is one standard deviation above the mean), a one unit improvement in the institutions index is associated with a 19 percent improvement in income per capita. With low social divisions (a social division score one standard deviation below the mean), on the other hand, the same institutional improvement is associated with a 68 percent income increase.<sup>34</sup>

Splitting the sample at the mean social division score and running separate regressions for the two resulting sub-samples, we can see that the institutional parameter is more than twice as large in the low social divisions group,<sup>35</sup> and that both coefficients are statistically significant at the one percent level. If we instead split the sample at the mean institutions score and run separate regressions for countries with ‘good’ and ‘bad’ institutions, the parameter of the composite social division indicator is 0.25 but statistically significant only at the 10 percent level in the ‘bad institutions’ group, and -0.24 and far from statistically significant in the ‘good institutions’ group.<sup>36</sup> Hence, judging from these sample splits it seems that it is the institutional parameter varying with the level of social divisions rather than the social division parameter varying with the level of institutional quality that primarily drives the identified interaction effect.

### *4.3 Social divisions and regional variation in the institutional parameter*

When inspecting the regional variation in our social division indicators it turns out that Sub-Saharan Africa (henceforth Africa) is the region with the highest ethnic fractionalisation and the second highest income inequality (after Latin America), giving the highest score on the composite social division indicator. Conversely, Europe is the region with the lowest ethnic fractionalisation, the lowest income inequality, and hence also the lowest score on the composite social division indicator.<sup>37</sup> Knowing this one

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<sup>32</sup> Again, the interaction term parameter remains negative and statistically significant in the restricted sample estimations including controls for colonial influence and political tradition, policy, and level of education.

<sup>33</sup> Had we not observed a significant interaction effect it is still doubtful whether it would be suitable to make inferences from the composite social division indicator alone, considering the very different phenomena that its component variables income inequality and ethnic fractionalisation constitute. The far from statistically significant parameter of the social division indicator in Regression 1, for example, does not lend itself to easy interpretation.

<sup>34</sup> Both of the marginal effects are statistically significant.

<sup>35</sup> 0.57 (standard error 0.08) versus 0.24 (standard error 0.09); the 95% confidence intervals overlap, but only by 0.009.

<sup>36</sup> With standard errors of 0.14 and 0.22 respectively, and with the 95% confidence intervals overlapping considerably.

<sup>37</sup> Looking at Eastern Europe (including Russia and Turkey) and Western Europe separately, Western Europe has the lowest level of social divisions. Western Europe does however display too little variation on the institutions indicator for meaningful estimation to be possible. In fact, out of the 16 Western European states included in the benchmark sample only two score under 9.5 out of 10 in the institutions index; Portugal at of 9.0 and Greece at 7.5. Looking at Europe as a whole partly alleviates this problem.

would, in line with the social division hypothesis advanced in this paper, predict that Africa has a smaller and Europe a larger institutional parameter than the rest of the sample. To investigate whether this is the case or if there are other forces at work obscuring the identified relationship between social divisions and the strength of the institutional parameter, the first round of regressions gives Africa its own intercept as well as permits its institutional slope term to differ from that of the rest of the sample, and the second round does the same for Europe. Tables 8 and 9 present the results of these regressions.

As expected, the coefficient of the interaction term between the institutions indicator and the Africa dummy comes out negative and is, in Regression 3-5 (Table 8), statistically significant around the 5-10 percent level.<sup>38</sup> Correspondingly, and as predicted, the parameter of the interaction term between the institutions indicator and the Europe dummy is positive and statistically significant when faced with the standard controls (see Regression 3-5 in Table 9).<sup>39</sup> In line with this, and as we can see from Regression 5 in Tables 8 and 9 respectively, the per capita income increase associated with a one unit increase in the institutions index turns out considerably lower in Africa (20 percent) than in non-Africa (58 percent),<sup>40</sup> and higher in Europe (84 percent) than in non-Europe (33 percent).<sup>41</sup> Also, a similar pattern emerges when splitting the sample and running separate regressions for African and non-African countries, and European and non-European countries, thereby allowing all slope terms to vary along these regional dividing lines. In the non-African sample we can observe a positive and statistically significant institutional parameter, whereas in the African sample the coefficient is close to zero and far from statistically significant.<sup>42</sup> When comparing Europe and non-Europe we see that although the difference between the institutional parameters is relatively small, the pattern nevertheless remains.<sup>43</sup>

Considering the multitude of factors, perhaps working in different directions, that could give rise to regional differences in the association between institutional quality and economic performance, it is by no means obvious that the institutional parameter should vary among regions according to the pattern suggested by the regional variation in social divisions. Nevertheless, if we compare Africa and Europe to the rest of the world, the regional differences identified in the institutional parameter in fact turn out to work in the directions that would be expected judging from the regional levels of social divisions. Moreover, the fact that we can detect this regional variation in the institutional parameter

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Moreover, Europe still has lower scores on the social division variables than all other regions in the sample, making the region suitable as a point of comparison for Africa.

<sup>38</sup> The fact that the parameter of the Africa dummy does not retain its statistical significance when faced with this interaction term should not be given too much weight considering the collinearity between the two.

<sup>39</sup> That the parameter of the Europe dummy is not statistically significant in Regression 1 before including the interaction term is not surprising considering that the benchmark case (the regional dummy not included in the regression) is North America.

<sup>40</sup> For non-African countries the effect of a one unit increase in the institutional index (which when the Africa dummy equals zero simply reduces to the institutional parameter) is statistically significant. For African countries, on the other hand, the predicted impact is only statistically significant at the ten percent level.

<sup>41</sup> Both marginal effects are statistically significant.

<sup>42</sup> The institutional parameters are 0.47 (standard error 0.06) and -0.01 (standard error 0.16) respectively, and their 95% confidence intervals do not overlap.

<sup>43</sup> The institutional parameter is 0.51 (standard error 0.13) in the European sample and 0.38 (standard error 0.08) in the non-European sample. Both coefficients are statistically significant at the one percent level but have overlapping 95% confidence intervals.

in specifications including regional dummies suggests that it is robust to controls for level effects originating in structural differences between regions.

To get a picture of the extent to which social divisions can help explain a weaker institutional parameter in the African sub-sample and a stronger in the European, we examine to what degree the coefficients of the regional interaction terms survive the inclusion of the institutions-social division interaction term.<sup>44</sup> Table 10 presents the results from this undertaking.

As seen in Regressions 1 and 2, when included as the only interaction variables, the regional interaction term parameters are statistically significant; the institutions-Africa variable with a parameter of -0.24 and the institutions-Europe with a coefficient of 0.32. Similarly, when included alone (Regression 3) the institutions-social division interaction term has a parameter of -0.17, statistically significant at the one percent level. When faced with the social division interaction (Regression 4), the size of the African interaction term parameter drops markedly (in absolute terms) and it is no longer statistically significant, whereas the size of the social division interaction term coefficient remains stable (or even grows slightly in absolute terms) and statistically significant. The same pattern holds for the European interaction term parameter; when exposed to the social division interaction term (Regression 5) it drops considerably in size and is no longer statistically significant. The social division interaction term parameter, on the other hand, again remains stable and statistically significant. Finally, when including all the concerned interaction terms in combination, as in Regression 6, it is only the social division interaction variable coefficient, whose size is remarkably stable, that remains statistically significant. Based on these estimations, social divisions seem to bear some relevance for explaining the smaller institutional parameter in the African sample and the larger institutional coefficient in the European sample.

Let us consider an illustration. Regression 3 in Table 10 allows the institutional slope term to differ with the social division indicator (but not along the regional dividing lines between Africa and non-Africa, or between Europe and non-Europe). The marginal effect of a change in the institutions index is given by:  $\Delta \log y = \Delta inst [\beta_{inst} + \delta_{Inst-Socdiv} \cdot Socdiv]$ . If we evaluate the income increases associated with a one unit improvement in the institutions index at the African and non-African and at the European and non-European mean levels of social divisions, we get the predicted marginal ‘effects’ of the institutional improvement in the respective regions judging from their social division scores. Doing so, the model predicts an increase in log income per capita by approximately 0.16 and 0.41 for Africa and non-Africa, respectively; i.e. judging from their different average levels of social divisions the income increase associated with a one unit improvement in the institutions index is predicted to be 0.25 smaller in Africa than in the rest of the sample. Similarly, based on the European and non-European mean social division scores, log income per capita should increase by about 0.54 and 0.28, respectively; i.e. based on their different average levels of social divisions the income increase associated with a one unit improvement in the institutions index is predicted to be 0.26 higher in Europe than in the rest of the sample.

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<sup>44</sup> Including several interaction terms in combination could be problematic due to multicollinearity. High variance inflation factors (which give the impact of collinearity among the explanatory variables on the precision of the estimation) of the regressors in an estimation including the different interaction terms in combination confirms this concern. In order to partly alleviate this problem, the individual institutions-ethnic or institutions-Gini interactions are not used in this round of regressions. Instead, the regional interaction term parameters are exposed to the interaction term between the institutional indicator and the composite social division variable.

Compare this to Regressions 1 and 2 where the institutional slope term is only allowed to vary along the regional dividing line between Africa and non-Africa and between Europe and non-Europe, respectively (and not with the social division indicator). In these setups, the interaction term parameters give the predicted difference in income increase associated with a one unit improvement in institutions between Africa and the rest of the sample, and between Europe and the rest of the sample. Looking at Regression 1 the improvement in log income per capita associated with a one unit improvement in the institutions index is thus predicted to be 0.24 smaller in Africa than elsewhere, to be compared with the difference of 0.25 between Africa and non-Africa predicted from Africa's high mean social division score. Similarly, according to Regression 2 the improvement in log income per person associated with a one unit improvement in the institutions index should be 0.32 higher in Europe than in the rest of the sample, to be compared with the difference of 0.26 predicted from Europe's low mean social division score. Hence, a considerable share of the regional differences in the institutional parameters could be predicted from differences in social divisions.

To sum up, considering that Africa scores high and Europe low on the included social division variables included one would (in line with the social division hypothesis) predict that Africa should have a smaller and Europe a larger institutional parameter than the rest of the sample. This prediction is supported by the results. The regional interaction term parameters (between the Africa dummy and the institutions indicator and between the Europe dummy and the institutions indicator) survived the inclusion of several control variables, but when exposed to the social division interaction term they dropped markedly in size and were no longer statistically significant. The social division interaction term coefficient, on the other hand, was remarkably stable and remained statistically significant. Moreover, a considerable share of the regional differences in the institutional parameters could be predicted from differences in social divisions. Based on this it seems reasonable to argue that social divisions, acting to weaken the association between institutional quality and income, should bear some relevance for explaining the smaller institutional parameter in the African sample and the larger institutions coefficient in the European sample.

## **5 Sensitivity of results**

We have already seen that our main result of a weaker association between institutions and economic performance in countries with high ethnic fractionalisation or high income inequality is robust to the inclusion of a wide range of control variables. We have also seen that when combining these two dimensions of social divisions into a composite social division indicator, we can identify a combined influence of the two variables on the institutional parameter, and that based on regional differences in social divisions we can predict regional variation in the strength of the association between institutional quality and economic performance. This section raises some issues that could potentially drive the identified results.

### ***5.1 Omitted variables***

Finding the lowest levels of social divisions (as measured here) in Europe and the highest in Africa, a reasonable question is whether the identified interaction effects could be driven by omitted variables related to the level of economic development.<sup>45</sup> Social

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<sup>45</sup> The results of Eicher and Leukert (2006), who find a stronger institutional parameter in non-OECD than in OECD countries, would seem to contradict this idea. However, considering that we focus on different

divisions are negatively correlated with income (see table 4) and if simply splitting the sample at the median level of income and running separate regressions for richer and poorer countries, ignoring the selection issues this involves, we find a larger institutional parameter in the richer sub-sample. With this in mind, we would want to control for the influence of unobserved heterogeneity across countries. The regional dummies included in all estimations so far help control for level effects originating in structural differences among the regions. However, it might well be that omitted variables relating to these differences affect not only the intercept but also the slope terms. To check that this is not what drives the result that countries with high social divisions tend to show a weaker association between institutions and economic performance, we can interact all the regional dummies with our institutions indicator and expose our social division-institution interaction term to these terms (see Table 11).

To begin with let us expose the social division interaction variable to the regional interaction terms, one at a time. We have already seen that the social division interaction term parameter is robust to the inclusion of the institution-Africa and the institution-Europe interaction terms. As it turns out, this pattern holds for the remaining regional interaction terms as well; the parameter of the institutions-social division interaction term remains statistically significant and stable (the parameter ranges from -0.161 to -0.189). The coefficients of the regional interaction terms, on the other hand, are far from statistically significant in these regressions. As noted, including many institutional interaction terms in combination could be problematic due to multicollinearity. Nevertheless, in the final regression (Column 7) we include the social division interaction while at the same time allowing all regions their individual intercept and institutional slope terms. Even so, the social division interaction effect remains statistically significant and remarkably stable.

If still not convinced one might ask whether any multiplicative term between the institutions indicator and an indicator correlated with economic development would generate a similar parameter (however implausible it is that the latter indicator would influence the institutional coefficient). If so, this would seem to suggest that the weaker association between institutions and economic performance found in high social division countries originates in unobserved heterogeneity among countries rather than in having high levels of social divisions per se. Let us consider two small placebo exercises.<sup>46</sup> First, consider an interaction term between the institutions indicator and a dummy for being located in the tropics, which just as social division is negatively correlated with economic performance but should arguably not affect the institutional parameter. As it turns out, this interaction term parameter comes out negative and statistically significant, just as the coefficient of our social division interaction. Second, consider an interaction term between the institutions indicator and a dummy variable that takes the value one if the country's flag contains the colour green. Many African countries have the colour green in their flag and hence this variable too is negatively correlated with economic performance. At the same time it seems fair to say that having a green flag should not influence the association between institutional quality and economic performance. Nevertheless, the

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institutional measures (Eicher and Leukert consider the very wide 'social infrastructure' variable of Hall and Jones 1999, that is an average of the GADP index and the Sachs and Warner openness index, and thus covers law and order, bureaucratic quality, corruption, risk of expropriation, government repudiation of contracts, non-tariff barriers, average tariff rates, black market premium, socialist rule, and monopolisation of major exports) the results are not really comparable. Cavalcanti and Novo (2005) use the same variable as Eicher and Leukert, and measure the returns to institutions at different points in the *conditional* distribution of international incomes, rather than in different income groups in general.

<sup>46</sup> The results are available upon request.

interaction term parameter again comes out negative and is weakly statistically significant.

As it turns out, however, these interaction effects are not stable, and when including the institution-social division interaction term the parameter of neither of these variables is anywhere near statistically significant. The institution-social division interaction term parameter, on the other hand, is statistically significant and stable in the presence of the placebo interaction variables. Also, in contrast to the institution-social division interaction term parameter, which was very robust to the inclusion of the regional interaction terms, the coefficients of the institution-tropical and the institution-greenflag interaction variables are far from statistically significant when allowing the institutional slope term to vary among regions. These exercises demonstrate that while it is easy to pick up a correlation it is more difficult to find a stable relationship. As it seems, unlike the ‘placebo’ interaction variables constructed for the purpose of this exercise, our social division interaction term does not simply pick up the influence of unobserved regional heterogeneity on the institutional coefficient, and hence the level of social divisions appears to carry some information beyond being related to general economic performance.

## ***5.2 Influential observations***

A related question is whether the results are sensitive to influential observations. To check whether the main result is sensitive to extreme values along the dependent variable or the two key explanatory variables (institutions and social divisions), we run a series of regressions where we for the three concerned variables, one at the time, omit the observations in the top and bottom deciles respectively. The negative parameter of the institution-social division interaction term remains statistically significant and relatively stable.<sup>47</sup> The same pattern holds (the negative coefficient of the social division interaction variable remains statistically significant and stable) when excluding the respective regions<sup>48</sup> one at a time. Furthermore, when we identify influential observations that have a particularly large effect on our parameter of interest by using the DFBETA statistic<sup>49</sup> and exclude these when running our regression, the parameter of our social division interaction term remains negative and statistically significant. In fact, it becomes larger in absolute terms,<sup>50</sup> suggesting that the identified observations impede rather than drive the observed relationship. Hence, our main result is seemingly not driven by influential observations.<sup>51</sup>

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<sup>47</sup> The parameter estimates range between -0.15 and -0.19; results are available upon request.

<sup>48</sup> Sub-Saharan Africa, Europe, East Asia and the Pacific, South Asia, the Middle East and Northern Africa, Latin America and the Caribbean, and North America.

<sup>49</sup> The DFBETA statistic is calculated for each observation of the concerned variable. For a particular observation it gives the change in the concerned variable coefficient resulting from omitting the observation, scaling this difference by the estimated standard error of the coefficient when the observation is deleted. The standard cut-off value for DFBETA, above which the observation is considered influential, is the absolute value of  $2/\sqrt{n}$ , where  $n$  is the number of observations. 11 such observations are identified for the institutions-social division interaction term, namely Namibia, Mongolia, Japan, Albania, Bangladesh, Switzerland, Madagascar, Greece, South Africa, Sierra Leone and Botswana.

<sup>50</sup> -0.22 versus -0.17; results are available upon request.

<sup>51</sup> Furthermore inference should not be biased by heteroskedasticity. Visual inspection of the residuals plotted against our key independent variables reveals no apparent trend in the residual variances, and according to the White test we cannot reject the hypothesis of homoskedastic disturbances. Moreover, using robust estimation the institution-social division interaction term parameter remains stable and statistically significant.



### 5.3 *Alternative social division indicators*

To check that the results are not contingent upon the choice of specific ethnic fractionalisation and income inequality measures, let us consider a number of alternative indicators.<sup>52</sup> Using the ethno-linguistic fractionalisation variable used by e.g. Easterly and Levine (1997), the ethnic measure of Fearon (2003), and the language fractionalisation measure of Alesina et al. (2003) produces similar results. Also, if we use Fearon's (2003) measure of cultural diversity, aiming to capture the cultural distance between ethnic groups by estimating the proximity between their languages, the results are again similar. Most importantly, the negative parameter of the interaction term between the fractionalisation and institutions measures remains.

Similarly, if we instead of using the Gini index use the ratio of income or consumption of the richest 10 (and 20) percent of the population to the poorest 10 (and 20) percent; the share of income or consumption of the poorest 10 (and 20) percent of the population; and the share of income or consumption of the richest 10 (and 20) percent of the population, then the parameter of the interaction term between the inequality indicator and the institutions measure is statistically significant and of the expected sign. Hence, the result that the positive association between institutional quality and income is weaker in countries with high ethnic fractionalisation or income inequality seems robust to the use of alternative ethnic fractionalisation and income inequality measures.

### 5.4 *Alternative institutional indicators*

Whether the institutional parameter varies with the level of social divisions should first of all depend on the type of institution considered. In this paper we focus on property rights institutions. It is argued that social divisions should have a negative effect on the perceived and actual inclusiveness of property rights institutions, and that this in turn should act to weaken the association between institutions and economic performance via a coverage and a compliance effect.<sup>53</sup> If we were to focus on another type of institution, these hypothesised linkages would not necessarily be expected to hold.<sup>54</sup> Whether social divisions affect the association between economic performance and specific political institutions would for example be interesting to look at, but lies outside the scope of this paper. Hence, in this section we consider alternative *property rights* indicators.

Second, given that we focus on property rights institutions, the extent to which the institutional parameter varies with the level of social divisions should depend on the specific property rights indicator used. For the reasons discussed above, unless the property rights measure incorporates the inclusiveness of property rights and thus perfectly captures the level of property rights protection experienced by citizens in general, social divisions should have a negative influence on the size of its parameter. It seems fair to argue that it is very difficult to find a property rights proxy that perfectly captures the extent of property rights protection for society as a whole. However, different measures should have varying success on this account. As noted, the ICRG property rights proxy used here focuses explicitly on the situation faced by foreign investors and hence it could hardly be said to take account of the inclusiveness of

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<sup>52</sup> The results are available upon request.

<sup>53</sup> See section 2.

<sup>54</sup> In fact, it does not seem unreasonable to argue that for certain institutional components, such as institutions of political checks and balances preventing capture of power by small elites, the association with economic performance might well be *more* pronounced in countries with deep social divisions.

property rights to any larger extent. The fact that this measure has had a wide impact in the literature on the association between institutional quality and economic performance<sup>55</sup> in spite of its seeming incapability to capture the degree of property rights protection for a broad cross-section of society makes it interesting to study in this context. Ideally, however, one would want to compare the main results one gets when using this indicator to the results obtained when using measures that to varying extents capture the inclusiveness of property rights institutions. Unfortunately, we are confined to the imperfect property rights proxies that are available for a wide range of countries.

We consider two alternative property rights proxies: the property rights indicator that is part of the Heritage Foundation Index of Economic Freedom,<sup>56</sup> and a measure obtained from the World Bank Doing Business indicators capturing the ease of enforcing contracts.<sup>57</sup> Unlike the ICRG measure, these measures do not explicitly focus on the conditions of foreign investors. Nevertheless, they are no doubt based on expert judgements of wide economic and judicial structures rather than on citizen views of property rights protection.

Using the property rights measure from the Heritage Foundation we find some evidence that its parameter varies with the level of social divisions according to the hypothesised pattern; the coefficient of the interaction term between the property rights indicator and the composite social division variable is negative, although only statistically significant at the ten percent level. If we instead of using the composite social division variable include the ethnic fractionalisation and the Gini indicators separately, and interact these with the new property rights measure, we find a negative and statistically significant interaction effect between the property rights measure and the Gini indicator but not between the property rights indicator and the ethnic fractionalisation variable.

Turning to the Doing Business indicator capturing the ease of enforcing contracts, there is some evidence that its parameter varies with the level of social divisions. Again, however, the results are considerably weaker than when using the standard ICRG property rights measure; the interaction term between the enforcing contracts indicator and the composite social division variable is negative, but statistically significant only in some of the estimations. When including the ethnic fractionalisation and the Gini indicators separately, and interacting these with the enforcing contracts measure, we find a negative and statistically significant interaction effect between the enforcing contracts variable and the ethnic fractionalisation measure but not between the enforcing contracts variable and the Gini indicator.<sup>58</sup>

Hence, when using the alternative property rights indicators we find some evidence of the hypothesised parameter variation, but the results are not nearly as strong as when using the standard ICRG property rights proxy. So, what does this tell us? First of all it

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<sup>55</sup> It is used in some of the most (or perhaps *the* most) important papers in the field. See for example Knack and Keefer (1995); Hall and Jones (1999); and Acemoglu, Johnson and Robinson (2001) and (2002).

<sup>56</sup> Here scaled to range from 1 to 10, with 10 meaning stronger property rights. According to the Heritage Foundation, the indicator measures the extent to which 'a country's laws protect private property rights and the degree to which its government enforces those laws. It also assesses the likelihood that private property will be expropriated and analyzes the independence of the judiciary, the existence of corruption within the judiciary, and the ability of individuals and businesses to enforce contracts'. See: <http://www.heritage.org/research/features/index/index.cfm>.

<sup>57</sup> The Doing Business indicators rank 178 countries in terms of the ease of doing business. The particular measure used here considers the rankings of the sample countries on the 'enforcing contracts' component (but rescaled and adjusted so that a higher value means it is easier to enforce contracts), which should measure the efficiency of the judicial system in resolving commercial disputes. See <http://www.doingbusiness.org/economyrankings/>.

<sup>58</sup> The results are available upon request.

seems to indicate that, as expected, the extent to which the institutional parameter varies with the level of social divisions depends on the specific property rights indicator used. Out of these measures, the ICRG indicator seems to be the most problematic in terms of lacking inclusiveness, considering that it is focused on the situation of foreign investors. Hence, it should come as no surprise that the negative interaction effect between institutions and social divisions is most pronounced when using this measure. The implication for empirical investigation is that when using a measure that is focused on the property rights for only a narrow segment of the economy (which has in fact been standard in the literature) while aiming to draw conclusions on the general association between economic performance and the strength of property rights institutions, it is particularly important to evaluate whether there is institutional parameter variation along a social division dimension. In more general terms, the results suggest that one should carefully evaluate the extent to which an institutions indicator captures the institutional framework that applies to a broad cross-section of the population, and that one should take steps to deal with how a failure of the institutions measure to do so could affect one's conclusions. Moreover, we can note that all the property rights indicators considered here are based on expert judgements of economic and judicial structures faced by investors. If what matters for economic decisions of individuals in this context is the perceived degree of property rights protection, then maybe the existing indicators should be complemented with survey-based property rights measures capturing citizen views on the extent of property rights protection.

## **6 Conclusions**

This paper investigated the hypothesis that the observed association between the strength of property rights institutions and economic performance is weaker in countries marked by social divisions. The hypothesis was based on the argument that social divisions should have a negative influence on the inclusiveness of property rights institutions, which, if lacking a property rights indicator that perfectly captures the inclusiveness of property rights protection, in turn should reduce the strength of the observed association between property rights institutions and economic performance.

In line with the social division hypothesis, the results suggested a weaker association between property rights institutions and economic performance in countries with high social divisions, as measured in terms of ethnic fractionalisation, income inequality and a composite social division indicator, and indicated that social divisions could bear some relevance for explaining observed regional variation in the institutional parameter.

The findings were robust to controlling for the influence of omitted variables relating to structural differences between regions by allowing each region its own intercept and institutional slope term. They also survived the exclusion of influential observations, and the use of alternative ethnic fractionalisation and income inequality indicators. When using alternative property rights indicators we found some evidence of the hypothesised parameter variation, but the results were not as strong as when using the standard ICRG property rights proxy. This underlines the importance of allowing for institutional parameter variation along a social division dimension when using a measure focusing on the property rights for a narrow segment of the economy to draw conclusions on the general association between economic performance and the strength of property rights institutions. It also highlights the need to carefully evaluate the extent to which an institutions indicator captures the institutional framework that applies to a broad cross-section of the population.

Further research is needed to uncover the mechanisms behind the weaker observed association between property rights institutions and economic performance in countries with deep social divisions. For example, would a property rights measure that better captures the strength of property rights institutions for a broader segment of the population (such as a survey-based indicator based on the views of ordinary citizens) produce less institutional parameter heterogeneity along the investigated social division dimension? Moreover, considering alternative social division and institutional dimensions should provide interesting openings for future research. It would, for example, be interesting to look at whether social divisions affect the association between economic performance and institutions other than property rights, such as specific political institutions. Similarly, ethnic fractionalisation and income inequality surely do not capture the entire range of possible societal dividing lines and other aspects, such as the degree of gender inequality, seem interesting to consider in this context.

In sum, the results of this paper highlighted the problems with neglecting institutional parameter heterogeneity along a social division dimension, particularly when using property rights measures that focus on very limited segments of economic actors. In wider terms, the findings demonstrated the necessity of taking account of context specific effects when studying the association between institutions and economic performance. In a cross-country framework taking systematic institutional parameter variation into account should constitute a first step in the right direction. Taken one step further, however, the results could be taken to suggest a need for the literature to shift away from the cross-country framework altogether and to rely to a greater extent on case studies and other micro-based work.

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## APPENDIX

Table 1: Variables

Variable	Description	Source
Africa	1 if country belongs to Sub-Saharan Africa, 0 otherwise	Global Development Network Growth Database
Ethnic	Measures the probability that two randomly selected individuals in a country belong to different ethnic groups.	Alesina et. al. (2003)
Ethnic2	Ethnic squared	
Europe	1 if country belongs to Europe, 0 otherwise	
Gini	Gini index, 0-100, (year of measurement varies among countries; see HDR)	Human Development Report (HDR) 2005
Gini2	Gini squared	
Institutions	Valuation of the risk of 'outright confiscation and forced nationalization' of property. Ranges from 1-10, with higher values meaning less risk of expropriation. Here measured as the 1982-1997 average.	Obtained from Glaeser et al. (2004). Originally developed by the International Country Risk Guide (ICRG)
Inst-Africa	Institutions * Africa	
Inst-Ethnic	Institutions * Ethnic	
Inst-Europe	Institutions * Europe	
Inst-Gini	Institutions * Gini	
Inst-Socdiv	Institutions * Socdiv	
Landlocked	1 if country is landlocked, 0 otherwise	Global Development Network Growth Database
Latitude	Latitude in degrees	Global Development Network Growth Database
Log GDP per capita	Log GDP per capita (PPP terms) in 2000	World Development Indicators (WDI)
Socdiv	The first principal component between Ethnic and Gini	
Socdiv2	Socdiv squared	
Trade share	(exports+ imports) / GDP, averaged over the 1990s	World Development Indicators (WDI)
Tropical	1 if country is tropical, 0 otherwise	Global Development Network Growth Database
War	1 if involved in a civil war between 1960 and 1999, 0 otherwise (civil war defined as an internal conflict with at least 1000 battle-related deaths per year)	Constructed from Collier and Hoeffler (2004)

Table 2: Benchmark sample with descriptive statistics for key variables

Country	Log GDP p.c.	Institutions	Ethnic	Gini	Socdiv
Albania	8.22	7.26	0.22	28.20	-1.25
Algeria	8.58	6.76	0.34	35.30	-0.57
Argentina	9.40	6.31	0.26	52.20	0.22
Australia	10.15	9.38	0.09	35.20	-1.13
Austria	10.26	9.74	0.11	30.00	-1.40
Bangladesh	7.34	5.41	0.05	31.80	-1.43
Belgium	10.21	9.69	0.56	25.00	-0.69
Bolivia	7.78	5.60	0.74	44.70	0.87
Botswana	9.03	8.01	0.41	63.00	1.19
Brazil	8.88	7.88	0.54	59.30	1.27
Bulgaria	8.71	9.04	0.40	31.90	-0.63
Burkina Faso	6.89	4.85	0.74	48.20	1.07
Cameroon	7.54	6.46	0.86	44.60	1.14
Canada	10.22	9.72	0.71	33.10	0.14
Chile	9.12	7.80	0.19	57.10	0.35
China	8.28	8.11	0.15	44.70	-0.44
Colombia	8.69	7.35	0.60	57.60	1.31
Costa Rica	9.01	7.04	0.24	46.50	-0.15
Cote d'Ivoire	7.37	7.06	0.82	44.60	1.05
Denmark	10.26	9.72	0.08	24.70	-1.76
Dominican Republic	8.80	6.36	0.43	47.40	0.33
Ecuador	8.08	6.76	0.66	43.70	0.62
Egypt	8.17	6.80	0.18	34.40	-0.97
El Salvador	8.43	5.21	0.20	53.20	0.15
Ethiopia	6.70	6.05	0.72	30.00	-0.02
Finland	10.16	9.72	0.13	26.90	-1.53
France	10.16	9.71	0.10	32.70	-1.25
Gambia	7.40	8.38	0.79	47.50	1.14
Germany	10.14	9.89	0.17	28.30	-1.36
Ghana	7.56	6.22	0.67	40.80	0.50
Greece	9.74	7.48	0.16	35.40	-0.97
Guatemala	8.31	5.16	0.51	59.90	1.24
Guinea	7.59	6.67	0.74	40.30	0.61
Guinea-Bissau	6.76	4.62	0.81	47.00	1.16
Honduras	7.96	5.41	0.19	55.00	0.23
Hong Kong, China	10.17	8.49	0.06	43.40	-0.72
Hungary	9.46	9.08	0.15	26.90	-1.48
India	7.77	8.07	0.42	32.50	-0.56
Indonesia	7.97	7.48	0.74	34.30	0.26
Iran	8.67	4.69	0.67	43.00	0.61
Ireland	10.27	9.72	0.12	35.90	-1.03
Israel	10.04	8.51	0.34	35.50	-0.55



Table 2 - *Continued*

Country	Log GDP p.c.	Institutions	Ethnic	Gini	Socdiv
Italy	10.14	9.46	0.11	36.00	-1.04
Jamaica	8.19	7.04	0.41	37.90	-0.26
Japan	10.17	9.72	0.01	24.90	-1.91
Jordan	8.32	6.56	0.59	36.40	0.06
Kenya	6.94	6.41	0.86	42.50	1.01
Korea	9.69	8.57	0.00	31.60	-1.54
Madagascar	6.74	4.69	0.88	47.50	1.35
Malawi	6.37	6.86	0.67	50.30	1.05
Malaysia	9.06	8.15	0.59	49.20	0.79
Mali	6.67	4.00	0.69	50.50	1.10
Mexico	9.13	7.47	0.54	54.60	1.00
Mongolia	7.33	7.95	0.37	30.30	-0.80
Morocco	8.18	6.71	0.48	39.50	0.00
Mozambique	6.68	6.81	0.69	39.60	0.47
Namibia	8.67	5.40	0.63	70.70	2.14
Netherlands	10.26	9.98	0.11	30.90	-1.35
New Zealand	9.90	9.74	0.40	36.20	-0.39
Nicaragua	8.04	5.29	0.48	43.10	0.21
Niger	6.52	5.55	0.65	50.50	1.01
Nigeria	6.75	5.30	0.85	50.60	1.46
Norway	10.44	9.85	0.06	25.80	-1.75
Pakistan	7.54	6.15	0.71	33.00	0.12
Panama	8.71	6.06	0.55	56.40	1.13
Papua New Guinea	7.76	7.74	0.27	50.90	0.18
Paraguay	8.32	6.90	0.17	57.80	0.35
Peru	8.46	6.21	0.66	49.80	0.98
Philippines	8.30	5.79	0.24	46.10	-0.17
Poland	9.26	7.81	0.12	34.10	-1.14
Portugal	9.81	9.01	0.05	38.50	-1.04
Romania	8.68	7.56	0.31	30.30	-0.93
Russian Federation	8.85	8.50	0.25	31.00	-1.03
Senegal	7.26	5.93	0.69	41.30	0.57
Sierra Leone	6.14	5.71	0.82	62.90	2.10
South Africa	9.08	7.35	0.75	57.80	1.66
Spain	10.01	9.55	0.42	32.50	-0.56
Sri Lanka	8.14	6.54	0.42	33.20	-0.52
Sweden	10.18	9.50	0.06	25.00	-1.80
Switzerland	10.35	9.99	0.53	33.10	-0.27
Tanzania	6.26	6.89	0.74	38.20	0.48
Thailand	8.75	7.64	0.63	43.20	0.55
Trinidad & Tobago	9.11	7.29	0.65	40.30	0.41
Tunisia	8.74	6.51	0.04	39.80	-0.98

Table 2 - *Continued*

Country	Log GDP p.c.	Institutions	Ethnic	Gini	Socdiv
Turkey	8.77	7.29	0.32	40.00	-0.34
Uganda	7.06	4.80	0.93	43.00	1.20
UK	10.19	9.76	0.12	36.00	-1.02
USA	10.45	9.98	0.49	40.80	0.08
Uruguay	9.08	6.94	0.25	44.60	-0.23
Venezuela	8.66	7.11	0.50	49.10	0.58
Vietnam	7.61	6.95	0.24	37.00	-0.70
Zambia	6.67	6.67	0.78	52.60	1.42
Zimbabwe	7.82	6.03	0.39	56.80	0.78

Table 3: Summary statistics for key variables

Full sample					
Variable	Obs	Mean	Std. Dev.	Min	Max
Log GDP p.c.	93	8.56	1.21	6.14	10.45
Institutions	93	7.37	1.59	4.00	9.99
Ethnic	93	0.43	0.27	0.00	0.93
Gini	93	41.56	10.29	24.70	70.70
Socdiv	93	0.00	1.00	-1.91	2.14
Africa					
Variable	Obs	Mean	Std. Dev.	Min	Max
Log GDP p.c.	24	7.19	0.81	6.14	9.08
Institutions	24	6.11	1.09	4.00	8.38
Ethnic	24	0.73	0.13	0.39	0.93
Gini	24	48.37	9.10	30.00	70.70
Socdiv	24	1.07	0.50	-0.02	2.14
Europe					
Variable	Obs	Mean	Std. Dev.	Min	Max
Log GDP p.c.	23	9.76	0.67	8.22	10.44
Institutions	23	9.10	0.94	7.26	9.99
Ethnic	23	0.20	0.15	0.05	0.56
Gini	23	31.27	4.46	24.70	40.00
Socdiv	23	-1.11	0.42	-1.80	-0.27

Table 4: Correlation Coefficients

	GDP	Inst	Ethnic	Gini	Socdiv	Africa	Europe	Inst- Ethnic	Inst- Gini	Inst- Socdiv	Inst- Africa	Inst- Europe
GDP	1.00											
Inst	0.79	1.00										
Ethnic	-0.66	-0.54	1.00									
Gini	-0.39	-0.56	0.40	1.00								
Socdiv	-0.63	-0.66	0.84	0.84	1.00							
Africa	-0.68	-0.47	0.67	0.39	0.63	1.00						
Europe	0.57	0.63	-0.50	-0.58	-0.64	-0.34	1.00					
Inst- Ethnic	-0.44	-0.22	0.92	0.27	0.71	0.51	-0.38	1.00				
Inst- Gini	0.27	0.30	-0.03	0.59	0.34	-0.01	-0.12	0.14	1.00			
Inst- Socdiv	-0.64	-0.66	0.82	0.83	0.98	0.58	-0.69	0.72	0.36	1.00		
Inst- Africa	-0.64	-0.39	0.64	0.38	0.61	0.98	-0.33	0.54	0.07	0.57	1.00	
Inst- Europe	0.59	0.66	-0.50	-0.58	-0.64	-0.34	0.99	-0.38	-0.10	-0.70	-0.33	1.00

Table 5: Institutional parameter heterogeneity along an ethnic fractionalisation dimension

Dependent variable is log GDP per capita (PPP terms) in 2000

	(1)	(2)	(3)	(4)	(5)	(6)
Constant	6.463*** (1.006)	5.862*** (0.899)	6.231*** (0.910)	6.191*** (0.890)	5.078*** (1.063)	4.996*** (1.103)
Institutions	0.367*** (0.069)	0.560*** (0.095)	0.561*** (0.096)	0.557*** (0.094)	0.577*** (0.096)	0.586*** (0.101)
Ethnic	-0.654* (0.365)	1.708 (1.261)	2.061 (1.259)	2.522** (1.250)	2.901** (1.234)	3.452 (2.199)
Latitude	-0.003 (0.004)		-0.007* (0.004)	-0.008** (0.004)	-0.005 (0.004)	-0.005 (0.004)
Landlocked	-0.271 (0.173)		-0.224 (0.170)	-0.259 (0.167)	-0.298* (0.165)	-0.310* (0.170)
Tropical	-0.217 (0.240)		0.006 (0.222)	-0.165 (0.232)	-0.179 (0.229)	-0.187 (0.231)
Trade share	0.002 (0.002)			0.004** (0.002)	0.003 (0.002)	0.003 (0.002)
Gini	0.019* (0.010)				0.021** (0.009)	0.020** (0.010)
War	-0.151 (0.158)				-0.158 (0.150)	-0.169 (0.155)
Ethnic2						-0.419 (1.378)
Inst-Ethnic		-0.349** (0.165)	-0.402** (0.166)	-0.457*** (0.165)	-0.486*** (0.162)	-0.514*** (0.187)
Regional dummies <sup>3</sup>	yes	yes	yes	yes	yes	yes
Observations	93	93	93	93	93	93
R-square	0.82	0.81	0.82	0.83	0.84	0.84

<sup>1</sup>Standard errors in parentheses<sup>2</sup>\* indicates statistical significance at the 10% level, \*\* at the 5%, and \*\*\* at the 1% level<sup>3</sup>Refers to the dummies for (Sub-Saharan) Africa, Europe, East Asia Pacific, South Asia, the Middle East and North Africa, and Latin America and the Caribbean (North America is used as a benchmark).

Table 6: Institutional parameter heterogeneity along an income inequality dimension

Dependent variable is log GDP per capita (PPP terms) in 2000						
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	8.278*** (1.586)	1.093 (1.607)	1.320 (1.615)	1.589 (1.620)	2.483 (1.642)	2.018 (2.891)
Institutions	0.348*** (0.070)	0.978*** (0.195)	0.991*** (0.200)	0.967*** (0.200)	0.922*** (0.197)	0.951*** (0.246)
Gini	-0.055 (0.051)	0.113*** (0.033)	0.119*** (0.033)	0.115*** (0.033)	0.112*** (0.033)	0.127 (0.087)
Latitude	-0.004 (0.004)		-0.004 (0.004)	-0.005 (0.004)	-0.006 (0.004)	-0.006 (0.004)
Landlocked	-0.277 (0.172)		-0.260 (0.167)	-0.278* (0.167)	-0.306* (0.165)	-0.307* (0.166)
Tropical	-0.168 (0.240)		-0.208 (0.209)	-0.306 (0.220)	-0.134 (0.230)	-0.138 (0.232)
Trade share	0.002 (0.002)			0.002 (0.002)	0.002 (0.002)	0.002 (0.002)
Ethnic	-0.594 (0.365)				-0.613* (0.348)	-0.621* (0.353)
War	-0.166 (0.157)				-0.155 (0.150)	-0.152 (0.152)
Gini2	0.001 (0.001)					-0.000 (0.001)
Inst-Gini		-0.012*** (0.004)	-0.014*** (0.005)	-0.014*** (0.005)	-0.013*** (0.004)	-0.014** (0.005)
Regional dummies <sup>3</sup>	yes	yes	yes	yes	yes	yes
Observations	93	93	93	93	93	93
R-square	0.83	0.82	0.83	0.83	0.84	0.84

<sup>1</sup>Standard errors in parentheses

<sup>2</sup>\* indicates statistical significance at the 10% level, \*\* at the 5%, and \*\*\* at the 1% level

<sup>3</sup>Refers to the dummies for (Sub-Saharan) Africa, Europe, East Asia Pacific, South Asia, the Middle East and North Africa, and Latin America and the Caribbean (North America is used as a benchmark).

Table 7: Institutional parameter heterogeneity along a composite social division dimension

Dependent variable is log GDP per capita (PPP terms) in 2000

	(1)	(2)	(3)	(4)	(5)	(6)
Constant	7.053*** 7.210***	6.032***	6.717***	6.921***	7.169***	
	(0.844)	(0.728)	(0.770)	(0.758)	(0.784)	(0.787)
Institutions	0.341***	0.441***	0.404***	0.371***	0.346***	0.342***
	(0.071)	(0.062)	(0.063)	(0.063)	(0.066)	(0.067)
Socdiv	-0.002	1.082***	1.182***	1.206***	1.239***	1.034**
	(0.132)	(0.369)	(0.364)	(0.356)	(0.356)	(0.442)
Latitude	-0.005		-0.008*	-0.009**	-0.009**	-0.009**
	(0.004)		(0.004)	(0.004)	(0.004)	(0.004)
Landlocked	-0.249		-0.236	-0.271	-0.297*	-0.279
	(0.180)		(0.170)	(0.167)	(0.168)	(0.170)
Tropical	-0.335		-0.121	-0.269	-0.237	-0.219
	(0.246)		(0.224)	(0.229)	(0.230)	(0.232)
Trade share	0.003			0.004**	0.003*	0.003*
	(0.002)			(0.002)	(0.002)	(0.002)
War	-0.176				-0.183	-0.159
	(0.164)				(0.152)	(0.156)
Socdiv2						0.063
						(0.080)
Inst-Socdiv		-0.143***	-0.162***	-0.169***	-0.170***	-0.144**
		(0.046)	(0.047)	(0.046)	(0.046)	(0.057)
<b>Regional dummies<sup>3</sup></b>	<b>yes</b>	<b>yes</b>	<b>yes</b>	<b>yes</b>	<b>yes</b>	<b>yes</b>
Observations	93	93	93	93	93	93
R-square	0.80	0.81	0.82	0.83	0.83	0.84

<sup>1</sup>Standard errors in parentheses

<sup>2</sup>\* indicates statistical significance at the 10% level, \*\* at the 5%, and \*\*\* at the 1% level

<sup>3</sup>Refers to the dummies for (Sub-Saharan) Africa, Europe, East Asia Pacific, South Asia, the Middle East and North Africa, and Latin America and the Caribbean (North America is used as a benchmark).

Table 8: Regional variation in the institutional parameter: the case of Africa

Dependent variable is log GDP per capita (PPP terms) in 2000					
	(1)	(2)	(3)	(4)	(5)
Constant	6.463*** (1.006)	5.458*** (0.844)	5.938*** (0.882)	6.009*** (0.867)	5.576*** (1.068)
Institutions	0.367*** (0.069)	0.495*** (0.075)	0.468*** (0.078)	0.448*** (0.077)	0.458*** (0.080)
Africa	-1.703*** (0.539)	-0.010 (1.088)	0.053 (1.102)	0.206 (1.085)	0.239 (1.051)
Europe	-0.415 (0.447)	-0.202 (0.431)	-0.140 (0.430)	-0.229 (0.425)	-0.360 (0.438)
Latitude	-0.003 (0.004)		-0.005 (0.004)	-0.006 (0.004)	-0.004 (0.004)
Landlocked	-0.271 (0.173)		-0.230 (0.178)	-0.266 (0.176)	-0.312* (0.170)
Tropical	-0.217 (0.240)		-0.192 (0.220)	-0.351 (0.230)	-0.185 (0.235)
Trade share	0.002 (0.002)			0.004** (0.002)	0.002 (0.002)
Ethnic	-0.654* (0.365)				-0.699* (0.358)
Gini	0.019* (0.010)				0.019** (0.010)
War	-0.151 (0.158)				-0.116 (0.155)
Inst-Africa		-0.211 (0.134)	-0.231* (0.135)	-0.255* (0.133)	-0.274** (0.128)
Regional dummies <sup>3</sup>	yes	yes	yes	yes	yes
Observations	93	93	93	93	93
R-square	0.82	0.79	0.80	0.81	0.83

<sup>1</sup>Standard errors in parentheses

<sup>2</sup>\* indicates statistical significance at the 10% level, \*\* at the 5%, and \*\*\* at the 1% level

<sup>3</sup>Refers to the additional regional dummies included on top of the (Sub-Saharan) Africa and the Europe dummy: that is, the dummy for East Asia Pacific, South Asia, the Middle East and North Africa, and Latin America and the Caribbean (North America is used as a benchmark).

Table 9: Regional variation in the institutional parameter: the case of Europe

Dependent variable is log GDP per capita (PPP terms) in 2000					
	(1)	(2)	(3)	(4)	(5)
Constant	6.463*** (1.006)	6.591*** (0.808)	7.544*** (0.878)	7.645*** (0.869)	7.344*** (1.058)
Institutions	0.367*** (0.069)	0.380*** (0.071)	0.309*** (0.075)	0.287*** (0.075)	0.286*** (0.077)
Europe	-0.415 (0.447)	-2.266 (1.446)	-3.269** (1.466)	-3.264** (1.448)	-3.389** (1.402)
Africa	-1.703*** (0.539)	-1.730*** (0.502)	-1.883*** (0.566)	-1.894*** (0.559)	-1.998*** (0.542)
Latitude	-0.003 (0.004)		-0.006 (0.004)	-0.007* (0.004)	-0.005 (0.004)
Landlocked	-0.271 (0.173)		-0.262 (0.178)	-0.289 (0.176)	-0.334* (0.171)
Tropical	-0.217 (0.240)		-0.294 (0.218)	-0.434* (0.230)	-0.269 (0.235)
Trade share	0.002 (0.002)			0.003* (0.002)	0.002 (0.002)
Ethnic	-0.654* (0.365)				-0.665* (0.356)
Gini	0.019* (0.010)				0.018* (0.010)
War	-0.151 (0.158)				-0.145 (0.154)
Inst-Europe		0.217 (0.149)	0.332** (0.152)	0.323** (0.151)	0.322** (0.145)
Regional dummies <sup>3</sup>	yes	yes	yes	yes	yes
Observations	93	93	93	93	93
R-square	0.82	0.79	0.81	0.81	0.83

<sup>1</sup>Standard errors in parentheses

<sup>2</sup>\* indicates statistical significance at the 10% level, \*\* at the 5%, and \*\*\* at the 1% level

<sup>3</sup>Refers to the additional regional dummies included on top of the (Sub-Saharan) Africa and the Europe dummy: that is, the dummy for East Asia Pacific, South Asia, the Middle East and North Africa, and Latin America and the Caribbean (North America is used as a benchmark).

Table 10: Social divisions and regional variation in the institutional parameter

Dependent variable is log GDP per capita (PPP terms) in 2000						
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	6.285*** (0.934)	7.918*** (0.921)	7.169*** (0.784)	7.449*** (0.955)	7.304*** (0.903)	7.609*** (1.071)
Institutions	0.421*** (0.083)	0.261*** (0.080)	0.346*** (0.066)	0.319*** (0.085)	0.333*** (0.080)	0.303*** (0.097)
Africa	0.059 (1.105)	-1.961*** (0.567)	-2.150*** (0.538)	-2.807** (1.375)	-2.172*** (0.546)	-2.857** (1.391)
Europe	-0.225 (0.458)	-3.235** (1.467)	-0.653 (0.442)	-0.714 (0.459)	-1.116 (1.572)	-1.227 (1.593)
Socdiv	-0.005 (0.131)	-0.006 (0.130)	1.239*** (0.356)	1.381*** (0.450)	1.173*** (0.417)	1.314*** (0.494)
Latitude	-0.006 (0.004)	-0.007 (0.004)	-0.009** (0.004)	-0.009** (0.004)	-0.009** (0.004)	-0.009** (0.004)
Landlocked	-0.285 (0.179)	-0.312* (0.179)	-0.297* (0.168)	-0.290* (0.169)	-0.305* (0.171)	-0.299* (0.172)
Tropical	-0.313 (0.243)	-0.388 (0.242)	-0.237 (0.230)	-0.234 (0.231)	-0.251 (0.236)	-0.249 (0.237)
Trade share	0.003* (0.002)	0.003 (0.002)	0.003* (0.002)	0.003* (0.002)	0.003* (0.002)	0.003* (0.002)
War	-0.146 (0.163)	-0.170 (0.161)	-0.183 (0.152)	-0.194 (0.155)	-0.182 (0.153)	-0.193 (0.156)
Inst-Africa	-0.243* (0.134)			0.085 (0.163)		0.088 (0.164)
Inst-Europe		0.320** (0.151)			0.052 (0.170)	0.058 (0.171)
Inst-Socdiv			-0.170*** (0.046)	-0.189*** (0.059)	-0.161*** (0.054)	-0.180*** (0.065)
Reg. dummies <sup>3</sup>	yes	yes	yes	yes	yes	yes
Observations	93	93	93	93	93	93
R-square	0.81	0.82	0.83	0.83	0.83	0.83

<sup>1</sup>Standard errors in parentheses

<sup>2</sup>\* indicates statistical significance at the 10% level, \*\* at the 5%, and \*\*\* at the 1% level

<sup>3</sup>Refers to the additional regional dummies included on top of the (Sub-Saharan) Africa and the Europe dummy: that is, the dummy for East Asia Pacific, South Asia, the Middle East and North Africa, and Latin America and the Caribbean (North America is used as a benchmark).



Table 11: Allowing the institutional slope term to vary among all regions

Dependent variable is log GDP per capita (PPP terms) in 2000							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Constant	7.449*** (0.955)	7.304*** (0.903)	7.249*** (0.807)	6.916*** (0.811)	7.128*** (0.804)	7.070*** (0.823)	0.038 (30.029)
Institutions	0.319*** (0.085)	0.333*** (0.080)	0.337*** (0.070)	0.372*** (0.070)	0.351*** (0.069)	0.357*** (0.071)	1.070 (3.047)
Socdiv	1.381*** (0.450)	1.173*** (0.417)	1.189*** (0.375)	1.321*** (0.362)	1.231*** (0.360)	1.219*** (0.361)	1.306** (0.581)
Africa	-2.807** (1.375)	-2.172*** (0.546)	-2.199*** (0.552)	-2.103*** (0.538)	-2.137*** (0.543)	-2.105*** (0.551)	4.612 (30.061)
Europe	-0.714 (0.459)	-1.116 (1.572)	-0.638 (0.445)	-0.645 (0.441)	-0.653 (0.444)	-0.622 (0.450)	6.232 (30.048)
EAP	-1.330** (0.517)	-1.273** (0.503)	-1.930 (1.557)	-1.240** (0.499)	-1.265** (0.502)	-1.230** (0.509)	5.309 (30.043)
SA	-1.450** (0.563)	-1.420** (0.565)	-1.409** (0.549)	0.958 (2.074)	-1.363** (0.545)	-1.328** (0.554)	7.814 (30.081)
MENA	-0.734 (0.523)	-0.688 (0.514)	-0.674 (0.500)	-0.586 (0.496)	-0.278 (1.533)	-0.602 (0.509)	6.680 (30.043)
LAC	-0.946* (0.558)	-0.871 (0.529)	-0.886* (0.529)	-0.787 (0.518)	-0.832 (0.522)	-0.359 (1.274)	6.487 (30.039)
Latitude	-0.009** (0.004)	-0.009** (0.004)	-0.009** (0.004)	-0.009** (0.004)	-0.009** (0.004)	-0.009** (0.004)	-0.009* (0.004)
Landlocked	-0.290* (0.169)	-0.305* (0.171)	-0.292* (0.169)	-0.290* (0.167)	-0.296* (0.169)	-0.300* (0.169)	-0.287 (0.176)
Tropical	-0.234 (0.231)	-0.251 (0.236)	-0.210 (0.239)	-0.228 (0.230)	-0.230 (0.233)	-0.240 (0.231)	-0.212 (0.247)
Trade share	0.003* (0.002)	0.003* (0.002)	0.003* (0.002)	0.003* (0.002)	0.003* (0.002)	0.003* (0.002)	0.003* (0.002)
War	-0.194 (0.155)	-0.182 (0.153)	-0.177 (0.154)	-0.141 (0.156)	-0.184 (0.153)	-0.192 (0.155)	-0.151 (0.163)
Inst-Socdiv	-0.189*** (0.059)	-0.161*** (0.054)	-0.162*** (0.049)	-0.179*** (0.046)	-0.169*** (0.046)	-0.166*** (0.047)	-0.177** (0.078)
Inst-Africa	0.085 (0.163)						-0.674 (3.052)
Inst-Europe		0.052 (0.170)					-0.696 (3.052)
Inst-EAP			0.080 (0.177)				-0.657 (3.051)
Inst-SA				-0.346 (0.298)			-1.040 (3.061)
Inst-MENA					-0.054 (0.211)		-0.755 (3.054)
Inst-LAC						-0.067 (0.162)	-0.760 (3.050)
Obs.	93	93	93	93	93	93	93
R-square	0.83	0.83	0.83	0.84	0.83	0.83	0.84

<sup>1</sup>Standard errors in parentheses

<sup>2</sup>\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

<sup>3</sup> EAP refers to East Asia Pacific, SA to South Asia, MENA to the Middle East and Northern Africa, and LAC to Latin America and the Caribbean.

# Preferences for redistribution

## - A country comparison of fairness judgements

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### Abstract

This paper seeks to explain within- and between-country variation in redistributive preferences in terms of self-interest concerns and an input-based concept of fairness, which we examine by looking at the effects of beliefs regarding the causes of income differences. Results of estimations based on data for the US, Sweden, Germany and Hungary indicate that both factors are indeed 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.

**JEL classification:** D63, D31, D01

**Keywords:** Redistribution preferences; fairness.

### 1. Introduction

Rational economic self-interest seemingly fails to explain 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 is puzzling. However, based on a vast experimental literature there is a growing consensus that people are motivated by forces other than self-interest, and particularly so by fairness considerations.<sup>2</sup>

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

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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 and Tungodden (2005) and Clark (1998).

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

<sup>4</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 Van Dijk and Wilke (1994) or Clark (1998).

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, then those who believe that income determinants to a greater degree are 'responsible' should consider the prevailing income distribution fairer and thus be less inclined to support redistribution, whereas those who to a larger extent view them as 'arbitrary' should see the existing income differences as more unfair and accordingly be more supportive of redistribution.<sup>5</sup>

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

As noted, beliefs about the causes of income differences are likely to vary across societies. One reason for this variation could be differences in the redistributive policies pursued by the countries in question, in turn giving country variation in perceived and/or actual income earning possibilities<sup>8</sup>. We examine country variation in beliefs about the causes of income differences, but are primarily interested in the potential variation in the *effect* of these beliefs on preferences for redistribution, which when controlling for country level effect should not depend on how the existing welfare state alters perceived and/or actual income determinants.

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

- i. Both economic self-interest and an input-based fairness concept, where individuals judge the fairness of income determinants*

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<sup>5</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. However, the general formulation put forward here should still hold.

<sup>6</sup> Whether country differences in beliefs about the causes of income differences are due to actual variation in what determines final incomes is an interesting question, but will not be addressed in this paper.

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

<sup>8</sup> See for example the article on multiple welfare states equilibriums by Alesina et al. (2001), where the authors find that more redistribution means that less effort is exerted, which they argue make luck rather than effort a relatively more important income determinant, in turn implying a higher support for redistribution.

*according to their perceived degree of ‘responsibility’, matter for redistributive preferences.*

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

Explicitly relating beliefs about the causes of income differences to redistributive preferences is a relatively new approach in the economic literature. Out of the few previous investigations, our study mostly resembles that of Fong (2001), who to our knowledge is the only one to explicitly distinguish between responsible and arbitrary inputs.<sup>9</sup> She examines a US sample and finds beliefs about causes of income differences to be important (and working in the expected directions) for explaining redistributive preferences. A few other studies also lend support to the importance of an input-based concept of fairness for redistributive preferences. Alesina and La Ferrara (2005) and Piketty (1995), for example, both confirm that in the US, those who believe that society offers equal opportunities to people who put in effort are more averse to redistribution.

However, if there is country variation in beliefs about what causes income differences and in judgements of what income determinants could be considered under individual control one cannot necessarily expect these results to hold outside of the United States. In fact, related research efforts call attention to the need for cross-country comparative work in the area. Based on a comparison of former East and West Germany showing that former East Germans are more in favour of redistribution than West Germans, even when controlling for their lower incomes, Alesina and Fuchs-Schündeln (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. To our knowledge, the only serious cross-country study in the area 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 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 cross-country parameter heterogeneity.

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

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<sup>9</sup> She refers to them as exogenous and discretionary factors.

## 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 US, Sweden, Germany and Hungary.<sup>10</sup> We choose to focus on four countries as we believe this allows for more in-depth cross-country comparison. Furthermore, we deliberately select countries that we think represent different regimes in terms of redistributive attitudes, restricting our attention to Western democracies. Looking at our four-country sample, the US can be taken to 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 dependent variable is the response to the statement, *‘It is the responsibility of the government to reduce the difference in income between people with high incomes and those with low incomes’*, ranging from 1 for *strongly disagree* to 5 for *strongly agree*. In using this variable as our dependent, we have to make the assumption that the responses to the statement actually reflect the degree of redistribution that the respondents want, meaning that people who are more supportive of the statement also desire more redistribution. The fact that responses to this statement are highly correlated with responses to a question about the desired progressiveness or regressiveness of the tax system makes us more confident with regard to this assumption.<sup>13</sup> Figure 1 displays the variation in the responses to the redistributive statement with histograms for each country separately. As seen, there is large variation in expressed support for redistribution, not only within each country but also across countries, with Hungarians and Swedes being the most supportive of redistribution and Americans the least.

<<FIGURE 1 ABOUT HERE>>

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, an individual should according to standard economic thinking want the level of redistribution that maximises the utility derived from his/her current and 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 and expected future relative income. Moreover, it is possible to view redistribution as insurance against income risk (Buchanon and Tullock, 1962). A more risk-averse person should then prefer more redistribution and vice versa, and similarly someone with a high perceived income risk should prefer more redistribution and vice versa. Due to data limitations, however, expected future income, risk aversion and

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<sup>10</sup> 708 observations for the US, 520 for Germany, 747 for Sweden and 791 for Hungary give 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.

perceived income risk are omitted, leaving us with relative income<sup>14</sup> as the only self-interest indicator. 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 associated with fairness concerns. Just as a more homogenous group is likely to be more equal in terms of omitted self-interest variables (such as expected future income), it seems reasonable that they also have more similar beliefs about how much an omitted ‘input’ *does* contribute to income and how much it *should* contribute to income. This ambiguity makes it more suitable to view the included socio-demographic indicators as controls for omitted variables rather than as factors in themselves capturing the influence of either fairness or self-interest concerns. The socio-demographic variables included on top of relative income are level of education, father’s education, self-reported class belonging, sex and age. In addition, the pooled sample estimations include country dummies to capture unexplained country differences in redistribution support, for example originating in an effect (beyond what is captured by differences in beliefs about the causes of income differences) of having different welfare state systems.

To evaluate the potential influence of an input-based fairness concept where individuals judge the fairness of income determinants according to their perceived degree of ‘responsibility’, we need to include variables capturing beliefs about the importance of income determinants that are arguably under a varying degree of individual control.<sup>15</sup> As noted, views on the degree to which an input could be seen as ‘responsible’ are likely to differ among individuals. Some inputs, however, are probably easier to classify than others. Effort, for example, is often put forward as being largely under individual control, whereas factors associated with birth conditions, such as family background, could hardly be seen as something controllable by the individual. However, inputs such as intelligence, skills or talents seem to be more controversial. We include three variables to capture beliefs about the importance of certain factors for determining income differences in society:<sup>16</sup> one looks at beliefs about the importance of effort (arguably a responsible factor), another has to do with the importance of family background (arguably an arbitrary factor outside of individual control), and the third captures the perceived importance of intelligence and skills. How to categorise the latter in terms of ‘responsibility’ is less clear-cut,<sup>17</sup> why the impact of this belief variable on redistributive preferences should

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<sup>14</sup> Household income per adult equivalent divided by the country sample average. Note that the difference between relative income and absolute income is only relevant in pooled sample estimations including all four countries.

<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’). While this might simplify theoretical modelling, we believe that speaking in terms of different *degrees* of responsibility over inputs, where completely arbitrary and entirely responsible are the two extremes, better reflect popular opinions in this context.

<sup>16</sup> As seen in the variable description in the appendix, the belief variables are based on questions asking how important the concerned 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.

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 A1.

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

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

$PR_{ic}$  gives the unobserved redistributive preference of individual  $i$  in country  $c$ ,  $\tilde{y}_{ic}$  captures individual relative income,  $\mathbf{b}_{ic}$  is the vector of belief variables,  $\mathbf{x}_{ic}$  is the vector of socio-demographic variables and  $\varepsilon_{ic}$  is a standard normally distributed error term. Note that the parameters ( $\alpha_c$ ,  $\boldsymbol{\beta}_c$  and  $\boldsymbol{\delta}_c$ ) are allowed to vary across countries.

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

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

The sign of the coefficients reveals the average direction of change in 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.

### 3. Results

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

#### 3.1 Explaining preferences for redistribution

Our first hypothesis 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 redistributive preferences, implies that a higher relative income should give a lower support for redistribution, so that  $\alpha_c < 0$ . The analysis of the second part of the hypothesis, arguing that the effect of beliefs about the causes of income differences differs with the respective inputs' degree of responsibility, rests on accepting the suggested classification of effort as the most 'responsible' input out of the three considered, family background as the least responsible, and intelligence/skills as a less clear-cut one located somewhere between the other two. Then with regard to believing that the concerned inputs are important for determining income, we should have  $\beta_c^{effort} < \beta_c^{skills} < \beta_c^{family}$ ,  $\beta_c^{effort} < 0$  and  $\beta_c^{family} > 0$  (and vice versa if believing that these inputs are *not* important income determinants). Table 1 presents the parameters of the first round of estimations, and

Table 2 presents marginal effects of our focus variables on the probability of a respondent to choose the different responses to the redistributive statement.

<<TABLE 1 ABOUT HERE>>

<<TABLE 2 ABOUT HERE>>

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

Let us first consider the relative income effect. Table 2 shows that, as expected, people with a higher relative income tend to be less supportive of redistribution. The marginal effect of going from a relative income of one-half standard deviation below the mean to a level one-half standard deviation above the mean is a reduction in the probability of agreeing or strongly agreeing with the redistributive statement of around 5% in all samples.

Turning to the effects of holding certain beliefs about what causes income differences, Tables 1 and 2 show that parameters and marginal effects, although not always statistically significant, tend to follow the hypothesised pattern. The marginal effect of believing that effort is rewarded varies among countries, but the pooled sample shows 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 that effort is rewarded thus seems to have a negative impact on the probability of supporting redistribution similar to the effect of a one standard deviation increase in relative income. Moreover, believing family background is important in order to get ahead is, as anticipated, associated with stronger support for redistribution. Again marginal effects differ between countries. For the full sample though, 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 an 8.2 percentage point increase in the ‘strongly agree’ alternative). However, the effect of believing that intelligence and skills are rewarded is, as 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’.

Although not always statistically significant, in all samples the belief parameters capturing the belief that the concerned factor is important for determining income fulfil the hypothesised pattern  $\beta_c^{effort} < \beta_c^{skills} < \beta_c^{family}$ <sup>18</sup>,  $\beta_c^{effort} < 0$  and  $\beta_c^{family} > 0$ . The fact that  $\beta_c^{skills}$  is not statistically significant in the full sample, the US and the Hungarian samples adds support to rather than weakens our reasoning that intelligence/skills is more difficult to classify in terms of responsibility. In general, beliefs that the inputs are *not* important do not to the same extent have a statistically

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<sup>18</sup> A possible exception is Hungary, where the parameter of believing effort to be rewarded is not statistically significant (and breaks the hypothesised pattern), but where we instead find *not* believing effort to be rewarded to have a positive effect, as would be expected.



significant impact on redistributive preferences, but when they do they are of the expected signs. Hence, the pattern displayed by the belief parameters largely supports the hypothesis that the effect of beliefs about the causes of income differences differs with the degree of responsibility assigned to the inputs, as suggested by the input-based fairness concept.

We know from Table 1 that relative income is a statistically significant determinant of support for redistribution. To formally test the joint importance of the belief variables, we performed log likelihood ratio tests where the unrestricted model included them and the restricted model did not. The null-hypothesis, that excluding the belief variables does not affect the explanatory power of the model, could be firmly rejected for all samples. Hence, in line with Hypothesis 1 it seems that both relative income and belief variables matter for explaining redistributive preferences.

### *3.1.2 Socio-demographic dividing lines*

As discussed in Section 2, omitting belief and self-interest variables makes the parameters of the socio-demographic variables somewhat difficult to interpret; do they reflect differences in norms and beliefs among different groups in society, or do they capture self-interest considerations? At any rate, a number of interesting patterns stand out. For example, people with higher education tend to be less supportive of redistribution in all countries except the US. This could reflect higher expected future relative incomes given current relative income for well-educated people with steeper age-earnings profiles, but could also be due to different norms among highly educated people. Similarly, the fact that Americans and Swedes claiming to belong to the upper class tend to be less positive towards the redistributive statement could partially be due to that people belonging to higher social classes have better professional connections and thus face smaller income risks, but could also depend on differences in norms between social groups. The fact that Swedish, German and Hungarian women are more supportive of redistribution 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, something that is not found in the other countries. In line with the reasoning of Alesina and Fuchs-Schündeln (2005) who compares former East and West Germany, this could be due to older cohorts in Hungary having spent more time under a socialist regime, and that societal regimes influence preferences.

### *3.1.3 Dealing with omitted variables*

When interpreting the results one has to consider the potential influence of omitted self-interest and belief variables on our key parameters. Variables that appear important in this context include the self-interest indicators expected future relative income, risk-aversion and perceived income risks, and variables capturing beliefs regarding the importance of a wide range of inputs which could affect income, for example luck, honesty, ethnicity and gender. Since patterns in omitted variables such as these ones are likely to vary among different societal groups, 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, then the estimated relative income coefficient will be larger than its true effect as it also captures some of the effects from expected future income. It is less clear in what direction the omissions of risk aversion and perceived income risks affect the relative income effect. As noted, however, since self-interest indicators are likely to vary among different societal groups, the included socio-demographic variables are likely to pick up some of this influence.

Perhaps more worrying is the possibility that relative income does not only affect redistributive preferences directly, but also via an influence on the beliefs about the importance of an input in explaining 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, then the omission of relevant belief variables is problematic. Our strategy to deal with this relies on the assumption that relative income co-varies with the omitted and the included belief variables in a similar manner. To get a picture of whether relative income affects the beliefs regarding income determinants we run ordered probit regressions with the belief indicators as dependent variables and with relative income and the socio-demographic controls as independent variables (see Tables A2 to A4). In short, with the exception of Hungary, relative income does not seem to be an important determinant of the concerned beliefs in the different countries. If the same goes for the omitted belief variables, then their influence should not be a major problem. Alternatively, in the benchmark redistributive preference 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. When estimating our model without the belief variables (see Table A5) it turns out that in all samples the relative income effect is very similar to that observed when including them. Hence, although 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 redistributive preferences captured by relative income 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 beliefs.<sup>19</sup> Particularly, it seems reasonable that people who 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. More generally, if belief variable effects are influenced by omitted self-interest variables, we expect the relative income effect to differ between groups holding different beliefs about what determines income. To get a picture of the

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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. However, 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.

potential influence of omitted self-interest variables we therefore introduce interaction terms between the belief variables and relative income in a number of estimations (see Table A6). None of the interaction term parameters is statistically significant in the American and Hungarian samples, and including them has no noteworthy effect on the belief and relative income parameters. In Germany and Sweden, however, the interaction term between relative income and believing it is important to be from a wealthy family to get ahead has a statistically significant negative parameter, indicating that the negative relative income effect on redistributive support is stronger among people holding this belief.<sup>20</sup> The estimated effect of believing it is 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. We can nevertheless conclude that both relative income and beliefs about the causes of income differences seem to matter for redistributive preferences, and that they do so according to the pattern suggested in Hypothesis 1. We can, at this stage, also note that there is substantial country variation in redistributive preferences, as well as in the coefficients of our main explanatory variables. We investigate this variation further in the next section.

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

Our second hypothesis stipulates that differences in beliefs about the causes of income differences, as well as differences in the *effects* of these beliefs, both contribute to explain the cross-country variation in redistributive preferences. Let us evaluate this hypothesis in three steps. First we will consider whether beliefs about the causes of income differences differ across countries in a direction consistent with the country variation in redistributive support. Second we will examine whether there is cross-country heterogeneity in the effects of holding certain beliefs regarding what causes income differences on redistributive preferences. Finally we will attempt to complete the analysis by addressing the extent to which the discussed 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 each country sample. Figures 2, 3 and 4 present histograms over the distributions of beliefs about whether effort is rewarded in society, whether intelligence and skills are rewarded, and whether being from a wealthy family is important in order to get ahead. As expected, the belief distributions by no means appear to be identical across countries. To formally test this we perform two-sample Kolmogorov-Smirnov tests of equal cumulative distribution functions.<sup>21</sup> Each country

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

<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 differences in both the location of the distribution and the shape of the distribution.

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 vary across countries.

<<FIGURE 2 ABOUT HERE>>

<<FIGURE 3 ABOUT HERE>>

<<FIGURE 4 ABOUT HERE>>

With effort being classified as the most and family background as the least responsible input, one would predict that the countries least supportive of redistribution will also be the ones that to a greater extent believe that effort is rewarded in society and that family background is not very important for getting ahead (and vice versa for countries more supportive of redistribution). As we can see 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, Figure 4 shows that compared to the other country samples, Americans believe this to be relatively unimportant, whereas Hungarians are the ones who believe this factor to be most important. A similar picture emerges when 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 (see Table A2 to A4).

Considering that Hungary was the country most supportive of redistribution, followed by Sweden, and that the US was the country least supportive of redistribution,<sup>22</sup> the country pattern in beliefs about the causes of income differences seems well in line with the suggested input-based concept of fairness. At this stage it thus seems as though country differences in beliefs about income differences could have some relevance for explaining cross-country differences in redistribution support.

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

Turning to the second step, evaluating possible cross-country heterogeneity in the *effects* of the belief variables on redistributive preferences, the results presented for the separate country sub-samples (see Tables 1 and 2) suggest such heterogeneity to be present. In the US and German samples, believing effort to be rewarded implies an approximate 10 percentage point decrease in the probability of agreeing or strongly agreeing with the redistributive statement. Similarly, in Hungary not believing effort to be rewarded gives a 10 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 conceivable that depending on social background and other circumstances, individuals do not all have the same choice set regarding how

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<sup>22</sup> See Figure 1

much effort to exert. This could be a more commonly held view in Sweden than in the other investigated countries. An alternative interpretation is that Swedes are more concerned about equal outcomes, regardless of the degree of control they believe people have over important income determinants.

Believing it is important to be from a wealthy family to get ahead implies an approximate 15 percentage point increase in the probability of agreeing or strongly agreeing with the redistributive statement in Sweden and the US, while the likelihood of Hungarians to strongly agree goes up by about 10 percentage points. However, in Germany the effect is very small and not statistically significant. According to the reasoning 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 argument that someone who has succeeded in creating wealth should be able to pass this on to his/her children is quite common. The degree of responsibility assigned to an input may not necessarily depend only on perceived *individual* control over that input; conceivably it could also depend on perceived control within a larger entity, such as the family.<sup>23</sup> An alternative interpretation could be that Germans are more libertarian in the sense that they believe a person is entitled to the income he/she earns, irrespective of his/her degree of control over the inputs involved in earning that income.

As already discussed, 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, whereas in Germany it means an 11 percentage point *decrease* in the 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 the two countries differ in the 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.

We formally tested whether the effects of belief variables differ across countries using a number of log-likelihood ratio tests (see Table A7). 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, while the hypothesis of homogenous effects of effort beliefs is only close to being rejected at the 10% level of significance. This suggests there is more agreement across countries on whether effort is a fair income determinant than on whether the other inputs are. The possibility that the effects of beliefs about income differences on redistributive preferences are more similar in some of the investigated countries, possibly because of shared ideas about fairness, is also investigated using a number of different log-likelihood ratio tests. In line with the above discussion, Germany seems to stand out the most in terms of belief parameters.

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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.

Similarly, like the effects of the belief variables, the effects of our socio-demographic 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 relative income, our self-interest indicator. For age and belonging to the working class cross-country parameter homogeneity can be strongly rejected, while for higher education it can be rejected at the ten percent level of significance only. 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 a self-reported belonging to the upper-class, however, the null hypothesis of cross-country parameter homogeneity cannot be rejected at the ten percent level of significance. Turning to our self-interest variable relative income, parameter homogeneity cannot be rejected. Put in relation to the heterogeneity in belief variable effects discussed above, this result is interesting as it might 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, we can conclude that there is cross-country parameter heterogeneity in the effects of our belief variables, but we cannot be sure of what is the basis of this variation. Interpreting the observed heterogeneity in terms of the input-based fairness concept, Germans seem to be the ones who to the greatest extent view the included inputs as being under individual control, followed by Americans and Hungarians. Swedes, on the other hand, seem to be the most reluctant to do so. As noted, however, alternative explanations, such as country differences in the very fairness ideal adhered to or in the concern for incentives effects of redistribution, are conceivable in this context. Leaving open the question of what the cross-country heterogeneity in the belief effects is due to, we can go on to investigate if the observed parameter heterogeneity could help explain the country variation in redistribution support. Controlling for belief variables, relative income and other socio-demographic indicators, Hungary is 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. It also corresponds with Hungarians desiring more redistribution than Germans and Americans. However, considering the limited parameter variation between Hungary and the US, it is unlikely that this could explain their large difference in redistributive support. What this pattern is not in line with, however, is that Germans want more redistribution than Americans, and that Sweden does not top Hungary in terms of redistribution support. The next section discusses these issues further.

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

Let us now turn to the last stage where we address to what extent the identified differences in (1) beliefs and (2) the impacts of these beliefs can explain the large cross-country variation observed in redistributive preferences. Previous literature suggests that differences in people’s beliefs are indeed central in this respect (Alesina and Angeletos, 2005). To get an idea of the relative importance of differences in beliefs and differences in the *effects* of these beliefs for explaining cross-country variation in preferences for redistribution, we evaluate how the marginal effect of belonging to a certain country changes as beliefs and beliefs-country interaction terms

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).

$$\begin{aligned}
 1 \quad PR_{ic} &= \phi' \text{country}_{ic} + \varepsilon_{ic} \\
 2 \quad PR_{ic} &= \phi' \text{country}_{ic} + \beta' \mathbf{b}_{ic} + \varepsilon_{ic} \\
 3 \quad PR_{ic} &= \phi' \text{country}_{ic} + \beta' \mathbf{b}_{ic} + \gamma' \mathbf{b}_{ic} \text{country}_{ic} + \varepsilon_{ic}
 \end{aligned}$$

The results of these estimations are presented in Table 3.

<<TABLE 3 ABOUT HERE>>

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 effect 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 and the Hungarian marginal effects somewhat, but *increases* the German marginal effects. This confirms the picture we got from simply comparing the country levels of redistribution support with their respective belief effects. Hence, it seems as though a relatively large part of the strong support for redistribution in Sweden (compared to the US) could be explained by Swedes assigning a lower degree of responsibility to inputs believed to be important for income determination.<sup>25</sup> 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. However, the stronger support for redistribution in Germany than in the US is even more puzzling, considering that Germans seemingly assign a higher degree of responsibility to inputs believed to determine income.<sup>26</sup>

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 redistributive preferences. 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. 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 redistributive preferences, 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

<sup>25</sup> Or, alternatively, that Swedes are more concerned about equal outcomes or less concerned about incentives effects of redistribution.

<sup>26</sup> Or, alternatively, that Germans tend to be more libertarian or more concerned about incentives effects of redistribution.

concerns. With regard to the latter, we suggested that when judging whether an outcome is fair, people are likely to consider individual actions and traits contributing to the outcome; the more people view these inputs as controllable by the individual, the more they think that they should affect the distribution of income. According to this input-based fairness concept, whether an individual views prevailing income differences as fair or thinks there is a need for redistribution depends on what inputs he/she thinks the income differences are due to, and to what extent he/she views these inputs as 'responsible' in the sense that they are under individual control. To single out these potential influences, we included in our empirical setup beliefs about income determinants arguably under varying degrees of individual control, stipulating that believing a 'responsible' factor to be important for determining income would imply less support for redistribution, whereas believing an input outside individual control to be an important income determinant should bring with it more support for redistribution.

Furthermore, and very importantly, we argued that these beliefs, and their effects, should vary with context. The comparative cross-country perspective was therefore 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, where individuals judge the fairness of income determinants according to their perceived degree of 'responsibility', matter for redistributive preferences. This was supported by the data. As anticipated, relative income had a negative and statistically significant impact on preferences for redistribution in all samples. The effects of the variables capturing beliefs about the causes of income differences followed the hypothesised pattern in all samples, although they were not always statistically significant. As stipulated, believing effort to be rewarded in society had a negative impact on support for redistribution, whereas believing that family background is important for getting ahead was associated with stronger support for redistribution. Also, and as expected, the effect of believing that intelligence and skills (the input arguably most difficult to classify in terms of 'responsibility') are rewarded was more ambiguous, producing mixed results. Although problems of omitted variables made it difficult to pin down the exact magnitude of the effects found, we could conclude that both relative income and beliefs about the causes of income differences matter for explaining redistributive preferences, and that they do so according to hypothesised patterns.

Our second hypothesis put forward that differences in both beliefs about income determinants, and in the effects of these beliefs, should contribute to explain the cross-country variation in redistributive preferences. 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 followed the pattern that would be expected judging from our input-based fairness concept and the observed country variation in redistribution support. Second we demonstrated that the effect of these belief variables on redistribution support varied significantly across countries. The difference between the Swedish and German parameters was striking, perhaps indicating that Swedes are the ones most reluctant to classify the investigated inputs as 'responsible', while Germans appeared to be the ones most prone to do so. Looking at how well (1) differences in beliefs and (2) differences in the effects of beliefs can



explain cross-country variation in redistributive preferences, we concluded that the former can explain some of the variation but leaves much unexplained, and that the latter contribute to explain why Swedes and Hungarians are more pro-redistribution than Americans while making it more puzzling that the German support for redistribution is stronger than the American.

Summing up, our findings 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 differences, both contribute to explain redistributive preferences. The large country variation in redistribution support, and the cross-country parameter heterogeneity displayed, demonstrate the importance of attempting to explain not only 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 status quo, or path dependence, on redistributive preferences. Interestingly, and in contrast to the marked cross-country heterogeneity found in the belief parameters, we could not reject cross-country *homogeneity* in the effect of relative income on redistribution support. This could be taken to suggest that self-interest motives are more ‘fundamental’ than fairness considerations in the sense that they are more context-independent. This too could provide an interesting opening for future research.

## Appendix

<<TABLE A1 ABOUT HERE>>

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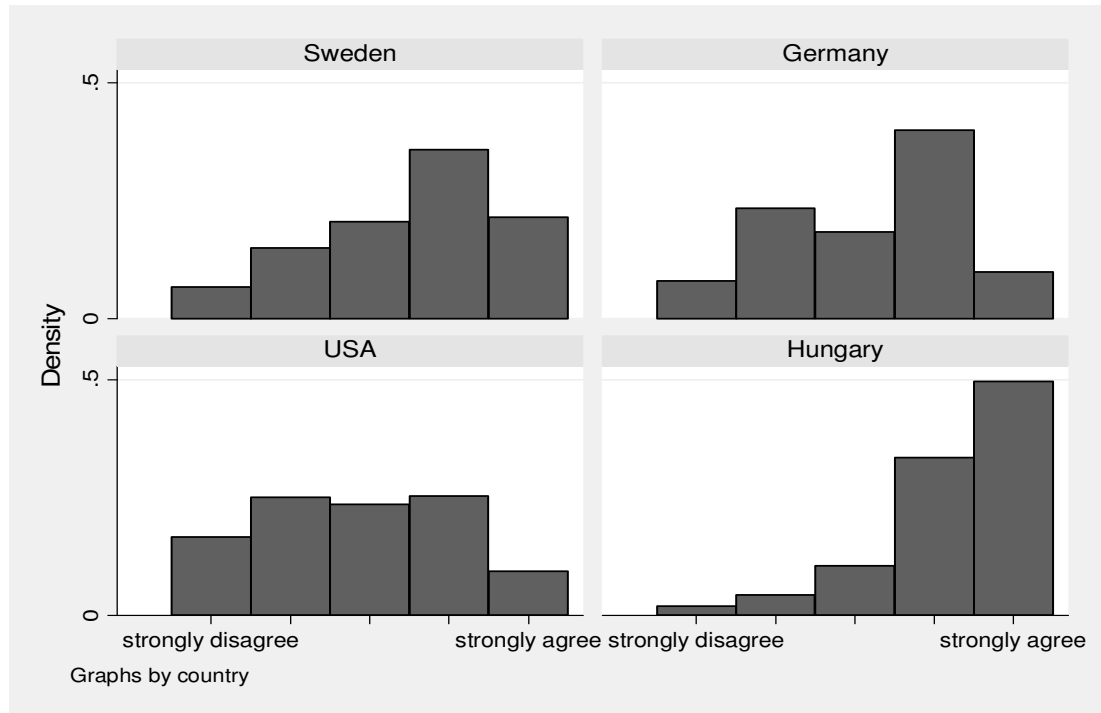
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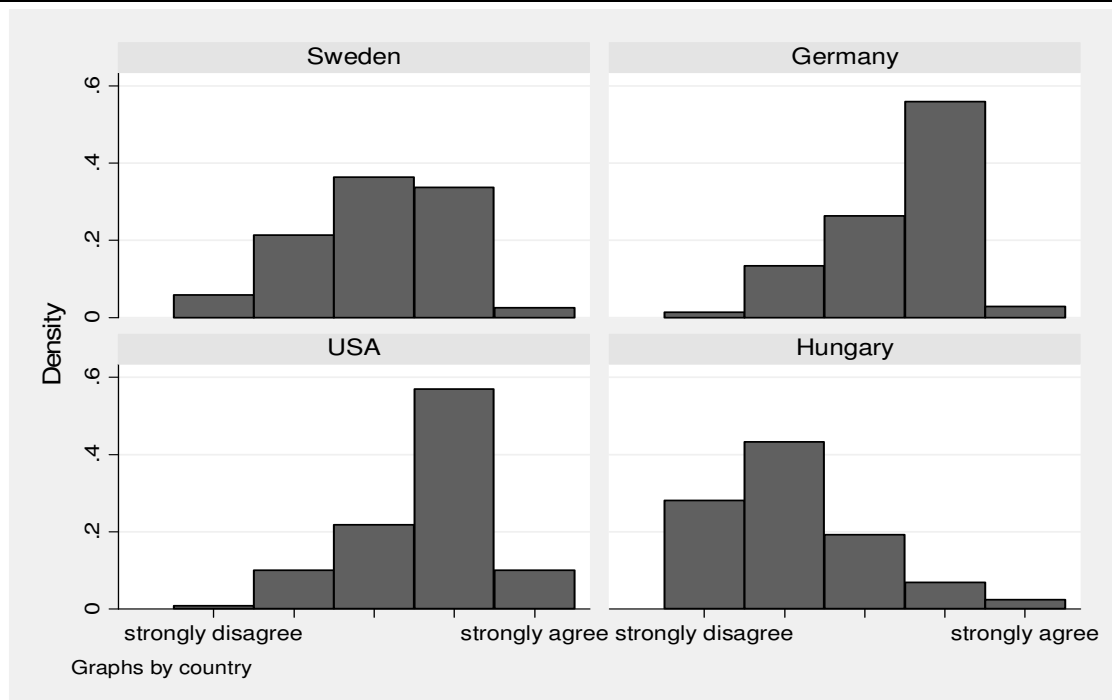
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Figure 1: Distribution of support for government income redistribution



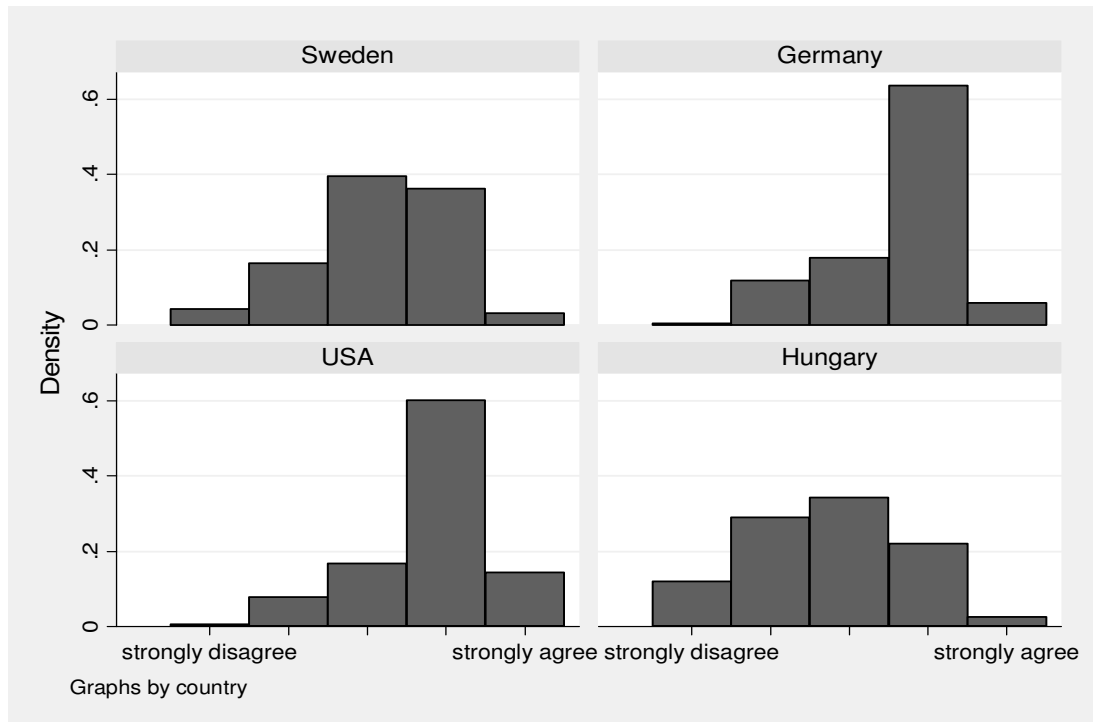
Support for redistribution is measured by the response to the statement, 'It is the responsibility of the government to reduce the difference in income between people with high incomes and those with low incomes', ranging from 1 for *strongly disagree* to 5 for *strongly agree*.

Figure 2: Distribution of belief about whether effort is rewarded



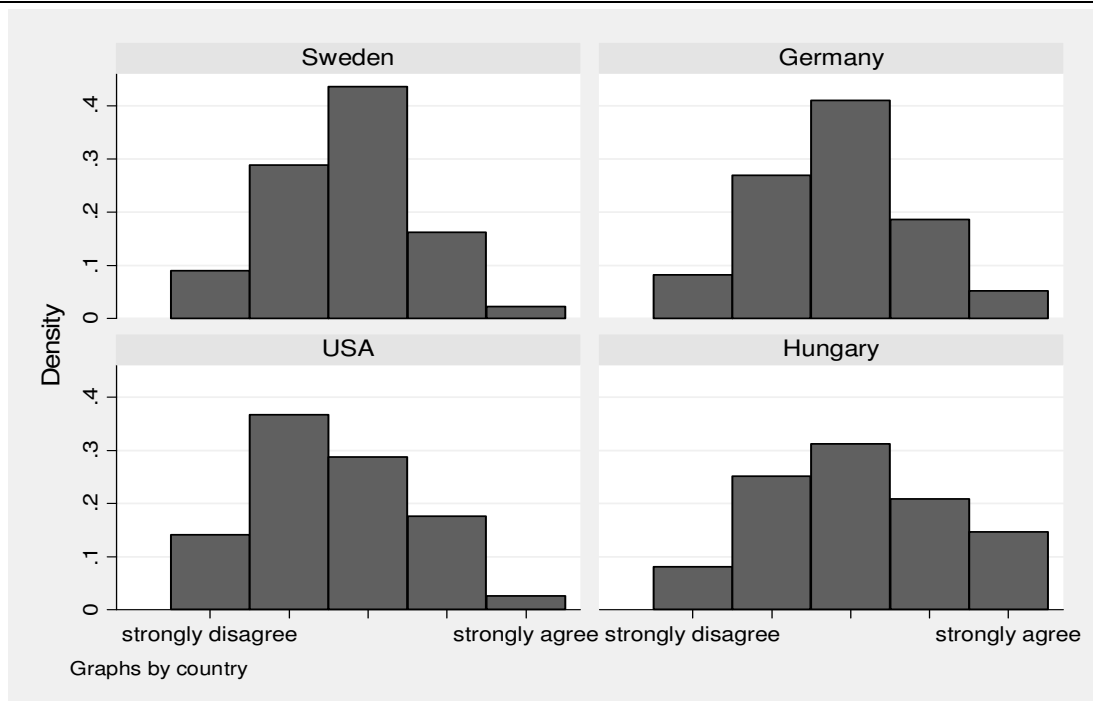
Belief about whether effort is rewarded is measured by the response to the statement, 'In [country] people get rewarded for their effort', ranging from 1 for *strongly disagree* to 5 for *strongly agree*.

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



Belief about whether intelligence and skills are rewarded is measured by the response 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 question, '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: Benchmark estimation of preferences for redistribution

Parameters from ordered probit estimations					
Dependent variable is redistributive preferences <sup>1</sup>					
	Full sample	USA	Germany	Sweden	Hungary
Believe family important <sup>2</sup>	0.278*** (0.056)	0.368*** (0.117)	0.093 (0.124)	0.398*** (0.113)	0.270*** (0.102)
Believe family not important	-0.054 (0.047)	-0.194** (0.094)	0.056 (0.109)	-0.031 (0.087)	0.030 (0.100)
Believe intelligence and skills rewarded	0.003 (0.058)	-0.031 (0.121)	-0.281** (0.139)	0.182* (0.108)	-0.090 (0.113)
Believe intelligence and skills not rewarded	0.003 (0.065)	-0.041 (0.176)	-0.038 (0.185)	0.207 (0.136)	-0.079 (0.097)
Believe effort rewarded	-0.140** (0.059)	-0.280*** (0.109)	-0.292** (0.122)	-0.036 (0.112)	0.026 (0.165)
Believe effort not rewarded	0.139** (0.063)	0.126 (0.159)	-0.098 (0.165)	0.036 (0.127)	0.255** (0.107)
Relative income <sup>3</sup>	-0.162*** (0.030)	-0.168*** (0.063)	-0.130*** (0.049)	-0.239*** (0.067)	-0.168** (0.070)
Age	0.002 (0.001)	-0.002 (0.003)	0.001 (0.003)	-0.003 (0.003)	0.010*** (0.002)
Female	0.238*** (0.042)	0.117 (0.081)	0.320*** (0.097)	0.345*** (0.080)	0.156* (0.082)
Higher education	-0.245*** (0.059)	-0.040 (0.107)	-0.542*** (0.187)	-0.281*** (0.100)	-0.407*** (0.134)
Father has higher education	-0.113* (0.061)	-0.144 (0.109)	-0.111 (0.167)	-0.109 (0.117)	-0.171 (0.118)
Upper class	-0.371*** (0.080)	-0.564** (0.234)	-0.269 (0.167)	-0.371*** (0.110)	0.329 (0.333)
Working class	0.245*** (0.047)	0.134 (0.088)	0.128 (0.107)	0.467*** (0.097)	0.170* (0.093)
Sweden	0.635*** (0.061)				
Germany	0.292*** (0.063)				
Hungary	1.138*** (0.069)				
Cut-point 1	-1,035 (0,107)	-1,483 (0,210)	-1,828 (0,220)	-1,757 (0,193)	-1,574 (0,220)
Cut-point 2	-0,208 (0,103)	-0,654 (0,204)	-0,821 (0,207)	-0,941 (0,183)	-0,993 (0,206)
Cut-point 3	0,401 (0,103)	-0,007 (0,203)	-0,295 (0,205)	-0,270 (0,180)	-0,369 (0,201)
Cut-point 4	1,485 (0,106)	0,961 (0,208)	1,080 (0,212)	0,836 (0,183)	0,682 (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 parentheses. \*\*\* indicates significance at the 1 % level, \*\* at 5 % and \* at 10 % .

<sup>1</sup> Measured by the response to the statement, 'It is the responsibility of the government to reduce the difference in income between people with high incomes and those with low incomes', which can take five possible values ranging from 1 for *strongly disagree* to 5 for *strongly agree*.

<sup>2</sup> For the belief 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 2: Marginal effects of movements in key variables<sup>1</sup> on probability of agreeing with the statement, 'It is the responsibility of the government to reduce the difference in income between people with high incomes and those with low incomes'.

	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 5 % and \* at 10 %.

<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 a ½ standard deviation below the mean to a ½ standard deviation above the mean relative income

Table 3: 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 Beliefs*country
	Sweden	-0.019	-0.031	-0.020	0.016	0.054	
	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 Sociodemographic
	Sweden	-0.050***	-0.104***	-0.077***	0.035***	0.197***	
	Hungary	-0.082***	-0.170**	-0.136***	0.022***	0.366***	
6	Germany	-0.035**	-0.076***	-0.057**	0.027***	0.141***	Beliefs Beliefs*country Socio-demographic
	Sweden	-0.029**	-0.059***	-0.041**	0.028**	0.100**	
	Hungary	-0.067***	-0.144***	-0.112***	0.035***	0.288***	

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

<sup>1</sup> Belief variables are responses to whether effort and intelligence and skills are rewarded, 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 response to the statement, 'It is the responsibility of the government to reduce the difference in income between people with high incomes and those with low incomes', ranging from 1 for strongly disagree to 5 for strongly agree.

Table A1: Variable description

Variable	Description
Preferences for redistribution	The response to the statement, 'It is the responsibility of the government to reduce the difference in income between people with high incomes and those with low incomes'; 1 if respondent chooses strongly disagree, 2 if respondent chooses disagree, 3 if respondent chooses neither agree nor disagree, 4 if respondent chooses agree and 5 if respondent chooses strongly agree.
Believe family important	1 if respondent answers <i>essential</i> or <i>very important</i> to the question, 'For getting ahead, how important is coming from a wealthy family?'; 0 otherwise.
Believe family not important	1 if respondent answers <i>not very important</i> or <i>not important at all</i> to the question, 'For getting ahead, how important is coming from a wealthy family?'; 0 otherwise.
Believe family fairly important	1 if respondent answers <i>fairly important</i> to the question, '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 responds <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 responds <i>disagree</i> or <i>strongly disagree</i> to the statement, ' <i>In [country] people get rewarded for their intelligence and skills</i> '; 0 otherwise.
No strong beliefs about intelligence and skills	1 if respondent responds <i>neither agree nor disagree</i> to the statement, ' <i>In [country] people get rewarded for their intelligence and skills</i> '; 0 otherwise. Used as omitted benchmark category in estimation.
Believe effort rewarded	1 if respondent responds <i>agree</i> or <i>strongly agree</i> to the statement, ' <i>In [country] people get rewarded for their effort</i> '; 0 otherwise.
Believe effort not rewarded	1 if respondent responds <i>disagree</i> or <i>strongly disagree</i> to the statement, ' <i>In [country] people get rewarded for their effort</i> '; 0 otherwise.
No strong beliefs about effort	1 if respondent responds <i>neither agree nor disagree</i> to the statement, ' <i>In [country] people get rewarded for their effort</i> '; 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 0 else
Higher education	1 if respondent has some post secondary school education 0 else
Father has higher education	1 if respondent's father has completed secondary school 0 else
Upper class	1 if respondent's self reported class is <i>upper class</i> or <i>upper middle class</i> 0 else
Working class	1 if respondent's self reported class is <i>working class</i> or <i>lower class</i> 0 else
Middle class	1 if respondent's self reported class is <i>middle class</i> 0 else
Sweden	1 if respondent belongs to the Swedish sample 0 else
Germany	1 if respondent belongs to the German sample 0 else
Hungary	1 if respondent belongs to the Hungarian sample 0 else

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Table A2: Effects on probability of agreeing with the statement, 'In [country] people get rewarded for their effort'.

	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**

The marginal effects are from ordered probit estimations with the explanatory variables: relative income, age, female, higher education, father has higher education, upper class, working class, Sweden, Germany and Hungary.

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

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

Table A3: Effects on probability of answers to the question, 'For getting ahead, how important is coming from a wealthy family?'

	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**

The marginal effects are from ordered probit estimations with the explanatory variables: relative income, age, female, higher education, father has higher education, upper class, working class, Sweden, Germany and Hungary.

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

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

Table A4: Effects on probability of agreement with the statement, ‘In [country] people get rewarded for their intelligence and skills’.

	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

The marginal effects are from ordered probit estimations with the explanatory variables: relative income, age, female, higher education, father has higher education, upper class, working class, Sweden, Germany and Hungary.

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

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

Table A5: 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 incomes’.

	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***

The marginal effects are from ordered probit estimations with the explanatory variables: relative income, age, female, higher education, father has higher education, upper class, working class, Sweden, Germany and Hungary.

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

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

Table A6: 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 (0.058)	0.093* (0.059)	-0.155* (0.085)
	Belief	-0.202** (0.083)	-0.088 (0.059)	0.423*** (0.097)
	Relative income	-0.201*** (0.047)	-0.223*** (0.049)	-0.144*** (0.031)
US sample	Interaction term	-0.095 (0.132)	0.028 (0.150)	-0.045 (0.147)
	Belief	-0.188 (0.168)	-0.056 (0.181)	0.410** (0.179)
	Relative income	-0.096 (0.118)	-0.191 (0.139)	-0.161** (0.067)
German sample	Interaction term	0.063 (0.172)	0.104 (0.168)	-0.420** (0.181)
	Belief	-0.353* (0.207)	-0.392* (0.228)	0.515** (0.220)
	Relative income	-0.188 (0.167)	-0.226 (0.162)	-0.100** (0.051)
Swedish sample	Interaction term	0.071 (0.168)	0.129 (0.128)	-0.403** (0.187)
	Belief	-0.105 (0.168)	0.056 (0.732)	0.775*** (0.208)
	Relative income	-0.269*** (0.087)	-0.296*** (0.088)	-0.182** (0.072)
Hungarian Sample	Interaction term	-0.018 (0.191)	-0.113 (0.162)	0.187 (0.198)
	Belief	0.045 (0.256)	0.014 (0.187)	0.097 (0.209)
	Relative income	-0.165** (0.075)	0.146* (0.077)	-0.190*** (0.074)

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

<sup>1</sup>Support for redistribution is measured by the response to the statement, 'It is the responsibility of the government to reduce the difference in income between people with high incomes and those with low incomes', ranging from 1 for *strongly disagree* to 5 for *strongly agree*.

Table A7: 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, are rewarded, 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 the US	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 US and Germany	Allow belief parameters to vary for each belief and each country	0.014
Restrict belief parameters to be the same in the US and Sweden	Allow belief parameters to vary for each belief and each country	0.168
Restrict belief parameters to be the same in the US 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 response to the statement, ‘It is the responsibility of the government to reduce the difference in income between people with high incomes and those with low incomes’, ranging from 1 for *strongly disagree* to 5 for *strongly agree*.